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RESEARCH ARTICLE



Considering the *direction of innovation* in EU merger control

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ABSTRACT

This paper considers the role that innovation plays in EU merger control analysis, and seeks to integrate perspectives highlighted by the philosophical literature on the so-called ‘direction of innovation’ in order to critically assess the impact of market concentration on the diversity of innovation and its ability to address larger normative questions and challenges, such as the transition to more sustainable economies. While normative goals other than competition are not an inherent part of merger control, this paper argues that in concentrated markets, ignoring such questions can play into the hands of the powerful merging entities, allowing them to further determine the *direction of innovation* to best serve their interests and business models rather than public interests. This is illustrated by critically discussing the merger between Bayer and Monsanto as an example.

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Introduction

As part of competition policy, merger control appraises concentrations and changes in market structures that often have a significant and long-lasting impact on markets and the development of industries and economies at large. While it is ‘not the job of competition law to save the planet’ (Khan 2022), both competition and innovation play a considerable role in deciding what the future markets and realities look like. This paper thus looks at the potential interaction of three things: the relationship between competition and market concentration; new perspectives on innovation; and the normative quest to address the sustainable development goals, in particular the counteraction of climate change. It postulates that the future structure of large industries and their innovation potential and diversity can play a large role in achieving sustainability goals. Critically analysing how market structures affect the innovative output and the so-called ‘direction of innovation’ could be a first step in this direction. This approach represents a diversion from traditional merger control, where market outputs such as innovation are often viewed as driven by market forces alone.

Directionality broadly describes the idea that innovation is not a blind or indeterminate process but that it can be the outcome of certain economic policies and market conditions.

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Thus ‘not all innovations are created equal’ and may yield unfavourable results or may be thwarted by market failure (Acemoglu 2023, 1). The literature that has emerged around this ideas thus looks at ‘directing of innovations’ towards adoption and acceptance, as well as at ‘the direction of innovation’ as an intentional steering process and at the ‘directionality of innovation’ as a concept that seeks to grasp and enhance the potential plurality and multiplicity of innovation (see Arora et al. 2020; Stirling 2024).

This paper aims to show that these philosophical ideas can help us to understand and critically analyse the impact of further market concentration on innovation. This paper’s focus on merger control as opposed to other anti-competitive behaviours such as collusion or horizontal and vertical agreements is due to the fact that mergers have the biggest impact on the structure of a market and its future development. It uses the Bayer–Monsanto merger to demonstrate that certain innovations are not the result of a blind or open process, but that directionality already exists and often skews innovation away from public interests to serve the interest of big corporates – a bias that can be further enhanced through mergers and the increase in market power. In this context it suggests the development of a theory of harm that looks not at innovation in quantitative terms, but at the power of certain corporations to ‘direct’ innovation in their favour and to the detriment of innovative diversity and plurality.

This paper is structured as follows: It first looks at the contentious relationship between competition, concentration and innovation and the arrival of critical questions relating to sustainability and the ‘greening’ of competition policy direction of innovation (section II ‘Three points of interaction: innovation, competition and other public policy goals (sustainability)’). Section III ‘Directionality: looking at the *direction of innovation*’ introduced philosophical notions of innovation and explains different aspects of directionality. The development of innovation perspectives or innovation theories of harm in competition policy/merger control are explored in section IV ‘EU merger control and the development of innovation theories of harm’. Last, directionality considerations applied and used to critique the Bayer Monsanto merger. In addition, a possible theory of harm is introduced (section ‘Assessing and critiquing the *direction of innovation* in EU merger control’).

Three points of interaction: innovation, competition and other public policy goals (sustainability)

Due to the urgency of issues such as climate change, there is an increasing scrutiny around the effects of competition policy beyond the protection of consumer welfare or competition in and of itself (Holmes 2020; Nowag 2016). In addition, there is also a renewed look at the competitive conditions for innovation (Kerber 2018; Schrepel 2023). But innovation too is of interest to the antitrust scholarship not only for its effects on efficiency and profit maximization, but also for its potential to achieve other public policy goals and to find solutions to the most pressing problems of our time.

The relationship between innovation, competition and concentration

Looking at the relationship between innovation and competition, it is best to start with the conventional understanding of these two terms in the context of competition economics. Based on the fundamental works of Schumpeter (1942), competition is deeply

driven by innovation because market participants try to maximise their profits through innovative activity. One way to create larger profits for the own firm would be by improving the quality of a certain product which the firm already has in its portfolio. The increased quality will be noticed by the consumers and the specific product will experience a higher demand, especially if the firms' contestants are not able to realise the same quality increase, and the firms' profits increase compared to the profits of its rivals, in the extreme case resulting in a monopoly position for this firm. This strategy also has been described and analysed by Porter (1980), which he describes as 'differentiation strategy'. Another way to maximise profits would be by reducing the production costs, for example, through innovations in the production process or the supply chain. Production factors which can be influenced are, for example, staff costs which can be lowered with increased automatisisation or the costs of resources necessary for the production (Porter 1980). That way, the firm is able to produce each unit of a product for a lower price than its contestants are able to. This places the innovative firm in a competitive advantage. The third way to increase a firm's profits in the context of innovation is by creating whole new markets through disruptive and ground-breaking innovations, placing the respective firm as a temporary monopolist on a new market before potential rivals eventually catch up and imitate its product (Schumpeter 1942). The commonality among these assumptions is their contribution to the creation of welfare in the form of consumer and producer surplus which ultimately are the signs of a functioning and flourishing economy. This leads to the more fundamental assumption that a neutral and impartial competitive process is best suited to foster and select innovative advancements.

Beyond the idea that competition fosters innovation, the relationship between innovation and the degree of competition and rivalry (concentration) has in fact been a contentious issue in competition policy for a long time. Alongside the empirical indeterminacy of the relationship, authors such as Kerber highlight that the problem is also theoretical in nature and that the longstanding and somewhat dated ideas of Schumpeter, Arrow and Hayek have not been developed further substantially (Kerber 2018). In addition, competition and innovation are largely viewed as two separate problems with separate assumptions, methods and prerequisites (Kerber 2018).

