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**Competition Law for the Digital Era: A
Complex Systems' Perspective**

Ioannis Lianos

Centre for Law, Economics and Society

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Competition Law for the Digital Era: A complex systems' perspective

Ioannis Lianos*

Abstract:

As the global economy incurs a process of transformation by the ongoing 'fourth industrial revolution', competition law is traversing a 'liminal' moment, a period of transition during which the normal limits to thought, self-understanding and behaviour are relaxed, opening the way to novelty and imagination, construction and destruction. There is need for the discussion over the role of competition law in the digital era to be integrated to the broader debate over the new processes of value generation and capture in the era of digital capitalism and the complex economy to which it has given rise to. This complex digital economy is formed by a spider web of economic links, but also their underpinning societal relations, between different agents. However, competition law still lives in the simple world of neo-classical price theory (NPT) economics, which may not provide adequate tools in order to fully comprehend the various dimensions of the competition game. The emphasis put recently by competition authorities on multi-sided markets in order to analyse restrictions of competition in the data economy illustrates the agents' changing roles and the complexity of their interactions, as the same agents can be at the same time consumers and producers while their personal data raw material for the value generation process.

It becomes therefore essential to uncover the new value capture and value generation processes in operation in the digital economy, and draw lessons for the optimal design and enforcement of competition law, rather than take the established competition law framework as a given and try to stretch within it a quite complex reality that may not fit this Procrustean iron bed. These approaches should engage with the complex economics of digital capitalism, and in particular the role of futurity and financialisation, personalisation and cybernetics.

These new developments, first, call for a re-conceptualisation of the goals of competition law in the digital era, as competition law moves from the calm and predictable waters of 'consumer welfare', narrowly defined, to integrate considerations of income/wealth distribution, privacy and complex equality.

Second, it also requires a revision of the current understanding of the nature of the competitive game, which only focuses on horizontal rivalry in product and eventually technology markets. This is of course an important dimension of competition, but hardly the most significant one in the current process of value generation and capture in the digital economy. Firms do not only compete on the product market dimension, but in the today's financialised economy, probably the most important locus of competition is capital markets. The process of financialisation has important implications for the development of digital capitalism, an issue that the paper explores in detail for the first time in competition law and economics scholarship. Financial markets evaluate companies in view of expected returns in

* The paper is a modified version of Chapter 4 of the BRICS Competition Law and Policy Report, Digital Era Competition: A BRICS view (August 30th, 2019), available at <http://bricscompetition.org/upload/iblock/6a1/brics%20book%20full.pdf> . Andrew McLean contributed to Section 3.1.2., and also read through the whole text providing useful comments and suggestions. Azza Raslan read the whole text, and provided useful comments, as well as prepared the various comparative boxes included. The author would also like to thank Igor Kharitonov for excellent research and editorial assistance.

the not so near future, often linked to the emergence of bottlenecks or the perception that a firm holds important assets and resources (e.g. data, algorithms, specialised labour). The role of financial markets' evaluation in driving business strategies in the era of digital and financialised capitalism is linked to the 'subtle shift of mindset' in digital capitalism 'from profit (and isolating mechanisms) to wealth creation (and the potential for asset appreciation)' as value is created by investing in assets that will appreciate.

Third, this calls for a consideration, not only of horizontal competition, but also of vertical competition, the competition for a higher percentage of the surplus value brought by innovation, and competition from complementary technologies that may challenge the lead position in the value chain of the incumbents (vertical innovation competition). Fairness considerations, among other reasons, may also lead competition authorities to not only focus on inter-platform/ecosystem competition but to also promote intra-platform/ecosystem competition, as this may be a significant element of the competitive game.

To implement this broader focus of competition law, we need to develop adequate conceptual tools and methodologies. A recurrent problem is the narrow definition of market power in competition law, whose presence often triggers the competition law assessment, and which is also intrinsically linked to the step of market definition. This currently ignores possible restrictions of vertical competition, personalisation and the predictive role of digital platforms, which may become source of harm for consumers, the competitive process, or the public at large.

It is important to engage with concepts of vertical power and the paper develops a typology of vertical power, combining in an overall conceptual framework the various concepts of non-structural power that have been used so far in competition law literature and some new ones (positional and architectural power). This conceptualisation offers an overall theoretical framework for vertical power that is necessary for sound competition law enforcement, and which has been lacking so far. The paper also explores specific metrics for vertical power, although this is still work in progress.

Another important tool that competition authorities may employ in order to map the complex competitive interactions (horizontal and vertical) in the digital economy is the value chain approach. Although competition authorities have already used this tool in sector/industry inquiries, they have not in competition law adjudication. A value chain approach enables competition authorities to better assess the bargaining asymmetries across the various segments of the value chain that may result either from the lack of competition on the markets affected or from the central position of some actors in the specific network and their positioning in the value chain. This tool may complete the market definition tool.

The effectiveness of competition law in the digital age may be curtailed by the cross-side network effects linked to positive feedback loops, increasing returns to scope and scale, the intense learning effects linked to AI, and the propensity of digital markets to tip. Hence, competition law on its own may not be sufficient to address the market failures in the digital economy. One therefore needs to take a toolkit approach that would combine different fields of law and regulation, competition law playing a primordial role in this new regulatory compass. This toolkit approach may rely on different combinations in each jurisdiction, on the basis of

the institutional capabilities and the relative efficiency of the various regulatory alternatives, any choice being between imperfect, if perceived in isolation, institutional alternatives.

Keywords: competition law, antitrust, digital platforms, ecosystems, network effects, learning effects, multi-sided markets, vertical competition, financialisation, personalised markets, complex systems, Big Data, smart data, digital value chains, vertical power

JEL Codes: K21, K23, L4, L40, L41, L43, L5

Competition Law for the Digital Era: A complex systems' perspective

*Ioannis Lianos***

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1. A complex economy perspective for digital competition law

1.1. Competition law in liminal times: beyond neoclassical price theory

As the global economy is incurring a process of transformation by the ongoing ‘fourth industrial revolution’, competition law is traversing a ‘liminal’ moment, a period of transition during which the normal limits to thought, self-understanding and behaviour are relaxed, opening the way to novelty and imagination, construction and destruction.¹ The development of digital capitalism the last three decades has led to an important ‘information overload’², induced by this rapid revolutionary change. Competition authorities in Europe and elsewhere have been rather slow to react, as they have tried unsuccessfully to deal with the problem by applying industrial capitalism era competition law to the ‘next generation competition’ of the post-industrial informational capitalism.

¹ A van Gennep, *The Rites of Passage* (Psychology Press 1960).

² A. Toffler, *Future Shock* (Random House, 1970).

Most competition authorities and competition law scholars have addressed this process of transformation by focusing on its technological dimension and its impact on business models. Their work usefully explores the ways the existing competition law framework may apply to these new business models, or to these new technologies, in order to address the technological challenges of the moment. Others have attempted to theorize the impact technology may have on the concept of competition in order to show that the current framework might be myopic³. This effort has identified the problem but has not delved that deeply into suggesting a new theoretical framework for competition economics and competition law, and has stopped short in offering new operational concepts that could be integrated in positive law.

All these initiatives to a certain extent strive to address the question of the scope, role and function of competition law in the post-industrial capitalism era. However, they have not so far integrated this question in the broader debate over the new processes of value generation and capture in the era of digital capitalism and the complex economy to which it has given rise to. This complex digital economy is formed by a spider web of economic links, but also their underpinning societal relations, between different agents. As we will explore in the following Section, in order to understand this emergent non-deterministic behaviour of such complex system, one needs to refer to concepts such as increasing returns, leverage points, tipping points and path dependence⁴.

However, competition law still lives in the simple world of neo-classical price theory (NPT) economics, which may not provide adequate tools in order to fully comprehend the various dimensions of the competition game and to guide public policy and competition law enforcement in the digital age and the complex interactions between economic actors that these new technologies enable. The emphasis put recently by competition authorities on multi-sided markets in order to analyse restrictions of competition in the data economy illustrates the agents' changing roles and the complexity of their interactions, as the same agents can be at the same time consumers and producers while their personal data raw material for the value generation process.

It becomes therefore essential to uncover the new value capture and value generation processes in operation in the digital economy, and draw lessons for the optimal design and enforcement of competition law, rather than take the established competition law framework as a given and try to stretch within it a quite complex reality that may not fit this Procrustean iron bed. The stalemate of fitting multi-sided markets theory in the context of a kind of loose operation of market definition as a transaction platform or of determining the existence of a restriction of competition by effect but facing the difficult consideration of out-of-market efficiencies, provide an illustration of the inherent difficulties, and ultimately of the futility, of such exercise. We consider that competition law should first focus on the way the value brought by innovation in the digital economy is captured, shared and generated, the three processes being intrinsically linked, before exploring how this process affects the competitive strategies of firms and the broader selection environment in the economy. Once this effort is completed, it would be possible to re-target and re-conceptualise the competition law tool. We

³ See, L.M. Khan, Amazon's Antitrust Paradox, (2017) 126(3) *The Yale Law Journal* 564; A. Ezrachi & M. Stucke, *Virtual Competition* (HUP, 2016).

⁴ See our analysis in Section 3.1.2.

identify three important manifestations of this increasing complexity that may have significant implications for competition law in the years to come.

The first relates to futurity, a term originally coined by John R. Commons to describe the reorientation of economies towards the future. This is linked to the fledgling practice of treating businesses as ‘going concerns’, measuring their value in terms of their anticipated future profits.⁵ In today’s financialised digital economy the most important driver of value creation is pots of gold being found far into the future and eventually linked to future expected monopolistic rents of the digital economy players.

The futurity trend is particularly salient in the funding of blockchain technology projects with Initial Coin Offerings (ICOs) emerging as the main source of funding for blockchain startups, even before any promise in their ‘white paper’ has materialized in real product markets. Digital platforms are also ‘madly’ valued by financial markets, in a way that does not seem to correspond to their current cash flow, but which increasingly relates to high expectations for phenomenal profits in the not-so-immediate future, because of their position as gatekeepers controlling important bottlenecks in the digital economy (e.g. operating systems, search engines, app stores, the cloud)⁶. The relatively recent focus of competition law on innovation, rather than allocative efficiency, also provides an additional example of the impact of futurity, this time in competition law doctrine. Futurity and its linkage to financialization challenges the traditional approach of competition law, which focuses on market power perceived as the ability to raise prices and reduce output in a well-delineated and existing product market.

Second, the harvesting and processing of personal data enables the personalisation of both production and distribution. It is increasingly acknowledged that data collection is key in the ability of firms to compete in the future Internet of Things (IoT), or Internet of Services (IoS). Firms harvest personal data by attracting users and monetise this data in advertising ‘attention markets’. Although consumers often do not pay for the zero-priced products provided by the platforms, other than providing their data, their autonomy to self-determine the level of privacy they enjoy is curtailed by the ‘take it or leave it’ nature of their exchanges with digital platforms, on which they are dependent in order to operate (work, develop social interactions, be entertained) in their daily life. Consumers cannot easily and costlessly escape from this technological dependence by switching to alternative options, in view of the high switching costs, to the extent that they may not be able to port all their data and digital relations to the competing platforms, and the lack of competition resulting from the ‘winner takes most’ nature of most of these markets. Data analytics connected to the use of software for predictive modelling, will also reinforce the competitive advantages for the digital platforms holding most of the data, or the attention of users, this being ultimately crystallised in ‘architectural advantage’. This entrenches their monopoly and/or monopsony position in the value chain⁷. Much of this data will relate to the digital identity of the consumer and will enable companies to draw fairly accurate preference maps for each of their clients. In this era of ‘mass

⁵ John R Commons, *Institutional Economics: Its Place in Political Economy* (The University of Wisconsin Press 1934).

⁶ See, <https://www.economist.com/business/2017/02/23/are-technology-firms-madly-overvalued> .

⁷ M. Jacobides, S. Winter & S. Kassberger, “The Dynamics of Wealth, Profit, and Sustainable Advantage”, (2012) 33 *Strategic Management Journal*, 1386

personalisation’⁸ the focus will not only be on ‘attention markets’⁹, but on the development of bespoke products to the individual preferences of the consumers. Once a specific amount of data is harvested, these personalised markets may tip to monopoly, if only one platform or ecosystem has the capabilities to harvest and analyse the data as well as to perfectly satisfy the individual consumer’s demand function in an array of products. Firms may be able to monetize this power in financial markets and to leverage it or convert it in other spheres of social activity (e.g. political power, cultural power). Firms may also use this privileged access to the ‘mind’ and attention of users in order to reinforce their positional advantage in the specific value chain vis-à-vis firms forming part of their value ecosystem or which are dependent on them for reaching these users.

The third important change is the move from markets to cybernetics. In the static model of competition applied by competition authorities, prices provide complex information in a condensed way to producers about consumer preferences, thus enabling conventional markets to work. The new data harvesting and processing techniques are nonetheless important game-changers. First, the use of data improves market matches. As customers keep shopping, digital assistants learn how to make even better recommendations, most of this ‘learning’ taking place completely or largely unassisted by humans, as data is fed into machines that continuously update their algorithms. Algorithmic firms gather comprehensive personal data on their customers, and by doing so they undo the need to rely on decentralized markets to acquire knowledge on the preferences of consumers. Preferences are not materializing through choice but algorithmically predicted. Second, they may also more easily discriminate between groups of consumers/users, by choosing a price structure that would subsidize some and ‘tax’ with higher prices others or by offering a personalized price. Price loses its central position as an indicator of consumer preferences expressed in decentralized markets. Consumers are not in the driving seat, as buyers are influenced both by explicit recommendations and by the ways in which options are filtered and presented, in particular as their ‘trust in the machine’ may be higher than trust in humans. Digital platforms may thus replace markets to a certain extent, in particular in a “winner takes most” world, where in the presence of strong network effects digital markets may easily ‘tip’. Platforms are not just ‘matching’ different groups of users but become prediction machines with the ability to manipulate or influence users’ choice. The way these digital platforms finish by regulating their ecosystems, but also manage consumer demand, presents some similarities to a private version of a centrally-planned mini-economy and the field of cybernetics.

1.2. What are the distinctive characteristics of a complex economy perspective?

As discussed in the previous Section, ‘simple economics’ rely on partial equilibrium thinking grounded on few propositions (e.g. rational choice), reducing heterogeneity by grouping the

⁸ Deloitte, ‘Made to Order: The Rise of mass personalisation’ (2015), available at <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/consumer-business/deloitte-uk-consumer-review-mass-personalisation.pdf>.

⁹ On this concept, see T. Wu, Blind Spot: The Attention Economy and the Law (March 26, 2017). Antitrust Law Journal, Forthcoming. Available at SSRN: <https://ssrn.com/abstract=2941094>; D. S Evans, The Economics of Attention Markets (October 31, 2017). Available at SSRN: <https://ssrn.com/abstract=3044858>.

various elements that compose the system in few broad categories (e.g. the consumer, the firm, or in other words the ‘representative agent’). It also ignores the ‘connective complexity of the economy’ (the net of links that shape the economy, but also their underpinning societal relations, being kept very simple due to the hypotheses of complete information so that each element of the economy can contact and evaluate all others at no cost, the network of connections being irrelevant to the functioning of the system)¹⁰. Unfortunately, using the same tools to understand complex economies and societies fails, because it ignores the variety of adaptive processes at play.

Some definitions of complexity focus on the internal structure of the system, rather than the complexity of the behaviour, qualifying a system as complex ‘when it is composed of many parts that interconnect in intricate ways’¹¹. That said, an important concept in complexity theory is ‘emergence’. Contrary to neoclassical economics where the behaviour of the system is assumed to reflect the behaviour of its constituent parts, complex economics accepts that there is a disconnection between an individual’s localised behaviour and how this aggregates into global behaviour¹². As a result of this disconnect, the overall emergent behavior of a complex system is difficult to predict, even when subsystem behavior is readily predictable. Small changes in inputs or parameters may thus produce large non-linear changes in behavior. Markets may tip once a critical threshold is reached, they are characterized by network effects and various feedback loops, positive or negative. This should not be considered as a criticism to competition law enforcement, in view of the difficulty sometimes to determine with appropriate precision the effects of a specific conduct on the competitive process or the interests protected by competition law

Complex systems are also dynamic as they learn, evolve, and adapt, generating emergent non-deterministic behaviour, which breaks with the assumptions of equilibrium behaviour of simple economics¹³. They are not populated by homogeneous predictable agents, but by a collection of heterogeneous agents (individuals, organisations etc.), whose state influences and is influenced by the state of others (for instance situations of social contagion), and whose interactions give rise to global properties of the system that are more than the sum of individual behaviour. As the interactions within complex systems are not independent, various feedback loops can enter the system and affect individual decisions. This complex digital economy is characterised by

- increasing returns to scale and scope,
- feedback loops, when interactions between agents are not independent, which may alter fundamentally the dynamics of the system. In systems with negative feedback, changes get quickly absorbed and the system gains soon stability, whereas in a system with positive feedback, ‘changes get amplified leading to instability’¹⁴.
- leverage points, that is are ‘places where the system can be altered or changed’,

¹⁰ M. Fontana, Can Neoclassical Economics Handle Complexity? The Fallacy of the Oil Spot Dynamic, (2010) 76(3) *Journal of Economic Behavior and Organization* 584.

¹¹ J.M. Sussman, Collected Views on Complexity in Systems, MIT Engineering Systems Division Working Paper Series, ESD-WP-2003-01.06 (2003), 6 citing the definition of J. Moses, *Complexity and Flexibility* (mimeo).

¹² J.E. Miller & S.E. Page, *Complex Adaptive Systems* (Princeton University Press, 2007), 50.

¹³ For an excellent introduction to the significance of complex economics for public policy, see B.A. Furtado, P.A.M. Sakowski, M.H. Tóvolli (eds.), *Modeling Complex Systems for Public Policies* (IPEA, 2015).

¹⁴ *Ibid.*, 50.

- tipping points, ‘where a system suddenly changes state based on a small change in a parameter of the system’, and
- path dependence, which means that ‘the current possibilities of the system are in some sense constrained by the past choices that were made’¹⁵.

The study of complexity also demands different strategies of engagement and new methodologies. As David Colander writes, ‘(i)instead of trying to find a formal analytical model, with a formal solution for these complex phenomena, complexity theory looks for patterns that develop when non-linear processes are repeated for long periods of time’, the mathematics used being ‘non-linear dynamics’, and the models generally used being ‘open models with no unique deterministic solution. Many solutions are possible; which one is arrived at depends upon initial conditions and the path the model follows’¹⁶. This puts emphasis on computation and brings to the center of the economic enquiry simulation approaches that rely less on theory and more ‘on conjectures and patterns that temporarily fit’¹⁷. In simple economics, models are constructed for prediction and derive from a set of first principles, which often include assumptions as to the abilities and motives of the underlying agents, these being linked through mathematical reasoning and deduction with axioms, the latter being associated with the notion that ‘social systems tend toward equilibrium states’¹⁸. In contrast, the computational models are used as mapping tools¹⁹. They provide the terrain for computational experiments and thus aim to generate only inductive proof. In these models, ‘(a)bstracts maintain a close association with the real-world agents of interest’ and ‘uncovering the implications of these abstractions requires a sequential set of computations involving these abstractions’²⁰. These computational models should enable the consideration of the complicated preference structures of the population, and its heterogeneity, so as to account for their more elaborate set of choices.

One of the tools that is often used to generate these computational models is ‘agent-based modelling’, which attempts to depart from the abstraction of the underlying agents in a system into a single representative agent, all agents being subsumed into a single simplified agent²¹. Although agent-based modelling cannot completely dispense of this step, as even if it does not rely on a representative agent, there is some level of abstraction from the real-agents by constructing an artificial adaptive agent, it allows for the direct interaction between these agents (hence the focus on ‘adaptive’) by using computation. Adaptation can be incorporated through different means, such as employing population-based search evolutionary algorithms (e.g. a genetic algorithm) that draw on metaheuristic inspired by the process of natural selection and rely on a pool of potential solutions, rather than one²².

¹⁵ See the discussion in W. Rand, *Complex Systems: Concepts, Literature, Possibilities and Limitations*, in B.A. Furtado, P.A.M. Sakowski, M.H. Tóvulli (eds.), *Modeling Complex Systems for Public Policies* (IPEA, 2015), 37, 41.

¹⁶ D. Colander, *Complexity and the History of Economic Thought* (March 2008), 4.

¹⁷ *Ibid.*, 6.

¹⁸ J.E. Miller & S.E. Page, *Complex Adaptive Systems* (Princeton University Press, 2007), 59.

¹⁹ *Ibid.*, 36.

²⁰ *Ibid.*, 65.

²¹ *Ibid.*

²² The process involves several steps, beginning with a set of individuals (population), each individual being characterised by a set of parameters (variables or ‘genes’), these being joined into a string to form a solution (‘chromosome’). A fitness function measures the ability of an individual to compete with other individuals (how ‘fit’ an individual is), each individual being given a fitness score. The selection of the fittest individuals to pass

These interactions depend on, and determine the boundaries of, the ‘space’ within which the agents are contained, the space being often endogenous in a system. The point is that determining the relevant ‘space’ or ‘field’ of interaction cannot be done before fully engaging computationally with the interactions of the agents themselves, also taking into account the possibility of asynchronous activation, each agent awaking at a different time, processing what information is currently available and thus by its action altering ‘the information ether’ that the other agents will face when activated²³. Such an approach may cater for situations in which, assuming that the focus is on competitive interactions, there is a potential competitor.

In view of its focus on interactions between agents, complex economics models social systems as networks of nodes and ties. These ties act as pipes through which things (e.g. information) flow. This brings to the fore the role of networks as spaces of interaction. This has important implications on the understanding of power relations within systems. For instance, in ‘small worlds’ networks, where each agent is first connected to a set of neighboring agents, information can be transmitted between any two nodes using, typically, only a small number of connections (allowing the generation of ‘six degrees of separation’), which shows the crucial role in the operation of the system of only a few intermediate nodes²⁴. If however a network is solely composed of neighbourhood connections, ‘information must traverse a large number of connections to get from place to place’, thus limiting the power/influence of the intermediary nodes²⁵. Hence, the position of an agent in a network may be a source of advantage and power.

The type of connections linking the agents is also a crucial issue. The ‘strength of weak ties’ is a well-known contribution in the field of sociology²⁶, showing that weak ties are surprisingly valuable because they are more likely to be the source of novel information than strong ties. This comes out of the hypothesis that if A and B have a strong tie, they are likely to have many acquaintances (weak ties) in common. Strong ties create transitivity which creates a closed world with redundant ties. Bridges are ties connecting different parts of the network: removing the tie between Y and Z would mean the shortest path from Y to Z would be quite long. These are more likely than other ties to be sources of novel, non-redundant information. Weak ties are more likely to be bridges than strong ties. According to another theory, structural holes, which denote a lack of connection between two nodes that is bridged by a broker, provide information benefits and may lead to rewards, thus emphasising the power the broker may draw from his positioning within the system²⁷. This theory does not focus, as the ‘strength of weak ties’ theory on the strength of the relationship between two entities, but rather on the lack of a tie between entities (the ‘chasm’) that may become source of power for the broker. Complex economics allow for these different sources of wisdom (e.g. economic

their ‘genes’ to the next generation depends on their fitness score. The next stage is crossover where for each pair of parents to be mated, a crossover point is chosen at random from within the genes. Certain new offsprings formed from the crossover are subjected to a mutation with a low random probability in order to maintain diversity in the population, the algorithm being terminate if the population has converged (does not produce offspring which are significantly different from the previous generation).

²³ J.E. Miller & S.E. Page, *Complex Adaptive Systems* (Princeton University Press, 2007), 97.

²⁴ *Ibid.*, 155.

²⁵ *Ibid.*

²⁶ M.S. Granovetter, The Strength of Weak Ties, (1973) 78(6) *American Journal of Sociology* 1360.

²⁷ R. Burt, *Structural holes: The social structure of competition* (Harvard Univ. Press, 1992).

sociology, network theory, neuro-economics) to be integrated in the way the computational models are constructed, thus augmenting their explanatory power in the context of a complex set of interactions between heterogeneous agents.

Computational models may also allow for a greater heterogeneity of the agents whose interactions will be modelled, for instance by developing ‘an ecology of agent types, each relying on different behavioural governing mechanisms’²⁸, although as mentioned above it cannot completely dispense with the constitution of representative agents. This enables the theorist to construct computation models ‘bottom-up’, any abstraction focusing ‘over the lower-level individual entities that make up the system’²⁹. The model also integrates learning and adaptation as a byproduct of this direct interaction, thus incorporating frameworks for emergence, the model being flexible enough so that ‘new unanticipated features’ may naturally arise within the model³⁰. This contrasts with the ‘top-down’ modelling of simple economics which ‘abstracts broadly over the entire behaviour of the system’³¹. The point is that even if we managed to acquire ‘a complete specification of the psychological aspects of behaviour or the probability of interaction’ of all the underlying agents, it would still be difficult to fully understand the macrolevel implications of their interactions, in particular because the models of simple economics do not anticipate emergence³². Emergence does not deny the possibility for an equilibrium state, however it indicates that this equilibrium state may not be unique and may ‘depend on various random elements of the model or nonlinearities’, the system being in ‘perpetual motion’³³.

This computational modelling may aim to unveil a simple structure of interactions, abstracted from the behaviour of artificial adaptive agents, or a more complicated structure of interactions, in case the computational modelling and the use of simulations allows for the constitution of ‘artificial life’ or artificial worlds. These would rely on a model of ‘adapting, communicating, multiple-game playing artificial agents’³⁴. One may think of reproducing the digital twin of a network or ecosystem, linking the real and digital worlds, using AI to turn data into actionable insights. First, various sorts of data may be harvested, and then millions of examples of curated data could be leveraged to train deep learning neural networks. At the next step, neural networks may be used to approximate parts of the computational model. This holds the potential for evaluating the effectiveness of tailored treatments and experiment with various forms of intervention, using advanced simulation in order develop more precise prognoses. These tools may enable a better and quicker filtering of the situations in which more elaborate competition law analysis is needed, and may provide solid evidence for building counterfactuals in competition law investigations.

Some of the theoretical insights and concepts of complex economics have been gradually incorporated in competition economics’ scholarship and some in competition law enforcement. Terms, such as increasing returns, tipping point, leveraging point are widely used by scholars,

²⁸ J.E. Miller & S.E. Page, *Complex Adaptive Systems* (Princeton University Press, 2007), 101.

²⁹ *Ibid.*, 66.

³⁰ *Ibid.*, 69.

³¹ *Ibid.*

³² *Ibid.*, 67.

³³ *Ibid.*

³⁴ *Ibid.*

competition authorities and courts and form now part of the current mainstream approach in competition law and economics. However, the tools and methodologies of complex economics have not yet made any impact on competition law enforcement, but also on competition law and economics literature. We consider that it is time competition authorities make the effort to engage with these new tools, and to develop capabilities for engaging with computational economics. In view of the large availability of data, and the complexity of the issues raised by digital platforms and networks, the digital economy offers plenty of opportunities to try these new methodologies and tools, such as agent-based modelling, computational models, digital twins etc. In our view one of the major impediments for the use of such novel approaches is the rigidity of the ‘consumer welfare’ standard that has enthused so far the geist of competition authorities and has provided the theoretical framework of their action the last few decades. We consider that the emphasis put on ‘consumer welfare’ is very much linked to the simple economics of the ‘representative agent’, and does not account for the heterogeneity of agents and the complexity of their preference structures, in particular as competition law becomes more ‘polycentric’³⁵.

This discussion leads us to explore how the current consumer welfare standard applied by competition authorities may fare in the era of digital competition and a complex economy.

2. Is the consumer welfare standard adequate to deal with the competition challenges of digital competition, and how could this consumer welfare standard be defined?

2.1. The pitfalls of the consumer welfare standard in a complex digital economy

The concept of consumer welfare is one of the most commonly referred goals of competition law, by competition authorities and also competition law and economics scholarship globally. The concept is in reality quite fuzzy and may include multiple dimensions of ‘consumer harm’ that may trigger competition law enforcement:

(i). In the economic jargon, the protection of consumer surplus constitutes an important part of the total welfare standard test. In this context, consumer surplus denotes the consumer part of the deadweight loss suffered as a result of the restriction of competition. For example, a price increase might lead to a volume effect that would be suffered by a certain category of consumers: because of the price increase some consumers will not be able to buy the product any more, although past consumption patterns (revealed preferences) indicate that they would have preferred to do so, if the price had not increased. In this sense, the case against the exploitation of substantial market power is not linked to the transfer of wealth from consumer to producers over those (infra-marginal) units of output still sold, but merely on the lost transactions which could have taken place under a more competitive scenario.³⁶ In any case, for operational purposes the focus is on consumer harm, as captured by the (likelihood of)

³⁵ I. Lianos, Polycentric Competition Law, (2018) Current Legal Problems 161.

³⁶ The irrelevance of distributional concerns is normally justified with reference to the ‘compensation principle’ (also labelled Kaldor-Hicks efficiency criterion, or Potential Pareto Improvement) which posits that, if gainers can compensate losers and still be better-off, the change observed in the partial equilibrium analysis is desirable. That is to say, even if the compensation never actually takes place, it is down to the political system to take care of the redistribution of the ‘pie’ (the separability thesis).

higher prices and lower quantity; bearing in mind that in practice hardly anyone in the field of enforcement ever actually attempts to measure/estimate actual changes in either total or consumer welfare.³⁷ Under this narrow definition of consumer surplus, the overcharge paid by the consumers as a result of the price increase should not be of concern for competition law enforcement, as it constitutes a wealth transfer from the buyers to the sellers. The suppliers may be in a position to compensate (hypothetically, not actually) the loss that consumers have suffered while still being able to compensate with this wealth transfer their own losses following the volume effect (producer surplus). In this configuration the situation will be Kaldor-Hicks efficient. We will call this view of consumer harm: the ‘consumer surplus standard’.

(ii). There is also an argument to move beyond consumer surplus and include in the analysis the wealth transfer that consumers have incurred because of the overcharges following the restriction of competition. These may relate not only to higher prices but could cover any other parameter of competition, such as quality, variety, innovation. In this case, both the loss of consumer surplus and wealth transfers will be compared to the total efficiency gains pertaining to the supplier(s), thus enabling a cost benefit analysis of the effect of the conduct on the welfare of a specific group of market actors, direct and indirect consumers (not all market actors). The idea is that following the change from an equilibrium situation to another, the consumers of the specific product will benefit from a surplus and/or wealth transfer, in the sense that their ability to satisfy their preferences will increase. Again, for clarity this standard will be referred to as the ‘consumer welfare standard’.

Usually, looking at changes in total or consumer surplus makes no difference in practice, since both tend to move in the same direction, as graphically captured by the deadweight loss, which is the loss of consumer and producer surplus due to a restriction in output caused by an increase in price, and stands to signify how allocative efficiency has worsened due to the exploitation of market power. As put by Werden ‘[a]nything enlarging the metaphorical pie offers a potential Pareto improvement because it is possible to make at least one individual better off while no one is worse off³⁸’. However, there may be situations in which a specific conduct, while leading in theory to a potential increase of the pie, worsens the situation of consumers, who not only capture less than before, but may also see their situation worsen. In these cases, a consumer welfare standard will focus on the wealth transfer from consumers to other market players. Let’s imagine that thanks to the exclusion of a less (productively) efficient rival (i.e., as a result of a merger or foreclosure) a larger share of demand is now allocated to a dominant firm with lower costs, so that the supply curve shifts outward to the right. At the same time, though, the exclusion of a less efficient rival will reduce competitive constraints in the market making it possible for the dominant firm to increase prices. The reduction in costs may not be large enough to offset the increase in price.

³⁷ There are some examples of competition authorities commissioning studies into the effects of their past decision, thus basically assessing whether their intervention (or lack thereof) has increased consumer surplus. For an overview, see, OECD (2011), *Impact Evaluation of Merger Decisions*, available at <http://www.oecd.org/daf/competition/Impactevaluationofmergerdecisions2011.pdf>.

³⁸ G.J., Werden ‘*Antitrust’s Rule of Reason: Only Competition Matters*’,(Mimeo Washington, DC: U.S. Department of Justice - Antitrust Division, 2003), 28.

(iii). Some authors argue also that competition authorities should aim to preserve an optimal level of ‘consumer choice’, defined as ‘the state of affairs where the consumer has the power to define his or her own wants and the ability to satisfy these wants at competitive prices’³⁹. This concept seems broader than the concepts of ‘consumer surplus’ and ‘consumer welfare’ (the latter including consumer surplus plus the wealth transfer because of the overcharge) as it may include other parameters than price, in particular ‘variety’. The same authors have used interchangeably the term of ‘consumer sovereignty’, which is defined as ‘the set of societal arrangements that causes that economy to act primarily in response to the aggregate signals of consumer demand, rather than in response to government directives or the preferences of individual businesses’.⁴⁰ Defining the ‘optimal degree’ of consumer choice or consumer sovereignty and measuring it using some operational parameters seems however a daunting task. Consumer sovereignty may be conceptually appealing but may prove empirically weak to implement in competition law enforcement.

(iv). Consumers, or more generally the public, may also benefit by a vivid competitive process. The idea is that the preservation of a competitive process is essential to prevent a prolonged departure from the optimal outcome usually associated to competition. Another approach may be deontological and would argue that the competitive process and the economic freedom of undertakings to participate to this competitive process must be preserved, irrespective of the effects of such competition on social or consumer welfare. The German ordoliberal school has arguably put emphasis on the competitive process indicating that we should be concerned if ‘the number of freely competing producers is artificially reduced in ways that do not result from the normal process of competition itself’, and ‘where this reduces the scope of alternatives among which consumers may freely chose’.⁴¹ Defining the competitive process as ‘the process of sellers and buyers forming improving coalitions’, other authors argue that ‘[competition law] protects the *potential beneficial trades between competitors and consumers*’, recognising ‘both consumers and thwarted competitors’ ‘antitrust rights, even though antitrust protects ‘competition and not competitors’.⁴² Such an approach may dispense, to a certain extent, with focusing on all practices that reduce consumer welfare in equilibrium and may provide a useful starting point for the competition assessment, or for some a substantial part of the competition assessment.

(v). As innovation is considered a major engine of growth, public authorities play a direct role in fostering innovation⁴³, but also in supporting the emergence of an innovation-

³⁹ R.H. Lande, ‘Consumer Choice as the Ultimate Goal of Antitrust’ (2001) 62(3) *University of Pittsburgh Law Review* 503, 503. For an import of this concept in EU competition law, see P. Nihoul, N. Charbit & E. Ramundo (eds.), *Choice – A New Standard for Competition Law Analysis?* (Concurrences, 2016).

⁴⁰ N.W. Averitt & R.H. Lande, ‘Consumer Sovereignty: A Unified Theory of Antitrust and Consumer Protection Law’ (1997) 65 *Antitrust Law Journal* 713, 715 .

⁴¹ P. Behrens, ‘The Ordoliberal Concept of ‘Abuse’ of a Dominant Position and its Impact on Article 102 TFEU (September 9, 2015) Nihoul/Takahashi, Abuse Regulation in Competition Law, Proceedings of the 10th ASCOLA Conference Tokyo 2015, available at SSRN: <https://ssrn.com/abstract=2658045> . For a translation in English of the views of one of the principal authors of the ordoliberal group, see W Eucken, *The Foundations of Economics – History and Theory in the Analysis of Economic Reality* (1992, first published in 1939, Springer).

⁴² See A. Edlin & J. Farrell, Freedom to Trade and the Competitive Process, in R Blair & DD Sokol (eds.), *The Oxford Handbook of International Antitrust Economics*, Vol. I (OUP, 2014), Chap. 13.

⁴³ This is either done through public investment in science and basic research, which can play an important role in developing general-purpose technologies and, hence, in enabling further innovation, as well as public support

friendly market environment. The role of the competitive process in the promotion of innovation is well recognized and widely accepted. Certainly, research and development requires up front investments for uncertain rewards. For instance, intellectual property rights were initially conceived as an exception to the rule of competitive markets. By providing some economic rents, intellectual property rights are supposed to ensure that the inventor has adequate incentives to innovate at the first place. Although IP may provide some certainty over the ability of an undertaking to retain the benefits from the innovation it put in place (and internalise the positive externalities thus produced), the social return to innovation largely exceeds its private return.⁴⁴ In reality, imperfect IP protection may lead the competitors to gain some of the rewards from the rival's innovation (the problem of limited appropriability).⁴⁵ Technological spillovers and imitation across the industry or cross-industries may boost growth to a considerable extent, without being possible that these indirect benefits are appropriated by the IP holder, thus illustrating the inadequacy of a policy relying on intellectual property rights only to spur innovation and the importance of public funding of research. It has been argued that disruptive innovation may also challenge monopoly positions that become temporary (the process of 'creative destruction').⁴⁶ Determining what is the appropriate market structure for innovation remains however an open and hotly debated issue.⁴⁷ The rise of digital platforms may have both positive and negative effects on innovation. In theory, digital platforms have been investing considerably in R&D, although their R&D intensity is lower than that observed in the pharmaceutical industry, even if the amount of R&D expense, because of their capitalisation may seem quite high. Figure 4.1. below, illustrates comparative R&D expenditure as a percentage of net income between the five largest tech and pharmaceutical companies by market capitalisation.

Figure 4.1.: Big Tech vs. Big Pharma - R&D expenditure as a percentage of net income, 2016-18

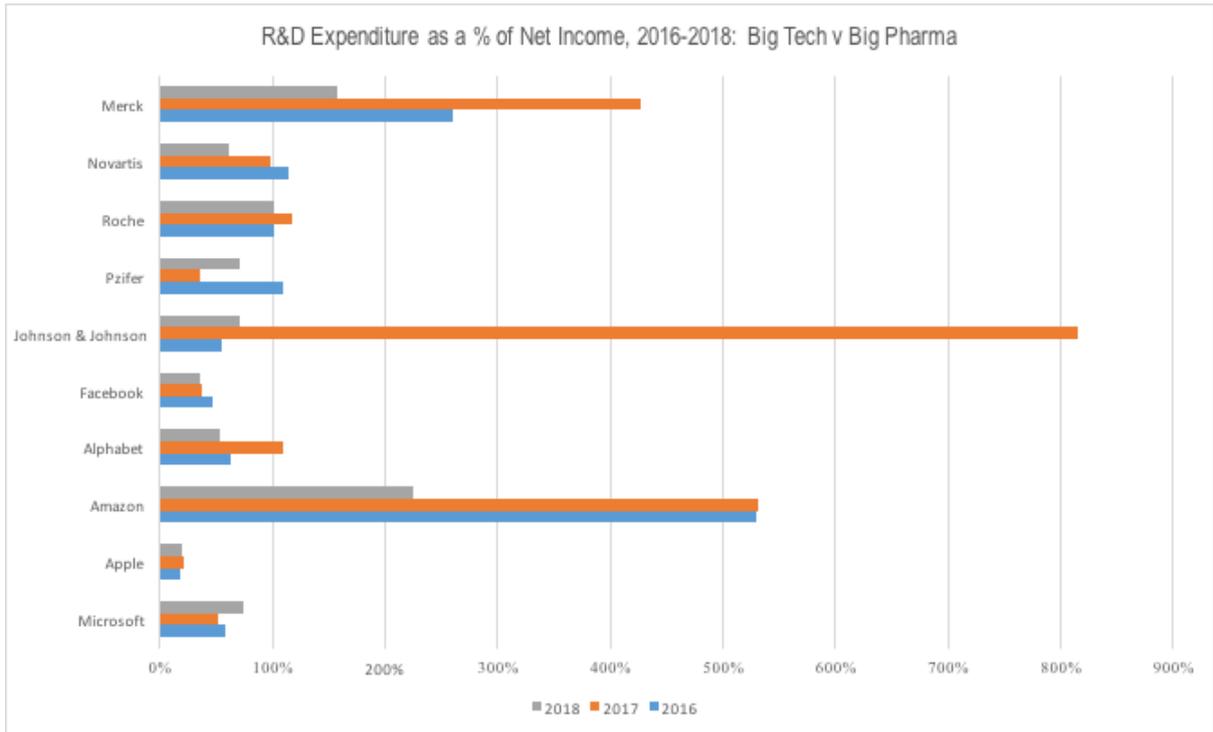
to innovative activity in the private sector, which is usually taking the form of a mix of direct and indirect instruments such as tax credits, soft loans, direct support etc. On the important role of the State in supporting innovation, see M. Mazucatto, *The Entrepreneurial State: debunking public vs. private sector myths* (Anthem 2013).

⁴⁴ This was highlighted by K. Arrow, Economic Welfare and the Allocation of Resources for Invention in *The Rate and Direction of Inventive Activity: Economic and Social Factors* (NBER, 1962) 609.

⁴⁵ *Ibid.*, 619.

⁴⁶ J. Schumpeter, *Capitalism, Socialism and Democracy* (1942, published by Harper & Bros. in 1950) 83, noting that 'The opening up of new markets, foreign or domestic, and the organizational development from the craft shop and factory to such concerns as U. S. Steel illustrate the same process of industrial mutation - if I may use that biological term - that incessantly revolutionizes the economic structure *from within*, incessantly destroying the old one, incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism. It is what capitalism consists in and what every capitalist concern has got to live in'.

⁴⁷ For a critical analysis, see the companion volume. See also, J Baker, 'Beyond Schumpeter vs. Arrow: How Antitrust Fosters Innovation' [2007] 74 *Antitrust Law Journal* 575; RJ Gilbert, 'Competition and Innovation' in WD Collins (ed) [2008] 1 *ABA Section of Antitrust Law, Issues in Competition Law and Policy* 573.

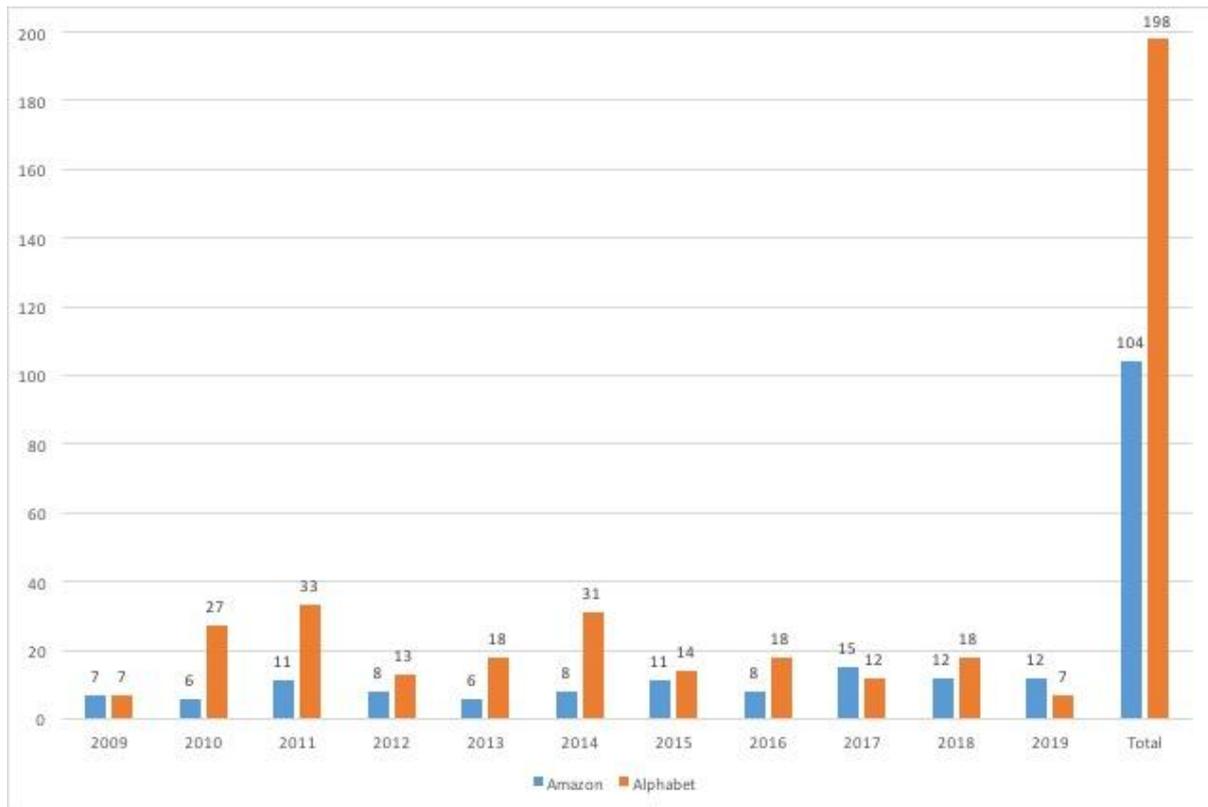


However, we also observe that the Big Tech platforms have engaged in intensive M&A activity, buying not only a number of potential competitors (contributing to the problem of ‘killer acquisitions’), but also vertical and conglomerate mergers, quite often in order to control technologies that could complement well their core activities. Figure 4.2. illustrates the scale of acquisition activity by Amazon and Alphabet over the last decade, and highlights the largest of these transactions by deal value.⁴⁸ Amazon and Alphabet were involved in 102 and 195 transactions, respectively, over the period.⁴⁹

Figure 4.2.: No. of M&A deals completed by Amazon and Alphabet, 2009-19

⁴⁸ 'Investments' should be taken to mean partial investments in a company. Large coloured circles indicate the deal value exceeded \$1 billion, small coloured circles indicate the deal value to be less than \$250 million, and clear circles denote that the deal value is unknown. The original graph produced by The Economist also contains the acquisition and investment activity of Microsoft, Facebook and Apple. Microsoft, Facebook and Apple were involved in 117, 68 and 71 transactions, respectively. The Economist, Calls to rein in the tech titans are getting louder (16 July 2016) <<https://www.economist.com/graphic-detail/2019/07/16/calls-to-rein-in-the-tech-titans-are-getting-louder>> accessed 14 August 2019.

⁴⁹ *ibid.*



Source: Author compilation

Although Big Tech retain earnings and do not distribute, at least as much, to their shareholders, they do not seem to significantly reinvest these retained earnings in R&D as most of them sit on large amounts of unutilised cash.⁵⁰ This is not a unique story for Big Tech. Investments in R&D are increasingly concentrated in a few sectors across most of the mature economies⁵¹. Firms may also employ cash hoarding as a defensive tool in order to protect their current stock of technology, and not in order to invest in new technologies. Statistics show that business investment has steadily declined since the late 1970s, if measured as a share of GDP⁵². The concept of research has also changed. A lot of money is actually spent on product adaptation, design and development, copying a feature or add on from another product or adjusting the product stock to local demands – i.e. the development - and little is spent on the research⁵³. Growth in real investment on R&D is declining, the US National Science Foundation reporting that its measure of R&D intensity has flat-lined since 1995⁵⁴. Many companies have reacted to problems with their R&D strategy by outsourcing R&D to smaller

⁵⁰ See R. Waters, 'Google parent Alphabet overtakes Apple to become new king of cash' (31 July 2019) <<https://www.ft.com/content/332dd974-b349-11e9-8cb2-799a3a8cf37b>> accessed 14 August 2019.

⁵¹ See for example G. Clark, 'Winter Is Coming: Robert Gordon and the Future of Economic Growth', (2016) 106(5) American Economic Review: Papers & Proceedings 68-71.

⁵² Ibid, p. 29.

⁵³ F. Erixon and B. Weigel, *The Innovation Illusion* (Yale University Press, 2016), 33.

⁵⁴ R&D intensity, measured as the share of industry-level R&D expenditure to sales, increased in the seed sector from 11.0% in 1994 to 15.0% in 2000 before falling back to 10.5% in 2009.

firms that can take bigger risks⁵⁵. Similar processes are in operation in the digital sector where a significant amount of R&D depends on start-ups, many of which will not develop to unicorns. Once the R&D investments have begun to mature into innovative products, large companies have acquired them and integrated them into their global value chains⁵⁶. This may affect the innovation and entrepreneurial ethos and consequently lead to the loss of opportunities to innovate in comparison to a more competitive industry structure. In the absence of some assurance that large firms will invest their profits to promote innovation and increase the production possibility frontier, it would be imprudent to provide a *carte blanche*.

Box 1 Goals and objectives of BRICS competition laws and the digital economy

On the adequacy of the relevant national competition laws to face the challenges arising from the digital economy, especially whether the goals and the objectives are sufficient to address challenges arising from the digital economy, most BRICS economies find the matter requiring further analysis or redesign of existing tools:

BR The competition law establishes the prevention and the restraint of violations against the economic order as the main goal of the Brazilian Competition Defense System. This goal addresses conducts involving the digital economy as well. So no revision of goals is required. Further the current competition law is very flexible to address the specific issues related to digital markets. It has been applied successfully in several competition cases involving these markets in the recent years. Nonetheless, CADE is concerned about the challenges to competition law and enforcement posed by new technologies and is developing studies to identify potential limitations of the current legal framework as well as of the analytical and enforcement tools.

RU The FAS Russia does not see necessity to change the objective of competition regulation. However, enforcement practice in relation to digital companies showed that there is a need to amend the current antimonopoly legislation in order to be able to reply to the challenges of the digital world. The FAS Russia prepared the fifth antimonopoly package, which contains significant number of provisions devoted to digital economy. It concerns introduction of the new definitions, adding criteria of dominant position of the platforms, adding consideration of data ownership when analysing the market, empowering the FAS Russia with the function to impose a remedy in the form of providing non-discriminatory access to data and establishing Trustee for monitoring compliance of the economic entity with the Ruling.

⁵⁵ See for instance, P. Gleadle et al., 'Restructuring and innovation in pharmaceuticals and biotech: The impact of financialisation', (2014) 25 Critical Perspectives on Accounting 67-77

⁵⁶ Comanor and Scherer point out to how M&A may have been used as a safety net for companies against the uncertain prospects of innovation projects or to acquire synergies in R&D, W. S. Comanor and F. M. Scherer, 'Mergers and innovation in the pharmaceutical industry', (2013) 32 Journal of Health Economics 106-113. Similar analyses can also be found in P. Gleadle et al., 'Restructuring and innovation in pharmaceuticals and biotech: The impact of financialisation', (2014) 25 Critical Perspectives on Accounting 67-77.

CN The basic framework and principles of the existing Anti-Monopoly Law are sufficient to deal with the competition caused by the digital economy. The Anti-Monopoly Law protects fair competition in the market, which means that all operators are equal before the law. The Internet sector is also regulated under the Anti-Monopoly Law. Any operator that violates the Anti-Monopoly Law must accept the investigation of the national competition authorities and assume corresponding legal liabilities. The State Administration for Market Regulation, responsible for the unified anti-monopoly law enforcement in China, attaches great importance to the competition in the new economic field. The State Administration supervises the development of emerging fields such as the Internet according to the principle of inclusiveness, protects fair competition in the market, and provides an inclusive development atmosphere for new Internet formats and new operation models. It is necessary to fully utilise market mechanism, enhancing the role of innovation in driving the Internet industry; it is also necessary to improve the Internet industry's regulatory system, working synergistically with relevant departments, strengthening market surveillance in accordance with the law, effectively regulating the competition of platforms, investigating the alleged anti-competitive conduct, preventing the formation of industry monopolies and market barriers, protecting the legitimate rights and interests of consumers and the public interests, and guiding the healthy and orderly development of the Internet industry.

ZA The current competition Law is adequate. However, the challenges mentioned above indicate that a process of reviewing the border regulatory regime is required if South Africa is to catch up with the shifts to the digital age. Challenges faced by South Africa include concerns raised across several sectors about the fact that the broader regulatory framework in many cases does not apply to new, disruptive technology, which gives these firms an unfair competitive advantage over regulated incumbents. For instance, traditional metered taxis have raised the concern that area restrictions and price regulation applied to their business model is not applied to e-hailing firms, placing the traditional model at a competitive disadvantage. Public and FTA broadcaster licensees subject to local content requirements express concerns that streaming services are not licensed and therefore not subject to the same regulations, and that their advertising revenue base is being rapidly eroded by Facebook and Google.

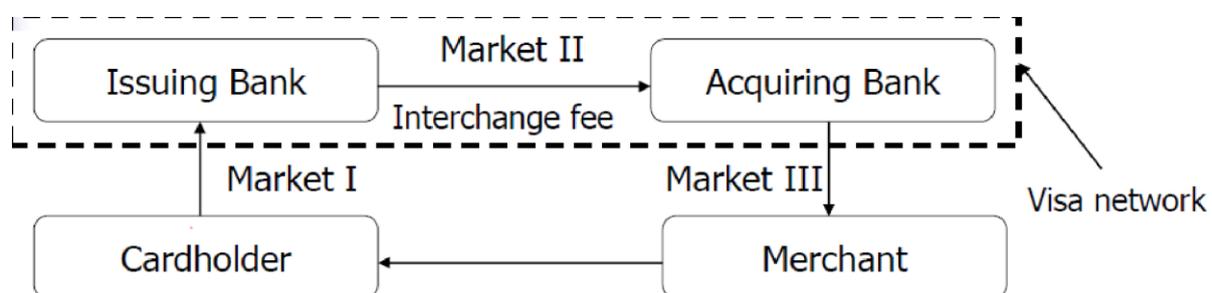
What appears to be lacking is the understanding of the tools used by digital actors in competing with one another, in setting prices, in excluding other players from the market by way of foreclosure. From the cases investigated thus far, it appears that the Commission is left behind in terms of understand the competition dynamics in the digital markets. Thus, it appears that what need to change or improve is mainly the tools for identifying competition issues as the traditional methods do not seem to be working well in digital markets.

Source: BRICS NCAs Questionnaire

Whichever option (or options) from the above is chosen, there are adjustments that need to be made in order to take into account the specificities of the digital economy. Some of them may directly concern all options, such as for instance network effects and tipping or leverage points that may change the way we think about the need to preserve the competitive process (option iv) or promote innovation (option v). Personalisation and cybernetics may have effects as to the conceptualisation of consumer choice (option iii). However, in view of the importance given to price competition in contemporary competition law and economics analysis, I would be good to focus the specific welfare standard under dimensions (i) and (ii). Two related changes brought by digital competition are of particular relevance here. First, it is quite frequent that products may be distributed for ‘free’ at one side of the platform, this meaning that consumers are not charged positive prices, the products being sold at zero-prices, or even it is possible that consumers receive a reward (they are charged a positive price). Hence, it is more complex to assess the consumer welfare effect or consumer surplus effect in these markets, without also taking into consideration other parameters of competition (such as quality and variety). Second, the multisided nature of platforms renders this static and focused analysis of effects on a specific relevant market rather inconclusive. Anabelle Gawer notes the ‘changing roles’ of agents in these multi-sided platforms, as it is possible that ‘(w)hile end-users “consume” the service (search, social networking) offered by these platforms, they also constantly “feed”, individually and collectively, their personal data into these platforms (as expressed by the items they search, their location, their preferences as revealed by previous queries, and their personal connections data), thereby providing the very data upon which these platforms draw upon to deliver their services’ (akin to input suppliers)⁵⁷. As it is imaginatively explained by Kate Crawford and Vladan Joler, ‘[...] the user is simultaneously a consumer, a resource, a worker and a product’⁵⁸.

There is no need to focus on an advertised-based platform in order to gauge the complexity of implementing the consumer welfare standard in the digital era of multi-sided platforms. We will use the example of a ‘transaction platform, that of four-parties payment system, such as Visa or Mastercard (Figure 4.3.).

Figure 4.3.: A four-parties payment system platform



⁵⁷ A. Gawer, Bridging differing perspectives on technological platforms: Toward an integrative framework, (2014) 43 Research Policy 1239, 1243.

⁵⁸ Kate Crawford and Vladan Joler, Anatomy of an AI system: The Amazon Echo As An Anatomical Map of Human Labor, Data and Planetary Resources, *AI Now Institute and Share Lab*, (September 7, 2018), available at <https://anatomyof.ai/>.

As it appears from Figure 4.3., there are three markets, one between networks and merchants (Market III), the other one between networks and cardholders (Market I). One may also identify market II, as acquiring and issuing banks set an interchange fee for each transaction, but we do not focus on this market right now as it is managed by the platform (Visa, Mastercard) and creates competition law problems of its own. The payment system faces competition from rival network (for instance Visa competes with MasterCard, Amex, Union Pay. Assume that each network charges a fee to a merchant in market III if a transaction is routed through that network. Each network also pays a ‘reward’ to cardholders to induce them to use that network and increase demand (sales) in market I. Rewards to cardholders are not sold in market III but have the effect to shift upwards demand in market I. In a competitive environment, merchants are allowed to ‘steer’ consumers to cheaper payment networks by providing monetary and non-monetary incentives. However, if a digital platform restricts price competition in market III by not allowing merchants to ‘steer’ consumers to other payment systems or to disclose the transactions’ costs to cardholders and provide incentives (including monetary incentives) to cardholders to use cheaper payment cards, this may constitute *prima facie* a restriction of competition. The anti-steering rule may result in higher fees to merchants than otherwise, and clearly harms the merchants.⁵⁹ The restriction of competition likely results in an increase in retail prices paid by all consumers, including those paying cash. The application of the consumer welfare standard requires a complex design which would enable competition authorities to take into account all the possible consumer harms, but also possible benefits to consumers. But these are many: one may refer to the harm to the merchants, consumers of market III, or to the harm of cash-paying merchants’ customers, who may be considered as indirect consumers downstream market III, on which the merchants may pass the higher fees. There is however consumer benefit in market I, as because of the anti-steering rules, and the possibility to increase its fees, the payment system may afford to reward cardholders with positive prices, for instance travel or shopping rewards etc. A competition analysis focusing on consumer welfare will need to decide (i) which market will serve as the main unit of analysis of consumer welfare, or (iii) to balance costs and benefits for the consumers affected in all markets. This may prove a rather difficult and resource consuming task, that would also require the possibility for out of relevant market efficiencies to outweigh consumer harm in another market.

2.2. Should competition law take into account the broader social cost of restriction of competition in the digital economy, and can this be done?

One may envisage the possibility that competition law may intervene in situations in which the power held by digital platforms or other digital gatekeepers and the restriction of competition in the digital economy, which result from the exercise of this power, produces broader social costs than just a cost to consumer welfare. These broader aims for competition law intervention may be considered as economic or political, to the extent that one defines economic as narrowly concerned with consumer surplus and economic efficiency. One needs however to also take

⁵⁹ For a detailed discussion, see F. Ducci, Out-of-Market Efficiencies, Two-Sided Platforms and Consumer Welfare: A Legal and Economic Analysis, (2016) 12(3) *Journal of Competition Law and Economics* 591.

into account the broader political objective to keep the Internet free from all, state or corporate, gatekeepers, which is an intrinsic characteristic of the Internet architecture that emerged from the international consensus in the early 1990s. This broad international consensus on a decentralised trans-national architecture of the Internet, most norms and principles governing protocols and standards in this network of networks deriving largely from a bottom up process⁶⁰, may be jeopardised by the regulatory role of a handful of digital platforms. These concerns provide the philosophical background that justify the consideration of the broader social costs of the restrictions of digital competition than those encompassed by the narrow aim of consumer welfare.

2.2.1. Income and wealth distribution

There are certainly many causes that could explain the recent rise in poverty and inequality: the globalization of production, the erosion of collective bargaining systems, the continued drop in real wage values, tax evasion or unfair tax systems. However, it is increasingly accepted that market power may be a significant source of both inefficiency *and* inequality. Joseph Stiglitz notes that “today’s markets are characterised by the persistence of high monopoly profits”⁶¹. He also argues that “policies aimed at reducing market power can accordingly play some role in the reduction of inequality”, although he remains careful of setting this as an explicit aim of competition law⁶². Other economists have been equally vocal on the need for a robust competition law and policy against inequality⁶³. Is increasing economic concentration leading to higher degrees of inequality of wealth? This may be a difficult question to answer in view of the overall tendency of wealth concentration that has been observed during the twentieth century and at least part of the nineteenth century⁶⁴, and according to more recent studies, apparently since the fourteenth century⁶⁵, although one should note that there are various measurement and data related difficulties for such research endeavours.

⁶⁰ Such as the end-to-end design principle, according to which application-specific features reside in the communicating **end** nodes of the network, and not in intermediary nodes, such as the router, which establish the network, or the separation of the upper and lower layers with the TCP/IP protocol serving as a portability layer.

⁶¹ J. Stiglitz Monopoly’s New Era, (2016) available at www.project-syndicate.org/commentary/high-monopoly-profits-persist-in-markets-by-joseph-e--stiglitz-2016-05 .

