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Competition only an Innovation away?!
- a data-driven approach

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ABSTRACT

Increasing parts of the everyday lives of many people are determined by data-driven innovations and the service improvements they provide. This generates a great power to the leading innovators. A power stretching from the influence over the consumers' lives to determining the market structures. Especially fast growing markets like the data-driven one are determined by competition and innovations driving each another. This necessitates a protection of both, the level of competition and the innovative potential. Yet, the question arising in this context is whether there are effective regulations to sufficiently support the potential for data-driven innovations.

This question leads to the research question of the thesis, discussing the possible influence of competition law on data-driven innovations.

Locating the setting within the Federal Republic of Germany, the thesis examines the existing academic literature as well as the present domestic and European Union's legislations. The results of the apart examination are combined in the analysis, to predict the influence of competition law on data-driven innovations.

This combination delivers a clear conclusion to the research question – by appropriately applying the present legislation, the competition authorities can have an at least preservative, if not positive influence on data-driven innovations.

KEY WORDS: Competition Law, data-driven innovations, merger-control, influence, European Union, Federal Republic of Germany, prevention, commitments

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III List of Abbreviations

BKartA	Bundeskartellamt
EU	European Union
GWB	Gesetz gegen Wettbewerbsbeschränkungen
TEU	Treaty on European Union
TFEU	Treaty on the Functioning of the European Union

1. Introduction

The data-driven industry has experienced a great rise in importance over the last decade, with Google, Facebook and smartphones conquering and increasingly determining our world. The industry is fast growing and at the same time seems to be ever changing with innovations popping up daily. Innovations aimed at making life better and easier – today we are able to video-call people via Skype, message them on WhatsApp or write a tweet to let the world know how we are feeling. Yet, data driven innovations are not limited to social networking systems or consumer communication services - it includes a wide variety of services, comprising online maps, search engines, mobile applications and many others. However, in the last years the matter of innovation seems to be limited to a small number of competitors outpacing the rest of the industry. Once a small, uprising, novel start-up succeeds in gaining attention and competitive potential with an innovative idea, their services are soon copied by the big companies or their businesses are acquired by the market leaders (Pontius, 2017).

Such phenomena are in large parts due to the prevailing power of the leading companies and the high concentration of the essential facility of the market, i.e. the data. This market structure allows great advantages to the big companies, which leaves the smaller, uprising businesses at a greatly disadvantaged position (Argenton & Prüfer, 2012). Yet, the unequal distribution of access to data only constitutes a starting point that leads to many other connected disadvantages in the long-run.

The heroes of our times are no longer movie stars or politicians, but more increasingly the college drop-outs Bill Gates, Steve Jobs, Larry Page or Mark Zuckerberg. Many young people strive to become the newest member to this enumeration with their start-ups and novel, innovative ideas. Yet, they face great barriers, erected by their heroes. While some find their services copied and implemented into the services of the big ones, others are faced with acquisition offers hard to reject (Pontius, 2017). Moreover, many companies are shut-down soon after a merger, with only the innovative ideas and engineers recruited by the buying companies (Shontell, 2011). Many of those young people end-up finding themselves stuck in lost promises of a world-wide-web, acquired and robbed of their ideas by the leading companies – their heroes and role-models.

Plus, the mentioned persons are not only the heroes of our times, but have also managed to gain more and more influence over our lives in general. The recently published 2017 Forbes List on *the world's most powerful people* does not only list politicians and federal reserve bank chairs as the ten most influential people, but seat number 7, 8 and 10 are reserved for Bill Gates (Microsoft), Larry Page (Google) and Mark Zuckerberg (Facebook) (Forbes Media LLC, 2017).

Accordingly, them and their companies are great, influential players in the world of data-driven innovations – a world, that is determined by start-ups and bigger competitors fighting for consumer

attention by presenting their newest innovation (cf. Case COMP/M.7217, 2014). Innovations aimed at making our lives better and easier.

This constitutes a relevance for social science to investigate the happenings. On the one hand the overwhelming influence and powerful position of companies like Facebook are greatly discussed in the public discourse. Yet, on the other hand about 1,65 Billion people world-wide use Facebook and more than 3 trillion search request we placed on Google in 2016 (Roth, 2016; Statista, 2017), which makes them and their potential for data-driven innovations a great part of our everyday-lives. This combined forms an even greater demand for social science to investigate the influences possible.

Nevertheless, the authorities have practiced a rather hands-off approach towards the data-driven processes and innovations. For years, the only company that has exceedingly been faced with major competition investigations has been Microsoft. Since 2010, Google has become the target of investigations by the European Union, with the first decision been failed only recently. Facebook on the other hand is only now appearing on the radars of the competition authorities – suggesting the demand for legal control on the actions of the companies (Weber, 2013).

The need for regulations and control is given, it only requires investigations into which legislations are present and whether those are sufficient to turn the current trends into a desirable direction. Especially the described uncompetitive behaviour and acquisitions naturally call upon competition law as a promising tool for such a control. Not only merger control constitutes a great aspect of competition legislation, but also consumer protection plays a great role for the competition authorities. Among others, consumer protection involves the preservation of innovations. Innovations constitute an important contribution to public welfare, leading to their protection and fostering by the competition authorities. Correspondingly, competition law could be a tool to stop the far-reaching practice of the mentioned companies and thereby enhance the innovative potential of the market to ensure the steady increase of public welfare. It also requires investigations into the driving forces behind those life-improving innovations and whether the mentioned practices hinder data-driven innovations or support them.

Therefore, there is the necessity to examine the possibilities competition law can have and whether their present tools are sufficient to influence and stabilise these improvements for social welfare, i.e. the data-driven innovations.

Research Question
The determination of the extent to which we can influence the data-driven processes by our legislation is the major interest of this thesis. This can be done by scrutinising the possible influences competition law can imply on the potential for data-driven innovations.

The overarching, predictive research question of this thesis is:

In what way can competition law affect the data-driven innovations?

The answering of such a complex question requires various sub-questions, that define the variables and their interrelations. Therefore, the following sub-questions are included in order to find a profound answer to the research question.

1. *What are data-driven innovations?* – This first sub-questions should deliver a definition about the dependent variable of this research and illuminate the major requirements and essential facilities for data-driven innovations.

2. *What are the drivers of data-driven innovations?* – In order to analyse the influence on data-driven innovations, one has to determine the general influences on data-driven innovations. This question should provide an overview of those aspects that enhance data-driven innovations and create an environment of intensive innovative potential.

3. *What are the barriers of data-driven innovations?* – When looking at those factors enhancing innovations and the developments, one also needs to look into the other side, i.e. the barriers to innovation. This question is included to deliver an overview on the factors hindering the potential for data-driven innovations.

4. *What is the present competition law, especially concerning merger control?* – This question specifies the independent variable of this research and illustrates the tools of competition law for the authorities to apply.

5. *What is the influence of the identified tools of merger control on the drivers and barriers of data-driven innovations?* – This final sub-question creates the link between the previous four questions and thereby deliver results that allow for the answering of the overarching research question.

Those five sub-questions also present a lose structure along which the thesis will examine and draw conclusions.

2. Theory

The following section will scrutinise and present the existing academic literature on the topic of the research question. In doing so, the thesis will evaluate the academic landscape concerning innovations, their drivers and barriers as well as the influence of regulation in this sector. The assessed concepts are chosen as they present the basic concepts of the research question and therefore require examination prior to the analysis. Accordingly, this section should therefore not only outline definitions, but also present he components of investigation in the analysis. Combining those two aspects, the section will conclude with presenting the graphical framework of the thesis, which will include the relevant concepts discussed.

The selection of articles and studies is based on their relevance to the thesis, which includes their content but also the reputation of their authors in the field of research as well as the importance of the theories presented in the articles.

2.1 Innovations

Before discussing the factors that influence innovations, one has to start with defining what innovations themselves are. Deriving from the Latin word 'innovare', the verb 'to innovate' literally means 'to make new' (Oxford Dictionary, 2017).

Starting with this general explanation, academic literature furthermore defines innovations as "the creation of new (or the efficient reallocation of existing) resources, which contribute to progress" (Pelkmans & Renda, 2014 p. 2). However, to be considered an innovation instead of a simple modernisation or invention, innovations also need to constitute a long-term improvement for social welfare and not deprive resources that could have been used more efficiently elsewhere. Furthermore, in an economic setting they need to have market relevance and market acceptance – the higher a given item or feature scores on those aspects, the more likely it is to be called an innovation (Kusiak, 2009). This addition identifies the demand and satisfaction of customers' needs as the most important driver of innovations. Yet companies have to balance the needs to fulfil those needs and adapt to the market environment in order to meet the innovative potential (Kusiak, 2009).

Having given the broad definition, innovations can occur on various markets and stages of the process and are not limited to specific settings. Looking at the definitions made by the OECD concerning innovations, one will find a categorisation into four different types, which discuss the various stages of an organisation (Pelkmans & Renda, 2014 p. 2). This also highlights the idea of the variety among innovations. Another important distinction to be made among innovations is whether they are disruptive or incremental. Disruptive innovations are the radical type, where the old is fully replaced by the new. This type presents a riskier approach on the one hand, as the replacement of something may fulfil the demand but also fail to be an improvement. Yet, on the other hand the benefits of this type are usually

much higher than the ones of the incremental innovations. These, in turn, are described as 'follow-ons', which rather deliver small improvements to the status quo (Pelkmans & Renda, 2014 p. 2).

This general definition of innovations should provide the basis for the upcoming sections. The importance of variance among innovations should have become apparent and is of great consideration when following the upcoming sections – being an overview of the various drivers and barriers of innovations, as well as the influence of regulation on the latter.

2.1.1 Drivers of Innovations

One of the factors in this context named frequently across the academic literature and economic theories is capital or financial capacity. Investments in research and development (R&D) provide the basis for innovations in many companies, which accordingly require a certain amount of monetary resources to be allocated to this department. Expanding on this idea, Austrian economist Schumpeter created the equation that the more financial resources a company has, the more it is able to invest in R&D and is therefore able to make use of its innovative potential (Blind, 2011). This is in accordance with the findings of Pelkmans & Renda (2014), which define availability of funds as one of the main drivers of innovation. In their article they have also identified appropriation as another important driver. The more demand there is for innovations, the more likely companies are to engage in the process. Concurring with Motta (2004, p. 64) the authors also mention legal protection and patent law in this context, as a way to solve potential issues. They highlight the importance of these factors in this context, as there would be no incentives for a company to innovate if its competitors can easily copy and simultaneously apply its innovative ideas. However, there is no consistent picture regarding patents as innovation drivers across the academic literature. While the mentioned two studies consider them important, Blind (2011) has a more nuanced view on the topic. He highlights the positive influence of weaker protection regulations, as those might encourage diffusion and variety. Those aspects can also lead to innovations. A way out of this dilemma is considered to be an appropriate implementation of patent law according to the demands of the market (Blind, 2011, p. 394).

Other drivers identified are firm-size, education of workforce, and export activities (Blind, Petersen, Rillio, 2016). According to Blind et al.'s (2016) analysis, firm-size and education of workforce significantly increases the innovative potential of companies – the larger the firm and the more educated the workers, the greater the innovative potential of a company. This might have a connection to the above mentioned innovation driver of financial capacity, as a larger firm usually has more capital left to spend on R&D than a small or medium-sized one. Furthermore, Blind et al. also identified export activities as a driver of innovation. They highlight the greater and differentiated competition exporting

firms are facing, being competitive on different markets with different demands. Especially export activities on the European market seem to have a positive influence on the innovative potential (Blind et al., 2016). Having defined export activities as a driver in more detail, one arrives at demand and competition as the essential factors in this context. Considering demand, this is also in line with the research done by Kusiak (2009), who considers customers' needs and demands as a major incentive to innovate. An examination of the demand is presented as essential, yet unsatisfactory if considered as the only source of evaluation.

When discussing competition as an incentive for innovation, we arrive at one of the most discussed topics in the literature and one with great importance to this thesis. Being the main focus of the thesis, the influence of competition on innovations needs to be carefully examined. Following the earlier mentioned theory of Schumpeter, innovations are considered a way of 'creative destruction' (Kusiak, 2009). They are used to reach market dominance, which makes competition not necessarily an incentive for innovation but more the strive to become the dominant undertaking. The example given in the literature is Polaroid, which managed to emerge as a leading company for instant photography but lost its status due to the rising innovations in the photography industry (Kusiak, 2009). Focusing a little more on Schumpeter, he did not only present the theory about creative destruction, but directed most of his work towards the role of monopolies and arrived at the conclusion that not competition but monopoly is the driver of innovations. His conclusions reveal that monopoly power increases the R&D efforts much more than competition does. However, other authors presented competition as one of the main incentives to innovate (D'Este, Iammarino, Savona, von Tunzelmann, 2011). This lead Aghion, Bloom, Blundell, Griffith & Howitt, P. (2002) to investigate the relationship of competition and innovation in
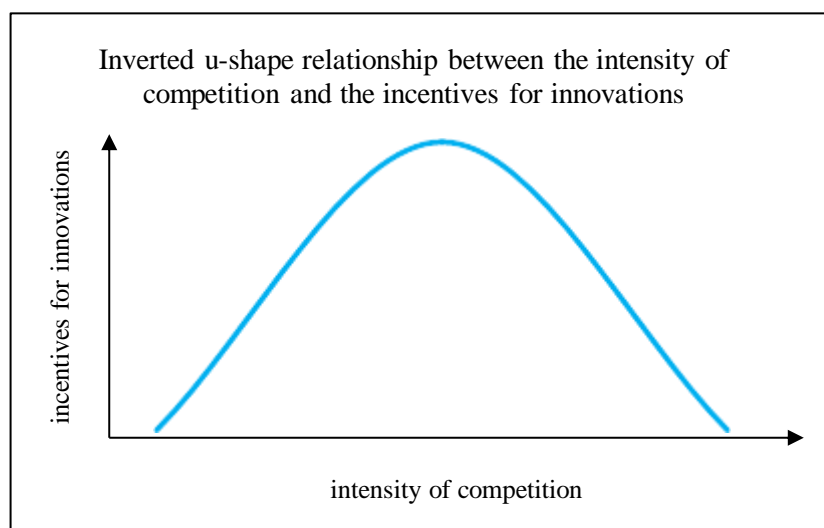
Graph 1: Illustration of the relationship between the intensity of competition and the incentives for innovations (illustrating the work of Aghion et al. (2002))

more detail. They concluded their investigations with an inverted u-shape to best describe the relationship between the intensity of competition and the incentives for companies to invest in innovations. Consequently, the environment best suited for an innovation requires a certain level of competition and market power, yet no monopolies or too dominant market position.