As these theories stand, they offer three different assumptions about competition, market structure and innovation. In *Capitalism, Socialism and Democracy* (1942), Schumpeter theorised that large firms, rather than a multitude of small firms, create a more innovative market environment. According to Schumpeter, large firms operating in markets with an oligopolistic structure would be superior to small firms in highly competitive markets: 'The firm of the type that is compatible with perfect competition is in many cases inferior in internal, especially technological, efficiency' (Schumpeter 1942, 106). He argued that larger firms have greater incentives and capabilities to invest in R&D because of their market power and their superior scale relative to their (potential) competitors. In addition, many authors since have used his theory of 'creative destruction' to emphasise the temporary nature of the market power as a driving force for successful innovation (Shapiro 2012). For instance, Stiglitz (1981) argued that increases in competition may reduce welfare on imperfect markets such as markets where information is incomplete and costly and where research and development expenditures and learning are important. Potential policies should be based on a more complete analysis of the functioning of competition in imperfectly competitive environments as they

otherwise could lead to non-pareto-optimal equilibria with producers and consumers worse off. Furthermore, Dasgupta and Stiglitz (1980) show that if the present market is dominated by a monopolist, there is likely to be more R&D than in a market with a competitive market structure. As a reason, they state that in a post-invention market, there will be, as a result, less competition, and therefore more profits. Another approach with regard to Schumpeter's view has been undertaken by Gilbert (2006) who has shown in an extensive literature analysis that R&D expenditures increase in proportion to business unit size above some threshold value that varies across industries. He argues further that a fragmented industry, even if all firms have the same R&D intensity, would have lower R&D incentives per firm and could result in redundant and wasteful R&D expenditures. As a solution, Gilbert suggests consolidating business units or merging the R&D activities of separate business units in an R&D joint venture to avoid inefficiencies.

In contrast, Arrow's *Economic Welfare and the Allocation of Resources for Invention* (Arrow 1962) argued that a monopolist always has a less incentive to innovate than a competitive market player. The idea behind this reasoning is as follows: The incumbent monopolist has no interest in changing the current situation, in which it holds the vast majority of the market power in its industry and thus reaps substantial profits from the status quo. Any new technology brought forward would risk a disruption of this status quo, thus threatening the financial benefits that the monopoly firm derives from its current predatory position: 'The pre-invention monopoly power acts as a strong disincentive to further innovation' (Arrow 1962, 620). Therefore, Arrow suggests that more competition in a given market should lead to more innovation in that market. This argument has since been also used by many authors supporting Arrow's approach towards the relation between innovation and competition. For instance, Porter (2001) underlines innovation as the most important element for productivity growth in an economy:

Innovation, in this broad sense, is driven by competition. While technological innovation is the result of a variety of factors, there is no doubt that healthy competition is an essential part. One need only review the dismal innovation record of countries lacking strong competition to be convinced of this fact. Vigorous competition in a supportive business environment is the only path to sustained productivity growth, and therefore to long term economic vitality. (Porter 2001, 4).

Another argument is made by Holmes and Schmitz (2010) who have conducted a large literature review concerning industries experiencing extreme changes in their competitive environment. They state that:

Nearly all studies found that increases in competition led to increases in industry productivity. Plants that survived these increases in competition were typically found to have large productivity gains, and these gains often accounted for the majority of overall industry gains. [...] The suggest that this 'illustrates another reason why monopoly may be bad for investment and innovation, since if a firm has no competitors, then its input suppliers have a great incentive to invest in their own market power and thereby extract surplus from the firm's innovations. (Holmes and Schmitz 2010, 33–34)

Neither view, however, has been proven or significantly refined and – depending on the degree of concentration – they don't even necessarily contradict one another (Kerber 2018). Similarly, Hayek's much cited idea of 'competition as a discovery procedure' – the idea that 'competition is important only because and insofar as its outcomes are

unpredictable and on the whole different from those that anyone would have been able to consciously strive for' (Hayek [1968] 2002, 9, 18) – has informed competition law thinking but hasn't been developed or clarified sufficiently enough to be able to inform the assessment of competition law cases.

Developing these thoughts further, a relationship between competition and a diversity of ideas arises: A merger between highly innovative, R&D-focused firms is often feared to cause a loss of knowledge and know-how in the market. This concern aligns with Hayek's view of 'competition as a discovery procedure' ([1968] 2002), where firms learn through trial and error, gradually gathering information about consumer preferences and effective technologies. As firms compete, they gain feedback from consumers, helping to refine their products. Competitors then learn from successful firms, driving innovation through imitation, a concept also emphasised by Schumpeter (1942). However, a merger might reduce the number of independently experimenting firms, potentially slowing the knowledge generation process and problem-solving ability within an industry. This reduction in R&D diversity could harm consumers and society by limiting alternative approaches to problem-solving. Scholars like Farrell (2006) and Kerber (2011) argue that maintaining a variety of approaches is crucial in complex markets, referring to this as 'econodiversity' (Farrell 2006). They highlight the risk of a lack of diversity, comparing it to a 'monoculture' in competition. Although the necessary degree of diversity in an industry is difficult to determine, it remains a critical yet elusive factor in maintaining a healthy competitive environment. Farrell (2006) thus refers to it ultimately as 'dark matter of competition – potentially very important, but hard to pin down and prove'.

All three concepts view innovation as an essential, dynamic component of competition: Arrow's 'innovation incentives', Schumpeter's 'force of creative destruction' and Hayek's characterisation of 'competition as a process of discovery' can by their very nature only be part of a dynamic process. While such dynamics need to be integrated into competition law analysis, they stand in contrast with and even contradict standard (static) models or views of competition (Kerber 2018, 33, 39) that dominate competition policy and competition law analysis. In fact, competition and innovation policy are still considered two distinct fields, with little theoretical overlap or cross-fertilisation. According to Kerber, (1) Competition policy deals with market failure and competition problems in relation to existing markets and (2) innovation policy deals mainly with market failure problems of insufficient innovation incentives due to appropriability problems (Kerber 2018, 33, 35). Moreover, he points out that it is not always evident whether the two fields can or should be merged, as this would at least require a change in competition law methodology and the assumption that are applied when looking at the competition effects (the effects of mergers or R&D agreements) on innovation (Kerber and Vezzoso 2019).

In order to bridge this gap and further develop competition policy with regards to innovation, several authors thus suggest turning to the fields of industrial dynamics (Cantner 2011; Kerber 2018), evolutionary economics (Kerber 2018; Metcalfe 1998; Nelson 1995; Nelson and Winter 1982) and even the strategic management literature. The studies in the field on *industrial dynamics* are mostly empirical and look at the dynamics and path dependencies in industry processes and cycles. As Cantner (2011) puts it:

The main objective is to understand the dynamics of industries by looking at the knowledges and competences of firms as well as of other actors relevant for a sector.

The analytical approach explicitly looking at the dynamics of structural patterns is considerably different in both static approaches and approaches based on a dynamic optimization. With this orientation, the issue of competition in a market may be looked at from a different point of view than in traditional approaches to industrial organization. (Cantner 2011, 167).