⁶² J. Stiglitz, Towards a Broader View of Competition Policy, in T. Bonakele, E. Fox & L. McNube (eds.), *Competition Policy for the New Era – Insights from the BRICS Countries* (OUP, 2017), 4, 15; J. Stiglitz, N. Abernathy, A. Hersh, S. Holmberg, and M. Konczal, *Rewriting the rules of the American economy: an agenda for growth and shared prosperity*, New York: W.W. Norton (The Roosevelt Institute, May 2015, <http://www.rewritetherules.org>.)

⁶³ T. Atkinson, *Inequality: What can be done?* (Harvard University Press, 2015).

⁶⁴ See, for instance, F. Alvaredo, A B Atkinson, T Piketty & E Saez, The Top 1 Percent in International and Historical Perspective, (2013) 27(3) *Journal of Economic Perspectives* 3-20; A. Atkinson, T Piketty & E Saez, Top incomes in the long run of history, (2011) 49(1) *Journal of Economic Literature* 3; T. Piketty, G. Postel-Vinay, & J.-L. Rosenthal, Wealth Concentration in a Developing Economy: Paris and France, 1807-1994, (2006) 96(1) *American Economic Review* 236; J. Roine, & D. Waldenström, *Long Run Trends in the Distribution of Income and Wealth*, in A. Atkinson & F. Bourguignon (eds.), *Handbook of Income Distribution*, (vol 2A, North-Holland, 2015), 469.

⁶⁵ G. Alfani, Economic Inequality in Northwestern Italy: a Long-Term View (Fourteenth to Eighteenth centuries), (2015) 75(4) *Journal of Economic History* 1058; G. Alfani, The rich in historical perspective. Evidence for preindustrial Europe (ca. 1300-1800), (2017) 11(3) *Cliometrica* 321.

The effects of concentration on the unequal distribution of wealth may, however, be linked as in the “Age of secular stagnation⁶⁶” and intense financialisation, return to capital exceeds economic growth, the result being that rentiers or senior executives, which form the bulk of the richest 1% of the population, see their share of total wealth increase. One may also rely on empirical evidence linking higher concentration following mergers to higher prices⁶⁷, and evidence showing that in the ‘winner-take-most’ competition of digital markets, where ‘superstar firms’ command growing market shares and become highly profitable, one may observe a larger decline in labour’s share⁶⁸, which has obviously an impact on economic inequality.

To the extent that competition law regimes may integrate ‘fairness’ concerns and not focus on consumer surplus, or more broadly consumer welfare, it is possible that they may scrutinise more carefully mergers or conduct that may reduce competition and maintain or increase economic concentration in the market.

More concretely, competition authorities usually employ an error cost framework in their analysis over the need to intervene, or not on a specific market, following the identification of a market failure resulting from the existence or the exercise of market power. Social costs can be of two sorts: ‘substantive costs’ (error costs)⁶⁹ and ‘procedural costs’, also called costs of ‘error-minimizing procedures’ or decision costs⁷⁰. There is a negative correlation between these two forms of costs, as in order to evaluate accurately the costs or benefits of specific conduct and thus minimize substantive errors (false positives or false negatives), which are costly, one would need to spend more time and resources gathering evidence and assessing it, thus increasing decision costs. False positives (or type I error) occur when the decision maker finds violations although the conduct did not harm competition, while false negatives (or type II error) occur when the decision maker does not find violations although the conduct harmed competition.

⁶⁶ L. Summers, *The Age of Secular Stagnation: What It Is and What to Do About It*, Foreign Affairs (noting the imbalance between excessive savings and investment, pulling down interest rates, savings tending to flow into existing assets, causing asset price inflation and possible

⁶⁷ See, J. Kwoka, *Mergers, Merger Control, and Remedies* (MIT press, 2014); J. Kwoka, *Does Merger Control Work? A Retrospective on U.S. Enforcement Actions and Merger Outcomes*, (2013) 78(3) *Antitrust Law Journal* 619.

⁶⁸ D. Autor, D. Dorn, L. Lawrence, F. Katz, C. Patterson & J. Van Reenen, *Concentrating on the Fall of the Labor Share*, (2017) 107(5) *American Economic Review* 180.

⁶⁹ These are often the focus of competition law and economics commentators since the early 1970s and constitutes one of the principal contributions of the Chicago school of antitrust law and economics. As it is explained by J. Baker, *Taking the Error out of the ‘Error Cost’ Analysis: What’s Wrong with Antitrust Right*, (2015) 80(1) *Antitrust Law Journal* 1, 4, ‘(t)hat framework was first employed in the law and economics literature by Richard Posner during the 1970s and introduced into mainstream antitrust scholarship by Paul Joskow and Alvin Klevorick in 1979. Modern antitrust commentators often refer to Frank Easterbrook’s adoption of the framework in a widely-cited article published in 1984 but the idea is older: R. A. Posner, *An Economic Approach to Legal Procedure and Judicial Administration*, (1973) 2 *Journal of Legal Studies* 399; P. L. Joskow & A. K. Klevorick, *A Framework for Analyzing Predatory Pricing Policy*, (1979) 89 *Yale LJ* 213; Frank H. Easterbrook, *The Limits of Antitrust*, (1984) 63 *Texas Law Review* 1.

⁷⁰ Alex Stein, *Foundations of Evidence Law* (OUP, 2005), 1. One may also expand this category to ‘transaction costs’, which costs go beyond the costs of adjudication and information gathering but also include the costs of ‘uncertainty about legal rules’, which ‘chills beneficial conduct or means that those rules fail to deter harmful conduct’: J. Baker, *Taking the Error out of the ‘Error Cost’ Analysis: What’s Wrong with Antitrust Right*, (2015) 80(1) *Antitrust Law Journal* 1, 5.

For instance, an approach requiring the identification and analysis of all possible effects of a conduct on consumer welfare would have limited the likelihood of error costs, but at the same time increase the likelihood of decision costs (e.g. costs of information gathering and processing). Decision makers employ a sequential information gathering process in order to reduce information and, more broadly, decision costs, while of course aiming to minimize the occurrence of substantive errors.⁷¹ The decision to acquire more information is a trade-off between two types of costs: ‘error costs on the one hand’, that is the decision maker may mistakenly identify a pro-competitive practice as being anticompetitive or the opposite, and information or decision costs on the other.⁷² This trade-off is done incrementally, at each level of this sequential assessment.

The assessment of costs involves some value judgment on the acceptability of type I or type II errors. These costs are not just administrative (the cost of arriving to a decision and implementing it) or substantive (the cost of an under-inclusive or over-inclusive rule with regard to the coverage of the rule on the basis of its statistical significance – how well the results represent the occurrence of false positives or false negatives in practice), but also the broader social costs of such errors. Indeed, it is possible that for several reasons competition law regimes may provide more weight in terms of social cost to false negatives than to false positives. The fact that digital markets are characterised by network effects, and the realisation that positions of power may be quickly entrenched after a tipping point and provide possibilities to some economic actors to leverage their powerful position in other markets, and thus to affect inequality may lead competition authorities to weigh more as cost of error false negatives than false positives, and consequently take a more pro-active approach, eventually relying on some form of implementation of the principle of precaution in competition law⁷³. The level of statistical significance is often set by the statistician in light of the acceptable rate of false positives. However, this issue is not related to substantive significance that measures the real social cost of false positives or false negatives, from a policy perspective. In order to assess substantive significance it is important to specify and examine the ‘loss function’ (utility loss associated with an estimate being wrong as a function of the difference between the estimated value and the real value), then, by what scale a number is large or small for the specific policy purpose and, finally, to perform a cost benefit analysis that will include the cost of this loss function⁷⁴. Similar consideration may also take place when performing the error cost analysis with as only focus consumer welfare. One may also criticise the error cost framework altogether, in view of the rather rapid development of technology and the limited knowledge of competition policy makers and competition authorities as to the real impact of their decisions

⁷¹ C Frederick Beckner III and Steven C Salop ‘Decision Theory and Antitrust Rules’ (1999) 67 *Antitrust Law Journal* 41, 43.

⁷² *Ibid.*, 46.

⁷³ See, for instance, the approach of the EU Court of Justice in Case C-52/09 *Konkurrenverket v TeliaSonera Sverige AB* [2011] ECR I-527, para 108, where the CJEU noted that ‘(p)articularly in a rapidly growing market, Article 102 TFEU requires action as quickly as possible, to prevent the formation and consolidation in that market of a competitive structure distorted by the abusive strategy of an undertaking which has a dominant position on that market or on a closely linked neighbouring market, in other words it requires action before the anti-competitive effects of that strategy are realised’.

⁷⁴ Deirdre Mc Closkey & Stephen Ziliak, *The Cult of Statistical Significance* (Univ. of Michigan Press, 2007), 97, who also note at 5 that ‘(a)ccepting or rejecting a test of significance without considering the potential losses from the available courses of action is buying a pig in a poke. It is not ethically or economically defensible’.

in the future. In this case, we can refer to a different mostly descriptive model relying on Bayesian statistics, where probabilities are always beliefs, rather than classical statistics where probabilities are objective. In the Bayesian analysis, the starting point is a ‘prior belief’ about the state of the world and then evidence changes those beliefs so that, having incorporated the evidence, the end point is a ‘posterior belief’ about the state of the world⁷⁵. The challenge to Bayesian statistics has always been that the prior beliefs may affect the resulting posterior belief whereas, perhaps in an ideal world, the evidence alone would drive the conclusion

2.2.2. Privacy

Breaches of privacy or data protection, facilitated by the use of Big Data and sophisticated computer algorithms, may affect millions of people and, depending on the purpose, even compromise the democratic process.⁷⁶ The debate over the interaction of privacy and competition law has been particularly vivid in the EU, as well as in its Member States, in view of the ‘constitutional’ protection of privacy,⁷⁷ and the existence of an elaborate system of data protection.⁷⁸ The discussion has since moved on to all other jurisdictions, with the enactment of legislation protecting privacy⁷⁹ and the development of data protection regulation⁸⁰. In recent years, the digital sector has attracted the attention of competition authorities and regulators involved in data protection.⁸¹ Competition authorities have also looked to these questions when exploring the changes brought by platform competition.⁸²

One of these issues is whether merger control should take into account the fact that access to personal data may constitute an important source of market power⁸³. Competition

⁷⁵ Specifically, Bayesian statisticians consider that an investigator will begin with a ‘prior belief’ about a given hypothesis, $P(h)$. Evidence may then allow those beliefs to be updated to give ‘posterior beliefs’ describing the likelihood of the hypothesis given the evidence, $P(h/e)$. Bayesian statisticians use Bayes Theorem to calculate their posterior beliefs using the formula $P(h/e) = P(e/h) * P(h)/P(e)$ where $P(e)$ denotes the probability of observing the evidence we see; $P(e/h)$ denotes the probability of observing the evidence given the hypothesis h ; and $P(h)$ is the prior belief

⁷⁶ J Drexler, ‘Economic Efficiency versus Democracy: On the Potential Role of Competition Policy in Regulating Digital Markets in Times of Post-Truth Politics’ in D Gerard and I Lianos (eds), *Competition Policy: Between Equity and Efficiency*, (forthcoming, CUP 2019).

⁷⁷ Article 7 of the Charter of Fundamental Rights lays down the right to respect for private and family life, home and communications, protecting the individual primarily against interference by the state.

⁷⁸ Article 8 of the Charter of Fundamental Rights recognises the protection of personal data as a separate right, which goes beyond simply protecting against interference by the state, but entitles the individual to expect that his or her information will only to be processed, by anyone, if however this processing is fair and lawful and for specified purposes, that it is transparent to the individual who is entitled to access and rectification of his/her information. The EU has adopted Regulation (EU) 2016/679 General Data Protection Regulation [2016] OJ L 119/1 the protection of natural persons with regard to the processing of personal data and on the free movement of such data, which applies from 25 May 2018. Its scope is significant and wide-ranging.

⁷⁹ ADD REFERENCES HERE

⁸⁰ ADD REFERENCES HERE

⁸¹ See, European Data Protection Supervisor, Privacy and competitiveness in the age of big data: The interplay between data protection, competition law and consumer protection in the Digital Economy (March 2014); Autorité de la Concurrence & Bundeskartellamt, Competition Law and Data (May 16, 2016); US FTC, Big Data – a Tool for Inclusion or Exclusion? (January 2016) and the references included.

⁸² European Commission, Online Platforms and the Digital Single Market Opportunities and Challenges for Europe, COM/2016/0288 final; House of Lords, Online Platforms and the Digital Single Market, HL Paper 129 (2016); OECD, Big Data: Bringing Competition Policy to the Digital Era, DAF/COMP(2016)14.

⁸³ See, M. Stucke and A. Grunes, *Big Data and Competition Policy* (OUP 2016) chs 6–8.

authorities are also increasingly active in data markets, reviewing exclusionary conduct involving (personal) data, but also examining the possibility of applying the provisions on abuse of a dominant position against privacy breaches, discrimination and exploitative contracts, which may be facilitated by control of big data, companies interchanging individualized offers on the basis of the information they acquire on individuals' willingness to pay through their past browsing history or other personalising factors; this enables them to charge different prices to various customers for homogeneous products (online personalised pricing).⁸⁴ Certain competition authorities have found that these practices may represent an abusive imposition of unfair conditions on users, by limiting their 'informational self-determination'⁸⁵. These practices raise the question of the interaction between competition law and other social and technical regulatory regimes protecting consumers or personal data.

This is not the only available integration strategy for privacy concerns. A number of authors have put forward various strategies in order to ensure the commensuration of privacy concerns within the competition law toolbox, such as assessing privacy as an element of product quality,⁸⁶ an element of consumer choice, or as a 'non-monetary price'.⁸⁷ Noting the 'privacy paradox', that is that consumers often state different preferences than those they actually reveal by their behaviour on the marketplace, these authors argue for the adoption of different methodologies than the price-based revealed preferences model of valuation, which has in any case difficulties to work in the context of a 'free' product not subject to monetary evaluation,⁸⁸ as is often the case in these multi-sided markets.⁸⁹ These approaches have in

⁸⁴ Autorité de la Concurrence & Bundeskartellamt (n 85) 21–22. See also, A Acquisti and HR Varian, 'Conditioning prices on purchase history' (2005) 24(3) *Marketing Science* 367; OFT 1489, *Personalised Pricing* (May 2013) finding also evidence of search discrimination, targeted discounting and dynamic pricing (use fluctuations in demand to change the prices of products depending on availability); A Ezrachi and M Stucke, 'The Rise of Behavioural Discrimination' (2016) 37 *ECLR* 484; A Ezrachi and M Stucke, *Virtual Competition* (HUP 2016) ch 12; M Bourreau, A de Streel and I Graef, 'Big Data and Competition Policy: Market Power, personalised pricing and advertising' CERRE Project Report (February 2017).

⁸⁵ See, Bundeskartellamt, Facebook decision, B6-22/16, https://www.bundeskartellamt.de/SharedDocs/Entscheidung/EN/Fallberichte/Missbrauchsaufsicht/2019/B6-22-16.html;jsessionid=D7517C62D2FECA034C11F273708EBC13.1_cid371?nn=3600108

⁸⁶ M. Stucke and A. Grunes, *Big Data and Competition Policy* (OUP 2016), 65-66.

⁸⁷ For a critical discussion of these approaches see, E Deutscher, 'How to Measure Privacy-Related Consumer Harm in Merger Analysis? A Critical Reassessment of the EU Commission's Merger Control in Data-Driven Markets' (2017) Faculty of Law, Stockholm University Research Paper No 40 <<https://ssrn.com/abstract=3075200> .

⁸⁸ For a general discussion, see, JM Newman, 'Antitrust in Zero-Price Markets: Foundations' (2015) 164 *U Pa L Rev* 149; M Gal and D Rubinfeld, 'The Hidden Costs of Free Goods: Implications for Antitrust Enforcement' (2016) 80(3) *Antitrust Law Journal* 521.

⁸⁹ E. Deutscher, 'How to Measure Privacy-Related Consumer Harm in Merger Analysis? A Critical Reassessment of the EU Commission's Merger Control in Data-Driven Markets' (arguing for the use of conjoint analysis on the basis of consumer surveys exploring their responses to different hypothetical choice problems for different variations of the product (higher or lower standard of privacy protection); K Bania, 'The role of consumer data in the enforcement of EU competition law' (2018) 14(1) *European Competition Journal* 38 (advancing the need for a stated preferences/conjoint analysis method).

common that they treat privacy as a parameter of price competition⁹⁰, even if this does not take a monetary form⁹¹.

In their effort to establish some form of commensuration that would enable balancing, some authors explore alternatives to the traditional consumer welfare standard:

(i) a ‘*broad* consumer welfare standard’, which will indirectly take into account non-economic interests, to the extent that these are directly related to the relevant market and accrue to the consumers of these markets, in a similar vein than the approaches explored above regarding the integration of privacy;

(ii) an ‘inclusive welfare standard’ that would take non-economic interests directly into account even if these do not affect the consumers of the relevant market, for instance through the consideration of some other unspecified aggregation method and

(iii) a ‘capability approach’, that would not rely on a welfarist standard.⁹² The last approach relies on the theoretical framework put in place by Amartya Sen, focusing on ‘well-being’, rather than welfare.⁹³ This calls for a new metric enabling some degree of commensuration and interpersonal comparison relying on the concepts of ‘functionings’ and ‘capabilities’. ‘Functionings’ are ‘beings’, such as being well-nourished, being undernourished, being safe, being able to participate to social and economic activities, but also being in bad health, and ‘doings’, such as voting in an election, travelling, eating to your hunger, consuming fuel to get warm, but also taking illicit drugs. For instance, consuming a lot of fuel might be considered as a positive thing for someone taking a growth perspective, while a bad thing for an environmentalist or from a sustainable growth perspective. Capabilities constitute a person's real freedoms or opportunities to achieve these specific functionings. Contrary to the welfarist perspective, in the capabilities approach social welfare is not seen as ‘a function of the person-specific distribution of each commodity’, but ‘as a function of the combination of everyone’s functioning vectors (or of everyone’s capability sets)’.⁹⁴

The legal status of the right to privacy, which is recognised in some jurisdictions,⁹⁵ as well as the development of specific legislation to ensure data protection,⁹⁶ should also provide the evidence of the hypothetical extended preferences of consumers/citizens to have their personal data protected, even if in practice their choice on the market may reveal that they are ready to be lured to sacrifice it for some other immediate gratification/benefit (e.g. free search). Their behaviour as revealed by their choices in the market sphere may not constitute evidence

⁹⁰ See, European Commission *Microsoft/LinkedIn* (Case COMP/M.8124), para. 350. The Commission had found that privacy was an important parameter of competition and driver of customer choice in the market for professional social networking services.

⁹¹ For a further discussion of privacy as a parameter of quality and methodologies, see N. Economides, & I. Lianos, *Restrictions on Privacy and Exploitation in the Digital Economy: A Competition Law Perspective* (August 30, 2019). NET Institute Working Paper No. 19-15. Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3474454.

⁹² R. Claassen and A. Gerbrandy, ‘Rethinking European Competition Law: From a Consumer Welfare to a Capability Approach’ (2016) 12(1) *Utrecht Law Review* 1.

⁹³ A. Sen, *Inequality Reexamined* (OUP 1995) 92.

⁹⁴ *ibid*, 95.

⁹⁵ See, for instance, in the EU, Article 7 of the EU Charter on Fundamental Rights.

⁹⁶ See, for instance, in the EU, Regulation (EU) 2016/679 (General Data Protection Regulation), [2016] OJ L119/1 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC.

of their true preferences, as it cannot be excluded that their behaviour may have been manipulated by a more powerful actor. It would therefore make sense to also rely on evidence of these extended preferences by looking to the rights and duties provided for in legal system where all actors are, at least formally, equal.

2.2.3. Fairness and complex equality

There is a widespread perception in public opinion and among commentators, that the small number of digital platforms and the resulting global economic concentration may have important implications on the political process, further undermining the autonomy of the political and cultural order vis-à-vis the economic order. For example, there are studies documenting how corporate lobbying is directly related to firm size⁹⁷ and evidence that large digital platforms are important contributors to the lobbying industry⁹⁸. There is also evidence that the Big Tech industry has led an effort to influence academic writing in the area of competition law and policy⁹⁹. Overall, the greater the market power enjoyed by firms, the more they have “both the ability and the need to gain political power”¹⁰⁰. This has led a number of authors to argue that competition law should have a role in order to ensure the autonomy of the political and social sphere, on the basis of the principle of ‘complex equality’¹⁰¹. According to this view, economic power may lead to political and cultural power, not only in the sense that it will generate some form of resource dependence, measured by the ability to raise prices profitably on a relevant market, or the ability to exercise superior bargaining power, in the specific social sphere (monopoly), but also because it will influence the options available for each individual agent in other spheres of social activity. Dominance will therefore challenge the autonomous distribution criteria applying in the various social spheres.

⁹⁷ M. D. Hill, G. W. Kelly & R. A. Van Ness, Determinants and Effects of Corporate Lobbying, (2013) 42(4) Financial Management 931

⁹⁸ See, <https://www.ft.com/content/7147935c-1f34-11e9-b126-46fc3ad87c65> ; https://www.washingtonpost.com/gdpr-consent/?destination=%2ftechnology%2f2019%2f01%2f23%2fgoogle-led-multimillion-dollar-tech-industry-lobbying-blitz-records-show%2f%3f&utm_term=.dda703aea532 ;

⁹⁹ See <https://www.independent.co.uk/life-style/gadgets-and-tech/news/google-invests-favourable-academic-research-publicity-campaign-accountability-transparency-project-a7839466.html> .

¹⁰⁰ L. Zingales, Towards a Political Theory of the Firm, NBER Working Paper No. 23593 (July 2017). Of course, other (cumulative or alternative) explanations for market concentration have been put forward: (i) the rise of IT and important expenses in developing IT systems (see, J.E. Bessen, Information Technology and Industry Concentration, (December 1, 2017). Boston Univ. School of Law, Law and Economics Research Paper No. 17-41. Available at SSRN: <https://ssrn.com/abstract=3044730> finding that industry concentration – the share of revenue captured by the top firms in a sector – is largely explained by the adoption of IT and that IT systems appear to play a major role in the recent increases in industry concentration and in profit margins, more so than a general decline in competition); (ii) the importance of investments in intangibles, such as brands, software, employee training, management (see J. Haskel & S. Westlake, *Capitalism without Capital* (Princeton Univ. press, 2017); (iii) the rise of “superstar firms” or “superforecasters” which are able to take advantage of technology, including Big Data and artificial intelligence, in understanding better than “standard” firms the competitive game) (see on “superstar firms”, D. Autor, D. Dorn, L.F. Katz, Ch. Patterson, J. Van Reenen, The Fall of the Labor Share and the Rise of Superstar Firms, NBER Working Paper No. 23396 (May 2017). For a comparative discussion of various causes, see J.E. Bessen, Accounting for Rising Corporate Profits: Intangibles or Regulatory Rents?, (November 9, 2016). Boston Univ. School of Law, Law and Economics Research Paper No. 16-18. Available at SSRN: <https://ssrn.com/abstract=2778641> .

¹⁰¹ For a discussion of this principle, see M. Walzer, *Spheres of Justice: A Defense of Pluralism and Equality* (Basic Books, 1983).

The existence of autonomous distributive criteria requires that no citizen's standing in one sphere or with regard to one social good can be undercut by his standing in some other sphere, with regard to some other good. 'Complex equality' aims to narrow the range within which particular goods are convertible and to preserve the autonomy of distributive spheres. Individuals interacting with digital platforms in the context of an online market transaction may use their algorithmic power to gain power in other spheres of social activity, which through lobbying they may later convert in economic power, as rent seeking and lobbying constitute the second most important driver of firms' profitability.¹⁰² Why should we not consider this multi-dimensional nature of competition, for the simple reason that the current version of competition law only focuses on price and output competition?

Indeed, digital platforms have become the central nervous system of modern capitalist value generation. Some jurisdictions, like the EU, have been quite concerned by the transformation of these digital platforms to important gatekeepers for various economic activities in the digital economy¹⁰³, and of their ability to leverage their economic power (resulting from the control of resources such as Big data, algorithms and Artificial Intelligence, on which the new model of economic production depends) in various domains of activity, including the capture of an even higher percentage of the total surplus value of the value chain¹⁰⁴. Concerns over the fact that control of (personal) data by these digital platforms may affect privacy¹⁰⁵, but also more generally the political process¹⁰⁶, thus leading to the emergence of a dominant position over a dominant social good (the dominant social good in question being information) have been quite prominent in the current debate over the economic (and political/cultural) power of BigTech.

3. The changing competition game

¹⁰² JE Bessen, 'Accounting for Rising Corporate Profits: Intangibles or Regulatory Rents?' (2016) Boston Univ School of Law, Law and Economics Research Paper No 16-18<ssrn.com/abstract=2778641> accessed 26 October 2018.

¹⁰³ See, EU Communication on digital platforms of 25 May 2016 (COM(2016)288 final) 12, noting that "(a)s online platforms play an increasing role in the economy, the terms of access to online platforms can be an important factor for online and offline companies. For SMEs and micro-enterprises, some online platforms constitute important, sometimes the main, entry points to certain markets and data".

¹⁰⁴ This explains the recent focus of competition authorities in Europe on leveraging practices, with the aim to ensure the "equality of opportunity" of economic operators (see, European Commission, Case AT 39.740 – Google Search, paras 332 & 334), as well as recent ideas to regulate from a fairness perspective platform to business relations (see, Inception Impact Assessment, Fairness in Platform to Business Relation, Ares(2017)5222469, available at https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-5222469_en).

¹⁰⁵ See, European Data Protection Supervisor, Privacy and competitiveness in the age of big data: The interplay between data protection, competition law and consumer protection in the Digital Economy (March 2014); Autorité de la Concurrence & Bundeskartellamt, Competition Law and Data (May 16, 2016); US FTC, Big Data – a Tool for Inclusion or Exclusion? (January 2016). Some public authorities have also looked to these questions when exploring the changes brought by platform competition: European Commission, Online Platforms and the Digital Single Market Opportunities and Challenges for Europe, COM/2016/0288 final; House of Lords, Online Platforms and the Digital Single Market, HL Paper 129 (2016); OECD, Big Data: Bringing Competition Policy to the Digital Era, DAF/COMP(2016)14.

¹⁰⁶ See, for instance, the debate about "fake news" presumably promoted by some digital platforms as being an "antitrust problem": S. Hubbard, 'Fake News Is A Real Antitrust Problem', (2017) Competition Policy International; S.P. Sacher & J.M. Jun, 'Fake News is not an Antitrust Problem' (2017) Antitrust Chronicle.

New technologies require important investments and fixed costs for their developments. This may lead to increasing returns to scale, the average cost of producing output being smaller at larger levels of output. From the demand side, consuming such technologies often leads to network effects, as use of a product or service by any user increases the product's value for other users (sometimes even all users). In other words, the value of the product to one user is positively affected when another user joins and enlarges the network (positive network externalities)¹⁰⁷. Furthermore, an additional user of a search engine may increase the quality of search provided by this search engine, therefore benefitting all users, in view of the additional queries that this may direct to the search engine and consequently the increase in the stock of data/ information the specific search engine disposes about users and their preferences which can help search engines to offer better search services to all consumers (learning-by-doing effects). These positive feedback loop mechanisms explain why these markets are 'tippy' and are characterized by 'winner takes it all' competition. For instance, there might be fierce competition to conquer a market share advantage over rivals, with regard to the specific technology or standard applying in the industry, as the market may switch almost completely to the winner (competition for the market).

Digital firms (and in particular digital platforms) generate profit in two principal ways:

- (i) they may exploit, better than conventional firms, the willingness to pay of their users, either by better understanding through data harvesting and personalisation the willingness to pay of their various market sides (in case the platform acts as an intermediary), thus extracting a higher surplus for their 'matching', or by increasing their willingness to pay for the platform itself adding new functionalities and features and developing an ecosystem of complementary products, which increase the value of the platform'
- (ii) they may adopt value capture strategies that aim to extract more surplus value from their ecosystem, for instance by capturing 'value as a portion of the sale of every complementary product or service sold for the platform, including its complements they build themselves'¹⁰⁸.

3.1. Financialisation and the re-interpretation of competition: implications for the digital economy

The recent discussion over the implementation of competition law in the digital economy has mainly focused on issues of access to data, interoperability of technologies and protection of final consumers from exploitation in product markets¹⁰⁹. The starting point of the analysis

¹⁰⁷ This positive feedback loop may work in reverse and in case the technology/product fails to reach a critical mass of users, it may fall into a 'death spiral' and ultimately disappear: see H Varian, Use and Abuse of Network Effects (September 17, 2017). Available at SSRN: <https://ssrn.com/abstract=3215488> .

¹⁰⁸ M. Cusumano, A. Gawer, D.B. Yoffie, *The Business of Platforms* (Harper-Collins, 2019), 79.

¹⁰⁹ See, J. Furman et al., Unlocking digital competition, Report of the Digital Competition Expert Panel (March 13, 2019), available at <https://www.gov.uk/government/publications/unlocking-digital-competition-report-of-the-digital-competition-expert-panel> (hereinafter Furman report); J. Crémer Y.-A. de Montjoye & H. Schweitzer, Competition Policy for the Digital Era (Final Report, OPOCE, 2019), available at <http://ec.europa.eu/competition/publications/reports/kd0419345enn.pdf>) (hereinafter European panel of experts Report).

provided and the recommendations take the traditional perspective of product market competition, with the additional emphasis put on data, as the most important input in the digital economy. This is of course an important dimension of competition, but hardly the most significant one, if one focuses on the process of value generation and capture in the digital economy, which is, as we described marked by the characteristic of futurity. Firms do not only compete in the product market dimension, the geographical boundaries of markets being to a certain extent expanded with the emergence of the Internet, but in the today's financialised economy, probably the most important locus of competition is capital markets. We will first describe the process of financialisation, before explaining how this could be relevant for our effort to understand competition in the digital era.

3.1.1. Financialisation and the rise of financial capitalism: implications for the digital economy and competition

The process of financialisation of the global economy has been described as a recurrent trend affecting a number of markets¹¹⁰. There has been a transformation of corporate control and behaviour since the 1970s. With the development of the multiproduct firm, in which managers sought to spread risks across various product lines in order to achieve greater profitability and to grow through mergers financed by leveraged buyouts, private equity investing, financed by junk bonds and other innovative financial techniques, has driven an increase in the level of corporate debt. The financialisation of the modern corporation has been a marked feature of this evolution. This process led to an important increase of the profits of the finance sector (finance, insurance and real estate) from barely 10% to approximately 45% of total corporate profits between 1950 and 2001, while the profits of the manufacturing sector dropped during the same period¹¹¹. It also led to a significant increase in the share of financial assets held by the non-financial sector of the economy and an increased importance of financial revenue for nonfinancial businesses¹¹². This period coincides with the prevalence of the shareholder value principle¹¹³, which dominated corporate governance discourse since the 1970s, and the subsequent focus on short-term share price¹¹⁴. The shareholder primacy principle changed managerial priorities from that of maximising growth by re-investing corporate savings in the long-term productive potential of the corporation (the principle of 'retain and re-invest') to that

¹¹⁰ More generally, see, G.A. Epstein, *Financialization and the World Economy*, (Northampton, MA: Edward Elgar, 2005); R.J. Shiller, R. J., *The New Financial Order. Risk in the 21st Century*, (Princeton: Princeton University Press, 2003); Johnna Montgomerie & Karel Williams, Financialised Capitalism: After the Crisis and beyond Neoliberalism, *Competition & Change* (June 2009) 13: 99-107; Ewald Engelen, The Case for Financialization, *Competition & Change* (June 2008) 12: 111-119; N. van der Zwan, Making sense of financialization, *Socio-econ Rev* (2014) 12 (1): 99-129; R. Solow, How to Save American Finance from Itself – Has Financialisation gone too far?, *New Republic* (April 8, 2013), available at <http://www.newrepublic.com/article/112679/how-save-american-finance-itself> .

¹¹¹ *Ibid.*, p. 1-2.

¹¹² *Ibid.*, p. 15.

¹¹³ W. Lazonick & M O' Sullivan, Maximizing shareholder value: a new ideology for corporate governance, (2000) 29(1) *Economy and Society* 13.

¹¹⁴ L. E. Davis, The financialization of the nonfinancial corporation in the post-1970s U.S. economy (2014), *Doctoral Dissertations*. 175.

of maximising stock value through extensive buybacks of corporate stocks (share repurchase) in order to inflate stock prices as the resulting artificial scarcity of shares boosts their value¹¹⁵.

Disciplined by a corporate market for control dominated by financial interests, in particular institutional investors, corporate managers became increasingly aligned with the interests of shareholders, and adopted strategies aiming to increase the price of their corporate stocks. They downsized their corporations (in particular cutting labour costs) in order to create short term shareholder value and distributed the freed up corporate revenues to financial interests, particularly shareholders, instead of re-investing them in the corporation (the principle of ‘downsize and distribute’)¹¹⁶.

An important facet of the financialisation movement has been the increasing leveraging of corporations through debt and other hybrid financial instruments and consequently their dependence on the investments of some institutional investors which increasingly now own shares in publicly listed companies, displacing ownership by physical persons¹¹⁷. Lazonick and O’ Sullivan have highlighted how ‘the rise of the institutional investor as a holder of corporate stocks encouraged top managers to align their own interests with external financial interests than with the interests of the productive organizations over which they exercised control’¹¹⁸. This literature has also shown how financial profits (mainly interest and dividend income as well as realised capital gains) form a significant part of corporate cash flow, this growing financialisation being inversely related to fixed investment¹¹⁹. The abandonment of the ‘retain and re-invest’ principle in favour of buybacks is indeed considered as one of the main sources of the stagnating productivity since the 1980s, as the economy is ‘starved’ from productive investments¹²⁰. The expansion of non-financial corporations into financial assets holdings shifts firm-level portfolio composition from fixed capital towards liquid financial assets (such as cash and short-term investments) and raises leveraging, in particular for larger firms which become increasingly focused on stock market performance, while unlisted smaller and medium-sized firms slowly de-leveraged their balance sheets¹²¹.

¹¹⁵ W. Lazonick, Profits without Prosperity, Harvard Business Review (September 2014), available at <https://hbr.org/2014/09/profits-without-prosperity> ; L. Palladino, Stock Buybacks, Driving a High-Profit, Low Wage Economy, (Roosevelt Institute, March 20, 2018), available at <http://rooseveltinstitute.org/stock-buybacks-high-profit-low-wage/>.

¹¹⁶ W. Lazonick, Profits without Prosperity, Harvard Business Review (September 2014), available at <https://hbr.org/2014/09/profits-without-prosperity>.

¹¹⁷ See, Serdar Çelik and Mats Isaksson, Institutional investors and ownership engagement, (2013) 2 OECD Journal: Financial Market Trends 93, 94 (noting that only 10% ‘of all public equity is today held by physical persons’).

¹¹⁸ W. Lazonick & M O’ Sullivan, Maximizing shareholder value: a new ideology for corporate governance, (2000) 29(1) *Economy and Society* 13, 27.

¹¹⁹ E. Stockhammer, Financialisation and the slowdown of accumulation, (2004) 28(5) *Cambridge Journal of Economics* 719; L. E. Davis, The financialization of the nonfinancial corporation in the post-1970s U.S. economy (2014), Doctoral Dissertations. 175, p. 17.

¹²⁰ See, for instance, I. Tung & K. Milani, Curbing Stock Buybacks: A Crucial Step to Raising Worker Pay and Reducing Inequality - An Analysis of Three Industries—Restaurant, Retail, and Food Manufacturing, (National Employment Law Project & Roosevelt Institute, July 2018), available at http://rooseveltinstitute.org/wp-content/uploads/2018/07/The-Big-Tradeoff-Report_072618.pdf (showing how buybacks in three segments of the food industry value chain reduce corporate resources that are available for growth-inducing activities, such as investing in research and development, spending on capital investments and new technologies, or creating new jobs and improving worker compensation).

¹²¹ L. E. Davis, The financialization of the nonfinancial corporation in the post-1970s U.S. economy (2014), Doctoral Dissertations. 175, p. 44.

The rise of institutional investors constitutes an epiphenomenon of this growing financialisation of the economy. This is a quite disparate group of legal entities whose purpose is mainly to manage and invest other people's money, although this is not always the case and there are hybrid forms of equity funds in which the managing partners co-invest with the limited partners¹²². Institutional investors include traditional financial investors, such as investment funds (in particular index funds), pension funds and insurance companies, as well as 'alternative' institutional investors, such as hedge funds, private equity funds, and sovereign wealth funds¹²³. The degree of engagement of these institutional investors in the competitive strategy of the corporations they invest in varies. One may contrast active hedge funds or mutual funds, with some index funds are investment funds (mutual funds or exchange traded funds) that track mechanically the performance of an index and are presumed to be 'passive' as they have little incentives to invest in the stewardship of the companies in which they are present¹²⁴. Hence, they defer excessively to the positions of corporate managers¹²⁵. Because of their 'passive' nature, they are not concerned with firm-level performance, as would normally active shareholders, but to the extent they are investing in a group of companies, they are simply concerned by the performance of their portfolio of firms, without however their internal structure and governance leading them to engage with the governance of their portfolio companies.

The institutional investor and asset management market has witnessed in recent years a significant process of concentration. Recent research has found that the 20 largest asset management firms around the globe account for 43.3% of the top 500 managers' total assets under management (AUM) and represent US\$ 93.8 trillion in 2017, the highest level of concentration at least since 2000¹²⁶. 'Passive' index funds, such as BlackRock with \$6,3 trillion total AUM, Vanguard Group with \$4.9 trillion total AUM, and State Street Global with \$2.7 trillion, constitute the top three asset managers globally in 2017 (called 'The Big Three')¹²⁷, followed by Fidelity, with \$2.4 trillion AUM, which does offer passive funds but they are just

¹²² S. Çelik & M. Isaksson, Institutional investors and ownership engagement, (2013) 2 OECD Journal: Financial Market Trends 93, 96.

¹²³ Ibid.

¹²⁴ Note however that passive investment does not equal passive ownership. Lots of the common ownership literature stresses how index funds do engage significantly in corporate governance activities. The crucial difference is the investment time horizon - e.g. index funds, which have very low turnover, essentially invest in perpetuity and so have long horizons and are materially interested in good governance among their portfolio companies. In contrast, a quantitative active fund may buy and sell frequently as per the recommendations of their model and so do not establish meaningful relations with the management of portfolio companies.

¹²⁵ For a discussion, L. Bebchuk & S. Hirst, Index Funds and the Future of Corporate Governance: Theory, Evidence, and Policy, (June 1, 2018). European Corporate Governance Institute (ECGI) - Law Working Paper No. 433/2018; Forthcoming, Columbia Law Review, Vol. 119 (2019); European Corporate Governance Institute (ECGI) - Law Working Paper No. 433/2018; Harvard Law School John M. Olin Center Discussion Paper No. 986. Available at SSRN: <https://ssrn.com/abstract=3282794>.

¹²⁶ See, Thinking Ahead Institute, The world's largest 500 asset managers (Willis Towers Watson, 2018), available at https://www.thinkingaheadinstitute.org/en/Library/Public/Research-and-Ideas/2018/10/PI5002018_research_paper.

¹²⁷ See, J. Fichtner, E. M. Heemskerck & J. Garcia-Bernardo, Hidden power of the Big Three? Passive index funds, re-concentration of corporate ownership, and new financial risk, (2017) 19(2) Business and Politics 298.

not that large¹²⁸. The concentration of corporate ownership resulting from the concentration of the asset management market may lead index funds to be more actively engaged with corporate strategy and influence corporate management, either actively, for example by exercising the voting power of the shares owned by their funds, or more indirectly, by simply ‘doing nothing’. This may induce corporate management to internalise the index funds’ interests in competing firms, in view of the fact that their importance in the shareholding has risen significantly in recent years¹²⁹. The rise of common ownership and the concentration of the asset management market may have considerably contributed to the loss of dynamism in the economy, the drop in productivity and the rise of firm markups¹³⁰.

The spread of ICT and digitalization in all sectors of the economy has also led to the development of dedicated tech venture capital, mostly based in the Silicon Valley in the US, and concentrating in the hands of a few asset managers, with the knowledge, the network and the funds to credibly support the development of start-ups to large digital platforms at a global scale.

The combined effects of the shareholder value primacy and the rise of common ownership, as well as the subsequent concentration of asset management have important implications on the competitive strategies undertaken by the management of corporations. Together they challenge the ‘assumption of own-firm profit’ or value maximisation that has animated industrial capitalism since the 1930s¹³¹, which forms part of the neoclassical theory of the corporation¹³². Subsequent literature has challenged the separation theorem, finding that the turn to shareholder primacy in the late 1970s with the emergence of financialisation, and the

¹²⁸ Thinking Ahead Institute, The world’s largest 500 asset managers (Willis Towers Watson, 2018), available at https://www.thinkingaheadinstitute.org/en/Library/Public/Research-and-Ideas/2018/10/PI5002018_research_paper, p. 38.

¹²⁹ See, M.C. Schmalz, Common-Ownership Concentration and Corporate Conduct, (2018) 10 Annual Review of Financial Economics 413, 444; S. Hemphil & M. Kahan, The Strategies of Anticompetitive Common Ownership, (December 1, 2018). Yale Law Journal, Forthcoming; NYU Law and Economics Research Paper No. 18-29; European Corporate Governance Institute (ECGI) - Law Working Paper No. 423/2018. Available at SSRN: <https://ssrn.com/abstract=3210373> (distinguishing between macro-mechanisms and micro-mechanisms that may account for the influence common owners may exercise on firm’s management, critically reviewing the effectiveness of the different mechanisms).

¹³⁰ See, J. Shambaugh, R. Nunn, A. Breitwieser & P. Liu, The state of competition and dynamism: Facts about concentration, start-ups, and related policies. (Technical report, The Hamilton Project: Economics Facts, 2018), available at <https://www.brookings.edu/research/the-state-of-competition-and-dynamism-facts-about-concentration-start-ups-and-related-policies/>; G. Gutiérrez, & T. Philippon, Investment-less growth: An empirical investigation, Technical report (National Bureau of Economic Research, 2016); J. De Loecker & J. Eeckhout, The rise of market power and the macroeconomic implications, Working Paper 23687, (National Bureau of Economic Research, 2017); M. Backus, C. Conlon, M. Sinkinson, The Common Ownership Hypothesis: Theory and Evidence (Brookings, Economic Studies, 2019) (finding less a link between concentration in asset management and common ownership incentives than between a broader increase in diversification of investor portfolios and common ownership incentives).

¹³¹ This stems from the Fisher separation theorem stipulating that the goal of any firm is to increase its profits and present value to the fullest extent, the profit goals of the firm being completely separate from its diverse shareholders: I. Fisher, *The Theory of Interest* (Macmillan 1930). This principle stops the firm from caring what the shareholders’ utility function is, which is also an implication of the separation of management and control as envisaged by A. A. Berle & G. C. Means, *The Modern Corporation & Private Property* (Routledge; 2nd edition, 1991, first published in 1932).

¹³² For an interesting discussion, see H. Hovenkamp, Neoclassicism and the Separation of Ownership and Control, 2009). Faculty Scholarship. 1792. http://scholarship.law.upenn.edu/faculty_scholarship/1792.

fact that the shareholding of public corporations is less dispersed resulting from the rise in common ownership, may have multiple effects.

It may:

- (i) increase the influence of shareholders in determining the utility function of the corporations in which they invest, thus challenging one of the assumptions of the Fisher separation principle,
- (ii) it may lead shareholders not to want firm-profit/value maximisation, but instead maximisation of the value of their whole portfolio of shares in other firms present in the industry, and thus
- (iii) it may result in altering corporate managers' incentives to aggressively compete on product markets with competing firms in which the common owners also hold shares¹³³.

These characteristics have important implications for competition law. Indeed, competition does not only take place in *product* markets (competition between products), as mainstream competition law assumes, but also in *capital* markets ('competition between capitals'). Competition becomes a struggle to lower costs per unit of output with the aim to gain more profit and market share and thus raise the rate of return of the capital invested¹³⁴. Some have also distinguished between *competition within an industry*, which forces individual producers to set prices that keep them in the game and compels them to lower costs so that they can compete effectively, thus leading to a turbulent equalization of selling prices but a dis-equalization of profit margin and profit rates, and *competition between industries*, the capital moving from one industry to another in search of higher profits, thus bringing about the equalization of profit rates between industries.¹³⁵

It is interesting to place the emergence of large global digital platforms in the context of the development of different forms of competition corresponding to the different stages (not varieties) of capitalism in the modern era¹³⁶. To some extent these global digital platforms have

¹³³ For a detailed discussion, see M.C. Schmalz, Common-Ownership Concentration and Corporate Conduct, (2018) 10 Annual Review of Financial Economics 413

¹³⁴ A Shaikh, *Capitalism: Competition, Conflict, Crises* (Oxford University Press, 2016).

¹³⁵ *Ibid.*, p 34.

¹³⁶ For an interesting discussion, see B. Carbala Smichowski, Competition and Market Power: A Critical Reassessment in Light of Recent Changes, PhD thesis (Paris 13, 2018) (distinguishing different forms of competition for each period of capitalist development: 'predatory competition' (1840-1860) which corresponds to the phase of capitalism that is linked to the consolidation of the corporation as the organization carrying on the production and the delivery of goods and services; 'collusive competition' (1870-1910) linked to the need for firms facing important technological disruption brought by the second industrial revolution and the rise of patenting requiring important investments and fixed costs to control their competitive environment through explicit coordination with competitors, eventually through the first wave of M&As in view of the difficulty of forming cartels after the adoption of the Sherman Act in the US; 'constricted competition' (1920s-1945) with the development of vertical integration, product differentiation and advertising in order to manage demand, mass production, ex ante pricing etc., the dominant market structure during this period being vertically integrated oligopolies; 'Fordist competition' (1945-1970s) involving the development of industrial conglomerates and multi-product firms leading to the emergence of the multidivisional form (M-firm), the production of technologically complex products requiring a more centralized organization for control, and aggressive antitrust and merger enforcement (also against vertical and conglomerate mergers) incentivizing firms' diversification in related markets, firms making 'profits over large quantities of standardized products instead of on large margins' (*ibid.*, 74); 'finance-led competition', which emerged as a reaction to the fact that the profit rate in the US has reached its lowest level since the beginning of World War II and led to a 'financialised/assetized' growth regime, leading to downsizing of conglomerates, modularization, fierce competition between international networks of vertically

been compared to the industrial conglomerates that dominated the US and global economies from the 1950s to late 1970s. US economist Galbraith, commenting on the rise of the conglomerates, argued that they relied on industrial planning, which was necessary in order to provide the stability that the significant commitment of capital and time for the development of more sophisticated technologies required, the more technically sophisticated the product is, the more important it is for the economic entities to plan their industrial production, but also “manage demand” (e.g., through advertising), in advance¹³⁷. This could take several forms, one being vertical integration and different forms of contractual restraints. Galbraith coined the term of “technostructure” to refer to the main source of authority in this more technologically sophisticated part of the economy. This term did not only make reference to the management of corporations but to a broader corporate technocracy, which controlled corporate savings that were quite significant during this period and represented more than three fifths of the total of savings supplied. Indeed, most of the earnings of a corporation were not paid as dividends to stockholders, but were instead retained by the corporation and reinvested or used for wage increases, in what has been qualified as the ‘retain and reinvest’ model of the corporation.¹³⁸ The essence of the power held by the technostructure relied on the specialised knowledge that was necessary for the organisation of the production and sale of more sophisticated technologically products, capital and labour being relatively less important factors of production in this context. Galbraith noted a ‘shift of power in the industrial enterprise (...) from capital to organized intelligence’¹³⁹. Profit maximisation, which is for Galbraith ‘the only goal that is consistent with the rule of the market’, is not the goal of the technostructure, which exercises power in order to pursue other goals, and in particular the organisation’s own survival.¹⁴⁰ Price stability serves one of the main objectives of industrial planning, growth, as it facilitates ‘control and minimise[s] the risk of a price collapse that could jeopardize earnings and the autonomy of technostructure’¹⁴¹.

As explained above, the rise of financialisation led to the emergence of a different conception of the firm during the late 1970s, seen as a portfolio of activities, managed according to their financial performance (in terms of rate of return on investment), rather than defined in terms of productive capabilities. A number of diversified firms were broken up in the 1980s, this movement ending the period of the ‘managerial corporation’ and corporations’ diversification in sectors unrelated to the main activity of the corporation. It also led to the rise of the power of market finance and of debt as the main source of corporate finance. The focus shifted on short term shareholder value by the development of lean corporations (downsize) and the distribution of profits to shareholders, rather than re-investing them in the corporation (distribute). During this period the interests of institutional investors and short-term financial

disintegrated firms (‘global value chains’) and the consequent ‘polarization of profit rate levels between firms’ (ibid., 80). During this period, the shareholders, in particular institutional investors, largely gained in importance with regard to workers and the firm’s management or technostructure.

¹³⁷ J. K. Galbraith, *The New Industrial State* (Princeton Univ. Press, 1967).

¹³⁸ See, on this concept and its opposition to the maximising shareholder value approach, W. Lazonick and M. O. Sullivan, Maximizing shareholder value: a new ideology for corporate governance, 29 *Economy and Society* 13 (2000).

¹³⁹ Ibid., 70.

¹⁴⁰ Ibid., 140 and 208–209

¹⁴¹ Ibid., 241.

markets' valuations took a more prominent role and the role of technostucture and long-term planning became more limited.

Digital platforms seem to constitute a hybrid between these models of 'retain and reinvest' and 'downsize and distribute'. They are characterised by conglomerate type of expansion, marked by high diversification, often driven by merger activity in weakly related markets, rather than organic growth. For instance, Amazon started off as an online retailer of books before being vertically and horizontally integrated to being a vendor of various products and also becoming a media and entertainment company, thus competing with other media and entertainment companies whose products it also sells on its platform. Amazon has also expanded in the Internet cloud business and storage and transmission of content to consumers. Intensive merger activity has been a feature of the technology industry in recent years¹⁴², with Google having made 214 acquisitions since the company was founded, Microsoft 189 since 1991, Apple 89 since 1991, Amazon 77 and Facebook 65¹⁴³. They also constitute eco-systems based on various forms of governance, contractual and technological. Although most of the US-based digital platforms are financialised, to the extent that large institutional investors are a prominent presence among their ownership structures (see 4.3.1.2.1.), in view of the structure of the organisation of voting rights they are more tightly controlled by their management, quite frequently their founders (see 4.3.1.2.2.). This tends to put emphasis on the long-term growth of the company, which becomes an objective as such, rather than short-term profitability. The organisational structure of the company also has some features of the M-corporation model, although financial targets may be replaced by innovation/technology targets or user base targets. Digital platforms also invest in R&D, although this is probably justified by the innovation-competition they are facing and the pressure to win the 'winner takes most' competition game. At the same time, digital platforms with a strong presence of institutional investors proceed to the distribution of dividends and stock buybacks that characterize financialised corporations (see 4.3.1.2.3.). Hence, it is possible to hypothesize the emergence of a new 'hybrid' model, which we will call 'expand and distribute'.

Competition law and economics' doctrine has not so far proceeded to a thorough analysis of how the process of financialisation of the digital economy may impact on competition law. In our view, this should play an important role as it may shed light on the competitive strategies of firms and also their welfare effects. For instance, some authors have observed the rise of 'digital conglomerates'¹⁴⁴ that emerged during the last decade, mostly through a spectacular number of mergers and acquisitions that have gone through without proper scrutiny by competition authorities. These authors acknowledge that conglomerates are formed because of a quest for market power: 'although they diversify into seemingly unrelated markets, this may indirectly increase their market power'¹⁴⁵. This may either occur 'because high degrees of diversification increase multi-market contacts, thereby facilitating (tacit) collusion between conglomerate firms', or because '(c)onglomerate firms may also use cross

¹⁴² See, <https://www.statista.com/statistics/511172/worldwide-technology-industry-mergers-acquisitions-total-deal-volume/>.

¹⁴³ See, <https://www.visualcapitalist.com/interactive-major-tech-acquisitions/>.

¹⁴⁴ M. Bourreau & A. de Stree, Conglomerates and EU Competition Policy (CERRE/CRIDS, March 2019), available at <http://www.crid.be/pdf/public/8377.pdf>.

¹⁴⁵ Ibid., 7.

subsidies between different lines of business to increase their market power in a given market, for example through predatory pricing’ (the “deep pocket” theory)¹⁴⁶. This is not of course the only reason we witness the birth and development of digital conglomerates, as these may be formed because of excess capacity in the use of their resources (e.g. data, technology, qualified and specialised personnel), because of the existence of ‘internal capital markets that may allow new ventures to obtain funding more easily than from external capital markets’, economies of scope (in view of the existence of sharable inputs, modular design and economies in product development) and ‘consumption synergies derived by consumers when adopting product ecosystems’¹⁴⁷, these factors not usually perceived by competition authorities as raising concerns. Bourreau and de Stree argue that the specific characteristics of the digital economy should nevertheless lead to a different starting point regarding these motivations for conglomerate expansion. First, they contend that ‘by making strategies of product proliferation less costly and through the control of essential inputs’ these economies of scope in product development may allow a firm to foreclose competition¹⁴⁸. Second, they note the role digital platforms play as gatekeepers, which is facilitated by their presence in various markets and areas of activity that are dependent on data, and the potential impact this may have on market outcomes and welfare¹⁴⁹. Third, they warn about the real motives of conglomerate mergers, which may be to pre-empt competition by killing at its birth any opportunity for a potential competitor to emerge (“killer acquisitions”)¹⁵⁰.

Similar concerns over the emergence of digital conglomerates have been raised by Nobel-prize winner Jean Tirole, who raised concerns as to the adoption of possible bundling practices that may exclude new entrants from the market:

“New entrants into online markets often begin with a niche product; if it proves successful, they expand to offer a much wider range of products and services. Google began with only its search engine before it became the company we know today; Amazon started by selling books. So what matters is whether new entrants can access the market in the first place. If a newcomer has a single original product that is better than what the incumbent offers, the incumbent might want to block it from gaining even a partial foothold in the market. The incumbent will do so not to improve its short-term profits, but to prevent the newcomer from later competing in areas where the incumbent occupies a monopoly position, or to stop the newcomer from allying with the dominant firm’s competitors”¹⁵¹.

A dimension that is nevertheless currently missing from the debate is the role of financial markets in providing the impetus for conglomerate expansion and the constitution of conglomerates. We have been focusing too much on digital capitalism, without comprehending that the shift towards dataification may not have had such dramatic economic and social consequences so far if it was not paired with another older shift in the global economy, the

¹⁴⁶ Ibid.

¹⁴⁷ Ibid., 9-13.

¹⁴⁸ Ibid., 17.

¹⁴⁹ Ibid., 18-19.

¹⁵⁰ Ibid., 21-23.

¹⁵¹ J. Tirole, *Regulating the Disrupters*, (January 1st, 2019), available at www.livemint.com/Technology/XsgWUgy9tR4uaoME7xtITI/Regulating-the-disrupters-Jean-Tirole.html (

emergence of the era of financialised capitalism. In order to understand this financial dimension and incorporate it into the competition law and economics framework, it becomes important to explore the role of financialisation in general, but also in particular with regard to the emergence and expansion of digital platforms.

3.1.2. Digital platforms and financialisation¹⁵²

This Section explores in more detail the influence of financialisation on digital platform companies. Financialisation at the firm level entails the ascendancy of shareholder value maximisation as the guiding principle of corporate behaviour among non-financial companies.¹⁵³ ‘Financialised’ firms act to improve the welfare of their shareholders, regardless of the impact of such actions on other stakeholders, including workers or society more generally.¹⁵⁴

A clear indication of financialisation is the amount of cash firms redistribute to their shareholders through dividends and share buybacks, at the expense of other ends such as investment in R&D or improved worker remuneration.¹⁵⁵ As noted above, we may contrast financialised firms that engage in such strategies with conglomerates, which dominated the Anglo-American economies until the 1970s and behave according to a business model built on the retention and reinvestment of profits.¹⁵⁶

In this section we explore whether digital platforms have become financialised or if they more closely resemble traditional conglomerates. Furthermore, we suggest the traditional demarcation between strategies of ‘downsize and distribute’ and ‘retain and reinvest’ breaks down in the context of the digital platforms and we see the emergence of a new hybrid form of capitalism characterized by strategies of ‘expand and distribute’.

Our analysis centres on the five largest digital platforms by market capitalisation: Microsoft, Apple, Amazon, Alphabet and Facebook. Overall, we report mixed results. Apple, and to a lesser extent Microsoft, appear to be financialised. In contrast, Amazon, Alphabet and Facebook appear resistant to the financialisation trend.

To build a picture of the degree of financialisation among digital platform firms, we present quantitative data on the following: (i) shareholding patterns; (ii) shareholder voting rights; and (iii) dividend, share repurchasing and R&D activity.

3.1.2.1. Shareholdings of Digital Platforms

¹⁵² This Section was drafted with a significant contribution by Andrew McLean and the research assistance of Igor Kharitonov.

¹⁵³ See L. E Davis, *The financialization of the nonfinancial corporation in the post-1970 U.S. economy* (PhD thesis, University of Massachusetts 2014).

¹⁵⁴ See Alexander Styhre, *The Financialization of the Firm: Managerial and Social Implications* (Edward Elgar 2015).

¹⁵⁵ See M. Mazzucato, *The Value of Everything* (Penguin 2019).

¹⁵⁶ For example, W. Lazonick, ‘Stock buybacks: From retain-and-reinvest to downsize-and-distribute’ (2015) Centre for Effective Public Management at Brookings <<https://www.brookings.edu/wp-content/uploads/2016/06/lazonick.pdf>> accessed 23 May 2019.

The presence of institutional investor shareholdings is a necessary (but insufficient) precondition for the financialisation of a firm. Institutional investors, through concentrating the stock ownership of dispersed asset holders, strengthen the voice of shareholders.¹⁵⁷ Therefore, we examine the ownership structure of Microsoft, Apple, Amazon, Alphabet and Facebook. We remark upon the overall proportion of institutional investor ownership and the identity of top shareholders, including institutional investors, insiders (executive officers and directors), or investors that are neither institutional nor insiders.

First, we observe that each platform is predominantly owned by institutional investors. This is illustrated below:

Digital Platform (Nationality)	Total Institutional Investor Shareholdings (%)	Total Non-Institutional Investor Shareholdings (%)
Microsoft (US)	73.5	26.5
Apple (US)	61.5	38.6
Amazon (US)	56.1	44.0
Alphabet (US)	79.4	20.6
Facebook (US)	73.0	27.0

Note: Data as of 5 May 2019, to one decimal place. Source: Bloomberg.

In contrast, China-based digital platforms are characterised by the prevalence of non-institutional shareholding (see Figure 4.4.).

Figure 4.4. China-based digital platforms: institutional versus non-institutional investors

Digital Platform (Nationality)	Total Institutional Investor Shareholdings (%)	Total Non-Institutional Investor Shareholdings (%)
Tencent (China)	0.4	99.6
Alibaba (China)	40.0	60.0

Note: Data as of 5 May 2019, to one decimal place. Source: Bloomberg.

Source: Authors compilation

¹⁵⁷ See William Lazonick and Mary O’Sullivan, ‘Maximizing shareholder value: a new ideology for corporate governance’ (2000) 29(1) *Economy and Society* 13.

A deep look into the shareholders of some of these Big Tech and the role of institutional investors and venture capitalists shows that the same institutional investors are often present in Big Tech.