Controversially, this equation only works if the market power derives from innovative activities – this reveals the possibilities of innovations for the others companies on the market (Kusiak, 2009; Motta, 2004, p. 57).

Graphical Display

The figure included should summarise the aspects mentioned in the section above. As some aspects influence the ability to innovate and some present incentives to innovate, the aspects are differentiated accordingly. Another categorisation possible is the level on which they influence innovations, being either the company specific one of a general market influence. The attached colour reveals the respective level of influence, i.e. green for company specific and white for market. Half coloured boxes indicate that the aspects can be considered market and company level influences[1] at the same time.
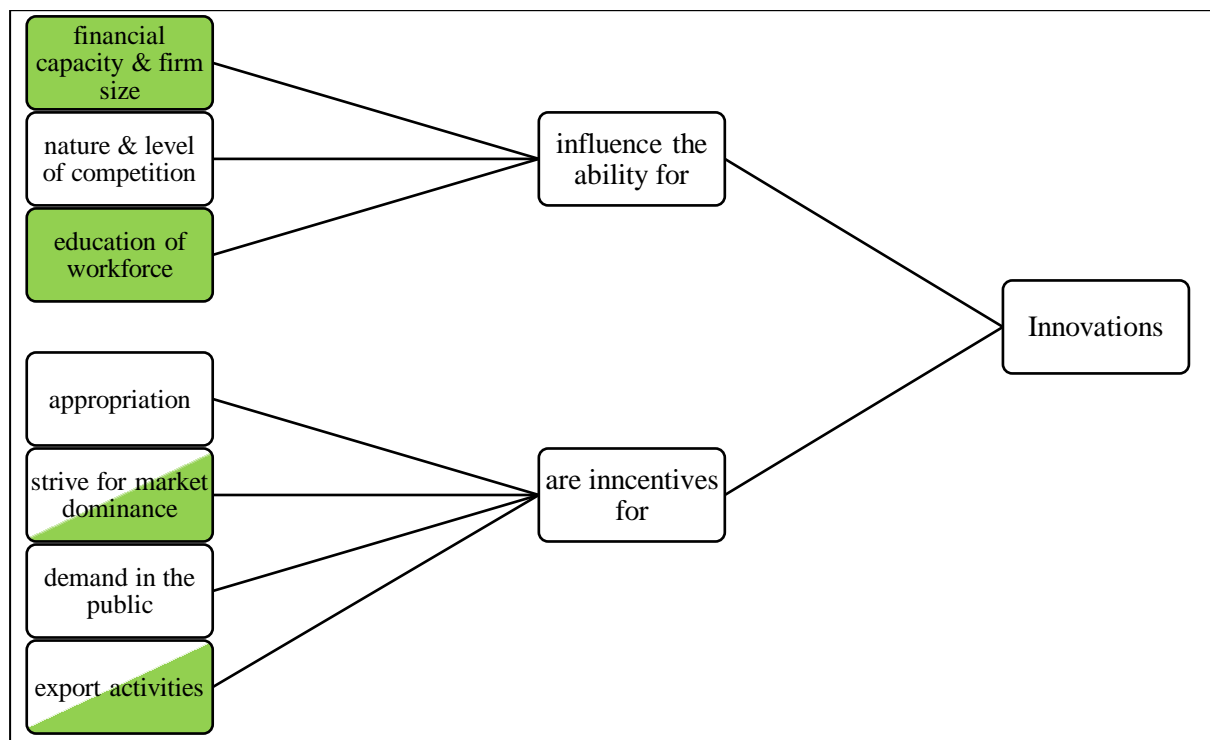
Figure 1: Graphical illustration of the drivers of innovations

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[1] ‚Strive to market dominance' can be considered a company specific incentive, yet it is highly dependent on the level of competition, which is a market factor. ‚Export activities' of an individual company can increase the incentives for this company to innovate – usually however the entire market is involved in such activities, therefore it can also be considered a market level influence.

2.1.2 Barriers of Innovations

As the end of the previous section has hinted at, there are not only drivers to innovation but also barriers decreasing the innovative potential of a particular company or market.

When discussing these barriers, one finds various distinctions in theories and the academic literature. One has to differentiate between intrinsic, company-specific, and general market factors; another distinction has to be made between revealing and deterring barriers to innovations. The latter distinction marks the difference between those barriers which 'reveal themselves' during the process of innovating to companies engaged in the process, and those which 'deter' companies from engaging in the process in the first place.

Considering revealing barriers, the more a company is involved in innovating, the more it is faced with such barriers and the more it pays attention to them. The barriers represent problems, which are not effectively encountered until firms face them (D'Este, et al., 2011, p. 483) during the process. Therefore, the more a company is involved in the process of innovating, the more it is likely to face them. Such barriers tend to slow the process but usually do not stop companies from engaging in such activities. They are more likely to be considered mistakes to learn from (D'Este et al., 2011). Allowing for this disclosing and learning effect, such barriers rather present obstacles companies are able to overcome but not hindrances that influence the ability to innovate. The barriers can be company-specific as well as general market factors, depending on the situation in which they occur (D'Este, et al., 2011, p. 486f.). As the attribute assigned to the second type already indicates, deterring barriers are those that prevent companies from engaging in innovating at all (D'Este et al., 2011).

Having explained this distinction in more detail, there is also the distinction to be made amongst barriers that affect large, established firms and those that tend to impact smaller, new firms. Obstacles that the former are most likely to face are 'path-dependency' and 'lock in' (D'Este, et al., 2011, p. 484). Loosely based on the saying 'never change a winning horse', both of these barriers lead to a reluctance to innovate as the status quo is considered a fair, efficient way of running things. For many of the established organisations processes become routines, which are difficult to be changed. Also, those routines hinder the employees from thinking outside of the box in order to identify new chances for an increased efficiency in the first place. Furthermore, those established companies weigh the efficiency improvements against the cost of innovating, where the latter factor is usually higher (D'Este et al., 2011, p. 484). Many organisations are therefore 'locked into' their routines and hardly deviate from their paths.

In contrast, the smaller, new firms generally have to face a lack of resources and the existing market structure as the biggest barriers to their innovative potential. The lack of resources can be specified as a lack of profound expertise, knowledge, organisational skills and financial power and support (D'Este et al., 2011, p. 484). Being a new company on the market means that one might have an innovative idea,

yet is lacking the financial means that bigger and more established competitors have. Likewise, expertise and knowledge are needed during the phase of implementing an innovation, where newer companies might run into problems due to a lack of experience.

Market structure instead concerns the idea of competition, firm size, and appropriation conditions as specific barriers (D'Este et al., 2011, p. 484; Pelkmans & Renda, 2014). Many of those market structure obstacles are not easily feasible for new enterprises and therefore provide a great barrier to innovations for them. This is the point where competition and competition regulations become important again. Having mentioned them as a driver, it can also be barrier to innovation. Following the outlined argumentation, the settings of rather large, competitive markets in general are the hardest to adapt to and innovate within (D'Este, et al, 2011, p. 484). Those obstacles "present reasons for withdrawal and failure without learning" (D'Este, et al., 2011, p. 487) for many of the new enterprises.

Dwelling a little more on the issue of competition, one has to refer back to the theories mentioned under 2.2. While creative destruction can be a driver of innovation for one company, it is also likely to be a barrier for others on the market to engage in innovations, as it can lead to anti-competitive innovations. While aiming at becoming a market leader can be a great incentive to innovate for many companies, failure or being outcompeted generates frustration and discouragement for others (Kusiak, 2009). Once being successful with an innovation and having gained the market power, companies are tempted to imply measures preserving this market power. Such measures can be anti-competitive innovation. Those include placing new products on the market which do not improve a previous one but are purely aimed at depriving market shares from competitors, by this also enhancing the entry barriers for others. Such actions can take various shapes, such as new products where the consumer cannot differentiate between the technologies at hand or where a dominant undertaking on an upstream market uses its power to influence the competition and promote its own services on a downstream market. Possible influencing factors in those cases are especially licensing and interoperability (Devlin & Jacobs, 2012).

Another aspect identifiable as barriers to innovations are market response and risks. Many companies refrain from innovating because they are afraid to miss the demand of the market and therefore fail with their innovation (D'Este et al., 2011).

Having mentioned financial resources and competition in this section which have already been discussed in their function as drivers in the previous one, this holds true also regarding other barriers as well. As this section has shown, one can undoubtedly turn some of the drivers outlined above around and define them as barriers, depending on the context. An example would be financial resources, where their availability is a great driver but the lack of it a great barrier (Blind, 2011).

Concluding, there are various aspects influencing and hindering the innovative potential of a company or market. The similarity between some of the drivers and barriers can be explained by the extent to which they are present.

Graphical Display

This figure should again present a summary, yet this time to illustrate the barriers of innovations. Similar to the graph presented in section 2.2., the factors hindering innovations are categorised according to the level of their influence. A differentiation between incentives and ability is not included.
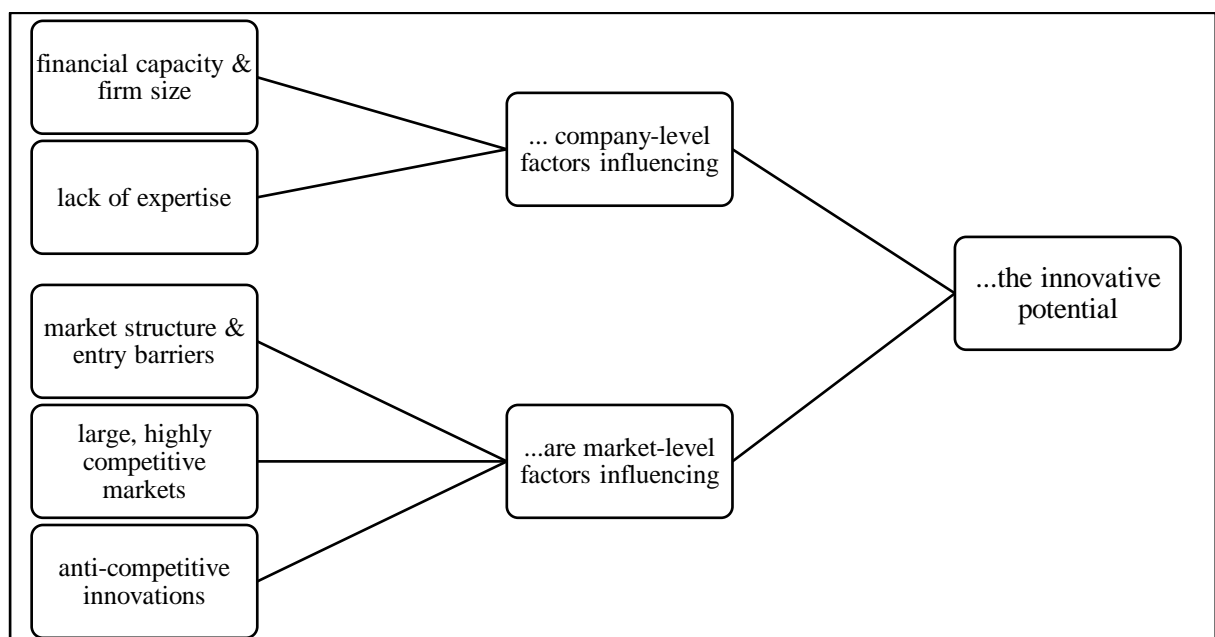
Figure 2: Graphical illustration of the barriers of innovations

