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Articles

STARTUPS AND YOUNG INNOVATIVE FIRMS MERGERS & ACQUISITIONS: AN ANTITRUST DEBATE? LESSONS FROM THE ICT TECNO-ECONOMIC PARADIGM

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ABSTRACT: This paper is devoted to answering two questions. First, as to how the antitrust authorities should consider knowledge-based startups or the acquisition of young innovative firms. Second, what the current institutional challenges in this topic are. We looked at the antitrust theoretical debate and examined two recent merger cases of the ICT industry in the United States and in the European Union in order to extract insights about these questions. In addition, we briefly explored the Brazilian institutional framework to propose an agenda in terms of policies and academic research for this country. We sustain that market shares are not an accurate proxy for market power considering the possibility of being successful in terms of innovation strategies; they can be highly volatile or might not appropriately show the firm's potential in the process of

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competition by innovation. There are important contributions that present general principles concerning the incentives to innovate post-merger. Nevertheless, they were designed to encompass all kind of merger effects on innovation and still there are no well-defined procedures in the international or national scenario. Regarding startups and young firms, some issues are addressed: the small or even non-existent market share and the importance of identifying the buyer and their changes in incentives to maintain the innovation path are some characteristics that make the analyses even more complex. There are relevant gaps for the antitrust authorities, since submission thresholds are mainly based on companies' revenues. The introduction of additional thresholds for the value of transaction and a better interaction between innovation and competition policies may be a starting point.

KEYWORDS: antitrust; competition policy; startups; young enterprises; innovation.

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FUSÕES E AQUISIÇÕES DE STARTUPS E FIRMAS JOVENS E INOVADORAS: UM DEBATE ANTITRUSTE? LIÇÕES DO PARADIGMA TECNO-ECONÔMICO DAS TIC

RESUMO: Este artigo se dedica a responder duas questões. Primeiro, como as autoridades antitruste deveriam considerar startups de base tecnológica ou aquisições de empresas inovadoras jovens. Em segundo lugar, quais são os desafios institucionais atuais neste tópico. Analisamos o debate teórico antitruste e examinamos casosrecentesde fusões ou aquisições nos Estados Unidos e na União Europeia para extrair algumas ideias sobre essas questões. Além disso, exploramos brevemente a estrutura brasileira para traçar uma agenda política e acadêmica nesse país. Sustentamos que as participações de mercado não são uma *proxy* precisa para o poder de mercado, considerando a capacidade de sucesso em estratégias de inovação; elas podem ser altamente voláteis ou podem não mostrar apropriadamente o potencial da empresa na competição por inovação. Vemos que há contribuições importantes na busca por princípios gerais sobre os incentivos para inovar após a fusão. Entretanto, esses princípios foram criados de modo a dar conta de todos os tipos de efeitos na inovação provenientes de fusões, e ainda não há procedimentos bem definidos no cenário internacional ou nacional. Para o caso de *startups* ou empresas jovens, levantamos algumas questões a serem abordadas: a reduzida ou inexistente participação de mercado e a importância de identificar o comprador e possíveis mudanças nos seus incentivos para manter o caminho da inovação são algumas especificidades que tornam as análises ainda mais complexas. Existem lacunas relevantes para as autoridades antitruste, pois os limites de apresentação baseiam-se principalmente nas receitas das empresas. A introdução de limites adicionais para o valor da transação e uma melhor interação entre a inovação e as políticas de concorrência podem ser um ponto de partida.

PALAVRAS-CHAVE: antitruste; defesa da concorrência; *startups*; empresas jovens; inovação.