Evolutionary economics on the other hand looks at the experimental and evolutionary dynamics of competition and innovation, with high regard for uncertainty, unpredictability and trial-and-error processes. This branch of economics has not only been widely used as an extension of the ideas of Schumpeter, but also to support the ideas of diversity, heterogeneity in competition and the progressive development of markets. It goes beyond the linear consideration of single actor or firm incentives and tries to consider innovation as a more evolutionary and cumulative process also based on cross-fertilisation and knowledge spill overs. While borrowing from Hayek's idea of competition as a trial-and-error or discovery procedure, a strong focus of the evolutionary economic concepts and models (of Nelson and Winter 1982) is on learning and knowledge-creation (Kerber and Vezzoso 2019). These scholars thus argue that

systems of innovation are needed so that new knowledge and innovation can diffuse throughout the economy, and that systems of innovation (sectoral, regional, national) require the presence of dynamic links between the different actors (firms, financial institutions, etc.), as well as horizontal links within intermediary institutions. (Lundvall 1992; Mazzucato 2013, 31; Nelson and Winter 1982)

The **strategic management literature** and in particular the 'dynamic capabilities approach' in turn looks at the resources (Kerber 2018) and other (learning) capabilities (Barney 1991; Kerber 2018) of individual (but heterogenous) firms and the effects of these on their ability to adapt and innovate. The literature of 'dynamic capabilities', mainly developed by scholars like Teece, constitutes an area of research focussing on how firms acting in an uncertain environment can maintain a competitive advantage. The 'dynamic capabilities' are 'high-level sensing, seizing, and transforming skills that enable a firm to identify, develop, market, and sell innovative products' (Petit and Teece 2021). They furthermore are firm level and firm specific and must be built as they cannot be bought which distinguishes them from other capabilities such as skills learned at business and engineering schools which then can be bought readily to support a firm's growth and efficiency (Petit and Teece 2021; Teece 2020). The approaches' starting point is the firm, which it views as a bundle of resources, specifically valuable, rare (not replicable), inimitable and non-substitutable resources (Kerber and Vezzoso 2019). While seldomly explored in competition analysis, a resourced-based analysis offers two valuable insights for the further discussion: The first is that a firm's own ability to innovate and to contribute to innovation is determined by its resources. Capacities and capabilities can thus also be used to determine 'innovation spaces' (see below). Second, while focussed on individual firms, the strategic management literature highlights the importance and benefits of heterogeneity and diversity – how firms with different sources of knowledge and capabilities drive diverse innovation paths and can benefit and learn from each other's successes and failures (Kerber 2018). Both the capacity to enable and even steer or direct innovation (for first order innovation – i.e. innovation by a firm or within a market or ecosystem) as well as the importance of diversity will be of significance below.

While the relationship between innovation and concentration remains indeterminate, this section has shown that new ways to understand and analyse innovation play an ever-greater role in competition analysis.

Greening competition policy

In recent years competition law scholarship has grown increasingly critical of the dogma that competition policy ought only to protect ‘competition’ as a means to increase welfare and that (consumer) welfare is a neutral or impartial goal of competition and antitrust policy. This has led to a critical reflection on the goals of competition policy, but also to a discussion of their possible expansion. Alongside consumer welfare, the literature also suggests that competition policy should aim at increasing or at least critically reflecting on its effects on privacy (Lynske 2020), economic equality (Broulík and Cseres 2022), sustainability (Holmes 2020; Nowag 2016) and even gender equality (Cseres 2023) as well as democracy (Ezrachi and Robertson 2024). Amongst these ‘further’ goals of competition policy (see Mendelsohn 2023) its contribution to sustainability and counteracting climate change is seen as the most urgent and also legally the most established (due to Green New Deal Packages and ESG-legislation). Here, in the words of Holmes, competition policy can either serve as a ‘sword’ to tackle unsustainable conduct (and mergers) or as a ‘shield’ against the prohibition of conduct that may (also) help achieve more sustainability (Holmes 2020). While several traditional antitrust law scholars and economists warn against the latter – the legalisation of anti-competitive conducts (such as price agreements and cartels) to achieve sustainable outcomes of production methods – they are more lenient towards prohibitions of conducts that are anticompetitive and pose a great risk to the environment as well (Budzinski and Stöhr 2023). In addition, only a small part of the scholarship and case law has highlighted the importance of ‘green’ merger control in order to guarantee sustainable market structures moving forward (Lianos 2018b; Mendelsohn 2023; Commission decision Case M.7292 – DEMB/Mondelez/Charger OPCO and Case M.9706 – Aleris/Novelis). While it is not clear that greater market concentration necessarily leads to greater harm to the environment (Lianos 2018b however suggests that very large enterprises do contribute massively to its destruction and have lobbied against sustainability legislation in the past) or less innovation in the field of sustainability (see Deutscher and Markis 2022), a normative assessment of the *direction* of the innovation in question could help to guide critical merger decisions in future.

Directionality: looking at the *direction of innovation*

A more recent – and more normative – approach to innovation looks at ‘directionality’, or the ‘direction of innovation’. While this terminology is primarily used either to analyse market failures (Acemoglu 2023) or to explore the state’s role in large innovation processes (Mazzucato 2013), it also (1) demystifies the idea of innovation as an entirely unpredictable and indeterminable process, and (2) allows the process of innovation to be connected to the achievement of other (normative) goals.

In philosophical terms, the idea of directed innovation is rooted in the wants and demands (first and second order system of reproduction) of the so-called ‘innovation

society'. One of the first philosophical works on (modern) innovation distinguishes between the innovation society in the weak sense and in the strong sense. According to Ziegler, the innovation society in the weak sense describes 'actors, institutions and ways of promoting/hindering innovation in society' (Ziegler 2020, 2). By contrast the information society in the stronger sense refers to 'societies that aim at promoting innovation and therefore have innovation policies' (Ziegler 2020, 2). Here Ziegler explicitly references the EU 'innovation union' whose goal is an 'innovation-friendly environment that makes it easier for great ideas to be turned into products and services' (Ziegler 2020, 3). Strong innovation societies are, however, not without problems and paradoxes and are (in late modernity) often called to question the results and end-goals of their forces on innovation. This point can also be made via the distinction between first, second and third orders of reproduction:

- In a first order system of reproduction, he suggests, 'goods are produced within a society that perceives its economy in a stationary state' ('weak innovation society') (Ziegler 2020, 3).
- By contrast, in the second order of production (the 'strong innovation society' where innovation is a societal strategy) rules are created to ensure an endless cycle of innovation, creative destruction and progress.
- Where the second order of production causes problem and tensions, he further suggests, a third order emerges: 'this third-order society also asks if innovation is needed and if so, what kind; if it should be resisted and discontinued; how (not) to measure it; if and where it needs to be accelerated or slowed down; and above all, why is it relevant – for what ends and what goods?' (Ziegler 2020, 4).

As the quest for innovation thus become 'reflexive' (Mendelsohn 2022) the idea of directionality and the direction of innovation emerges (Ziegler 2020). This introduces a normative element and poses questions such as: Whom does which innovation serve? What type of innovation best serves further goals such as sustainability or economic well-being? How can the capacity to innovate be best used to meet the world's most pressing needs? (for a look at the questions posed by advanced 'innovation societies', see: Ziegler 2020). This normative turn in innovation studies, but also in innovation policies in recent times, mainly to deal with big societal challenges such as climate change, poverty or economic restructuring, has also been described by Von Schomberg (2013, 2019), Uyarra, Ribeiro, and Dale-Clough (2019), and Stahl (2022) in the context of responsible research and innovation (RRI) as well as by Schot and Steinmueller (2018) who see the necessity of innovation as a transformative force in the presence of the aforementioned challenges. Furthermore, there are frameworks and models which have been developed for responsible innovation to address social and ethical concerns (see: Schlaile et al. 2018; Stilgoe, Owen, and Macnaghten 2013).