2.1.3 Graphical Summary

This figure should illustrate the various possible influences on innovations identified in the previous two sections, i.e. the drivers and barriers. The influences are again differentiated according to their level of influence. The attached colour indicates, whether the factor can be considered an incentive to innovate or rather influences the ability to innovate. As the two previous graphs and sections have shown, it is not always easy to clearly categorise influences as either barriers or drivers of innovations. In order to avoid too many considerations in the graph and avoid the problematic categorisation into driver or barriers, the graph only includes the mentioned differentiations into levels as well as incentive and ability as a second criterion.
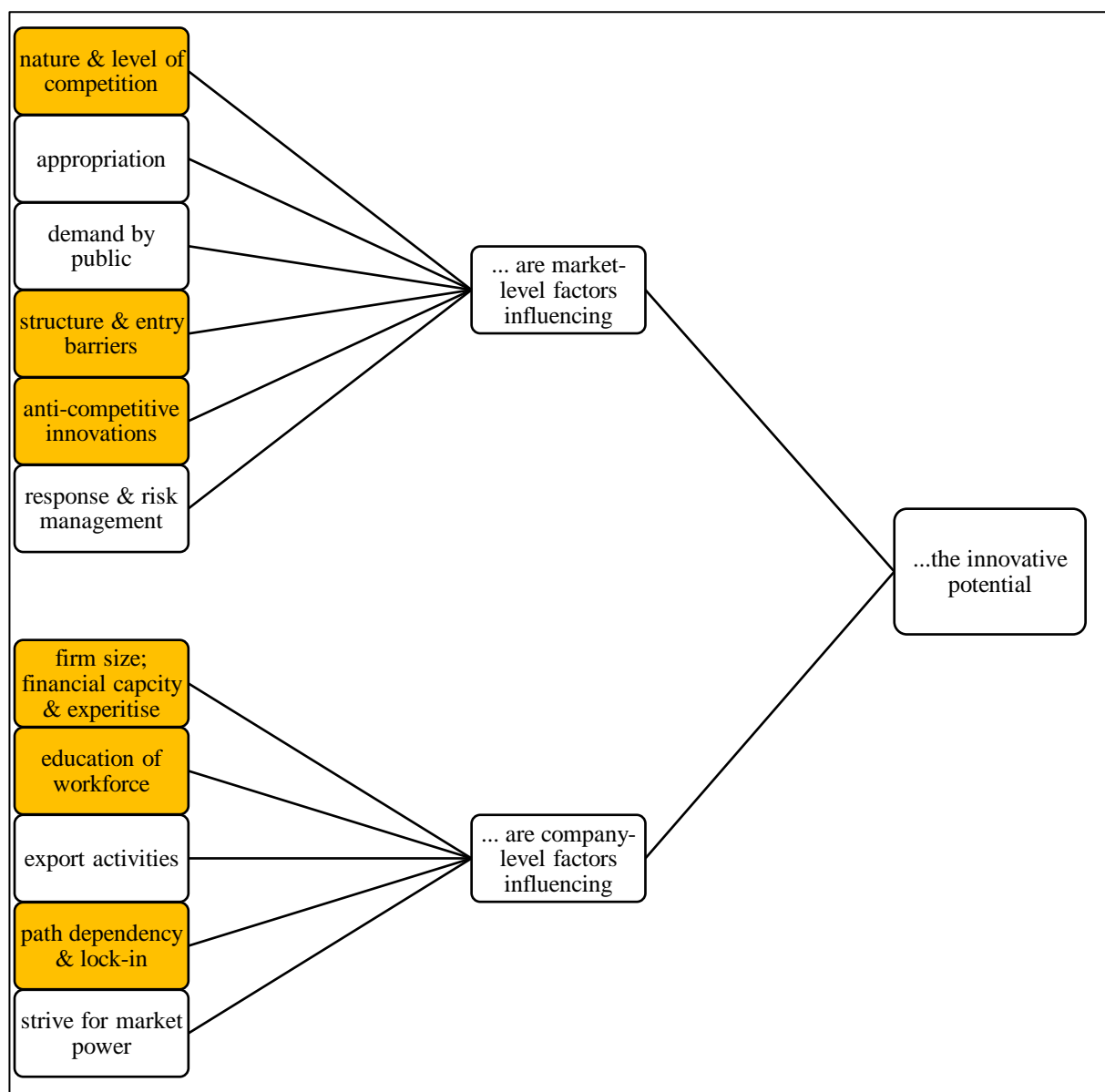
Figure 3: Graphical illustration of the factors influencing the innovative potential

2.1.4 Regulation and Innovation

As the previous chapters have already alluded to and discussed, regulations can be drivers as well as barriers to data-driven innovations (Blind, 2011; Motta, 2004; Pelkmans & Renda, 2014). Considering that this thesis is precisely concerned with predicting the effect of competition regulation on innovation, this specific sub-chapter will discuss the relationship between regulation on the one hand and innovation on the other in more depth.

Which kind of influence it will have depends ultimately on the type of regulation as well as on its implementation, as this final part will uncover. A well designed regulation can increase the incentives to innovate, as it encourages changes or demands adaptions in order to meet its requirements (Blind et al., 2016). Yet, compliance with the legal framework can also constitute a burden in terms of innovation. Taxation for example draws monetary resources that could have otherwise been invested in R&D (Blind et al., 2016).

2.1.4.1 Ex-Ante vs. Ex-Post Regulation

When assessing the relationship between regulations and innovations, one has to pay attention to the differentiation between ex-ante and ex-post efficiency and regulations (Motta, 2004). Governments usually have to evaluate their interests, whether to enhance innovations in ex-ante regulations and their goal of enriching society through the availability of such innovations to everyone through ex-post regulations. To generate innovations in less innovative markets, law-makers employ regulations in order to increase the innovative potential. Such regulations are usually connected to advantages for innovative firms, such as funding or legal protection. As those regulations are employed to get companies engaged in the innovative process and therefore before the innovations have actually taken place, they are considered to increase the ex-ante efficiency (Motta, 2004, p. 65). The advantages granted in the regulations however might hinder the sharing of the innovations and therefore hinder the greatest possible increase of public welfare. The most common example for ex-ante regulations enhancing innovations are patents, as they grant the innovative companies exclusive rights to produce and distribute their innovations. However, exclusivity is usually connected with high demand and low competition, leading to price increases. Another problem arising is a possible incompatibility with competitors' products, which demands the users to buy whole product lines from a single producer, further decreasing competition.

As governments try to achieve this greater goal, they are faced with an internal conflict: Scrapping or changing the regulations imposed earlier would generate distrust and therefore a decreased motivation to engage in further innovations for companies, while consumers and competitors would appreciate such

changes for their own benefit (Motta, 2004, p. 65). The increase of the ex-post efficiency therefore creates problems of its own. On the whole, it leaves one with the conclusion that regulations effecting the ex-ante efficiency often increase the innovative potential and can be considered a driver, while targeting the ex-post efficiency bares the risk of generating disincentives to innovate.

<u>2.1.4.2 Aspects determining the Influence between Regulation and Innovation</u>

Pelkmans and Renda (2014) have investigated the influence of regulation on innovation to a great extent and have identified five different aspects of regulation, which determine the relationship.

1 Administrative regulation

The first one they discuss are administrative regulations, which are largely considered as burdensome. Especially the creation of red-tape takes up a lot of resources and time that could have been used more effectively elsewhere. Such regulations also intensify entry barriers. If new companies are faced with too great amounts of administrative work, they might lose interest to further develop their idea and see red-tape as too great of a burden to deal with (Pelkmans & Renda, 2014).

2 Compliance

As mentioned above, a regulation can be an encouragement to innovate, if it demands changes from the companies in their working-processes or outputs in order to comply with the requirements of the regulation. However, if the requirements are too high it can erect entry barriers and or even force competitors out of the market because they cannot meet the requirements. This in turn will obviously decrease the innovative potential of the market (Pelkmans & Renda, 2014).

3 Timing

If a regulation is placed at the right time and with an appropriate timeframe for implementation, it can place pressure on an industry to implement changes in order to comply with the regulation. Yet, if it allows too little time for the implementation, many companies are faced with the threat of being penalised or forced out of the market due to a possible incompliance with the regulation. This would decrease the incentives of those companies to innovate, as they would have to focus all their resources and time on complying with the regulations. Granting too little time also fails to increase the incentives to the desired degree, as the companies do not feel the pressure of having to comply and change. Therefore, timing can be a fruitful tool to enlarge the innovative potential, but it has to be used wisely and appropriately (Pelkmans & Renda, 2014).

4 Flexibility

The fourth characteristic identified is flexibility, which when used right can increase the potential of the market but also kill the alternatives if applied imperfectly. Outcome-based, flexible regulations tend to increase the innovative potential of the companies as it requires them to come up with their individual ideas to meet a target set by the government or authorities. This usually enhances the creativity of the companies. Too strict regulations in turn destroy alternatives and therefore hinder innovations from developing (Pelkmans & Renda, 2014).

5 Uncertainty

The final characteristic identified by the authors is legal uncertainty. Uncertainty can enhance the creativity of companies, as the introduction of innovative practices can be a way to prevent further regulations by the governments. However, long-term developments need a fixed and stable regulatory framework to advance (Pelkmans & Renda, 2014).

Summary

Summing up the characteristics of regulation, one can conclude that the first as well as the final characteristic – administration and uncertainty – both tend to have a slightly different influence on innovations than the others. While the other three can either have a positive or negative impact, depending on their implementation, the negative influence prevails with the mentioned two. Due to this, one can consider them as barriers to innovations, while the others can either act as incentives or as disincentives. This again leads to the conclusion, that regulations can either be barriers to or drivers of innovations – always depending on the way they are written and implemented. A graphical summary is presented in the following:
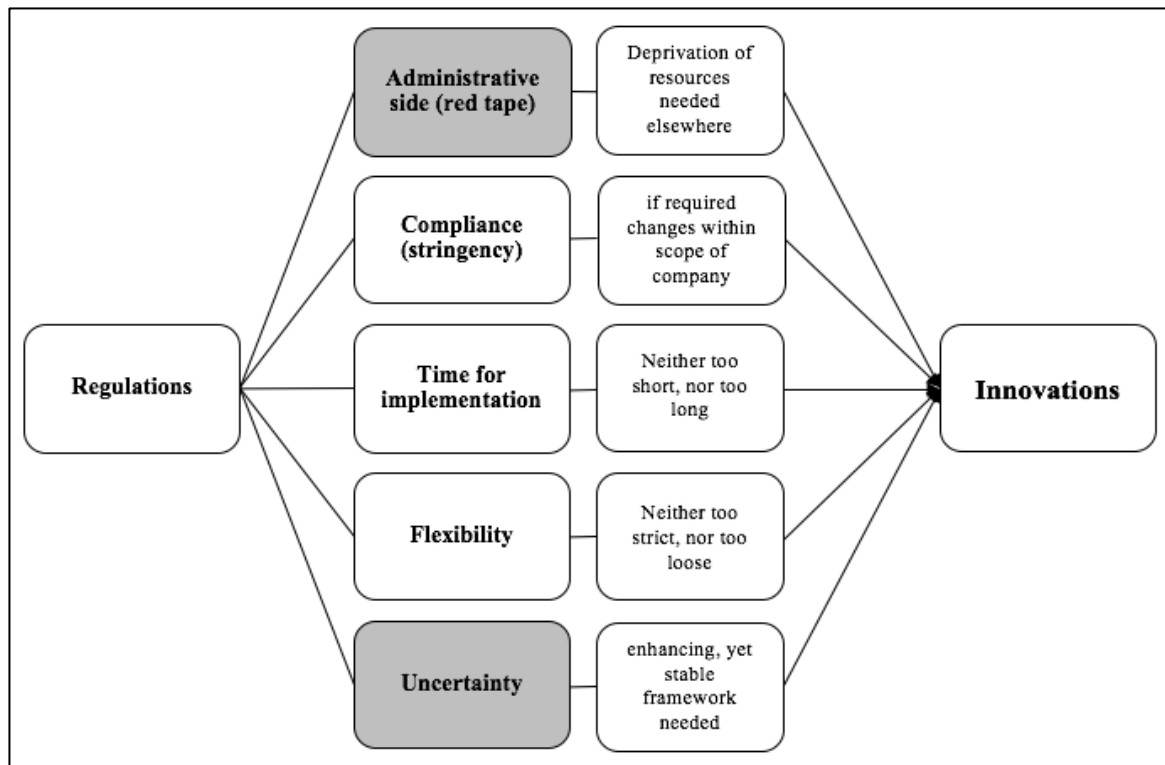
Figure 4: Influence of regulation on innovation (illustrating the work by Pelkman & Renda, 2014)

2.1.4.3 Standardisation as a type of Regulation

Another aspect of regulation is standardisation, which is discussed to a great extent in Blind et al. (2016). Publically demanded or privately initiated, a self-regulation of the market in general seems to erect lower barriers than its top-down governmental regulation-counterpart. However, especially with standardisation one has to keep in mind influences such as regulatory capture and asymmetry. Standards are usually highly influenced by the leading companies and will therefore rather benefit them instead of the smaller ones (Blind et al., 2016). Another thing to consider in this regard is that such standards might also destroy alternatives if they are set to early or lead toward disruptive innovations, which do not increase the public welfare but rather damage it (Pelkmans & Renda, 2014).

Summing up, this overview presents the mentioned ambiguity, whether regulations are drivers of or barriers to innovations. A way out seems to be the close and extensive examination of the context in which a specific regulation is to be placed in order to avoid the creation of barriers.

2.1.4.4 Overview of the Relationship between Competition Regulation and Innovation

Considering competition, one has to relate back to the mentioning in section 2.1.1 about the so-called inverted u-shape relation between competition and innovations (Aghion et al., 2002). For regulations to

be innovation-encouraging, policies need to aim at creating the "'right' level of competition" (Motta, 2004, p.57), which are hard to generate and implement. At the same time, they are needed as "competition enhancing and securing policies increase incentives for companies to invest in innovation" (Blind et al., 2016, p. 393). Therefore, the need to pay special attention to the context might even be of greater important when it comes to competition policies than when considering the general relationship of regulations and innovations.