1. INTRODUCTION[1]

The new technological paradigm and the recent changes in the functioning of markets and economies show us the great importance of successful innovation. The expansion of capitalism through long technological waves constitutes an academic field crafted by highly recognized economists, such as Schumpeter. More contemporarily, the progress of capitalism is understood based on either a technological or techno-economic paradigm approach. Roughly speaking, the system's progress would be driven by a succession of technological revolutions, each one introducing a new 'key' transversal technology or infrastructure that modifies the relative costs in most of the sectors of the economy and results in a leap in overall productivity (DOSI, 1982, 1984; PÉREZ, 2001, 2002). In this context, in parallel to the emergence of a new techno-economic paradigm, several entrepreneurial opportunities appear. Paired with adequate funding, capabilities and institutional support, the new businesses associated to the new techno-economic paradigm may be a 'window of opportunity' to the 'catching up' process (PÉREZ and SOETE, 1988; PÉREZ, 2002).

At national and sub-national level, many developed countries have implemented different programs and developed a great number of institutions dedicated to the promotion, the emergence, and consolidation of successful innovation strategies. Many of these include incentives and promotion of startups and young innovative companies.[2] In fact, over the last two decades, it is a recurrent part of public policy to create institutions and programs that support the conception and development of high-growth innovative firms (INDIA MINISTRY OF COMMERCE AND INDUSTRY, 2016; NATIONAL INSTITUTE FOR TRANSFORMING INDIA, 2015; WORLD BANK, 2010; AUDRETSCH *et al*., 2002; LUNDSTRÖM and STEVENSON, 2005). Business incubators and accelerators, university training programs, special visa programs for entrepreneurs, the promotion of academic spin-offs, mentoring programs, networking and cluster initiatives, the development of seed and entrepreneurial capital supply, specific fiscal incentives and public procurement programs are some of the main instruments that have been used to this end (OECD, 2017, 2016a, 2016b; MAZZUCATO, 2013; GILBERT *et al.*, 2004; EUROPEAN COMMISSION, 2004a; ZAVATTA, 2008, KANTIS *et al*., 2004). In Latin America,

[1] The authors are grateful for the contributions of the anonymous reviewer and comments from the participants of the congresses in which this paper was presented. We also want to thank João Augusto Ferreira Freire for his important help.

[2] As in Kantis *et al*. (2016), we defined young firms as those that have been in business for ten years or less. This definition is in line with the one the World Bank uses. Furthermore, a startup is defined here as an independent firm newly created either by one or by a group of entrepreneurs.

many countries have also supported several projects and institutions dedicated to promoting the unfolding and consolidation of innovative entrepreneurial ecosystems (KANTIS *et al*., 2013, 2004; KANTIS and FEDERICO, 2012; KANTIS, 2010).

The hypothesis that underpins these policies and institutional efforts is that these firms could become a driving force towards economic renewal through: (i) the generation and diffusion of innovations; (ii) the gathering of know-how and existing knowledge; (iii) the generation of new highly qualified jobs; (iv) the appearance of new sectors and activities; (v) the change in each economy's specialization pattern; and (vi) the regional development (MALERBA and MCKELVEY, 2018; AUDRETSCH and KEILBACH, 2007; AUDRETSCH and THURIK, 2000; AUTIO, 1997; FONTES and COOMBS, 2001; DANSON, 1996; MASON and HARRISON, 2006). Furthermore, in competitive terms, in the last decade, given the increasingly global competitive environment, many large firms are looking at startups as a source of innovation and dynamism. This trend implies the interaction between large and consolidated firms, particularly of their R&D, financial and new business teams and departments, with the entrepreneurial ecosystem, mainly the entrepreneurs and their startups, in what is called as *corporate venturing* (KPMG, 2014; BONZOM and NETESSINE, 2016; REIMSBACH and HAUSCHILD, 2012, among others). Indeed, some of these corporations are ex-startups such as Google, Microsoft, Apple, Facebook, etc.