Figure 4.5: Digital Platforms' shareholding: a panorama

FACEBOOK

INSTITUTIONAL V. NON-INSTITUTIONAL OWNERSHIP

	Ownership Share
Institutional	72.96%
Non-Institutional	27.04%

TOP FIVE INSTITUTIONAL INVESTOR SHAREHOLDERS

Investor	No. of Shares	Ownership Share
Vanguard	176,427,337	7.34%
BlackRock	149,675,571	6.23%
Fidelity	116,022,748	4.83%
Price T Rowe	90,094,802	3.75%
State Street	86,216,867	3.59%

INSIDER AND OTHER MAJOR SHAREHOLDINGS

Investor	No. of Shares	Ownership Share
Mark Zuckerberg	377,901,839	15.73%
Combined all directors and executive officers (including Zuckerberg)	414,874,690	17.27%
Dustin Moskovitz	32595276	1.36%
Eduardo Saverin	53433148	2.22%

Insiders with at least 1% of total share ownership and non-institutional investors with at least 5% of total share ownership

Source: author's compilation

MICROSOFT

INSTITUTIONAL V. NON-INSTITUTIONAL OWNERSHIP

	Ownership Share
Institutional	73.49%
Non-Institutional	26.51%

TOP FIVE INSTITUTIONAL INVESTOR SHAREHOLDERS

Investor	No. of Shares	Ownership Share
Vanguard	603102597	7.87%
BlackRock	507006157	6.62%
State Street	303610380	3.96%
Fidelity	254905697	3.33%
Price T Rowe	192592815	2.51%

INSIDER AND OTHER MAJOR SHAREHOLDINGS

Investor	No. of Shares	Ownership Share
Bill Gates	102992934	1.34%
Combined all executive officers and directors (including Gates)	106111414	1.38%

Insiders with at least 1% of total share ownership and non-institutional investors with at least 5% of total share ownership

Source: author's compilation

TENCENT

INSTITUTIONAL V. NON-INSTITUTIONAL OWNERSHIP

	Ownership Share
Institutional	0.41%
Non-Institutional	99.59%

TOP FIVE INSTITUTIONAL INVESTOR SHAREHOLDERS

Investor	No. of Shares	Ownership Share
Fisher Asset Management	19,888,495	0.21%
DSM Capital Partners	7,563,929	0.08%
Parameters Portfolio Associates	2,738,910	0.03%
Ark Investment Management	2,614,306	0.03%
Rheos Capital Works	1,200,000	0.01%

INSIDER AND OTHER MAJOR SHAREHOLDINGS

Investor	No. of Shares	Ownership Share
Ma Huateng	819,507,500	8.66%

Combined all executive officers and directors (including Huateng)	867,433,373	9.17%
MIH TC (Naspers)	2,961,223,600	31.29%

Insiders with at least 1% of total share ownership and non-institutional investors with at least 5% of total share ownership

Source: author's compilation

ALIBABA

INSTITUTIONAL V. NON-INSTITUTIONAL OWNERSHIP

	Ownership Share
Institutional	40.04%
Non-Institutional	59.96%

TOP FIVE INSTITUTIONAL INVESTOR SHAREHOLDERS

Investor	No. of Shares	Ownership Share
BlackRock	67,733,482	2.61%
Price T Rowe	60,090,770	2.32%
Ballie Gifford	49,028,056	1.89%
Vanguard	42,489,423	1.64%
Temasek Holdings	27,369,175	1.06%

INSIDER AND OTHER MAJOR SHAREHOLDINGS

Investor	No. of Shares	Ownership Share
Jack Ma*	167,159,739	6.45%
Joseph Tsai*	59,316,886	2.29%
Combined all executive officers and directors (including Ma and Tsai)*	247552556	9.55%
Softbank	746998571	28.81%
Altaba	383565416	14.80%

Insiders with at least 1% of total share ownership and non-institutional investors with at least 5% of total share ownership

Source: author's compilation

From the above, we consider that the China-based platforms are far less, or not at all, financialised. Their behaviour may thus correspond to the traditional conglomerate model of the late industrial capitalism that also prevailed in the US before the beginning of the era of financialised capitalism in the late 1970s.

We further explore the varying patterns of ownership by examining the extent of stock ownership by the top five institutional investors in each of the digital platforms that are financialised and, where appropriate, the shareholdings of firm insiders and other non-institutional investors:¹⁵⁸

- Microsoft's top five institutional investors own nearly one quarter of total outstanding shares,¹⁵⁹ while all insiders combined own less than two per cent, with the majority of insider stock ownership held by Bill Gates.¹⁶⁰
- Apple's top five institutional investors own just over one quarter of total outstanding shares,¹⁶¹ while all insiders combined own a negligible amount.¹⁶²
- Amazon's top five institutional investors own nearly 22 per cent of total outstanding shares,¹⁶³ while all insiders combined own approximately 16 per cent, with the majority of insider stock ownership held by Jeff Bezos.¹⁶⁴
- Alphabet's top five institutional investors own nearly one quarter of total outstanding shares,¹⁶⁵ while all insiders combined own 15 per cent of stock. Insider shareholdings is largely concentrated in ownership by Larry Page, Sergey Brin and Eric Schmidt.¹⁶⁶
- Facebook's top five institutional investors own just over one quarter of total outstanding shares,¹⁶⁷ while all insiders combined own approximately 17 per cent, with the majority of insider stock ownership held by Mark Zuckerberg.¹⁶⁸ Dustin Moskovitz and Eduardo Saverin also own notable shareholdings, yet are neither institutional investors nor insiders.¹⁶⁹

3.1.2.2. Shareholder Voting Rights

In addition to simple measures of stock ownership, to gain insight into the financialisation of digital platforms it is also important to appreciate the nature of voting rights within these firms. Share class differentiation reduces the strength of the link between observed shareholding and voting rights. Unlike Microsoft, Apple and Amazon, which all offer only one class of share, Alphabet and Facebook have differentiated share structures.

¹⁵⁸ Institutional ownership data sourced from NASDAQ website, based on institutional investors' latest 13F filings. Data on insider and other non-institutional investor ownership taken from firms' Annual Reports (10-K SEC filings).

¹⁵⁹ Microsoft's top five institutional shareholders are Vanguard (7.9%), BlackRock (6.6), State Street (4.0), Fidelity (3.3) and Price T Rowe (2.5). Cumulatively, 24.3%.

¹⁶⁰ Combined all insiders own 1.4% of Microsoft shares, Bill Gates owns 1.3%.

¹⁶¹ Apple's top five institutional shareholders are Vanguard (7.4%), BlackRock (6.4), Berkshire Hathaway (5.4), State Street (4.0) and Fidelity (2.4). Cumulatively, 25.7%.

¹⁶² All insiders aggregated own just 0.1% of Apple shares.

¹⁶³ Amazon's top five institutional shareholders are Vanguard (6.2%), BlackRock (5.2), Fidelity (3.6), Price T Rowe (3.2) and State Street (3.2). Cumulatively, 21.5%.

¹⁶⁴ Combined all insiders own 16.1% of Amazon shares, Jeff Bezos owns 16.0%.

¹⁶⁵ Alphabet's top five institutional shareholders Vanguard (7.3%), BlackRock (6.3), Fidelity (5.3), State Street (3.6) and Price T Rowe (2.4). Cumulatively, 24.9%.

¹⁶⁶ Larry Page owns 6.7% of Alphabet stock, Sergey Brin owns 6.4% and Eric Schmidt owns 1.4%.

¹⁶⁷ Facebook's top five institutional shareholders are Vanguard (7.3%), BlackRock (6.2), Fidelity (4.8), Price T Rowe (3.7) and State Street (3.6). Cumulatively, 25.7%.

¹⁶⁸ Combined all insiders own 17.3% of Facebook shares, Mark Zuckerberg owns 15.7%.

¹⁶⁹ Dustin Moskovitz owns 1.4% and Eduardo Saverin owns 2.2%.

Alphabet has three classes of shares: Class A shares, which confer one vote per share; Class B shares, which confer 10 votes per share; and Class C shares, which do not confer any voting rights. Only Class A and Class C are available to purchase on public equity markets, with Class B owned only by insiders and not publicly traded. According to Alphabet's most recent Annual Report, as of 31 December 2018 Larry Page, Sergey Brin, and Eric E. Schmidt beneficially owned approximately 92.8% of our outstanding Class B common stock, which represented approximately 56.5% of the voting power of our outstanding common stock. Page, Brin, and Schmidt therefore "have significant influence over management and affairs and over all matters requiring stockholder approval, including the election of directors and significant corporate transactions, such as a merger or other sale of our company or our assets, for the foreseeable future."¹⁷⁰

Similarly, Facebook has a dual-class share structure: Class A shares conferring one vote per share and Class B shares conferring 10 votes per share. Class A can be publicly traded, while Class B is reserved for insiders. Due to his ownership of Class B shares, Mark Zuckerberg, Facebook's founder, chairman and chief executive officer, has control over key decision making. According to Facebook's latest Annual Report:

Mark Zuckerberg...is able to exercise voting rights with respect to a majority of the voting power of our outstanding capital stock and therefore has the ability to control the outcome of matters submitted to our stockholders for approval, including the election of directors and any merger, consolidation, or sale of all or substantially all of our assets.¹⁷¹

Based on the above observations regarding shareholding and voting power, we may expect Amazon, Facebook and Alphabet to be relatively less financialised in comparison to Apple and Microsoft. In the case of Amazon, while voting power is not entrenched through share class differentiation, Jeff Bezos remains the largest shareholder and therefore has greatest voting power. Mark Zuckerberg not only owns the most Facebook stock, but due to Facebook's dual-class structure, he has disproportionately great voting power. Likewise, Alphabet's three primary insiders – Larry Page, Sergey Brin, and Eric Schmidt – own sizeable proportions of stock and have outsized voting power due to Alphabet's differentiated share classes. In contrast, insiders of Microsoft and Apple benefit from neither meaningful proportions of share ownership nor voting power conferred by share class differentiation. This likely gives greater influence to the institutional investor shareholders of these two platforms.

3.1.2.3. Dividends, Share Buybacks and Investment

As noted, a primary indicator of a firm's financialisation is the amount of cash they dedicate to increasing the welfare of their shareholders through issuing dividends or inflating stock prices through share repurchases, potentially at the expense of other goals such as R&D investment.

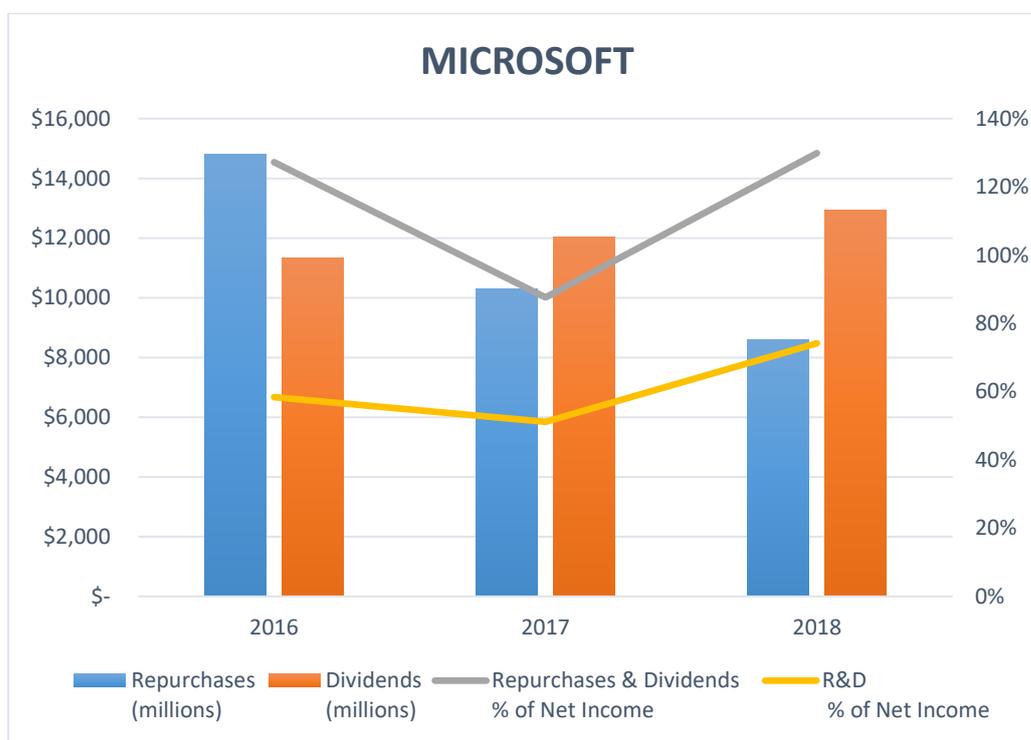
¹⁷⁰ Alphabet Q4 2018 10-K SEC Filing.

¹⁷¹ Facebook Q4 2018 10-K SEC Filing.

Here we examine the sums the largest five digital platforms spent on issuing dividends, repurchasing their own shares and R&D over five years from 2014 to 2018:¹⁷²

- Microsoft returned cash to its shareholders in every quarter, spending an average of \$10.7 billion per year on dividends and \$11.1 billion per year on share repurchases. At the same time, Microsoft spent an average of \$12.2 billion per year on R&D. Expenditure on dividends and share buybacks combined as a percentage of net income increased markedly across the period, from 71% to 130%. Expenditure on R&D as a proportion of net income also increased, from 52% to 74% (see Figure 4.6.).

Figure 6. Microsoft: Buybacks, Dividends and R&D

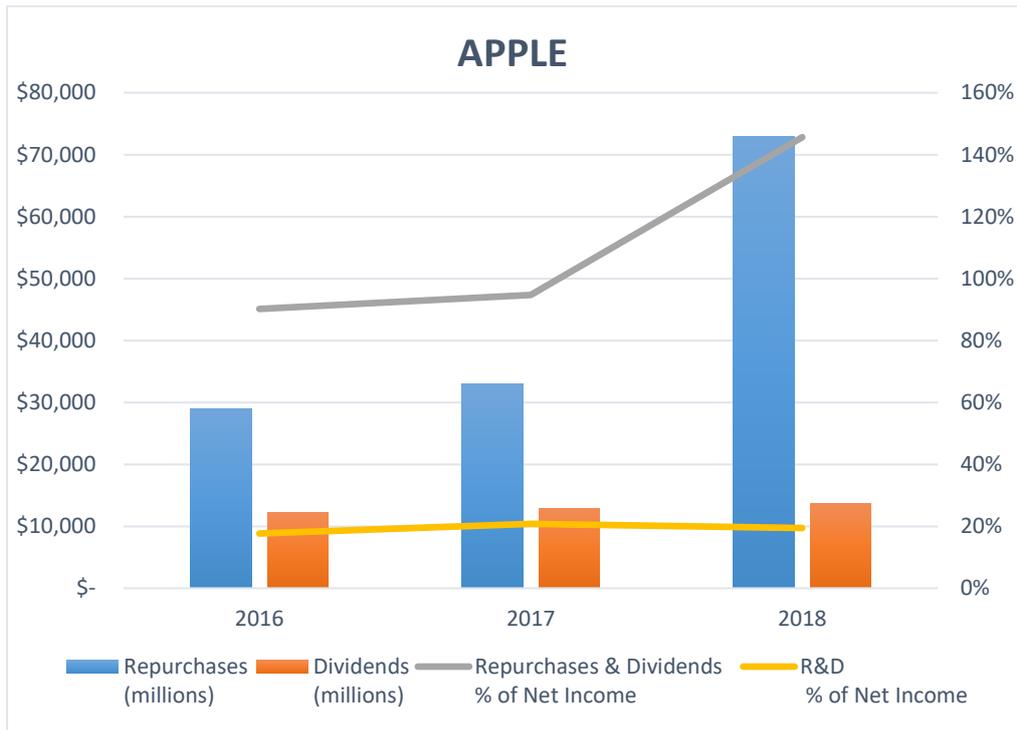


Source: author's compilation

- Apple returned cash to its shareholders in every quarter, spending an average of \$43.1 billion per year on dividends and \$12.2 billion per year on share repurchases. At the same time, Apple spent an average of \$8.0 billion per year on R&D. Expenditure on dividends and share buybacks combined as a percentage of net income increased slightly across the period, from 142% to 146%. Expenditure on R&D as a proportion of net income also increased, from 11% to 19%. (see Figure 4.7.)

Figure 4.7.: Apple: Buybacks, Dividends and R&D

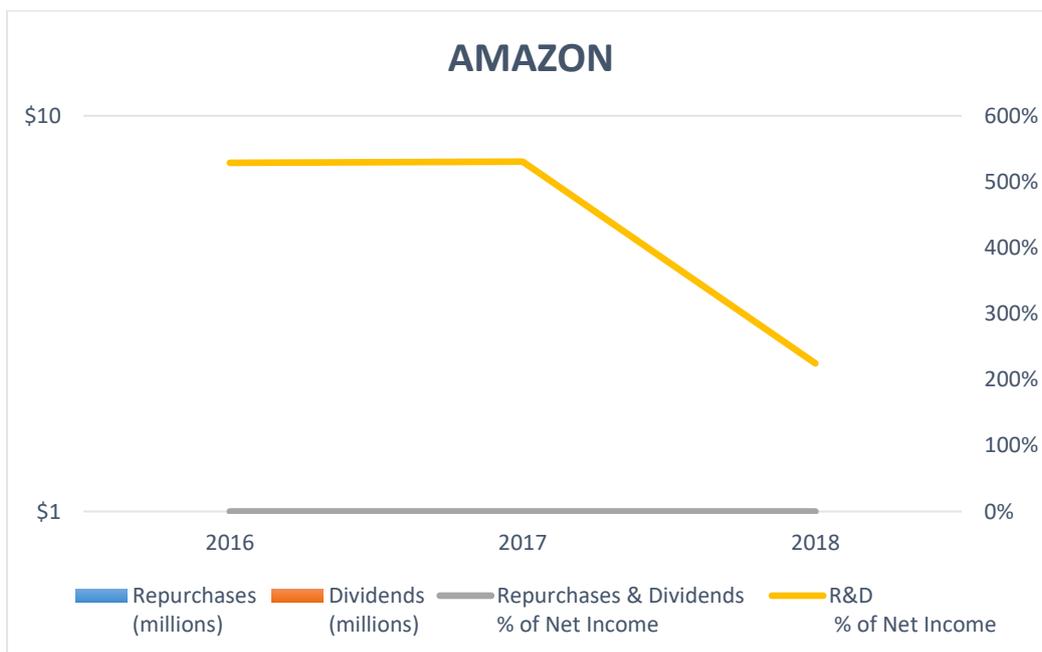
¹⁷² Net Income, Dividend and Share Repurchase data sourced from the digital platforms' Annual Reports (10-K SEC filings) and Quarterly Earnings Reports. R&D data sourced from the R&D data from Strategy&, 'The 2018 Global Innovation 1000 study' (PwC 2018).



Source: author's compilation

- Amazon returned no cash to its shareholders across the period. At the same time, Amazon spent an average of \$13.4 billion per year on R&D. Expenditure on R&D as a percentage of net income increased markedly across the period, from -2726% in 2014, when net income was negative, to 225% in 2018 (see Figure 4.8.).

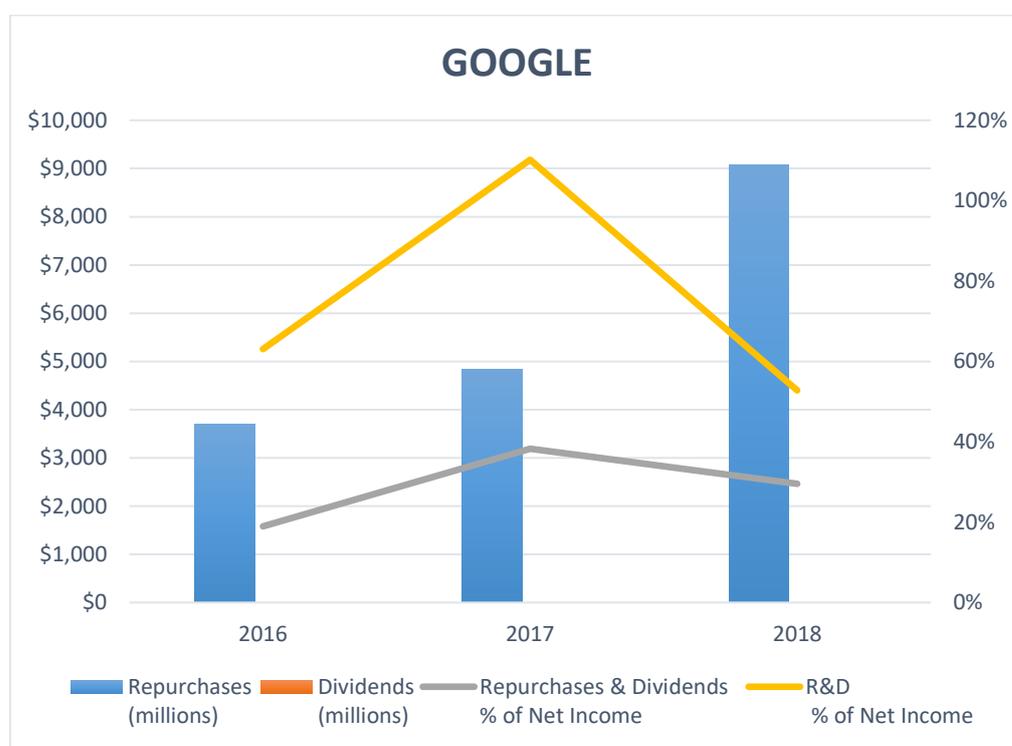
Figure 4.8. Amazon: Buybacks, Dividends and R&D



Source: Author's compilation

- Alphabet began to return cash to shareholders through dividends in the last quarter of 2015. It issued further dividends two quarters of 2016, three quarters of 2017 and every quarter of 2018. Across the period, Alphabet spent an average of \$3.9 billion per year on dividends. Alphabet engaged in no share repurchasing activity. In contrast, R&D expenditure was recorded across the entire period, averaging \$11.9 billion per year. Expenditure on dividends as a percentage of net income increased from 0% in 2014 to 11% in 2015 when dividend payments began and 30% by 2018. Expenditure on R&D as a proportion of net income increased slightly from 51% in 2014 to 53% in 2018 (see Figure 4.9.).

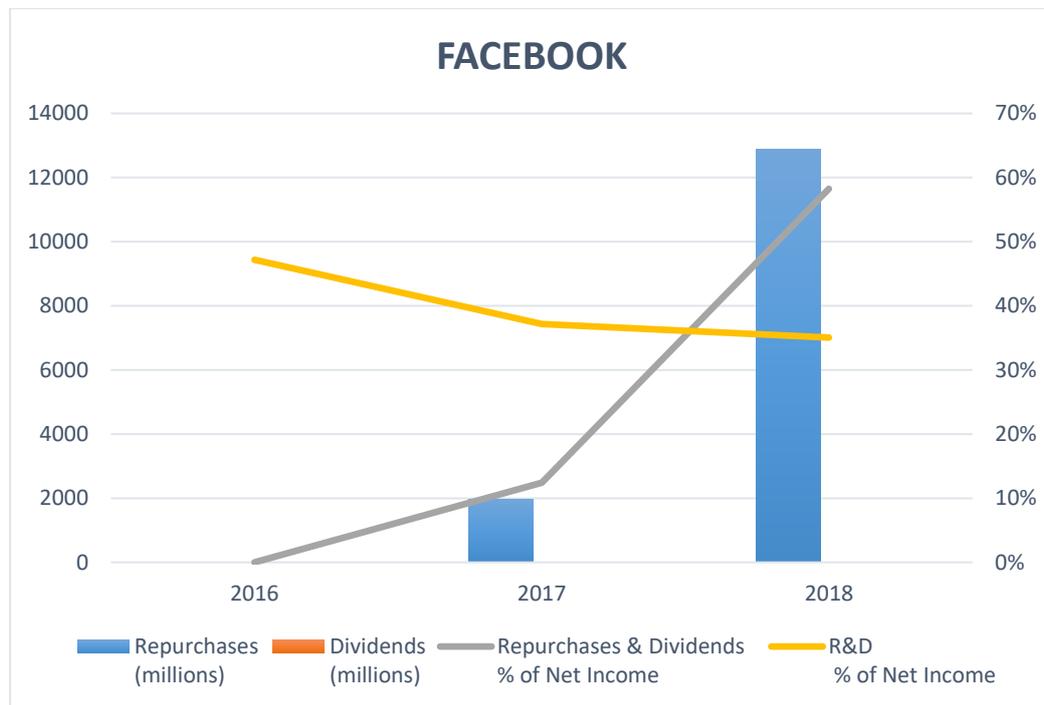
Figure 4.9. Alphabet (Google): Buybacks, Dividends and R&D



Source: Author's compilation

- Facebook began to return cash to shareholders through dividends in the first quarter of 2017. It issued dividends throughout 2017 and 2018. Across the period, Facebook spent an average of \$3.0 billion per year on dividends. Facebook engaged in no share repurchasing activity. In contrast, R&D expenditure was recorded across the entire period, averaging \$4.5 billion per year. Expenditure on dividends as a percentage of net income increased from 0% in 2014 to 12% in 2017 when dividend payments began and 58% by 2018. Expenditure on R&D as a proportion of net income decreased from 48% in 2014 to 35% in 2018 (see Figure 4.10.).

Figure 4.10. Facebook: Buybacks, Dividends and R&D



Source: Author's compilation

Our contention that Microsoft and Apple are characterised by a greater degree of financialisation, due to the nature of their share ownership and voting rights, appears to be supported by the data on dividends, share buybacks and R&D expenditure. From this perspective, Amazon, Alphabet and Facebook could more readily be likened to pre-financialisation era conglomerates. We note, however, that the strong merger activity undertaken by Microsoft and Facebook undermines the traditional distinction between ‘downsize and distribute’ and ‘retain and reinvest’. The term ‘expand and distribute’ may be more apt, describing a hybrid period of financialisation and digitalisation.

3.1.3. Futurity and the financial dimension of competition in the digital economy

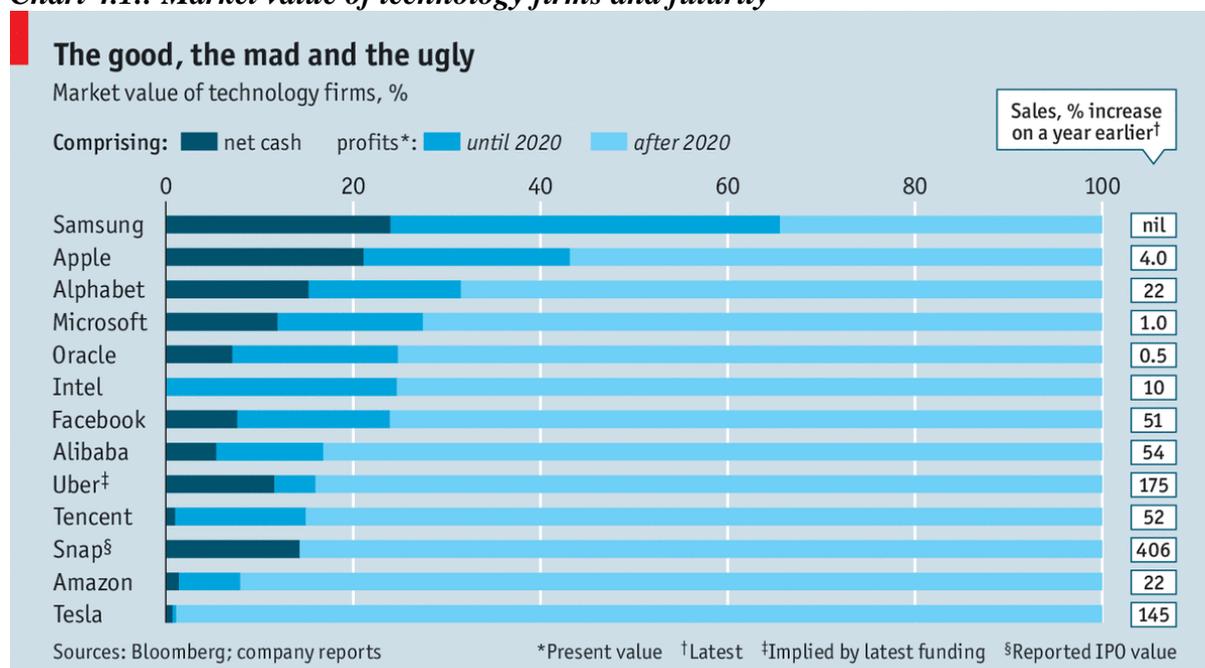
Financial markets play a crucial role in determining the market value of corporations, and consequently the compensation of their management. Due to futurity, market valuation relies on the expectation of future profits, rather than on actual profits being made by the firm. This may explain a number of competitive strategies that would often not make sense if one only takes into account product competition. This dimension of competition may have significant effects on productivity, innovation and the share of surplus value between the different segments of digital value chains.

Digital platform’s growing output is not motivated by their increasing profitability in product markets, as it has by now been well documented that many of these platforms have been incurring important losses or not making profits for a considerable period of time.

Motivated by network effects and the quest for the holy grail of the ‘tipping point’ that will enable them to become the winners in the ‘winner takes most’ competition, digital platforms drive to increase its market value is motivated by the signal this provides to financial markets. Indeed, their strategy is to increase their market share, even in the presence of negative profit margins. In this they are driven by the futurity of financialised capitalism, which value not their current cash flow but expected profits in the short and medium term.

One way to understand the importance of financialisation in this industry as the main drive of value creation is to see how much of these companies’ current market worth is expected to be realised soon and how much relies on expected returns into the future. In February 2017, The Economist identified the ten most important digital platforms and three promising ones and distinguished their market value into three parts: value which has already been realised in the form of net cash held, the present value of expected earnings in the next four years, and the value attributable to what happens after 2020¹⁷³ (see Chart 4.1.).

Chart 4.1.: Market value of technology firms and futurity



Economist.com

Source: *Economist* (February 23, 2017)

The article notes how the shares of technology firms trade on their highest ratio to sales, four of the world’s most valuable firms being tech companies: Apple, Alphabet, Microsoft and Amazon. While over 40% of Samsung’s and Apple’s value can be explained by cash and near-term profits, as the firms do not follow a rapid growth strategy and are low-risk, for some of the ‘raciest firms’, such as Tesla, 90% of their value concerns expected profits to be made after 2020. As it is explained in the article, Amazon is ‘one of the most optimistically valued firms’, as 92% of its current worth refers to profits after 2020. Only a third of the \$1 trillion of Apple’s value is justified by its profitable cloud-computing arm, AWS, while the rest of the activities

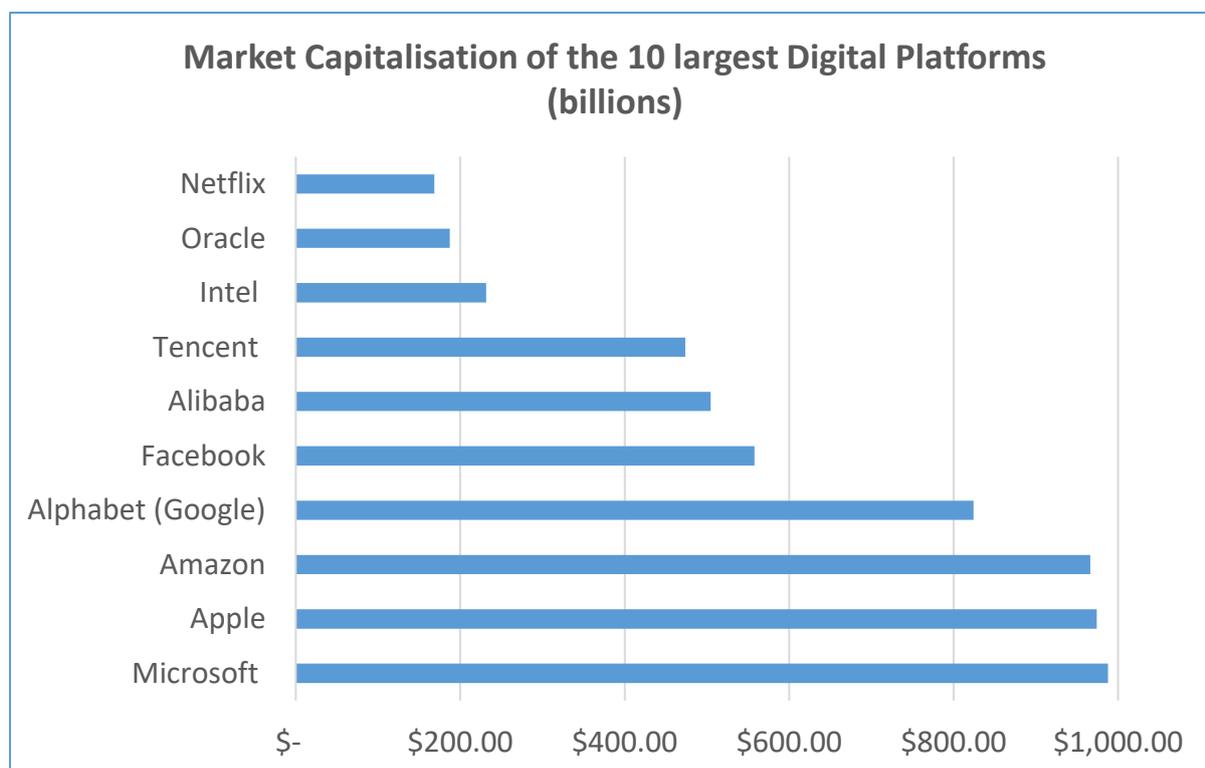
¹⁷³ See, <https://www.economist.com/business/2017/02/23/are-technology-firms-madly-overvalued>.

of the firm in e-commerce, television and films, as well as logistics, ‘barely makes money despite generating large sales’¹⁷⁴. Nor is it growing particularly fast for its industry. To justify this valuation one needs to believe that the company has become a sort of ‘giant utility for e-commerce which by 2025 cranks out huge profits, more than any other firm in America’. Some of the other firms in the list, such as Alibaba, Tencent, Facebook and Alphabet, see their sales growing at an annual rate of over 20%, with high margins. A number of ‘blue-sky’ firms, such as Uber and Snap are unprofitable but witness explosive sales growth.

Hedge fund managers are not anticipating the same profit stream twice for each functionality. For example, Facebook is not expected to become a force in search, while Google is not expected to conquer social media. Hence, the reason that these firms are highly valued is their monopolistic potential as they control important bottlenecks in the attention and prediction economy.

Digital platforms have reached almost incredible market valuations (see Figure 4.11)

Figure 4.11. Market Capitalisation of the top 10 Digital Platforms



Source: Author's compilation

Notes and Source: Market capitalisation in billions (USD), as at 5/5/19. Source: Bloomberg Markets

List of platforms based on P Evans and A Gawer, 'The Rise of the Platform Enterprise: A Global Survey' (2016).

Rankings updated for market capitalisation as at 5/5/19, including newly floated companies

¹⁷⁴ Ibid.

The role of financial markets in the valuation of these digital platforms is also manifested by the important role played by institutional investors and certain star venture capitalists that invest in technology firms, start-ups and Big Tech, accompanying them along the process, or for part of it, and playing a very important role of quality certification that impacts significantly on the market valuation of these companies, and may make them or break them.

3.2. Competitive advantage beyond horizontal competition

Competitive strategy analysis focuses on competition, taking into account the corporate strategy to maximise the firm's performance, in terms of surplus value and economic profit¹⁷⁵. Corporations seek a competitive advantage, either by imitating successful competitors while lowering their costs, or by differentiating themselves from their competitors, by developing internal resources and capabilities and designing strategies to exploit these differences. The business environment in which competitive advantage strategies are integrated is formed by the relationship the corporation has with three sets of players: customers, suppliers, and competitors¹⁷⁶. Firms make profits but they must also provide value to their customers. 'Value is created when the price the customer is willing to pay for a product exceeds the costs incurred by the firm'¹⁷⁷. This surplus is distributed between the customers and the producers by the forces of competition. If competition is strong, consumers will receive the higher percentage of the surplus value (the so called consumer surplus, which measures the difference between the price they paid and the price they were willing to pay). The rest of the surplus value will be received by producers (the so called producer surplus, which measures the difference between the amount a producer receives and the minimum amount the producer is willing to accept for the product). The profitability of industries varies, some earning high rates of profit, while others can cover a little more than their cost of capital¹⁷⁸. This largely depends on the degree of competition that prevails in each industry, as intense price competition generally leads to weak margins. Profitability within a specific industry may also be quite different, some firms earning significant profits, while others struggling to maintain themselves on the market¹⁷⁹.

¹⁷⁵ Economic profit is 'the surplus available after all inputs (including capital) have been paid for': R M Grant, *Contemporary Strategy Analysis* (Wiley, 2013) 38. To the extent that financial markets look to the actual but also expected stream of economic profit (or cash flows), the Net Present Value (NPV) (or stock market value) of a firm provides a forward-looking performance measure, which has become extremely important, in view of the financialisation of the economy and the intense competition between capitals. Enterprise value depends on three drivers: rate of return on capital, cost of capital and profit growth: Ibid, 42.

¹⁷⁶ Ibid., 61.

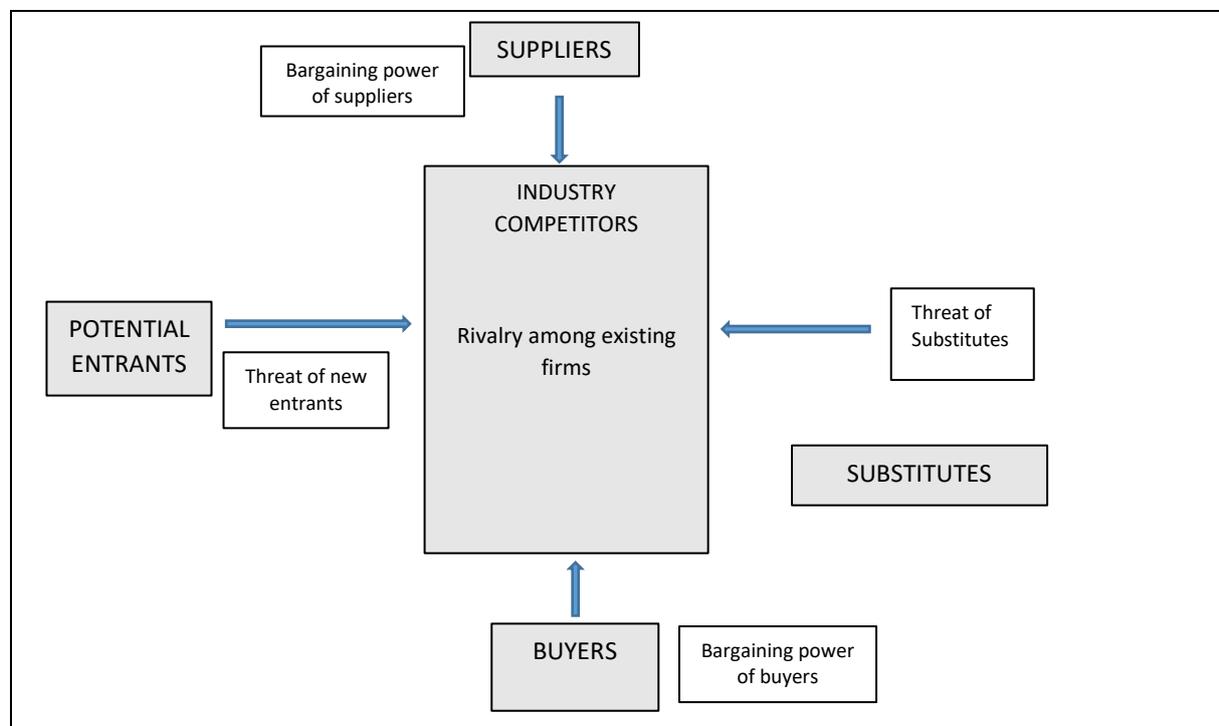
¹⁷⁷ Ibid., 62.

¹⁷⁸ Ibid.

¹⁷⁹ The advent of the digital economy has led to the development of what has been characterized as the rise of "superstar firms" which are able to take advantage of technology, including Big Data and artificial intelligence, in understanding better than "standard" firms the competitive game. See, D. Autor, D. Dorn, L.F. Katz, Ch. Patterson, J. Van Reenen, *The Fall of the Labor Share and the Rise of Superstar Firms*, NBER Working Paper No. 23396 (May 2017).

The most widely used competition framework in business strategy is that put forward by Michael Porter, the ‘five forces of competition framework’¹⁸⁰.

Figure.4.12: Porter’s five forces



Source: R M Grant, *Contemporary Strategy Analysis* (Wiley, 2013) 65.

According to this framework, the profitability of an industry is determined by five sources of competitive pressure: competition from substitutes, competition from new entrants in the industry, competition from established rivals, which can be characterised as sources of ‘horizontal’ competition, and competition from the bargaining power of suppliers and the power of buyers, which can be characterised as sources of ‘vertical competition’¹⁸¹.

In the context of the ‘winner takes most’ competition of the digital economy and the role of financial markets valuation in competitive strategy in the era of financialisation, vertical competition becomes an important dimension of the competitive game.

Competition economics has largely focused on horizontal competition from established competitors (producing substitute products), or on the threat of entry of potential competitors. Rivalry between established competitors is often measured by reference to the level of market concentration, often measured by a concentration ratio, the market share of the largest producers in a specific market. However, it is still unclear how the level of market concentration impacts on profitability, and consequently the allocation of the surplus between consumers and producers¹⁸². The likelihood of a new entry (potential competition) largely

¹⁸⁰ M. E. Porter, *The Five Competitive Forces that Shape Strategy*, (January 2008) Harvard Business Review 25.

¹⁸¹ R.M. Grant, *Contemporary Strategy Analysis* (Wiley, 2013) 65.

¹⁸² See, the different positions of the so called ‘Harvard’ or Structure-Conduct-Performance school, which found a causal link between a concentrated market structure and profitability [see, J.S. Bain, *Relation of Profit Rate to Industry Concentration: American Manufacturing, 1936–1940*, (1951) 65 Quarterly Journal of Economics 293

depends on barriers to entry, that is, an advantage that an established firm enjoys vis-à-vis its rivals, which may include economies of scale (to the extent that large, indivisible investments in production facilities, research & technology or marketing may be more easily amortized over a large volume of output), absolute cost advantages (which may come from an easy access to an indispensable input), capital requirements (because of the large fixed costs required in order to kick start economic activity in an industry), product differentiation (as it might be quite difficult to enter a market where consumers have strong loyalty ties to existing brands), access to channels of efficient distribution, strategic barriers to entry because of competitive strategies that aim to increase the potential rivals' costs if they enter the market, legal and regulatory barriers etc. Competition law aims to limit the effectiveness of barriers to entry, so as to increase the 'contestability' of the market¹⁸³.

In contrast, vertical competition has not been the focus of competition economics, even if it may play a significant role with regard to the allocation of the total surplus value that is generated by a value chain. The relative bargaining power of a supplier upstream, or of a customer downstream, have been considered as playing a less important role than 'horizontal competition', in particular because it is assumed that, in most cases, they play a quite limited role on the overall economic efficiency of the transactions. To the extent that economic efficiency still constitutes one of the main goals of competition law, rather than fairness in the distribution of the total surplus value, the exercise of relative bargaining power is not considered as being a primary concern for competition law, with the exception of course of the situation where its exercise may harm economic efficiency (e.g. the rather confined case of monopsony or buyer power). Vertical competition may however become an important concern, if one wants to focus on productivity and on the ability of 'superstar' large digital platforms to pull away from competition and enjoy tremendous levels of profitability, without these accumulated profits being used for productive investments.

In the digital economy, what constitutes an established or a potential competitor becomes also blurred, as the companies are actively pursuing strategies to alter industry structure in order to alleviate competitive pressures, by positioning the company where competition, horizontal and vertical, is the weakest¹⁸⁴. In the digital economy, important network effects lead to 'winner-takes-most' competition, with only one platform controlling a market, or being the significant player on a relevant market (thus restricting horizontal competition), or more broadly dominating a value chain (thus restricting vertical competition). Markets characterised by platform competition are thus horizontally concentrated, sometimes to such an extent that the second or third player in the market may not offer a viable competitive alternative to the

(who showed that showed that the after-tax returns on shareholder equity across forty-two U.S. manufacturing industries were higher when the eight-firm concentration ratio (sum of the shares of the eight leading firms) was above 70 percent); H.M. Mann, Seller Concentration, Barriers to Entry and Rates of Return in Thirty Industries, (1966) 48 Rev Econ & Statistics 296], and that of the so called 'Chicago' school, which found that this effect was weak statistically and usually quite small [see, Y. Brozen, Bain's Concentration and Rates of Returns, Revisited, (1971) 14 Journal of Law & Economics 351; H. Demsetz, Two Systems of Belief about Monopoly, in H. J. Goldschmidt & H. M. Mann, (eds), *Industrial Concentration: The New Learning* (Little, Brown, 1974) 164].

¹⁸³ W.J. Baumol, J.C. Panzar & R.D. Willig, *Contestable Markets and the Theory of Industry Structure* (Harcourt Brace Jovanovic, 1982).

¹⁸⁴ R.M. Grant, *Contemporary Strategy Analysis* (Wiley, 2013) 74-76.

established platform. Inter-platform competition remains weak, and there is significant *inequality in the distribution of market shares* among horizontal competitors.

At the same time, the centralized platform forms a bottleneck, with the power to determine the allocation of the surplus generated by the value chain between the various contributors, and in particular to keep the overwhelming part of this surplus, thus accumulating significant profits (exercising vertical economic power). In view of the anchoring of users and the low levels of switching to competing platforms, the platform operators can be confident that the reduction of vertical competition, between the different segments of the value chain, with regard to the allocation of the total surplus value generated by the value chain, will not lead to the desertion of their platform from a significant number of applications developers. Hence, value chains dominated by digital platforms are also marked by a very *unequal distribution of profits* between the established platforms and the participants to their ecosystem.

The digital economy gives rise to a variety of strategies to acquire competitive advantage and convert this to surplus value to be later collected in product and financial markets. In this fast-moving environment, innovation competition provides the main constraint to ‘winner-takes-most’ competition, as new economic actors rely on cost-cutting technology to break into markets, disrupt the existing competitive structure, and eventually acquire a position of economic power, before they give way to new actors making a more efficient use of the technology or relying on a better technological alternative.

Box 2 How should BRICS NCAs address digital platforms where ‘winner takes most’?

BR In many cases, the "winner takes most" situation is the equilibrium of some digital markets. In such cases, attempting to superimpose a different market structure (say, one in which all firms have approximately equal market shares) may be counterproductive and inefficient. On the other side, it is necessary to prevent the misuse of market power. Therefore, finding the right balance is essential for promoting innovation and protecting consumer welfare in the fast-moving environment presented in digital markets.

RU The experience of the FAS Russia shows that the significant market power of the digital platform could be addressed with the remedies of providing access to data or technological transfer to the market players which could hypothetically be competitors.

CN The digital platform usually involves multi-sided markets, which is partially or completely free. Compared with the traditional industry, it has the characteristics of network effects and locking effects. Therefore, the competition authorities face challenges in market definition, competition assessment, remedies, and other aspects in the cases involving digital platforms. This requires the authorities, on the basis of further in-depth research, to adjust and employ flexibly the traditional concepts and tools of Anti-Monopoly Law according to the specific circumstances of the case concerned.

ZA South Africa's experience in digital markets is limited. However, depending on how the challenges presented by digital markets are addressed on a case-by-case basis, South Africa may either face increasing competitive, contestable markets in the future, where efficiency and continuous innovation prevail, or end up in situations of 'winner takes most.' Hence, each case needs to be assessed on its merits. From the mergers' perspective, the access condition with no room to discriminate should always be imposed. The difficulty will be to understand how the merging parties can use the sophisticated digital tools to circumvent the conditions.

Source: BRICS NCAs Questionnaire

3.3. Vertical competition: introducing the concept

Although we have a number of theories explaining horizontal competition, with some exceptions, vertical competition has been largely ignored in competition law and economics literature.

The issue was first raised in competition law literature on vertical restraints, in particular dealing with contexts in which the supplier and distributors may be in competition with each other (e.g. dual distribution, private labels). Robert Steiner has advanced the view that there are two forms of competition that co-exist in vertical structures: First, the horizontal competition between the different vertical structures or between the retailers of the same vertical structure, and second, the vertical competition between the different levels of the vertical structure, such as suppliers versus retailers over the sharing of the profits of the vertical chain¹⁸⁵. Steiner perceives competition as a struggle between firms aiming to capture a perceptible share of markets from each other (which is the traditional view of horizontal competition) but also an important share of sales or margins. It follows that suppliers and retailers engage 'in a form of vertical intrabrand competition by attempting to increase their vertical market share (VMS) at each other's expense', where vertical market share consists in their respective shares of a brand's retail price¹⁸⁶. In contrast to the Chicago school and Transaction Cost Economics (TCE) approaches to vertical restraints, this literature perceives the relation between the different levels of the vertical chain as not being exclusively complementary, but also as antagonistic¹⁸⁷. Steiner suggested an alternative approach for vertical restraints that affect intrabrand competition between retailers. He considered that the 'single-stage paradigm' of vertical restraints, which emphasizes the analysis of the existence of interbrand competition and largely ignores the role of vertical competition, does not correspond to commercial reality. The dual stage model, he suggested, will not only focus on the existence of market power at each level and/or horizontal competition between suppliers or

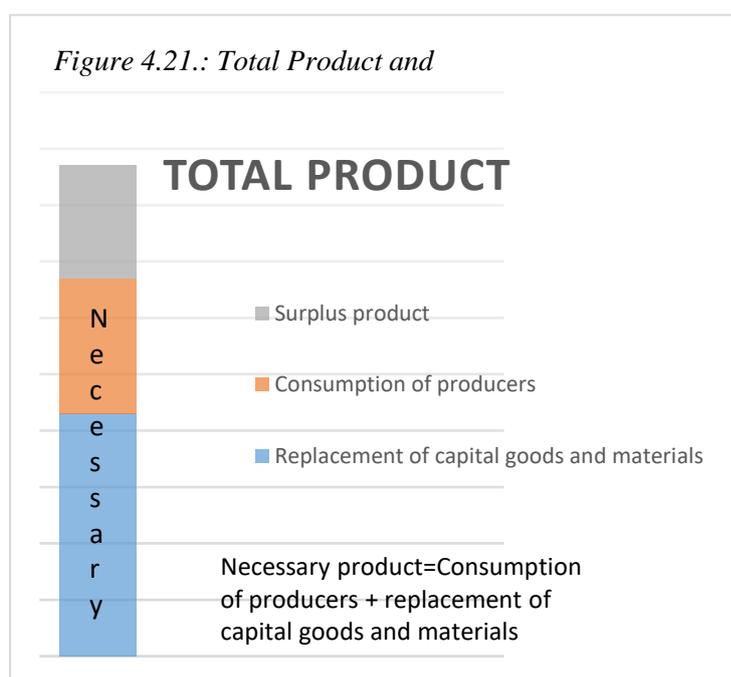
¹⁸⁵ R.L. Steiner, 'Intrabrand Competition-Stepchild of Antitrust', (1991) 36 *The Antitrust Bulletin* 155, 161.

¹⁸⁶ *Ibid.*

¹⁸⁷ R.L. Steiner, 'The Inverse Association Between the Margins of Manufacturers and Retailers' (1993) 8 *Review of Industrial Organization* 717; R.L. Steiner, 'The Virtual Equivalence of Horizontal and Vertical Competition—An Analysis of the Sources of Market Power in Consumer Goods Industries' (2007 *Loyola Antitrust Colloquium*) 7 http://www.luc.edu/law/academics/special/center/antitrust/pdfs/Steiner_Vertical_paper.pdf .

between dealers, but will also examine competitive relationships between manufacturers and retailers¹⁸⁸. Consequently, the ‘locus of market power’ and consequently the source of the restraint, supplier or retailer market power, should be an important consideration in the enforcement of competition law¹⁸⁹.

One may focus on competition in products market and explore the process of value generation in the context of a typical input-output process. In the digital economy, the main input is data, hence we will frame our analysis accordingly. Any economic process of production relies on the use of labour, technology, and some form of social organization of the production process that transform some inputs to outputs, most often commercialised on a market. The various labour processes that form the production process rely on inputs (raw materials or machines, labour), some of them ‘used up in the course of a production cycle’ (materials), and others that may be used in a more long-lasting way, in different production cycles, although they are also subject to a certain amount of depreciation because of their use (capital)¹⁹⁰. When the production process leads to output that is ‘in excess of what is needed for reproducing and replenishing the labo(u)r, tools materials, and other inputs used or used up in production’, so that the next production cycle can begin under the same conditions, this is considered as a ‘surplus product’, as this output is available for investment in the level of production, or for capitalist consumption¹⁹¹.



Hence, ‘surplus product’ is the part of the total output that does not constitute the “necessary product” to maintain the previous level of consumption. The ‘necessary product’ includes the output used for the replacement of capital goods and materials used in the production process, the output used for the maintenance and replacement of the capital goods used in production and the output used so as to guarantee the consumption of producers at their customary standard of living.

The total surplus may be invested in ‘labour-saving

technology’ or technical change, which enables a greater production of output with a given amount of labour, or in ‘capital-goods saving technical change’, which ‘reduces the amount of

¹⁸⁸ See: R.L. Steiner, ‘The Evolution and Applications of Dual-Stage Thinking’ [2004] 49 Antitrust Bulletin 719.

¹⁸⁹ See the analysis in I. Lianos, The Vertical Horizontal Dichotomy in Competition Law: Some Reflections with Regard to Dual Distribution and Private Labels, A. Ezrachi & U. Bernitz, (eds.), *Private Labels, Brands and Competition Policy* (OUP, 2009), 161.

¹⁹⁰ S. Bowles, R. Edwards, F. Roosevelt & M. Larudee, *Understanding Capitalism* (OUP, 2018), 72.

¹⁹¹ *Ibid.*, p. 67.

capital goods or the quantity of materials required to produce the total product'¹⁹². The total output may also be enlarged because of an increase in the 'Intensity of labour', the producers keeping their amount of work constant, although they work harder'¹⁹³.

How does this process of production take place in the context of the digital economy? As previously explained, data is the raw material of the digital economy. Digital platforms dominate 'Big-data driven' systems, to the extent that they constitute 'scalable data systems', data being connected through the web or other IT platforms, and the operation of various apps where information and experiences are exchanged in real time.¹⁹⁴ As with any other production process, which relies on inputs, including commodities, in order to produce outputs, data may be considered as the basic input in the input-output process of the digital economy. These production processes generate a surplus product, the latter being provided a value, either by a process of trade and exchange on product markets (value generated by its current use), and/or, as we will examine in more detail, on financial markets (value generated by expectations about its future use).

Lets' focus for simplicity on value generated by current use. Drawing the input-output production process for the digital economy is rather complex, as there is a great variety of digital platforms active in various fields of economic activity. What we will present is a simplified form that would, hopefully, describe the basic process of transformation of inputs into outputs occurring in the digital economy. A data-driven input-output process may be described as englobing the following steps¹⁹⁵:

- *Data generation or data capture*: In this segment a huge amount of data, about consumer transactions, bio-physical phenomena and conditions, such as the weather, soil consistency, health status, are generated and ultimately captured by a variety of sources: sensors, interacting devices, Mobile apps, social media and networks, posts, blogs, eMails, scientific publications, texts, antennas, videos and other connecting sources through several different devices (e.g. smartphones, Internet of Things, the cloud, PCs etc). Consumers are attracted to these various sources of data capture by being offered products and services "for free".
- *Data storage or data-warehousing*: this data is stored quickly in elaborate storage systems (e.g. the Cloud), which ensure that the data will be maintained, being relatively easy to access, secure and amenable to verification.
- *Data processing*, which connects heterogeneous data (e.g. pictures, text, video) also establishing protocols to confirm data veracity. Various methods are applied at this level of data analysis: (i) statistical methods of correlation among big data, reduction algorithms enabling the sampling of data and other techniques aiming to minimize the loss of data, (ii) data mining that aims to infer patterns from data (including clustering and regression analysis), (iii) artificial neural networks which are used for pattern recognition and image analysis, (iv) social network analysis enabling the study of social relations, social systems and networks.

¹⁹² Ibid., 81-82.

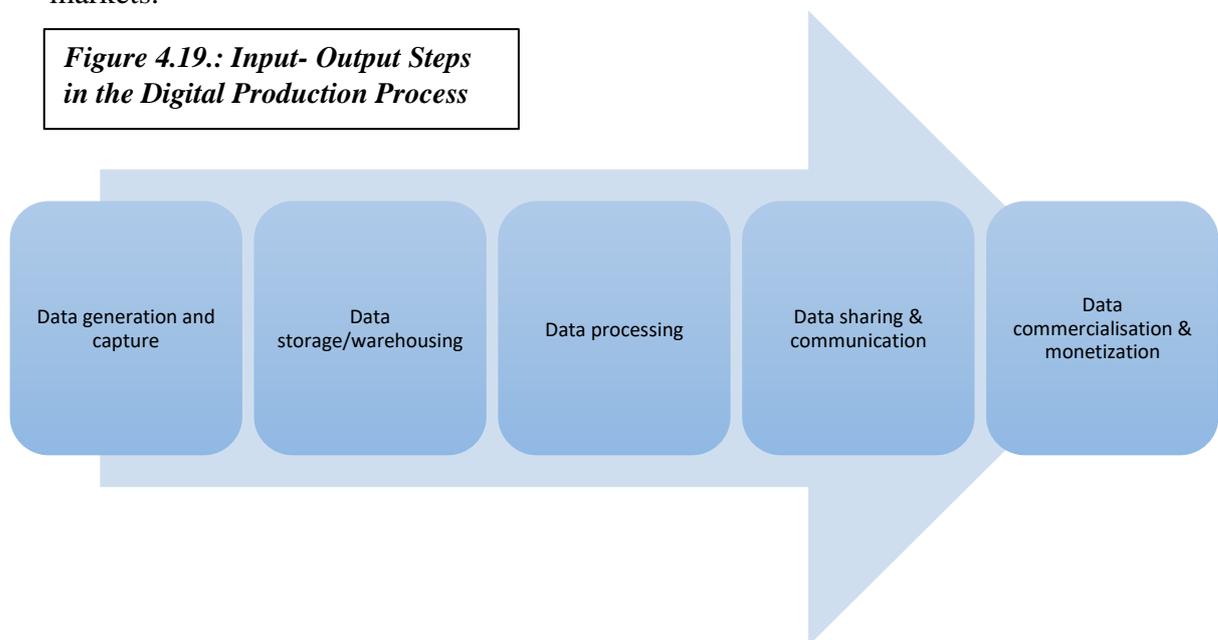
¹⁹³ Ibid., 83.

¹⁹⁴ R. Moro Visconti, A. Larocca & M. Marconi, Big data-Driven Value Chains and Digital Platforms: from Value Co-Creation to Monetization, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2903799 .

¹⁹⁵ Ibid.

- *Data sharing and communication*: this step aims to visualize and communicate or share data with the stakeholders. Various visualization tools may enable the stakeholders to interpret the data in order to establish robust causal connections, that is causal dependencies in the real world that may also lead to accurate predictions of the phenomena on which data have been collected (e.g. consumer needs and eventually future purchasing decisions of consumers, future yields on the basis of the quality of soil, weather conditions and the composition of fertilizers).
- *Data commercialization and monetization*: the process of assembling value through the creation of datasets merging different types of data (structured and unstructured), for instance integrating location data with customer data or public data with private data and of converting the intangible value of data into real value. Quite often this monetization occurs by selling this data to a group of consumers with indirect network externalities to the group of consumers whose data has been the input of the value chain, that is the first group of consumers is more willing to ‘be on board’ if they expect the other group of consumers to be equally popular. Data monetization requires “high technical data capabilities” (e.g. network capacities enabling the collection, storage and retrieval of data) and “high analytical capabilities” (the analytical skills needed to exploit the data). Of course there are different possibilities for monetization and various business models. Data may become an important asset for the company to protect, and merely used in its internal production process, or a valuable asset to exchange in data markets.

Figure 4.19.: Input- Output Steps in the Digital Production Process



It is noteworthy that contrary to traditional commodity/value chains, where the final consumer sits at the end-point of the supply chain, the chain describing the entire input-output process bringing a product or service from initial conception to the consumer’s hands, in data-driven markets, where unstructured data constitutes the raw material, the consumer most often (but not always, as data may not be personal data) constitutes the first input, and therefore the first segment in the value chain at the end of which sit the generators of capital, institutional

investors, venture capitalists, investment banks and others that profit from the monetization of data. This inversion of the role of the consumer in the input-output process for data-driven value chains results from digitalisation, which makes possible the capture, storage, processing and analysis of data at a scale never achieved before.

In addition to competing with firms in the same relevant market and/or potential horizontal competitors at each level of the value chain, there is also vertical competition among the firms forming part of the same value chain as to which one will be able to capture the largest share of the surplus value generated by the value chain. Depending on the governance of these value chains some firms may be able to raise their markup prices above average costs, which will affect the part of the surplus generated by the other segments of the value chain. Referring to the competition theory of Michael Kalecki, who modeled the mark up as being a function of ‘the degree of monopoly of the firm position’¹⁹⁶, William Milberg and Deborah Winkler note that ‘the degree of monopoly is determined by a set of environmental or institutional factors, including industrial concentration, advertising expenditure levels, the influence of labor unions [countervailing powers], and changes in the ration of fixed to variable costs’¹⁹⁷. Firms determine their output price by marking up over average prime costs, while taking into account the output-weighted average price charged by their competitors in the industry, taking into account their degree of monopoly in the industry¹⁹⁸. According to the same authors, a large deviation between the firm’s price and the average industry’s price shows that there is less competition among firms in the industry, this being usually associated with a high markup. Firms aim of course to limit their prime costs so as to be able to increase their mark up, if other firms in the industry do not benefit from these lower prime costs¹⁹⁹. According to this conception, contrary to neoclassical price theory, prices are not understood as ‘signals’ of productive efficiency or inefficiency and ‘pricing decisions do not serve the role of bringing allocative efficiency’ but are rather driven by the firm’s ‘long-term objectives for investment and growth’²⁰⁰.