2.2 Data-driven Innovations

One of the major disruptive innovation was placed with the internet and the possibility to use data to provide services and target the public's needs. Since then data-driven innovations have played a major role and have become one the driving forces of the economies in the twenty-first century (OECD, 2015). Such innovations distinguish themselves from others through the use of data, generated mainly through information and communication technologies. The need for data has since generated an exceptional increase in data collection and the persistent power of analytics is by now available not only to the big players but also to small and medium sized enterprises. By extracting value from information and being able to process this information, companies across various sectors have become involved in the technological development and have used the generation and collection of data to improve their respective services and products (OECD, 2015). The most prominent examples are internet companies such as Facebook or Google, yet also companies from the 'offline-world' such as sports goods producer Adidas have presented innovations involving the usage of data.

Coming from this development, the OECD has settled with the following definition for data-driven innovations: "[D]ata-driven innovations refer to the [usage] of data and analytics to improve or foster new products, processes, organisational methods and markets" (OECD, 2015).

2.2.1 Drivers and Barriers of data-driven Innovations

Sections 2.1.1 and 2.1.2 in particular have highlighted the various influences that impact on the existence and extent of innovations. These influences can appear on the market level as well as on the individual company's level and impact the ability to innovate or simply create an incentive to do so. However, those two sections have discussed the topic of innovation from a more general point of view. As the thesis considers the impact of certain influences on data-driven innovations in particular, there is the need to pay special attention to an essential feature of those innovations identified above – the data (OECD, 2015). Being an essential requirement, the accumulation of data brings along several additional factors influencing the innovative potential of a given company or market. Due to the lack of finding relevant academic articles and information directly defining the specific drivers and barriers of data-

driven innovations, the following aspects are mainly theorised from the previous sections and various articles relating to the data-driven market in general.

2.2.1.1 Essential Feature: Data & Technical Know-How

The most obvious aspect of consideration for the innovative potential on the data-driven market is the access to its essential feature, namely the data: Simply put, in order to generate innovations, one needs to have access to data (OECD, 2014; OECD, 2015). Yet, the access to data requires the free flow of data on the internet and therefore incentives for consumers to share information (OECD, 2014, p. 42). The free flow of data and access to data therefore most prominently determine the ability of a company to engage in the development of data-driven innovations. Furthermore, factors such as technical expertise and know-how of how to effectively use the acquired data, influence the ability in the next steps.
This includes for example the development of efficient algorithms for search engines or the ability to integrate information gained with the help of the data into the functioning of a company's service (OECD, 2014). This, in turn, requires greater financial capacities for development and construction of those abilities as well as the training of the employees (Weber, 2013).

2.2.1.2 Entry Barriers as Barriers of data-driven Innovations

All of these aspects combined create relatively high entry barriers into the data-driven market, which are further increased by other tendencies. Those tendencies mainly hinder the free flow of data on the market, especially between companies, such as single-homing in some segments of the market and network effects (Gebicka & Heinemann, 2014). This includes factors such as data-portability and switching-costs (Weber, 2013; Yoo, 2012), which are greatly discussed in the academic literature applied in this thesis[2] and highly influential for the market and new, potential competitors. Another aspect with great influence is the fact that many of the data-driven services are free of charge. While other markets are determined by price competition the data-driven market mainly focuses on quality and features, requiring the companies to invest more into research and development to keep up with ongoing innovations. Competition on the data-driven market is therefore driven by innovations and the other way around, making the combination an essential feature of the market (Weber, 2013). This feature also calls upon patents and intellectual property rights to regulate the innovations. Yet another aspect considering the ability to innovate and to meet the demands generated in the public are the organisational changes required to create innovative ideas, which are comparable to the barriers defined above as locked-in (OECD, 2014).

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[2] cf. for example Weber (2013), Yoo (2012) and Prüfer & Schottmüller (2017)

2.2.1.3 Special Role for Start-Ups

A factor requiring a little more attention as well as a slightly different approach from the one above is company size: While innovations in general are more likely to be implemented by the bigger companies, data-driven innovations sometimes require smaller firms. Start-ups are usually much more agile and flexible concerning demands formulated in the public. This characteristic allows them to react faster and present better fitted innovations to satisfy public needs than larger companies. Start-ups and not necessarily the big companies are therefore a driver of data-driven innovation (Kusiak, 2009; OECD, 2014).

2.2.2 Summary

This section should have highlighted the specific influences impacting data-driven innovations. Some aspects identified show great correspondence with the ones acknowledged in the previous section. However, there are some specifications feasible for data-driven innovations, which need to be taken into account.

2.3 Summary and Graphical Framework

Summing up, this chapter has attempted to provide an overview of the most influential drivers of and barriers to innovations identified in the academic literature. As the research topic of this thesis discusses the influence of competition law, special attention needs to be paid to this facet. Discussing the influence of competition legislation on data-driven innovations, one needs to investigate the various influences of competition in the first place, including the types of competition which include among other economic and product competition. The latter has been identified as an inverted-u shape, which allows for the conclusion of a positive relationship between ('a right level') competition and innovations. Yet, the research question of this thesis discusses the influence of competition law and not competition itself, calling for the importance of section 2.4. Having presented the overview of the general influence of regulation on innovation and of competition regulation more specifically, one can draw an ambivalent conclusion. The nature of the relationship highly depends on the context and implementation of the regulation. To draw a profound conclusion about this nature will be the core feature of the analysis. Therefore, this section will end with the following graphical framework.

This graphical framework includes the main research question as the direct influence of competition regulation on innovation. However, it also shows the indirect influence through the drivers of and barriers to innovation. The two intermediate variables are included, as the following analysis will

evaluate this overall influence, by determining the extent to which competition legislation can enhance the drivers and demolish the barriers at the same time.
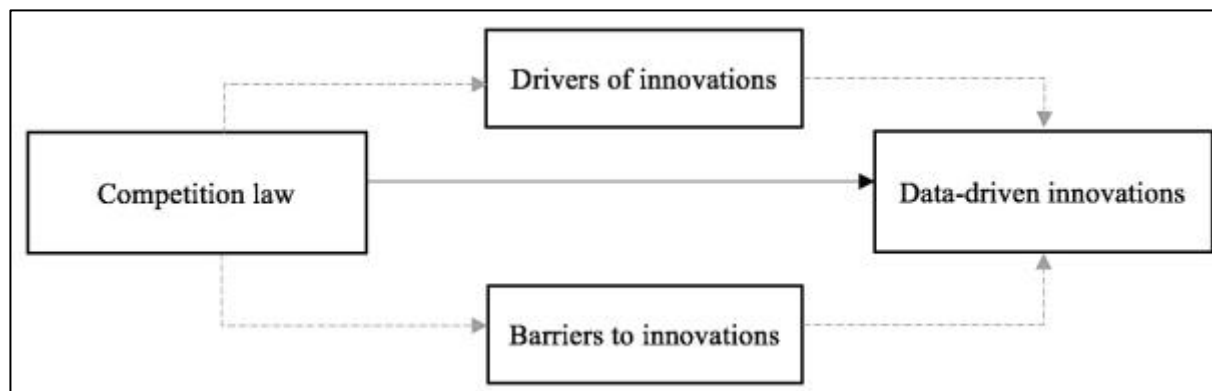

Figure 5: Overall Graphical Framework

3. Data and Documents – The Methodology

In order to conduct a reasonable analysis and find profound answers to the earlier proposed research and sub-questions, the variables of the research need to be fully defined. This includes limiting the concepts to those aspects needed for the thesis. The following chapter will do precisely this limitation of the variables at hand, being competition legislation and data-driven innovations.

3.1 Competition Law

Before going into detail on how to the variable of competition regulation is measured in this thesis, a little more specified conceptualisation is required.

The variable has two decisive limitations in this thesis, the first concerns the setting of the thesis and the second the type of competition regulations examined in this thesis.

Setting of the Thesis

The setting of the thesis is limited to the Federal Republic of Germany. The selection for this setting has various reasons. On the one hand the convergence of German Legislation with the superior, supranational European Law, which allows for a narrow but at the same time broad, international examination of the topic. This should provide the analysis with an extensive set of regulations and legislations concerning prohibited practices and interventions. On the other hand, the selection is highly influenced by the relative proactiveness of the country in the field of competition law and especially when tackling the new, upcoming issue of data-driven innovations. Facebook provides one of the recent examples of companies from the data-driven industry which are facing investigations in Germany.

Type of Legislation examined

Competition legislation comprises the various types of regulations and tools. The aspect of closer consideration in this thesis is merger control. The limitation of the concept to merger control also has its reasons.

The first reasons to settle for merger control is the ex-ante approach of the instruments. While others only come into the picture once the harm is already caused in order to repair damages and limit the extent of future ones, does merger control act before any harms is done. The authorities debate and investigate possible harms to competition before the merger has taken place. This approach allows for a prevention of harms in the first place.

The second reason is the forced intervention of the authorities in the case of merge control. Any merger requires a notification to the authorities as well as a clearance. Without this clearance, no merger is allowed to be conducted on European or German level. This forces the authorities to look into the

happenings and take actions – if only the direct clearance without any further investigations. This also allows the authorities take an active role.

This active role marks the third reason. The possibility of taking this active role in the merger process provides a much greater regulatory function for the authorities than their other instruments. Furthermore, the focus of the investigations and allowance of commitments, especially their extent, offers the authorities the possibility to actively regulate the market and implement policies and structures they consider important and efficiency enhancing. The other instruments of competition law, as mentioned, are more concerned with restoring a previous order than implementing new concepts.

The academic literature also provides various reasons for an in-depth investigation of merger control. One is the definition of comprehensive practices as the way to the future for the data-driven industry (cf. Weber, 2013). This rises the importance of merger control as a tool for intervention. Another reason is the problematic concentration arising by the many acquisitions taking place on the market. This further strengthens the role of merger control as an important tool, which requires in-depth analysis concerning its influence.

Operationalisation

Having made and defined the necessarily limitation for the concept of competition legislation, this section should also give insights into how the thesis has operationalised competition regulation or merger control, to measure their influence on data-driven innovations.

The legislation is made measureable by considering the tools of merger control available to the authorities – the prevention tool and the commitment tool. Those involve the various aspects, such as an investigation of the harms of competition caused by merger or market structures. A closer definition of the concepts will be made in the analysis.

3.2 Data-driven Innovations

The dependent variable identified in the research question is data-driven innovations. However, one can hardly measure innovations as such, wherefore the concept will be operationalised as the potential for data-driven innovations. As the theory section should have revealed, the likelihood of innovations is determined by the presence and interplay between the driver and barriers of innovations. Hence, innovations and their potential will be measured by the presence of those drivers and barriers and their likely possibility to affect data-driven innovations. This concludes that essentially not the influence on data-driven innovations is measured, but the influence on the drivers and barriers of such – which is also revealed in the graphical framework (cf. section 2.3).

Another limitation to be included at this point is limiting the wide scope of data-driven innovations. Data-driven innovations nowadays are developed and launched by a great variety of companies, which are part of the online and offline world. Due to time and capacity issues, the investigations have been limited to mainly data-driven innovations taking place on the online-markets.

Accordingly, data-driven innovations are operationalised as the likelihood of market access, the conditions of start-ups, the extent of data-accumulation, access to essential facilities, which include data and technologies, and the level of competition.

3.3 Influence of Competition Law on data-driven Innovations

As the previous section of this chapter and also the graphical framework in section 2.2 haven given away, the influence of competition regulation on data-drive innovations will be measured by applying the tools of merger control on the drivers and barriers of data-driven innovations. As the thesis is conducted as a desk-based, predictive research, the influence is not measured via a regression analysis or by running interviews and surveys. However, the analysis is conducted by creating a theoretical connection between the tools of merger control and the drivers and barriers identified in the theory chapter (2). The analysis flows along the lines of the guidelines of the authorities on the application of the tools of merger control and thereby examines the theoretical influence of those on the drivers and barriers of data-driven innovations. In doing so, the thesis identifies the explicit tools and aspects of merger control and how those can have an impact on data-driven innovations. Especially the prevention tool is specified as harms caused by merger to the current state of the market and the entry barriers. This requires the analysis to examine the influence of those harms on the potential for data-driven innovations and to conclude with an evaluation, whether the harms caused by mergers consider the influences on data-driven innovations. The results of those evaluations allow for a prediction, whether the reasons to prevent a merger consider the potential for data-driven innovations and therefore can have an influence on data-driven innovations by preventing merger – essentially, whether the tools of merger control theoretically consider the innovative potential sufficiently. The same procedure is done for the commitment tool, considering the extent to which the allowed commitments are able to sufficiently remedy the harms to potential for data-driven innovations. Thereby the thesis can constitute the theoretical influence of the commitment tool on data-driven innovations.
This combined allows for profound predictions on the theoretical influences of competition law on data-driven innovations.

Due to the mentioned predictive character of the thesis, does the analysis only investigate the theoretical influence of the legislation on the data-driven innovations.

3.4 Data and Documents

The data and documents needed for thesis are those that constitute the legal framework and those that reveal the drivers and barriers of competition law.

This includes, on the one hand, the available law of both levels of legislation, i.e. the EU and German levels ones. Those are found in the treaties of the European Union and in the German '*Gesetz gegen Wettbewerbsbeschränkungen*' (GWB)[3]. However, also further leading guidelines and guidance papers are of consideration, that define the application of the identified legislation. Those provide detailed information about the approach of the authorities towards merger cases. This delivers the basic structure of the analysis, as mentioned in the previous section (3.3).

On the other hand, the academic literature plays an important role. This includes the wide landscape of articles and books on both variable, the drivers and barriers of data-driven innovations and on possible influence of competition regulation on data-driven innovations. Most of the academic literature has already been used to establish the theoretical framework and is re-applied in the analysis, but also further leading articles are included at the analysis stage to underline the argumentation concerning the influence of merger tools on data-driven innovations.