In part as a result of the success of the promotion policy and in part because of the global *corporate venturing* trend, many Latin American startups that emerged in different industries were acquired by global companies, particularly those that have shown innovative performance and superlative growth rates (ALVES *et al*., 2017; GONZALO, 2015; GONZALO *et al*., 2013, 2011; CASSIOLATO and BIANCHI, 2011; KANTIS, 2018).[3] Although in some cases these purchases have resulted in an expansion of the activities of these firms and maintenance of R&D activities, in many other cases, these takeovers[4] implied a termination of local businesses, in terms of a current or potential competitor of the acquirer firms or in terms of a source of innovation. In fact, this process of takeover could be interpreted as the 'Latin American paradox of entrepreneurial success'. In Wasserman (2003), the paradox of entrepreneurial success referred to the replacement of the successful entrepreneurs by the CEOs elected by the venture capital funds. In Latin America, the process is similar, but, additionally, it is not only the entrepreneur that is replaced, but also the R&D team and, in some cases, even the whole firm may be closed.

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[3] According to Crunchbase base, more than 20 young knowledge-based firms from Argentina, Bolivia, Brazil, Chile, Paraguay and Uruguay were acquired in 2016 (CRUNCHBASE, 2016).

[4] In this paper, we will use takeovers, acquisitions and mergers as synonyms.

As discussed in Gonzalo *et al* (2013) and Gonzalo (2015) there are different paths of growth for Latin American young innovative firms. Among these different paths, the fast-sale is one possibility and the emergence of a *multilatina* is another possibility. Besides that, there are several intermediate paths with different grades of involvement of the entrepreneurial team and the stakeholders, both at the firm board and in the management level. In some cases, the fast sale could be one planned growth path strategy of the entrepreneur team. Indeed, in contexts of scarce or inadequate financing to scale up the business, the takeover may provide the firm with access to fresh funds in order to continue its growth path. However, in terms of public policy perspective, it is important to wonder about the possible result in terms of competition, technological diversity, innovation or welfare[5] of these mergers.

In this context, the main objective of this paper is to consider the antitrust[6] implications of the takeovers of startups and young innovative firms. This paper is devoted to answering two questions. First, as to how the antitrust authorities should consider knowledge-based startups or the acquisition of young innovative firms. Second, what the current institutional challenges in this topic are. That said, we discuss whether these mergers deserve a particular look by competition and innovation policy authorities, taking the traditional approach of mergers as reference. In particular, considering the competition policy goal, we ask: is the anticompetitive assumption valid and – if so – in which cases? How should the antitrust authorities assess these mergers? What are the main challenges?

As dealing with mergers in innovative markets is already a challenge, the proposed discussion is absent in the current antitrust literature. In fact, although the acquisition of innovative startups is being increasingly discussed in American, European and Asian specialized IT and business blogs and magazines, there is not much articulated academic research discussing this matter. Specially combining innovation and competition policy motivations and theoretical frameworks. Between the works that

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[5] Different Latin American economist such as Ferrer (1963), Sunkel (1971), Fajnzylber (1983) and Tavares (1985) have pointed out the implications of the transnational takeovers for the development of local entrepreneurial and technological capabilities. Transnational enterprises, backed by their better financial access and government of origin support, might acquire local firms without dislocating the R&D activities. More contemporary, Soares *et al*. (2015) and Szapiro *et al*. (2015) sustain that the transnational enterprises presence in Latin American countries has not always been virtuous. Besides that, in many cases it may 'lock' the development of local technologies, entrepreneurial and collective capabilities. Given that the structural heterogeneity is still a main feature of the Latin American productive structures, the 'foreignization' of the local young firms related to the new techno-economic paradigm firms gives a new face to a not so new discussion.

[6] In this paper we will consider antitrust and competition policy as synonymous.

indirectly debate this issue, Mandel and Carew (2011) analyze it albeit from an ecosystem's perspective, sustaining that startups acquisitions by an incumbent firm mainly improve the innovation dynamic of the ecosystem as a hole. Audretsch *et al.* (2001) and Audretsch (2013) also shed some light on the relationship between entrepreneurship and competition policy, although in a very general sense and without expanding on how the antitrust authorities may evaluate these sorts of mergers.