A firm may increase its mark up by three strategies: (i) raise the product price, (ii) lower input prices, and (iii) raise productivity²⁰¹. The first strategy may be adopted in case the firm faces weakened horizontal competition, to the extent that the reduction of output cannot be easily substituted by actual or potential competitors present in the same market. An additional condition for the success of this strategy is that the firm faces weakened vertical competition, for instance by being able to exercise selling power downstream, without this strategy being compromised by the existence of a countervailing power downstream. This weakened vertical competition supposes the existence of vertical market power, which as we will explain in a subsequent Section may have multiple sources. The second strategy again supposes the existence of vertical power, this time upstream, as the firm should be able to exercise buyer or superior bargaining power vis-à-vis its suppliers of inputs. The third strategy involves the

¹⁹⁶ M. Kalecki, *Theory of Economic Dynamics*, Reprinted in J. Osiatynski (ed.), *Collective Works of Michael Kalecki*, Vol. II, (OUP, 1993), 18.

¹⁹⁷ W. Milberg & D. Winkler, *Outsourcing Economics – Global Value Chains in Capitalist Development* (CUP, 2013), 107.

¹⁹⁸ Ibid.

¹⁹⁹ Ibid.

²⁰⁰ Ibid.

²⁰¹ Ibid.

ability of the firm to invest in superior resources and to develop superior capabilities that would enable it to sustain its competitive advantage.

Transposing the discussion in the context of the data economy, digital platforms may theoretically increase their mark ups by raising their product price in one of the markets on which they are present (price mark up), to the extent that this is the ‘money side’ of the platform. There is also the subsidised side, on which often the digital platforms offer their products and services for ‘free’²⁰², although one may also conceive that mark ups could take the form of the harvesting of more personal data, and therefore represent the consequent reduction in privacy, considered in this context as a parameter of quality (a data mark up). Digital platforms may take advantage of their vertical power to lower their input prices. This, for instance, may take the form of suppressing the wages of their employees or dependent self-employed, or by taking advantage of heightened competition among suppliers and the existence of excess capacity upstream. They often achieve this by a strategy of lowering the barriers of entry in upstream markets and therefore provoking the continuous entry by new firms into the production of goods and services that serve as inputs to the outputs of the digital platform, for instance through the reduction of costs for app developers to participate to their app store²⁰³. This increased competition between their suppliers increases their mark ups. Digital platforms may also rely on their large installed base of users for providing inputs for free, through for instance the collection of large scale data on queries that can be used to train the algorithms of a search engine managed by the platform, or for instance through freely provided content for media platforms (e.g. blogs for a news’ aggregator, videos for a video-sharing website), which are then monetised in different ways.

Hence, in the digital economy context one needs to take a more dynamic perspective than product market competition. The strategy of the various firms in the digital economy is to capture a disproportionate amount of the surplus value created by innovation resulting from the emergence of the new industry resulting from the new technological developments. In some situations, the most effective strategy will be to opt for an ‘open architecture’ that nurtures complementarity through an open eco- system, should a system of ‘open innovation’ be the most effective way to generate higher value in this industry²⁰⁴. In other situations, firms may opt for a ‘walled garden approach’, opting for a closed architecture with regard to firms with competing assets and capabilities entering the value chain while keeping it open for firms with complementary assets. Finally, in other circumstances, firms may opt for vertical integration; taking full control over the rents generated by the complementarities brought by the innovation, whilst maintaining the possibility to exclude or marginalize any new entrant, for instance, by denying interoperability with regard to some indispensable technological interfaces. As the focus of competition authorities switches to innovation competition, it becomes important to ensure that the players contributing to this effort are properly incentivized with regard to their

²⁰² For a discussion of zero or negatively priced markets, see J.M. Newman, *Antitrust in zero-priced markets: foundations*, (2015) 164 *University of Pennsylvania Law Review* 149.

²⁰³ The emergence of the app economy has been a significant feature of recent years. The market for apps is growing, and it is estimated that between iOS, Android, and smaller platforms, apps could generate \$101 billion annually by 2020:

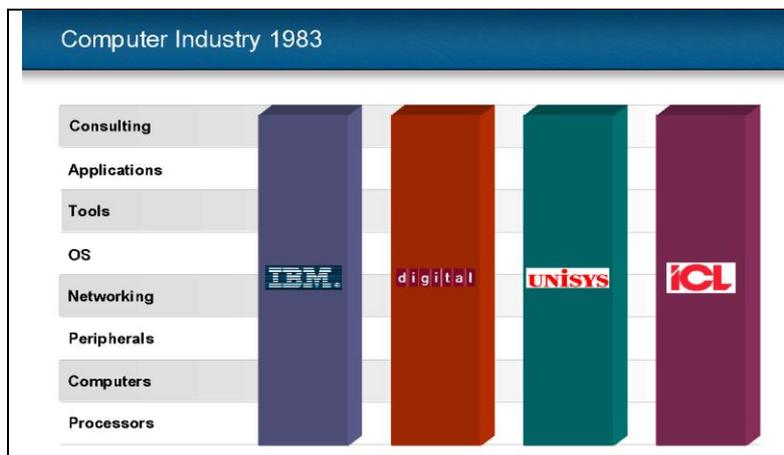
²⁰⁴ See, for instance, the discussion in A. Gawer, ‘Bridging Differing Perspectives on Technological Platforms: Toward an Integrative Framework’ (2014) 43 *Research Policy* 1239.

returns on their investment on innovation, in particular if this takes place in an open innovation ecosystem²⁰⁵.

It is also important to keep in mind the role of *vertical innovation competition* in challenging competitive bottlenecks resulting from the control of essential inputs by dominant players in an industry. In a digital economy marked by network effects, it is quite frequent that the position of incumbents can only be challenged by firms vertically situated in complementary markets that may also benefit from network effects, rather than competitors situated on the same relevant market. For instance, the dominant position of IBM on the computer industry until the early 1980s was not challenged by another hardware company, but by Microsoft, which was present in the complementary segment of software, and controlled the market of the operating system, an essential input for personal computers (PCs). Microsoft, with time, benefitted from important network effects, which provided it with the power to commodify hardware and thus change the computer industry architecture, thus becoming able to acquire the largest percentage of the surplus value generated by the industry, the centre of power moving from hardware to software in the mid- 1980s– 90s²⁰⁶.

Business studies research by Jacobides and MacDuffie has compared the process of disintegration and value migration in the computer industry, where in the process of twenty years between 1980s and 2000s the industry was transformed from single brand value chains to heterogeneous value chains, in comparison wto the relative stability of the relation between Original Equipment Manufacturers (OEMs) and complementors in the automotive industry during the same period, as both sectors witnessed a process of vertical des-integration (see Figure 4.13. for the computer industry)²⁰⁷.

Figure 4.13.: The des-integration of the computer industry



²⁰⁵ See M. Bogers et al, ‘The Open Innovation Research Landscape: Established Perspectives and Emerging Themes across Different Levels of Analysis’ (2017) 24(1) Industry and Innovation 8.

²⁰⁶ See TF Bresnahan & S Greenstein, ‘Technological Competition and the Structure of the Computer Industry’ (14 December 1997), available at [https:// pdfs.semanticscholar.org/ 0675/ 051e52dc04ec384951242a82f95022abe71f.pdf](https://pdfs.semanticscholar.org/0675/051e52dc04ec384951242a82f95022abe71f.pdf)

²⁰⁷ M.G. Jacobides & J. P. MacDuffie, How to Drive Value Your Way, (2013) July-August Harvard Business Review 92.



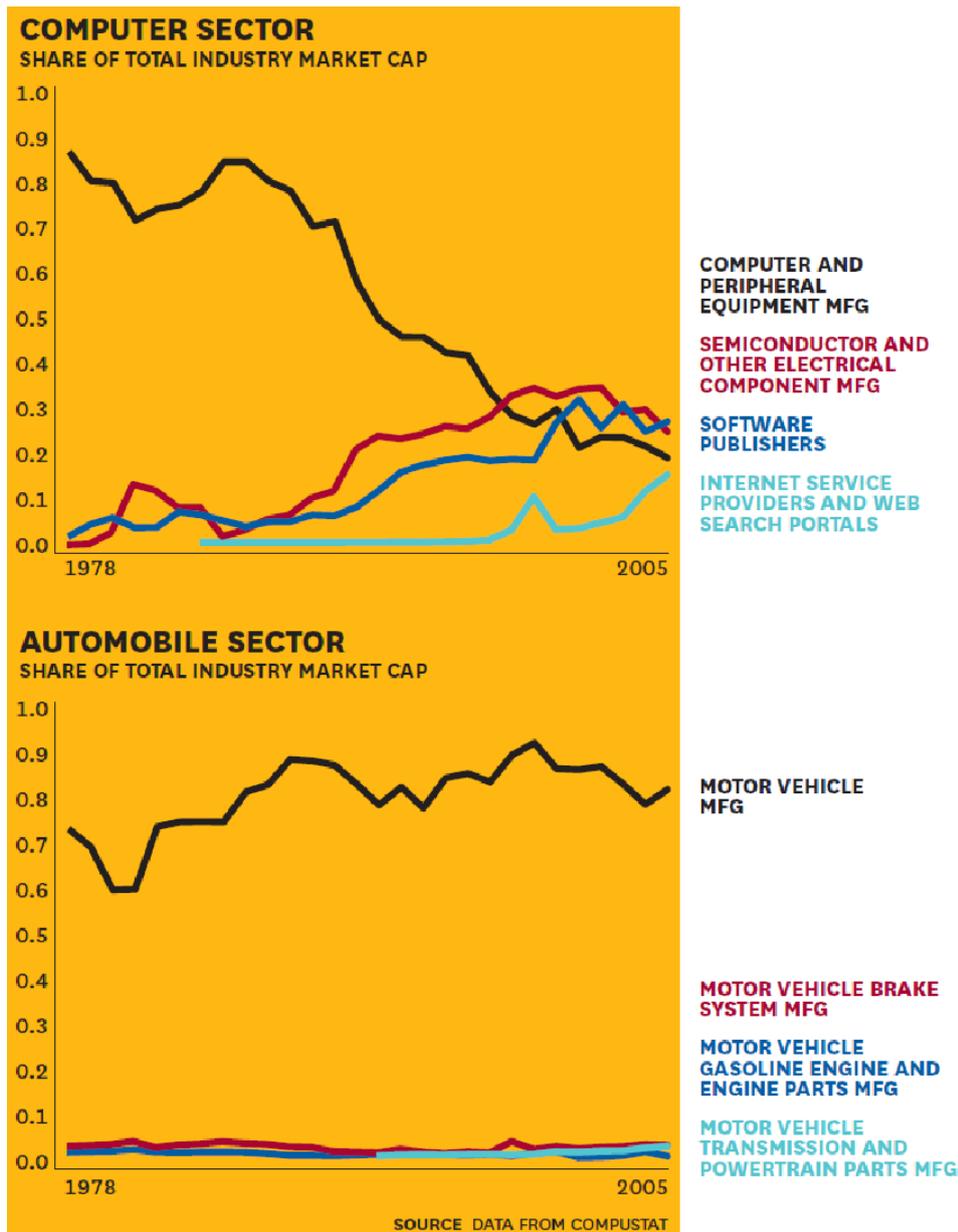
Jacobides and MacDuffie show that ‘industry disaggregation’ was not inevitable and that ‘(m)any industries characterized by intense competition and innovation – including those that are vulnerable to highly disruptive technologies – are likely to remain tightly integrated and dominated by traditional players’²⁰⁸. They provided the example of the automotive industry. Indeed, OEMs in the automotive industry managed to keep a constant share of their industry’s total market capitalization, even if they had massively recourse to outsourcing and despite intense horizontal competition between carmakers²⁰⁹. The value has not ‘migrated upstream (or downstream to aftermarket products and services)’ but stayed with the OEMs (see Figure 4.14.)²¹⁰. In contrast, in the computer industry value has shifted upstream (e.g. Intel) and downstream (e.g. Microsoft), as these companies managed to control the customer experience (see Figure 4.15.).

Figures 4.13.-4.14: Value migration in the automotive and computer industry

²⁰⁸ Ibid.

²⁰⁹ Ibid., 94.

²¹⁰ Ibid.



Source: M.G. Jacobides & J. P. MacDuffie, *How to Drive Value Your Way*, (2013) July-August *Harvard Business Review* 92, 96.

Jacobides and MacDuffie explain that ‘Microsoft and Intel (“Intel Inside”) succeeded not only in asserting their brands over the OEMs but in convincing consumers that they were in the driving force behind the entire computing experience’²¹¹. Furthermore, they note that the vertical des-integration in the automotive industry was based on hierarchical non-modular structures and proprietary (closed) standards (e.g. each brand’s own, non-compatible navigation system); OEMs in the automotive industry also kept control of most critical and differentiating assets; they were responsible for achieving end-product differentiation, supported by the brand; they had near-exclusive control over distribution through the franchised dealer model and had the responsibility for regulatory compliance and being

²¹¹ Ibid., 96

accountable for product defects/failures (guarantor of quality)²¹². In contrast, computer OEMs outsourced component design and production responsibilities to suppliers, this outsourcing leading to vertical unbundling with the creation of a set of modular, open-access components²¹³. The vertical unbundling undermined the OEM's system integrator role as suppliers could standardize components across OEMs²¹⁴. The result is that the 'locus of differentiability' moved to suppliers who became the guarantors of quality for their respective component²¹⁵. Suppliers became 'bottlenecks' by taking up positions that give them control over scarce resources, allowing them to capture a bigger share of value²¹⁶. The OEMs could not revert the trend as they lost the expertise within their firm's boundaries, also due to the industry's short product cycles (measured in months)²¹⁷.

To the extent that, in view of its essential characteristic of futurity, the main source of value in the digital economy comes from valuation by financial markets, one may also identify the importance of attracting capital as a dimension of competition.

This dimension is often ignored by research putting forward the view that the competition game is transformed by the emergence of intensive oligopolistic competition as the various large digital platforms (Big Tech) move outside their core business activity in adjacent or overlapping fields of activity on which they become strong rivals (see Table 1)²¹⁸.

Table 1: Competition among digital platforms²¹⁹

²¹² Ibid.

²¹³ Ibid.

²¹⁴ Ibid.

²¹⁵ Ibid.

²¹⁶ Ibid.

²¹⁷ Ibid.

²¹⁸ See, H.R. Varian, Use and Abuse of Network Effects (September 17, 2017). Available at SSRN: <https://ssrn.com/abstract=3215488> or <http://dx.doi.org/10.2139/ssrn.3215488> ; For a similar argument, see N. Petit, Technology Giants, the Moligopoly Hypothesis and Holistic Competition: A Primer (October 20, 2016). Available at SSRN: <https://ssrn.com/abstract=2856502> or <http://dx.doi.org/10.2139/ssrn.2856502> (who includes a comparable table showing the overlaps between the various digital platforms).

²¹⁹ AMZN: Amazon, AAPL: Apple, GOOG: Alphabet (Google), FB: Facebook, MSFT: Microsoft.

Product	AMZN	AAPL	GOOG	FB	MSFT
advertising platforms	✓		✓	✓	✓
artificial intelligence	✓	✓	✓	✓	✓
browsers	✓	✓	✓		✓
cloud services	✓		✓		✓
digital assistants	✓	✓	✓	✓	✓
ebooks	✓	✓	✓		
email and messaging		✓	✓	✓	✓
games	✓	✓	✓	✓	✓
general purpose search engines			✓		✓
home delivery services	✓		✓		
maps		✓	✓		✓
office tools		✓	✓		✓
operating systems	✓	✓	✓		✓
smartphones	✓	✓	✓		✓
social networks			✓	✓	
special purpose search engines	✓	✓	✓	✓	✓
streaming video	✓		✓	✓	
video and music distribution	✓	✓	✓		
video conferencing		✓	✓	✓	✓

Source: H.R. Varian, *Use and Abuse of Network Effects* (September 17, 2017). Available at SSRN: <https://ssrn.com/abstract=3215488> or <http://dx.doi.org/10.2139/ssrn.3215488>

The argument is that it is indifferent if digital platforms dominate specific relevant markets, as in reality they compete with each other, by offering a mix of products and services, and thus forming competing conglomerates. While recognizing the superior position held by each digital platform on its core business activity they are subject to a variety of competitive pressures exerted across industries by other technology or non-technology firms. The top 3 competitors that each of these Big Tech companies recognize as their rivals in their financial reports and other financial databases are the other Big Tech, even if these are not present in their core market²²⁰. The argument goes that the dynamic nature of competition and disruptive innovation in technology markets, and the risk of negative feedback loops that would generate a death spiral and may rapidly erase any dominance these firms were able to acquire, generates uncertainty that pushes these digital platforms to expand their output (in their core business activity as well as in adjacent markets) and behave as competing oligopolies, hoping to ‘maintain the ability to “hop” to the next (disruptive) “dominant design”²²¹. Competition takes place in various dimensions, beyond product and service markets, in particular entrepreneurial assets but more significantly ‘non consumption’²²².

Petit coins the term ‘moligopoly’ merging the terms ‘monopoly’ and ‘oligopoly’ to illustrate the nature of the competitive game, which is that the (moligopoly) firm ‘engages into competition against the non-consumption in search of new and low end market footholds.’²²³. Like the story of Don Quixote tilting at windmills, which he takes for giants, this battle for

²²⁰ Ibid., 7-15.

²²¹ Ibid., 39.

²²² Ibid., 47.

²²³ Ibid., 4.

competitive survival looks like it will end in the same way, Don Quixote knocked of his horse... This type of head to head, disruptive competition, however, almost never concerns the core markets where the technology firms holds a dominant position. However, the lack of competition in these areas of core activity should, according to this view, not be a matter for concern, if the undertakings in question are ‘mologopolies’ and therefore are subject to a ‘multidimensional degree of mologopoly competition’²²⁴. This ‘mologopoly screen’ is sufficient, for Petit, to absolve any indication of likely anticompetitive effects on a relevant market, if firms-related variables provide the impression (or is it certitude?) that the firm is ‘worthy’ of the indulgence of finding no competition law violation, because (i) it is a conglomerate, (ii) it is open to experimentation, (iii) it is committed to patient capital, or (iv) is ‘a platform leader, in other words...it serves as the foundation of an ecosystem of innovative companies’²²⁵. The paper builds this argument on the empirical finding that, contrary to monopolies, mologopolies ‘channel sizeable amounts of resources into research and development’ and invest in human resources (in particular entrepreneurship).

Despite its reference to a multidimensional framework for assessing competition and the criticism to the ‘crude tool’ of market definition, which we share, there are important problems with the overall argument of the paper and the ‘mologopoly screen’. First, Petit while criticising the traditional understanding of antitrust, relies on the simple economics of market definition in claiming that mologopolies increase production (and therefore output), which is something that cannot be wrong, in particular as they also distribute this output ‘for free’. This may be true with regard to one side of the platform (e.g. search), but is not always true with regard to the other side of the platform (predictions, advertising), which is conveniently ignored, the paper falling in the single relevant market phalacy. In fact, there may be significant consumer harm in increasing the harvesting and exploitation of personal data, not only because consumers may be charged higher prices, than what would have been the case if they could not be targeted, but also because of the risks of manipulation and lessening of privacy. Second, the investment in R&D in thee dynamic industries is certainly a positive feature, but as we have previously explained its level is lower than in other industries and is in no sense remarkable for a sector that has a high profitability and incurs less fixed costs and probably risks of failure than the pharmaceutical industry when launching a new molecule. Third, although the paper makes references to the fact that ‘mologopolies’ retain their earnings and do not distribute, this is not supported by the facts, which show that the top Big Tech distribute more to shareholders or to their management than what they invest in R&D (see Section 3.1.2.3.). The paper does not engage with the financialisation of US based digital platforms, which to a certain extent influences their competitive strategy, and may explain their development (and the formation of conglomerates) according to the ‘expand and distribute’ model . Fourthly, the paper assumes that ‘mologopolies’ are the sole source of R&D and innovation, and on the basis of this assumption, gives a *carte blanche* to them for regulating their ecosystems as they seem fit, suppressing innovative startups and reducing opportunities for vertical (innovation) competition. Fifthly, and most importantly, the paper does not engage in a true multi-dimensional analysis of competition, in particular by integrating the dominant characteristic of

²²⁴ Ibid., 65.

²²⁵ Ibid., 65-66.

financialised capitalism, futurity and its role in competitive strategies. As we explained in 4.3.1.3., one needs to understand that competitive strategies do not only take place in product or service markets, or in fictitious markets for ‘entrepreneurship assets’ and ‘non consumption’, but also in financial markets where market evaluation of companies’ stocks because of the perception that they control a valuable bottleneck that may provide them with a sustainable competitive advantage and abnormal profits in the medium to long-term are crucial drivers for strategic action by the management. Certainly, the process of ‘convergence²²⁶’ of the IT, communications and AI may unleash some intensified degree of potential competition (and produce overlaps generating rivalry), but this remains for the time being limited. Despite the important convergence between the communications and IT industries in the last two decades, at the level of the core network layer used, with packet switched technology and LTE used for both IT and communications, each industry has kept its own service layer, its own private governance architecture and business models²²⁷, and is subject to different regulatory regimes with regard to the harvesting of data²²⁸. Hence, expecting competition clashes to occur in the short-term, this justifying a laissez-faire regime, seems ambitiously optimistic.

In our view competition authorities cannot refer to the dispense with an analysis of the sources of sustainable competitive advantage, to which we now turn to.

3.4. Sources of sustainable competitive advantage in the digital economy

There are various factors driving competitive advantage in the digital economy. In view of the high costs for the development of technologies and the need for these to interoperate so as to provide the user a seamless experience, and the central role of ‘system interconnectors’, there is a high intensity of interaction and cooperation, as well as competition, between the different economic actors. Hence, the quest for competitive advantage takes more complex forms and the strategies are often quite elaborate, combining elements of cooperation and elements of

²²⁶ Competition Commission of South Africa, *Data Market Inquiry Provisional Findings and Recommendations* (April 24, 2019), 180, notes ‘the convergence of various types of technology onto the same platform (e.g. video, voice, data) or the convergence of fixed and mobile devices (e.g. hybrid devices)’.

²²⁷ Compare the harvesting of personal data by Facebook and Google so that they offer social media and search engine services ‘for free’, with the approach used by AT&T which imposed a privacy surcharge in its GigaPower gigabit-speed broadband Internet service, offering consumers an option to prevent AT&T from collecting vast amounts of data about its users’ browsing habits for advertising and other purposes: see Elizabeth Dwoskin & Thomas Gryta, *AT&T Offers Data Privacy—for a Price*, available at <https://blogs.wsj.com/digits/2015/02/18/att-offers-data-privacy-for-a-price/>. The programme was later abandoned: see <https://www.fool.com/investing/2016/10/03/att-drops-its-controversial-extra-charge-for-privacy.aspx>.

²²⁸ An interesting example concerns the regime regulating the harvesting of personal data. While social networks and search engines are free to harvest all sorts of data, although now in conformity to the GDPR rules, this may not be possible for mobile operators which, until Congress adopted resolutions to repeal the broadband privacy regulations introduced in 2016 to reverse the Broadband Privacy Rule, a regulation from the FCC that made some inconvenient changes to the ways internet providers can collect and sell the data they collect on consumers, could not harvest data from the websites visited, emails and other texts and with some limitations could only collect location data. Note however that in March 2019, the FTC issued orders to seven U.S. Internet broadband providers seeking information to examine how broadband companies collect, retain, use, and disclose information about consumers and their devices: available at https://www.ftc.gov/system/files/attachments/press-releases/ftc-seeks-examine-privacy-practices-broadband-providers/isp_privacy_model_order.pdf.

competition (co-opetition²²⁹). We explore in a different paper in more detail the sources of sustainable competitive advantage in the digital economy²³⁰.

4. Moving beyond traditional relevant markets

The Internet era gave rise to many online intermediaries and digital platforms controlling and orchestrating value-generating ecosystems that not only offer products and online services but also provide the infrastructure and tools on which other platform businesses are built. At the same time, the development of Big Data and multi-sided markets strategies have raised questions and cast doubt on the sole focus of the assessment undertaken by competition law concerning the definition of the relevant market. How could one proceed to delineate a market in a world in which the possible personalisation of production means that consumers can themselves become the designers of the individually-customised products they consume with the products being produced by 3-D printing and robots? Will firms be competing mainly on the market for personal information? What will serve as the raw material on which personalised production will be based? Competition law analysis needs to consider, when assessing competitive constraints, the type of competition taking place in the specific ‘field’. We consider that the current field of relevant market is too simplistic and will have to be complemented by additional fields of assessment of the competitive game.

4.1. Multi-sided markets and ‘transaction platforms’

Platforms that operate in multi-sided (often two-sided) markets facilitate the interaction between two groups of customers, where members on each side are more willing to ‘be on board’ if they expect the other side to be equally popular (matching platforms). Classic examples are:

- credit cards, where users want a card that is accepted ubiquitously, and merchants do not want to lose business by not offering to their client the convenience of being able to pay with their credit card;
- online marketplaces (e.g., auction sites): where both sellers and buyers are keen to trade in a tick market with plenty of choice;
- game consoles (and App [application] stores): where users wants a variety of compatible games (Apps) and game (Apps) developers do not want to waste their energies developing a game (App) for a proprietary platform unless it is expected to attract many potential clients.

What these examples share is the fact that members from each side join the platform to execute an interaction (often carry out a transaction) with a member from the other side – i.e., the platform is a match-maker. Hence, a decision of a member to join the platform on side A

²²⁹ A Brandenburger and BJ Nalebuff, *Co-opetition* (Currency Doubleday, 1997). Professors Brandenburger’s and Nalebuff’s concept of ‘co-opetition’ may characterize the future of competitive interactions in the economy, where business become more competitive by cooperating with each other and developing unique capabilities that add value and complement those of their competitors.

²³⁰ I. Lianos & A. McLean, Sources of Competitive Advantage in the Digital Economy and Competition Law Implications, Annex 3 of BRICS Competition Law and Policy, Report on

will benefit members on the other side B; and vice versa, in the sense that to the extent that side B becomes more attractive (thanks to the new affiliation on side A) this will in return increase the utility of joining side A in the first place.

In economic jargon these cross-sided dynamics are called ‘indirect network externalities’, as opposed to ‘direct network externalities’ where there is only one side and users benefit if other users join the network – e.g., mobile telephony. The term ‘externality’ refers to the idea that, when an individual user decides to join in, he/she will normally fail to appreciate that his/her decision will benefit others (either on the same side under direct network externalities, or on the other side as with multi-sided platforms).

Hence, the theory goes, individual adaptations should be encouraged through some form of subsidisation in order to achieve the optimal critical mass on the network. Accordingly, the role of the two-sided platform is to ‘internalise’ these externalities, by solving the ‘chicken-and-egg’ problem that typically besets such platforms thus managing to get ‘both sides on board’. This is typically done by subsidising the side that at first brings the strongest benefits to the other side, e.g., women’s entrance in a night club, users’ access to a property website (whilst estate agents are charged to list their properties). Therefore, the fees charged on both sides may not reflect the underlying costs incurred for each side.²³¹ Indeed, one side might not be charged at all, or even there could be negative prices on one side to bring them on board – e.g., a free voucher.²³²

These peculiarities make it tricky to implement the SSNIP test. To impose a SSNIP only on one side, would ignore the fact that a reduction in membership (i.e., following an increase in the membership fee) or intensity of usage (i.e., due to an increase in the transaction fee) on one side will cause a similar knock-on effect on the other side and so on. That is to say, indirect network externalities provide a constraint on the ability to impose a SSNIP on one side only. Therefore, it is argued that the hypothetical monopolist should be required to increase the overall *level* of prices, whilst allowing the platform to adjust the *structure* of prices across each side in order to minimise the negative feedback loop thereof.²³³ Incidentally, the interrelatedness between the two sides strongly points towards a two-sided market definition, whereby substitutability is based on the same idea of match-making between the two sides.²³⁴

The analysis of two-sided markets/platforms presented so far is uncontroversial, in the sense that there is little doubt that the examples presented above fit the concept. However, there is a tendency to stretch the definition of two-sided markets, as by doing so it is possible to argue that antitrust intervention is unwarranted since the ability to exercise market power is

²³¹ There can two types of fees: a) membership fee to just become an affiliate; and b) transaction fee, levied each time an interaction with a member of the other side is executed.

²³² This is typically the case where the members of one side are promiscuous, in the sense that they can use multiple platforms, often at the same time (so-called, ‘multi-homing’).

²³³ For a discussion on this topic, see L. Filistrucchi, D. Geradin, E. van Damme and P. Affeldt (2013), ‘Market Definition in Two-Sided Markets: Theory and Practice’, (2014) 10(2) *Journal of Competition Law & Economics* 293.

²³⁴ This does not mean that only platforms can be seen as potential substitutes. For example, transactions do not have to be intermediated, as with cash payments in place of the use of credit cards.

naturally constrained by the kind of negative feedback loops (fuelled by indirect network externalities) described above.²³⁵

In particular, media markets are regularly considered to be two-sided markets *sui generis*, where on one side there is the audience (readers/listeners/viewers) and on the other side there are advertisers seeking to reach that audience. However, media markets definitely constitute an outlier in terms of their presupposed two-sidedness for at least three reasons:²³⁶

- indirect network externalities are only one directional, rather than reciprocal: advertisers benefit from larger audiences, but not vice versa. Indeed, ads normally constitute a nuisance for the audience;²³⁷
- the two sides do not interact on the platform. It is true that the aim of advertisers is to ultimately trigger a transaction, but none of this is hosted by the platform – i.e., the primary purpose for the audience to affiliate the media outfit is to access content, whilst tolerating advertisers’ attempt to build brand awareness;
- for media firms two-sidedness is an optional business model, not a necessity – i.e., their core business is not about match-making in nature. For example, a TV operator can either adopt a free-to-air business model - where content is free for the audience whilst advertisers pay to have their ads aired – or a Pay-TV business model – where the audience has to pay to view content of their choice, often without the nuisance of advertising.²³⁸

By the same token, it is debatable whether social networks, such as Facebook and Twitter, and search engines, such as Google search, are truly two-sided platforms. In both cases usage is driven by the desire to interact, respectively, with other users (i.e., direct network externalities), or finding the right content on the web for free, whilst tolerating the fact that their data are used by the host operator to allow advertisers to target them with their impressions (i.e., the externality is one-directional rather than reciprocal).

Accordingly, in all these (*sui generis*) cases, to impose a SSNIP on advertisers would hardly set off the kind of negative feedback loop described above. The ability to exercise market power on one side is not restrained by the need to keep both sides on board, since the audience would not be bothered by the fact that there is less advertising on the platform (i.e., as a consequence of an increase in price). It is true that the ability to offer, potentially for free, good quality content and online services, such as search and social networking, relies on the monetisation of audience’s attention, but the audience decision as to of which services to use is not affected by an expectation that the other side will be popular.

²³⁵ In contrast, though, two-sided markets may be subject to ‘winners-take-all’ dynamics, where the incumbent platform becomes the de-facto place to be for users on both sides. Therefore, the chances of rival platforms being able to build their own critical mass are low due to an insurmountable ‘chicken-and-egg’ problem. The role of network externalities as potential barrier to entry and expansion is discussed in the next section.

²³⁶ For a detailed discussion, see G. Luchetta, ‘Is the Google Platform a Two-Sided Market?’, (2013) 10(1) *Journal of Competition Law & Economics* 185.

²³⁷ There are exceptions, of course, as with readers of fashion/glamour magazines and with classified ads. In the latter case, though, advertisers have radically deserted media outfits and, nowadays, normally prefer to reach the other side by posting their ads on dedicated two-sided platforms such as gum-tree, eBay and many others.

²³⁸ It is true, of course, that a Pay-TV business model would not be viable without premium content such as sports and recent blockbusters, but the choice of what type of content to broadcast is endogenous, in the sense that an FTA TV operator could over-time decide to switch to a Pay-TV business model.

That is to say, there is no ‘chicken-and-egg’ problem, in that it is the quality of the content provided (for free) that determines audience’s affiliation, and advertisers do not determine the quality, they only exploit it (at a price) in order to reach their target audience.²³⁹ As a final example, let’s consider price comparison sites, which are free to consult for user whereas sellers are charged, typically, a commission on a per-click basis. On the one hand, users look for a comparison that is both accurate and covers the entire market (e.g., car insurance quotes); on the other hand, sellers are in two minds, as they want to be listed on popular websites but are aware that accurate comparison spurs pricing rivalry.

Usually, though, sellers have no choice as they know that the website may list their offer in any case. This is the key intuition as to why price comparison sites are not two-sided platform in a strict sense: users’ decision to consult is based on the expectation of a comprehensive and accurate comparison, regardless of whether sellers accept to be charged for sponsored links or on a click-through basis. Indeed, the fact that price comparison websites are financially reliant on sellers’ commission fees makes users uneasy, if not suspicious; and this is notwithstanding the fact that users would hardly pay for a comparison that is financially independent.²⁴⁰

In conclusion, whilst it is important to be aware of the type of unidirectional externality that characterises these types of (*sui generis*) platforms, a one-sided approach to market definition may nevertheless still be appropriate.²⁴¹

This is still the approach followed by the EU Courts, which usually address the issue of multi- sidedness not when they determine the competitive constraints directly faced by the undertaking in question in defining the appropriate antitrust relevant market that will serve as the starting point for competition assessment, but when determining the existence of a restriction on competition, since the two- sidedness is part and parcel of the overall economic context that needs to be taken into account by the competition decision- maker before concluding on the existence of a restriction of competition by object or by effect²⁴². In contrast, in a five to four judgment in *Ohio v American Express Co*, drafted by Justice Thomas, the majority of the US Supreme Court highlighted the fact that some two- sided platforms, such as credit card operators like American Express, facilitate a single, simultaneous transaction between merchants and cardholders and thus supply ‘only one product’, namely transactions, which are jointly consumed by the card- holder and the merchant²⁴³. The Supreme Court stressed the importance of evaluating *both* sides of a two- sided transaction platform in order

²³⁹ One peculiar feature that distinguishes media business from social networking and web-searching is that in the latter case the quality of the content is determined in a positive way by the number of users (i.e., positive direct network externalities). For example, Goggle’s search engine gets better and better thanks to the cumulated intelligence gathered as to what constitute a good search result. Hence, the importance to maintain high volume of traffic.

²⁴⁰ For a detailed discussion, see H.C. Gamper, How Can Internet Comparison Sites Work Optimally for Consumers?, (2012) 35 *Journal of Consumer Policy* 333-353.

²⁴¹ See L. Filistrucchi, D. Geradin, E. van Damme and P. Affeldt (2013), ‘Market Definition in Two-Sided Markets: Theory and Practice’, (2014) 10(2) *Journal of Competition Law & Economics* 293. For some examples of cases in the UK where multi-sided markets were considered, see *Global Radio/ GMG* (CC, 2013); *WRI/Hostelbookers.com* (ME/6062/2013); *BSkyB/Virgin Media* (ME/4568/2010); *Capital Shopping Centres/Trafford* (ME/4903/2011).

²⁴² See the CJEU’s approach in Case C- 67/ 13 P, *Groupement des cartes bancaires (CB) v Commission*, ECLI:EU:C:2014:2204, paras 76- 81.

²⁴³ *Ohio v American Express Co*, 585 US _ (2018).

to accurately assess competition and thus analysed the two-sided market for credit-card transactions as a whole, at least for ‘transaction platforms’²⁴⁴.

4.2. From ‘Big’ and ‘Smart’ Data and ‘matching’ platforms to prediction platforms

4.2.1. Data and Big/Smart Data markets

Competition authorities and the largest body of scholarly work on digital platforms has focused on competition law issues related to the harvesting and possession of data from digital platforms, in particular access to personal and/or non-personal big data issues. The concept of ‘big data’ is usually employed to refer to gigantic digital datasets, which are often held by corporations, governments and other large organisations, and which are extensively analysed using computer algorithms.²⁴⁵ It is thought that access to data may become a source of market power: according to a joint report by the German and the French competition authorities, ‘(p)rovided that access to a large volume or variety of data is important in ensuring competitiveness on the market (which is a market-specific question), the collection of data may result in entry barriers when new entrants are unable either to collect the data or to buy access to the same kind of data, in terms of volume and/or variety, as established companies’²⁴⁶. This data may be either provided voluntarily by the consumer or prospective customers of a company in the context of existing transactions or attempts to enter into these transactions, it may be observed or inferred and aggregated by the digital platform in the context of an interaction with a (prospective) customer, in these cases the undertaking having control on the collection of data as it is involved in the relationship with the (prospective) customer (thus constituting a ‘first party data’ source). The fact that some undertakings benefit from a considerable market share in terms of number of users leads them to also benefit from a large share in the harvesting of data. Furthermore, undertakings may also use ‘third-party data’, that is ‘data collected by another entity’, although this possibility may be limited by some regulatory restrictions on the transfer of data between first and second aggregators (i.e. data protection requirements on consent)²⁴⁷. In these cases, it is possible that superior access to data could provide a competitive advantage and could increase barriers to entry isolating ‘established

²⁴⁴ According to the majority Opinion, the key feature of transaction platforms is that they cannot make a sale to one side of the platform without simultaneously making a sale to the other. This approach was criticized by the minority of the Supreme Court in an Opinion drafted by Justice Breyer, who considered that the relationship between merchant-related card services and shopper-related card services is primarily that of complements, not substitutes, and thus the two could not form part of the same product market. Justice Breyer rejected the concept of ‘transaction platform’, *inter alia*, because of the difficulty to determine its limiting principles and to distinguish clearly these platforms from other platforms in which the two sides should be considered separately. The approach of the minority of the US Supreme Court seems close to that adopted by the CJEU in *Cartes Bancaires*.

²⁴⁵ ‘Aspects of ‘big data’ that are often mentioned are large amounts of different types of data, produced at high speed from multiple sources, whose handling and analysis require new and more powerful processors and algorithms’: Autorité de la Concurrence & Bundeskartellamt, Competition Law and Data (May 16, 2016), 4. ‘Big data’ is often characterized by the various ‘V’s’, which go from four, according to certain descriptions, *Velocity, Variety and Volume, Value* (to be extracted) to six, according to others adding *Veracity* and *Validation*.

²⁴⁶ Autorité de la Concurrence & Bundeskartellamt, Competition Law and Data (May 16, 2016), available at https://www.bundeskartellamt.de/SharedDocs/Publikation/DE/Berichte/Big%20Data%20Papier.pdf?__blob=publicationFile&v=2, 11.

²⁴⁷ *Ibid.*, 12.

competitors from smaller rivals and potential entrants, thereby allowing them to increase their prices'²⁴⁸. Consequently, a lot of the discussion has focused on ways to reinforce inter-platform competition by promoting access to data and data portability.

With regard to delineating relevant markets for the sale or purchase of data, one needs to distinguish between situations in which the data operates as an input for a product and is not traded or sold to third parties, in which case it would be difficult to define a pure data market and the competition authorities proceed to a 'market determination based on the services provided'²⁴⁹, and situations in which data is available to be traded or sold to third parties, in which case it would be possible to define a market for the provision of data, as a 'specialised asset'²⁵⁰. However, the last option is usually fraught with difficulties. For instance, in the recent *Apple/Shazam* merger, the European Commission found that both parties were active in the licensing of music data (in particular music charts data), among other relevant product markets. The Commission explored the degree of substitutability (or complementarity) between the parties' different data products, in particular their music data charts. The substitutability of the music data charts of Apple and Shazam was debated as there were differences between them that made them complementary rather than substitutable: for instance, Shazam's music charts could give an indication of the popularity of certain music tracks, as well as of future music trends, while Apple's charts reflected Apple's estimates of its own music sales and/or usage patterns²⁵¹. The Commission did not find it necessary to determine this substitutability question as this did not affect the competition assessment. This did not refer to personal data, as the Commission did not find a horizontal overlap in relation to the Parties' user behavioural data, which was not in any case licensed by the Parties to third parties²⁵².

When it came to determine the market shares of the parties in this market, the Commission was not able to compile market shares and found that there was a large number of sources of music data²⁵³. Interestingly, the parties contested the definition of a separate relevant market for music chart data, arguing that they were instead an 'ancillary feature of the core business of music streaming or voice recognition'²⁵⁴. They also argued that should a separate data market be defined, this would have existed 'for the collection of data on individuals' music tastes and the analytics of such data' and should not have been limited to data collected in the digital music industry, but should have covered 'all data compiled relating to music preferences, including data gathered by undertakings active in the wider field of online social networks' (i.e. LinkedIn, Facebook, WhatsApp or Google) collecting the same type of data on their users. This argument was not accepted by the Commission, which preferred to define a separate market for music charts, although it did accept that there were multiple

²⁴⁸ *Ibid.*, 13.

²⁴⁹ For a discussion, see I. Graef, *Market Definition and Market Power in Data: The Case of Online Platforms*, (2015) 38(4) *World Competition* 473, 491 (discussing the Facebook/WhatsApp acquisition, where the Commission did not define a data market as none of the parties was trading or selling the data to third parties).

²⁵⁰ P.J. Harbour and T.I. Koslov, *Section 2 In A Web2.0 World: An Expanded Vision of Relevant Product Markets*, (2010) 76 *Antitrust L.J.* 769-797; I. Graef, *Market Definition and Market Power in Data: The Case of Online Platforms*, (2015) 38(4) *World Competition* 473, 491; D.D. Sokol & R. Comerford, *Antitrust and Regulating Big Data*, (2016) 23(5) *George Mason L Rev* 1129, 1155-1156.

²⁵¹ CASE M.8788 – *APPLE / SHAZAM* (2018), para. 123.

²⁵² CASE M.8788 – *APPLE / SHAZAM* (2018), para. 119.

²⁵³ CASE M.8788 – *APPLE / SHAZAM* (2018), para. 167.

²⁵⁴ CASE M.8788 – *APPLE / SHAZAM* (2018), para. 120.

sources for such data. Interestingly, the Commission considered that, regardless of whether it constituted a relevant product market, access to this data could constitute a possible competitive advantage for the new entity as it could have helped it ‘to improve existing functionalities, or offer additional functionalities’²⁵⁵. This assessment formed part of the analysis of the non-horizontal unilateral effects of the transaction resulting from the possible foreclosure of competing providers of digital music streaming apps, to the extent that user data is an important input for competing providers of digital music streaming apps²⁵⁶.

The activity of digital platforms relies on the harvesting and processing of different types of data, which may constitute, under certain circumstances a source of market power or dominance. In particular user data may be a source of increasing returns, due to either economies of scale and scope or learning effects to the extent that more user data may enable the digital platforms to train better the algorithms underlying their services, in particular as platforms present in several markets may harvest data from different markets, thus forming a ‘richer model of consumer (behaviour)’ (economies of scope)²⁵⁷. The possession or control of data for which there is no good substitute may also enable a digital platform to raise the costs of its rival platforms or make it more difficult for them to compete in advertising markets, by adopting exclusionary conduct, such as refusals to deal, exclusive contracts with third party data brokers or aggregators who could have been an alternative source of data for their rivals, or erecting barriers to data portability for its users²⁵⁸. Digital platforms may also adopt predatory conduct limiting the ability of competing platforms to reach a critical mass of users that would enable them to benefit from network effects²⁵⁹. This, for instance, may occur if the platform uses as bait to attract users free products or below AVC prices in one side of the platform (the ‘honey’). The harvesting and control of data may also enable the development of sophisticated pricing practices, in particular price discrimination, or of strategies increasing switching costs for consumers giving rise to lock-in effects of the consumers to specific platforms²⁶⁰. Access to data may also increase information asymmetry between undertakings or between undertakings and consumers, thus enabling the undertakings (or digital platforms) with privileged access to reinforce their bargaining power vis-à-vis other undertakings or the consumers, with the potential to limit consumer surplus.

However, it may be also argued that, in a lot of cases, data presents some of the characteristics of a public good, to the extent that their consumption is non-rivalrous, and there may also be different sources of data available, in particular if data is traded or sold on data markets. The availability of data in the digital economy, and the multiplication of data harvesting devices, in particular with the development of the Internet of Things, is put forward as an argument to challenge the conception of data as posing a barrier to entry or as forming an essential facility²⁶¹. A lot of user data is presumably available through data brokers (third

²⁵⁵ CASE M.8788 – *APPLE / SHAZAM* (2018), paras 313-329.

²⁵⁶ CASE M.8788 – *APPLE / SHAZAM* (2018), Section 8.4.2.2.

²⁵⁷ M. L. Katz, *Multisided Platforms, Big Data, and a Little Antitrust Policy*, (2019) Review of Industrial Organization, available online at <https://doi.org/10.1007/s11151-019-09683-9>

²⁵⁸ *Ibid.*

²⁵⁹ *Ibid.*

²⁶⁰ *Ibid.*

²⁶¹ See the criticisms of, *inter alia*, C. Tucker, *Digital Data, Platforms and the Usual [Antitrust] Suspects: Network Effects, Switching Costs, Essential Facility* (2019) Review of Industrial Organization

parties), such as Acxiom, Experian, Epsilon, CoreLogic, Datalogix, Inome, PeekYou, Exactis, Recorded Future, among the more than 4000 data brokering companies worldwide. Contrary to other digital intermediaries, these do not provide any products or services to the consumer, their core business being to harvest data and to trade/sell it to other firms²⁶². Digital intermediaries or suppliers, such as Oracle, Thomson Reuters, IBM, Nielsen Holdings Plc, Bloomberg, Moody's, Alibaba Wolters Kluwer etc., may also be present in the data brokerage market, and sell data in their possession. Data brokers detain considerable information. For instance, Acxiom, one of the major data brokers, provided up to 10000 attributes on 2,5 billion of consumers in 2018²⁶³. However, it has also been noted that this data is kept in 'silos', according to the sector of activity (e.g. Experian and Epsilon is focusing on data that are relevant for marketing), the companies having mostly a vertical focus usually not addressing the full range of the data transactions²⁶⁴. This data, which can be on consumer purchase and transaction information, consumers' available methods of payment, health conditions, social media activity is harvested through mainly 'five major avenues: government records and other public data, purchase or license from other data collectors, cooperative agreements with other companies, self-report by consumers, often through surveys, questionnaires, and sweepstakes, and social media'²⁶⁵. These data brokers use this data to create products and services providing customers with data that has varying degrees of specificity about individual consumers, either on the basis of 'actual' elements of information, or on the basis of 'modeled' data that result 'from drawing inferences about consumer characteristics or predicted behavior based on actual data'²⁶⁶.

The issues raised by the privileged or unique access of some digital platforms to valuable data raise the possibility of competition law intervention in order to limit the likelihood of exclusionary practices.

<https://doi.org/10.1007/s11151-019-09693-7> (noting that data are on-rival and widely available' and that 'large shifts in supply infrastructure have rendered the tools for gathering digital data commonplace'. She concludes that 'the relationship between digital data and network effects is contextual and needs to be evaluated on a case-by-case basis' and that 'data alone are often not very valuable''))

²⁶² On this industry, see the following reports: US Senate, Committee on Commerce, Science and Transportation, A Review of the Data Broker Industry: Collection, Use and Sale of Consumer Data for Marketing Purposes (2013), available at <https://www.commerce.senate.gov/public/cache/files/0d2b3642-6221-4888-a631-08f2f255b577/AE5D72CBE7F44F5BFC846BECE22C875B.12.18.13-senate-commerce-committee-report-on-data-broker-industry.pdf> ; US FTC, Data Brokers: A Call for Transparency and Accountability (May 2014), available at <https://www.ftc.gov/system/files/documents/reports/data-brokers-call-transparency-accountability-report-federal-trade-commission-may-2014/140527databrokerreport.pdf> .

²⁶³ See, <https://www.fastcompany.com/90310803/here-are-the-data-brokers-quietly-buying-and-selling-your-personal-information> .

²⁶⁴ See, https://f69aa27b9b6c6702e27b-ffbfdeddb5f7166a1729dfea28599a63.ssl.cf3.rackcdn.com/raw_54206_15080ceb05f4b9ba9be630b4ccb74c06_qDatum-Presentation-Investors14-PDF.pdf .

²⁶⁵ US Senate, Committee on Commerce, Science and Transportation, A Review of the Data Broker Industry: Collection, Use and Sale of Consumer Data for Marketing Purposes (2013), 15 (although the Report noted that some of the major data brokers did not share information on their main data sources); US FTC, Data Brokers: A Call for Transparency and Accountability (May 2014), 11-15.

²⁶⁶ Ibid., 23-35 (noting three broad categories of products: marketing, risk mitigation, such as identity verification or fraud detection, and people search). US Senate, Committee on Commerce, Science and Transportation, A Review of the Data Broker Industry: Collection, Use and Sale of Consumer Data for Marketing Purposes (2013), 22. Actual data may be used to create 'look-a-like' models from predicted characteristics of types of users.

Box 5 The CADE analysis of big data

In 2016, CADE analysed a case in which Brazil's leading banks formed a joint venture for credit scoring. Credit scoring companies are multi-sided markets with strong network effects. Financial institutions are the main suppliers of inputs (information about users' financial transactions) to credit bureaux, while they are also the main consumers of bureaux's products (credit scores). Thus, CADE was concerned the operation would lead to vertical integration. In this case, CADE analysed whether data (information about consumers) might act as an entry barrier. When data is also a source of market power, a dominant platform can leverage its userbase in order to prevent potential competitors to enter the market, which might lead to market foreclosure. The SG and the Reporting Commissioner highlighted the risks of foreclosure in both the markets of positive and negative credit scoring, due to the great number of consumers' data held by the proposing banks. Accordingly, one of the remedies agreed by the parties was the commitment that the banks would continue providing data to all credit bureaux, with no discrimination or provision of favourable treatment to their own bureau.

Source: BRICS NCAs Questionnaire

4.2.2. Attention markets

Emphasising control over data and defining separate data markets may however overlook the real competitive game in the platform economy. Data, as such, may not be the core aspect of the business model, in particular of the leading digital predictive platforms relying on an advertisement-based model (i.e. Google, Facebook).

These platforms aim to attract and hold the attention of the users, not only in order to harvest data, but also more generally in order to influence their choice and manipulate their preferences through a some (insidious) process of choice architecture. In the classic two-sided model of digital platforms, these platforms are thought as matching, on one side, advertisers (the money side) and users (on the subsidised side). Data harvesting is indispensable for this process of matching to work. However, in reality, the digital platforms do not trade or sell access to the raw data of the users, which stay the possession of the digital platform, but simply sell information, that is *inferences* from the data the digital platform was able to harvest *and* process on the personality of the consumers and their overall preferences. This mapping could be relevant for the specific product/service the advertiser is aiming to promote. Advertisers value a lot these inferences, to the extent that they know these are quite accurate and enable them to offer targeted advertising that would be more likely to attract the attention of the users on the products/services they promote. From this perspective, data is an indispensable input for an output sold in 'attention markets'.

Contrary to data, which may be available from a variety of resources and is a non-rivalrous resource, attention is a scarce and rivalrous resource, to the extent that an individual has a limited attention span. As a result of the digital revolution and the systematic use of

smartphones, individuals receive increasing amounts of information, which recent research has found lead to a narrowing of their collective attention span²⁶⁷. Attention is a scarce resource that may be easily exhausted in an information heavy ‘always connected’ environment. As Satya Nadella, the chief executive officer of Microsoft, wrote in a recent report ‘(w)e are moving from a world where computing power was scarce to a place where it now is almost limitless, and where the true scarce commodity is increasingly human attention’²⁶⁸. Professor Tim Wu at Columbia University Law School claims that ‘(o)ver the coming century, the most vital human resource in need of conservation and protection is likely to be our own consciousness and mental space’²⁶⁹. Research by Microsoft Canada indicates that the average human attention span went down from 12 seconds in 2000 to 8 seconds in 2012, less than the average attention span of a goldfish!²⁷⁰

The development of ‘addictive technologies’, such as smartphones have considerably reduced the attention span of younger generations, in comparison to older generations. Empirical research has documented the ‘accelerating dynamics’ of shorter attention cycles that has been mainly driven by ‘increasing information flows’ both in terms of content production and consumption rates through the use of smartphones²⁷¹. The result is ‘shortening attention spans for individual topics and higher turnover rates between popular cultural items’, leading to the ‘squeezing of more topics in the same time intervals as the result of the (consequent) limitations of the available collective attention’²⁷². Indeed, the research by Microsoft Canada indicated above notes that higher usage of social media ‘increases short bursts of high attention’²⁷³. These scarce period of ‘high’ ‘attention bursts’²⁷⁴, are therefore extremely valuable for advertisers and/or companies and other entities aiming to attract consumers’ attention and influence consumer behaviour. Some media may be more efficient than others in attracting this attention.

Sohlberg and Mateer’s well known theoretical framework for analysing attention distinguishes five different components of attention on the basis of the clinical model of attention based on experimental attention literature²⁷⁵ (see Table 2.).

Table 2: Varieties of attention

²⁶⁷ See, Philipp Lorenz-Spreen et al. Accelerating dynamics of collective attention, *Nature Communications* (2019). DOI: 10.1038/s41467-019-09311-w and the research cited; Microsoft Canada, Consumer Insights, Attention spans (2015), available at <http://dl.motamem.org/microsoft-attention-spans-research-report.pdf>.

²⁶⁸ Cited in Microsoft Canada, Consumer Insights, Attention spans (2015), available at <http://dl.motamem.org/microsoft-attention-spans-research-report.pdf> at 4.

²⁶⁹ T. Wu, *The Attention Merchants* (Atlantic Books, 2016), 350.

²⁷⁰ Microsoft Canada, Consumer Insights, Attention spans (2015), available at <http://dl.motamem.org/microsoft-attention-spans-research-report.pdf> at 6.

²⁷¹ P. Lorenz-Spreen, B Mørch Mønsted, P. Hövel & S. Lehmann, Accelerating dynamics of collective attention, (2019) 10 *Nature Communications* Article 1759, 6.

²⁷² Ibid.

²⁷³ Microsoft Canada, Consumer Insights, Attention spans (2015), available at <http://dl.motamem.org/microsoft-attention-spans-research-report.pdf> at 19.

²⁷⁴ The concept of ‘attention bursts’ refers to a ‘count of the number of times attentional activity reaches the 75th percentile for an individual’: Microsoft Canada, Consumer Insights, Attention spans (2015), available at <http://dl.motamem.org/microsoft-attention-spans-research-report.pdf> at 13.

²⁷⁵ M.M. Sohlberg & C.A. Mateer, *Cognitive rehabilitation: An integrative neuropsychological approach* (Guilford Press, 2001).

<i>Component</i>	<i>Description</i>
Focused attention	Response to discrete visual, auditory, or tactile stimuli
Sustained attention	Vigilance and working memory
Selective attention	Ability to ignore irrelevant or distracting stimuli
Alternating attention	Set shifting, mental flexibility
Divided attention	Ability to respond to multiple simultaneous tasks

Source: M.M. Sohlberg & C.A. Mateer, Cognitive rehabilitation: An integrative neuropsychological approach (Guilford Press, 2001).

Following this model, research by Microsoft Canada examined how our increasingly digital lives may affect three components (‘types’) of attention from those enumerated above: in particular, sustained, selective and alternating attention.

First, with regard to sustained attention, the research notes that that exposure to increased digital consumption through social media usage erodes long-term focus²⁷⁶. Indeed, social media users, which is a large and increasing part of the human population, pay more attention in interactive (digital) environments, their results being also high with regard to connection (emotional attachment) and encoding (memory). The research emphasises how overall, ‘digital lifestyles have a negative impact on prolonged focus’²⁷⁷. As a result, consumers are trained to become better at processing and encoding information through these highly valuable ‘short bursts of high attention’²⁷⁸.

Second, digital lifestyles also have implications on selective attention. A number of similar devices (PCs, smartphones, tablets or combinations) have become the ‘gatekeepers of an infinite number of distractions and sources of instant gratification’, but also important gateways to consumers’ attention. Users attempt to simplify their lives by disconnecting or switching off these devices, expressing their wish to filter out distractions²⁷⁹. This need for simplification leads to the finding that ‘(w)hat consumers can see in one glance has everything to do with what they’ll do next’²⁸⁰. Again, this has important implications on companies’ strategies to attract attention and indicates the existence of important leverage and tipping points for attention.

Third, although an active engagement with social media may build alternating attention and train users to multi-tasking, when this use crosses the top quartile, social media drain

²⁷⁶ Microsoft Canada, Consumer Insights, Attention spans (2015), available at <http://dl.motamem.org/microsoft-attention-spans-research-report.pdf> at 18.

²⁷⁷ Ibid., 23.

²⁷⁸ Ibid.

²⁷⁹ Ibid., 27.

²⁸⁰ Ibid., 33.

resources and reduce the ability of users to allocation attention, ‘connect with content on an emotional level, and process information’²⁸¹.

Attention can be captured in different ways, depending on the form of the ‘attentional decision’ of the user²⁸². In reviewing the attention scholarship, Tim Wu distinguishes broadly between two different mechanisms for making these attentional decisions: the first is when attention can be seized in voluntary manner, and the second when attention is captured without a voluntary decision being made by the agent²⁸³. He includes in the second category ‘bottom-up’ or ‘stimulus-driven’ attention ‘activated by lower parts of the brain outside of conscious control’, to the extent that our brains are ‘involuntarily responsive to properties inherent in certain forms of information’ or stimuli (.e.g. food, familiar faces, potential sexual partners)²⁸⁴.

These different mechanisms to capture attention, sometimes involuntarily, are well known by the ‘management of specific demand industry’, whose purpose is to ‘shift the locus of decision in the purchase of goods from the consumer where it is beyond control to the firm where it is subject to control’²⁸⁵. This includes according to the description given to it by John K. Galbraith, not only the advertising industry but also ‘a huge network of communications, a great array of merchandising and selling organizations’, ‘numerous ancillary research training and other related services’²⁸⁶ in these economics of ‘increasing affluence’²⁸⁷ but also of limiting attention.

What has changed with the emergence of digital platforms and superior technologies of personalisation is that instead of this management of demand being targeted to the mass, it is now possible to target it to the individual consumer. By selling attention and enabling targeted advertising, digital platforms also contribute and form part of this ‘management of specific demand industry’.

In a recent working paper, Andrea Prat and Tommaso Valletti formalise the ability of digital platforms to sell personalised advertising to product market firms.²⁸⁸ Prat and Valletti propose that usage data held by digital platforms provides them with proprietary information on the activity of users, to which the platforms apply artificial intelligence in order to infer consumption preferences of individual users.²⁸⁹ Acting as ‘attention brokers’, the platforms then sell, via auction, targeted advertising to the firms that supply the product or service the

²⁸¹ Ibid., 40.

²⁸² T. Wu, Blind Spot: The Attention Economy and the Law, Wu, Tim, Blind Spot: The Attention Economy and the Law (March 26, 2017). Antitrust Law Journal, Forthcoming. Available at SSRN: <https://ssrn.com/abstract=2941094> 11 fn 49 (defining attention as ‘the decision of what stream of information to process’).

²⁸³ Ibid., 12.

²⁸⁴ Ibid., 12, fn 51.

²⁸⁵ J. K. Galbraith, *The New Industrial State* (Princeton Univ. press, 2007),255.

²⁸⁶ Ibid., 247-248.

²⁸⁷ J. K. Galbraith, *The Affluent Society* (Houghton Mifflin, 1976).