In parallel to these basic normative questions driving the contemporary 'directionality discourse' (Edler, Kuhlmann, and Helfrich 2023; i.e. from Nelson 1962 to Stirling 1994, 2009) a more differentiated terminology has emerged. Stirling (2024) thus distinguishes between three current notions and scopes of research: (1) 'the directing of innovation' as an accelerating process of adoption and acceptance; (2) 'the direction of innovation' as a steering of innovation along and especially into selected pathways; and (3) 'the

directionality of innovation’ – a more nuanced concept seeking to grasp and harness pluralities (Stirling 2024) and the multiplicities of innovative potentialities (Arora et al. 2020).

These approaches and distinctions can greatly stimulate legal and policy analysis of innovative mergers. As this paper shall argue and as shown by Stirling, many fields of innovation (agriculture, biotech, pharma) are ‘routinely oriented by incumbent interests’ (Stirling 2008, 2014). Competition analysis can thus first and foremost become more critical and aware of the ‘incumbency biases’ steering innovation and the discourse around it and it may even, in certain select cases, analyse the ‘direction of innovation’ to normatively assess whether it is in line with non-competition goals (ESG, Green New Deal). Most fundamentally, however, ideas around the ‘directionality of innovation’ can ensure that markets remain ‘open’ and able to harness pluralities and multiple potentialities. This aligns with a notion of polycentric competition (developed by Lianos 2018b and by Deutscher and Markis 2022, see below III. 3.) and competition as an open field and a process of selecting the best ideas and outcomes.

EU merger control and the development of innovation theories of harm

EU merger control – goals and method

The goals of EU merger control are to protect competition and to secure and enhance consumer welfare.¹ Whether consumer welfare should be regarded as the sole goal of competition policy (formal competition law approach) or whether room should be left for the further substantive goals of the EU treaties (the holistic approach) is an equally contentious issue (Dunne 2020; Holmes 2020; Kingston 2011; Monti 2002; Odudu 2006; Townley 2009). The inclusion of further or broader goals of competition policy, however, remains the exception in practice.

Under to the EU Merger Regulation (EUMR) the European Commission can review and prohibit cross-border mergers, acquisitions and joint ventures, if the proposed concentration would **significantly impede effective competition** (SIEC) in the common market or in a substantial part of it. This substantive test replaced the somewhat more formal and legalistic test for the creation or strengthening of a (collectively) dominant position in 2004 as part of a reform that sought to make EU competition law more economically (the ‘more economic approach’) and empirically sound. In order to identify a significant impediment to effective competition, the Commission first defines the relevant market where competitive constraints may arise, and then formulates a ‘theory of harm’ for every individual case to help demonstrate potential competitive harms and constraints. Potential harm can exist for instance if a potential merger is expected to lower the product choices for the consumers significantly as a consequence, if prices are expected to increase disproportionately or if lines of product innovation within one of the merging companies could get discontinued post-merger. The European horizontal and non-horizontal merger guidelines provide some guidance on the theories of harm that the EU Commission may adopt² and the either unilateral or coordinated effects that may arise. Since the publication of these guidelines, many additional theories of harm have been developed by the courts. Most recently, the Commission has issued a guidance on lower threshold mergers (possible ‘killer acquisitions’, Ivaldi, Petit, and Unekbas 2023) being referred to it by the member states (Art. 22 EUMR) (COMP

(2021) 1959 final, 26.3.2021), and the literature and practice have struggled to establish new theory of harm for digital conglomerates and ecosystems (OECD 2020a, 2020b). As both mergers and market conditions are rarely static, a consideration of the effects of a merger on innovation has become increasingly important in merger control, leading to the development of so-called innovation theories of harm (Lianos 2018a).

The development of an innovation theory of harm

The US Department of Justice and Federal Trade Commission first included innovation aspects in their Horizontal Merger Guidelines of 2010.³ In the US, the so-called (controversial) ‘Innovation Market Analysis’, which featured in the 1995 DOJ/FTC Intellectual Property Guidelines to determine a specific category of intellectual property licencing restraint (see I.P. Guidelines § 3.2.3), was then developed into a more general theory by Gilbert and Sunshine (1995). They attempted to move antitrust analysis (market definition) away from static and existing product markets to the ‘relevant R&D product and geographical markets where competition in research and development may be affected by a proposed merger or acquisition’ (Gilbert and Sunshine 1995, 569). While this approach never became official doctrine (for the main lines of critique, see Starek 1996), it suggested the introduction of an innovation specific concept in order to identify the relevant competitive constraints and has been influential in the field on innovation and competition (Kerber and Vezzoso 2019).

The European Commission’s horizontal merger guidelines from 2004 also emphasise mergers’ effect on innovation, and the non-horizontal merger guidelines from 2010 list the diminishing of innovation as a competition relevant factor in vertical and conglomerate mergers⁴ (also Federico, Langus, and Valletti 2017). While there doesn’t seem to be a unified approach to analysing the potential dynamics of innovation, over the last decade, a number of horizontal⁵ and vertical or conglomerate⁶ merger decisions of the European Commission have considered a range of effects on innovation:

First, in several cases the Commission acknowledges the general importance of innovation and the associated significant R&D efforts as drivers of the respective markets. For instance, in the two cases *Syngenta and Monsanto’s Sunflower Seed Business* (COMP/M. 5675, Commission decision of 17 November 2010) and *General Electric and Alstom (Thermal Power – Renewable Power & Grid Business)* (COMP/M. 7278, Commission decision of 8 September 2015),⁷ the ability to innovate and to differentiate the already existing product offerings, is of outstanding importance: The Commission here clearly identifies certain markets and their dynamics as particularly innovation based, for example, because firms involved in these markets can only gain substantial profits if they regularly and frequently release new innovative products. A potential new entrant could suffer from this market dynamic since it is expected to release innovations in a similar frequency as the already established firms, leading to either a quick exit or a potential acquisition of this new entrant by one of the established companies and subsequently to less competition.

Second, is the question of the need for extensive capabilities (COMP/M. 5675, *Syngenta/Monsanto’s Sunflower Seed Business*, paras. 61; COMP/M. 7278 – *General Electric/Alstom*, paras. 384/385, para. 764). These include large investments and research capabilities leading to massive R&D costs as well as lengthy and costly procedures to

introduce new products, which are typical features of several markets in question (COMP/M. 7278, paras. 992–996). Such extensive R&D capabilities often create high entry barriers for potential new competitors which will only increase in cases where the merger is cleared by the Commission. In the relevant cases, the Commission acknowledges the fact that smaller competitors will either struggle noticeably as a consequence of the merger or that already existing competitors of the merging companies are only partly able to ensure further competition on the market after the merger (COMP/M. 5675, para. 207; COMP/M. 7278, para. 760).