In order to contribute to this unexplored field and to answer our research questions, in the next section we present a brief outline of the actual antitrust merger review. The discussion about the subject is still incipient, but some advancements in the debate may be seen, especially opposed to the standard approach. At the end of this section, the antitrust conceptual debate is further developed to discuss the impacts of mergers on innovation as we introduce a few considerations about the analyses of the acquisitions of startups and young innovative firms as a special case. Additionally, we examine two recent merger cases of the ICT industry in the United States and in the European Union that exemplify the arguments presented along the paper and the antitrust theoretical debate surrounding the issue.

In this sense, we present and analyze the Google/Waze acquisition and the Facebook/WhatsApp case. Despite the fact that startup and young innovative firm takeovers is a process happening in different industries worldwide (such as biotech, pharma, media, e-commerce, IA, renewable energies, and so on), since there are not many cases analyzed from an antitrust perspective, we preferred to focus on two cases of the ICT industry, which are at the core of the new techno-economic paradigm. Thus, these cases have been chosen because they fit our research motivation and illustrate well the arguments presented in the literature review. Finally, we briefly explore the Brazilian institutional framework to draw an agenda in terms of policies and academic research to this country, as we address some recent issues in Brazil and raise lessons and challenges to the Brazilian authority. In the conclusion section, we present suggestions for policy and for future research.

Undoubtedly, it is an initial conceptual and policy-oriented effort in a relatively new field. Therefore, instead of drawing definitive conclusions building case databases, our main objective is, as a priority, to introduce this discussion and present the most relevant topics in perspective. However, we consider that this paper contributes to the debate in two significant ways. First, we set up an initial conceptual discussion and analyze the acquisition of startups and young innovative firms from an antitrust merger review approach, deepening in the innovative implications of the merger. Next, as we have mentioned before, there are no efforts in Latin America and just a few papers around the world that explore this line of analysis. Second, we suggest some initial potential lines of dialogue around the need to coordinate competition and innovation policy.

2. THE ANTITRUST THEORIES AND PROCEDURES: FROM THE CURRENT CONVENTIONAL MERGER APPROACH TO INNOVATION EFFECTS CONCERNS

This section begins with a brief presentation of the most important economic theoretical influences in Competition Policy up to its actual stage and will later consider the current procedures and the most important characteristics of merger analysis. Next, the section introduces the discussion concerning the competition through innovation on competition policy and the debates surrounding the effects of mergers on innovation in order to, finally, treat startups' takeovers as a special case.

2.1. THE CURRENT CONVENTIONAL MERGER APPROACH

After the second world-war, the biggest controversy in the history of US antitrust law started to take shape. As Budzinski (2008) says, the most famous debate among competition theories is represented by the Harvard–Chicago controversy. While the Harvard school and its structure-conduct-performance paradigm-based view predominated between the 1940s and 1960s, the 1970s and 1980s were for the Chicago school, with its less interventionist approach for better results in efficiency and social welfare.

As a result of this debate, from the mid-1990s on, as Budzinski (2008) emphasized, the current antitrust policy conventional approach began gaining ground. It is based on different applications of industrial organization theories and these conceptual contributions to the antitrust area have been grouped together in what is called the post-Chicago approach. Methodologically, there are some post-Chicago contributions such as game theory, theory-based empirical studies, use of econometrics, etc. Conceptually, there are distinct contributions that were neglected by the Chicago school and a dialogue between Chicago and structuralist ideas, particularly the theory of strategic barriers to entry and coordinated and unilateral effects in oligopolistic theory.