²⁸⁸ A. Prat & T. Valletti, ‘Attention Oligopoly’ (2019) SSRN Electronic Journal <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3197930>

²⁸⁹ As per Ajay Agrawal, Joshua Gains and Avi Goldfarb, *The Simple Economics of Artificial Intelligence* (Harvard Business Review Press 2018).

user is interested in. Given the scarcity of attention noted above, platforms become ‘attention bottlenecks’, through which they control access to consumers.²⁹⁰

Moreover, it is the largest digital platforms, including Google and Facebook, that are best able to match consumers and advertisers due to the scope, scale and timeliness of the data they collect and analyse. Access to such personalised advertising, through the platform-bottleneck, may play a significant role in maintaining or establishing market power for retailers.²⁹¹

Indeed, in line with Prat and Valletti’s narrative, the business model of some of the leading digital platforms relies on advertising revenue, collected at the money side of the platforms, which partly subsidises the content received by users on the other side, to the extent that users do not pay a monetary price (free content). Users may pay a price in a reduction of their privacy, as their personal data is harvested by the platform. As indicated above, this data is used as input for the delivery of the services of digital platforms, the inferences as to the users’ preferences and personality that would enable the advertisers to target them better. The business model is particularly ingenious as the ‘free’ content from which the consumers may benefit, and which acts as bait (the ‘honey’) to attract their attention, at the same time adds to the information they receive and therefore narrows down their attention span. This makes the attention of the users even more valuable for advertisers, which are then ready to pay increasingly high amounts for their ads to be placed at a more valuable attention grabbing position, or for benefiting from specialised advice on what would better attract a specific user’s attention. This process of value extraction therefore is self-reinforcing as it contributes to the scarcity of attention that generates the surplus value captured by the various business actors involved in this process. Hence, competition is not really for data but for the increasingly scarce resource of human attention.

This form of scarcity has its proper intermediaries: the so called ‘attention merchants’²⁹². One of the first manifestations of this new form of commerce is the emergence of printed advertising in the late 17th century in England²⁹³, and in the printing press in the early decades of the 19th century in England and the United States²⁹⁴ as a way to finance the printing and distribution of newspapers below costs, to the extent that these were subsidised by the revenue made by selling advertising. Newspapers were indeed not relying on the ‘traditional strategy’ for making profit, that of selling at a price that is higher than the cost of production, but on different business model, the reselling of the attention of their readers in advertising markets²⁹⁵.

We consider that the field on which the assessment of competition takes place needs to be determined according to the broader conception of the competition game and in particular

²⁹⁰ A. Prat & T. Valletti, ‘Attention Oligopoly’ (2019) SSRN Electronic Journal <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3197930>; David Parker and Federico Bruni, ‘Attention Oligopoly: Comments on the Paper by Prat & Valletti’ (2019) CPI Antitrust Chronicle April 2019.

²⁹¹ A. Prat & T. Valletti, ‘Attention Oligopoly’ (2019) SSRN Electronic Journal <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3197930>.

²⁹² T. Wu, *The Attention Merchants* (Atlantic Books, 2016).

²⁹³ See, B.B. Elliott, *A History of English Advertising* (B.T. Batsford, 1962); A. Bruttini, *Advertising and the Industrial Revolution*, (1973) 4 *Economic Notes* 2

²⁹⁴ T. Wu, *The Attention Merchants* (Atlantic Books, 2016), Chapter 1.

²⁹⁵ *Ibid.*, 12.

being related to the process of accumulation of capital and the capture of value in the digital economy. Hence, we need to explore more closely the value generation and capture process taking place in these ‘attention’ markets. An important issue with ‘attention’ markets is nevertheless to develop an appropriate metric that would enable competition authorities to prioritise their scarce resources and ensure that their intervention in these markets may be effective.

Digital advertising markets may provide indications as to the value of this attention captured by the digital platforms (by reference to some form of hedonic pricing). Digital advertising spending has risen considerably worldwide, from \$152 billion in 2015 to \$204 billion in 2017. Internet advertising spending worldwide is projected to rise to \$142,2 billion for display advertising, \$109 billion for advertising in search engines (paid search), and \$23,2 billion for classified Internet ads (\$274.4 billion)²⁹⁶. Most of this digital advertising revenue was collected in 2018 in the US (\$100.69 billion), followed by China (\$48.96 billion), the UK (\$12.74 billion), Japan (\$11.7 billion), and Germany (\$10.65 billion)²⁹⁷. Digital advertising is still however not the most significant source of advertising revenue. In the US, out of the \$191.2 billion total of the advertising market (all media), Internet/digital advertising occupied the second place in 2016, while TV advertising was ranked first, with much smaller parts going to radio advertising, newspaper and consumer magazines advertising and outdoor advertising²⁹⁸. The largest part (a little more than 60%) of the digital advertising revenue is collected through the use of mobile rather than desktop computing²⁹⁹. With regard to the US digital advertising spending per industry, more than 20% comes from the retail sector, followed by the automotive industry (12.6%), financial services (12.2%), telecom (10.7%), and consumer products (8,8%)³⁰⁰. Online advertising has also surged in Europe. In the UK, the largest market in Europe, online advertising accounted for 52% of total UK ad spend (most of this generated by mobile Internet use), followed by TV advertising (with a little more than 12% of the total UK ad spend), advertising being the main source of funding for online content³⁰¹. Paid for search accounted for half of the online advertising, although display advertising also made heavy inroads in recent years³⁰².

The core activity of these advertising markets therefore consists in the capture of the attention of the users of digital platforms. The attention of users becomes a commodity that is freely traded and exchanged in attention markets. An important dimension of assessing the economic impact of the conduct of the rise of dominant digital platforms on the attention of consumers is to determine the value and the boundaries of these markets. The fact that attention can be valued results from its commodification and evaluation in the context of specific advertising markets. This can even go beyond taking the form of evaluation in fiat money, but

²⁹⁶ Zenith, ID 276671.

²⁹⁷ Statista (Digital Market Outlook), Global overview, ID 459632.

²⁹⁸ MoffettNathanson, ID 272315 (2016).

²⁹⁹ Statista (Digital Market Outlook) ID 459593.

³⁰⁰ eMarketer: Marketing Charts ID 301868.

³⁰¹ OFCOM, Communications Market Report (August 2nd, 2018), available at <https://www.ofcom.org.uk/research-and-data/multi-sector-research/cmr/cmr-2018/76-77> (noting that other forms of funding include subscription-based services (such as Amazon Prime Video, Netflix, Financial Times) and transaction/donation based (such as YouTube, The Guardian).

³⁰² Ibid., 78 (noting the increasing prevalence of video overtook banners for his type of ad format).

embracing futurity even further, its value can be represented by a ‘basic attention token’ as this was issued in the context of the Initial Coin Offering of BAT, a token that can be exchanged between publishers, advertisers, and users in order to obtain a variety of advertising and attention-based services on the Ethereum blockchain run BAT platform³⁰³.

However, this metric faces several problems. Although the value the advertisers spend on digital ads is considerable, this only represents just a small part of the surplus value of the activity of attracting consumer attention, which forms the core activity of prediction platforms. This comes out of the routines that consumers have developed in using the Internet and specific digital platforms in their day-to-day life and the importance this continuous use has taken in the very short period of time of the explosive growth of the Internet that followed the diffusion of smartphones (and mobile Internet) since the launch of the iPhone in 2007. Some refer to this period as the decade of ‘digital dependence’³⁰⁴. As a recent report by the UK OFCOM (telecom regulator) explains, ‘in an “always on” society, people expect to be connected everywhere through a plethora of devices’³⁰⁵. The OFCOM report found that in a world where mobile phones are becoming ubiquitous, the time people spend online has considerably increased (in the UK it doubled on average from 12,5 hours in 2007 to 24 hours in 2018, while a fifth of adults, mostly the younger generations spend more than 40 hours each week online)³⁰⁶. Almost two thirds of adults (64%) in the UK agreed that the internet was an essential part of their life³⁰⁷. Consumers are always connected or feeling connected, the OFCOM report finding that ‘40% of adults first look at their phone (apart from checking the alarm/clock) within five minutes of waking up, increasing to 65% of under-35s. Even before going to sleep, 37% of adults check their phones five minutes before lights-out, again increasing to 60% of under-35s’³⁰⁸.

As previously mentioned this higher intensity of connectivity and use of the Internet is related to the rise in the use of smartphones, combined with the take-up of 3G and 4G networks improving the quality of connectivity, which enhanced mobile Internet access³⁰⁹. Smartphones offer a multi-functional device that usually combines functions previously completed by a range of devices. While the take-up of new technologies, such as smartphones, smart TVs, tablets or laptops has risen, other technologies, such as DVD players, Desktop PCs, MP3 players have seen their take-up decrease during this period, the smartphone becoming the more ubiquitous digital device.³¹⁰ This ensures that the digital platforms controlling access to central points of control of control the vast amounts of information generated by Internet use. The use of new devices, such as smart speakers, whose functionality may be extended with software similar to smartphone apps, or voice assistants is on the rise and would have considerable implications on the use of Internet as the devices are now controlled by the user’s voice through

³⁰³ See <https://basicattentiontoken.org/>.

³⁰⁴ See <https://www.ofcom.org.uk/about-ofcom/latest/features-and-news/decade-of-digital-dependency>.

³⁰⁵ OFCOM, Communications Market Report (August 2nd, 2018), available at <https://www.ofcom.org.uk/research-and-data/multi-sector-research/cmr/cmr-2018>, 4.

³⁰⁶ *Ibid.*, 14.

³⁰⁷ *Ibid.*, 15.

³⁰⁸ *Ibid.*, 15.

³⁰⁹ The report notes that use of a smartphone increased from 27% of all adults in 2011 to 78% in 2018: *Ibid.*, 16.

³¹⁰ *Ibid.*, 24.

an integrated AI voice assistant³¹¹. Voice control systems are also integrated in smartphones, tablets, and certain models of smart TVs and even cars, and often provide the possibility of voice recommendations, further affecting the choice architecture of the user, as this does not have to choose on screen among different options but is instead ‘suggested’ an ‘optimal’ choice devised by the algorithm.

Accessing the Internet also becomes an activity that may be exercised outside work or home, the amount of time people spend online in a location other than work or home having quadrupled between 2007 and 2017³¹². An increasing number of people use their smartphone while commuting (the most frequent uses being sending and receiving text messages/ instant messages, accessing social networking sites and general web browsing)³¹³. People use the Internet for entertainment, in order to avoid ‘boredom’, for shopping and online banking, as well as in order to stay connected with friends and family, although it is also acknowledged that being online may sometimes interrupt face-to-face communications³¹⁴.

Large digital platforms, such as Google and Facebook in Europe and the US, account for a very large amount of use of this important and increasing amount of time spent online³¹⁵. Figure 4.16. provides the list of the top 10 Internet properties accessed on mobile/desktop devices in the UK during March 2016 and March 2018. It appears in this Figure that Google sites (including You Tube, Google Search, Google maps, Gmail) and Facebook (including Instagram, Whatsapp and the main Facebook site) are ranked first and second properties with a considerably more intensive use, in terms of average time spent per person per month, than other websites.

Figure 4.16: Top ten properties assessed on mobile/desktop devices in the UK, ranked by reach: March 2016-March 2018

³¹¹ Ibid., 40.

³¹² Ibid. 15.

³¹³ Ibid., 17.

³¹⁴ Ibid., 19.

³¹⁵ Ibid., 65.

Average time spent per person per month ■ <100 mins ■ 100-300 mins ■ >300 mins

Rank	2016		2017		2018	
	Property	Reach	Property	Reach	Property	Reach
1	Google Sites	98%	Google Sites	98%	Google Sites	99%
2	Facebook	87%	Facebook	91%	Facebook	95%
3	Amazon Sites	82%	Microsoft Sites	87%	BBC Sites	93%
4	Microsoft Sites	82%	BBC Sites	87%	Amazon Sites	89%
5	BBC Sites	81%	Amazon Sites	85%	Microsoft Sites	87%
6	Yahoo Sites	72%	Trinity Mirror Group	73%	Oath	81%
7	eBay	69%	eBay	71%	Sky Sites	73%
8	Sky Sites	65%	Mail Online/Daily Mail	70%	Trinity Mirror Group	71%
9	Trinity Mirror Group	64%	Yahoo Sites	69%	News UK Sites	71%
10	Mail Online/Daily Mail	63%	Sky Sites	67%	eBay	69%

Source: OFCOM, *Communications Market Report (August 2nd, 2018)*, available at <https://www.ofcom.org.uk/research-and-data/multi-sector-research/cmr/cmr-2018> 71.

In this attention-seeking economy firms do not only compete for consumer expenditure, which may constitute the main incentive of firms present in advertising markets to be matched to consumers, but also, or sometimes instead, for consumer attention³¹⁶.

Economic literature has explored different ways to value this consumer attention dedicated to online activities and the time spent on websites controlled by the major digital platforms.

As we have indicated, economists initially focused on the amount of money spent by advertisers, but this may under-represent the value of ‘attention markets’. Other approaches started focusing on the time the users were spending on these platforms in an effort to assess the value provided by the Internet to consumers, which was difficult to assess under the traditional metrics as the services provided by these digital platforms were ‘free’, in the sense of ‘zero-priced’. The ultimate purpose of these measurement efforts was to assess the value of the Internet³¹⁷. Such evaluations were of course also related to the effort of determining the value provided by online ads to advertisers, publishers, charities and others, and were particularly important in the process of setting the auction technique that was used to value ads in the most popular digital platform in terms of number of users, Google³¹⁸. Indeed, bidders

³¹⁶ A. Boik, S. Greenstein & J. Prince, *The Empirical Economics of Online Attention*, NBER (July 2016).

³¹⁷ See, H. Varian, *Economic Value of Google* (2011), available at <http://assets.en.oreilly.com/1/event/57/The%20Economic%20Impact%20of%20Google%20Presentation.pdf>; E. Brynjolfsson & J. Hee Oh, *The Attention Economy: Measuring the Value of Free Digital Services on the Internet*, (2012) available at <https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1045&context=icis2012>.

³¹⁸ H. Varian, *Economic Value of Google* (2011), available at <http://assets.en.oreilly.com/1/event/57/The%20Economic%20Impact%20of%20Google%20Presentation.pdf>

compete through auctions managed by Google Ads for longtail keywords which may be most relevant for their target audience. However, they only have to pay if someone clicks on the ad (pay per click or PPC) at the price set at the auction. Advertisers may predict how many clicks they will get at a new bid by using a Bid Simulator. This assumes of course that the value per click, generated for instance by the conversion of the click to, for instance, an online e-commerce transaction on the specific website, is greater than the incremental cost per click. In a widely publicised presentation in 2011 the chief economist of Google, Hal Varian, indeed indicated that advertisers on Google were getting back about seven times what they spent in value of ad clicks. They also had the possibility to benefit from clicks coming out of organic (non-ad funded search). While AdWords is focusing on the advertisers' side, AdSense focuses on publishers or Website owners helping them to reserve space for AdWords placements on their website (these could be text, video, images), the Google platform operating as an intermediary between advertisers and publishers/website owners. The latter get a 67% share of the ad revenue generated by AdSense. Varian also emphasised the benefits going to the users of Google's search engine in terms of time 'saved', estimating that this amounted to an annual value of \$120 billion in 2011, on the basis of the value of time savings to average users, but did not discuss any opportunity costs these may incur because of their attention being grabbed by the platform. Indeed, determining such opportunity costs may be quite difficult, if not impossible. However, factoring these costs in the analysis is essential if one needs to take into account all the social benefits and costs of the business model of digital platforms.

There are two possibilities to account for this opportunity costs of attention. A time-based model will focus on the percentage of time users spend online, from their available time excluding hours of sleep, and how much time from this is accounted for by Big Tech³¹⁹. A money-based model would go try to assess the value of the attention time users spend on digital platforms. Evans notes the increasing amount of time users spend on Apps/Web accessed through smartphones and tablets or other multimedia devices, in comparison to the time they spent on other media, such as Live TV, DVR/Time-Shifted TV or AM/FM Radio etc.³²⁰. Evans only takes into account the time spent on ad-supported content, some of which is spent offline (e.g. newspapers, radio, TV). Then Evans relies on the economics of household production in order to measure the value of consumer attention. He divides the time people spent to three broad categories: labour, household production and entertainment/leisure time, acknowledging that this tripartite distinction does not account well for multi-tasking as people may do more than one type of activity at the same time. Evans recognises that 'consumers have a finite amount of time and must allocate it across competing uses'³²¹. Indeed, for Evans, 'consumers allocate time to wage work until the marginal rate of substitution between consumption and leisure equals the marginal after-tax wage rate, which therefore provides a monetary measure of the value of time'³²². From this starting point, he concludes that 'the opportunity cost of an

³¹⁹ See, for instance, E. Brynjolfsson & J Hee Oh, *The Attention Economy: Measuring the Value of Free Digital Services on the Internet*, Proceedings of the Thirty Third International Conference on Information Systems, Orlando, available at <https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1045&context=icis2012> .

³²⁰ D.S. Evans, *The Economics of Attention Markets*, (October 31, 2017), available at SSRN: <https://ssrn.com/abstract=3044858> .

³²¹ *Ibid.*, 7.

³²² *Ibid.*, 9.

extra hour consuming content is equal to the after-tax marginal wage rate³²³. On this basis, Evans assesses the value of the 437 billion hours US consumers spend on ad-supported content to \$7,1 trillion (taking into account after-tax average wage as a measure of the opportunity cost of time), this figure coming down to \$5 trillion (if one takes into account before tax average wage rate) and \$2 trillion (if one considers after tax minimum wage)³²⁴. This time is valuable and could of course be used for other things. Evans ventures that ‘consumers receive surplus over and above what they pay in the form of time for consuming content’³²⁵.

The content consuming users’ time is not always produced by the digital platforms, their role being merely to match content with users grabbing their attention and then to resell users’ attention in advertising markets, by matching an ad with a user who in all likelihood, in view of his past revealed preferences or inferences about his preferences, will be interested in it. Digital platforms therefore compete to get users to spend time with them.



The more a platform spends on content, the more attention it may get. However, the possibility of the platform to resell that attention is fixed as there is a fixed amount of time, or space, available for ads, as there is a risk that in case the platform includes more ads, this may have negative effects to the attention of the users which may abandon the platform, of course in case there are less-intensive in terms of ads platform available. Advertisers realise diminishing returns from the attention they attract through content as consumers have decreasing propensity to buy advertisers’ products if they spend more time on the free content.

Evans’ analysis does not take into account the fact that as it is observed in the EU panel of experts report, ‘(m)any consumers are typically not consciously participating in this exchange, or do not appreciate the value of the attention they are providing’³²⁶. Although he acknowledges that the HHI of the top 1000 websites, in terms of time share, has increased from 2868 in 2008 to 2968 in 2013, therefore showing that this is a concentrated market, he also notes that ‘the HHI understates the degree of competition for attention because it is a static measure that does not reflect the entry and exit, and expansion and decline, of websites, which takes place over relatively short periods of time’³²⁷. For instance, he refers to studies that have found that the top five websites accounted for 42.5% of the time in 2008 but their share declined to 20% by 2013³²⁸. However, the same study notes the limit of the number of websites that can be visited by households and that people do not split time into more numerous and shorter site visits³²⁹. This indicates that browsing behavior may be stable over time, thus limiting the opportunity of other websites to make serious gains in these attention markets. Indeed, if one

³²³ Ibid. 10.

³²⁴ Ibid., 12.

³²⁵ Ibid., 28.

³²⁶ European Panel of Experts Report (2019), 22.

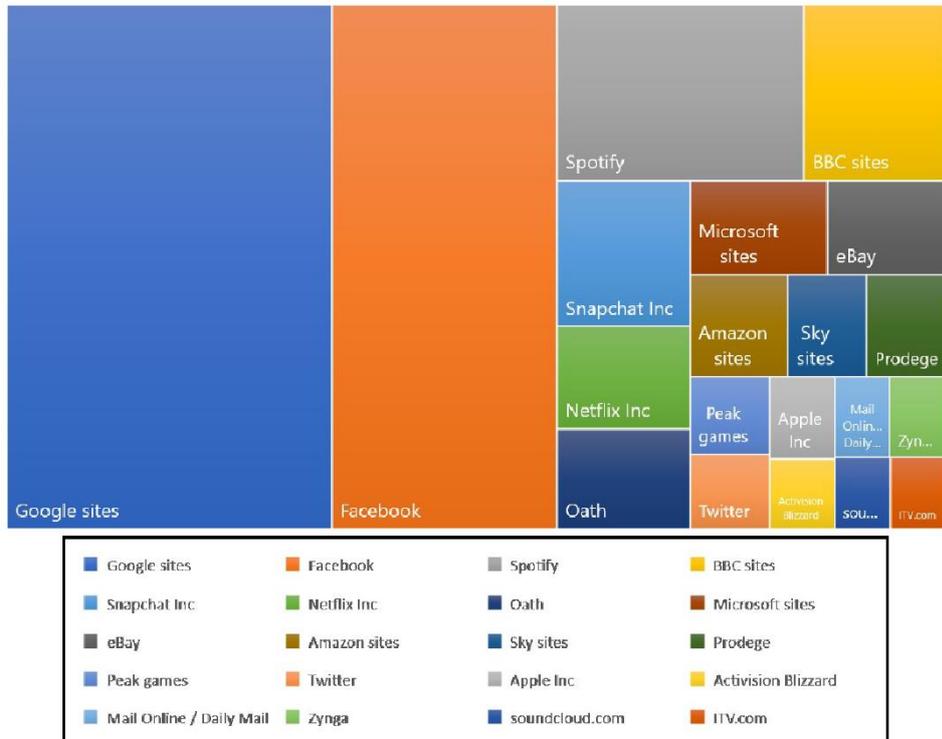
³²⁷ D.S. Evans, *The Economics of Attention Markets*, (October 31, 2017), available at SSRN: <https://ssrn.com/abstract=3044858> , 22-23.

³²⁸ Ibid., 25 referring to A. Boik, S Greenstein & J. Prince, *The Empirical Economics of Online Attention*, NBER Working Paper Series (July 2016), available at <https://www.nber.org/papers/w22427> .

³²⁹ A. Boik, S Greenstein & J. Prince, *The Empirical Economics of Online Attention*, NBER Working Paper Series (July 2016), available at <https://www.nber.org/papers/w22427> , 29.

looks to the share in terms of time spent on the top 20 websites in the UK, the market looks quite concentrated (see Figure 4.17).

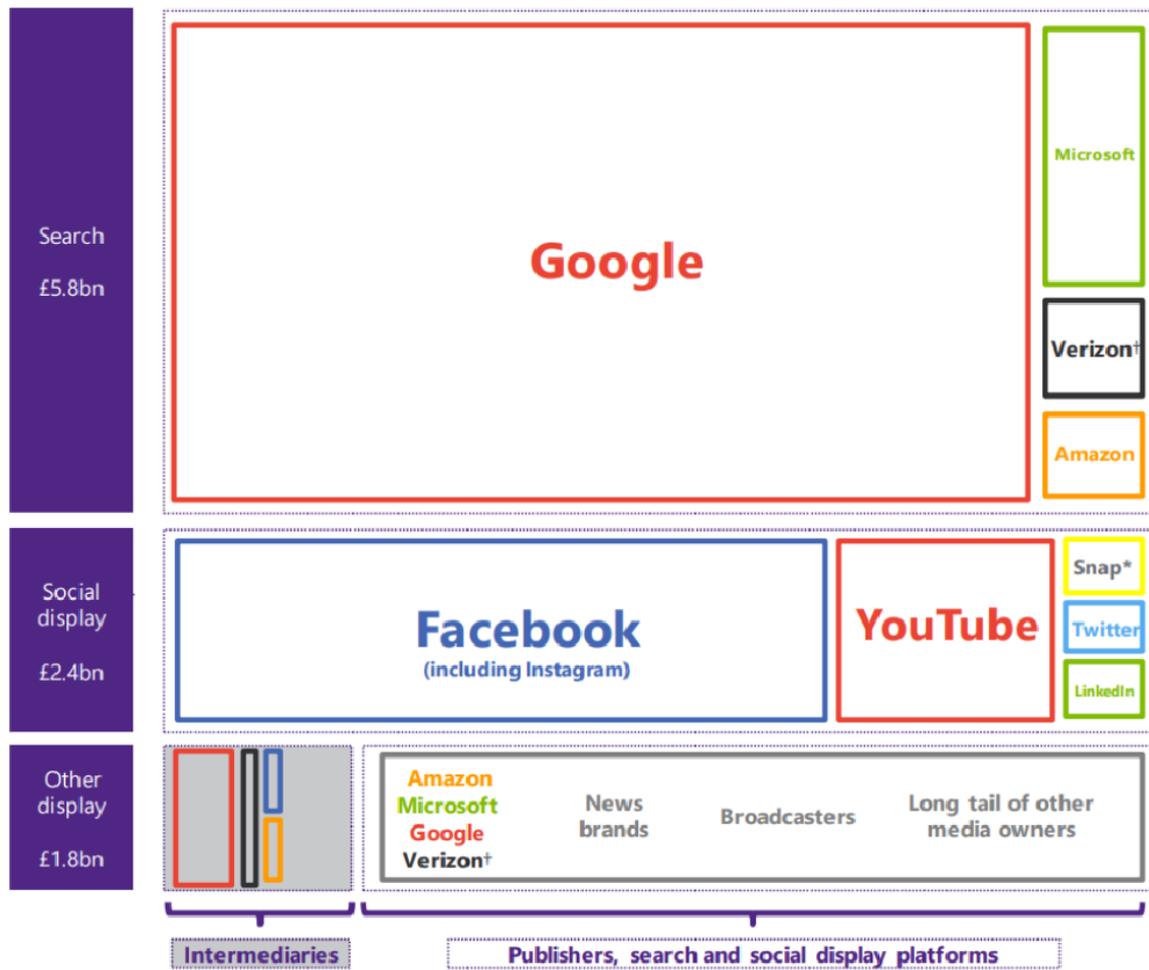
Figure 4.17: Share of time spent on top 20 sites by UK users



Source: Comscore cited in Furman et al Report (2019), 29

One may also note that other studies have found that the top websites' share in terms of advertising revenue indicates that the market of attention (taking into account its advertising side) is quite concentrated (see Figure 4.18.).

Figure 4.18.: Indicative market share of online advertising expenditure by major competitors in the UK (2017)



Ownership: = Google = Facebook = Microsoft = Verizon = Amazon = Snap = Twitter = Other

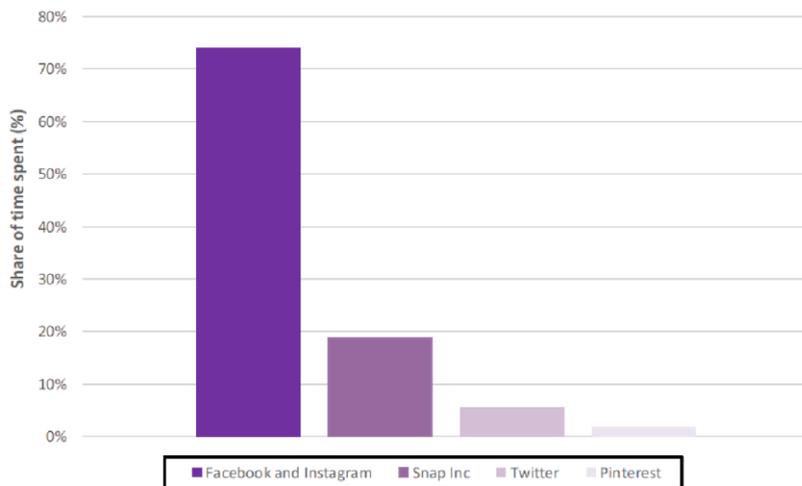
* Snap is generally included in the social display category, although it describes itself as a camera and communications company.

† Verizon Media Group (formerly Oath)

Source: Plum Consulting cited in Furman et al Report (2019), 28.

Similar findings were made with regard to the share of time spent on social media platforms in the UK (see Figure 4.19)

Figure 4.19.: Share of time spent on selected popular social media services in the UK



Source: Comscore cited in Furman et al Report (2019), 26

More generally, Evans takes the view that advertising fulfils the function to inform the consumers so as to enable them to make more efficient choices, and it is therefore something that may be considered as contributing to consumer surplus³³⁰. By espousing this assumption Evans seems to adhere to the informative view of advertising, according to which the principal function of advertising is to convey information to consumers, and from that perspective, to help them choose the products/services that correspond the best to their preferences³³¹. This view has been advanced by authors close to the Chicago School of economics³³². Telser, a proponent of that view, argued that ‘advertising is frequently a means of entry and a sign of competition’, in view of its role as ‘an important source of information’ for consumers³³³. More importantly, although Telser recognizes that ‘firms which have some monopoly power are more likely to advertise because they can obtain most of the increased sales stimulated by their advertising’, he also finds a weak correlation between concentration or stable market shares and advertising, thus questioning the causal link earlier made by the proponents of the persuasive view³³⁴. Nelson also advances an informative view argument by distinguishing between search goods (whose quality can be determined prior to purchase, even if at high costs) and experience goods (whose quality can only be determined after consumption) and observing the benefits of advertising (and enhanced product differentiation) for experience goods (through the provision of indirect information on the product)³³⁵. Advertising constitutes a way for the firms to signal to consumers that they are the most efficient (low-cost) firms, since they seek demand expansion (the ‘signalling-efficiency effect’ of advertising). Furthermore, ‘(a)dvertising increases the probability of a consumer’s remembering the name of a brand’, and therefore advertising assists the consumer by informing his choice (‘the match-products-to-

³³⁰ D.S. Evans, *The Economics of Attention Markets*, (October 31, 2017), available at SSRN: <https://ssrn.com/abstract=3044858>, 30.

³³¹ K. Bagwell, *The Economic Analysis of Advertising*, Discussion paper No. 0506-01, Columbia University, Department of Economics, August 2005, p. 16.

³³² G.J. Stigler, *The Economics of Information*, *Journal of Political Economy*, 69 (1961), 213-25.

³³³ L.G. Telser, L. G., *Advertising and Competition*, *Journal of Political Economy*, 72 (1964), 537-62, 558.

³³⁴ *Ibid.*, 544.

³³⁵ P. Nelson, P., *Advertising as Information*, *Journal of Political Economy*, 82 (1974), 729-54, 732-34.

buyers effect). Hence, advertising, as well as any mechanism of product differentiation (such as branding) stimulate price comparisons and therefore price competition. Finally, advertising, and brands in general, assist the consumer to draw positive associations between specific products and quality, reminding them of their previous experience with the product ('the repeat-business effect')³³⁶.

One may nevertheless take a more negative view on advertising as to its benefits for consumers, and adopt the persuasive view that focuses on the potential of advertising to manipulate consumers. Advertising may be perceived as a tool to alter consumer preferences and to create product differentiation and brand loyalty, driving the demand curve of the advertised product to become more inelastic and thus leading to higher prices for consumers, as well as have an 'entry-deterrence effect'³³⁷. Empirical work has confirmed some of the intuitions of the 'persuasive view'. Comanor and Wilson performed a multi-variate regression analysis of the averaged profits of manufacturers in 41 consumer-good industries for a period of three years and found 'empirical support for the conclusion that the heavy volume of advertising expenditures in some industries serves as an important barrier to new competition in the markets served by these industries'³³⁸. More recently, with regard to product differentiation Bronnenberg *et al* highlighted that brands, advertising, or other past experiences and social milieu, such as childhood, lead to 'preference capital', which could be a valuable asset for incumbent firms and a source of long-term economic rents for them³³⁹. This explains, according to these authors, why consumers have high willingness to pay for particular brands, even when the alternatives are objectively similar³⁴⁰. This evidence indicates that brand loyalty may not always be a natural outgrowth of consumer preferences and that there is value for firms to use advertising, branding or other forms of product differentiation in order to establish some form of 'preference capital'. This strategy may generate high willingness to pay for consumers and presumably steady economic rents for the incumbents in the future, without that being justified by the objective characteristics of their product/or service in comparison to the products/services of a new entrant. In other words, incumbent firms may have the incentives and the ability to alter the utility function of consumers in order to increase their profits.

The emphasis put on the potential of manipulation through advertising or more broadly choice architecture and agenda-setting may indeed shed light on one of the sources of power for digital platforms, and the reasons their valuation by financial markets has skyrocketed in recent years. The more people switch to a digital an 'always connected' way of life, the more the opportunities to influence their preferences through choice architecture or outright manipulation become more important. Firms may more actively manipulate the choice of

³³⁶ Ibid.

³³⁷ K. Bagwell, *The Economic Analysis of Advertising*, Discussion paper No. 0506-01, Columbia University, Department of Economics, August 2005, 9.

³³⁸ W.S. Comanor and T. A. Wilson, *Advertising and Market Power* (Cambridge, MA: Harvard University Press, 1974), p. 239.

³³⁹ Bart J. Bronnenberg, J.-PH. Dubé, M. Grentzkow, The Evolution of Brand Preferences: Evidence from Consumer Migration, *American Economic Review*, 102(6) (2012), 2472–2508.

³⁴⁰ Ibid. See also, BJ. Bronnenberg, S.K. Dhar, J.-P.H.. Dubé, Brand History, Geography, and the Persistence of Brand Shares, *Journal of Political Economy*, 117(1) (2009), 87–115. Yet, these preference are shaped during a considerable period of time.

consumers in digital markets³⁴¹, and will be able to do this even more effectively as the control of devices moved from screens, where the user benefits from a relatively open architecture, to voice-controlled devices. The message provided by advertisers may be even more convincing the more it is targeted to the specific vulnerabilities and core beliefs of the consumer. Hence, the value of digital platforms is not only related to their matching function but more importantly to their predictive and manipulative function. This raises interesting issues for competition law enforcement, and its interaction with other areas of law aimed to protect consumers from deception or manipulation, such as consumer law. The discussion over the effects of digital platforms on attention markets also raises the potential of exploitation of consumers. This can take different forms related to the different activities of digital platforms. First, harvesting personal data may affect privacy and produce consumer harm, if privacy is considered as an important parameter of competition by consumers. Second, by proceeding to frequent ‘attentional intrusions’ digital platforms may commit ‘attention theft’, defined as ‘the non-consensual seizure of the scarce resource of attention, yielding cognitive impairment’, thus producing consumer harm³⁴². Thirdly, digital technology offers the enhanced possibilities of personalisation, which may in turn lead to abuses, such as algorithmic discrimination and personalised pricing. We explore the implications of personalisation for determining the field of the competition law assessment in the next Section.

4.3. Personalised markets

It is increasingly acknowledged that data collection is fundamental to firms’ ability to compete in the future Internet of Things (‘IoT’), Internet of Services (‘IoS’) and/or Internet of Everything. The firms that have obtained access to the largest amounts of data will benefit from a competitive advantage.³⁴³ Data analytics connected to the use of software for predictive modelling, will also reinforce the competitive advantages of such firms, with this ultimately being crystallised in architectural advantage because of their control of ‘idiosyncratic rent-earning resources’ (i.e. in the form of superior algorithms) or, more generally, by their development of capabilities that cannot be imitated by competitors (because of increasing returns to scale).³⁴⁴ With the advancement of the IoT and IoS and the possible emergence in the near future of the Internet of Everything, the amount of data that will be collected will increase immensely, including in industries that were not previously digital.

Much of this data will relate to the digital identity of the consumer and will enable companies to draw a pretty accurate individual preferences map for each of their clients. More

³⁴¹ See, J.D. Hanson & D.A. Kysar, *Taking Behavioralism Seriously: The Problem of Market Manipulation*, (1999) 74 *New York University Law Review* 630. For the first study in EU competition law raising this problem, see N. Economides & I. Lianos, *The Elusive Antitrust Standard on Bundling in Europe and in the United States in the Aftermath of the Microsoft cases*, (2009) 76 *Antitrust Law Journal* 483, 542.

³⁴² T. Wu, *Blind Spot: The Attention Economy and the Law* (March 26, 2017). *Antitrust Law Journal*, forthcoming, available at SSRN: <https://ssrn.com/abstract=2941094>, 9.

³⁴³ There is a discussion regarding the definition of ‘data’: does it encompass syntactic information, semantic information, or both; and where should one draw the line in reference to protecting ‘data’?

³⁴⁴ M. Jacobides, S. Winter & S. Kassberger, “The Dynamics of Wealth, Profit, and Sustainable Advantage”, (2012) 33 *Strategic Management Journal*, 1386.

than just being dominant in an ‘attention market’³⁴⁵, firms may be able to practice behavioural pricing or personalised price discrimination, which comes tantamount to first degree price discrimination (or person-specific pricing). This is now possible in view of Big Data and algorithmic pricing as practiced in online commerce, as sellers charge different prices depending upon a buyers’ search history, or “digital shadow”³⁴⁶. Recent calls for intervention against “behavioural pricing” (or personalised price discrimination)³⁴⁷, which may be considered as a form of algorithmic discrimination, illustrate the broader societal concerns (if not only economic) that are raised with regard to the perceived manipulation of consumers by companies, something as old as advertising exists.³⁴⁸ In the era of “machine learning” and Artificial intelligence-assisted pricing the risks of “digital” consumer manipulation may admittedly increase at an industrial scale.³⁴⁹ Digital markets exacerbate the above risks, in view of the possibilities they offer of “a vast psychological audit, discovering and representing the desires of society”³⁵⁰ and of each individual separately, offering sophisticated evaluation methods that are closely linked to the direct observation of consumer preferences, but also more broadly of a whole range of preferences expressed in social, and private life, through the means of sociometric analysis³⁵¹. Big data enable us to observe, allegedly more accurately, the inner mental states of people and potentially influence the way these form their core preferences. Such manipulative potential and of course the possibility that this may occur at a larger scale, in view of the possibilities offered by algorithms, data analysis and artificial intelligence, is clearly motivating public authorities to action.

This may later feed in the companies’ commercial strategies that may, for instance, develop personalised pricing strategies, which may be considered a form of price discrimination.

³⁴⁵ On this concept, see T. Wu, *Blind Spot: The Attention Economy and the Law* (March 26, 2017). *Antitrust Law Journal*, forthcoming, available at SSRN: <https://ssrn.com/abstract=2941094>; D.S. Evans, *The Economics of Attention Markets*, (October 31, 2017), available at SSRN: <https://ssrn.com/abstract=3044858>.

³⁴⁶ M. Gal, ‘Algorithmic-facilitated Coordination’, DAF/COMP/WD(2017) 26 (noting that “ (a)s more data is gathered about each consumer’s preferences, a personalized ‘digital profile’ can be created by algorithms, which calculates and updates each consumer’s elasticity of demand in real-time. This digital shadow can then be used by suppliers to increase their profits even further, if they can price-differentiate between the offers they make to different consumers”).

³⁴⁷ See, *Autorité de la Concurrence & Bundeskartellamt, Competition Law and Big Data* (May 10th, 2016), 21-22, noting that although the application of EU competition law to these practices may be debated, in Germany, the Federal Supreme Court found that the national provision against the abuse of a dominant position can include a consumer protection dimension as regards price discrimination, see German Federal Supreme Court (BGH), „Entega II“, KZR 5/10, judgment of 07.12.2010. For a discussion of “personalised pricing” see, P Coen & N Timan, ‘The Economics of Online Personalised Pricing’ (Office of Fair Trading 2013); Oxera, ‘Behavioural Economics and Its Impact on Competition Policy’ (Oxera 2013) ; T.J. Richards et al, *Personalized Pricing and Price Fairness*, (2015), available at https://courses.cit.cornell.edu/jl2545/papers/personalized_Pricing_IJIO.pdf ; A Ezrachi & M Stucke, ‘The Rise of Behavioural Discrimination’ [2016] 37 *ECLR* 484; A Ezrachi & M Stucke, *Virtual Competition* (Harvard University Press 2016), Chapter 11 (distinguishing “near perfect” discrimination, involving the categorisation of consumers through the harvesting of personal information collected with the help of Big Data and self-learning algorithms, from “behavioural” discrimination, which is led with the aim to trigger consumer biases and increase consumption).; M Bourreau et al., *Big Data and Competition Policy: Market Power, personalised pricing and advertising*, CERRE Project Report (February 2017).

³⁴⁸ See, I Lianos, ‘Brands, Product Differentiation and EU Competition Law’ in D. Desai, I. Lianos & S. Weber Waller (eds.), *Brands, Competition Law and IP* (Cambridge University Press, 2015), (discussing the ‘persuasive view’ of advertising in economic literature).

³⁴⁹ R Calo, ‘Digital Market Manipulation’, (2014) 82 *George Washington Law Review* 995.

³⁵⁰ W. Davies, *The Happiness Industry: How the Government & Big Business Sold Us Wellbeing* (Verso, 2015).

³⁵¹ *Ibid.*

Personalised pricing improves the ability to distinguish customers and may lead to first degree price discrimination, as well as third degree price discrimination, when it is possible for the firms to apply group pricing, discriminating between groups of consumers. Subjecting to price discrimination final users may enable the producer to capture the entire consumer surplus, generate unequal treatment of various individual consumers or groups of consumers, and affect competition with other producers (not necessarily of the same relevant market), in the sense that by enabling the producer to charge a specific consumer as high as his willingness to pay, reduces the available income of the consumer to make other purchases. Different producers compete for the limited resources/budget of a consumer or a group of consumers.

Personalised pricing or “price targeting” has been observed in various markets.³⁵² To the extent that this manipulation may result in welfare losses for individuals, or group of consumers, in the sense that the specific individual, or the specific group of consumers, could find its/their situation worse off, in comparison to a counterfactual where no such digital manipulation would have taken place, it can be argued that these deviations from the counterfactual situation need to be corrected through State intervention, eventually by competition law enforcement. But this is a matter for debate. One may argue that personalised pricing should not be considered as a form of “manipulation”, but as a technological opportunity to charge each consumer as much as her/his willingness to pay is. This may, for instance, enable some consumers that would not have been able to purchase the specific product, if a uniform price would have been implemented and would have been higher than their willingness, to pay for the product. “Personalised pricing” may have ambiguous welfare effects, depending on market structure and the trade off between the market “appropriation” effect to consumer with high willingness to pay versus the “market expansion” effect to consumers with a low willingness to pay of targeted pricing.³⁵³

Competition law intervention may also be motivated by fairness considerations (value ethics), in particular if personalised pricing is not transparent and thus consumers are not informed, or the need to limit an extensive use by the firms practising algorithmic discrimination of consumers’ sensitive personal data, in view of the purpose limitation and data minimisation requirements in the Data Protection regulation³⁵⁴. These practices may also raise more conventional competition law concerns, as they discourage consumer search by making it harder or more expensive to return to buy after a search for alternatives, with the effect that the matching of products to consumers is sub-optimal and that consumers, on aggregate, may finish paying higher prices.³⁵⁵

³⁵² See the analysis and examples provided in M Bourreau et al., *Big Data and Competition Policy: Market Power, personalised pricing and advertising*, CERRE Project Report (February 2017), 40-41 and the empirical studies they refer to.

³⁵³ For a discussion, see OFT1488, *The economics of online personalised pricing* (May 2013), available at http://webarchive.nationalarchives.gov.uk/20140402142426/http://www.of.gov.uk/shared_of/research/of1488.pdf; M Bourreau et al., *Big Data and Competition Policy: Market Power, personalised pricing and advertising*, CERRE Project Report (February 2017), 43-45.

³⁵⁴ Art. 5(1) of Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation - GDPR), [2016] L 119/1. See also Art. 9(1) GDPR and Section 2 of the Data Protection Act 1998 which require the data controller when processing personal data to obtain a specific and explicit consent to process these categories of data.

³⁵⁵ M Armstrong & J Zhou, ‘Search Deterrence’ (2016) 83 *Review of Economic Studies* 26

One may argue that the principle of ‘open market economy’ would require that economic value should be set in the context of a competitive process taking place on a market, where various actors, consumers and suppliers interact through the signals of price. Hence, charging a consumer a personalised price that would correspond to her/his willingness to pay, without him being aware of this and without enabling the specific consumer to benefit from the competitive process taking place at the ‘open market’ and the source of information this may provide so as to enable informed comparison with regard to the situation of other consumers. This is particularly important as one may argue that consumers value the competitive process as such, and not just the fact that the price of a product is within the range of their willingness to pay, which is also something that cannot be set in advance, but essentially cultivated in the context of a market involving continuous interactions between buyers and sellers. That said, it is important to explore if competition law is the best legal instrument to deal with welfare-reducing targeted pricing, or if other alternatives, such as consumer protection law, data protection and privacy rules, anti-discrimination law, unfair commercial practices law, regulation, may prove to be more appropriate, following a detailed comparative institutional analysis.³⁵⁶

Moving beyond personalised pricing, another implication of personalisation is that firms will be able to develop bespoke products that suit the individual preferences of their consumers without incurring prohibitive costs as they will be able to achieve economies of scale by developing various series of products that could satisfy the entire demand function of the specific consumer in various product categories. In this era of ‘mass personalisation’,³⁵⁷ these new conglomerates will not just control markets in the traditional sense but they will control the personalised markets of individual consumers on whom they hold a superior level of data than other firms. This, in turn, will enable them to cater for the entirety of demands and needs of that individual, for instance, in consumer goods or entertainment. Once a specific amount of data is harvested, these personalised markets will tip with the result that only one firm will have the capabilities to perfectly satisfy the individual consumer’s demand in an array of products. Indeed, consumers will economise their time if they rely on the personalised made-to-order and customised-to-their-preferences offer of one digital platform or reseller that has been able to harvest their personal data and, from that, gain a greater understanding of their individual preferences map. Firms may then be able to organise the production process within their ecosystem. They may do this by limiting access to an individual consumer’s profile to a

³⁵⁶ See, M Bourreau et al., *Big Data and Competition Policy: Market Power, personalised pricing and advertising*, CERRE Project Report (February 2017), 45-47, noting restrictions on personalised pricing from data protection rules (the need to have the explicit consent of the data subject involved), consumer protection rules (disclosure to consumers about the prices and how they are calculated), unfair commercial practices (prohibiting in certain circumstances consumer profiling and considering this as a misleading commercial practice), free movement law (the Services’ directive prohibitions to discrimination based on the service recipient’s nationality or residence), as well as specific regulations on geo-blocking (see Proposal for a Regulation of the European Parliament and of the Council on addressing geo-blocking and other forms of discrimination based on customers’ nationality, place of residence or place of establishment within the internal market and amending Regulation (EC) No 2006/2004 and Directive 2009/22/EC, COM(2016) 289 final), or the application of competition law provisions against geo-blocking.

³⁵⁷ See, for instance, Deloitte, *Study on emerging issues of data ownership, interoperability, (re-)usability and access to data, and liability*, A study prepared for the European Commission DG Communications Networks, Content & Technology (2016); *Industry 4.0*, Study for the ITRE committee, European Parliament, (2016).

number of firms that they control, either directly or indirectly, and such access will be dependent on this latter firm ensures their products fit the relevant consumer's specific preferences. Even if one assumes that consumer preferences may evolve and that some degree of competition may still be possible, it is clear that mass personalisation will increase demand stickiness and the ability of firms to exploit consumers whilst simultaneously reducing consumer surplus, product variety and consumer choice.

Some of these 'personalised markets' may well appear in the pharmaceutical industry through the development of personalised healthcare, precision medicine and smart healthcare. Changes brought about by developments in digital technology will transform the pharmaceutical and the medical services industries. Data and algorithms are important game-changers as they will enable the development of new 'beyond-the-pills' solutions. Firms will be able to combine drugs, sensors collecting information on the patient's condition and different sorts of data (early R&D data, digital medical records, including diagnostic results, medication history, genomic or gene-expression data, lifestyle data) to develop such solutions. Future medical service providers may be able to 'personalise' patient care, better identify optimal therapies, better predict the patient's response to treatment, as well as engage more fully with physicians, in particular, enabling them to draw from superior insights when making decisions.

The digital revolution will likely transform the pharmaceutical and health service industries beyond recognition in the same way the media, retail, transport and banking industries have been reshaped in recent years. The role of 'personal data', in particular 'genetic data' (such as gene expression data) and 'lifestyle data', in the delivery of personalised medical services and personalised medicine will change the current paradigm, which is very much based on the development of therapies that target an entire population. New digital and/or data-based business models will certainly develop on the basis of competitive advantage in accessing this pool of personal data. This, in turn, will enable the development of health and medical solutions tailored to the characteristics of a specific individual. Hence, it might be expected that the main industrial actors in this area in the future will not only be the pharmaceutical industry and biotechnology companies but also digital intermediaries, which may rely on their superior technological (e.g. algorithms, specialised human resources etc.) and data-gathering capabilities in order to move to the centre of this new emerging health services ecosystem. This move may be based on their own initiative or be done in combination with other firms benefitting from expertise in a specific domain.

In view of the 'intermediation power' some digital platforms may enjoy, to the extent that intermediaries dispose of privileged access to consumer data and/or of 'a significant ability' to steer consumers,³⁵⁸ such platforms may acquire a unique level of access to and

³⁵⁸ H. Schweitzer, J. Haucap, W. Kerber and R. Welker, "Modernising the Law on Abuse of Market Power", (2017) Report for the (German) Federal Ministry for Economic Affairs and Energy. For example, the German Competition Act was amended in 2017; it states that "access to relevant data is a potential source of market power". See also W. Kerber, "Digital Markets, Data, and Privacy: Competition Law, Consumer Law and Data Protection", (2016) *Gewerblicher Rechtsschutz und Urheberrecht Internationaler Teil*, 639-647. There are several authors who purport that holding big data does not equate to market power: G. Colangelo and M. Maggolino, "Big Data as Misleading Facilities", (2017) Bocconi Legal Studies Research Paper No. 2978465. Generally, they argue that big data does not create a significant barrier to entry and they base their claims, inter alia, on the non-exclusive and non-rivalrous nature of data and a claimed ease of collecting it, while disregarding many potential

control over personalised data. This raises concerns over them being the sole source and controller of it in relation to further processes of data monetisation and commercialisation; or of multiple firms being the individual controllers over different sources of data, thus constituting ‘data thickets’. The right of access to the data (i.e. through a request to the manufacturer, maker or generator of the data) will certainly constitute an important element in devising the public policy aim that should frame the principles that would apply in each regulatory framework. However, conceiving access to data as a right that any actual (and/or potential) business participant may stumble across raises considerable theoretical and practical difficulties, such as the issues of:

- ownership of this data (i.e. if data may be ‘owned’),
- the business practices of firms holding the data limiting or conditioning access to it (i.e. hold-up situations in cases of split ownership),
- this information is subject to moral rights,
- this information is subject to rules concerning inalienability,
- regulatory prohibitions or limits to the sharing of personal data,³⁵⁹ and
- the technical means and way in which access to the specific data will be implemented and the transaction costs inherent in such (these costs are likely to be considerable).

One should expect that many of the actors operating in the digital pharmaceutical and health services industry will engage in extensive long-term collaborations in reference to the creation, the exchange and trade of data. These collaborations will likely be based on the high level of transaction costs and specificity of data and technological capabilities required by this industry in order for it to flourish. It should also be expected that various industry players will seek to control bottlenecks and, thus, preserve their ability to gain abnormal profits, even after the superior technological capabilities of which they currently dispose have dissipated in view of the diffusion of any necessary and relevant technologies among all players in this new ecosystem.

entry barriers. Other scholars argue that the harm created by big data pertains mainly to privacy. Yet, these conclusions are based on the limited existing economic studies on big data, which often focus on one specific market (most commonly on search engines or personal data markets). See, for example, Rubinfeld and Gal, (41), 339; D. Tucker and H. Wellford, “Big Mistakes Regarding Big Data”, (2014) 6 *Antitrust Source*, 10; M. Ohlhausen and A. Okuliar, “Competition, Consumer Protection, And the Right [Approach] To Privacy”, (2015) 80 *Antitrust Law Journal*, 121; J. Cooper, “Privacy and Antitrust: Underpants Gnomes, the First Amendment and Subjectivity”, (2013) 20 *George Mason Law Review*, 1129.

³⁵⁹ This is particularly the case for “genetic data”, which forms a “special category” under Article 9 of the GDPR. According to Recital 34 of the GDPR, “genetic data should be defined as personal data relating to the inherited or acquired genetic characteristics of a natural person which result from the analysis of a biological sample from the natural person in question, in particular chromosomal, deoxyribonucleic acid (DNA) or ribonucleic acid (RNA) analysis, or from the analysis of another element enabling equivalent information to be obtained”. However, this is not the only type of personal data of interest. There is also ample discussion on the issue of the ownership of databases containing such type of data, in particular if this is generated by sensors or machines/algorithms for the purposes of the ‘Database Directive’ 96/9/EC (i.e. Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases, [1996] OJ L 77/20) in view of Article 1(3) of the Directive, which provides that “protection under this Directive shall not apply to computer programs used in the making or operation of databases accessible by electronic means”. For a discussion, see Joint Institute for Innovation Policy and Technopolis Group, “Study in Support of the Evaluation of Directive 96/9/EC on the Legal Protection of Databases”, (2018) Study for the European Commission DG Communications Networks, Content and Technology.

Indeed, pharmaceutical firms, especially the so-called ‘Big Pharma’ ones, have traditionally focused on “taking drugs to the market” whilst having, as the basis for their business model, a large patent portfolio consisting of substance and/or process patents. They have traditionally been at the forefront of controlling and driving the (downstream) procedure of obtaining marketing authorisations whilst also managing the (upstream) R&D procedure by purchasing or licensing-in potential successful R&D results from often smaller R&D firms. Now health data and the control of health data will challenge that traditional value chain of taking drugs to the market.

Effectively, the digital transformation has caused both a need and opportunity for pharmaceutical firms to explore new business models, i.e. the logic or framework they use to create and capture value.³⁶⁰ Business model innovation can be particularly challenging in the context of disruptive change especially when there is a lack of clarity as to what the new business model would or should look like,³⁶¹ and its organisational structure.³⁶² Moreover, the complexity involved in emerging technologies, in terms of both potential problems and solutions, gives rise to a need to connect disciplines and organisations. This will likely lead to more open business models³⁶³ focusing on joint value creation with complementary partners operating within larger ecosystems.

Future product markets will likely face a paradigm shift when data becomes the starting point of the value chain as pharmaceutical products and medical services will likely be framed according to the genetic and lifestyle data of an individual patient. The vast amounts of collected data will also enable producers to understand what consumers and/or patients value in the pharmaceutical products and medical services they purchase. This will influence the way in which products are designed and developed thereby increasing product quality, which, in turn, should help generate products that, in accordance with preferences revealed by their data, match the relevant buyer’s expectations. This could fundamentally alter ‘old economy’ markets. They would no longer be solely focused on marginal cost and price. Instead, firms would compete on a wider range of variables. The knock-on effect of the possible personalisation of offers and the dependency of patients on one specific firm, may provide said firm with further sources of monopolistic rents thereby reducing the percentage of the surplus going to consumers.

Health data could, for example, enable the creation of new human health services solutions. The organisation of health services and the production of pharmaceutical products within the same digital eco-system would allow for feedback loops feeding health information back to pharmaceutical companies. These companies would then be able to develop business processes that could respond in real-time in order to improve the effectiveness of the relevant drugs or medicinal products. Such improvements would not be done on the general level of populations but on the specific level of individual patients. Patients would also be given the

³⁶⁰ A. Afuah, *Business Model Innovation: Concepts, Analysis and Cases* (New York, NY, Routledge, 2014).

³⁶¹ H. Chesbrough, “Business Model Innovation: Opportunities and Barriers”, (2010) 43(2-3) *Long Range Planning*, 354-363.

³⁶² K. Sund, M. Bogers, J. Villarroel and N. Foss, “Managing Tensions Between New and Existing Business Models”, (2016) 57(4) *MIT Sloan Management Review*, 8-10.

³⁶³ H. Chesbrough and M. Bogers, “Explicating Open Innovation: Clarifying an emerging paradigm for Understanding Innovation” in *New Frontiers in Open Innovation* (edited by H. Chesbrough, W. Vanhaverbeke and J. West, Oxford University Press, 2014), 3-28.

possibility of becoming more engaged with their health through an array of digital tools that provide them with the possibility of being better informed about their health and making lifestyle changes accordingly and of monitoring their own health and constantly sharing this information with medical experts. Data would become part of a “digital ecosystem that constantly monitors a patient’s condition and provides feedback to the patient and other stakeholders”,³⁶⁴ and tailors any treatment or therapy required to the patient’s clinical and lifestyle needs.

In the health sector, several firms (claimed ‘proprietors’) hold different types of data. For, example, we have clinical (i.e. patient) data, which is normally held by physicians, and we have clinical trial data held by pharmaceutical firms. Pharmaceutical firms also hold early R&D data. We have public health authorities, insurance firms and specific health data firms (e.g. IMS Health), which hold data regarding the cost and consumption of pharmaceuticals. Further, we have Internet firms like Google, or specific vertical medical search engines, may hold much data about patients’ behaviour, their fears and conduct. If the data collected by these bodies could be anonymised, pooled and combined, that might prove very useful in the fight against all kind of diseases. It may substantially decrease the time currently required for identifying outbreaks of diseases, for developing new drugs or health solutions, for understanding the impact of new drugs, side-effects etc.³⁶⁵ Personal health solutions can thus be developed. Indeed, data pools may be very successful in the human medical products and healthcare industry.

Generally, the current situation on data-driven markets is that there are a number of *de facto* data holders, each with a limited set of data. This situation has the potential to lead to market failure because to achieve the best results from any analysis undertaken, either all the relevant firms would need access to all this data or there would need to be one sole firm/provider that would be responsible for such. This is where the need for a federated ‘data commons’ becomes clear; it is necessary to enable interoperability between the various systems put in place by the participants in this ecosystem so that they provide an effective solution for patients. Borrowing the concept of ‘integrated care’ from health law,³⁶⁶ the importance of ensuring that data is shared and relied upon so that care becomes responsive to the specific person’s needs and genetic characteristics is crucial. Investigations should be undertaken to see whether dynamic efficiencies of ‘data aggregation’ exist in specific sectors and whether the market is capable of dealing with such. Investigations should also be undertaken to consider whether a federated data commons may be organised in the context of ‘data pooling’ or organised and closely-supervised in the context of markets for ‘data trading’³⁶⁷.

³⁶⁴ D. Champagne, A. Hung and O. Leclerc, *The Road to Digital Success in Pharma* (McKinsey & Co, 2015).

³⁶⁵ See, for example, P. Groves, B. Kayyali, D. Knott and S. van Kuiken, “The ‘Big Data’ Revolution in Healthcare”, (2013) McKinsey & Company Report for the Centre for US Health System Reform Business Technology Office.

³⁶⁶ UK Government, “Complying with Monitor’s Integrated Care Requirements”, (*gov.uk*, 27 March 2015) <<https://www.gov.uk/government/publications/integrated-care-how-to-comply-with-monitors-requirements/complying-with-monitors-integrated-care-requirements>>.

³⁶⁷ See D. Burk, “Patents as Data Aggregators in Personalised Medicine”, (2015) 21(2) *Boston University Journal of Science and Technology Law*, 233–255; N. Duch-Brown, B. Martens and F. Mueller-Langer, “The Economics of Ownership, Access and Trade in Digital Data”, (2017) 1 JRC Digital Economy Working Paper.

4.4. Ecosystems

The shift from competition and value capture to mixed strategies of value capture and value creation, involving strategies of co-opetition, indicates that an additional ‘field’ of competition-related activity should also be added: that of the ‘eco-system’.

Developed in the early 1990s,³⁶⁸ the concept of an ‘ecosystem’ has been defined in broad terms as ‘a group of interacting firms that depend on each other’s activities’.³⁶⁹ Teece notes that a characteristic of eco-systems is their ‘co-evolution’ in the sense that the ‘attributes of two or more organisations become more closely complementary’, ‘the system being typically reliant on the technological leadership of one or two firms that provide a platform around which other system members, providing inputs and complementary goods, align their investments and strategies’. Teece also notes that ‘co-creation’ is a characteristic of eco-systems as two or more organisations ‘combine forces to pioneer new markets’.³⁷⁰ Adner observes that ‘the ecosystem is defined by the alignment structure of the multilateral set of partners that need to interact in order for a focal value proposition to materialise’. Adner proceeds to define this ‘alignment structure’ as ‘the extent to which there is mutual agreement among the members regarding positions and flows’.³⁷¹ The concept of ‘eco-system’ has emerged as the dominant idea for depicting the competitive environment in the modern digital economy. The ‘eco-system manager’ determines the elements of the value chain that will need to be internalised and those which will be supported externally so as to capture value. Most studies on eco-systems focus on the role of the eco-system as a ‘hub’ of inter-firm relations taking place within the context of a platform, often referred to as the ‘lead firm’ or ‘ecosystem captain’, which ‘defines the hierarchical differentiation of members’ roles and establishes standards and interfaces, a number of formal mechanisms, such as the management of standards and interfaces, platform governance, IP rights etc. forming the ‘key tools that hubs use to discipline and motivate ecosystem members’.³⁷² However, from a theoretical perspective, a platform eco-system has never been the only option even if, in practical terms, the platform model has become dominant – it is possible to imagine an eco-system in which power is neither concentrated in a hub nor governed by a platform but is distributed among various economic actors and stakeholders who will take decisions by consensus. This model of governance is more frequently associated with blockchain technology.