The third effect is the anticipated discontinuation of certain products or product lines as a consequence of the concentration and the resulting loss of innovation rivalry between the merging parties (and the elimination a relevant competitor) (*Syngenta/Monsanto* paras. 160/207; *General Electric/Alstom* para. 247, 504; *Medtronic/Covidien* paras. 242/249; *Novartis/GlaxoSmithKline*, 84, paras. 102/104; *Pfizer/Hospira*, para. 57). This argument features prominently in the *General Electric/Alstom* case since the Commission feared a discontinuation of advanced parts of the Alstom product offering and the related R&D (COMP/M. 7278, para. 247). In addition, the Commission also considered the lowering of the incentives to innovate in order to introduce upgrades for already existing technology in the market (COMP/M. 7278, para. 1068). These arguments looking at the reduction of such innovation incentives have, however, been criticised by Kerber and Vezzoso (2019). They observe that these considerations are based on the theory of unilateral effects of a merger on innovation incentives and have their origins in the ‘cannibalization-effect’ or ‘business-stealing effect’ first described by Arrow in 1962. This theory suggests that an incumbent monopolist has a lower incentive to innovate because a product innovation would ‘cannibalize’ part of the profits of his already existing product. Kerber and Vezzoso (2019) acknowledge the existence of this effect but also point out that the theoretical models used to determine this effect are static equilibrium models which are designed in analogy to models about the unilateral effects of mergers on prices and may thus not adequately reflect innovative and dynamic markets. Additionally, this topic touches the contentious debate on ‘killer acquisitions’ and their detrimental effect on competition. The term ‘killer acquisition’ describes the acquisition of a new firm by an already established company in the same market, solely with the purpose of discontinuing the target’s innovation projects and to pre-emptively avoid competition with the potential rival (Cunningham, Ederer, and Ma 2021). Using data from the pharmaceutical industry, it is shown that drug projects are often less likely to be developed if they significantly overlap with the acquiring companies’ own portfolio (Cunningham, Ederer, and Ma 2021). Given the fact that a significant amount of merger cases which have been under merger control by the Commission which in those cases particularly focused on a probable discontinuation of innovation projects post-merger, also stem from the pharmaceutical industry, it seems that competition authorities begin to take the phenomenon of ‘killer acquisitions’ into account. Further evidence for that is that the Commission has recently issued a guidance on lower threshold mergers which can be seen as a first step to tackle possible ‘killer acquisitions’ (Ivaldi, Petit, and Unekbass 2023) since they disproportionately occur just below the applicable thresholds for antitrust scrutiny (Cunningham, Ederer, and Ma 2021).

The fourth effect considers the impact of the planned concentration on the customers and overall market structure. Whereas in the *Syngenta/Monsanto* case, the

impact on customers is described rather briefly in that especially farmers would face a reduced choice compared to the situation absent the concentration (COMP/M. 5675, para. 200), the Commission makes a broader argument in the *General Electric/Alstom* case. Here the Commission found that the planned merger would not only lead to worse product choice on the side of the customers, but also to worse commercial conditions, terms and prices, as well as a lower innovation in the market, as the need to innovate may be reduced in a market with fewer competitors (COMP/M. 7278, paras. 936–938).

The fifth effect looks at the argument that the planned concentration would eliminate one of the closest and most significant competitors and market players of the acquiring company. Both in *Syngenta/Monsanto* and in *General Electric/Alstom*, one important, if not the closest, competitor in terms of market share but more important, in terms of R&D capabilities, would be eliminated as a consequence of the merger, resulting in negative effects on downstream markets, other competing firms and industry innovation as a whole (COMP/M. 5675, para. 160; COMP/M. 7278, paras. 247, 504). With focusing on this particular issue, the Commission tries to prevent the further concentration of market power and capabilities on already concentrated markets, for example if a planned merger would lead to a monopolist structure of the market with barely any competition left.

Broadening the scope of its considerations, the Commission introduced a new innovation parameter in its assessment of the *Dow/DuPont* merger. The merger between Dow Chemical and DuPont, announced in 2015, brought together two of the largest firms in the chemical industry and created the very real danger of creating a monopoly in crop protection, a sector in which both companies were market leaders. The merger had the potential to significantly reduce competition in a number of markets for already existing pesticides and petrochemical products, as well as innovation competition in pesticides. Looking at innovation competition, the Commission decision clearly states that:

... innovation should not be understood as a market on its own right, but as an input activity for both the upstream technology market and the downstream [...] markets. This however does not prevent the Commission from assessing the impact of the Transaction at the level of innovation efforts by the Parties and its competitors. (COMP/M. 7932, para. 348)

Furthermore, the Commission also first used the term ‘innovation spaces’ to describe ‘... those spaces in which innovation competition occurs in the crop protection industry’ (COMP/M. 7932, para. 350). As explained after that, ‘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’ (COMP/M. 7932, para. 352). This notion clearly expands the merger investigation, from products close to commercialisation to products and innovations far further from the ultimate stage of product development. This notion and the detection of ‘innovation spaces’ as played a significant role in the *Bayer/Monsanto* merger discussed below. However, Kerber and Vezzoso (2019) have pointed out, that from a theoretical point of view, it is not entirely clear what an ‘innovation space’ might be and although this concept might work for the innovation processes in the pharmaceutical industry and, as in the case of *Dow/DuPont*, in the crop protection industry, since the

identification of innovation projects and whether they are ‘overlapping’ or not seems relatively easy, a clearer theoretical concept to the nature of ‘innovation spaces’ would be necessary in order to apply this concept to specific cases on a broad scale (Kerber and Vezzoso 2019).

In addition to the merger decisions by the European Commission, Schrepel (2023) uses a systemic analysis of the case law of the Court of Justice of the European Union (CJEU and the Court) to show that these do not have a coherent theory of innovation either. In terms of the observed inconsistency in the Court’s considerations with regard to innovation, Schrepel (2023) shows several dimensions in which this claim is underlined. For instance, the role assigned to innovation by the Court can be divided into three different categories: First, innovation as a factor to assess market power; second, harm to innovation when evaluating anti-competitive effects; and third, innovation as a justification for practices and mergers (Schrepel 2023). Thus, the innovation considerations by the Court have different weights and aims in the respective decisions and consequentially vary in their importance and meaning. In addition, there are also significant differences on whose innovation capacities and strategies the Court focuses: In 13 of the 20 cases, it only focuses on the defendant’s innovative capacity and strategies and does not address at all the impact of the merger on the ability and incentives of third parties to innovate. In six cases, the defendant’s and the competitors’ innovative capacities and current innovation level of both are taken into account and in only one of the cases, the Court focuses exclusively on the competitor’s innovative capacity (Schrepel 2023). The final dimension which should be mentioned from the work by Schrepel (2023) is the comparison between the cases with regard to the approach undertaken by the Court evaluating the relationship between innovation and competition. Here, there is a distinction made between cases in which the Court is focusing on the incentive effect (eleven cases), the ‘impact effect’ (one case) and a mixture of both these effects (seven cases) (Schrepel 2023). The first category refers to the argument often made also by the Commission (see above) that a concentration in a specific market could lower the incentives to innovate in the companies involved in the merger and thus reduce innovation in the industry as a whole. The second category predominantly applies to sectors and markets in which innovation largely defines competition and where a merger would thus constitute severe competition constraints not only with regard to prices in the respective markets (Schrepel 2023).