Following these primary ideas, the current conventional approach to antitrust policy is based mainly on a static view of competition and is designed to pursue the goal of reaching the most efficient allocation. In order to reach the goal of preserving welfare, the antitrust authority uses the Paretian Criteria.[7] The focus is on diminishing the 'deadweight loss' and, by preventing excessive post-merger concentration, the authority is avoiding a larger deadweight loss or the reduction of consumer welfare, only when it will likely lead to higher prices, mostly, or other forms of abuse of market

[7] If an allocation is efficient in Pareto sense, there is no other allocation that is better for all agents involved. In other words, there is no way to improve someone's situation without making it worse for at least one other agent.

power. The merger analysis takes place following the rule of reason: a merger is not prohibited *per se*, the benefits (efficiencies) and the anticompetitive effects are put in the scale and the merger is approved in case of a positive net effect. If the net effect is negative, the merger is blocked or allowed with the imposition of restrictions – also known as remedies – to diminish anticompetitive concerns.

About merger analysis itself, the current procedure can be generally divided in five main steps: (i) market definition; (ii) concentration analysis; (iii) entry conditions; (iv) anticompetitive effects evaluation; and (v) efficiencies analysis.

In most cases, the first step consists in defining the relevant market both in its product and in geographic dimensions (checking the substitutability degree between products and geographic areas, considering demand side, mainly).

The second step is evaluating market shares and concentration indexes, such as the Herfindahl-Hirschman Index (HHI)[8] to assess the 'likelihood of having adverse competitive effects' as defined by the American Horizontal Merger Guidelines, the document that guides merger assessment by the US Agencies. Market shares, concentration indexes and their variations are relevant benchmarks used to consider the anticompetitive threats that a merger may impose and are calculated earlier in the analysis. The market shares of the merging firms are calculated taking into account their sales and the overall relevant market delimitated. When the merging firms are smaller than 15% in Europe,[9] or when the HHI increases are smaller than 100 points, in the US, for example, the merger is considered unlikely to have adverse competitive effects, which means that there is a higher probability that this merger will not draw the attention of the antitrust agency and may undergo superficial scrutiny.[10]

By checking the likelihood of anticompetitive effects, particularly in horizontal mergers, the authorities will have two main concerns: unilateral and coordinated effects. The first one happens when it is expected that the merged firm finds it profitable to increase prices post-merger on its own. The second one happens through the higher likelihood of coordination between the merged firm and other competitors (coordination in this case may occur explicitly or tacitly). Besides, in order to consider

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[8] HHI is measured by adding the square of all firms' market share.

[9] In the European Union Merger Control, if the combined share of the merging parties is less than 15% in any market both firms compete, or less than 25% in vertically integrated market, the merger is analyzed through the simple procedure. For more information, check European Commission (2004b).

[10] Mergers resulting in unconcentrated markets (HHI below 1500), regardless of the size of HHI increase, are also considered unlikely to have adverse competitive effects in the US merger control and ordinarily require no further analysis. For more information, check the American Horizontal Merger Guidelines (2010). Available at: <https://www.ftc.gov/sites/default/files/attachments/merger-review/100819hmg.pdf>

the likelihood of anticompetitive effects, the antitrust agency must evaluate the entry and actual rivalry conditions. Most of the theoretical and analytical models applied directly or indirectly in merger analysis are based in competition models in which prices (or quantities) are the main variable (Cournot and Bertrand models are predominant).[11] That in turns means that the policy, and also its instruments and procedures, are mainly concerned with price effects of mergers, although laws and guidelines do not exclude other possible effects in quality, innovation, and variety, for example.[12]

As a final step and as a result of Chicago's contributions, it is considered that even complex mergers can actually improve welfare (reduce prices, improve quality, innovation, variety, etc.): the last step is evaluating if there are alleged efficiencies that can be achieved exclusively because of the merger. After measuring the effect in pricing of both anticompetitive effects and efficiencies, the antitrust authorities evaluate the net effects of these two opposing forces.

Finally, it is worth mentioning that not all mergers and acquisitions need to be analyzed by the antitrust authorities, as they usually establish a threshold for size of firms and transaction value for merger notification. Indeed, there is a presumption that a merger between small firms will not harm competition. The United States agencies (FTC and DoJ), for example, follow the Hart-Scott-Rodino (HSR) Act, that establishes threshold values for premerger notification. Currently the transaction value threshold for premerger notification is $ 84.4 million,[13] while sizes of parties vary from $ 16.9 million and $ 168.8 million. Below these values, parties are not obliged to notify the agencies. However, if the transaction value exceeds the amount of US$ 323 million, it needs to be notified independently of the size of the parties.