The essence of this new insight on ecosystems comes from the realisation that competition analysis should engage with the ‘value capture’ strategies put in place by economic actors competing for strategic or architectural advantage.³⁷³ These should form the starting

³⁶⁸ J. Moore, “Predators and Prey: A New Ecology of Competition”, (1993) 71(3) *Harvard Business Review*, 75.

³⁶⁹ M. Jacobides, C. Cennano and A. Gawer, “Towards a Theory of Ecosystems”, (2018) 39 *Strategic Management Journal*, 2255.

³⁷⁰ D. Teece, “Next-Generation Competition: New Concepts for Understanding How Innovation Shapes Competition and Policy in the Digital Economy”, (2012) 9 *Journal of Law & Policy*, 105-106.

³⁷¹ R. Adner, “Ecosystem as Structure – An Actionable Construct for Strategy”, (2017) 43(1) *Journal of Management*, 42.

³⁷² M. Jacobides, C. Cennano and A. Gawer, “Towards a Theory of Ecosystems”, (2018) 39 *Strategic Management Journal*, 2255, 2258-2259 and the literature review provided.

³⁷³ D. Teece, “Business Models, Value Capture and the Digital Enterprise”, (2017) 6(8) *Journal of Organizational Design*.

point of competition analysis, rather than the relevant market concept which no longer constitutes the sole reference point firms consider when devising their strategies and identifying the competitive constraints to which they are subject. Abandoning solely focusing on the relevant market concept also stems from the relatively more limited role of price competition in the digital economy. Firms often compete for customers in order to (i) enlarge their customer base, and/or (ii) take advantage of network effects and be perceived by financial markets as holding a ‘bottleneck’, even if such trade, from a price-cost perspective, may not be profitable. This struggle for a large customer base explains why firms continue to offer ‘free goods’, even if the gains in market share they obtain or their ability to harvest consumer data (personal data being the ‘price’ to pay for these ‘free goods’) may not be immediately monetised in data markets. However, capturing a large customer base at reduced or negative profitability is not the ultimate aim of these strategies. This strategy makes sense if, by acquiring a large customer base, firms are able to develop dynamic capabilities in prediction (for instance, the firm may use consumer data to enable it to improve its algorithms), which is of essence in today’s ‘surveillance capitalism’³⁷⁴. These benefits do not only materialise in the long-term but may also be enjoyed through a higher market valuation by the financial markets in the short-term.

4.5. The behavioural dimension: Market failures at the demand side

The assessment of consumer welfare in competition law relies only on observable behaviour, the ‘revealed preferences’ of consumers, which are amenable to empirical verification or refutation³⁷⁵. The aim is to ascertain an individual’s preferences by observing that individual’s market behaviour. Assuming, under the consistency principle, a single observed choice reveals a stable preference, one could infer the preferences of consumers from the economic choices they make. The welfare analysis in competition law works within a revealed preferences paradigm, when relevant and reliable data on actual purchases are available. The use of quantitative methods (econometrics) enables in this case competition authorities to estimate the elasticities of demand, in particular the cross-price elasticity of demand, which measures the sensitivity of demand for one category of products to the price of another category. However, such data is not often available or not specific enough to estimate the cross-price elasticities of demand for the product(s) in question, in which case properly designed survey methods will measure preferences over hypothetical products and alternatives. In this case, the preferences will be *stated*, as opposed to revealed preferences. The survey method will aim to create a controlled experiment, testing the reaction of consumers to a set of choices that includes the specific product at a low price and another set which includes the same product at a higher price. These discrete methods of surveying choice attempt to mimic the situation of choice faced by the consumer in the real-world, but is a proxy for revealed preferences, assuming that the survey is well designed, the process was conducted so as to assure objectivity, and that a

³⁷⁴ S. Zuboff, *The Age of Surveillance Capitalism* (Profile Books, 2019).

³⁷⁵ P.A. Samuelson, A note on the pure theory of consumer’s behaviour, (1938) 5(17) *Economica*, New Series, 61, 63.

representative sample of consumers to be surveyed has been selected. The approach relies on an axiomatic analysis of preferences.

Behavioural economics has challenged the link between preferences (revealed or stated) and welfare, which forms the basis for the welfare analysis performed in competition law. It cannot be assumed that consumers' choice on the market represents their "true preferences". However, there are at least two caveats with this approach.

First, it does not describe accurately the behaviour of consumers. Research by Kahneman and Tversky showed that human behaviour may be described as the outcome of two different cognitive systems/processes of choice, which inhabit every individual³⁷⁶. In what was called System 1, the individual operates automatically and quickly, with little or no effort and no sense of voluntary control. Decisions are reached through intuition, emotional and affective elements playing an important role in decision-making, which relies on heuristics, thus reducing 'the complex tasks of assessing probabilities and predicting values to simpler judgmental operations'³⁷⁷. In System 2, the individual allocates attention to effortful mental activities, including complex computations. System 2 is mobilised when a question arises for which System 1 does not offer an answer or when an event is detected that violates the model of the world that System 1 maintains. The division of labour between System 1 and System 2 is highly efficient as it minimizes effort and optimizes performance. Processing power biases of individuals may push them to a choice overload, where the multiplication of the options offered to consumers may lead to sub-optimal choice³⁷⁸, in the sense that consumers may follow rules of thumbs, for instance imitating what other consumers do rather than make their own decisions, in order to satisfy their preferences. Richard Thaler, one of the main representatives of the behavioural economics movement, makes this clear when he uses the term "quasi-rationality" to denote behaviour that is situated between full rationality and purely irrational behaviour, when people try to behave as if they were fully rational, but they are nonetheless subject to systematic error³⁷⁹.

Tversky and Kahneman advanced a theory explaining decision-making under conditions of risk. They argued that most people violate all the axioms of expected utility theory. Their prospect theory is based on psychophysical models and presents a different account, and a more accurate prediction, of how people really behave³⁸⁰. They found that people's attitudes toward risks concerning gains may be quite different from their attitudes

³⁷⁶ D. Kahneman, *Thinking, fast and slow* (Allen Lane, 2011).

³⁷⁷ A. Tversky and D. Kahneman, *Judgment under Uncertainty: Heuristics and Biases*, (1974), *Science*, New Series, Vol. 185, No. 4157, 1124.

³⁷⁸ This is the classic problem of "confusopoly". See, P. Diamond, *A Model of Price Adjustment*, 3(2) *J. Econ. Theory* 156 (1971) [if all firms set the same price (monopoly price) no consumer finds it worthwhile to incur the search cost to find the best deal; and if no consumer is informed, then each firm will set the monopoly price to exploit those consumers who randomly come to it (Diamond's paradox)]; R. Spiegler, *Competition Over Agents with Boundedly Rational Expectations*, (2006) 1(2) *Theoretical Econ.* 207; B. I. Carlin, *Strategic Price Complexity in Retail Financial Markets* (2009) 3 *Journal of Financial Economics* 278; M. Armstrong & Y. Chen, *Inattentive Consumers and Product Quality*, (2009) 7(2&3) *Journal of European Economic Association* 411; For a general discussion in competition law and policy, see P. Siciliani, *Confusopoly: A Special Case of the 'Oligopoly Problem' – Implications for Consumer and Competition Policy* (UCL, Doctoral Dissertation, 2013).

³⁷⁹ R. H. Thaler (ed.), *Quasi-rational Economics* (Russell Sage Foundation, 1994).

³⁸⁰ D. Kahneman and A. Tversky, *Prospect Theory: An Analysis of Decision under Risk*, (1979) 47(2) *Econometrica*, 263.

toward risks concerning losses. Loss aversion and endowment effect imply that selling prices should be higher than buying prices as the minimal compensation people demand to give up a good is often several times larger than the maximum amount they are willing to pay for a commensurate entitlement³⁸¹. They distinguished between different phases of decision-making. During the *editing/framing phase of decision making*, they observed the influence of framing effects, as choosing an option may be affected by the order or manner in which it is presented to a decision maker and choice can be affected by trivial manipulations in the construction of available options. During the *evaluation phase* in decision-making, the *status quo* serves as an operative reference point and hence has a value function, while a different function, the *weighing* function, measures the impact of the probability of an event on the desirability of a prospect. They advanced the idea that this psycho-scientific framework should be adopted as a basis for investigating individual (economic) behaviour.

Second, the current approach ignores the way preferences were formed at the first place. Research on the foundations of human sociality has found that preferences are not exogenous but that they are shaped by the economic and social interactions of everyday life, thus questioning the foundations of marginal and ordinal theory, which take preferences as a given and a fixed norm that influences decision-making³⁸².

This has important implications on the way we conceptualise consumer behaviour in competition law. Thaler suggested that neoclassical price theory of consumer behaviour, which was based on a rational maximizing model describing both how consumers should choose, but also how they do choose, may make systematic errors in predicting behaviour as consumers act in a manner that is inconsistent with the theory. He gave the example of individuals underweighing opportunity costs, or failing to ignore sunk costs (costs they would not be able to recover), as well as their complex search behaviour³⁸³. From a legal perspective, the quasi-rationality framework and the new positive theory of consumer behaviour proposed by Thaler has far-reaching implications, as it identifies a new form of “market failure”, this time not due to externalities, which identify imperfections of the price system because of a divergence between private (to the parties of a transaction) and public benefits and costs, but due to internalities, that is situations in which people do not internalise all consequences of their actions on themselves because of bounded rationality³⁸⁴.

³⁸¹ The loss aversion biases include endowment biases (consumers value something more once they have owned it more than before they own it).

³⁸² J. Henrich, R. Boyd, S. Bowles, C. Camerer, E. Fehr, & H. Gintis, *Foundations of Human Sociality: Economic Experiments and Ethnographic Evidence from Fifteen Small-Scale Societies* p. 46, noting that “the institutions that define feasible actions may also alter beliefs about consequences of actions and the evaluation of these consequences. For example, a market-oriented society may develop distinct cognitive capacities and habits. The fact that almost everything has a price in market-oriented societies provides a cognitive simplification not available to people in societies where money plays a lesser role: namely, allowing the aggregation of disparate objects using a monetary standard as in ‘\$50 of groceries’”. To take another example, extensive market interactions may accustom individuals to the idea that interactions with strangers may be mutually beneficial. By contrast, those who do not customarily deal with strangers in mutually advantageous ways may be more likely to treat anonymous interactions as hostile or threatening, or as occasions for the opportunistic pursuit of self-interest”.

³⁸³ R.H. Thaler, *Towards a Positive Theory of Consumer Choice*, (1980) 1 *Journal of Economic Behavior and Organization* 39.

³⁸⁴ See also OFT1228, *What does Behavioural Economics Mean for Competition Policy?*, (March 2010), 10, (indicating that “behavioural biases can be viewed simply as a fourth type of market failure”, in addition to market power, asymmetries in information between consumers and firms and externalities).

Limits in the cognitive capacities of consumers lead them to boundedly rational choices, or as economist Dan Ariely puts it, they act as “predictably irrational”³⁸⁵. People tend to make judgments about the likelihood of an event, on the basis of how easily this event comes to mind (the availability heuristic), hence, indicating that prior exposure to a number of events may influence an individual’s subsequent judgments³⁸⁶. Similarity of an event or product may also serve as a cognitive shortcut in decision-making, which explains, for instance, why the package of a generic (store) brand (private label) looks similar to that of an established national brand in order to influence consumers’ choice (the representativeness heuristic)³⁸⁷. Ariely advances the concept of “zero-price effect”, which suggests that the usual cost-benefit analysis cannot account for the psychological effect of a free good, consumers perceiving it as intrinsically more valuable than a reduction of the price of the same product from £0,15 to £ 0,01, because of the “affect heuristic” associating free goods with a good feeling, which surfaces automatically when making decisions under System 1³⁸⁸. Decisions in risky or uncertain situations are often influenced by anticipatory feelings and emotions experienced in the moment of decision-making³⁸⁹. Humans are also averse to change and exhibit a status quo bias, the formation of a habit making it difficult to disengage, unless the incentive to do so is strong. However, this may indicate that higher prices may not be enough for consumers’ to switch their existing suppliers, procrastination and inertia eventually limiting their ability to exercise an active choice³⁹⁰. Of particular interest is also the fact that human beings often attach more importance to present events than future events, discounting future benefits for actual benefits. Thus discounting is non-linear and its rate may vary over time. Time inconsistency bias may also manifest itself by the impossibility to predict accurately our preferences in the future³⁹¹. Preferences are context-dependent, the framing of the choice exercising an important influence over the decision of consumers³⁹².

Hence, consumers do not make decisions in isolation, in order to satisfy their given preferences, but are also embedded in social environments, which inevitably influence, one might even say construct their preferences³⁹³. Because of these broader social preferences that

³⁸⁵ D. Ariely, *Predictably Rational* (Harper Collins, 2008).

³⁸⁶ A. Tversky & D. Kahneman, Judgment under uncertainty: Heuristics and biases. (1974) *Science (New Series)*, 185, 1124.

³⁸⁷ D. Kahneman & A. Tversky, Subjective probability: A judgment of representativeness. (1972) 3 *Cognitive Psychology*, 430; F.R. Kardes, S.S. Posavac & M.L. Cronley, Consumer inference: a review of processes, bases, and judgment contexts, (2004) 14(3) *Journal of Consumer Psychology*, 230.

³⁸⁸ K. Shampanier, N. Mazar, & D. Ariely, Zero as a special price: The true value of free products, (2007) 26 *Marketing Science*, 742; On the affect heuristic, see M. L. Finucane, A. Alhakami, P. Slovic, & S.M. Johnson, The affect heuristic in judgments of risks and benefits, (2000) 13 *Journal of Behavioral Decision Making*, 1.

³⁸⁹ The risk as feelings model of decision-making: G. Loewenstein, Emotions in economic theory and economic behaviour, (2000) 90(2) *The American Economic Review* 426G. Loewenstein, E.U. Weber, C.K. Hsee, N. Welch, Risk as feelings, (2001) 127(2) *Psychological Bulletin* 267.

³⁹⁰ D. Kahneman & A. Tversky, The psychology of preference, (1982) 246 *Scientific American* 160; W. Samuelson & R.J. Zeckhauser, Status quo bias in decision making. (1988) 1 *Journal of Risk and Uncertainty*, 7.

³⁹¹ OFT1228, What does Behavioural Economics Mean for Competition Policy?, (March 2010), 6, “The time inconsistency biases include: projection bias (consumers expect that they will feel the same tomorrow as they do today); over optimism (consumers over estimate how much they will use a good, or underestimate how much it will cost them); and hyperbolic discount biases (consumers value today disproportionately greater than tomorrow”.

³⁹² D. Kahneman & A. Tversky, Choices, Values and Frames, (1984) 39(4) *American Psychologist* 341.

³⁹³ S. Lichtenstein & P. Slovic (eds.), *The Construction of Preference* (CUP, 2006).

often frame individual ones, people show that they prefer fairness and reciprocity over inequality and pursuing one's own self-interest³⁹⁴. It is not only monetary incentives that count, but also people's perception of self, in other words, their social identity³⁹⁵. Preferences are influenced by social roles, and more broadly social norms, which vary across cultures and contexts. Preferences may even follow choice, instead of guiding it, the order of preferences aiming mainly to rationalize/justify actions after the fact.

It was reported in several markets that behavioural biases may limit consumers' ability to switch to the best supplier³⁹⁶. Similar issues may also arise in digital markets, where the choice of the consumers is any case subject to the choice architecture of their smartphone screen, thus raising the risk of manipulation. Choice architecture may even be more tightly controlled in the future in the context of voice technology, to the extent that there is a higher risk of 'manipulation' and reinforcing consumer bias in the context of a voice-based recommendation than when the user is at least offered the possibility to choose among various options on a smartphone's or tablet's screen³⁹⁷, although this risk has not materialised yet as voice assistants are presently used for simple operations³⁹⁸.

The manipulative dimension of targeted advertising practised by digital platforms also hints to a process of value generation and capture in the digital era that is in many respects different from that of industrial capitalism. As Zuboff explains, the 'invention of targeted advertising paved the way to financial success, but it also laid the cornerstone of a more far-reaching development: the discovery and elaboration of surveillance capitalism'³⁹⁹. Data are of course the raw material that are necessary for 'surveillance capitalism's novel manufacturing processes'. During the initial stage of the development of digital capitalism, digital platforms, collect behavioural data tracking the behaviour of users, which, with the help of analytics leads to improvements in the services provided by the platforms, which compete with each other in order to take advantage of network effects and manage to tip the market in their favour. In this intense competitive struggle platforms compete in order to gain the highest possible market share, if need be by luring users providing them services at zero or even positive prices and rewards. This often explains why the digital platforms in this initial stage not only do not make profits but have suffered significant losses and have been dependent on the support of financial investors. The latter were attracted by the prospects of the digital platform to emerge as the winner if this competitive struggle for the market. This is of course part of the story, as at the

³⁹⁴ E. Fehr & S. Gächter, Fairness and Retaliation: The economics of reciprocity, (2000) 14 *Journal of Economic Perspectives* 159.

³⁹⁵ G. Akerlof & R. Kranton, *Identity Economics* (Princeton University Press, 2010).

³⁹⁶ C. M. Wilson & C. Waddams Price, Do Consumers Switch to the Best Supplier?, (2010) 62(4) *Oxf. Econ. Pap.* 647; In a subsequent report the OFGEM noted that two third of consumers' energy accounts are with one of their ex-monopoly electricity suppliers, which provides evidence of a status quo bias and time inconsistency: Ofgem Discussion Paper: What can behavioural economics say about GB energy consumers?, March 2011, available at http://www.ofgem.gov.uk/Markets/RetMkts/rmr/Documents1/Behavioural_Economics_GBenergy.pdf.

³⁹⁷ M. Stucke & A. Ezrachi, The Subtle Ways your Digital Assistant May Manipulate You, *Wired* (29 November 2016), available at <https://www.wired.com/2016/11/subtle-ways-digital-assistant-might-manipulate/>. See also, <https://econsultancy.com/how-will-voice-technology-change-consumer-behaviour/>

³⁹⁸ See, PWC, *Consumer Intelligence Series: Prepare for the voice revolution* (2018), available at <https://www.pwc.com/us/en/advisory-services/publications/consumer-intelligence-series/pwc-voice-assistants.pdf>.

³⁹⁹ S. Zuboff, *The Age of Surveillance Capitalism* (Profile Books, 2019), 65.

same time the digital platforms participate to the ‘winner takes most’ competition in these ‘zero-priced’ markets, they are harvesting a considerable amount of data, not always with the aim to recycle this for the benefit of their users with service improvements, but with the aim to constitute what Zuboff calls ‘behavioral surplus’⁴⁰⁰. This is often camouflaged as ‘digital exhaust’ or ‘digital breadcrumbs’, presented as the equivalent of industrial waste and the necessary leftover from the production process, that for efficiency purposes should not be left into the ‘atmosphere’ but captured in order to be recycled in ‘useful data’. All content becomes a source of this behavioural surplus: the behaviour of people tracked, ‘their patterns of connection, communication, and mobility, their thoughts and feelings, and the meta-data expressed in their emoticons, exclamation points, lists, contractions, and salutations’⁴⁰¹. Computer mediation is thus repurposed on ‘extraction architecture’, where a number of devices, fixed, portable and wearable technology, soon to become invisible through nanotechnology and bio-hacking.

The industrial waste metaphor does not adequately portray the real purpose of harvesting this data, which is driven by a ‘full-blown logic of accumulation’. This logic takes different forms. First, it serves the construction of a dynamic online advertising marketplace, where digital platforms auction to advertisers, not the attention of the users as such, as these are still free not to click through the ad, but ‘derivatives of behavioral surplus’ on the basis of behavioral predictions made by Google as to the likelihood that a specific user will click through the ad and proceed to a purchase⁴⁰². As Zuboff explains ‘users were no longer ends in themselves but rather became the means to other’ ends’⁴⁰³. Digital platforms share these ‘surveillance assets’ with the partners in their ecosystems, or commercialise them in order to gather ‘surveillance revenues’ that are then accumulated in ‘surveillance capital’⁴⁰⁴. However, ‘advertising is ‘the beginning of the surveillance project, not the end’⁴⁰⁵. The data is, indeed, used in order to develop the digital platforms’ evolving AI capabilities. These enable them to make better predictions about the individuals’ future behavior and to develop specific prediction products which are offered into new kind of markets trading exclusively in future behavior. As Zuboff explains ‘(s)urveillance capitalism’s profits derive primarily from these ‘behavioral futures markets’⁴⁰⁶. In this surveillance capitalism era, monopolies and bottlenecks are not constituted with the aim to raise prices, as traditional neoclassical theory assumes, but in order to ‘corner’ ‘user-derived raw material supplies’ and protect ‘critical supply routes for the unregulated commodity that is behavioural surplus’⁴⁰⁷. Competitive struggles are not just for market shares in delimited markets, but for dominance of the dispossession cycle and the generation of behavioural surplus that will itself be highly valued in behavioural futures markets. This ‘dispossession cycle’ relies on incursion practices into ‘undefended spaces’ (a laptop, an email to a friend, a web page, the street you live), undefended because of the expectations that these will be unobservable to a third party and therefore out of the

⁴⁰⁰ Ibid., 81.

⁴⁰¹ Ibid., 112.

⁴⁰² Ibid., 83.

⁴⁰³ Ibid., 88.

⁴⁰⁴ Ibid., 94.

⁴⁰⁵ Ibid., 96.

⁴⁰⁶ Ibid.

⁴⁰⁷ Ibid., 133.

commodification and market logic, in order to ‘kidnap’ behavioural surplus⁴⁰⁸. It then develops because of an ‘habituation’ process, in which, these practices of incursion become normal and are ‘rapidly bolstered by growing ecosystems of stakeholders’⁴⁰⁹. Should social tensions arise, digital platforms adapt and redirect the practices in larger projects of surveillance, for instance the Google maps project evolving to a more spectacular project of incursion with the development of the self-driving car or Google cities⁴¹⁰. The surveillance capitalists omnipresence and superior capabilities to predict will turn them to ‘copilots’ of our lives, predicting where and when a person might spend time, and making the adequate recommendations, or trading these behavioural futures in real time⁴¹¹. The market frontier is pushed to the extreme, all predictable behaviour becoming a source of behavioural surplus. In this world, ‘unpredictable behaviour is the equivalent of lost revenue’⁴¹².

These ‘behavioral futures markets’ will be personalized, to the extent that more than just personal data, the surveillance capitalists will trade ‘human consciousness’ that will be the next territory of commodification, after that of land, labour, personal information and attention, the extraction architecture reaching further and deeper into ‘new territories of human experience’⁴¹³. This conquest relies on the asymmetrical bargaining power of digital platforms, on which an increasingly important part of the population depends in its day-to-day life for work and entertainment, the take it or leave it strategies they adopt, the manipulation of the choice architecture in order to further their capacity to extract behavioural surplus. The ‘prediction imperative’ pushes also the boundaries of what can be considered as a voluntary exchange to the extent that the digital platforms devise ‘means of behavioural modification’⁴¹⁴ though nudging, herding and other forms of influence, a new ‘execution architecture’ with the aim to generate surveillance revenues by challenging the individuals’ ‘elemental right to the future tense’⁴¹⁵. Zuboff argues that ‘we now face the moment in history when the elemental right to the future tense is endangered by an pervasive digital architecture of behaviour modification owned and operated by surveillance capital, necessitated by its economic imperatives, and driven by its laws of motion, all of the sake of its guaranteed outcomes’⁴¹⁶. As all behaviour becomes predictable, the surveillance capitalists may trade this newly acquired capacity of certainty for profit⁴¹⁷. Individual autonomy, and the potential of unpredictable behaviour, becomes a ‘friction’ and a threat to surveillance revenues⁴¹⁸. Much of the data collected relates to the digital identity of the consumer and enables companies to draw a pretty accurate individual preferences map and personality traits for each of their clients from even small samples of data and meta-data.

⁴⁰⁸ Ibid. 139.

⁴⁰⁹ Ibid., 140.

⁴¹⁰ Ibid., 153.

⁴¹¹ Ibid., 154.

⁴¹² Ibid.

⁴¹³ Ibid., 175.

⁴¹⁴ Ibid., 203.

⁴¹⁵ Ibid., 195.

⁴¹⁶ Ibid., 332.

⁴¹⁷ Ibid., 212.

⁴¹⁸ Ibid., 241.

In the era of “machine learning” and Artificial intelligence-assisted pricing the risks of “digital” consumer manipulation may admittedly increase at an industrial scale.⁴¹⁹ Digital markets exacerbate the above risks, in view of the possibilities they offer of “a vast psychological audit, discovering and representing the desires of society”⁴²⁰ and of each individual separately, offering sophisticated evaluation methods that are closely linked to the direct observation of consumer preferences, but also more broadly of a whole range of preferences expressed in social, and private life, through the means of sociometric analysis⁴²¹. Big data enable us to observe, allegedly more accurately, the inner mental states of people and potentially influence the way these form their core preferences. Indeed, “personality correlates” can now be identified that predict the precise ways in which each customer will react to marketing efforts⁴²². Emotion detection becomes possible through the emergence of ‘affective computing’, ‘computing that relates to, arises from, or influences emotions’, any conscious, or even unconscious emotion becoming observable behaviour for coding⁴²³. ‘Emotion scanning’ will become the new form of tracking to which are subject users⁴²⁴. ‘Instrumentarianism’, ‘the instrumentation and instrumentalization of behaviour for the purposes of modification, prediction, monetization and control’⁴²⁵.

Such manipulative potential and of course the possibility that this may occur at a larger scale, in view of the possibilities offered by algorithms, data analysis and artificial intelligence, is clearly motivating digital platforms’ commercial strategies to accumulate behavioural surplus and extract value from it.

These various possibilities of manipulation in digital capitalism call for collective action even if the preferences ‘revealed’ by consumer choice do not indicate the existence of a competition law problem. Competition authorities should be aware of the possibilities of manipulation and should not take for granted that the analysis of the revealed preferences of consumers in defining relevant markets, for instance examining the substitutability of a product vis-à-vis another, will reveal the real boundaries of actual competition. They should envisage that these preferences as revealed or inferred by actual consumer choice may not be the ones consumers really have. This may require a more holistic perspective in competition law taking into account stated preferences as well as evidence of the hypothetical extended preferences of consumers/citizens, as these are revealed in their behaviour in other spheres of their life. This may be easier in the future with the development of sociometrics technologies on the basis of Big Data.

Box 3 Market Definition and the digital economy – A BRICS perspective

BR Market definition is a challenging task in the digital economy. In digital markets there

⁴¹⁹ R Calo, ‘Digital Market Manipulation’, (2014) 82 George Washington Law Review 995.

⁴²⁰ W. Davies, *The Happiness Industry: How the Government & Big Business Sold Us Wellbeing* (Verso, 2015).

⁴²¹ Ibid.

⁴²² S. Zuboff, *The Age of Surveillance Capitalism* (Profile Books, 2019), 277.

⁴²³ R. W. Picard, Affective Computing, M.I.T Media Laboratory Perceptual Computing Section Technical Report No. 321, available at <https://affect.media.mit.edu/pdfs/95.picard.pdf>.

⁴²⁴ S. Zuboff, *The Age of Surveillance Capitalism* (Profile Books, 2019),

⁴²⁵ Ibid., 352.

are some particularities that should be taken into consideration, which are not explicitly established by any guide or legislation, but that have been revealed by the academic literature and examined in past cases analysed by CADE. In general, CADE holds that the Brazilian legal framework provides enough flexibility to adapt the existing concepts and tools. Therefore, the current toolkit has been suitable to analyse the cases involving digital market that CADE has investigated so far. Nonetheless, CADE also recognises that due to the rapid pace of innovation and transformation of the digital economy, legal and economic concepts employed by competition policy need to be constantly studied and reviewed. In that sense, CADE is developing studies to identify whether the current competition framework and tools of enforcement should be updated and adapted.

RU The ‘fifth antimonopoly package’ proposes to introduce the data ownership as a criteria for market definition.

ZA How markets are defined for the purpose of determining market shares and market power is not given specific expression in the Competition Act and is therefore subject to the application of economic techniques to the available evidence. These economic techniques include the necessary tools for defining digital markets such as two-sided assessments. As such, the current legislation is adequate for purposes of market definition. Problems may arise in instances of potential entry because authorities normally base their views on information on existing competitors. However, in digital markets, there is a significant role played by disruptive technologies such that the market may not always be limited to the relative positions of competitors at a given point in time, but competitors coming from outside are also relevant. For example, Uber came from outside the metered-taxi market to disrupt the metered taxi business when nobody was expecting it.

Source: BRICS NCAs Questionnaire

5. Moving beyond traditional definitions of market power

The complexity of competition in the digital economy and the different fields on which it takes place raise important challenges as to the prevailing conception of market power used in competition law and economic analysis, which may appear as myopic and not taking into consideration the various dimensions of the competitive game (financialisation, the importance of technological assets and resources, strategies of differentiation and single-homing, exploitation of consumer behavioural biases). In view of the fact that in the economic approach currently followed the existence of some form of market failure is required in most cases in order to trigger enforcement activity by the State, it is crucial to develop a concept of economic power that takes into account these various dimensions of the competitive game and enables competition law, or other instruments, to achieve the goals set by the policy makers.

5.1. Conceptualizing power in the digital economy: a theoretical perspective

Sociologists and economists have developed different approaches to the concept of power. If for economists, markets are primarily processes for price formation, the price helping to allocate scarce resources in an efficient manner, (market) power being the ability to increase prices and consequently to allocate scarce resources in an inefficient manner, sociologists focus on social relations and institutions in markets, analysing the way market actors interact with each other when producing or exchanging products.⁴²⁶ The potential for each of these approaches to deal with vertical, as opposed to horizontal power varies.

From a sociological perspective, in Max Weber's classic definition, power denotes a situation in which there is "probability that one actor within a social relationship will be in a position to carry out his own will despite resistance, regardless of the basis on which this probability rests".⁴²⁷ This definition may present various problems in view of the focus on the volitional element, the "will" of a specific actor, as opposed to the "resistance" of another, thus indicating that some form of coercion is exercised on one actor by another. The concept of coercion is notoriously complex and ambiguous. Most theoretical accounts of coercion appear to be either over- or under-inclusive.

The absence of alternative "reasonable choices" can easily entail a conception of coercion that is too narrow, particularly as applied to exercises of market power. Such a narrow understanding of coercion is advanced by Friedrich A. Hayek. Hayek takes the difference between a free man and a slave as his heuristic starting point in order to argue that "[c]oercion occurs when one man's actions are made to serve another man's will, not for his own but for the other's purpose [...] Coercion implies, however, that I still choose but that my mind is made someone else's tool, because the alternatives before me have been so manipulated that the conduct that the coercer wants me to choose becomes for me the least painful one."⁴²⁸ Consequently, Hayek argues that substantial market power or monopoly could rarely result in true coercion. A monopolist could only exercise true coercion if he were, for example, the owner of the only spring in an oasis, leaving other settlers no choice but to do whatever the spring owner required of them if they want to survive.⁴²⁹ Hayek's conception of coercion is thus clearly unhelpful, as it would only cover threats to deny goods that are crucial to one's existence.⁴³⁰

By contrast, a broader understanding of the absence of reasonable choices would entail that an extremely tempting offer, such as sharing the profits of a long-term joint venture, may be considered as exercising a pressure similar to a conditional threat by a monopolist of a scarce resource to deny access to this facility at a reasonable rate, to the extent that in both cases the presumed "coercer" is manipulating the incentives (or opportunity costs) that the presumed "coercee" associates with various courses of action, but one may not want that to be considered

⁴²⁶ For a discussion, see M. Grannoveter, *Society and Economy: Framework and Principles* (Harvard University Press, 2017), 91; R. Swedberg, *An Introduction and Agenda*, in V. Nee & R. Swedberg (eds.), *The Economic Sociology of Capitalism* (Princeton University Press, 2005), 4, 11.

⁴²⁷ M. Weber, *The Theory of Economic and Social Organization* (1947, Free Press, first published 1922), 152.

⁴²⁸ Friedrich A. Hayek, *The Constitution of Liberty* (University of Chicago Press 1960), 133.

⁴²⁹ *Ibid*, 136.

⁴³⁰ See e.g., Ellen Frankel Paul, "Hayek's Conception of Freedom, Coercion, and the Rule of Law" (1980) 6 *Reason Papers* 37-52.

as a form of economic coercion, as this would eventually lead to a quite broad interpretation of the term, eventually including also situations of mutually beneficial cooperation.

To the extent that the voluntary, or not, character of an exchange may not constitute an adequate criterion to define (economic) power, it may be more relevant to focus on indirect methods of observing power, such as the *process* through which economic power is manifested as well as its various *sources* or various *manifestations* of power deemed relevant for the specific circumstances.

Process-based definitions of power focus on the bargaining process and aim to identify situations in which there is some form of asymmetry or inequality on the ability of the actors to influence each other's course of conduct. In economics, the analysis of bargaining power is intrinsically related to the issue of how actors may divide the joint gains resulting from their cooperation, the so called bargaining problem. Bargaining power will conventionally refer to the relative share of the total surplus gained by an actor in the bargaining problem. What matters is not the distributive outcome as such, for instance that each participant enjoys an equal share of the joint profit, but the fact that each participant has been able to get a payoff equivalent to their next best alternative. Absent this rent from the joint surplus collected by the participants, these will have no incentive to enter into the joint activity at the first place.

Dominant conceptions of economic power also link power to dependence, as 'someone who controls resources that you value has power over you – can cause you to modify your behavior in an attempt to obtain more of those resources than otherwise'⁴³¹. Hence, power in the economy may derive from 'dependency arising from some particular distribution of resources'⁴³². The situation of resource-dependence between two firms may precede their business relationship, coincide with their relation and the contract that incepts such relationship, or arise in the implementation of the relation. We may have a situation of unbalance in the business relationship between two firms, which makes impossible or excessively difficult for one to continue with the business without the other, because of a high degree of interdependence between them, this being seen as equivalent to some form of intra-organizational relation between them. The conceptualization of such relations as forming part of a value chain contributes to this "intra-organizational" understanding of their interdependence. We may have, on the other hand, a resource-dependence created by market conditions precedent to the stipulation of the relation, which forced one of the parties to accept the terms imposed by the dominant firm(s) and undertake specific investments or actions.

Power differentials between the parties to an exchange may not only be assessed on the basis of the individual characteristics of the actors in a dyadic relation, such as the control of a superior technology or that of an indispensable input for the production process, but may also relate to the broader social structure of the exchange, such as the position of the specific entity in the social network to which it is embedded (positional power). As Willer explains, 'power as potential is located in structures', '(s)ubsequently, actors in structures produce power as activity'⁴³³. Cook et al., in particular, has focused on the network position of the economic

⁴³¹ M. Granovetter, *Society and Economy* (Belknap Press of Harvard University press, 2017), 92.

⁴³² *Ibid.*, 94.

⁴³³ D. Willer, Predicting power in exchange networks: a brief history and introduction to the issues, (1992) 14 *Social Networks* 187.

actors in order to determine the power-dependence not in the context of a dyadic relation, but in the context of a network⁴³⁴. The topography of networks is particularly important in view of ‘the tendency of complex systems to create asymmetric network structures, in which some nodes are ‘hubs,’ and are far more connected than others’⁴³⁵. Centralised networks provide actors with the necessary levers to extend their influence and thus reach sooner the tipping point towards sustainable dominance, eventually using the networks for their own purposes rather than those that led to the formation of the network at the first place.

Taking a sociological perspective, Cook et al. focus on social structure as a possible source of power, social structure being a configuration of social relations and positions among actors, ‘where the relations involve the exchange of valued items (which can be material, informational, symbolic, etc.)’⁴³⁶. These relations are not only linking actors directly, but also indirectly⁴³⁷. An exchange relation may not thus not only occur directly between two actors, but relate to more complex exchange networks, viewed as ‘connected sets of exchange relations’⁴³⁸. This calls for an analysis of resource dependence in the context of a network, with the assistance of social network analysis that focuses on the patterns of interaction between actors. Networks analysis forms part of structural analysis, to the extent that it aims to explain phenomena primarily, if not completely, by social structure, however, it cannot only be subsumed to structuralism, to the extent that it also explores the creation and/or maintenance of networks, as well as also emphasizes the role of the individual actors and their strategies, thus bringing to the picture exchange theory⁴³⁹.

In the complex, digital economy, power may take various dimensions than the simple reduction of output (and increase of prices) on which focuses the concept of market power traditionally used by competition law. Hence, there is need to enrich the dimensions of economic power considered in competition law. The next Section will examine whether the traditional concept of horizontal market power may be appropriate for the digital economy, or if it has to be supplemented by other concepts of economic power that take better account of vertical competition.

5.2. Is the traditional concept of horizontal market power fit for purpose in the digital economy?

⁴³⁴ K.S. Cook, R.M. Emerson, M.R. Gillmore, T. Yamagishi, The distribution of power in Exchange Networks: theory and experimental results, (1983) 89(2) *American Journal of Sociology* 275 (hereinafter Cook et al. 1983) K.S. Cook & J.M. Whitmeyer, Two approaches to social structure: exchange theory and network analysis, (1992) 18 *American Review of Sociology* 109 (hereinafter Cook et al. 1992).

⁴³⁵ See also, A.-L. Barabási & R. Albert, Emergence of Scaling in Random Networks, (1999) 286 *Science* No. 5439, 509; M. E. J. Newman & J. Park, Why Social Networks are Different from Other Types of Networks, (2003) 68 *Physical Review E*, No. 036122 (2003), 1.

⁴³⁶ Cook et al. 1993, 110.

⁴³⁷ See, P.M. Blau, *Exchange and Power in Social Life* (Wiley, 1964).

⁴³⁸ Cook et al. 1993, 113 referring to the work of R.M. Emerson, Exchange theory, part II: exchange rules and networks, in J. Berger, P. Zelditch & B. Anderson (eds.), *Sociological Theories in Progress* (Vol. 2, Houghton Mifflin, 1972), 58.

⁴³⁹ Cook et al. 1993, 114.

The emphasis put over control over access to data in the digital economy has led a number of competition authorities to re-conceptualise their traditional conception of market power by integrating this data access dimension. For instance, a recent study commissioned by the German Ministry of Economics and Energy⁴⁴⁰ observes that control over data can be analysed either as superior (comparatively to other horizontal competitors) market power ('relative' market power targeted by 20 (3) GWB), or as a source of relational market power in the context of vertical relations, for instance in IoT and aftermarkets contexts (which can be targeted by 20 (1) GWB). The study even notes that the control over access to data constitutes a more important criterion for the finding of a dominant market position than the financial capabilities of the undertaking (which is criterion relevant for the finding of a dominant position pursuant to § 18 Abs. 3 Nr. 2 GWB) since the financial resources are already subject to competing alternative use through functioning capital markets, while liquid markets for data are still absent and that, in so far as personal data is concerned, the GDPR may prevent the emergence of such liquid data markets from the outset.

This quest for flexibility in conceptualising power conducive to competition law enforcement leads competition authorities to go beyond the traditional perspectives of selling or buying power, first in order to integrate the futurity dimension of the digital economy (the emphasis on innovation), but also in order to be able to bring within the remit of the enforcement activity competition authorities market failures resulting from information asymmetries or more generally bargaining power that are not usually considered as normally falling within the scope of competition law.

5.2.1. Selling power

Neoclassical economics is based on resource scarcity. Scarcity entails that any choice as to how resources get allocated - as a result of decisions made by individuals, firms and/or the state - must reckon with the idea that there are alternative uses that would yield valuable outcomes. In economic jargon, the best alternative use corresponds to an 'opportunity cost', which the decision maker would want to factor in when choosing how best to allocate what he is endowed with. Ultimately, society would want to adopt an allocation mechanism that is capable of maximising the benefits from consumption of scarce resources over the long term.

Markets, though, are not faultless. As competition authorities have recently converged towards a 'consumer welfare' paradigm, however fuzzy its definition is, the focus has been on market power at the selling side (selling power), whereby competitive rivalry is lessened so that consumers are left with little choice than to buy on the conditions (price or non-price) imposed by the firm(s) holding market power. Hence, the idea is the important thing is that market power may impact on consumers (intermediary or final). Under these circumstances, consumer detriment might arise due to higher prices (leading to lower quantity sold), lower quality and variety on offer. Competition law, with its various provisions, is meant to address

⁴⁴⁰ Bundesministerium für Wirtschaft und Energie, Modernisierung der Missbrauchsaufsicht für marktmächtige Unternehmen (September 4th, 2018), available at <https://www.bmwi.de/Redaktion/DE/Publikationen/Wirtschaft/modernisierung-der-missbrauchsaufsicht-fuer-marktmaechtige-unternehmen.html> (hereinafter *Modernisierung Study*).

such market failures in order to preserve well-functioning markets by either protecting (through ex-ante intervention and indirect deterrence), or reinstating (through ex-post intervention and direct deterrence) competitive rivalry.

The inherent ambiguity in what underpins a position of substantial market power means that intervention under competition law is triggered primarily where market power is likely to be significantly increased through external growth, such as via mergers, joint ventures or other forms of coordination among firms. Moreover, enforcement can also be triggered where an alleged conduct undertaken by an already dominant firm is likely to entrench its position of substantial market power by cutting out rivals from a large chunk of the addressable market. The idea is that, absent the alleged conduct, the large portion of demand served by the dominant firm would have been more ‘contestable’; that is, the alleged conduct has made it more difficult for customers to be able to switch to a rival’s product if they so preferred.

5.2.2. Buyer power and monopsony

A typical definition of buyer power is the following one provided by Roger Noll:

“[B]uyer power” refers to the circumstances in which the demand side of a market is sufficiently concentrated that buyers can exercise market power over sellers. A buyer has market power if the buyer can force sellers to reduce price below the level that would emerge in a competitive market. Thus buyer power arises from monopsony (one buyer) or oligopsony (a few buyers), and is the mirror image of monopoly or oligopoly”⁴⁴¹.

In the standard model of monopsony, the supply side of a market is perfectly competitive and is represented by an upward-sloping supply curve. As a mirror image of a monopolist’s behaviour, a monopsonist can take advantage of his market power by reducing his demand. The lower price obtained by the buyer reflects the lower marginal cost of supply.

What are the competitive effects of buyer power and monopsony power⁴⁴²? With regard to the upstream side, as the monopsonist restricts its input purchases to reduce prices below competitive levels, there might be allocative inefficiency and the buyer may extract supplier surplus. With regard to the downstream side, there is no allocative inefficiency if the monopsonist discriminates perfectly. Consumers do not benefit though from reduced input prices as these do not lead to reduced output prices that are passed to output buyers, to the extent that “the monopsonist may control the *price* it pays for an input but cannot control the *quantity* of the input offered for sale at that price”⁴⁴³. Buyer power may also result in “waterbed effects” or “spiraling effects”. The “*waterbed effects*” may result, for instance, from the fact that buyer power could lead to a reduction of marginal costs and lower input prices for the entity with buyer power, which sees its output rising, while at the same time buyer power raises the input prices of the competitors of the entity which do not dispose of buyer power, as the

⁴⁴¹ R G. Noll, ‘Buyer Power’ and Economic Policy’, (2005) 72 Antitrust Law J. 589.

⁴⁴² For a detailed analysis, see R D. Blair & J L. Harrison, *Monopsony in Law and Economics* (Cambridge University Press, 2010).

⁴⁴³ J L. Harrison, Complications in the Antitrust Response to Monopoly, in I. Lianos & D. Sokol (eds.), *The Global Limits of Competition Law* (Stanford University press, 2012), 54, at 58.

reduction of prices has to be passed on to someone else, which may lead them to increase their prices, thus affecting the final consumers.⁴⁴⁴

Although monopsony is considered as the mirror image of monopoly, buyer-side conduct is regularly treated more leniently than equivalent conduct on the selling side. This relies on the idea that serving large buyers may involve lower distribution costs and lower production costs, leading to important discounts, as the larger the buyer the more credible would be its threat to integrate backwards and produce the good itself⁴⁴⁵.

One may also distinguish between buyer power, which denotes the ability of buyers to obtain advantageous terms of trade from their suppliers and countervailing power, which characterizes the presence of strong buyers mitigating or even fully averting adverse consequences for consumer surplus or total welfare that would otherwise arise from the exercise of market power at the supply side. Countervailing power on the buyer side may be an important force offsetting suppliers' increased market power⁴⁴⁶. The economic analysis of bilateral monopoly or oligopoly, the situation where a lawful monopolist confronts a lawful monopsony, does not offer clear directions. While some authors argue that bilateral monopoly produces welfare effects that are superior to those of monopoly or monopsony and that it does not raise any competition concerns⁴⁴⁷, others doubt on the possibility of bilateral bargaining to reliably reach an efficient outcome, because of the pervasive presence of private information and incomplete contracts⁴⁴⁸.

This debate on buyer power or monopsony is particularly important in the context of the emergence of large and powerful digital platforms that benefit from a bottleneck position at the middle of the digital value chain and may be seen as exploiting their power in order to extract unfair terms from their suppliers, or more generally the members of their ecosystem, including dependent self-employed labour force, and capture most of the surplus value generated by the value chain, thus leading to a fall in the labour share of capital⁴⁴⁹. Through the exercise of monopsony or buyer power, these digital platforms develop also their ability to impose a lower level of privacy protection to their users, in the sense that the activity of

⁴⁴⁴ On the “waterbed effects,” see, R Inderst & T Valletti, ‘Buyer Power and the “Waterbed Effect’ (2011) 59(1) *Journal of Industrial Economics*, 1-20; P Dobson & R Inderst, ‘Differential Buyer Power and the Waterbed Effect: Do Strong Buyers Benefit or Harm Consumers?’ (2007) 28(7) *ECLR*, 393-400; A. Majumdar, *Waterbed Effects and Buying Mergers, CCP Working Paper 05-7* (2007).

⁴⁴⁵ D Sheffman & P Spiller, ‘Buyers’ strategies, entry barriers, and competition’, (1992) 30 *Economic Inquiry*, 418.

⁴⁴⁶ The term was first coined by John Kenneth Galbraith to describe the power developed on one side of the market as a way to counter the market power on the other side of the market. John Kenneth Galbraith, *American Capitalism: The Concept of Countervailing Power* (1952). See also, T von Ungern-Sternberg, ‘Countervailing power revisited’, (1996) 14 *International Journal of Industrial Organization* 507; P W. Dobson & M Waterson, ‘Countervailing Power and Consumer Prices’, (1997) 107 *Economic Journal* 418; Z Chen, ‘Dominant Retailers and Countervailing Power Hypothesis’, (2003) 34 *Rand Journal of Economics* 612.

⁴⁴⁷ T Campbell, ‘Bilateral Monopoly in Mergers’, (2007) 74 *Antitrust Law Journal* 521; R D. Blair & C Depasquale, *Bilateral Monopoly and Antitrust Policy*, in Roger D. Blair & Daniel Sokol (ed.), *Oxford Handbook of International Antitrust Economics*, volume 1 (Oxford University Press, 2015) 364, 377.

⁴⁴⁸ J B. Baker, J Farrell & Shapiro, ‘Merger to Monopoly to Serve a Single Buyer’, (2008) 75 *Antitrust Law Journal* 637.

⁴⁴⁹ D. Autor, D. Dorn, L. F. Katz, C. Patterson & J. Van Reenen, *The Fall of the Labor Share and the Rise of Superstar Firms 1–3* (IZA Inst. Labor Econ., Discussion Paper No. 10756, 2017), <https://www.iza.org/de/publications/dp/10756/the-fall-of-the-labor-shareand-the-rise-of-superstar-firms> [https://perma.cc/5KXG-B42X].

harvesting data of digital platforms may be conceptualised as a form of purchasing of personal (or non-personal data), the users benefiting from ‘free’ services in return. The role of competition law in taming the buying power or monopsony of digital platforms in these various markets, and in particular labour markets⁴⁵⁰, sometimes assisted by digital platforms’ exclusionary strategies, such as no-poaching or non-compete agreements⁴⁵¹, or by the expansion of the heteromation process⁴⁵², is a hotly debated issue in competition law and economics scholarship⁴⁵³.

5.2.3. Can existing market power concepts take into account innovation effects?

Competition in the digital era is marked by the idea of futurity, one dimension of which is the emphasis put on the impact on innovation. Competition authorities are increasingly geared towards protecting competition in innovation, thus considering that dynamic efficiency constitutes the most important source of welfare. welfare, it is possible to highlight the (arbitrary) categorical thinking implicit in the trade-offs. The interests of future ‘consumers’ are assumed to coincide with the revealed preferences of the current ‘consumers’, for instance regarding the direction of innovation that is socially valuable, notwithstanding any evolution of the values presently prevailing in society, the technologies available, or of what are the requirements of the rules of the prevailing social contract. This monocentric focus on the

⁴⁵⁰ J. Azar, I., and M. I Steinbaum, Labor market concentration, Technical Report, National Bureau of Economic Research 2017; M. Steinbaum, Antitrust, the Gig Economy, and Labor Market Power (March 6, 2019). Law and Contemporary Problems, 2019, available at SSRN: <https://ssrn.com/abstract=3347949> ; Arindrajit Dube, Jeff Jacobs, Suresh Naidu, Siddharth Suri, Monopsony in Online Labor Markets(October 18th, 2018), available at https://irs.princeton.edu/sites/irs/files/monopsony_crowdsourcing_resubmission_sept_25_2018.pdf ; I. Marinescu & H. J. Hovenkamp, Anticompetitive Mergers in Labor Markets (April 2019). Indiana Law Journal, Vol. 94, 2019 ; U of Penn, Inst for Law & Econ Research Paper No. 18-8. Available at SSRN: <https://ssrn.com/abstract=3124483> ; E. A. Posner, G. Weyl & S. Naidu, Antitrust Remedies for Labor Market Power, (2019) 132 Harvard Law Review 537

⁴⁵¹ In 2010, the US DOJ entered a settlement with major digital platforms, such as Apple, Google, and Adobe, concerning their no-poaching or non-competition agreements in which they agreed not to hire each other’s employees: See Press Release, Office of Pub. Affairs, U.S. Dep’t of Justice, Justice Department Requires Six High Tech Companies to Stop Entering into Anticompetitive Employee Solicitation Agreements (Sept. 24, 2010), available at <https://www.justice.gov/opa/pr/justice-department-requires-six-high-tech-companies-stop-entering-anticompetitive-employee> . The US DOJ and the FTC also published specific guidance on this issue: US DOJ & FTC, Antitrust Guidance for Human Resource Professionals (October 2016), available at <https://www.justice.gov/atr/file/903511/download> . A number of recent antitrust cases made similar findings: see, *Garrison v. Oracle Corp.*, 159 F. Supp. 3d 1044, 1053–55 (N.D. Cal. 2016); *United States v. eBay, Inc.*, 968 F. Supp. 2d 1030, 1033 (N.D. Cal. 2013); *In re High-Tech Emp. Antitrust Litig.*, 985 F. Supp. 2d 1167, 1172–73 (N.D. Cal. 2013); see also *In re Animation Workers Antitrust Litig.*, 123 F. Supp. 3d 1175, 1181–84 (N.D. Cal. 2015).

⁴⁵² The process of heteromation was coined by Hamid Ekbia and Bonnie Nardi as referring to a process in which activities that were previously taking place within the firm are outsourced to the firms’ users/customers who enter into activities that contribute to the value with little or no compensation. Users are seduced into (gaming, social media...) or forced to (self-service, gatekeeper apps like Academia.edu...) participation in heteromated labour that provides surplus value without adequate compensation: H.B. Ekbia & B.A. Nardi, *Heteromation* (MIT press, 2017). Some authors hinted to the idea that the process of personal data harvesting may be considered as involving a form of labour from the part of the users of the platforms: I. Arietta Ibarra, L. Göff, D.H. Hernández, J. Lanier, E.G. Weyl, Should We Treat Data as Labor?, (May 2018) Papers and Proceedings of the American Economic Association 1, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3093683 .

⁴⁵³ See, the discussion in , I. Lianos, N Countouris, B. de Stefano, Re-thinking the Competition Law/Labour Law Interaction: promoting a Fair Labour Market, (2019) 10(3) European Labour Law Journal 291.

preferences of actual consumers for innovation, broadly defined, may explain why competition authorities have developed concepts that implement the ‘relevant market’ tool, when assessing the future effects of mergers or other anti-competitive practices on consumers, by developing concepts such as ‘innovation markets’.⁴⁵⁴

The concept has nevertheless been subject to a number of criticisms: first, R&D is only an input to the production of goods and services and competition law analysis should focus on outputs, the actual supply of future goods and services; second, economic theory does not provide a solid empirical basis on the assumption that the decrease in the number of firms engaged in R&D will affect negatively innovation (the link between market structure and innovation), as the elimination of redundant expenditure, the reduction of costs and the possibility for the firm to fully capture the results of the R&D programme might accelerate the process of innovation; third, the sources of R&D may be difficult to identify as discoveries may come from unexpected places. An “innovation market” approach may not provide an appropriate framework to the extent that it does not take into account the possibility of drastic innovation and the possible entry of undertakings that are not presently active in the specific industry or market, but may have some technological capabilities that could enable it to constitute a possible competitive constraint in innovation competition⁴⁵⁵.

In some recent merger cases concerning the seed/agrochem sector, the European Commission took a broader perspective and employed the concept of “innovation space” and the “industry” when assessing the possible effect of the merger transaction on innovation⁴⁵⁶. According to the Commission, when analysing the effects on innovation it becomes important to assess the impact of the transaction “at the level of innovation efforts by the Parties and its competitors”⁴⁵⁷. The assessment of innovation competition follows three steps:

“(349) First, the assessment of innovation competition requires the identification of those companies which, at an industry level, do have the assets and capabilities to discover and develop new products which, as a result of the R&D effort, can be brought to the market.

(350) Secondly, it is also relevant to identify and analyse those spaces in which innovation competition occurs in the crop protection industry. The R&D players do not innovate for all the product markets composing the entire crop protection industry at the same time. They also do not innovate randomly without targeting specific spaces within that industry. When setting up their innovation capabilities and conducting their research R&D players have specific discovery targets ([...]).

(351) A given discovery target is based on lead crops and lead pests and may thus comprise AIs that can be used in several downstream formulated product markets (for example chewing Lepidopteran insecticides, broadleaf herbicides). The spaces where innovation competition takes place are thus broader than an individual downstream crop protection market, but are nonetheless small. In fact, in light of increasing regulatory

⁴⁵⁴ See R.J. Gilbert and S.C. Sunshine, ‘Incorporating Dynamic Efficiency Concerns in Merger Analysis: The Use of Innovation Markets’ (1995) 63 *Antitrust Law Journal* 569.

⁴⁵⁵ R. J. Gilbert, ‘Competition and Innovation’ in Wayne D. Collins (ed) 1 *ABA Section of Antitrust Law, Issues in Competition Law and Policy* 577, 583 (American Bar Association 2008) Ch 26.

⁴⁵⁶ EU Commission Decision, *CASE M.7932 Dow/Dupont* (2017), paras 348-352

⁴⁵⁷ *Ibid.*, para. 348.

hurdles, which require crop protection products to be ever more selective, the innovation spaces in the crop protection industry are getting ever smaller: the innovation output tends to be confined to ever narrower spaces from which it is more difficult to adapt the innovation to other purposes.

(352) In conclusion, in order to assess innovation competition, the Commission will both consider metrics of innovation taking place at industry level, as well as innovation taking place in spaces consisting of groupings of crop/pest combinations [...] [areas where the parties' activities overlapped]⁴⁵⁸.

In its assessment of the *Dow/Dupont* merger the Commission focused both on innovation competition "at the level of innovation spaces within the crop protection industry and on innovation competition at the industry level"⁴⁵⁹. More specifically, the Commission focused on the line of research the merging companies were active, the latter concept comprising "the set of scientists, patents, assets, equipment and chemical class(es) which are dedicated to a given discovery target whose final output are successive pipeline [products] targeting a given innovation space"⁴⁶⁰.

A closely related debate is that on the way to integrate potential competition in the rapidly evolving digital industry. The debate was generated by the allegations that many established companies proceed to 'killer acquisitions' buying out smaller start-ups or small and medium undertakings with the aim to discontinue the development of the targets' innovation projects that may challenge their dominant position, thus pre-empting future competition⁴⁶¹. Indeed, if an additional investment in R&D by a potential entrant reduces the expected profits of a rival (and vice versa), because of its business stealing effect, then a merger between these two firms may internalise this negative externality, and reduce innovation.

Actual competitors are considered in the operation of the definition of a relevant market that may be affected by the specific anticompetitive conduct under examination. For instance, a merger where the target firm is not competing in the same relevant market of the acquiring firm can still give rise to a significant impediment of effective competition (SIEC), whether non-coordinated or coordinated, if there is a realistic prospect that the former could decide to enter the market in the near future but for the merger in question. The threat of entry is stronger where the target company already has, or is very likely to acquire, assets that could facilitate entry. Evidence of actual plans to enter at an advanced stage would point towards that conclusion. However, the likelihood of a SIEC is reduced if there are a sufficient number of potential competitors left able to discipline actual competitors. Usually competition authorities have taken a relatively narrow time scale for considering potential competition. For instance, under the EU Merger Guidelines, to be an effective threat, potential competitors should be able to enter within two years and on a sufficient scale. This can lead to ignore the possibility of potential entry into a market if the time scale of this entry may be longer than two years. The difficulty resides in finding evidence that the potential competitors may have such plans and

⁴⁵⁸ Ibid., paras 349-352.

⁴⁵⁹ Ibid., para. 1956.

⁴⁶⁰ Ibid., para. 1958.

⁴⁶¹ Some analysis in the pharmaceutical sector argues that more than 6% of acquisitions every year are 'killer acquisitions': see C. Cunningham, F. Ederer, and S. Ma, *Killer Acquisitions* (2018), available at: http://faculty.som.yale.edu/songma/files/cem_killeracquisitions.pdf.

that these are credible enough to influence the competitive strategies of the merging firms. It is thought that extending the time scale to a longer period than two years may lead to a high degree of uncertainty and increase the risk of arbitrary decision-making.

However, there can be circumstances where the threat of potential competition is less palpable but where a merger may be thought to give rise to a SIEC. It is often argued that the valuation of internet start-ups is very subjective due to the elusive nature of the key intangible asset underpinning their business model, that is, the acquisition of a large customer base. To this end, firms typically attract users by offering their services for free, thus incurring material operational losses for a number of years before the prospect of turning the venture into a profitable business. Furthermore, it is argued that once the customer base is in place, it is easier to launch new services thanks to the availability of a critical mass. Similar conclusions may be reached with regard to the possibility of a market becoming contestable in a medium term (e.g. five years), this assessment being based on the “idiosyncratic rent-earning resources” and capabilities, such as specific innovation and technological capabilities, that few other undertakings may have, that could provide them an advantage in entering a specific market, in particular if the structure of the industry is that of a global oligopoly. In this case, it is possible to argue that such resources and capabilities should be taken into account, even if there are no established plans or plans in the making to enter the specific market. But of course, such an approach will be subject to the criticism of considerably expanding the discretion of competition authorities to intervene, or not.

In this context, some competition regulators, in particular the European Commission, have looked beyond the R&D pipeline to explore the dynamic resources and capabilities of the specific firms to innovate and the development of specific “lines of research.”⁴⁶² The Commission has looked, for instance, to investment in basic R&D that may with some degree of probability become eventually profitable, even if this probability remains limited, for instance 10%. This approach seems to expand both the locus and the time period that is usually considered in assessing actual or potential competition, as the Commission has examined the overlaps between the parties, not only at the level of innovation spaces, by looking to “early pipeline projects” and “lines of research,” but also at the level of the industry. The Commission has indeed taken into account the global characteristics of R&D organisations, that is, the resources, personnel, facilities, and other tangible and intangible assets dedicated to research and development.⁴⁶³ If such a broader analysis may be perfectly justifiable in order to assess the innovation effects of the merger transaction and reduce the likelihood of “killer acquisitions,” it would also make sense to adopt a similarly flexible perspective when assessing potential entry when this could constrain the pricing strategies of the merged entity. Unless one is to consider that price effects would merit a different approach than innovation effects. This could make a difference in some cases, in particular if it is reasonable to expect that the future competitor may have the incentives and ability to enter the market in the medium term, on the basis of its tangible and intangible assets, idiosyncratic resources and capabilities, possibly in view of some history of previous expansion in other geographic markets.

⁴⁶² A theory that has, for instance, influenced the approach of the European Commission in *Dow/DuPont*: European Commission, Case M.7932 *Dow/DuPont* (2017).