On top of these case investigations and comparisons, more thorough and comprehensive theories of harm have been proposed in the literature (Denicolò and Polo 2018; Petit 2017). Significantly, Petit (2019) has criticised the narrow approach of existing theories that only focus on competition in a given market (the significant impediment to effective innovation competition, SIEIC) and has formulated a theory of harm that takes the innovative effects on an entire industry into account (so called Significant Impediment to Industry Innovation, SIII) (Petit 2017). This again, has been criticised by Kerber and Vezzoso (2019) who note that there is no clear theoretical concept in economics as to how to define an ‘industry’ which is preferably needed if the Commission or another competition authority decides whether a merger has a detrimental effect on innovation or not.

In summary, competition law and policy (Court and Commission decisions) have taken significant steps in recognising and incorporating innovation considerations into

merger decision. By critically assessing innovative capabilities they also recognise that the enigmatic nature of innovation changes as markets and industries become highly concentrated. There is thus some suspicion of how concentration effects innovation in markets and can create significant post-merger entry barriers. In addition, the Commission's analysis reaches beyond the scope of traditional markets to understand how innovations impact so called 'innovation spaces' or entire industries. The decisions do not, however, look at how the innovative process as such is impacted by concentration and market power, i.e. the capabilities that large firms have to steer and determine the outcome on innovation. This harm is strongly linked to ideas associated with knowledge and diversity problems as highlighted by Kerber and Farrell (see above). This perspective can be vital to understand the true competition dynamics linked to innovation. It can also contribute to finding ways to keep markets open – for new ideas and new solutions to larger problems.

Assessing and critiquing the *direction of innovation* in EU merger control

Directionality and larger economic and competition policy

In the traditional understanding of competition policy, based on the consumer welfare theory, the direction of innovation is not considered to be an issue which governments ought to take into consideration. Any 'steering' is left to the market and thought to be directed by consumers through their preferences and behaviour. With their willingness to pay for certain goods, consumers choose the most socially optimal and beneficial direction of innovation without the governments influence or intervention except for tackling externalities in some cases. This traditional view however, whose roots trace back to Adam Smith and his famous *The Wealth of Nations* (1776) and is held by authors like Mankiw (1991), Pindyck and Rubinfeld (1995) or Krugman and Wells (2012), only works under a certain set of 'perfect' and often static conditions: First and most fundamentally, the individual utility maximisation comes to mind, expressed through clear individual preferences as driving factor of economic action: The goods which can satisfy the individual's needs best, bear the largest utility and consequently maximise economic welfare. Second, all individuals behave totally rationally and try to reach the highest possible level of utility through the consumption of goods with given market prices and within the individual's budget constraints. Third, all individuals possess perfect information and hence make their individual decisions about the consumption of goods without any risk involved. These same idiosyncrasies and market failures affect innovations – the investments in innovations and ultimately their direction (Acemoglu 2023). These preconditions of the traditional (microeconomic) view on how the direction of an innovation is picked through the society of the consumers, are valid with respect to the goal of simplifying the situation of economic decision-making, but do not reflect the often much more complex market realities.

Whether markets themselves are 'best placed to experiment with new methods and carry out innovations' (Acemoglu 2023, 1), or should be shaped by government decisions and public institutions (Mazzucato 2013, 2021), is thus a matter of debate. While the former position acknowledges directional distortions and imperfections, it believes that these can be targeted with marginal adjustments to realign distortions and

externalities (taxes and regulation). It is therefore still a Hayekian understanding of innovation (See Papaioannou 2024 and also Davidson and Potts 2022), which, while recognising imperfect outcomes in many instances, insists that state interventions in general need to be kept to a minimum as these suffer from ‘epistemological and moral problems’ (see Papaioannou 2024). In this regard a recent paper by Acemoglu (2023) discusses a number of innovation distortions and their significant welfare implications. Acemoglu (2023) not only suggests ways to correct for such distortions, but regards them as relevant market failures, leading to conclusion that while innovation is the driving force of modern market economies, ‘not all innovations are created equal’ and that directionality will play an ever-larger role in the discourse on innovation. While admitting to distortions and the need for regulations and adjustments, liberal scholars still see no necessity or benefits of large-scale government intervention. In contrast, the approach of the proponents of a government-led industrial policy goes far beyond that of economists who suggest that government should only correct systemic factors that distort an optimal direction of innovation. In *The Entrepreneurial State* (2018) and *Mission Economy* (2021) Mazzucato redefines the role that governments can play in not only correcting market failures and funding key technologies as bystanders, but in directing large-scale ‘missions’ in service of alleviating so-called ‘wicked problems’, thereby setting the direction of innovation and building programmes or projects dedicated to achieving a certain end. Her work not only (selectively) demonstrates the success of past government-led missions, but highlights the scale of government spending and its role in the most important and foundational innovation projects of the past decades. In economic policy, the question of solving directionality errors sits somewhere between Keynesian and Schumpeterian politics (or is a culmination thereof – see Papaioannou 2024).⁸ More importantly, however, the question of directionality should be linked to the diversity and knowledge-problems in markets. Only if these are overcome can markets be assumed to be arbiters of progress.

While it is not the job of competition policy to address specific market failures or to direct or steer market dynamics such as innovation, a critical assessment of the direction of innovation and a recognition of the inherent incumbencies biases may be helpful in establishing a more nuanced approach to innovation, making sure that it serves not only the interests of the merging parties, but is also in line with important public policy interest and harnesses the potential plurality of innovation vested in the relevant markets.

Traces of directionality in merger cases: Bayer/Monsanto

To explore directionality and diversity considerations, this paper looks at the ill-fated takeover of the US stock company Monsanto by the German pharmaceutical stock company, Bayer, for USD 66 billion in 2018. The Bayer/Monsanto decision offers two distinctive features: As with the Dow/DuPont merger (2017), the potential impact of the merger on innovation in the relevant sectors and on ensuring global food safety and biodiversity played a role (COMP/M. 8084, *Bayer/Monsanto*, para. 1041ff., 3006 ff.; Kerber 2011; Podszun 2018). In addition, several stakeholders raised wide-ranging sustainability concerns about the merger. These related to the controversial seed modification and production methods of both corporations and the impact of the concentration

on the countervailing power of farmers and issues of food security worldwide (COMP/M. 8084, para. 3007).