The European Commission may review a merger through two alternative ways. The first is if the combined turnover of the merging companies is over 5 billion euros worldwide and 250 million euros EU-wide. The second is if the combined turnover is over 2.5 billion euros worldwide, there is a combined turnover of at least 100 million euros in at least three Member States. A turnover of 35 million euros for each of at least

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[11] As we can see from the debate about simulation models based on Cournot and Bertrand. Weiskopf (2003) and Werden, Froeb and Scheffman (2004) debate this matter.

[12] The American Horizontal Merger Guidelines (2010) discusses the various dimensions of competition besides prices on Section 6 'Unilateral Effects' (p. 20-23). The European guidelines (2004) states: "By 'increased market power' is meant the ability of one or more firms to profitably increase prices, reduce output, choice or quality of goods and services, diminish innovation, or otherwise influence parameters of competition. In this notice, the expression 'increased prices' is often used as shorthand for these various ways in which a merger may result in competitive harm…" (DG-COMP, 2004, p. 1).

[13] The transaction thresholds are usually reviewed on an annual basis. The last revision launched by the date of the submission of this paper is available at Federal Trade Commission (2018).

two of the merging firms in each of the three Member States and an EU-wide turnover for at least two firms of more than 100 million euros EU-wide.[14]

To sum up, this section became an embryonic outline aimed to show that the evolution of antitrust policy and its enforcement are not static or free of tension area. The political, competitive, technological and external insertion phase has influenced the conceptual debate and the enforcement of the law. Going back to our main subject, innovation is a topic of great importance in the competition process and in the new global economy scenario. Although it is possible to state that while competition is changing radically with the rise of more dynamic markets such as IT, competition policy is not changing as fast. In terms of its actual main procedures, we presented some characteristics that will be more deeply discussed later in the next subsection (which examines the implication that innovative dimension may have to analysis and discusses better approaches and the startups special case). Some characteristics are: relevant market definition, the price effect hegemony in terms of merger effects, market shares and revenues significance for submission and screening purposes, and finally, the adoption of the allocative efficiency concept.

2.2. MERGER ANALYSIS WITH SCHUMPETERIAN COMPETITION: MAIN ISSUES, CHALLENGES TO ANTITRUST POLICY AND LITERATURE PROPOSALS

Here we present different views related to the introduction of the innovation dimension when assessing merger effects on Schumpeterian markets. This is relevant to our discussion firstly because startups are unequivocally innovative firms and usually are players in innovative markets; secondly because most part of the debate is due to incompatibilities between the conventional analytical framework described above and its necessary corrections to accomplish with this sort of markets necessities. At the end of the section, we aim to be capable to discuss the startups and young innovative firms' mergers. To assess the different theories of effects that may emerge, first we take into account the usual criticism to the standard approach when we are dealing with innovative industries. Then, we describe the implications of innovation concerns to merger analysis and the desirable changes, according to softer and more radical authors.

[14] For more information check European Commission (2004b).

2.2.1. CENTRAL ISSUES: PRICE COMPETITION AND EFFECT ON PRICE BIAS AND STATIC ANALYSIS

Before going further into the debate, we should say that economic theory did not advance in finding a clear causality link between innovation and concentration, and there is no final answer to the Arrow/Schumpeter controversy,[15] even though there is exhaustive theoretical and empirical work. There is also no consensus on the empirical works that were devoted to test the inverted 'U' shaped curve of the relation between R&D expenditures and concentration firstly proposed by Scherer (1965).[16] Knowing so, evaluating market concentration may not give us the right clue about the likelihood of mergers on innovation anticompetitive effects. This is particularly true when considering knowledge or technological-based markets, which are our main concern: competition occurs at innovation levels or, in other words, there is Schumpeterian competition.[17] In this way, no assumptions about the effects of the merger should be made looking solely to changes in concentration when evaluating a case with innovation competition: mergers should be analyzed on a case-by-case basis, as in other sorts of markets. This being said, competition policy needs to investigate and evaluate mergers, using threshold criteria and analytical procedures that accomplish the specificities of these innovative markets.