⁴⁶³ *Ibid.*, para. 1957.

Box 6 South Africa and abuse of buyer power

The Competition authorities in South Africa have not yet developed a policy on the digital economy. Although South Africa's recent Competition Amendment Act 18 of 2018 has not specifically been designed to address digital markets, some features could have particular relevance for the authorities' assessment of digital markets. Online trading platforms have been included in a preliminary list of sectors to which a newly introduced prohibition against abuse of buyer power applies. The Amendment Act also strengthens market inquiry provisions. The South African Government applies a National Integrated ICT Policy. It outlines the overarching policy framework for inclusive digital transformation and includes strategies such as a national broadband policy.

Source: BRICS NCAs Questionnaire

5.3. Vertical non-structural power: variations on a theme

The theory of non-structural market power has been criticized by some authors as not being sufficiently substantial to constitute market power under competition law, and that it should therefore be excluded from competition law assessment⁴⁶⁴. Two reasons are advanced for this criticism: (i) enforcement agency budgets and judicial resources are scarce and thus, it does not make sense to squander them in attacks on market power over low sales volumes, as it is the case for relational power and (ii) there are no procedures or specific methodologies/metrics for measuring the extent of market imperfections, thus permitting the intervention of the competition authority in situations of intermediation or significant architectural or positional power. These issues notwithstanding vertical power becomes particularly important in the rapidly evolving environment of the digital economy, in which futurity and the potential for disruption plays a considerable role in driving the market valuation of the various players and therefore potential competition takes centre-stage, sometimes being more important than actual competition. This is particularly the case if the focus shifts from efficiency to the capture of surplus value in digital value chains, which brings in a fairness perspective. It becomes therefore essential to explore in more detail the different forms of non-structural power that have been put forward in the various competition authorities' reports and the literature.

5.3.1. Bottleneck or chokepoints power

Traditional conceptions define monopoly power by reference to the capacity it confers to exclude rivals: US economist Edward Mason explained the different conceptions of monopoly power in law and in economics, by opposing the neoclassical price theory view of market power

⁴⁶⁴ B Klein, 'Market Power in Antitrust: Economic Analysis After Kodak (1994) 3 *Supreme Court Economic Review* 43.

as the ability to raise prices profitably and reduce output, to the legal conception of monopoly power as the ability to exclude competitors and to affect the competitive process⁴⁶⁵.

New industrial economics have focused on the possibility of incumbents to employ strategic barriers to entry in order to exclude or marginalise rivals and thus be able to raise prices and harm consumers.⁴⁶⁶ Professors Krattenmaker, Lande and Salop have argued that there are two methods of exercising market power corresponding, respectively, to the 'power to control price' and 'power to exclude competitors' distinction⁴⁶⁷:

“First, the firm or group of firms may raise or maintain price above the competitive level directly by restraining its own output ('control price'). The power to control price by restraining one's own output is the usual focus of Chicago School antitrust analysts. For this reason, we denote the power to control price profitably, directly by restraining one's own output, as classical [...] market power.

Second, the firm or group of firms may raise price above the competitive level or prevent it from falling to a lower competitive level by raising its rivals' costs and thereby causing them to restrain their output ('exclude competition'). Such allegations are at the bottom of most antitrust cases in which one firm or group of firms is claimed to have harmed competition by foreclosing or excluding its competitors. We denote this power as exclusionary [...] market power. Consumer welfare is reduced by the exercise of either [classical] or [exclusionary] market power. [...]

Exercising either type of power reduces allocative efficiency and transfers wealth from consumers to the owners of the firms exercising monopoly power. In addition, for [exclusionary] market power, production efficiency also is reduced”.⁴⁶⁸

The distinction is important as “anticompetitive, exclusionary, market power occurs when an excluding firm successfully achieves two related goals”: first “by denying inputs to its rivals, the excluding firm materially raises its rivals' costs”; second, “by thus precluding the competitive check on its price and output decisions that those rivals provide, the excluding firm thereby gains the power to price in its output market above the competitive level. [...]”.⁴⁶⁹ Proof of either power should, according to the same authors, lead to the finding of market power or a dominant position.

An important implication of exclusionary market power concept is that it leads to a different approach from neo-classical market power or 'power over price' in order to estimate the existence of a dominant position, the competition authority first identifying the allegedly exclusionary conduct, and then analyzing market power.

Controlling a bottleneck or a 'chokepoint' in a network, cutting adversaries off from network flows⁴⁷⁰ may qualify as a dimension of exclusionary power, which we will call 'bottleneck power'. Bottleneck power has been a particular concern in view of the ability of platforms to adopt strategies such as exclusive contracts, bundling, or technical

⁴⁶⁵ See, Monopoly in Law and Economics' [1937] 47 *Yale Law Journal* 34

⁴⁶⁶ See, A Jacquemin, *Sélection et Pouvoir dans la nouvelle économie industrielle* (Economica, 1985), 118.

⁴⁶⁷ TG Krattenmaker, RH Lande and SC Salop, 'Monopoly Power and Market Power in Antitrust Law' (1987) 76 *Geo L J* 241, 248.

⁴⁶⁸ Ibid.248-253.

⁴⁶⁹ Ibid.

⁴⁷⁰ H. Farrell & A. L. Newman, *Weaponized Interdependence: How Global Economic Networks Shape State Coercion*, (2019) 44(1) *International Security* 42, 46.

incompatibilities in order to restrict entry of competitors, in particular in the digital economy. Bottleneck power does not only result from supply-side conditions, such as the control of an essential facility or input, necessary for competing producers if they are not to be excluded or marginalised from the market. It may also ensue from demand-side conditions, such as the propensity of consumers to single-home, and thus, not to use more than one platform for the specific functionality⁴⁷¹. One may also envisage different forms of bottlenecks that may emerge from changes in technology or the creation of new commodities, and scarcities, as bottlenecks in the digital economy may evolve in view of the technological developments.

5.3.2. ‘Intermediation’ power

The pivotal role of digital platforms and information intermediaries in the new economy has attracted the attention of competition authorities and has renewed the discussion over the sources of economic power, beyond the narrow view of market power as the ability to raise prices and reduce output profitably. The German Ministry for the Economy and Energy commissioned to a group of academics a report on the Modernisation of competition law published in September 2018⁴⁷². This report followed the 9th amendment of the ‘*Gesetz gegen Wettbewerbsbeschränkungen*’ (GWB, Law against Restraints of Competition) in which the legislator had implemented a more precise definition of the assessment criteria for the finding of a dominant position of platforms and networks. The study’s aim was to clarify whether the rules on abuse of dominant positions are sufficiently clear and effective and whether the particular challenges of the new economy could be sufficiently dealt with by §§ 18 and 19 GWB (the German equivalent to 102 TFEU), or should also be met through the use of §20 GWB, a provision prohibiting certain conducts of undertakings with relative or superior (non-structural) market power. Indeed, § 20 GWB is a stricter national provision for the protection against unilateral abuses, as is allowed pursuant to Art 3 (2) Reg. 1/2003. According to § 20 (1) GWB abuses of relational market power (in vertical relations) are prohibited while 20 (3) GWB proscribes exclusionary practices by an undertaking with comparatively more market power than its competitors. The German courts (BGH) have imposed very restrictive requirements on the applicability of § 20 (3) GWB.

The study’s starting point was the important role of new ‘information intermediaries’ (search engines, price comparison platforms, booking portals and trading platforms) which collect, sort and rank (at least parts of) the available online information for consumers and occupy a central position in an increasing number of markets. According to the *Modernisierung* Study, ‘information

⁴⁷¹ See, for instance, the definition of ‘bottleneck power’ by George J. Stigler Center for the Study of the Economy and the State - The University of Chicago Booth School of Business, Committee for the Study of Digital Platforms Market Structure and Antitrust Subcommittee (Report, May 15th, 2019), available at <https://research.chicagobooth.edu/-/media/research/stigler/pdfs/market-structure-report.pdf?la=en&hash=E08C7C9AA7367F2D612DE24F814074BA43CAED8C> as ‘a situation where consumers primarily single-home and rely upon a single service provider (a “bottleneck”), which makes obtaining access to those consumers for the relevant activity by other service providers prohibitively costly’.

⁴⁷² Bundesministerium für Wirtschaft und Energie, *Modernisierung der Missbrauchsaufsicht für marktmächtige Unternehmen* (September 4th, 2018), available at <https://www.bmwi.de/Redaktion/DE/Publikationen/Wirtschaft/modernisierung-der-missbrauchsaufsicht-fuer-marktmaechtige-unternehmen.html> (hereinafter *Modernisierung* Study).

intermediaries' provide the consumers with all kinds of information about the quality and reliability of different offers and transaction partners and create - following the evaluation of user data attractive matching options. Indeed, the efficient 'matching' of information-supply according to respective consumer preferences has become the core of many digital platforms. Moreover, consumers' options to check the quality of the 'intermediation intermediary' itself are limited. Therefore, the Report found that the increasing use of 'information intermediaries' caused sellers of goods and services to become dependent on access and visibility of their offers on these intermediaries, that thus function as gate keepers in a variety of different contexts. The economic power that an intermediary disposes in relation to a seller or service provider depends on the extent of consumers utilizing (solely) that intermediary and on the quality and availability of alternative intermediaries. If a supplier of goods and services is dependant from a digital intermediary, then this intermediary does not face any (significant) competitive constraints. This can be the case even if the intermediary has lower market shares than those traditionally required for the finding of dominance. Even if there are potential substitute platforms that consumers may switch to, information intermediaries may act independently of any competitive constraints, if consumers' reaction (e.g. leaving the platform) to price increases is stronger than decreases in quality (e.g. rankings that are not based on user preferences) and/or if consumers do not systematically multi-home and compare the results. This can lead to market failures that could be conducive to competition law enforcement, in particular as digital platforms and intermediaries may employ a variety of strategies to reduce inter-platform competition and artificially induce the tipping of the market. These can be exclusionary strategies towards horizontal competitors (at various segments of the value chain), for instance, through impeding multi-homing, certain smart pricing structures, conduct increasing the switching costs for consumers, self-preferencing in the context of a vertically integrated platform), or the development of conglomerate strategies that would enable digital platforms to gather a lot of data over consumers, and combine them so as to create very detailed user profiles, thus reducing the contestability of the intermediation power of digital platforms.

It is interesting that the study includes information asymmetries among the market failures that should be taken into account in competition law enforcement in the digital economy. According to the *Modernisierung* Study there are situations, in which an information intermediary may abuse information asymmetries vis-a-vis consumers for its own advantage and thereby exclude competitors with better services from the market, even if the incumbent does not dispose of a market share of at least 30-40%. This type of power can hardly be captured under traditional the assessments of market power (selling or buyer power). According to the Report, the broad definition of a dominant position in EU and German competition law as the 'possibility to act independent of any competitive constraints' may appear in conflict with the structural minimal requirements (minimum market shares) approach and raises the question as to whether a dominant position can be inferred from the ability to exclude competitors through a systematic abuse of information asymmetries.

In order to deal with this gap, the *Modernisierung* Study puts forward the concept of 'intermediation power'. Usually intermediation power can be seen as a special form of seller power, namely intermediation power on the market for the supply of intermediation services to suppliers of goods and services. However, this approach does not integrate the dependency of suppliers of goods and services on the intermediation service. For the authors of the Study, the concept of

intermediation power should stand explicitly as a third form of power, in addition to buyer power and seller power, in § 18 GWB and Art 102 TFEU. It would apply when there is a direct market relation between the intermediation platform and the supplier. Hence, they suggest that the criteria for the assessment of the market position of networks and multi-sided platforms enumerated in § 18 Abs. 3a GWB should be supplemented with a criterion relating to the ‘importance of the platform in the intermediation between suppliers and consumers’. Furthermore, § 20 GWB should be developed in order to encompass (relational) intermediation power.

However, moving beyond its conception as a form of relational power, the Study also argues that ‘intermediation power’ may also exist even if there is no market relation between the intermediation platform and the supplier (for instance in the case of pure information intermediaries, like specialised search engines which just provide users with aggregated publicly available information). The Study notes that ‘a significant ability to steer “information consumers” to certain offers, and thereby to affect – and possibly restrain – competition’ constitutes a possible source of ‘intermediation power’. The Study notes a gap in the enforcement of competition law as 102 TFEU/§§ 18, 19 GWB only encompass the dependency of undertakings on a ‘information intermediary’ indirectly, and only if there is a dominant position in relation to the user side (consumers) that is extended through abusive conduct to neighbouring markets. Thus, if the concept of intermediation power is to encompass also these situations, § 18 Abs. 1 GWB and in § 20 Abs. 1 GWB should clarify that intermediation power does not necessitate a market relation between intermediary and undertakings.

The *Modernisierung* Study also notes that unfair competition laws may constitute a tool for dealing with deceptive practices independent of any finding of market power (under § 3 and 5 UWG in Germany). It is also observed that the EU-Commission made suggestions regarding transparency duties for digital platforms towards commercial users, irrespective of any finding of market power (with the adoption of the Platform to Business Regulation), and they note also proposals for the amendment of the Directive on Consumer Rights to improve transparency duties towards consumers. For instance, online-Marketplaces should be obliged to reveal the essential ranking parameters, the applicability of consumer protection laws and the identity of the contractual partner (whether the consumer concludes a contract with the platform operator or with a third party). The Study noted that information asymmetries should be dealt with the parallel development of unfair competition laws, consumer protection laws and contract laws, but that insofar as digital platforms dispose of significant market power, transparency duties and contractual duties alone will not suffice for the protection of competition. Hence, the Study emphasises the fact that infringements of unfair competition laws, consumer protection laws and contract laws may constitute an infringement of competition law provisions, should the other criteria for these provisions being satisfied (*‘Missbrauch durch Rechtsverstoß’* or alternatively *‘Konditionenmissbrauch’*, when contractual terms imposed fall short of mandatory legal requirements). The Study also noted the utility of the new § 32e Abs. 5 GWB which foresees that the Bundeskartellamt may conduct sector inquiries if there is a reasonable suspicion that significant, long lasting and repetitive infringements of consumer protection laws has taken place harming the interests of many consumers and the opening of such a sector inquiry on October, 24th 2017 with regard to online price comparison platforms.

5.3.3.. Superior bargaining power

Concerns over the rising power of digital platforms have led some competition authorities to envisage the adoption of new rules on superior bargaining power, these rules either forming part of competition law statutes or of other functional equivalents.⁴⁷³ These different rules stay relatively opaque as to the definition of the concept of superior bargaining power. The common characteristic (and presumably) advantage of these provisions being that they may potentially impose competition law related duties to undertakings not disposing of a dominant position or a significant market power, for unilateral conduct, which would have otherwise not been subject to competition law related duties under the traditional rules of abuse of a dominant position⁴⁷⁴.

The concept of superior (or unequal) bargaining power is also a well-known concept in the fields of contract law and unfair competition law, where it has given rise to a considerable literature attempting to unveil its theoretical underpinnings.⁴⁷⁵ Authors usually contrast the use of this concept in these areas of law, where the focus is on the unfairness of the process of exchange, with the efforts to integrate this rule in the field of competition law, where the emphasis is usually put on outcomes, such as efficiency or consumer welfare⁴⁷⁶. The underlying objective of contract law or unfair competition statutes consists in regulating the contest between contracting parties and ensuring a relatively equalized landscape of bargaining capacity, bargaining power being interpreted as the interplay of the parties' actual power relationship in an exchange transaction.⁴⁷⁷ On the contrary, competition law defines bargaining power more generally, in terms of the ability of an undertaking to introduce a deviation from the price or quantity obtained from the competitive situation in the market in which the transaction takes place. In this context, buying power denotes the ability of a buyer to achieve more favourable terms than those available to other buyers or what would otherwise be expected under normal competitive conditions. This approach emphasizes the gain resulting from the presence of bargaining power relative to a situation in which it is absent (not necessarily that of perfect competition),⁴⁷⁸ focusing on market structure and concentration.⁴⁷⁹

⁴⁷³ For a comparative analysis of rules on superior bargaining power, see ICN, Report on Abuse of Superior Bargaining Position (2008), available at <http://www.internationalcompetitionnetwork.org/uploads/library/doc386.pdf>.

⁴⁷⁴ See the suggestions in the Furman report.

⁴⁷⁵ See in particular S. N. Thal, Inequality of Bargaining Power Doctrine: The Problem of Defining Contractual Unfairness, (1988) 8 *Oxford J. Legal Stud.* 17; M. J. Trebilcock, The Doctrine of Inequality of Bargaining Power: Post-Benthamite Economics in the House of Lords [1976] *University of Toronto L. J.* 359; L. A. DiMatteo, Equity's Modification of Contract: An Analysis of the Twentieth Century's Equitable Reformation of Contract Law (1998) 33 *New Eng. L. Rev.* 265; and more recently A. Choi and G. Triantis, The Effect of Bargaining Power on Contract Design [2012] *Va. L. Rev.* 1665.

⁴⁷⁶ See, P. Akman, *The Concept of Abuse in EU Competition Law: Law and Economic Approaches* (Hart Pub., 2012), 170-184.

⁴⁷⁷ Yet, it is important to note that regulatory interventions in order to rebalance contractual inequality are still designed as exceptions to the principle of the freedom of contract and the certainty of the contract, especially in B2B contracts, where a very limited power to rebalance the contractual arrangement is generally left to the discretion of the judge.

⁴⁷⁸ See, R. Clarke, S. Davies, P. W. Dobson and M. Waterson, Buyer Power and *Competition in European Food Retailing* (Edward Elgar 2002).

⁴⁷⁹ J. T. Dunlop and B. Higgins, Bargaining Power and Market Structures, (1942) L(1) *The Journal of Political Economy* 1, 4-5; R. G. Noll, "Buyer Power" and Economic Policy, (2005) 72 *Antitrust Law J.* 589.

The debate usually takes a more philosophical dimension, the main argument put forward by the opponents to the integration of the concept of ‘superior bargaining power’ in competition law assessment, being that competition law aims exclusively at the maximization of welfare effects, and should not include considerations of fairness, allegedly served by the doctrines of economic duress, unconscionability and undue influence in English contract law.

With regard to the definition of the relevant concept of economic power, some scholars have tried to draw a clear boundary between bargaining power, which is considered a contract law issue, and monopoly power, which is viewed as a competition law issue, what we will call the separability thesis. In particular, Trebilcock believes that it is fundamental to differentiate ‘situational monopolies’ from ‘structural monopolies’⁴⁸⁰. Situational monopolies are transitory states of imbalance in the bargaining position of the parties to an agreement, which can be subject to exploitation. The ‘situational monopolist’ (in Trebilcock’s terms) may take advantage of the business partner by charging prices that are higher than its ‘reference price’. For instance, Trebilcock imagines a situation where ‘A has violated his own reference price in opportunistically taking advantage of B’s temporary dependency’⁴⁸¹. For Trebilcock, these monopolies should be regulated by contract law. On the other hand, structural monopolies are those that antitrust law should target, as the dominance of the monopolist is market-wide and non-transitory. Here, the dominant firm enjoys a market power that precedes the negotiation of the specific bargain and that impacts on all the market actors⁴⁸². However, it has already been noted that when the relevant market is narrowly defined, as it may happen in EU competition law, the two situations are indistinguishable and therefore the distinction may lose significance⁴⁸³. Trebilcock maintains that while the problem of competition law is to determine and remedy to market failures, contract deals with contracting failures, which in the particular case of duress, relates to the coercion of voluntariness that may happen in ‘situational monopolies’. This is particularly the case for long term contracts where exploitation of a ‘bilateral monopoly’ is likely to occur⁴⁸⁴.

Several competition law regimes may be ambiguous as they may incorporate provisions regarding unilateral conduct involving ‘unfair business practices’ or ‘unfair contract terms’. Inequality of bargaining power has also been used by the European Commission in several cases, especially to deal with situations of economic dependence. According to Akman, ‘(t)he lack of freedom to choose between different suppliers as a result of the dominant undertaking’s

⁴⁸⁰ M J Trebilcock, *The Limits of Freedom of Contract* (Harvard University Press 1997); Michael J Trebilcock, ‘The Doctrine of Inequality of Bargaining Power: Post-Benthamite Economics in the House of Lords’ [1976] *University of Toronto Law Journal* 359.

⁴⁸¹ M Trebilcock, *The Limits of Freedom of Contract*, 94.

⁴⁸² *Id.* 96.

⁴⁸³ P. Akman, ‘The Relationship between Economic Duress and Abuse of a Dominant Position’ [2014] *Lloyd’s Maritime and Commercial Law Quarterly* 99, 113.

⁴⁸⁴ *Id.* 111. In this connection, Akman recalls Hovenkamp arguing that “[s]imple bilateral monopoly is not an antitrust problem because bilateral monopoly has no consequences for market prices and output” in Herbert Hovenkamp, ‘Harvard, Chicago, and Transaction Cost Economics in Antitrust Analysis’ (2010) 57 *The Antitrust Bulletin* 613, 14.

conduct' has been a concern in Article 102 TFEU cases in the EU⁴⁸⁵. Akman identifies two main problems that may arise of the interplay between competition law and the contract law doctrine of economic duress:

'First, there is a danger that pure contract cases are litigated as competition cases, even where there is no harm to competition. [...] Secondly, competition cases can be litigated as contract cases. [...]'⁴⁸⁶.

Adopting a separability thesis, which aims to establish clear boundaries for the application of competition law and contract law, Akman argues that 'pure exploitative practices where there are no issues of exclusion are more appropriately dealt with by contract law rather than by competition law'⁴⁸⁷.

In conclusion, two views are usually advanced with regard to the interaction of provisions focusing on superior bargaining power and competition law. First, considerable effort has been spent in order to mould the concept of superior bargaining power into the competition law and economics traditional framework by bringing adjustments to traditional competition law concepts such as relevant market and market power⁴⁸⁸ or focusing competition law enforcement on 'buying power'. Second, new provisions on superior bargaining power or economic dependence, introduced in the competition law statutes by some jurisdictions, are typically examined from the perspective of efficiency and consumer welfare and usually relegated to the outer boundaries of competition law provisions on abuse of a dominant position, for instance on the basis of an error cost analysis,⁴⁸⁹ or the perception that fairness concerns have little role to play in modern competition law⁴⁹⁰. Provisions on superior bargaining power are examined from a public choice perspective as a by-product of the political pressure of organised interests of small and medium undertakings or farmers, leading to the adoption of mainly redistributive statutes that restrict competition and presumably economic efficiency.

We consider that the 'superior bargaining power' concept is too easily dismissed by competition law scholarship. First, from a normative perspective, the role this concept may

⁴⁸⁵ P. Akman, The relationship between economic duress and abuse of a dominant position, (2014) Lloyd's Maritime and Commercial Law Quarterly 99, 102, who also noted that "the level of competition on a market and the objectionability of the contracts entered into on that market may be related" (Id., 101-102).

⁴⁸⁶ P. Akman, The relationship between economic duress and abuse of a dominant position, (2014) Lloyd's Maritime and Commercial Law Quarterly 99, 102-103.

⁴⁸⁷ Id., 108-109.

⁴⁸⁸ See, for instance, § 20 of the German Act against Restraints of Competition on "*relative and superior market power*" (*relative und absolute Marktmach*).

⁴⁸⁹ See, for instance, F. Wagner von Papp, Unilateral conduct by non-dominant firms: a comparative reappraisal, ASCOLA Tokyo Conference (2015), (on file with the author, shortly available at the SSRN) conducting an "error cost analysis" and advancing the view that dominance, and consequently the definition of a relevant market, is a necessary condition for a superior bargaining power to be considered as a competition law problem and recognising the countervailing impact that subsidiary contract law enforcement would have on error costs. An error cost analysis conducted *in abstracto* may underestimate the transaction costs associated with the use of the specific legal process, which may vary from jurisdiction to jurisdiction and in some cases may be less important in the context of competition law enforcement than other alternatives. Error cost analysis may also lead to the "*sin of single institutional analysis*" see, K. N. Komisar *Law's Limits*, (Cambridge: Cambridge University Press, 2001) as it will emphasize the defects of one institutional alternative (e.g. competition law) on some aspects to argue for an expansive role of another, probably equally defective in some other aspects, institutional choice: contract law or unfair competition law statutes.

⁴⁹⁰ See, for instance, P. Akman, *The Concept of Abuse in EU Competition Law* (Hart Pub. 2012), Ch. 4.

play in competition law enforcement becomes particularly significant, should one abandon a narrow neoclassical price theory (NPT) efficiency or consumer welfare driven perspective for an approach that would seek to preserve the competitive process or even one that will be inspired by broader political economy considerations. Second, from a descriptive perspective, we note that legislators and competition authorities do not share the antitrust law pessimism usually displayed by authors inspired by the NPT paradigm towards the concept of superior bargaining power, and have increasingly engaged with it, in the context of traditional competition law enforcement with regard to retail consolidation through buying alliances or mergers, in particular in the context of vertical restraints. That said, we do not consider that the concept should dispense from an analysis, probably at a latter stage in the competition law assessment, of the existence of harm to competition as a result from the specific conduct, the simple exploitation of a situation of superior bargaining power not being equated to harm to competition⁴⁹¹. The main added value of our approach is that it will not exclude outright from consideration exclusionary or exploitative conduct resulting from a situation of superior bargaining power, because of the simple fact that the undertaking in question does not dispose of substantial market power, defined as power over price (neoclassical market power), the latter concept functioning as a filter dispensing any further analysis. Such an approach will also break the artificial dichotomy between the step of determining the existence of a dominant position and that of identifying the abuse, thus enabling a more purposive definition of each element, enabling the claimant to put forward an overall theory of harm to competition resulting from the alleged abuse of a dominant position, which may eventually be rebutted by the defendant.

Recourse to the concept of ‘superior bargaining power’ may also expand the sources of market power taken into account in competition law. The attention of the competition law enforcers usually lingers on size and market share or concentration of the negotiating parties in order to define their power relations. However, scholarly studies on contracts and negotiations take a game/bargaining theory approach arguing that, for the outcome of negotiation, even more important than market shares or the size of negotiating parties is the existence of ‘threat points’ enabling one of the parties to seek a ‘*best alternative to a negotiated agreement*’ (BATNA).⁴⁹² Indeed, the negotiating party holding a BATNA has the possibility to resort to a valid alternative to the negotiation in progress or to the contract concluded, preventing hold-up and threats to cease negotiation. In conceiving the bargaining model one may take a Nash cooperative bargaining solution as the axiomatic starting point,⁴⁹³ or resort to a non-cooperative or sequential bargaining model which will attempt to factor in the costs of the delay to agreement, and extend this analysis from bilateral bargaining to n-person

⁴⁹¹ With regard to this issue we agree with P. Akman, The relationship between economic duress and abuse of a dominant position, 130, who argues that ‘demonstration of ‘harm to competition’ over and above harm to trading partners or competitors in all abuse cases may go some way in bringing clarity to the distinction between these two doctrines [economic duress and abuse of a dominant position]’.

⁴⁹² A. Renda and others, Study on the Legal Framework Covering Business-to-Business Unfair Trading Practices in the Retail Supply Chain, Final Report (2014) DG MARKT/2012/049/E 25, available at http://ec.europa.eu/internal_market/retail/docs/140711-study-utp-legal-framework_en.pdf; I. Ayres and B. J. Nalebuff, Common Knowledge as a Barrier to Negotiation (1996) 44 *UCLA L. Rev.* 1631.

⁴⁹³ Most of these studies have relied on this type of model so far.

bargaining.⁴⁹⁴ Although it is not clear if the results will be the same under each of these models, their common feature, in contrast to industrial organization theory, is that bargaining power is perceived as a concept that can be measured with reference to a specific bargaining relation in a specific context and it is not dependent on structural analysis (for instance the existence of monopsony or oligopsony). Bargaining power may also impact on price as well as on non-price terms.⁴⁹⁵ Measuring bargaining power may be considered as a difficult exercise, although not necessarily more complex than that of measuring market power. It is encouraging that some competition law enforcers have tried to engage with the measurement task, adopting diverse approaches.⁴⁹⁶

The issue may take more centre-stage as in the modern digital and algorithmic economy, we observe very different processing and evaluation capabilities among firms, as a number of economic actors may be considered as holding “asymmetrical bargaining power” vis-à-vis their suppliers or buyers, through the collection of Big Data and the use of algorithms⁴⁹⁷. Some authors have even coined the term of ‘algorithmic power⁴⁹⁸’ in order to convey an additional, quite important, source of market power, in the sense that this is based on the ‘technological dependence⁴⁹⁹’ of economic actors that work and consume in an increasingly complex computational environment. It is also based on the capability of some actors to control the ‘agenda’ of decision-making⁵⁰⁰, for instance through the gate-keeping role of their digital platforms as the most important gateway of businesses to consumers⁵⁰¹, or for the storage and processing of data⁵⁰², the ‘oil’ of the new economy⁵⁰³, or for the provision of

⁴⁹⁴ See, for instance, J. Sutton, *Non-Cooperative Bargaining Theory: An Introduction*, (1986) *LIII Review of Economic Studies* 709-724; K. Binmore, M. J. Osborne, A. Rubinstein, *Non-Cooperative Models of Bargaining*, Chapter 7 in *Handbook of Game Theory with Economic Applications* (Elsevier, 1992), 179-225.

⁴⁹⁵ A. Choi and G. Triantis, *The Effect of Bargaining Power on Contract Design* (2012) *Va. L. Rev.* 1665.

⁴⁹⁶ See, Bundeskartellamt, *Sektoruntersuchung Nachfragemacht Im Lebensmitteleinzelhandel* (2014) B2-15/11 BKartA, available at http://www.bundeskartellamt.de/Sektoruntersuchung_LEH.pdf?__blob=publicationFile&v=7 (hereinafter Bundeskartellamt Food Retail Report). The conditions adopted for this analysis were not only price terms but also non-price terms, such as deadline for payment and agreements on delivery. A fundamental stage of the Bundeskartellamt’s assessment was the reckoning of the importance of a retailer for its suppliers and the evaluation of the ‘outside options’ of both parties. For a discussion, see I Lianos & C Lombardi, ‘Superior Bargaining Power and the Global Food Value Chain: The Wuthering Heights of Holistic Competition Law?’, (2016 – I) *Concurrences* 22.

⁴⁹⁷ See, F. Pasquale, *The Black Box Society: The Secret Algorithms that Control Money and Information* (Harvard Univ. press, 2015), Chap. 2; A. Ezrachi & M. Stucke, *Virtual Competition* (Harvard Univ. press, 2016), 125-128, 225 (discussing “asymmetric bargaining power”).

⁴⁹⁸ See, T. Bucher, *Want to be on the top? Algorithmic power and the threat of invisibility on Facebook*, (2012) 14(7) *New Media and Society* 1164.

⁴⁹⁹ See, the opinion of Advocate general Whatelet in Case C-170/13 *Huawei Technologies Co. Ltd v ZTE Corp. and ZTE Deutschland GmbH* [2015] ECLI:EU:C:2014:2391, paras 71 & 74 who coined the term. The AG found in this case that the incorporation of a patent-protected element into the industry standard and the fact that a licence to use that patent was therefore indispensable had created a relationship of dependence between the SEP-holder and the undertakings which produce products and services in accordance with that standard. According to the AG, “(t)hat technological dependence leads to economic dependence”.

⁵⁰⁰ On the various definitions of “power” in economics and sociology, see M. Granovetter, *Society and Economy* (Harvard Univ. press, 2017), Chapter 4.

⁵⁰¹ One may, for instance, refer to the Amazon Marketplace.

⁵⁰² This could, for instance, be access to the cloud that is highly important for the Internet of Things. See, B Lundqvist, *Standardization for the Digital Economy - The Issue of Interoperability and Access Under Competition Law*, 62(4) *The Antitrust Bulletin* 710.

⁵⁰³ *The Economist*, ‘The world’s most valuable resource is no longer oil, but data’, (May 6th, 2017).

artificial intelligence services. This is exemplified by, for instance, control over the choice architecture which frames individual choice in the context of an economic transaction. These economic actors will therefore be in a position to exploit their superior ‘algorithmic power’ and/or ‘manipulate’ the choice and eventually the preferences of their suppliers and buyers⁵⁰⁴. This may also be considered as forming a separate dimension of economic power for which specific metrics and methodologies need to be developed.

Developing appropriate metrics for measuring superior bargaining power constitutes one of the challenges to which competition law authorities that would like to integrate this concept in the competition law framework may face.

Attempts to measure bargaining power have so far focused particularly on the demand side bargaining power. Buyer power must not be conflated with monopsony and can take a variety of forms. Carstensen contends that “[t]he continuum of buyer power is a function of the following factors:

- (1) the buyer’s market options for its output;
- (2) the producer’s ease of switching outlets or product lines;
- (3) the quantities that the buyer takes from any one producer as a percentage of its purchases of that input; and
- (4) the percentage of its own output that a producer sells to a single buyer.”⁵⁰⁵

In its report on the supply of groceries, the UK Competition Commission investigated the degree of buyer power of grocery retailers vis-à-vis suppliers. The Commission tries to define “buyer power” tautologically as being able to “obtain a better deal from its suppliers in terms of prices, product quality or purchasing terms, for example, compared with grocery retailers that do not have buyer power”. In its assessment of the grocery sector, the possession of buyer power by grocery retailers is assessed by looking at four types of evidence:

- (1) the relative size of grocery retailers compared to suppliers;
- (2) the prices and margins that suppliers are able to negotiate with grocery retailers;
- (3) the share of the retail price that is earned by grocery retailers and others; and

⁵⁰⁴ See the literature on market manipulation, providing evidence that firms take advantage of the specific characteristics of consumers and manipulate their cognitive biases, which may be extended to platform to business transactions, when digital platforms dispose of superior bargaining power : J.D. Hanson & D. A. Kysar, Taking Behavioralism Seriously: Some Evidence of Market Manipulation, (1999) 112 Harvard Law Rev. 1420; R. Calo, Digital Market Manipulation, (2014) 82 The George Washington Law Rev. 995; E. Kamenica, S. Mullainathan & R. Thaler, Helping Consumers Know Themselves, (2011) 101(3) American Economic Review: Papers & Proceedings 417 (noting that “when the seller has more information about expected usage than the customer, they may try to exploit this information by targeting specific offers to specific consumers” and raising the problem of “adverse targeting”, that is the ability of sellers “to use this informational advantage to construct special offers that the consumers will overvalue”); Ph. Hacker & B. Petkova, Reining in the Big Promise of Big Data: Transparency, Inequality, and New Regulatory Frontiers, (2017) 15 Northwestern Journal of Technology and Intellectual Property (not yet published, available at the SSRN). See the recent ideas to regulate from a fairness perspective platform to business relations (see, Inception Impact Assessment, Fairness in Platform to Business Relation, Ares(2017)5222469, available at https://ec.europa.eu/info/law/better-regulation/initiatives/ares-2017-5222469_en (raising interesting questions as to the interaction of competition law and other forms of economic regulation in order to tame the superior bargaining power of digital platforms).

⁵⁰⁵ Peter C. Carstensen, *Competition Policy and the Control of Buyer Power. A Global Issue* (Edward Elgar 2017), ch. 3.

- (4) a review of e-mail correspondence between two retailers and their suppliers, including e.g. evidence of below-cost selling by suppliers that would be difficult to explain in the absence of retailer buyer power.

In Japan, abuse of a superior bargaining position is prohibited by the Antimonopoly Act.⁵⁰⁶ In its Guidelines Concerning Abuse of Superior Bargaining Position under the Antimonopoly Act, the Japan Fair Trade Commission defines a superior bargaining position as follows. Party A has a superior bargaining position over Party B in the following situation: (1) Party A makes a request that is substantially disadvantageous for Party B. and (2) Party B would be unable to avoid accepting such a request on the grounds that Party B has difficulty in continuing the transaction with Party A and thereby Party B's business management would be substantially impeded.

The existence of a superior bargaining position is determined by considering four sets of facts, taking into account both structural and non-structural factors:

1. The degree of dependence by Party B on the transactions with Party A, which if Party B is the supplier is measured with reference to the amount of sales by Party B to Party A, divided by Party B's total amount of sales;
2. The structural market position of Party A, i.e. its market share and ranking;
3. The possibility of Party B to change its business by starting or increasing its transactions with another party other than Party A, for instance based on Party B's specific investments for its transactions with Party A;
4. Other factors indicating the need for Party B to carry out transactions with Party A, including for example the amount of transactions with Party A and the relative business size of Party A.⁵⁰⁷

In 2014, the German Bundeskartellamt concluded an in-depth study in the food retail sector, where it attempted to measure superior bargaining power ("demand side power" – "*Nachfragemacht*") econometrically by exploring the conditions of its existence.⁵⁰⁸ The conditions of bargaining power were converted into independent variables used for the econometric assessment. The selection of the independent variables was performed on the basis of a survey. In particular, the Bundeskartellamt looked into the procurement market of branded products for several reasons, including the fact that they form the core business of retailers, they are at the center of the majority of competition complaints and they are easier to compare and identify.⁵⁰⁹ The authority initially divided the products object of negotiations into four

⁵⁰⁶ Article 2 (9)(v) of the Act on Prohibition of Private Monopolization and Maintenance of Fair Trade.

⁵⁰⁷ Japan Fair Trade Commission, Guidelines Concerning Abuse of Superior Bargaining Position under the Antimonopoly Act (30 November 2010), p. 5-6, available at http://www.jftc.go.jp/en/legislation_gls/imonopoly_guidelines.files/101130GL.pdf.

⁵⁰⁸ Bundeskartellamt, Sektoruntersuchung Nachfragemacht Im Lebensmitteleinzelhandel (2014) B2-15/11 BKartA, available at http://www.bundeskartellamt.de/Sektoruntersuchung_LEH.pdf?__blob=publicationFile&v=7 (hereinafter Bundeskartellamt Food Retail Report)

⁵⁰⁹ The other market identified by the Bundeskartellamt is the one of private labels, which the authority describes as characterized by a different "*bargaining logic*," although deeply influencing the negotiations for branded products. Private labels are usually bargained through tenders, while branded products are traded with annual negotiations. However, in its econometric study the Bundeskartellamt states that "private labels are actually considered in the assessment of the "competitive environment" of the branded products," see Bundeskartellamt, Summary of the Final Report of the Sector Inquiry into the Food Retail Sector, 8. In this connection the

categories: “product category,” xxx“must-stock items,” “items listed at a discounter” and “high-turnover items.” Furthermore, they identified seven procurement markets with different market structures. In order to identify and order the branded products forming the statistical population belonging to the sample, the authority used the European Article Number (EAN). The authority then interviewed the retailers and manufacturers about the results of their negotiations on each EAN article. In particular, the Bundeskartellamt inquired about the switching possibilities to alternative negotiating partners and about the overall competitive environment. The authority noted that negotiations between producers and merchants take place once a year. In these negotiations producers and merchants bargain over the conditions for the business relationships of the following year. Yet, the Bundeskartellamt also acknowledged that the sole focus on procurement volumes is not sufficiently differentiated to provide valid conclusions for the definition and measurement of demand-side bargaining power. For its econometric assessment, the Bundeskartellamt considered different determinants in order to describe the individual bargaining position of each party and did not base itself only on market concentration and the existence of a monopsony or an oligopsony. The bargaining model construed on the basis of this theoretical approach can be summarized as following:

K [conditions of superior bargaining power] = $f(x$ [amount ordered]; D^{1-6} [bargaining determinants, which indicates the “*Drohpunkte*” (threat points), that is, the best alternative to negotiate])⁵¹⁰.

These are the following:

- Alternative distribution paths for producer p (other than with retailer r) or even alternative production paths (switching to different product) = outside options of producer;⁵¹¹
- Outside options of retailer: importance of the product for the retailer (is delisting a credible threat?);⁵¹²
- Brand strength: if consumers expect certain brands, then delisting is improbable;⁵¹³
- Competition by other producers/brands which creates opportunities for r to circumvent p ;⁵¹⁴

Bundeskartellamt observes that private labels are often considered as part of a different market with respect to branded products. However, they can be often used in negotiations to put pressure on manufacturers of branded products, at 11.

⁵¹⁰ Hence, the Bundeskartellamt especially focusses on the walk-away point in the specific negotiation and how it is influenced by different factors for each party.

⁵¹¹ Bundeskartellamt Food Retail Report, 321.

⁵¹² Bundeskartellamt Food Retail Report, 322.

⁵¹³ Bundeskartellamt Food Retail Report, 323.

⁵¹⁴ Bundeskartellamt Food Retail Report, 324. However the Bundeskartellamt states that this is only true if two conditions are assumed. Firstly the other brand has to pose a sufficient substitution to the article which is the subject of the negotiations and secondly that the producer of the relevant article is not also the producer of the alternative trade brand. The Bundeskartellamt measures the value of this influence with the help of a survey in which the undertakings were asked to assess the importance of alternative brands. Furthermore the survey asked for an assessment of the substitutability of the specific article through the alternative on a scale from 0% to 100 %..

- r's own brands ("*Handelsmarken*"): these must be substitutable for brands of p, and p must not be (by chance) the actual producer of r's own brands; the Report notes the trend towards private labels even in the premium segment,⁵¹⁵
- Buyer cooperation: bundling buying power⁵¹⁶.

The conditions adopted for this analysis were not only price terms but also non-price terms, such as deadline for payment and agreements on delivery. A fundamental stage of the Bundeskartellamt's assessment was the reckoning of the importance of a retailer for its suppliers and the evaluation of the "outside options" of both parties. The definition of "outside option" given by the authority resembles closely to the one of the BATNA, "*the better a party's outside options, the better the conditions that party is able to negotiate.*"⁵¹⁷ Not surprisingly, the Bundeskartellamt concluded in this study that the purchasing volumes "*have a decisive impact on the negotiating conditions,*"⁵¹⁸ and therefore constitute one of the main advantages of major retailers vis-à-vis their smaller competitors in negotiations. Furthermore, the authority determined that the well-known branded products "*the delisting of which would most likely result in a disproportionate decline in turnover for that retail company, has the effect that its manufacturer is able to achieve better conditions.*"⁵¹⁹ In such cases, the producer is in a stronger bargaining position, since the retailer has no BATNA.⁵²⁰

In a 2012 sector inquiry, the Italian Competition Authority studied the bargaining power of retailers and suppliers on the basis of three different "clusters" of undertakings, reaching comparable results.⁵²¹ These "clusters" were obtained by comparing several data, including the overall turnover, the number of retailers supplied, the "strength" of the brand (especially in the specific geographic area). In particular, these three groups or "clusters" were: i) undertakings with high bargaining power; ii) undertakings with medium bargaining power and iii) undertakings with low bargaining power.⁵²² The data published by the ICA relatively differs from that of the Bundeskartellamt, but still shows a situation of prevalence of retailers' superior bargaining position, irrespective of market concentration levels. On the basis of their clusters, the ICA concluded that in the 23.4% of their sample, the supplier holds a strong bargaining position (not necessarily stronger than the retailer) and is not economically dependent on the retailer. In the 48.8% of cases, the suppliers showed an intermediate degree of dependence from the retailers. Finally, the 27.8% of the sample highlighted a high level of dependence.⁵²³

⁵¹⁵ Bundeskartellamt Food Retail Report, 324-325.

⁵¹⁶ Membership in a buyer group reduces the outside-options of the supplier and thereby may lead to better conditions for the demand side. The impact of the membership is measured by adding a variable which is 1 for "yes" and 0 for "no". In a second step it is measured whether an undertaking is a "big" or a "small" member of such a group. Thereby a variable only gets the value one, when the undertaking is not the one with the highest turnover in the group.

⁵¹⁷ Bundeskartellamt, Summary of the Final Report of the Sector Inquiry into the Food Retail Sector, 10.

⁵¹⁸ Bundeskartellamt, Summary of the Final Report of the Sector Inquiry into the Food Retail Sector, 10.

⁵¹⁹ Bundeskartellamt, Summary of the Final Report of the Sector Inquiry into the Food Retail Sector, 10.

⁵²⁰ However, these so-called "must-have" products accounted only to 6% of the sample adopted by the authority that, according to the same authority, can be reasonably taken as representative of the whole food-retail national market.

⁵²¹ Italian Competition Authority, Market Investigation in the Retail Sector (2012).

⁵²² Italian Competition Authority, Market Investigation in the Retail Sector (2012), 162.

⁵²³ Italian Competition Authority, Market Investigation in the Retail Sector (2012), 162.

Both studies by the German and the Italian competition authorities engage with what may be considered as captive value chains in the GVC approach terminology and attempt to develop appropriate measurement tools for superior bargaining power that could be useful in also assessing vertical power.

5.3.4. Panopticon power

The power of specific nodes (actors) does not always result from the dependency of the other nodes of the network to which it forms part, for instance because of certain individual characteristics of this specific actor. Their influence may stem from their strategic position in the network. For instance, this position may enable them to extract an information advantage vis-à-vis potential adversaries, what Farrell and Newman call the ‘panopticon effect’ in reference to the institutional building and a system of control designed by English philosopher Jeremy Bentham⁵²⁴. Panopticon power may emerge in situations where there is significant and growing learning-by-doing asymmetry between the actor benefitting from this position in the network and the other nodes in the network. In view of the importance of hubs in a decentralised communications structure, Farrell and Newman explain that ‘hub nodes can use this influence to obtain information passing through the hubs’⁵²⁵. These actors may therefore tap, because of their positioning in the network, into the information gathering and generating activities of the whole network, well beyond the nodes with which they have direct, or even indirect, relations. Hence, despite the function of such actors as simple intermediaries providing an infrastructure of communication, their influence can be quite significant. Panopticon power thus results from the position of an actor in a network and is not related as such to the existence of some form of dependence. It is possible that the different actors in a network voluntarily agree to share information through the hub, for instance because they trust it better than a direct communication between them, or because it is more convenient to do so. Although each of these nodes is not dependent on the hub, assuming that there are other available, and therefore in the context of their dyadic relation the hub does not have power, taking into account the fact that the actor also serves as a hub for a number of other interactions may provide that actor some superior and more complete information on the strategies of the other members of the network, including its adversaries, in case these have communication interactions with some of the nodes also communicating with the hub.

5.3.5. Architectural power

Competition fights are not only won through the use of traditional strategic competitive advantage, in terms of lower costs, higher quality products etc. Increasingly, firms engage with the overall structure, economic and legal, of the industry in which they are active seeking opportunities to frame their architecture in a way that favors their position. This quest for architectural advantage, which is particularly important in competitive fights in the context of

⁵²⁴ H. Farrell & A. L. Newman, *Weaponized Interdependence: How Global Economic Networks Shape State Coercion*, (2019) 44(1) *International Security* 42, 46.

⁵²⁵ *Ibid.*, 55.

ecosystems, hints to a different dimension of economic power, not usually taken into account by the traditional competition law metrics, architectural power. To the extent that this architectural power emanated from the central positioning of platforms in ecosystems, it has also been referred to as ‘positional’ power. This does not necessarily relate only to the position of an undertaking as an indispensable intermediary, although this may constitute a source of architectural advantage, but relates to the overall position of centrality of the platform or specific undertaking in the industry architecture. We will briefly explore the concepts of industry architecture and architectural power, before making some comments on the possible metrics that may be employed to assess it.

In addition to competitive strategies that engage directly with the actual and potential sources of competition, a firm may also acquire a durable competitive advantage if it holds a position that enables it to reshape the ‘industry architecture’ in its own advantage. The concept of ‘industry architecture’ follows David Teece’s seminal contribution on how profits from innovation and how the various governance arrangements between the innovator and other vertically-related firms may influence the distribution of these innovation gains⁵²⁶. Teece suggested a theoretical framework. First, it focuses on the co-specialization of firms so that their assets are tailored to each other and the firms develop a high degree of complementarity, as the combination of assets yields a higher value. Second, it focuses on ‘factor mobility’, which relates to the ability of a firm to appropriate value without necessarily owning the complementary asset. Teece focused on the dyadic relation between the innovator and outside asset holders finding that complementarity usually leads to lower factor mobility. However, more recently, Michael Jacobides et al. disentangled the two constituent components of co-specialization by finding that a firm may manage to “obtain *both* high complementarity *and* high mobility in their vertically adjacent segments”, which led him to expand Teece’s analytical framework beyond ‘dyadic relations’ to also cover the ‘industry architecture’, which is “the various templates circumscribing the division of labor among co-specialised firms at the level of an industry, or economic sector”⁵²⁷. According to Jacobides et al.,

“(t)he concept of industry architecture (‘IA’) describes how labor is typically organized and structured within an industry (‘who does what’) and which firms capture value and profit as a result (‘who takes what’). It encompasses features such as the degree of vertical integration, the division of labor between firms and the ‘rules and roles’ that determine how firms interact and the business models, available to them. While IA reflects the conditions under which firms operate, it is influenced, in the medium term, by firms’ attempts to reshape those conditions to their own advantage”⁵²⁸.

As Jacobides further explains, “(a)rchitectures provide the contours and framework within which actors interact: they are usually partly designed (e.g. by regulation or *de facto*,

⁵²⁶ David Teece, “Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy”, (1986) 15(6) *Research Policy*, 285.

⁵²⁷ Michael Jacobides, Thorbjørn Knudsen and Mie Augier, “Benefiting from Innovation: Value Creation, Value Appropriation and the Role of Industry Architectures”, (2006) 35 *Research Policy*, 1201.

⁵²⁸ Michael Jacobides, “Industry Architecture” in *The Palgrave Encyclopaedia of Strategic Management* (edited by Mie Augier and David Teece, Palgrave Macmillan, London, 2016).

by standards), and partly emergent (by the creation of socially understood templates and means to coordinate economic activities)⁵²⁹.

Industry architecture is framed by the various economic actors at the birth of a new industry, the new players defining the interfaces (technological, institutional or social) that allow different entities to co-specialize and divide labor⁵³⁰. As the industry progressively matures, we observe the emergence of ‘winners’ who strive to frame the industry architecture in their own advantage by developing complex strategies. The objective of these strategies is to capture a disproportionate amount of the surplus value created by the innovation.

Industry architectures are not meant to last forever, although they tend to be relatively stable for some time once the technology has sufficiently diffused. There are various reasons for this stability, such as the requirement for any new technology to be interoperable with the technical standards of the industry architect who benefits from an installed base, the quality certification barrier from which the technologies of the industry architect benefit, to the extent that consumers’ expectations have been framed according to the industry architect’s quality standard, the favorable legal framework from which the industry architect benefits as it may have been framed so to respond to the risks generated by the technology of the incumbent or to accommodate the needs of the industry architect. However, as Jacobides et al. observe, “(i)ndustry architectures can... also change whenever new ways are found to put together the various industry participants: legal innovations that alter transaction costs..., new ways of safeguarding against loss from transactional hazards..., and technical innovations that alter the payoff to bundling specialized production factors... could inspire adjustment of an industry’s architecture”⁵³¹. This shift from the dyad to industry-wide networks of relationships regarding the allocation of the financial returns of innovation also explains the reason for the competitive game being more complex and wider than the usual focus of competition law on a relevant market.

Various factors may influence industry architecture. One is technological path dependence which results from a self-reinforcing process triggered by an event, such as a first mover advantage leading to the choice of a widely used technology standard, which leads to a ‘lock-in’ to a less optimal, from a quality of technology perspective, equilibrium, without that being the intention of the agents at the first place⁵³². The legal/ regulatory framework may also play a crucial role in the definition of the boundaries of an industry and of its governance. Quite often it supports the existing industry architecture. Finally, path dependence and ‘lock-in’ may result from intentional strategies seeking to manipulate the industry architecture so to create a bottleneck. This is a segment of the value chain where there is limited mobility⁵³³. The firm controlling the bottleneck is in a position to extract all surplus value in the specific segment as well as a higher percentage of the surplus generated by innovation in vertically adjacent

⁵²⁹ M.G. Jacobides, T. Knudsen & M. Augier, Benefiting from innovation: Value creation, value appropriation and the role of industry architectures, (2006) 35 Research Policy 1200, 1203.

⁵³⁰ *Ibid.*,

⁵³¹ *Ibid.*, fn 3.

⁵³² B. Arthur, Competing Technologies, Increasing Returns, and Lock-In by Historical Events, (1989) 99(394) *The Economic Journal*, 116, 116.

⁵³³ M.G. Jacobides, T. Knudsen & M. Augier, Benefiting from innovation: Value creation, value appropriation and the role of industry architectures, (2006) 35 Research Policy 1200, fn 13.

segments⁵³⁴. This may take different forms, such as manipulating the setting of technology standards as often standards shape industry architecture or influencing the regulators and/or the legislative framework shaping the architecture of the industry, either directly through lobbying activity and pressure groups or indirectly by developing a narrative that will catch the imagination of policy-makers and legislators so that the emergent regulatory framework serves the interests of industry architect.

In conclusion, being in a position to influence the way the industry is organized or structured and the value allocation between the industry (or ecosystem) actors, provides ‘architectural advantage’⁵³⁵. This may be a quite important source of sustainable abnormal profits. This is probably the reason why ‘architectural fights’⁵³⁶ have characterized the evolution of all industries. The competition to become the industry architect plays a crucial role in periods of profound technological transformation, such as the development of new GPTs; in periods when new technologies that confer significant advantages, such as reducing costs or increasing productivity are progressively integrated in the production process in the context of a specific industry⁵³⁷. These technologies offer a higher rate of return on investment and often attract capital from other industries. In the context of the inter-industry competition that is one of the characteristics of financial capitalism⁵³⁸. The important role of financial markets in the development of the digital economy and the monetization of digital inputs also shifts attention away from the traditional focus of competition law on competition within an industry, to competition between industries, capital (in the sense of value-enhancing activity, which does not constitute labor) moving from one industry to another in search of higher profits. The concept of ‘ecosystem’ offers an additional space where intra- and inter-industry competition occurs.

According to the architectural advantage approach, the boundaries of an industry should not be considered as a given. Firms with superior performance (due to superior resources and capabilities⁵³⁹) aim to shape ‘industry architectures’ in a way that provides them control of a ‘bottleneck’, i.e. that would enable them to leverage their position of strength over all other companies that collaborate with them in the creation of surplus value⁵⁴⁰. Hence, to understand this process of value extraction that motivates strategies of competition, it is important to analyze the market level and the industry and eco-system levels. It also challenges the idea that there are cycles in the life of an industry: an industry being marked by a dominant design, with an established hierarchy and stable market shares that slowly erodes as the industry matures with product innovation mainly occurring through new entry. According to this view, the competition of capabilities takes place not only at market or segment level (e.g. among mobile

⁵³⁴ *Ibid.*, 1208.

⁵³⁵ *Ibid.*, 1200.

⁵³⁶ *Ibid.*, fn 13.

⁵³⁷ Charles Ferguson and Charles Morris, “How Architecture Wins Technology Wars”, (1993) 71(2) *Harvard Business Review*, 86.

⁵³⁸ Anwar Shaikh, *Capitalism: Competition, Conflict, Crises* (Oxford University Press, 2016).

⁵³⁹ Birger Wernerfelt, “A Resource-Based View of the Firm”, (1984) 5(2) *Strategic Management Journal*, 171; C. K. Prahalad and Gary Hamel, “The Core Competence of the Corporation”, (1990) *Harvard Business Review*, 79.

⁵⁴⁰ Michael Jacobides and Jennifer Tae, “Kingspins, Bottlenecks, and Value Dynamics Along a Sector”, (2015) 26(3) *Organization Science*, 889.

handset manufacturers) but also at the value-chain level (e.g. among mobile handset manufacturers, network providers, content providers etc.). Contrary to (industrial) economics, which assumes that “(f)irms compete only within a market, and it is their performance, within that market, relative to other firms, that determines their profitability”, the architectural advantage perspective focuses on the role of vertical competition and the way this affects the relative proportion of value (i.e. the ‘NPV of future profits’) that each segment captures, which may lead to important value shifts from one part of the value chain to another. The firms acquiring architectural advantage (the ‘kingpins’) take a central role in the overall industry architecture, influencing not only the segment they belong to but also multiple segments within a single industry or ecosystem⁵⁴¹.

However, acquiring a bottleneck is not the only way architectural advantage converts to abnormal profits. Focusing on the appropriation of value from other value chain participants makes sense if one conceptualizes competition (horizontal or vertical) as essentially a process taking place on product or technology markets or eco-systems and focusing on capturing value through the protection and/or leveraging of innovation. However, value may also be created by “investing in assets that will appreciate”⁵⁴² and will, thus, increase the market value of the firm from the perspective of financial markets. Jacobides et al. note how this “subtle shift of mindset from profit (and isolating mechanisms) to wealth creation (and the potential for asset appreciation)”, explains why an industry architect may favor imitation by competitors, even if this reduces profitability, provided this strategy of openness increases the value of the underlying assets⁵⁴³.

Box 4 Assessing market power in digital markets: Does access to personal data constitute an important source of market power?

BR CADE usually employs its traditional toolkit to assess market power in the digital economy. When it comes to multi-sided markets, although there is no explicit guide or legislation, there are some particularities that should be taken into consideration, as pointed out by the academic literature and past cases analysed by CADE. For example, interdependent groups of customers that a platform serves and how the uneven effects to these groups deriving from anticompetitive behaviour.

Further, the Brazilian NCA has been paying special attention at the use of data in a way that might unduly restrict competition by companies of the digital economy. In the case Google vs. Buscapé/Bondfaro, CADE discussed how big data has become a relevant competitive factor, enabling companies to leverage assets and to extract value from the data to which they have access, by selling information about consumers’ patterns and behavior to advertisement companies. In 2016, CADE analyzed a case in which Brazil's leading banks formed a joint venture for credit scoring. Credit scoring companies are multi-sided markets with strong network effects. Financial institutions are the main suppliers of inputs (information about

⁵⁴¹ *Ibid.*

⁵⁴² Jacobides et al., (115), 1201.

⁵⁴³ *Ibid*, 1212.

users' financial transactions) to credit bureaux, while they are also the main consumers of the bureaux's products (credit scores). Thus, CADE was concerned the operation would lead to vertical integration. In this case, CADE analyzed whether data (information about consumers) might act as an entry barrier. When data is also a source of market power, a dominant platform can leverage its userbase in order to prevent potential competitors to enter the market, which might lead to market foreclosure. CADE highlighted the risks of foreclosure in both the markets of positive and negative credit scoring, due to the great number of consumers' data held by the proposing banks. Accordingly, one of the remedies agreed by the parties was the commitment that the banks would continue providing data to all credit bureaux, with no discrimination or provision of favorable treatment to their own bureau.

Personal data about user's preferences and characteristics are crucial to inform the creation of content that is better tailored to people's interests and for the development of more efficient products and services. Information harvested by internet companies, thus, can contribute to the reduction of production costs and to quality improvement in such markets. In contrast, precisely because collection and processing of data are determinants of which companies can compete and thrive in digital markets, restrictions in access to data can often lead to a decrease in competition. Lack of data can prevent companies from building a critical database, or from offering goods and services at competitive levels, which makes them less likely to survive in data-driven markets, leading to a decrease in competition.

RU The FAS Russia was dealing with the concept of market power when considering the Bayer/Monsanto merger. Remedies for Bayer/Monsanto merger were drafted taking into account the big data (including the historical data) on climatic, soil and other conditions around the globe. The FAS Russia assumed that having the mentioned data is crucial for business successful development. That is why the FAS Russia ruled to provide non-discriminatory access to data for the Russian players of agro technological market. Also, the FAS Russia considered cases in relation to big corporations which has access to big amounts of personal data (Google, Apple, Microsoft). At the same time, up to the moment the access to personal data has never been an argument in the antitrust cases considered by the FAS Russia.

CN There are no cases so far concerning operators in the digital platform who enjoy "market power". According to Article 11 of the Interim Provisions on Prohibiting Abuse of Dominant Market Positions, which will be implemented on September 1, 2019, when determining whether the entity has a dominant position in digital economy, regards can be made to the competitive characteristics of relevant industry, business models, and number of users, network effects, lock-in effects, technical characteristics, market innovation, ability to master and process relevant data, and market power of entities in related markets.