Of further consideration are also official publications and previous merger decisions. Those provide additional information about the variables and their interplay. Especially merger decisions reveal the structure of the decision-making process and provide definitions used by the authorities. However, the thesis is mainly of predictive, theoretical character, which sets the focus more on the legislation than on past decisions.

Those documents combined allow for a profound analysis and thereby to draw profound conclusions to answer the research question.

3.5 Limitations

Every study has its limitations that hinder the answering of the research question to a full extent – and this thesis is no exception to the rule. Even though trying to rule out and decrease them to a minimum, some limitations have remained.

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[3] English: Act against Restraints on Competition

A first limitation to the profoundness of the conclusion drawn arises from the limitations made concerning the variable of competition legislation. Out of the various tools of competition law, only merger control is considered in depth in this thesis, making the results only fully applicable to cases involving merger control. The other tools might have different influences as well as different extents to which they can influence the potential for data-driven innovations.

Hence, the predictions drawn for the influence of competition regulation regulations on data-driven innovations are limited to merger control.

However, those predictions are further limited by the theoretical, predictive character of the thesis and its research question. The thesis only examines the possible, theoretical influences, yet lacks an evaluation of the practical approaches taken by the authorities. As theory and practices do not always necessarily go hand-in-hand, but might differentiate to great extent on the various aspects, the results of this thesis are limited to their theoretical applicability and do not necessarily hold in the same extent for actual influences on data-driven innovations.

Furthermore, the thesis only considers the legal framework, present academic literature and official reports on the topic and does not collect further information through surveys or interviews. This limits the analysis to the information already available and bears the threat of on the one hand omitting articles of importance due to time capacities and on the other hand omitting aspects of great influence due to a lack of mentioning the considered literature. This combined can lead to an over- or underestimation of important aspects. Those aspects can include influences on the potential for data-driven innovations, i.e. an important driver or barriers, or an aspect of merger control, which influences the applicability of the identified tools. Such an omission and therefore over- or underestimation could sufficiently alter or even distort the conclusion drawn in this thesis.

Hence, the results and predictions drawn are limited to the information extracted from the documents considered for this thesis.

4. Analysis

Referring back to the research question and sub-questions proposed earlier, two of the sub-questions have been answered in the theory section. This requires the analysis to answer the missing two questions in order to answer the overarching research question concerning the influence of competition regulation on data-driven innovations. Accordingly, the analysis will define the legal framework of competition regulations applicable in this thesis and examine the influence of those regulations defined on the drivers and barriers of data-driven innovations.

4.1 Legal Framework

Before going into depth with answering the research questions, one needs to define the applicable legal framework of competition. As the setting of the thesis evolves around the Federal Republic of Germany, the legal framework of consideration for this thesis consists of the domestic level as well as the hierarchically superior supranational European Union law.

The upcoming section will provide the general overview of the legislation and applicable guidelines and regulations on how to apply the legislation. This will deliver the definition of the tools of competition law and merger control in particular.

4.1.1 European Level Framework

Starting with the hierarchically higher, supranational framework, the primary sources to consider are the articles of the treaties of the European Union – '*Treaty on the European Union*' (henceforth TEU) and the '*Treaty on the Functioning of the European Union*' (henceforth TFEU). The article of consideration from the TEU is Article 3(3) TEU, which discusses the creation of an internal market characterised by competition and promotion of advances. It highlights the necessity of competition on the internal market of the Union and the concurrent importance of innovations and their fostering. Article 3(1)(b) TFEU is in line with this description and spells out the "establishing of the competition rules necessary for the functioning of the internal market" (TFEU, 2007)[4]. Those provide the general provisions defining the importance of competition within the internal market. The more specific regulations concerning the preservation and impediments of competition are laid out in Articles 101 and 102 TFEU. While Article 101 deliberates the influence of cartel offences, 102 TFEU considers the abuse of dominant market positions. The latter will be the main focus of this thesis, as it delineates distinctive actions incompatible with the internal market due to market powers deemed too high.

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[4] Article 3(1)(b) TFEU – Article 3 TFEU in general discusses the exclusive competitions of the European Union.

The more defined approaches of the Union against such actions and to prevent them in the first place are laid out in the regulations of the European Council. The first regulation to consider is *Council Regulation (EC) No 1/2003* of December 16, 2002, defining the approaches towards the abuse of dominant positions. The other regulation of consideration is *Council Regulation (EC) 139/2004* of January 20, 2004, which discusses the control of concentration within the Union and how the obtainment of dominant positions can be prevented in the first place. Both regulations were implemented before the signing of the Lisbon treaty and therefore refer to Articles 81 and 82 EC, which are direct predecessors of Articles 101 and 102 TFEU and therefore continued in their applicability. These articles and regulations mentioned define the four types of tools applicable by the Union – merger control, behavioural remedies structural remedies and fines. As laid out in the third chapter, the control of concentration will be the focus of this thesis.

Given this limitation, *Commission Regulation (EC) No 802/2004* of April 2004 also on the implementation of the Merger Regulation, and the *Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings* of 2004 are of importance. Those guidelines and notices define the impacts of mergers and how merger control can prevent market dominance or comparable harmful effects on competition. In doing so, they define the tools of merger control, being the prevention of a merger primarily and commitments to remedies harms preventing a merger clearance.

4.1.2 German Level Framework

Having defined the legal framework regarding competition law within the European Union, the same is necessary for the Federal Republic of Germany. The German competition law can be found in the *'Gesetz gegen Wettbewerbsbeschränkungen'* (henceforce GWB)[5]. Paragraphs 18-20 GWB discuss dominant positions and prohibited practices concerning such undertakings. The general tools to terminate such practices are laid out in Paragraph 32, allowing for any "necessary conduct-related or structural remedies" considered appropriate (GWB, P. 32). These are comparable to the behavioural and structural remedies identified in the European framework. The further application of those remedies are discussed in Paragraphs 32a to 34 GWB. The German Act against Restraints on Competition also considers merger control and administrative fines as appropriate tools to prevent or hinder abuses of dominance. Merger control is discussed in detail in the seventh chapter of the legislation, especially in Paragraphs 36 and 37 GWB, and the according fines in Paragraph 81 GWB. The Bundeskartellamt, as an independent federal agency for competition issues, is responsible for investigations and the implementation of guidelines on how to asses any impediments or concentrations in the market.

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[5] English: Act against Restraints on Competition

The mentioned focus on merger control also has the *Leitfaden zur Marktbeherrschung in der Fusionskontrolle[6]* of March, 2012 as well as the *Guidance of Remedies in Merger Control* of May, 2017 as part of the legal framework in question. Both documents discuss the possible influences that concentrations can have on the domestic market, and how those can be targeted. Again, the same tools of merger control can be identified as for the European Framework, however a more detailed guideline on the commitments is available on this level of legislation.

All mentioned articles, paragraphs, and regulations provide the legal framework for and define the tools of competition law. They will be investigated in the following analysis.

4.2 Merger Control

As stated above, mergers and joint ventures have been identified as the way to the future for the online and data-driven businesses (Weber, 2013). Such projections call upon authorities to carefully examine the influence of concentration control on the data-driven market and how it can prevent any harm to competition and in the long-run also on data-driven innovations.

4.2.1 Distribution of Competences

Depending on the dimension of the merging companies' turnover, a merger needs to be announced either to the European Commission or the national competition authorities. Generally speaking, those concentrations, where the combined aggregated worldwide turnover is more than EUR 5 000 million and the aggregated turnover of each party is higher than EUR 250 million within the Union, are considered to have a community dimension and can be assessed under EU law (Merger Regulation, Art. 1, 2004). There are a few other scenarios where a merger can reach community dimension laid out in Art. 1 (3) of the Merger Regulation (2004), yet the mentioned conditions above are the most applicable ones. Any other merger needs to be assessed under domestic legislation or passes without investigations due to the low potential of impact.

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[6] English.: Guidance on dominance in merger control

4.2.2 General Indications for the Influence of Merger Control on data-driven Innovations

Most mergers, no matter if they occur on European or on German level, are cleared by the authorities and only a few out of many are investigated and even fewer are rejected. Those rejected are considered problematic because they would impose serious threats to competition and allow for too powerful market positions. As a result, competition authorities essentially investigate the extent to which the market power of the merging parties is increased, up to a dominant market position (Bundeskartellamt, 2014). Hence, "a concentration shall be deemed to arise where a change of control on a lasting basis" occurs (Merger Regulation, Art. 3, 2004). Any changes in the control[7] leading towards more market dominance tend to harm effective competition and therefore lower consumer benefits.

4.2.2.1 Relation of Consumer Benefits identified by the Union and data-driven Innovations

Benefits for consumers gained from competition are usually low prices, high quality products, wide selection of goods and services and innovations. Market dominance thus can have a depriving effect on those benefits and hence lower the social welfare outcome (Guidelines on horizontal mergers, 2004). This definition already presents the first indication on how merger control as a tool of competition law can have an impact on data-driven innovations. Innovations in general are considered an essential part of a competitive market and consumer benefits, which in turn are protected under EU merger control. Other aspects are high quality and variety of products, which are also considered part of the influences on data-driven innovations. Most market are driven by price competition, though not the data-driven one. The products and services are usually offered free of monetary charge to the consumers as they pay with their data (Prüfer & Schottmuller, 2017), which degrades price to an irrelevant measure. The major factors driving competition on this market are quality and innovations, hence competition and innovations are deeper interrelated on the data-driven market than on others (Weber, 2013). This requires closer attention to be paid to quality and innovations during the merger investigations, than on price differences.

4.2.2.2 Influence of further Factors identified by the BKartA on data-driven Innovations

The German BKartA has specified further factors of consideration regarding the determination of market power, which among others are market entry barriers, financial strength, competition from outside the

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[7] "Control shall be constituted by the right, contract or any other means which {…} confer the possibility of exercising decisive influence on an undertaking" (Art. 3, Merger Regulation, 2004) – control over another undertaking is constituted this way. The changes in the control involve, in the bigger picture, the change of market power and possible market control.

scope of the legislation, cost of changing and consumer loyalty and know-how[8] (Leitfaden Marktbeherrschung in der Fusionskontrolle, 2012, B (I,2),(II,2). Those factors also appear in the Union's legislations, though not as detailed as in the German one. Referring back to the theory chapter (2) and the analysis above, those aspects are all of high influence when discussing data-driven innovations. Market entry barriers have been discussed to a great extent highlighting the access and previous accumulation of data as main barriers for new competitors (OECD, 2014). Financial strength has not been discussed to a great extent in the analysis of the European legislations. However, it constitutes a great influence on data-driven innovations, as those require great and costly investments in the beginning (Blind, 2011; Weber, 2013). The consideration of this factor during the investigations of merger control concerning data-driven innovations is advantageous.

The competition from outside the context of legislation looks at export and import capacities of a market and the companies on the market, which also determines data-driven innovations: The incentive for companies to engage in innovations is increased when exporting and competing on different markets with different demands (Blind, 2011). Switching costs and consumer loyalty have also been discussed greatly revealing their influence on strengthening network effects and thereby possibly hindering data-driven innovations (Gebicka & Heinemann, 2014; Weber, 2013; Yoo, 2012). Finally, know-how is another one of the major factors influencing the ability to innovate, especially in the data-driven sector. Being a creative innovator requires the know-how and expertise on how to analyse and effectively make use of the data available (OECD, 2014; Blind, 2011).

Considering the explicit mentioning of those factors in the competition act and further defining guidelines underpins the importance of those factors and hints at the possible influence German merger control can have on the potential for data-driven innovations.

4.2.2.3 Summary

The examination of those general implications hints towards the tendency of concluding with an impact of merger control on data-driven innovations. It requires a competent deliberation of those factors and their identified possible relevance for data-driven innovations, for this tendency to fulfil its capacities. In order to confirm the hinted tendency, the following sections will take a deeper look into the reasons for the competition authorities to prevent mergers and their influence on the potential for data-driven innovations.

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[8] for further information, cf. Leitfaden Marktbeherrschung in der Fusionskontrolle, 2012, B (I,)(2), (II)(2)

4.2.3 Influence of the Prevention Tool of Merger Control on data-driven Innovations

When considering the investigations taking part in the merger control, the authorities on both levels most prominently enquire the market shares and levels of concentration. Those factors provide information about factual market powers and indications about the market structure (Chap. 3, Guideline on horizontal mergers, 2004). Yet, not only those factors are considered, but also the composition of the merger in question and characteristics of the merging companies are of importance. Mergers involving potential or recent market entrants are as carefully investigated as those of long-term direct competitors and also significant cross-shareholdings in a market require special attention, as both determine the future market structure. Another aspect is the characteristic of being important innovators on a market. Sometimes that is not reflected in market shares, yet it requires consideration (P. 20, Guideline on horizontal mergers, 2004).

Including the innovative potential of the merging parties in the investigation highlights the importance of innovations for the authorities and that the upholding of the innovative potential is an essential part of merger control. This upholding is of even greater importance on fast-growing, highly innovative markets, as competition is in great parts determined by innovations on those markets. The data-driven market can be considered such a market (Case COMP/M.7217, 2014), which adds even greater prominence to this special characteristic of a merging party. Allowing for a merger of two great innovators on the data-driven market will therefore not only decrease competition but can also lead to a decreased innovative potential, i.e. a negative impact on the data-driven innovations. Hence, in acknowledging the innovative potential of the merging companies and possibly rejecting a concentration due to this characteristic, merger control can have a positive impact on data-driven innovations.