In relation to innovation, the Commission examined whether the elimination of overlapping research efforts between the two groups could lead to a reduction in innovation competition. The Commission assessed both the impact on innovation rivalry between the two groups (firms) and the possible impact on innovation in the sector as a whole. In order to assess the degree of innovation rivalry between the parties, the Commission identified ‘innovation spaces’ where the parties’ research and development efforts competed with each other in the areas of development of new crop protection products, seed types and plant varieties (COMP/M. 8084, para. 1041). Within this paradigm the Commission, however, used a methodology similar to that used for standard price competition and analysed the substitutability and proximity of Bayer’s and Monsanto’s innovation projects. Structural criteria, such as increased concentration, existing barriers to entry, the innovative strength of other market players and a possible reduction in research and development output, were added to determine the impact on the overall level of innovation (COMP/M. 8084, paras. 75–88).

The decision did not include a separate or detailed analysis of possible effects of the merger on the environment, dependent farmers or issues of sustainability and organically produced crop diversity. The decision instead takes a narrow (or conservative) approach to these issues. The Commission thus does not consider sustainability as an issue in its own right, but only to the extent that it can be factored into the significant impediment to effective competition. The Commission justifies this by referring to the wording of the merger regulation (EUMR) and the scope of its substantive (competition orientated) test – a test that many would argue is very broad and almost legally nondescript. In its interpretation of the test the Commission recognised environmental protection as one of the goals of the EU treaties, but argued that sustainability issues should only guide a merger decision in so far as the parties in question were themselves competing on sustainability parameters (COMP/M. 8084, paras 3020). Ultimately leaving sustainability questions up to the merging parties. This means that competition policy remains entirely focussed on competition and market issues and does not introduce conflicting goals and interests into the equation.

The Commission in this case concluded that the merger was likely to reduce the incentive to innovate by eliminating overlapping R&D infrastructures and innovation efforts and reducing innovation overall (COMP/M. 8084, paras. 1263–1273). These concerns, however, did not lead to the prohibition of the merger. Instead, far-reaching structural remedies were imposed (COMP/M. 8084, paras. 3030–3325): Bayer was required to divest its seeds and pesticides portfolio and divest its global research and development in this area (seeds and agronomic traits). Research activities competing with Monsanto’s crop protection active ingredient glyphosate also had to be divested in order to be continued independently. Many of these ventures were taken over by the German chemical giant BASF. In addition, the new Bayer/Monsanto AG was also required to grant licences to the joint agricultural digital solutions (COMP/M. 8851, *BASF/Bayer Divestment Business*; Podszun 2018). While such remedies often offer targeted and balanced responses of a competition authority to the merger, they do little to mitigate the overall concentration and innovative potential of an industry as a whole and are limited to the scope of the competition law assessment at the time of the merger.

Appraisal

This merger decision has become a landmark for discussions of innovation and possible sustainability considerations in merger control (see Deutscher and Markis 2022; Lianos 2018b; Mendelsohn 2023). It is, however, also particularly well-suited for directionality considerations and shows the real-world policy implications of the three types of ‘directionality’ discourses set out by Stirling (2024). As mentioned above Stirling differentiates between: (1) ‘the direction of innovation’; (2) ‘the directing of innovation’ and (3) ‘the directionality of innovation’. From a competition law perspective these three distinctions are fruitful to (1) identify that innovation is not a neutral process but given a direction – often by powerful incumbent firms; (2) that there perhaps ought to room to critically assess the actual or possible direction of innovation in order to either address market failure or to guide markets in directions better aligned with the achievement of (non-market) public policy consideration in future; and (3), and most importantly, to engage with an idea of innovation and of (open) markets that would allow a pluralism of ideas and possible outcomes to unfold and to consider this (diverse or polycentric) notion of innovation the true object of competition policy.

First and foremost, we recognise that the Commission states that it was ‘mindful’ of a number of different policy implications when assessing this merger:

In the light of recital 23 of the Merger Regulation, the Commission has placed its competitive assessment of the Transaction within the general framework of the achievement of the fundamental objectives referred to in the EU Treaties. In particular, the Commission is mindful of the potential implications of a possible reduction of competition caused by the Transaction on human health, food safety, consumer protection, environmental protection and climate. The Commission has, in particular, paid specific attention in its review to ensure that post-Transaction innovation in the agroindustry sector is preserved as the key for the emergence of more effective, healthier, safer and more environmentally-friendly products (COMP/M. 8084, paras. 3011).

The decision, however, shows how the Commissions analysis of these issues is not in fact entirely neutral or objective but ‘*directed*’ (1) or predetermined. Since mergers are not illegal, merger decisions naturally centre around the narratives and strategies of the merging parties. And while it is fair not to consider the entire industry or field of enterprise, this also means that the analysis of the underlying issues, such as competition, innovation, sustainability, food security, is often not neutral or unbiased. This critique supports what Stirling has identified as a common phenomenon: that ‘developments in particular fields of innovation (like biotech, agrifood, computing or energy) (are) routinely oriented by incumbent interests in these settings’ (Stirling 2008). This incumbency bias and hence direction of innovation is an important critique of the merger decision and its analysis of the urgent issue of food security. While Bayer and Monsanto’s innovation efforts on crop resistance possibly offer one solution to the problem of food security, i.e. further crop modification and genetically enhanced crop resilience, it is by far not the only or the most environmentally-friendly solution. Focussing only on a narrow corridor of possible innovation efforts in this regard (and as defined by Bayer and Monsanto) does not only overlook possible alternatives but may also wrongly help to justify a detrimental further concentration of this industry, thereby leaving little room for possible alternative solutions. Most importantly, it allows innovation and the assessment thereof to be ‘directed’ (guided

and determined) by the merging (incumbent) firms. Identifying this directionality is crucial for a fruitful discussion of the interaction between innovation and competition in future.

This leads to the second observation relating to the ‘directing of innovation’ (2): Innovation in merger cases is not devoid of directionality or of normative questions (i.e. which outcomes are best served with which resources) but these are, to date, not scrutinised or critically assessed. Ignoring question of directionality and how innovation is being directed has real-world implications post-merger: with an increased concentration of market power (most often) comes the ability to further steer and direct this innovation in favour of projects envisioned by the incumbents, possibly to the detriment of other public policy goals.