Source: BRICS NCAs Questionnaire

6. Digital value chains as a new mapping tool in competition law: concept and metrics

A tool aiming to map the inter-firm networks on a global scale, the Global Value Chain (GVC) approach may also apply to explore a number of factors that may influence competitive interactions in the digital economy. We will refer to this specific application of the GVC approach as Digital Value Chains. Although the GVC tool was initially framed with the aim to assist policy-makers to design industrial strategies geared towards a greater participation of firms, active in their jurisdiction, to the global economy, its descriptive potential is wider. By exploring the sequences of tangible and intangible value adding activities, “from conception and production to end use”, GVC analysis offers a picture of global value creation and extraction both “from the top-down”, by examining for instance “how ‘lead firms ‘govern’ their global-scale affiliate and supplier networks”, but also from “the bottom-up”, asking “how these business decisions affect the trajectory of economic and social ‘upgrading’ or ‘downgrading’ in specific countries”⁵⁴⁴. We consider that the value chain approach may provide a quite useful tool in order to map horizontal and vertical competition in the context of the rapidly evolving digital economy, where various industrial structures begin to overlap. This process of convergence challenges the traditional definition of an industry by Michael Porter as ‘a group of companies offering products or services that are close substitutes for each other, that is, products or services that satisfy the same basic customers' needs’ and the emphasis put on industry borders that, it is often assumed, have already been drawn⁵⁴⁵. Although it has long been accepted that the concept of industry is not useful, as ‘(q)uestions relating to competition, monopoly and oligopoly must be considered in terms of markets’⁵⁴⁶, in the fast moving world of digital competition who is a competitor, an existing firm or potential competition is often quite difficult to determine. For this reason, and in order to map the complexity of the digital economy, and the various feedback loops in operation, it becomes essential to have recourse to new mapping tools, such as global value chains. These tools do not only serve the purpose of a better visualisation of the processes of horizontal and vertical competition. They also enable to better assess the bargaining asymmetries across the various segments of the value chain that may result either from the lack of competition on the markets affected or from the central position of some actors in the specific network and their positioning in the value chain. This tool may complete the market definition tool and brings to the centre of competition law enforcement the various dimensions of vertical (non-structural) power. We conclude with some suggestions as to the development of adequate metrics for vertical power, which if found to exist may trigger a more thorough competition law assessment of the specific business conduct.

⁵⁴⁴ G. Gereffi and K. Fernandez-Stark, *Global value Chain Analysis: A Primer* (CGGC: 2nd ed., 2016), p. 7

⁵⁴⁵ M. Porter, *Competitive Strategy* (Free Press, 1980)

⁵⁴⁶ J. Robinson, *The Industry and the Market*, (1956) 66(262) *The Economic Journal* 360, 361. See also, E. Chamberlin, *product Heterogeneity and Public Policy*, (1950) 40 *American Economic Review* (Papers & Proceedings) 85, 86-87 noting that “(i)ndustry’ or ‘commodity’ boundaries are a snare and a delusion – in the highest degree arbitrarily drawn, and wherever drawn, establishing at once wholly false implications both as to competition of substitutes within their limits, which supposedly stops at their borders, and as to the possibility of ruling on the presence or absence of oligopolistic forces by the simple device of counting the number of producers included”.

6.1. Digital Value Chains as a new mapping tool

This mapping approach examines various dimensions: (i) the input-output structure of a GVC, by focusing on the process of transformation of raw materials and factors of inputs of production to final products, (ii) the geographic scope of GVCs which explains the degree of global dispersion of the chain, (iii) the governance structure of the GVC, which delves into the issue of control of the chain, (iv) the upgrading, which describes “the dynamic movement within the value chain” and “how producers shift between different stages of the chain”, their aim being to move to higher added value activities, (v) the local (or global) institutional context in which the value chain is embedded, including regulation and self-regulation, (vi) industry stakeholders that may be various local (but also global) actors of the value chain that interact to achieve upgrading. These may not only be companies, but also industry associations, workers, educational or research institutions, government agencies and ministerial departments. All these actors are involved to a certain degree in the operation of the global value chains and influence their development.

The framework shares Michael Porter’s emphasis on “*value systems*” a concept that has been used in order to describe a set of inter-firm linkages through which different economic actors (and their value chains) are interconnected.⁵⁴⁷ GVC’s “holistic view” of global industries focuses on the governance of the value chain, that is, how some actors can shape the distribution of profits and risks in the chain. Taking a political economy perspective, the GVC approach explores the way economic actors may maintain or improve (“upgrade”) their position in the global value chain, “*economic upgrading*” being defined as “*the process by which economic actors—firms and workers— move from low-value to relatively high-value activities in GVC.*”⁵⁴⁸ There are different types of upgrading: some relate to the entry in the value chain, where firms participate for the first time in national, regional or global value chains, others to “end-market upgrading”, firms moving into more sophisticated markets that require compliance with new, more rigorous quality standards, or into larger markets that call for important investments in production scale⁵⁴⁹.

The tool has been increasingly used by competition authorities, in the context of market investigation references or sector enquiries⁵⁵⁰. The Furman report also recommended the completion of a market study by the CMA on the entire value chain of digital advertising (see Figure 4.20.). However, the tool has not been systematically used in infringement cases, most likely because of the emphasis put on horizontal competition and not vertical competition.

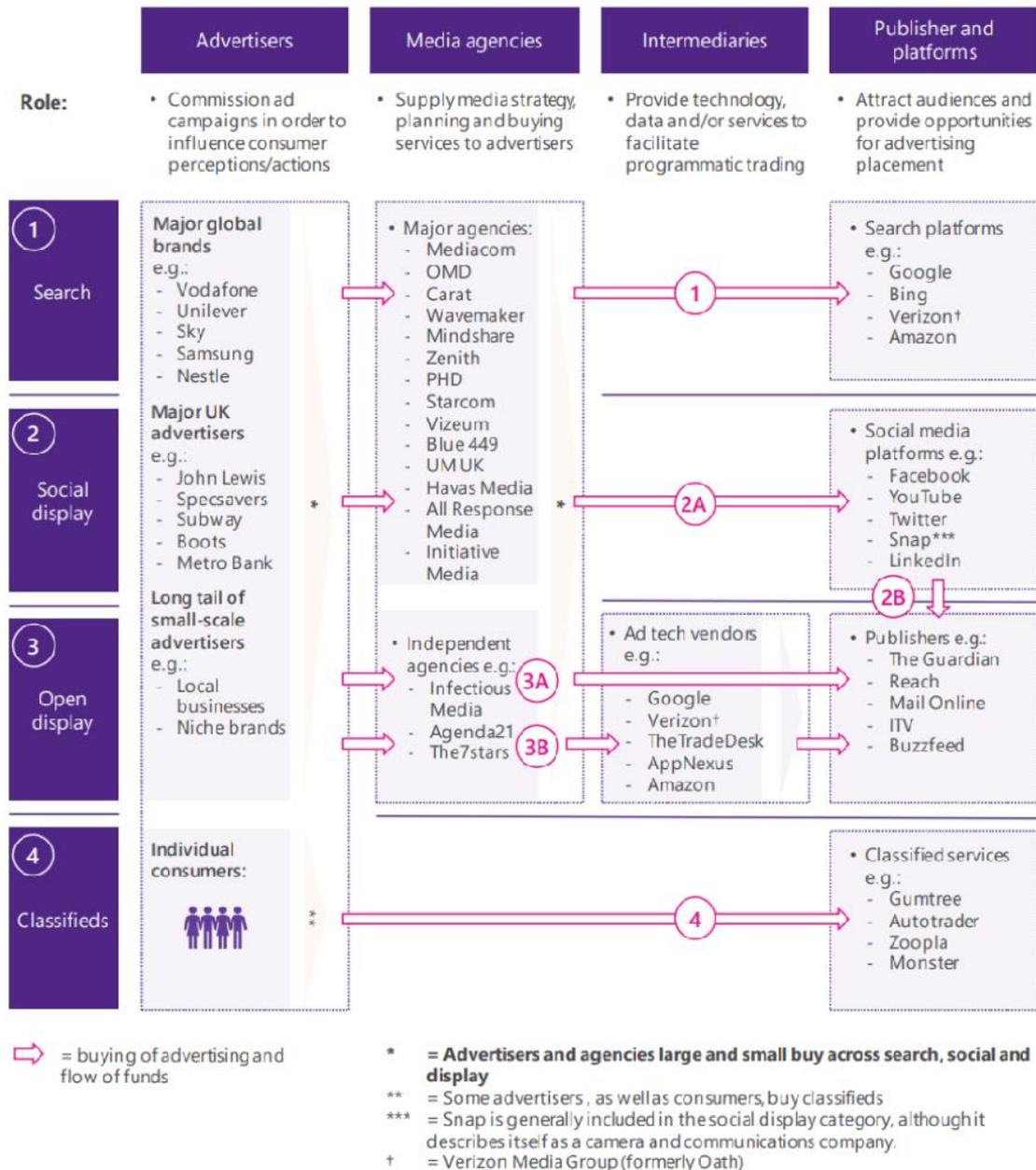
Figure 4.20. : The digital advertising value chain

⁵⁴⁷ M. Porter, *Competitive Advantage: Creating and Sustaining Superior Performance* (New York: Free Press, 1985).

⁵⁴⁸ G. Gereffi, Global value chains in a post-Washington Consensus world, (2014) 21(1) *Review of International Political Economy* 9-37, 18.

⁵⁴⁹ G. Gereffi and K. Fernandez-Stark, *Global value Chain Analysis: A Primer* (CGGC: 2nd ed., 2016), p. 12.

⁵⁵⁰ See, for instance, the Competition Commission of South Africa, *Data Market Inquiry Provisional Findings and Recommendations* (April 24, 2019), 25.



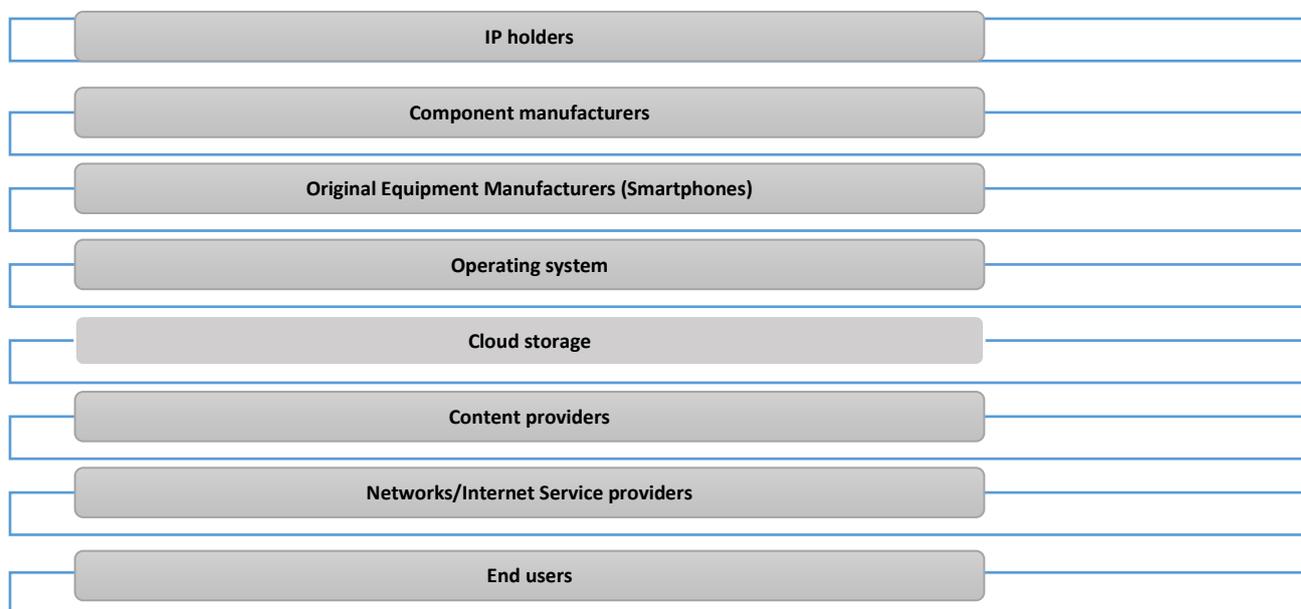
Source: Furman report, 14 (citing research completed by Plum Consulting).

The smartphone industry also provides an interesting area for value chain analysis. The following account shows an evolving connection between the physical and digital aspects of value chains; this connection has followed the transition from basic mobile phones to smartphones⁵⁵¹. Prior iterations of this value chain show a preference for a number of more or less vertically-integrated undertakings, including the design and assembly of the final product as well the software implementation.⁵⁵²

⁵⁵¹ Commission Staff Working Document, Online Platforms SWD(2016) 172 final, 23.

⁵⁵² J. Dedrick, K.L. Kraemer, G. Linden, The distribution of value in the mobile phone supply chain (2011) 35 Telecommunications Policy 505-21.

The dissection of the smartphone value chain into its segments is facilitated by loosely following a hardware/software division. This mirrors a ‘solution stack’ approach, which comprises of hardware (ie smartphone sub-components), device (the end-user machine), software (the operating system and other capabilities), services (cloud storage, navigation, etc) and content (apps). (see Figure 4.21.)⁵⁵³



For the present analysis, the smartphone value chain will be considered on the basis of three segments: smartphone manufacturing/assembly, software development, and distribution and network connectivity.⁵⁵⁴

The first segment, smartphone manufacturing and assembly, involves firms that are involved in the physical creation of the smartphone. Different value chains and ecosystems intersect this segment, involving for example the sourcing of the necessary input materials, or the production of certain hardware parts such as integrated circuits, memory chips, semiconductors, and cameras.⁵⁵⁵ In terms of components suppliers, there are some important players that affect this segment as a whole, including Qualcomm, Samsung Electronics, Intel, Texas Instruments.⁵⁵⁶

⁵⁵³ Commission Staff Working Document, Online Platforms SWD(2016) 172 final, 23; R. Manchiganti, On emerging business ecosystems in the mobile device industry; Evaluation of current and emerging mobile phone ecosystems, (2013) Massachusetts Institute of Technology. Retrieved from: <https://dspace.mit.edu/handle/1721.1/9069>.

⁵⁵⁴ See for example J. Lee & G. Gereffi, ‘The co-evolution of concentration in mobile phone global value chains and its impact on social upgrading in developing countries’ (2013) Capturing the Gains Working Paper 25 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2237510> ; A.T. Kearney, ‘The Internet Value Chain’ (GSMA, May 2016) <www.gsma.com/publicpolicy/internet-value-chain-study-economics-internet> .

⁵⁵⁵ M. Kenney & B. Pon, Structuring the Smartphone Industry: Is the Mobile Internet OS Platform the Key? (2011) 11(3) Journal of Industry, Competition and Trade 239-61, 241.

⁵⁵⁶ J. Ali-Yrkkö, P. Rouvinen, T. Seppälä, P. Ylä-Anttila, Who Captures Value in Global Supply Chains? (2011) ETLA Discussion Papers No 1240 <www.etla.fi/en/publications/dp1240-en/>.

The manufacture process proper involves a number of players, such as lead-firms (including two prominent companies like Samsung and Apple),⁵⁵⁷ electronic manufacturing services (EMS) firms (such as Foxconn and Flex), and original design manufacturers (ODM) firms.⁵⁵⁸ Although once focused on building their own devices, lead-firms started outsourcing this part of the process to EMSs and ODMs,⁵⁵⁹ providing instead “market knowledge, intellectual property” including a strong, reputable brand.⁵⁶⁰ On the other hand, EMSs and ODMs have also developed capabilities beyond assembly into component manufacturing and design of devices.⁵⁶¹ Different lead-firms have emerged in order to cater for different consumers, offering low-cost solutions or adopting online-only retail channels (as seen in Xiaomi).⁵⁶²

The second segment of the value chain is software development. Firms that affect this segment can be subdivided in three categories, according to whether they provide a smartphone operating system, standalone software, applications (apps) and their marketplaces.

Operating system (OS) firms deliver a core foundational technology at the base of the functionality of smartphone devices. Some of the crucial players in this category include Apple with its iOS and Google with Android.⁵⁶³ There are some differences in the business models of OS firms⁵⁶⁴:

- Manufacturer-built proprietary OSs are designed by developers who are also the lead-firm (Apple's iOS and the BlackBerry OS)
- Third-party proprietary OSs are designed by developers who license the OS, usually for a fee, to third-party hardware manufacturers (Microsoft's Windows OS)
- Open source OSs are designed by developers who release the OS via the open source license method (for eg Google Android)

In practice, the choice of whether to exploit the operating system has impacted other companies. Amazon and Xiaomi, for instance, have used open-source Android to build their own proprietary system above it, thereby adding an element of complexity to the operating system category.⁵⁶⁵

⁵⁵⁷ J. Lee & G. Gereffi, ‘The co-evolution of concentration in mobile phone global value chains and its impact on social upgrading in developing countries’ (2013) Capturing the Gains Working Paper 25 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2237510>

⁵⁵⁸ *ibid.*

⁵⁵⁹ *ibid.*

⁵⁶⁰ J. Dedrick, K.L. Kraemer, G. Linden, The distribution of value in the mobile phone supply chain (2011) 35 Telecommunications Policy 505, 507.

⁵⁶¹ J. Lee & G. Gereffi, ‘The co-evolution of concentration in mobile phone global value chains and its impact on social upgrading in developing countries’ (2013) Capturing the Gains Working Paper 25 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2237510>.

⁵⁶² A. Kharpal, What’s behind rapid rise of ‘China’s Apple’ Xiaomi? (CNBC, 22 December 2014) <www.cnbc.com/2014/12/22/whats-behind-rapid-rise-of-chinas-apple-xiaomi.html> .

⁵⁶³ B. Pon, T. Seppälä, M. Kenney, Android and the demise of operating system-based power: Firm strategy and platform control in the post-PC world (2014) 38 Telecommunications Policy 979-91.

⁵⁶⁴ Commission Staff Working Document, Online Platforms SWD(2016) 172 final, 24.

⁵⁶⁵ *ibid.*

Firms in the standalone software category provide software that is deemed necessary in smartphones. In the past, in particular, smartphone devices included such software as Adobe Systems' Acrobat Reader.⁵⁶⁶

Another important category of firms in this segment includes apps and their online marketplaces. An app is defined as a "standardised piece of software that runs on a computing platform,"⁵⁶⁷ that is provided over the internet and through centralised online marketplaces.⁵⁶⁸ Thus, apps are surrounded by a whole ecosystem of actors such as developers and network operators, each playing an important role. Network operators, for example, may preload a particular app marketplace on models of smartphones they sell.⁵⁶⁹ Apps marketplaces, (including the likes of App Store, Google Play, or Windows Phone Store) vary in terms of their exclusivity to a particular operating system and revenue models. Users of Apple and Windows, for example, need to get their app content through the dedicated marketplace; conversely users of Google can use the official Google Play as well as other important marketplaces (Amazon, Xiaomi, GetJar).⁵⁷⁰ Certain app marketplaces are also offering apps, designed in the latest markup languages to present content, in order to be more "OS-agnostic" and fit in different operating systems.⁵⁷¹ In terms of revenue, a number of apps marketplaces (such as Google Play and App Store) adopt a revenue-sharing model, whereby a share ca. 70% is normally passed to developers.⁵⁷²

The third segment of the value chain is distribution and network connectivity. The principal firms in this segment are network operators, who have the double function of distribution/sale of smartphone devices as well as operating their connectivity to the infrastructural network.⁵⁷³

The first function is illustrated by the combination of subsidisation of smartphones devices, customer locked SIM cards, and device exclusivity.⁵⁷⁴ The subsidisation is then recouped through a contract that provides for a monthly subscription fee.⁵⁷⁵ The second function, instead, does not include only voice and message services but also connectivity for the delivery and support of apps, which in turn rely on a stable and reliable service.⁵⁷⁶ The

⁵⁶⁶ J. Ali-Yrkkö, P. Rouvinen, T. Seppälä, P. Ylä-Anttila, Who Captures Value in Global Supply Chains? (2011) ETLA Discussion Papers No 1240 <www.etla.fi/en/publications/dp1240-en/>.

⁵⁶⁷ OECD, 'The App Economy' (2013) OECD Digital Economy Papers No 230, 8 <www.oecd-ilibrary.org/science-and-technology/the-app-economy_5k3ttftlv95k-en> ('The App Economy').

● ⁵⁶⁸ B. Pon T. Seppälä, M. Kenney, 'One Ring to Unite Them All: Convergence, the Smartphone, and the Cloud' (2015) 15 Journal of Industry, Competition and Trade 21-33; OECD, 'The App Economy', 8.

⁵⁶⁹ Ibid..

⁵⁷⁰ Ibid.

⁵⁷¹ Ibid.

⁵⁷² J. Oh, B. Koh & S. Raghunathan, 'Value appropriation between the platform provider and app developers in mobile platform mediated networks' (2015) 30 Journal of Information Technology 245–59.

⁵⁷³ M. Kenney & B. Pon, Structuring the Smartphone Industry: Is the Mobile Internet OS Platform the Key? (2011) 11(3) Journal of Industry, Competition and Trade 239-61; A.T. Kearney, 'The Internet Value Chain' (GSMA, May 2016) <www.gsma.com/publicpolicy/internet-value-chain-study-economics-internet>.

⁵⁷⁴ GSMA Intelligence, 'Understanding SIM evolution' (GSMA Intelligence, March 2015) <www.gsmaintelligence.com/research/2015/03/understanding-sim-evolution/499/>; Dedrick, K.L. Kraemer, G. Linden, The distribution of value in the mobile phone supply chain (2011) 35 Telecommunications Policy 505.

⁵⁷⁵ M. Kenney & B. Pon, Structuring the Smartphone Industry: Is the Mobile Internet OS Platform the Key? (2011) 11(3) Journal of Industry, Competition and Trade 239-61.

⁵⁷⁶ OECD, 'The App Economy' (2013) OECD Digital Economy Papers No 230, 8 <www.oecd-ilibrary.org/science-and-technology/the-app-economy_5k3ttftlv95k-en> ('The App Economy').

network operators that also control the network infrastructure are entrusted with the management and prioritisation of streams of data – an issue that has been flagged as raising potential network neutrality considerations.⁵⁷⁷ Companies that operate in this segment include established players (such as Telefonica, TMobile, Verizon Wireless, China Mobile) as well as more recent entrants, including MVNOs and other companies (like Google) who have made investments in wireless and fibre optic cable.⁵⁷⁸

The issue of value extraction in the smartphone value chain is multifaceted, with many aspects and recent developments that have somewhat confused the picture.

In terms of the smartphone manufacture/assembly, lead-firms tend to extract a greater share as they control intellectual property, design, branding and all other high-value aspects.⁵⁷⁹ This is to the detriment of contract manufacturers or outsourcing companies that merely provide assembly.⁵⁸⁰ However, two relevant trends have emerged in recent times that may contradict this illustration. First, convergence in handsets design and specifications could mean that outside of the top-two lead-firms (Apple and Samsung), competing companies could struggle in extracting higher shares, particularly if they are “hardware-centric.”⁵⁸¹ Secondly, contract manufacture companies have moved to extract greater value through vertical integration, by specialising in component manufacturing and higher-value elements such as design; an instance of this is Foxconn that now provides an array of services to a significant number of lead-firms.⁵⁸²

One solution that some firms in this segment have adopted to recapture value is the operation of a “hardware-software unit”. Although not universally accepted (as seen by Google’s sale of Motorola Mobility after acquiring it three years prior)⁵⁸³ this solution suggests an important consideration: understanding how value is distributed requires the adoption of a multi-segment view of the value chain.

⁵⁷⁷ N. Van Gorp & O. Bottura, ‘Challenges for Competition Policy in a Digitalised Economy’ (European Parliament, July 2015) 24 <[www.europarl.europa.eu/thinktank/en/document.html?reference=IPOL_STU\(2015\)542235](http://www.europarl.europa.eu/thinktank/en/document.html?reference=IPOL_STU(2015)542235)>; OECD, ‘The App Economy’ (2013) OECD Digital Economy Papers No 230, 8 <www.oecd-ilibrary.org/science-and-technology/the-app-economy_5k3ttftlv95k-en> (‘The App Economy’); B. Pon T. Seppälä, M. Kenney, ‘One Ring to Unite Them All: Convergence, the Smartphone, and the Cloud’ (2015) 15 Journal of Industry, Competition and Trade 21-33, 29.

⁵⁷⁸ A.T. Kearney, ‘The Internet Value Chain’ (GSMA, May 2016) <www.gsma.com/publicpolicy/internet-value-chain-study-economics-internet>; B. Pon T. Seppälä, M. Kenney, ‘One Ring to Unite Them All: Convergence, the Smartphone, and the Cloud’ (2015) 15 Journal of Industry, Competition and Trade 21-33.

⁵⁷⁹ J. Lee & G. Gereffi, ‘The co-evolution of concentration in mobile phone global value chains and its impact on social upgrading in developing countries,’ (2013) Capturing the Gains Working Paper 25 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2237510>;

⁵⁸⁰ N. Shin, K.L. Kraemer & J. Dedrick, ‘Value Capture in the Global Electronics Industry: Empirical Evidence for the “Smiling Curve” Concept,’ (2012) 19(2) Industry and Innovation 89-107.

⁵⁸¹ Commission Staff Working Document, Online Platforms SWD(2016) 172 final, 22 ; B. Pon T. Seppälä, M. Kenney, ‘One Ring to Unite Them All: Convergence, the Smartphone, and the Cloud’ (2015) 15 Journal of Industry, Competition and Trade 21-33; J. Russell, ‘Xiaomi stops disclosing annual sales figures as CEO admits the company grew too fast’ (*TechCrunch*, 11 January 2017) <<https://techcrunch.com/2017/01/11/xiaomi-2016-to-2017/>>;

⁵⁸² J. Lee & G. Gereffi, ‘The co-evolution of concentration in mobile phone global value chains and its impact on social upgrading in developing countries’ (2013) Capturing the Gains Working Paper 25 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2237510>; Dedrick, K.L. Kraemer, G. Linden, ‘The distribution of value in the mobile phone supply chain’ (2011) 35 Telecommunications Policy 505.

⁵⁸³ B. Pon T. Seppälä, M. Kenney, ‘One Ring to Unite Them All: Convergence, the Smartphone, and the Cloud’ (2015) 15 Journal of Industry, Competition and Trade 21-33.

Platforms (like Microsoft, Google, and Apple) have managed to operate as multi-sides markets, extracting value by developing ecosystems that span across device, operating system and app marketplace, and thereby attracting “a range of complementors such as app developers, network operators, and device manufacturers.”⁵⁸⁴ The control of these different elements has given platforms the flexibility to use them in the way they see most advantageous, locking-in firms in the various segments of the value chain, and benefiting from a mix of direct and indirect network effects as well as single-homing.⁵⁸⁵ In practice, one can see the realization of this strategy by looking at two diverging models.

- On one side, Apple has opted to retain full control over the value chain, including hardware components, design, OS, app store, apps and “associated services (music, books, maps, mail, calendar, cloud storage, messaging, video calls).”⁵⁸⁶
- On the other side, Google has adopted an open-source, freely licensed model in respect of the Android OS. This approach has made the Android operating system popular with many smartphone lead-firms, while giving control to Google with regards to device certification (Android Compatibility Program).⁵⁸⁷ This in turn has hindered other operating system firms (Windows Phone, Firefox, Tizen, and Ubuntu)⁵⁸⁸ by limiting their business model or access to smartphone devices. At the same time however, Google has managed to retain control of the Android APIs benefiting the proprietary version of Android, limiting the connectivity value of the fully open source Android.⁵⁸⁹

In terms of how network operators extract value in the value chain, a number of factors have emerged in recent years. Network operators have had a key role in the distribution and sale of smartphone devices.⁵⁹⁰ Moreover, network providers (especially those with connectivity infrastructure) have featured, to a greater or lesser extent, flexibility and control in managing data streams.⁵⁹¹

Nonetheless, exclusivity contracts between network operators and popular smartphone devices have also resulted in network operators handing over significant rates in revenue-sharing plans to platforms or smartphone lead-firms;⁵⁹² moreover there have been cases suggesting that exclusivity now features less in relation to leading smartphones.⁵⁹³ On the connectivity side, emerging apps and consumer preferences for content over the Internet have

⁵⁸⁴ Ibid; Commission Staff Working Document, Online Platforms, SWD(2016) 172 final, 22-25.

⁵⁸⁵ See for example Commission Staff Working Document, Online Platforms SWD(2016) 172 final, 5, 24-25.

⁵⁸⁶ Commission Staff Working Document, Online Platforms SWD(2016) 172 final, 26.

⁵⁸⁷ B. Pon T. Seppälä, M. Kenney, ‘One Ring to Unite Them All: Convergence, the Smartphone, and the Cloud’ (2015) 15 *Journal of Industry, Competition and Trade* 21-33.

⁵⁸⁸ Ibid.

⁵⁸⁹ Ibid.

⁵⁹⁰ J. Lee & G. Gereffi, ‘The co-evolution of concentration in mobile phone global value chains and its impact on social upgrading in developing countries’ (2013) *Capturing the Gains Working Paper* 25 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2237510>.; Dedrick, K.L. Kraemer, G. Linden, *The distribution of value in the mobile phone supply chain* (2011) 35 *Telecommunications Policy* 505, .

⁵⁹¹ N. Van Gorp & O. Bottura, ‘Challenges for Competition Policy in a Digitalised Economy’ (European Parliament, July 2015) 24 <[www.europarl.europa.eu/thinktank/en/document.html?reference=IPOL_STU\(2015\)542235](http://www.europarl.europa.eu/thinktank/en/document.html?reference=IPOL_STU(2015)542235)> .

⁵⁹² A. Becker et al., ‘Aggregated Survey of Sustainable Business Models for Agile Mobile Service Delivery Platforms’ (2012) 4 *Journal of Service Science Research* 97-121.

⁵⁹³ Nextgen Clearing, ‘Partnering for the future’ (Nextgen Clearing, 2015) <www.nextgenclearing.com/about-us/thought-leadership/16-partnering-for-the-future> ; GSMA Intelligence (fn 143).

resulted in less control by network operators over the service that is provided to users, and this has affected the revenue streams of these companies.⁵⁹⁴

Finally, one should note how Google and Apple may also have a greater impact on the role and value-extraction by network operators. Google has invested in connectivity infrastructure, perhaps with a view to decrease reliance on 3rd party networks,⁵⁹⁵ and both companies have individually invested on innovations that allow customers greater mobile network flexibility such as MVNO Project Fi (in the case of Google) and Apple SIM.⁵⁹⁶

M&A transactions in the smartphone value chain have provided consolidation in some segments more than others. In respect of smartphone manufacture and assembly, some of the noteworthy acquisitions include Google's acquisition of Motorola, then sold to Lenovo.⁵⁹⁷ Outside of such transactions, there has been a high level of market concentration in the case of two top lead-firms (Samsung and Apple), coupled however with dynamic and innovative smaller competitors (as Huawei, Oppo).⁵⁹⁸ The consolidation of lead-firms has in turn resulted in the consolidation for the other companies that supply them with important services, such as EMS and ODM.⁵⁹⁹

In the segment of distribution and network connectivity, one can also see a trend towards consolidation, particularly on a more national geographical level.⁶⁰⁰ Examples of this include the acquisition by Three of O2 in Ireland, and that by O2 of E-Plus in Germany, both resulting in the decrease of significant wholesale network operators in those countries.⁶⁰¹ Furthermore, there have been transactions involving fixed and mobile operators, including the purchase by Liberty Global of Base in Belgium.⁶⁰²

Data-driven business models feature strongly in some segments of the smartphone value chain. Big Data drives revenue streams connected to advertising through a number of different channels, including engine search, display ads and in-app advertising.⁶⁰³ An interesting example is Google, which offsets any costs of providing free access to Android by

⁵⁹⁴ A. Becker et al., 'Aggregated Survey of Sustainable Business Models for Agile Mobile Service Delivery Platforms' (2012) 4 *Journal of Service Science Research* 97-121; Nextgen Clearing, 'Partnering for the future' (Nextgen Clearing, 2015) <www.nextgenclearing.com/about-us/thought-leadership/16-partnering-for-the-future>.

⁵⁹⁵ B. Pon T. Seppälä, M. Kenney, 'One Ring to Unite Them All: Convergence, the Smartphone, and the Cloud' (2015) 15 *Journal of Industry, Competition and Trade* 21-33.

⁵⁹⁶ Nextgen Clearing, 'Partnering for the future' (Nextgen Clearing, 2015) <www.nextgenclearing.com/about-us/thought-leadership/16-partnering-for-the-future> .

⁵⁹⁷ B. Pon T. Seppälä, M. Kenney, 'One Ring to Unite Them All: Convergence, the Smartphone, and the Cloud' (2015) 15 *Journal of Industry, Competition and Trade* 21-33.

⁵⁹⁸ G. Cecere, N. Corrocher & R.T. Battaglia, 'Innovation and competition in the smartphone industry: Is there a dominant design?' (2015) 39 *Telecommunications Policy* 162-75.

⁵⁹⁹ J. Lee & G. Gereffi, 'The co-evolution of concentration in mobile phone global value chains and its impact on social upgrading in developing countries' (2013) *Capturing the Gains Working Paper* 25 <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2237510>.

⁶⁰⁰ A.T. Kearney, 'The Internet Value Chain' (GSMA, May 2016) <www.gsma.com/publicpolicy/internet-value-chain-study-economics-internet>.

⁶⁰¹ OECD, 'Digital Convergence and Beyond' (2016) *OECD Digital Economy Papers No 251* <www.oecd-ilibrary.org/science-and-technology/digital-convergence-and-beyond_5j1wvzzj5wv1-en> .

⁶⁰² *Ibid.*

⁶⁰³ A.T. Kearney, 'The Internet Value Chain' (GSMA, May 2016) <www.gsma.com/publicpolicy/internet-value-chain-study-economics-internet>.

means of advertising revenue obtained, for instance, in the Google Play app marketplace.⁶⁰⁴ A similar approach, although different with regards to the availability of the operating system, is followed by Apple.⁶⁰⁵

Platforms operate as multi-sided markets that combine different smartphone services and engage collect data in order to create “robust user profiles.”⁶⁰⁶ For instance, the use of online marketplaces to download apps enables the storage of information on the types of apps downloaded, the smartphone, language and so forth.⁶⁰⁷ Coordination and integration of the user’s profile is also assisted by provisions of other services, as shown by the interaction of Google’s Gmail, Maps, Drive and Wallet.⁶⁰⁸

Network operators can also potentially build user profiles, through billing information and data, provided that smartphone transactions are managed directly by network operator rather than other intermediaries.⁶⁰⁹ Purchasing, billing and other consumer behavior data is also used by companies in other segments of the smartphone value chain, like of Amazon, where they can integrate user’s profiles with their proprietary technological innovations (such as recommendation engine).⁶¹⁰

6.2. Vertical power: metrics

As we have already explained in Section 5.3., there have been many different names to refer to vertical power, perhaps because of disagreements as to how the different dimensions of vertical power may be integrated in competition law assessment, there has been paucity of systematic research on metrics of vertical power. This becomes particularly important in the context of the digital economy, and in particular in order to decide in which instances to trigger competition law intervention for conduct adopted by digital platforms that harms their suppliers, or the members of their ecosystems, and which may also cause consumer harm, or other social costs, as the traditional filter and metrics of market power may only provide part of the picture and does not, as we have explained in Section 5.2., cover all instances in which vertical power may not be structural and still cause concern.

We regroup in Table 2, the different approaches of vertical power by reference to the theoretical framework that has led to the definition of the specific type of vertical power we examine. One should be cautious to infer any possible anticompetitive effects from such vertical power. We distinguish two steps in the analysis, the first concerns the existence and exercise of some form of vertical power and the development of a filter that may indicate that the issue may be worthy of further competition investigation, with regard to the possible strategies and outcomes, the second consists in assessing the likely outcomes and potential social costs of a specific practice that may result from the restriction of horizontal or vertical competition and/or of a restriction of inter-platform or intra-platform competition.

⁶⁰⁴ OECD, ‘The App Economy’; B. Pon T. Seppälä, M. Kenney, ‘One Ring to Unite Them All: Convergence, the Smartphone, and the Cloud’ (2015) 15 *Journal of Industry, Competition and Trade* 21-33.

⁶⁰⁵ OECD, ‘The App Economy’.

⁶⁰⁶ Pon and others.

⁶⁰⁷ Pon and others.

⁶⁰⁸ *ibid.*

⁶⁰⁹ *ibid.*

⁶¹⁰ *ibid.*

Table 3: Features of Vertical Power Theories

Power family	Type of power	Source of power	Modality of power exertion	Scope of power sourcing exertion	Existence of standard metrics or modelling
Process-based	Process-based	Capacity to apply credible sanctions that affect another agent's gains	Credible sanctions that affect another agent's gains	Vertical and horizontal	Yes
Resource dependence	Standard market power	Market structure	Affecting equilibrium quantities or prices in a market	Vertical and horizontal	Yes
Resource dependence	Exclusionary/bottleneck	Supply-side (e.g. an essential facility or input, a technology) and demand-side (e.g. high switching costs, strong positive network effects) conditions creating a bottleneck	Exclusion from the bottleneck resource	Vertical	Yes
Resource dependence	Social exchange theory	Differential dependency between value co-creators	Obtaining a high share of the co-created value	Fully vertical	No

			through bargaining		
Positional	Panopticon	A position in the network of value co-creation that allows to collect valuable information	Strategic use of the information to obtain a higher share of value	Fully vertical	No
Positional	Architectural	Capacity to influence the industry architecture by affecting at least one of its interphases (technological, institutional, social)	Influencing the industry architecture to obtain a higher share of the value created in the industry	Fully vertical	No

Source: B. Carbala & I. Lianos, *Vertical Power: Theory and Metrics* (forth. CLES Research Paper Series, 2019)

We discuss in a separate paper different metrics for the specific types of vertical power we have examined in Section 5.3⁶¹¹.

First, we provide a metric of resource-based vertical power based on differential dependency. These metrics correspond to situations of 'resourced-based' differential dependency (i.e. dependency not depending on ownership or market shares, but only on how essential the firm is to the value chain). We have developed the indicator at the firm and at the value chain level, as we consider that both levels are important for the competition assessment, in particular of practices limiting intra-platform and vertical competition.

Second, we provide a metric of resource-based vertical power based on differential dependency, this time looking at what is often omitted by traditional competition law focusing on product markets, but which has to be incorporated in competition law if one takes financialisation seriously. We consider the ownership structure as a source of dependency within a value chain. As we explore in two different papers, the ownership structure may become a source of intra-value chain dependency⁶¹².

⁶¹¹ This research forms part of a large common project between Bruno Carbala and Ioannis Lianos on *Vertical Power: Concept and Metrics*. The thoughts shared in this Report are subject to further research and revision. See, B. Carbala & I. Lianos, *Vertical Power: Concept and Metrics* (forth. CLES Research Paper).

⁶¹² See, I. Lianos, A. Velias, D. Katalevsky & G. Ovchinnikov, Financialisation of the Global Food Value Chain: Implications for Competition Law, in I. Lianos, D. Davis & A. Ivanov (eds.) *Competition law and the Global*

Finally, we are working on a metric of panopticon power that engages with the type of concern that may arise out of structural holes and brokerage in the context of a more general "information-intensive" value chain.

6.3. A roadmap for the future

It results from the above that mainstream competition law may not always constitute an adequate tool to deal with the market failures that may Digital markets present some of the characteristics of a natural monopoly, in particular the configuration of high fixed costs and low to zero marginal costs, and are often marked by strong network effects that lead to 'winner takes most' dynamics. In conjunction with learning by-doing effects and increasing returns to scale, network effects enable digital platforms to easily leverage their power across markets through different exclusionary strategies (e.g. making the technical standards of the platform incompatible with apps developed by competitors or with apps that may commoditise the platform, bundling and other pricing strategies, or non-price discrimination strategies that may raise rivals' costs). The race to be a dominant firm in a network industry may increase the possibility of a lock-in to a technology which, when decisions taken in every period, looks optimal given past decisions, but is sub-optimal if decisions are delayed and all the decisions are taken at once. Hence, although the specific standard may appear efficient, from a static perspective, it may lack in dynamic efficiency.

Furthermore, in markets with strong network effects, once few firms are in operation, the addition of new competitors, even under free entry, does not change the market structure in any significant way. Although eliminating barriers to entry can encourage inter-platform competition, the resulting competition may not significantly affect market structure. Hence, it is possible that competition authorities may not be able to significantly affect market *structure* by eliminating barriers to entry.

One may face similar difficulties with regard to promoting intra-platform or vertical competition. The criticism often addressed to digital platforms⁶¹³, is that they seem to capture the most important part of the surplus value brought by digital innovation. However, the current tools of competition law seem to only focus on horizontal competition rather than vertical competition and the distribution of surplus value, thus excluding vertical fairness issues from the competition assessment. The only vertical issue explored is that of the allocation of surplus between consumers and producers, but again in the traditional NPT approach this is perceived from the angle of Kaldor Hicks efficiency and is cause of concern only when it reduces the level and/or quality of output. There are different strategies one may adopt in order to promote intra-platform competition. Non-discrimination or neutrality enhancing policies, or policies against abusive termination from the platform may limit the risks of self-preferencing and foreclosure, while access duties to the parts of the platform that may be considered as 'essential facilities' could protect the ability of the platform's partners to develop competing offers (to

Food Value Chain(s), (Cambridge University Press, *forthcoming 2019); B. Carbala & I. Lianos, Vertical power: concept and metrics (forth. CLES Research Paper 2019).

⁶¹³ See Australian Competition and Consumer Commission, *Digital Platforms Inquiry: Preliminary report* (Commonwealth of Australia 2018); Valerio de Stefano and Antonio, *European legal framework for "digital labour platforms"* (European Union 2018).

those of the platform's subsidiaries) in the other segments of the digital value chain. One may also think of the constitution of institutions with countervailing powers, such as unions of Google users, trade unions representing gig self-employed, such as Netflix artists and Uber drivers, or cartels of media companies, which would have the possibility to collectively bargain with the digital platforms and tame their power. The role of competition law will be in this case not to jeopardise the development of these countervailing powers by exempting horizontal cooperation that has this purpose. Such an option may nevertheless backfire and produce important costs without having any assurance that could be outweighed by any potential benefits.

Hence, if the traditional competition law approach does not work, what are the other available options?

Utilities-style regulation: If we accept that competition may not work in these natural monopoly-like markets, would that be an argument in favour of adopting a pervasive utilities-like regulation? There are different options if the specific digital platform may be considered as a natural monopoly. First, allow the monopoly to maximize profits by producing at the monopoly level. This would however result in a deadweight loss (loss of consumer and producer surplus). Second, it is possible to require the monopoly to set its price where the average cost curve crosses the demand curve. This transfers some surplus from the monopoly to the consumers, expands output, increases social surplus, and reduces deadweight loss. Third, the natural monopoly may be required to set its price where the marginal cost curve crosses the demand curve. This eliminates deadweight loss but revenues no longer cover costs. As a result, tax money must be used to subsidize the production of the good. Finally, the natural monopoly may be obliged to charge a zero price. This also results in a deadweight loss and causes costs to exceed revenues, necessitating subsidies.

Some of the digital platforms may be considered as presenting the characteristics of a natural monopoly to the extent that entry into the industry requires high fixed costs and the industry also faces declining average costs, once the 'entry fee' (fixed costs of production) into the industry is paid. In the context of natural monopolies, the core issue is always the number of firms a powerful and omniscient planner would have in the market. In natural monopolies, the quantity of the good can be produced at the lowest cost by having a single firm. In this context, the monopolist will reduce output, which will lead to deadweight loss. However, digital platforms are not a natural monopoly like any other, as in contrast to natural monopolies in the utilities' sector, they do not face a declining marginal revenue when they grow their production. The reason for that is the important increasing returns to scale and learning-by-doing effects, as well as the incentives provided to them by their valuation by financial markets (financialisation) to grow eternally. The important thing to have in mind though here is the type of 'output' produced by some of these digital platforms. For matching platforms, the output can be determined as the number of matches effectuated (e.g. for dating platforms could be the number of dates, for search engines it would be the number of searches), but most of this 'output' is actually related to the facilitation of transactions. This may be considered as 'output' (transactional output) but again it is not clear how this intangible output may be factored in the framework of natural monopoly that has been merely developed in the context of the tangible economy. Platforms are not also producing data but harvesting data. Could data be considered

as the output? If this is the case, one may wonder if there would be reason to value such increase in the harvesting of data, if this has negative effects on attention, a scarce resource, or produces externalities to other users (reducing their privacy) though the learning effects produced in terms of the platform being able to make more accurate prediction for users who have only consented to a limited harvesting of their data and for whom data may be largely unavailable. Hence, there may be reasons a policy maker might decide to control the exercise of socially undesirable market power by the natural monopoly.

How utilities-like regulation may work in practice for digital platforms? First, it might take the form of rate regulation. One may calculate the rate that would allow a digital platform to cover its total cost plus a fair rate of return on investments, or can impose a price-cap regulation and ceilings on the increase in prices over the ‘money’ side of the platform. Such ‘rate’ regulation may also work in the context of the subsidised side, as platforms may be required to offer positive price to the users (eg. rewards), or eventually forcing the digital platforms to adopt a different business model (e.g. move from an advertised-base model to a subscription or royalties-based model)⁶¹⁴.

A second option is to choose non-price regulation in order to limit externalities resulting from the incentive of the digital platforms to grow (and thus increase their market valuation) by harvesting even more personal data, or capturing an even higher percentage of the attention of their users. It would be possible in these cases to limit their output, in terms of data harvested or attention-grabbing advertising. As Pigou explained, “(i)n an industry, where there is reason to believe that the free play of self-interest will cause an amount of resources to be invested different from the amount that is required in the best interest of the national dividend, there is a *prima facie* case for public intervention”⁶¹⁵ One may possibly determine the socially optimal output (in the context of attention markets), for instance the number of ad-slots that should be available on a general search page. However, this type of regulation may also face important difficulties, in particular in order to determine the appropriate rate of return for the digital platform. Of course, there is the theoretical possibility of replacing competition in the market with competition for the market, by enabling the government to auction off a monopoly franchise contracts in order to deliver the functionalities provided by digital platforms⁶¹⁶. The boundaries of the markets to be auctioned are nevertheless notoriously vague and rapidly evolving in the dynamic context of digitalisation. As Richard Posner also noted a few decades ago, even if governments make the choice of an auction, the incumbent will have a cost advantage and in reality the auction will be a re-negotiation with the incumbent⁶¹⁷. Historical experience teaches us that even if administered contracts (such as franchises) following an auction are the best solution, this often evolves towards full-fledged regulation⁶¹⁸.

Soft or light-touch regulation: Another option would be to adopt some light touch regulation of the way platforms organise their relations with the businesses that are part of their

⁶¹⁴ This is possibly one of the implications of the remedial package finally agreed in the recent Commission’s decision concerning Google Shopping:

⁶¹⁵ A.C. Pigou: *The Economics of Welfare*, (Macmillan & Co., 1932), 331.

⁶¹⁶ For a classic discussion, see H. Demsetz, *Why Regulate Utilities?*, (1968) 11 *Journal of Law & Economics* 55.

⁶¹⁷ R. Posner, *Natural Monopoly and its Regulation*, (1969) 21 *Stan. L. Rev.* 548.

⁶¹⁸ See, the discussion in G. L. Priest, *The Origins of Utility Regulation and the “Theories of Regulation” Debate*, (1993) 36 *J.L. & Econ.* 289.

ecosystem, eventually by adopting a code of conduct for digital platform, or some more binding form of public regulation. This is the option put forward by the European Commission in the recently adopted *Platform to business regulation*, where a number of duties of non-discrimination and transparency were imposed to most digital platforms, irrespective from the fact they have, or not, market power⁶¹⁹. One may also refer to the recent proposals of the Furman Commission to impose to digital platforms with a ‘strategic market status’ to implement a code of conduct. This would result from a concerted effort of the digital platforms and unidentified “stakeholders”, and would complement antitrust enforcement with a clearer and more easily applied set of standards defining the boundaries of undesirable conduct in digital markets⁶²⁰. One may contrast this ‘soft law’ approach with the more ‘hard law’ implementation of the abuse of dominance or monopoly provisions in order to ensure that digital platforms do not limit intra-platform or vertical competition. There are different reasons that may operate as justifications for such an approach. The one put forward by the recent European panel of experts Report is that (at least dominant) digital platforms ‘play a form of regulatory role as they determine the rules according to which their users, including consumers, business users and providers of complementary services, interact, and, when they are dominant, have a responsibility to ensure that competition on their platforms is fair, unbiased, and pro-users’⁶²¹. Hence, ‘to the extent that the platform performs a regulatory function, it should bear the burden of proving that self-preferencing has no long-run exclusionary effects on product markets’⁶²². As it is noted in the EU report, ‘(d)ominant platforms have “regulatory power” and have a responsibility to use that power in a pro-competitive manner’⁶²³.

Property rights on data: One may also argue that we need to create the missing data markets by establishing property rights for data and providing each individual the possibility to transfer and sell this data. The recent GDPR data portability right provides an illustration of the introduction of some property rights’ logic, but of course one may push this further, for instance by treating the use of a search engine and the facilitation (active or passive) of data harvesting as a form of labour contributing to the surplus value generated by the digital value chain that has to be compensated⁶²⁴. The State could organise the process of commodification of human consciousness that will enable all citizens to at least benefit from some of the value generated by their data. Such an approach may increase the resources available for the less well-off who can now sell their own data and use them as collateral. However, this will not solve the problem of the structural inequality between those controlling these digital platforms and the rest of the population, in particular if the digital platforms do not face effective competition and

⁶¹⁹ On February 13th, 2019, the European Parliament, the Council of the European Union and the European Commission reached a political deal on a Proposal for an EU Regulation on promoting fairness and transparency for business users of online intermediation services (April 2018), available at <https://ec.europa.eu/digital-single-market/en/news/regulation-promoting-fairness-and-transparency-business-users-online-intermediation-services>.

⁶²⁰ Furman Report, 57-63. Designing a code of conduct has also been proposed by the Japanese competition authorities, see Japan Fair Trade Commission, *Interim Discussion Paper: Improvement of Trading Environment surrounding Digital Platforms* (December 2018), 6-8.

⁶²¹ European Panel of Experts Report (2019), 6.

⁶²² *Ibid.*, 12.

⁶²³ *Ibid.*, 16

⁶²⁴ For such a suggestion, see I. Arrieta Ibarra, L. Goff, D. Jiménez Hernández, J. Lanier & G. E. Weyl, Should We Treat Data as Labor? Moving Beyond 'Free' (December 27, 2017). American Economic Association Papers & Proceedings, Vol. 1, No. 1, Forthcoming. Available at SSRN: <https://ssrn.com/abstract=3093683>.

consumers are unable to switch easily and port their data or other data-related inputs. Such an approach may receive the blessings of prioritarians who are ready to give priority to the less well-off instead of caring about equal distribution itself, but it would certainly be considered as problematic for egalitarians who put an intrinsic value on equality of distribution.

Natural resources regulation: Some jurisdictions take this propertization logic to the next level. For instance, the recent national e-commerce policy in India, proclaims that the data that is generated in India belongs to Indians as do the derivatives there from, It takes a natural resources view by claiming that

‘(t)he data of a country, therefore, is best thought of a collective resource, a national asset, that the government holds in trust, but rights to which can be permitted. The analogy of a mine of natural resource or spectrum works here” and that “India and its citizens have a sovereign right to their data’⁶²⁵.

Using countervailing powers to tame the digital platforms: A light interventionism option, compared to the previous ones, is to accept that the structure of digital markets on which dominant platforms have emerged cannot be transformed to a more competitive structure, in view of the bottlenecks they control, and attempt instead to develop countervailing powers along the digital value chain that may tame the power of digital platforms and attempt to bargain a fairer allocation of the surplus value between the various segments of the digital value chain. This approach may be inspired by that put forward by US economist John Kenneth Galbraith who emphasised the role of countervailing powers in capitalism, being generally indifferent to concentrations of economic power, to the extent that government provides countervailing powers ‘freedom to develop and to determine how it may best do so’⁶²⁶. Recent talk about enabling users, self-employed gig workers, or even media companies to collectively bargain with platforms mutually efficient solutions, by enabling them to cooperate without such cooperation falling under the scope of the prohibition of competition law to collusive activity constitutes an example of what is possible. One may also argue that the lack of antitrust enforcement in the US against Big Tech, in particular with regard to monopolisation, and the withdrawal of net neutrality regulation, may be read as advancing a *laissez-faire* programme, or may also be read as a way to engineer the emergence of countervailing powers along the digital value chain. Similar arguments have been made with regard to the development of countervailing powers that would thwart the power of digital platforms through code, such as the ability of consumers to outsource purchasing tasks to algorithms, thereby minimizing the direct role they play in purchasing decisions and overcoming biases ‘to enable more rational and sophisticated choices’⁶²⁷. However, it is unclear if a countervailing powers approach, that would anyway require a great degree of sophistication and prior design, may succeed.

Polycentric competition law: Another option would be to abandon the sole focus on consumer (or social) welfare for one that would aim to also promote *well-being* (consumers or

⁶²⁵ See, Indian Draft National e-Commerce Policy (2019) 14-15.

⁶²⁶ J. K. Galbraith, *American Capitalism: The Concept of Countervailing Power* (Mifflin Co. 1952): 143.

⁶²⁷ M. S Gal & N. Elkin-Koren, ‘Algorithmic Consumers’ (2017) 30(2) *Harvard Journal of Law & Technology* 309

that of the general public).⁶²⁸ Such an approach would seek to enhance the cognitive openness of competition law so that it can address the multilevel strategies to restrict competition that are expected to unfold in a complex economy, and to account for the diversity of values or orders of worth in productive friction in society by preserving and promoting spaces of polycentricity (or polyarchy).

Taking a social contract perspective, competition authorities should try to assess the broader social costs of market power. They should consider that the consumer is also a citizen that may value privacy and other public values (e.g. informational self-determination, protection of the environment and sustainability).⁶²⁹ By focusing almost exclusively on the price dimension of competition law is monocentric and plays with a toy economy that only exists in the economic textbooks. In other words, competition law should move from a monocentric vision focusing on prices and output to a polycentric vision that perceives competition law as an important tool in order to preserve the plurality and autonomy of the various social spheres that may be affected by the rise of digital platforms. Enforcing competition law in a complex economy setting would require the development of a deeper understanding of the social structure of competition and of the various spaces on which competition tournaments may take place.⁶³⁰ As it was previously explained, individuals interacting with data comptrollers in the context of an online market transaction are participating in overlapping games in the political sphere with the same corporations. Different methodologies should also be developed to account for this complex reality, such as agent-based modelling and sophisticated computation or the use of simulation techniques to better map the multi-functional strategies of actors in the various competition ecosystems and allow for computation.⁶³¹

But more importantly, polycentric competition law aims to connect the activity of competition authorities with other regulatory fields, the relation between competition and regulation not being conceived as antagonistic but as complementary.⁶³² Our brief analysis showed the relative poverty of mainstream competition law to deal with the variety of social costs engendered by the emergence of digital platforms as the dominant players in today's digital economy. It also showed how important it is to make efforts to understand that modern economies and societies are complex systems that may not be dealt with easily with the simple economics of modern competition law.

In our view, one therefore needs to take a **toolkit approach** that would combine different approaches and different areas of law and regulation, competition law playing a primordial role in this new regulatory compass. Actually, as constitutional law provides broader directions for regulatory and administrative action, competition law could play a similar role in terms of promoting the principle of competitive markets among other principles

⁶²⁸ We note a significant contrast with the Furman Report, which asserts 'consumer welfare is the appropriate perspective to motivate competition policy and a completely new approach is not needed'. Furman Report (n 83), 5.

⁶²⁹ See M. Novak, *The Spirit of Democratic Capitalism* (Simon & Schuster 1982), (differentiating society into three power centres: a political sector, an economic sector, and a moral-cultural sector).

⁶³⁰ R.S. Burt, *Structural Holes* (HUP 1992).

⁶³¹ See L. Hamill & N. Gilbert, *Agent-Based Modelling in Economics* (Wiley 2016).

⁶³² The complementarity between competition law and regulation is also noted in the European Commission's digital report and the Stigler Centre report. Crémer et al (n 203), 52-53; Stigler Report (n 707), 78.

and values that need to be catered for. For instance, a lot of regulation, such as the Open Banking regulations in the UK, result from and integrate competition law values. One may also design property rights and data markets in a way that promotes the values of competitive markets in the economy as an autonomous sphere of justice.

This toolkit approach may rely on different combinations in each jurisdiction, on the basis of the institutional capabilities and the relative efficiency of the various regulatory alternatives, any choice being between imperfect, if perceived in isolation, institutional alternatives.

7. Conclusion

These considerations lead us to advance a different approach in exploring competition law in the digital era.

First, the complexity of the production process highlights the importance of conducting a careful analysis of the power relations *along* the digital value chain, and not only *between* different value chains, the aim being to unveil *value extraction bottlenecks* affecting the distribution of the total surplus value generated by digital innovation. The analysis cannot always be undertaken by the traditional NPT approach, which mainly focuses on horizontal competition (market power) and economic efficiency. The NPT framework ignores ‘vertical competition’, the competition for a higher percentage of the surplus value brought by innovation, and competition from complementary technologies that may challenge the lead position in the value chain of the incumbents (vertical innovation competition). We also need to consider the multiple dimensions and sources of ‘economic power’, horizontal and vertical, in the digital economy (e.g. intermediation power, algorithmic power, architectural power)⁶³³.

Second, data and network effects require us to rethink competitive interactions beyond the traditional concept of relevant market. Some have put forward the view that the competition assessment should be done at the level of the platform⁶³⁴. This may nevertheless challenge the important role of competitive markets as the main social institution to reward productivity. Competition law also needs to engage with the various forms of the competitive struggle to gain not only competitive advantage on product markets but also acquire architectural advantage, which is often more highly valued by financial markets, in view of its potential to sustain abnormal returns for a longer period of time. Competition analysis should engage with the ‘value capture strategies’ put in place by economic actors competing for strategic or architectural advantage in ecosystems⁶³⁵. Abandoning the sole focus on the relevant market also stems from the relatively more limited role of price competition in the digital economy (e.g. ‘free goods’ and multi-sided markets strategies). Hence, we need to develop new mapping

⁶³³ This derives from the central position of the agent in the network of various agents involved in this socio-technical system and capabilities to set the agenda for the rest of the network. I explore this further in I. Lianos et al, Superior Bargaining Power in Competition Law: A Theoretical Analysis, in I. Lianos, A. Ivanov & D. Davis, (eds.) *Global Food Value Chains and Competition Law: Towards Holistic Competition Law?* (forth. CUP, 2019) and in I. Lianos, V. Korah with P. Siciliani, *Competition Law: Analysis, Cases and Materials* (OUP, 2019), Chapter 8.

⁶³⁴ See, the majority opinion of the Supreme Court in *Ohio v American Express*, 138 S. Ct. 2274 (2018).

⁶³⁵ D. Teece, Business models, value capture, and the digital enterprise, (2017) 6:8 *Journal of Organizational Design*.

tools that represent more accurately horizontal and vertical competitive interactions in the digital economy⁶³⁶.

Third, the broader array of interactions, beyond market exchanges, between the different stakeholders, invites us to broaden our understanding of competition law, beyond the monocentric model focusing on price and output that has so far prevailed. In understanding the role of competition law in this new environment, some prominent authors have suggested a ‘broader reach for competition policy’⁶³⁷ that would engage with the full social costs engendered by restriction of competition on different dimensions of well-being. Competition law will have to acquire a polycentric dimension in order to guarantee the effective protection of the societal values that may be affected by actors with economic power⁶³⁸. However, we crucially lack the operational concepts, tools and metrics to develop this agenda further. Traditional equation-based modelling, although rigorous and insightful, may not cater for these very complex systems. We need to draw on the broader conceptual and methodological framework of ‘complex economics’⁶³⁹ which, we think, provides very interesting conceptual and practical insights in order to operationalise the complex systems that it becomes necessary to consider as competition law moves to tackle digital competition.

⁶³⁶ See, Global Food Value Chains and Competition Law - BRICS Draft Report (January 1, 2018). Available at SSRN: <https://ssrn.com/abstract=3076160> or <http://dx.doi.org/10.2139/ssrn.3076160>; I. Lianos, Digital Value Chains in Competition Law (CLES Research Paper 1/2019), available at <https://www.ucl.ac.uk/cles/research-papers>.

⁶³⁷ J. Stiglitz, Towards a Broader View of Competition Policy, in Tembinkosi Bonakele, Eleanor Fox, and Liberty Mncube (eds.), *Competition Policy for the New Era: Insights from the BRICS countries* (OUP, 2016)

⁶³⁸ I. Lianos, Polycentric Competition Law, (2018) *Current Legal Problems* 161.

⁶³⁹ See, *inter alia*, W. B. Arthur, *Complexity and the Economy* (OUP, 2015); D. S. Wilson & A. Kirman (eds.), *Complexity and Evolution – Towards a New Synthesis for Economics* (MIT Press, 2016).