Yet, those mentioned aspects only constitute the general approach towards mergers and how they are investigated. The more specific investigations look into the harms for competition caused by the potential merger, which include general harms to competition and increased market barriers.

4.2.3.1 Impact of considered Harms to Competition on data-driven Innovations

The specified harms mergers can cause for the internal market are defined in the *Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of the concentrations between undertakings* (European Union, 2004).

The guideline has identified the following six aspects as harms caused by mergers, which would constitute reason to prevent the merger:

1) General loss of competition
2) Decreased price competition
3) Decreased ability for consumers to choose between competitors
4) Artificial increase of demand justifying higher prices

5) Ability to effectively hinder competitor's expansions

6) Elimination of competitive forces

The following section will take a close look at the impact of these harms on data-driven innovations. By conducting this analysis, the thesis will examine the influence of these reasons for prevented mergers regarding data-driven innovations – in other words, the abilities for the authorities to consider and therefore influence data-driven innovations by prohibiting mergers.

1 General Loss of Competition

The most direct and obvious effect horizontal mergers can have on competition is the loss of competition. Whenever two direct competitors on a market merge, there is a decrease in the level of competition on the relevant market (*Guidelines on the assessment of horizontal mergers*, 2004, P. 24). Lowering the level of competition in turn can have a negative effect on the innovative potential of a market. As concluded by Aghion et al. (2002), markets need competition to generate innovation and a specific level of market power for the innovative potential to reach its peak. Having identified an inverted u-shape as the relationship between competition and innovations, mergers can therefore have a negative effect on the innovative potential of a market, when lowering the competitive-level to a too great extent. Data-driven innovations mark no exception to this relationship, a sound level of competition is even of greater importance. Especially growing markets are determined by the interplay between innovations and competition, one the drivers the and vice versa (Weber, 2013). This requires the authorities to pay special attention to both aspects in order to stabilise competition.

Summing up, innovations are considered an essential part of the market and the innovative potential is taken into account. Considering the shape of the relationship between innovations and competition, a merger can either enhance or decline the innovative potential. Therefore, by identifying the peak of the mentioned relationship, i.e. the best-fitted level of competition for the data-driven market, the authorities can have a positive or at least preservative effect on data-driven innovations.

2 Decreased Price Competition

A decreased competition frequently includes a decrease in price competition, which in most cases leads to higher prices on a market (*Guidelines on the assessment of horizontal mergers*, 2004, P. 27). While this might reduce consumer benefits, it does not have such a decisive influence on data-driven innovations. A major characteristic of the two-sidedness of data-driven products is the idea of being free-of-charge for the consumers, precluding price from influencing competition. The advertisement side however is prone to price competition, allowing a decreasing price competition to have a negative effect on the market. Yet, on the one hand the data-driven innovations discussed to the greatest extent in this thesis are more consumer than advertiser oriented, leaving decreasing price competition with no direct influence on the matter at hand. On the other hand, financial capacity is a great influence on the innovative ability of a company and a major requirement of costly R&D investments for data-driven

innovations. Considering the financial capacity of many of the purely data-driven companies like Facebook or Google, their financial income is almost entirely gained through the advertisement-side of the market (Prüfer & Schottmüller, 2017). By lowering the price competition and therefore allowing for higher prices on the distribution of data and the placement of advertisements, greater revenues are potentially generated. These revenues gained allow companies to make larger investments for innovations. Taking this side of the market into account, the possible harm to general consumer welfare of increased prices might have a positive, indirect effect on data-driven innovations and as a result also on consumer welfare on the data-driven market in the long run.

Merger control therefore has no direct influence on the potential for data-driven innovations when purely considering the price-competition for consumers, but an indirect effect when taking the advertisement side into account.

3 Decreased Ability for Consumers to choose between Competitors

The third anti-competitive effect of horizontal mergers can be summarised as decreased variance of providers for the consumers to choose from (*Guidelines on the assessment of horizontal mergers*, 2004, P. 31). This harm marks an interesting point when considered from the angel of data-driven innovation. The factors of great importance in this regard are single- versus multi-homing as well as data-portability. A market characterised by networking platforms, as feasible on the data-driven market, is either determined by single- or multi-homing. This differentiation refers to the preference or "possibility of consuming different services together" (Weber, 2013, p. 4). Applying this differentiation on the data-driven market of social media for example, it determines whether consumers tend to stay with one network or use various networks at the same time. Social media is considered a market segment with tendencies towards multi-homing, due to the variance between private and business networks[9]. The market for search engines on the other hand is much higher concentrated and can be considered as single-homing – people tend not to search for something on various engines simultaneously (Weber, 2013, p. 11).

An aspect highly determining the possibility of consuming different services or switching between services and thereby acknowledging the variance of producers on a market is data-portability. It comes with connected costs of transporting and switching. The cost of transporting data, information, and pictures uploaded in one network to another highly determines the likelihood of switching between producers or using multiple at the same time (Weber, 2013). The costs of switching tend to increase with a decrease of competition until there is no alternative left for the consumers to choose from (*Guidelines on the assessment of horizontal mergers*, 2004, P. 31). The switching costs on the data-driven market for social media or email programs for example are mainly created by users not being

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[9] Facebook for example is considered a private network, while LinkedIn is a business network. Due to this difference, they are not considered direct competitors on the market segment of social media.

able to transport the uploaded data. This makes data-portability a major source of monopoly power on those markets (Kusiak, 2009; Yoo, 2012).

A merger increasing switching costs and exacerbating data-portability will therefore have a negative impact on competition in the current situation on the data-driven market and thus on data-driven innovations. This marks another factor, where merger control can have a positive impact on data-driven innovations (Prüfer & Schottmüller, 2017).

4 Artificial Increase of Demand justifying higher Prices

Another effect caused by mergers is the ability of the merging party to effectively reduce their output to cause artificial demand and thereby increase prices (*Guidelines on the assessment of horizontal mergers*, 2004, P. 32). The impact of this harm is fairly comparable to the one identified for a decreased price-competition. The data-driven market is defined by its free-of-charge approach towards consumers (Weber, 2012).

This leaves such an ability without any significant influence on the market and also on data-driven innovations.

5 Ability to effectively hinder Competitor's Expansions

Paragraph 36 of the mentioned Guideline (2004) looks at hindered expansion of competitors as a possible harm caused by mergers. This includes any restrictions on the ability to compete for market-participants. The variance of restrictions needs to be taken into account at this point. One aspect of restricted competition are switching costs, as mentioned above. Being able to increase those will have a negative effect on competition and data-driven innovations (Weber, 2013; Yoo, 2012). Another aspect are patents and intellectual property rights. If the merged companies gain control over important combinations of patents, they can hinder the expansion of competitors by making efficient use of the rights. Those aspects are of great importance in growing markets, such as the data-driven one.

In conclusion, the authorities should carefully consider this aspect when investigating mergers on the data-driven market.

6 Elimination of competitive Forces

The final possible harm of importance caused by mergers and identified in the Guideline (2004, P. 37) is the elimination of important competitive forces. Looking at mergers of bigger, established companies that buy up smaller competitors with high potential, this also involves the mentioned aspect of mergers between two important innovators on a market. This aspect is of great importance when considering the influence on data-driven innovations. The data-driven market is characterised by large growth and start-ups introducing new, innovative and most importantly potentially very successful products. Those smaller companies and recent entrants to the market tend to have a greater potential to satisfy the demands in the public, which makes them a great competitor to the larger established firms on the market

(OECD, 2014). Their competitive strength however is not yet expressed in market shares and their market power tends to be underdetermined. This requires the authorities to pay close attention to the potential of the smaller party in a merger on the data-driven market.

An example of such an acquisition could be the merger between Facebook and WhatsApp dating from 2014. The leading company on the social media market acquired one of the leading companies on the instant-messaging market (*Case COMP/M.7217*, 2014). While being assessed as the social network platform Facebook and the consumer communication service WhatsApp, which were no direct competitors due to various reasons, the commission might not have put great enough focus on Facebook's consumer communications app Facebook Messenger. Being connected to the Facebook profile it had been assessed as no direct competitor to WhatsApp as such. Furthermore, Facebook declared an interlink between the respective WhatsApp and Facebook accounts as impossible during the investigations. Today's investigations have shown that this statement included insufficient information and Facebook has by now been able to interconnect the two services. Fining Facebook for supplying the wrong information, the Commission did not undo the concentration as it had only been one aspect of the investigations (European Union, 2017).

Looking at this concentration from today's perspective and considering the influence on the data-driven innovations, one might arrive at the conclusion of rejecting the merger. WhatsApp could very well have been considered a participant with great potential to compete with Facebook Messenger, delivering Facebook a strong incentive to acquire the company. The same can be said in regards the photo-sharing platform Instagram, which was bought up by Facebook before becoming a major competitor on the market for photo-sharing services. These are only two examples of the many acquisitions by Facebook and other established competitors on the large data-driven market, which are aimed at acquiring the engineering talents from start-ups for their own development-sections (Shontell, 2011). In doing so, the companies in question can enlarge their technical know-how, which has great influence on the ability to provide innovative ideas.

Summing up, the elimination of important competitive forces by the established market leaders will increase the potential for data-driven innovations of the larger companies. This in turn decreases the variety of companies and the innovative potential of the market, as many start-ups are acquired before developing their full potential. The authorities can therefore have a positive influence on data-driven innovations, when keeping those two impacts in mind and weighing them against one another.

Considering all six harms identified by the authorities allowing for a prevention of a merger, one arrives at a comparable result for all individual influences. Each harm has been discussed in detail concerning their possible influence or harm on data-driven innovations. When also including the up-holding of innovations as important for the authorities, a harm to the innovative potential constitutes a harm to competition.

Hence, the harms examined during the investigations have impacts on the data-driven innovations. By including the data-driven specific characteristics, the authorities have the possibility to prevent a merger based on the harms investigated and thereby preserve the potential for data-driven innovations.

4.2.3.2 Influence of enhanced Entry Barriers on data-driven Innovations

Apart from looking at the concentration and market shares as well as the harms caused by concentration on the data-driven market, the study of merger effects also includes an analysis of market entry barriers. Mergers on markets with low entry barriers usually do not present problems, as potential competitors can easily enter the market and therefore increase the competitive pressure again. Contrary, when the structure of a market is greatly determined by high entry barriers, mergers can have an even greater impact on competition (*Guidelines on the assessment of horizontal mergers*, 2004, P. 69). Making a first connection to data-driven innovations, entry barriers and market structures tend to constitute barriers to innovations, as they close up a market. Particularly smaller, new companies on the market tend to run into problems and start-ups might not be able to enter the market in the first place, which presents a great barrier to data-driven innovations in particular (OECD, 2014). Following from this first evaluation, paying special attention to entry barriers should be an essential part of the analysis of mergers on the data-driven market.

There are various forms of entry barriers possible, which can be summarised in the following three major classifications (*Guidelines on the assessment of horizontal mergers*, 2004, P. 71):

1) Legal restrictions
2) Technical advantages
3) Advantages resulting from established market positions

Additionally, (4) the future development of the market is of great importance, when looking at the influence of entry barriers on the innovative potential.

1 Legal Restrictions

Legal entry restrictions to market arise, where the legislator actively limits the number of competitors on the market. Mostly licences are used to limit the number of competitors. Yet, licencing is not too common on the data-driven market and the regulators have also not yet applied standards high enough in order to have a sufficient impact on the data-driven innovations.

Aspects that are currently debated concerning standards and regulations are data-protection regulations and court investigations in this field. If the legislators decide on standards and requirements, those would have a major influence.

However, as they are not present to a sufficient extent so far, this aspect can be neglected for the analysis.

2 Technical Advantages

Technical advantages, as the second entry barrier classification, construe much greater barriers for data-driven innovations and should be taken into consideration when investigating a merger on the relevant market. Technical advantages involve the various things, such as access to essential facilities, innovation and R&D, important technologies and sales networks.

2.1 Access to essential Facilities

The major barrier in this case is the access to the essential facility, i.e. the data (*Guidelines on the assessment of horizontal mergers*, 2004, P. 71; Argenton & Prüfer, 2012; OECD, 2015). Any data-driven innovation requires access to data in the first place, which is only possible once a company has entered the market (OECD, 2014). Yet, the barrier in this context is erected by the amount of data previously generated by the companies that are already present on the market. Opposed to what is demanded by many authors, there is no equal access to data or requirements to share the data collected by the leading companies (Argenton & Prüfer, 2012). This leads to the biggest problem for start-ups. They have fewer data available than their larger competitors, putting them at a competitive disadvantage. This disadvantage has a major influence on data-driven innovations, as start-ups and new competitors commonly have a greater potential to launch those data-driven innovations required by the public (OECD, 2014). Allowing for a merger between companies with a large data collection would further increase the barriers to access to the essential feature of the market. This has a negative influence on data-driven innovations.

Consequently, merger control can at least have a preserving influence on data-driven innovations, when taking the barrier of data-collection into account.

2.2 Access to Innovations, R&D and important Technologies

Another aspect of technical advantages is the access to innovations and R&D (*Guidelines on the assessment of horizontal mergers*, 2004, P. 71). Having launched and successfully implemented innovations in the past, allows companies to build upon the established structure to introduce improvements to their own technologies. The same is true concerning R&D, which requires great financial capacity when starting a business. Especially the development of algorithms can be costly (OECD, 2014). Having made those investments in the past and having been able to gain a return on them, constitutes a great advantage over new competition. Though, R&D does not only include technologies and algorithms, but also know-how and skills. While larger companies might have greater resources to invest into development, start-ups tend to be built up by excellent young engineers with great skills and potential. This aspect links back to the argument made concerning the buying-up of smaller, potential competitors. The larger companies' greatest incentive to do this can be considered the generation of know-how and art of engineering (Shontell, 2011). Generating vast pools of know-how

through mergers can place established firms at an advantageous position over incoming firms, erecting barriers to their innovative potential.