Last and perhaps most importantly, this decision has been criticised for its static, narrow and predetermined view of competition. The authors Deutscher and Markis (2022) criticise the Commission’s backward-looking and output-oriented analysis for methodologically corresponding too much with the analysis of price competition, thereby overlooking much of the actual innovative potential of the sectors in question and ignoring larger normative questions at stake: ‘A key concern of this consequentialist understanding of innovation that underpins the Commission’s approach is whether post-merger the parties will produce more or less innovation quantity and quality. Quality is understood in single-dimensional terms as commercial success or technological relevance’ (Deutscher and Markis 2022, 20). In addition, the quantitative criteria such as the number of patents cited and the investment in AI processes, the decision only focused on already existing innovations, approaches and projects. This benefits the companies already competing on these parameters and ignores alternative approaches and advancements. This is not, however, only a criticism of the Commission’s method but also of its perspective on competition and innovation. As stated by Deutscher and Markis: ‘Such an approach ignores the multi-dimensional aspect of quality of innovation as it examines only whether a merger can undermine the process of innovation that is geared towards conventional agriculture’ (Deutscher and Markis 2022, 20). They thus propose a polycentric view of competition. As explained by Lianos (2018a, 161)

polycentricity has close affinities with the concept of polyarchy that has been put forward in democratic theory as a variant of democracy which provides each member of the society the opportunity to express his or her preference, not so much in order to express a diversity of opinions or values, but because this enables each member of the society to make a rational calculation about alternative policies. (see also Ostrom, Tiebout and Warren 1961; Polanyi 1951)

When looking at innovation Stirling (2024) too proposes that questions of ‘directionality’ must lead us to consider the ‘disparate milieux in which these play out’ and to ‘grasp the potential pluralities at play’. Directionality, but also competition and innovation, should thus be embraced for the potential multiplicities and pluralities and assessed in as far as possible as systems that ought to be (kept) open to embracing new ideas, methods and approaches. Rather than greater output potentials or mere increases in efficiencies this is the true value of the systems in question.

Towards a new theory of harm?

It would take some time and competition law practice to develop a sound theory of harm that is inspired by the (philosophical) insights on directionality. What can be suggested

so far, however, is that competition authorities and courts develop a more critical attitude towards innovation and concentration. This means looking beyond the quantity of the innovative potential at play (the amount of investments and patents etc.), to consider the scope and diversity of innovation in markets and industries post-merger. While *directionality* has become somewhat of an ephemeral philosophical term, it is not difficult to identify directionality and who certain innovative efforts and capabilities serve, and which potential market barriers will be difficult to compete against post-merger. Many of these factors already play a role in competition and merger analysis. Particularly in difficult cases with a number of competition law concerns, the identification and critical assessment of directionality issues, as opposed to the mistaken assumption that innovation is always an open process, could decide a merger case in favour of greater diversity and competitive rivalry in the market or industry.

Conclusion

Innovation has become essential for our understanding of competition and the dynamic development of markets but also to address the larger normative challenges of our time. This paper has shown how competition policy – in particular merger review, which assess future concentrations of economic power in markets – struggles to integrate innovation considerations (and innovation economics) into its analysis. And where it does, it takes a fairly static and linear approach to innovation and often relies primarily on the perspectives of the merging firms in order to do so. This does not only fall short of realising true nature and potential of innovation but also fails to assess or address more normative consequences of higher concentration in potentially highly innovative markets. Inspired by the literature questioning or critiquing the direction of innovation this paper has shown that directionality considerations can help to (1) uncover incumbency biases in the analysis relevant cases, (2) draw in important normative questions, and (3) help to evoke a more pluralists and diverse understanding of competition and innovation.

Notes

1. Consumer welfare is traditionally understood as the increase of consumer surplus and relevant factors can include price, quality, innovation, privacy. See Alfred Marshall, *Principles of Economics*, 1890, 403 (Marshall 1890). In antitrust and competition policy consumer welfare has, however, often been conflated with overall welfare (to include the consumer and producer surplus) and often applied narrowly only to price effects. See Leah Samuel and Fiona Scott Morton, 'What Economists Mean When They Say "Consumer Welfare Standard"', *promarket* 16.2.2022, <https://www.promarket.org/2022/02/16/consumer-welfare-standard-antitrust-economists/> (Samuel and Scott Morton 2022).
2. EU Horizontal Merger Guidelines [2004] OJ C31/5; EU Non-Horizontal Merger Guidelines [2008] OJ C 265/7.
3. (a) Merger enhances market power if it is likely to encourage one or more firms to raise price, reduce output, diminish innovation, or otherwise harm customers as a result of diminished competitive constraints or incentives' – 65 USDOJ & FTC, *Horizontal Merger Guidelines* (2010), 2.
4. See EU Horizontal Merger Guidelines [2004] OJ C31/5, paras 8, 20, 38 & 81. 67; EU Non-Horizontal Merger Guidelines [2008] OJ C 265/7, paras 10 & 26; European Commission, *Competition Policy Brief* 2016-01.

5. *Syngenta/Monsanto's Sunflower Seed Business* (COMP/M. 5675, Commission decision of 17 November 2010, para. 248 and paras 200 and 207 (finding that farmers would have suffered from reduced choice)); *Deutsche Börse/NYSE Euronext* (COMP/ M.6166, Commission decision of 1 February 2012, section 11.2.1.3.4, confirmed by Case T-175/12, *Deutsche Börse AG v Commission*, ECLI:EU:T:2015:148); *Medtronic/Covidien* (COMP/M.7326, Commission decision of 28 November 2014); *Novartis/GlaxoSmithKline's oncology business* (COMP/M.7275, Commission decision of 28 January 2015); *Pfizer/Hospira* (COMP/M.7559, Commission decision of 4 August 2015); *General Electric/Alstom (Thermal Power-Renewable Power & Grid Business)* (COMP/ M.7278, Commission decision of 8 September 2015); *Dow/DuPont* (COMP/M.7932, Commission decision of 27 March 2017); *Bayer/Monsanto* (COMP/M.8084, Commission decision of 21 March 2018).
6. *Intel/McAfee* (COMP/ M.5984, Commission decision of 26 January 2011); *ARM/GIESECKE & DEVRIENT/GEMALTO JV* (COMP/ M.6564, Commission decision of 6 November 2012); *Intel/Altera* (COMP/M.7688, Commission decision of 14 October 2015).
7. The first case takes place in the agricultural industry, bringing together two of the most important companies in the industry, especially with regard to sunflower seed breeding and the development of new sorts of seeds being more resistant to new forms of pests and diseases. The second case involves the industry of the production of gas turbines, especially of 50 Hz Heavy Duty Gas Turbines (HDGTs) and the related R&D in this particular field. In both cases, several strands of argumentation by the Commission in regard of their impact on innovation can be observed.
8. As summarised by Papaioannou (2024): 'Their hope is that the Schumpeterian motor of innovation (i.e. profit) would keep entrepreneurs incentivised to take up market opportunities while the Keynesian state would support them by investing in infrastructure, redistributing risks and rewards of new technologies.' See also other such innovation theorists, Block and Keller (2011), Fagerberg, Martin, and Sloth Andersen (2013), Perez (2002).

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