Considering the correlation to the previous argument already, merger control can have a positive impact on data-driven innovations when considering the unproportioned accumulation of technologies and know-how as a barrier increased by a possible merger.

2.3 Sales Networks

Sales networks can constitute additional entry barriers (*Guidelines on the assessment of horizontal mergers*, 2004, P. 71). While distribution of products might not be the best-fitted term for the activities of data-driven companies such as Facebook and Google, these companies still try to provide their services to as many users as possible. At least at this point, the idea of network effects comes into play and highlights barriers for newcomers which they can hardly overcome.

As network effects are fostered by powerful market positions, these aspects call upon the third type of barriers.

3 Advantages resulting from established Market Positions

Network effects can either have direct or indirect consequences on a market. Direct network effects arise where users derive more utility from one service than from another (Prüfer & Schottmüller, 2017). In the case of social networks or communication services, users tend to decide in favour of one particular network, where most friends and possible friends are. The choice for a network is therefore not necessarily influenced by quality, but rather by utility. At the same time, this erects major barriers for new competitors, as users tend to be locked into one network (Gebicka & Heinemann, 2014). This obviously decreases the incentive for competitors to place innovations as consumers tend to stick with their old network.

The market for search engines works a little differently. It is more quality and output oriented. Yet, the more users select one search engine, the more utility a company is able to derive from it. This calls upon indirect network effects. The more demand a search engine receives, the more it is able to collect the log-data generated and thus improve its service (Argenton & Prüfer, 2012; Prüfer & Schottmüller, 2017). These effects foster consumer loyalty and make it hard for new competitors to enter the market. It also refers back to the argument put forth earlier concerning the access to data. Network effects allow the companies involved to collect far more data than their competitors, which then can be used for further developments and innovations. Especially in combination with mergers between leading companies concerning the volume of their data-accumulations, a monopoly over access to user data is created (Prüfer & Schottmüller, 2017), which leads to a further decrease in the distribution of data.

These network effects are also influenced by switching costs and data-portability. As discussed earlier, those aspects can construe great entry barriers and especially barriers to data-driven innovations (Weber, 2013; Yoo, 2012). Therefore, they have a negative impact on competition and hence also a negative one

on data-driven innovations in the long-run. Data-driven innovations require and drive competition at the same time, leaving market powers of too great a size to form a great barrier to innovations.

A merger between companies that would foster especially network effects should be carefully investigated by the authorities. In doing so, merger control can have a preservative influence on the potential for data-driven innovations.

4 Future Development of the Market

Another aspect of consideration in relation to entry barriers is the future development of market structure, as developments apart from mergers can have an impact on market barriers, which can be further facilitated by mergers cleared in the past. Particularly the potential growth of the market is taken into consideration in this context, which holds true for the data-driven market. Considering the future development of the barriers involved, one might have to consider the influence of the General Data Protection Regulation, which becomes legally binding as of May, 2018[10]. This regulation will influence the argument made earlier concerning the influence of closed relations between providers and consumers. Different to previous practice, the regulation demands data-portability (General Data Protection Regulation, 2016; Prüfer & Schottmüller, 2017) and might as a result lower the barriers on access to data, facilitating data-driven innovations.

Gaining more control over one's personal data might also positively influence the incentive for consumers to share their data, which will have a positive effect on data-driven innovations as well. Coming back to the influence of merger control on data-driven innovations, this regulation and comparable future ones should be taken into account. The General Data Protection Regulation has the potential to lower barriers to the market and also those on data-driven innovations. Yet, as it does not require the sharing of collected data between companies, the authorities will still have to consider network effects and switching costs when investigating mergers.

In doing so, the preservative effect on data-driven innovations identified earlier remains in place and might even be intensified.

4.2.3.3 Results

Summing up, the prevention tool of merger control can have an impact on data-driven innovations. The impact depends on the close examination of the parties of the merger, especially concerning their innovative potential for the market. The EU's merger control aims particularly at preserving consumer benefits, which include innovations. This requires them to pay close attention to this characteristic.

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[10] Referring to: Regulation 2016/679/EU of the European Parliament and the European Council 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

Thus far the legislation of the Union seems to have been the focus of the analysis, yet the authorities have a fairly comparable approach, which allows for the same conclusions on both levels. Also the BKartA has the preservation of innovation and the consideration of other factors, which highly influence the innovative potential, included in their guidelines. Therefore, the domestic authority should also be required to pay close attention to those aspects.

By paying special attention to the specific character of data-driven innovations and to how entry barriers or harms to competition influence their potential, authorities can have a positive or at least preservative influence on the data-driven innovations through the use of merger control.

4.2.4 Influence of the Commitment Tool on data-driven Innovations

Another tool of merger control are commitments. If the first step of the investigations by the competition authorities concludes a possible harm to competition, the merger must be prohibited. The merging parties then have the possibility to propose commitments to the authorities in order to remedy those harms (EC Merger Regulation, 2004, P. 30).

The major requirement for those commitments is, that they are suitable to fully remedy the harms to competition possibly caused by the merger (Guidance on Remedies in Merger Control, 2017). Looking at the earlier identified factors of consideration, a harm of the innovative potential requires a commitment. This consideration has a preservative effect on data-driven innovations, as the commitments need to repair any damages caused to the innovative potential.

Furthermore, a restoration of previous level of competition will also have an at least preservative influence on data-driven innovations due to the mentioned inverted u-shape relationship between competition and innovations. Concerning the data-driven market, the level of competition is of great importance as it is mainly driven by the number of innovations. Hence, a hindrance to either the innovative potential or the competition on the data-driven market, will automatically lead to a decrease in the other (Aghion et al., 2002; OECD, 2014).

Different to the conclusion drawn in the summary (cf. 4.2.3.3) above, there is a little variance between the guidelines of the BKartA and those of the European Union – lying in the design of the commitments. The *Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings* (European Commission, 2004) only mentions the possibility of commitments remedying potential harms in order to clear a merger and at which point these commitments are to be proposed. The BKartA has introduced a clear guideline on its preferences and the design of those commitments – the *Guidance on Remedies of Merger Control* of May, 2017.

The difference is therefore constituted not by the tool itself, but by the detailed description given for the German context, which the European Union one is lacking. Hence, the analysis of the commitment tool will be based on the German legislation.

The preferential commitment of the BKartA is divestment, paired with an up-front buyer solution (Guidance on Remedies in Merger Control, 2017, P. 30). Divestment, i.e. the selling off of a business, itself generates new competitors and balances out the power gained through the merger. The up-front buyer solution creates a specific obligation of the BKartA to prevent any possible harms to competition in the first place. While other types of divestment might cause harms in the time between the merger and the divestment, up-front buyer solutions demand a contractual agreement with the buyer of the divested business before the merger is cleared. This is a tool of great influence for data-driven innovations. A further concentration of data, if only for a short amount of time, can increase the barriers to innovations greatly without being remedied by the divestment.

Referring back to the argumentations made in the previous sections, the accumulation of data by the leading companies creates a great barrier for smaller companies simply because of the different amount of data accessible. For example, a small lead in the search engine market at one point in time allowed for Google to become the market leader and outcompete Microsoft or Yahoo within only a few years. As search engines work by analysing log-data in order to improve their services, the amount of queries placed determines the quality of the engine (Argenton & Prüfer, 2012). Following this argumentation, even a timely-limited concentration can have a long-lasting impact on data-concentration and therefore have a lasting negative impact on the innovative potential of smaller competitors. An up-front buyer solution however prevents the possibility of such short-term concentrations and therefore preserves the innovative potential on the market.

Apart from divestments, the BKartA also allows for a removal of links with competitors and entry access and behavioural commitments as suitable remedies to the competitive harms.

4.2.4.1 Influence of Divestments on data-driven Innovations

As explained earlier, divestments refer to the process of selling off a business which usually formerly belonged to the purchasing party of the merger. As laid out in the Guidance paper, a divestment-package has to comprise an existing and able to stand-alone, independent business unit. This includes that the newly autonomous business must be viable, marketable and of sustainable value.

4.2.4.1.1 Volume of the Divestment Package

Furthermore, the divestment needs to include all assets and items belonging to the unit. When submitting a divestment-commitment to alleviate competition harms, the divested package needs to be defined as precisely as possible (Guidance on Remedies in Merger Control, 2017, B(I)).

The assets that have to be included are any production sides, patents, certificates, documents and records and even key personnel. This should ensure the sustainability of the divestment. Applying this to data-driven innovations, such divestments can have a great influence. Especially the divestment of personnel and documents plays a major role for data-driven innovations. Development is costly in the sector and being able to build upon previous innovations grants a substantial advantage (Blind, 2011; OECD, 2014). Including all of these assets in the divestment ideally provides the buyer with the capacity to build upon them and introduce innovations. This is true regarding personnel. As many acquisitions in the data-driven sector have been driven by larger companies wanting to acquire the innovative know-how and engineers from start-ups, divestments can in fact have a balancing effect on those practices. Demanding a leading company in the sector to divest parts of their know-how to a competitor would increase the market's competitive level - by increasing the innovative potential of the competitors.

By demanding the inclusion of especially human resources as part of the divestment package in the data-driven sector, authorities can have a positive effect on the data-driven innovations.

4.2.4.1.2 Divestment of Crown Jewels

A rarely applied tool of German merger control is demanding the divestment of so-called 'crown-jewels'. Those are business-units of great importance to the merging parties which they certainly would prefer to keep. In practice, such divestments only become relevant if the merging parties either have no alternative unit to offer, which would comprise a comparable capacity to fully ease the possible harm to competition, or if the original divestment product does not attract a suitable buyer (Guidance on Remedies in Merger Control, 2017, P. 55). The crown jewels of the merging parties are considered valuable to their competitors as well, making their selling an unproblematic process. If such a measure is applied, it constitutes a great and positive influence on data-driven innovations.

The most valuable parts of leading companies in the data-driven sector are their units involving technical know-how, leading engineers or data-collections. As the theory section and previous analysis has shown, those are the most influential factors for data-driven innovations and their concentration in fewer hands pose a great hindrance for innovations. Contributing to a fairer distribution would therefore have great, positive influence on data-driven innovations.

Even though the divestment of crown-jewels is only rarely appropriated, it can be considered as one of the tools with the greatest positive influence on data-driven innovations.

4.2.4.1.3 Conditions for Buyer of the Divestment

The final condition of the BKartA concerning the divestment of businesses as a commitment to remedy likely harm caused by a merger is the suitability of the buyer. Among other things, like incentives to compete and obligations not to sell the business in the near future, the acquisition of the divested business by the buyer must not constitute a harm to competition in itself (Guidance on Remedies in Merger Control, 2017, B(I)(2)). Considering this requirement from the angle of data-driven innovations, it is highly important in order to achieve the positive impacts explained above: If the divested business, especially the mentioned crown-jewels, are acquired by a close competitor and not a smaller, uprising one, all positive impacts would be turned around and only benefit those already in prominent positions. The requirement of having to sell the units without causing further harm entails the need to ensure the intactness or even the increase of competition with the resulting positive influence on data-driven innovations.

4.2.4.2 Influence of the Removal of Links with Competitors on data-driven Innovations

Some markets are categorised with oligopolistic structures and strategic links between companies, securing the market position of the leading companies involved. Those links between companies can be accelerated or further strengthened by a merger. A removal of such links can therefore be a sufficient way to restore competition on the market (Guidance on Remedies in Merger Control, 2017, B(II)). In addition, such a removal may even open up the market a little further which, in turn, will naturally have an impact on data-driven innovations in relation to competition.

As those two factors drive each other, a positive influence on competition will also have a positive influence on data-driven innovations.

4.2.4.3 Influence of Market Access and other behavioural Remedies on data-driven Innovations

When the divestment of businesses or the removal of links to competitors will not sufficiently resolve possible harms caused by a given merger, companies can also offer behaviour commitments. Yet, those behavioural changes have to be permanent and sustainable (Guidance on Remedies in Merger Control, 2017, P 72) The BKartA has defined three types of so-called behavioural remedies:

1) Entry barriers
2) Licencing and disclosure of interfaces
3) Opening and termination of long-term contracts between suppliers and consumers

Each of which has its individual effect on data-driven innovations, when allowed as a commitment to remedy the harms caused by a cleared merger.

1 Entry Barriers

Lowering entry barriers by opening up access to infrastructure can have a positive effect on competition, as it allows for more potential competitors to enter the market (Guidance on Remedies in Merger Control, 2017, P. 77-79). Lowered entry barriers and especially allowed access to infrastructure can have a great influence on data-driven innovations. As pointed out in the analysis of the entry barriers discussed above, particularly the access to data and network effects constitutes great barriers to potential competitors and hinders their ability to innovate (OECD, 2014; Weber, 2013; Yoo, 2012). Infrastructure is usually the essential feature, which can be considered the free flow of data for the data-driven sector (OECD, 2014). Allowing third parties access to this infrastructure opens the market, as data becomes available to be analysed and effectively used for the development of data-driven innovations not only for the larger companies but also for new start-ups (Prüfer & Schottmüller, 2017). As a side-effect, allowing access to the infrastructure might also reveal the ways the other companies work.

Combined, this can have a positive impact on data-driven innovations, if the extent of access is sufficient.

2 Licencing or Disclosure of Interfaces

Also touching upon the working-ways of the competitors, the second type of behavioural remedy is licencing or the disclosure of interfaces. This includes non-expiring licences or the disclosure of information on soft- and hardware (Guidance on Remedies in Merger Control, 2017, P. 80-82). Especially the disclosure of information can be of great influence on data-driven innovations. Another factor hindering many companies from engaging in developing data-driven innovations is their limited financial capacity. Developing algorithms and other measures for the analysis of data are very costly and require considerable financial capacities to begin with (OECD, 2014). Receiving information about the ways merging companies handle and make use of their data, allows smaller competitors to skip a few of the initial development steps and copy from their larger competitors. This way the financial means required for innovations are lowered and more companies have the possibility to engage in the process. Resulting from this, the competition for new innovations is increased, which also fosters the potential for data-driven innovations.

Hence, a commitment including a disclosure of information about soft- and hardware will have a greatly positive influence on data-driven innovations.

3 Opening and Termination of long-term Contracts between Suppliers and Consumers

This measure is especially applicable to markets with exclusive contracts or other factors binding a consumer to a single supplier (Guidance on Remedies in Merger Control, 2017, P. 83-84). The commitment involves two distinct implications for data-driven innovations: The first relates to the

indirect effect mentioned in the analysis above concerning revenues generated by advertisement[11]. Even though Google for example is facing investigation by the European Commission for demanding exclusivity contracts with advertisement publishers (European Commission, 2016)[12], such practices in general enable Google and other companies to increase their revenues. In turn, this hinders other, mostly smaller competitors from gaining sufficient revenues from big advertisers. Thus, contributing to the unbalanced distribution of financial capacities across the sector, such exclusivity contracts form an obstructing effect on data-driven innovations. Committing to opening those contracts would therefore have a positive influence on the ability to introduce data-driven innovations for smaller companies.

The second implication directly concerns the binding relationship between suppliers and consumers. Transferring the argument onto data-driven innovations, one could find parallels to network effects, switching costs and data-portability. These factors generate this binding relationship between consumers and established companies and accordingly constitute great barriers for new companies to enter the market and implement successful innovations, as the costs of switching to new and possibly better services are often too high for individual clients (Weber, 2013).

Proposed commitments about changes to the mentioned aspects could therefore have a positive influence on the ability of companies to develop data-driven innovations.

Combined, all three behavioural commitments can have a positive influence on data-driven innovations, if designed as explained in this section.

4.2.4.4 Influence of Ancillary Measures on data-driven Innovation

Next to the commitments proposed by the merging parties in order get their merger cleared, the BKartA itself may impose measures to ensure a smooth and harmless implementation of the merger and the commitments connected with it. Most of these measures are concerned with the merging process and therefore have no implication for the innovative potential of a market[13]. Yet, several measures are indeed directly relevant to the issue of this study and hence require further elaboration. Those measures are:

1) Separation of facilities during a divestment
2) Non reacquisition obligation and non-compete obligation
3) Non-solicitation obligation

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[11] Reference to section 4.2.1. on the influence of possible harms of competition on data-driven innovations

[12] Google is currently facing various investigations from the European Union. The one referred to at this point is the investigation against Google's Ad-server Adsense (opened 2016)

[13] For further information, cf.: Chapter B, section IV of the *Guidance on Remedies in Merger Control* of May, 2017 by the BKartA.

1 Separation of Facilities during a Divestment

Particularly, IT-facilities require such a separation in order to ensure that data-processing and comparable processes are independent from the selling company. Including such a measure ensures the complete divestment of technologies and know-how, which results in a positive impact on data-driven innovations.

Therefore, referring to the argumentation made earlier concerning said divestments, such a measure would significantly strengthen the impact on the potential for data-driven innovations.

2 Non-Reacquisition Obligation and Non-Compete Obligation

Other measures ensuring the permanent, competitive character of a divestment are a non-reacquisition obligation and a non-compete obligation, respectively. These measures hinder the selling business to regain control over the divested unit or even force it out of the market by greatly investing in direct competition.

Equal to the argument put forth in the previous paragraph, these two measures further underline the identified effect on data-driven innovations by guaranteeing a certain level of competition.

3 Non-Solicitation Obligation

The final aspect of consideration here is a non-solicitation obligation, which the BKartA especially applies on mergers in mainly skills and expertise driven markets such as that of data-driven innovations. This measure confirms the identified need for a balanced distribution of skilled engineers and proactively hinders mergers that solely aim at acquiring the best engineers and thereby hindering the development of potential competitors.

As they construe barriers for competition and data-driven innovations, the safeguarding of divesting the human resources can have a great positive influence on the abilities for data-driven innovations.

Summing up, those ancillary measures strengthen the identified influences of the commitments in merger control.

4.2.4.5 Results

Concerning the influence of the potential commitments, especially as laid out by the BKartA, one can conclude an overall positive influence.

Yet, one has to keep in mind that these commitments are no measures applied onto the current state of the market, but onto the future market including a cleared merger. The commitments are only demanded

and applied when correcting an already existing harm caused by a merger[14]. This lowers their likely influence, as most measures solely aim at restoring the state of the market prior to the merger. Hence, the positive influence of those commitments on the data-driven innovations appears after the potential for the innovations is likely to have been harmed to begin with. Accordingly, the effect of the outlined commitments on the previous potential for data-driven innovation might only be preservative.

However, the analysis has still shown an overall positive effect of the commitments, leading to the conclusion that the commitment tool of merger control can have an at least preservative impact on data-driven innovations. Especially the extent of the commitments' influence is determined by the degree of concentration present on the market following the merger as well as the extent to which the commitments might not only remedy actual harms but also increase current competition on the market at the same time.

4.2.5 The Influence of Merger Control on data-driven Innovations

Summing up the results established for the tools of merger control and also concerning the general implications, one can conclude with a proven influence of merger control on data-driven innovations. All sections have identified an at least preservative, if not positive, influence on the potential for data-driven innovations.

This leads to the overall conclusion for section 4.2, that merger control can have an impact on data-driven innovations – always including the limitation, that the authorities pay attention to the special characteristics of the innovative potential.

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[14] The harms remedied by the commitments are those discussed in the sections 4.2.3

5. Discussion

Summing up the findings made in the analysis in chapter 4, merger control can have an at least preservative influence on data-driven innovations. For the commitment tool, the influence can even be considered positive. The commitments required by the authorities and then proposed by the merging companies might exceed the pure remedying of the potential harm of the merger. In doing so, the commitments do not only have a preservative influence on the data-driven innovation but can also lead to an enhanced potential for data-driven innovations. Those findings add to the existing knowledge about the topic of competition law and data-driven innovations and further provide inputs about what future research should discuss.

5.1 Information added to existing Knowledge on the Topic

Concerning the knowledge and background theory presented in the previous chapters, the findings of the analyse underline previous arguments and add further information.

One of the topics discussed previously in this thesis is the hands-off approach of the competition authorities towards the online world and data-issues in particular (cf. 1). While the authorities have started intervening and opening investigations against the leading companies, i.e. Google or Facebook, there have been no decision taken so far that would deeply effect the innovative potential. Yet, the analysis has revealed that this approach is not taken due to a lack of tools available. Especially the German, domestic legislation demands the specific consideration of two-sided markets, of which most companies involved in data-driven innovations are part of. Furthermore, one can find many implications for data-driven process and apply most of the aspects considered during the merger investigations on the influences of data-driven innovations. The European Union's legislation seems to be more focused on the offline, traditional types of innovations, yet their tools are also applicable on data-driven innovations. Hence, there is the possibility to engage and actively influence the potential for data-driven innovations. The authorities simply need to consider and apply it more specifically.

Another issues greatly discussed in this context is the asymmetric distribution of access to data. Construing the possibly greatest barrier to data-driven innovations, many leading scholars demand new regulations to tackle this issue. Yet, again did the analysis prove that those regulations are existing. One of the commitments applicable under merger control is the access to infrastructure. Applied on the data-driven innovations, this includes access to data-streams and accumulations of data.
Being a commitment to a proposed merger, the solutions require a merger and the identification of harms that justify such behavioural remedies by the authorities in the first place. However, those merger cases

have already been available and, according to the findings in the analysis, will be coming up in the future as well[15].

This allows the competition authorities to have a great influence over the potential for data-driven innovations – they simply have to enact it.

5.2 Implications for further Research

However, the results of the analysis did not only add to the previous knowledge, but also bring up new questions that require answering.

Taking on the argumentation made in the previous section concerning the availability and application of tools by the authorities, brings one back to the limitation made in section 3.5 concerning the possible deviation between theory and practice. As this thesis has focused on the theoretical influence of competition legislation on data-driven innovation, the practical application of the findings has not been examined, resulting in a limitation to the conclusions drawn.

The decision on the 2014 merger between Facebook and WhatsApp has shown that there is still a great disparity between the theoretical possibilities and their practical application. Looking at the outline of the decision taken by the EU, the critical issue of data accumulation has been greatly underestimated during the investigations as well as the market power arising from a merger between those two leading companies. A possible issue has been revealed with the imposition of the EUR 110 million fine on Facebook by the Commission in late May, 2017. While considering the infringement of suppling incomplete information, the authorities still do not see the necessity for untangling the merger passed. This reveals the divergence between the possible influences the authorities have concerning the potential for data-driven innovations and the actual exercising of those possibilities.

At this point, further research is required on the topic. Firstly, to why the authorities allowed and passed the merger in 2014, especially considering the extent to which the authorities have considered the data-specific elements also laid out in this thesis[16]. The second implication for further research from this aspect is to examine, why there is such a divergence between the theoretical possibilities and the practical applications.

Another implication for further research that derives from the limitations made in section 3.5 concerns the under- or overestimation of influences examined in this paper. The thesis bears this threat as it is

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[15] cf. 4.2.3.1 (6)
[16] cf. especially 2.2

purely conducted as a desk-based study. To further underline the conclusions drawn in this paper, researchers should invest in conducting interviews and a deeper analysis of previous case law.

Those interviews should be conducted with both sides of the examination, i.e. the competition authorities and the companies engaged in data-driven innovations. The competition law side could involve interviews with the authorities' officials and competition lawyers, as those two can reveal more detailed information on the approach taken towards data-driven innovations and mergers, especially those of data-driven innovators. The innovation side should include interviews with companies of various size, meaning new, innovative start-ups and leading companies. This would provide the researcher with information on their perception of the potential for data-driven innovations and the essential aspects necessary to engage in the process of developing and launching data-driven innovations. Having collected information on both variables, the possibility of omitting influences or under- or overestimating an influence is ruled out. Such an approach also relates to the implication made above concerning the divergence between theory and practice.

The third implication for further research deriving from this bachelor thesis concerns the general influence of competition law on data-driven innovations. An evaluation of the individual influence of the left three types of competition regulation[17] allows for a great variety of further research. On the one hand, further research could combine the individual influences of each tool in order to investigate the overall influence of competition regulation on data-driven innovations. On the other hand, the individual examination also provides the researcher with the possibility to draw conclusions concerning the most effective tool of competition when considering their influence on the potential for data-driven innovations.

Another suggestion for further research arises when considering the setting of the thesis. The investigations on competition law in this study have been limited to the Federal Republic of Germany and the EU, which presents only a small part of the world. Yet, the innovations considered are developed by world-wide operating companies. This indicates the need to consider whether the competition legislation of the Union or a nation state are sufficient to preserve and sustainably influence the potential or if a world-wide solution would be required. An answer to this question could also be part of future research.

Closing, the research conducted in this thesis has contributed to the present knowledge about competition legislation, data-driven innovations and most of all their interrelation, yet it also brought up new questions that require examination by future research.

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[17] ban on cartels, abuse of dominance and licensing

6. Conclusion

Determining the possibility and extent to which competition law can influence the potential for data-driven innovations, has been the core inquiry of this thesis.

The outcomes of the analysis show a clear result. Merger control, as a part of competition law, can have an at least preservative influence on data-driven innovations. Having been examined as the prevention tool and the commitment tool, both concluded with this result.

The prevention tool provides the authorities with the possibility to prevent a merger between a leading company and an uprising competitor or a start-up with great potential, with the investigation instruments available to them. In doing so, they can preserve the competition on the market, which enhances innovations and thereby also achieves the stabile increase in social welfare.

The commitment tool offers a great variety of solutions to restore the level of competition, harmed by a possible merger, and reinstall the potential of data-driven innovations. Furthermore, some tools even provide the possibility to not only remedy but improve the current potential for data-driven innovations. Greatly discussed aspects such as access to infrastructure, information and technologies are very likely to increase the potential, when applied with a sufficient range and without a too harmful merger in the beginning. Hence, the influence of the commitment tool can exceed the simple preservation and positively impact the data-driven innovations.

An aspect discussed in the beginning of this thesis is the role of start-ups and the dreams of young people to become the next Mark Zuckerberg. By preventing mergers or demanding extensive commitments, competition legislation can not only influence data-driven innovations, but more importantly generate a friendlier environment for start-ups, the major drivers of data-driven innovations.

However, the discussion has also hinted, that there is a great disparity between the possibilities of the authorities and their application in practice. The legal grounds for intervening and controlling the power-elite of the world are available, yet the authorities seem to be stuck in their hands-off approach. The underestimation of data-driven specific factors has been present in many decisions and requires attention when wanting to enact the possible great and positive influence on data-driven innovations.

Concluding, by appropriately applying the tools of merger control, the competition authorities can have an at least preservative, if not positive influence on data-driven innovations. They simply need to use it.

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