The first fundamental question and source of general criticism of the traditional approach in merger analysis is what the best way within the policy and its conventional procedures to consider the effects of a merger on market innovation would be. Since following the mainstream theoretical and methodological approach results in antitrust policy focusing on price competition, the consequence is that, when evaluating the merger, the likelihood of negative effects to variety, quality and innovation take a back seat in merger control analysis. However, despite the criticism, there are some recent changes that may be seen in the opposite direction: some specific cases in which price

[15] Kenneth Arrow favors the hypothesis that less concentration is better for innovation, while Joseph Schumpeter supposedly favors the idea that concentrated structures are better for innovation. Aghion *et al.* (2002) defend a middle-ground answer: some concentration is good up to a certain level, and after that level it starts to be prejudicial to innovation, the known inverted U relationship. See also Dosi (1984), for a discussion about concentration and innovation.

[16] Scherer (1967), Scott (1984), Levin *et al.* (1985), Aghion *et al.*(2002) are some of the woks that test the inverted U-shaped curve of the relation between R&D and market concentration.

[17] In general terms, the Schumpeterian competition is the process of competition through innovation in a dynamic environment, the opposite of the orthodox notion of competition (POSSAS, 2002; SCHUMPETER, 1942).

was not the most important dimension of competition considered,[18] but changes are yet far from satisfactory.

Another issue in the literature[19] is the prevalence of static and short-run analysis, which can be harmful to innovation, as enforcement can be too harsh in a market where innovation may alter future prices. On the other hand, making innovation the priority may include price increases in the short-run, diminishing consumers' supply. Promoting dynamic competition can interrupt price competition, as Sidak and Teece (2009) explain. It is also important to have in mind that choosing to focus on one of these two options does not mean that the agency will completely forget the other. It is possible to achieve middle ground, and determining the exact degree of each type of competition will be the authorities' call and the best decision will mostly depend on the case's analysis.

There is an ongoing debate with different approaches on how to incorporate innovation in merger review. Some authors prefer to follow the conventional step-by-step merger analysis with changes in the steps themselves such as Shapiro (2011), Baker (2007), Katz and Shelanski (2007), while some others prefer a more radical departure from conventional merger analysis, like Sidak and Teece (2009), Jorde and Teece (1990a), Kerber (2011), Budzinski (2008) and Farrel (2006). According to this literature, it is possible to verify that one important challenge is due to the perspective opened in the competition by a successful innovation and its potential to create new markets. This leads us to two main issues: (i) the adequacy of the relevant market's concept and the necessity of considering the firm's capabilities to innovate; and (ii) the post-merger effects on innovation, given by the changes in firms' innovation incentives and capabilities caused by the merger. Both issues will be presented below.

2.2.2. DIFFICULTIES DUE TO POTENTIAL MARKETS THAT MAY BE CREATED THROUGH INNOVATION: RELEVANT MARKETS DEFINITIONS, MEASURES, AND CAPABILITIES APPROACHES

Defining the relevant market and evaluating concentration are usually how antitrust authorities start merger analysis, even though the need to change procedures and how

[18] Microsoft/Skype (EU/DG-COMP - 2011), Genzyme/Novazyme (USA/FTC - 2004), AT&T/T-Mobile (USA/DOJ – 2011) are important examples of cases that were analyzed in other dimensions different from the traditional price one.

[19] Some of the papers are: Baumol and Ordover (1992), Possas (2004), Sidak and Teece (2009).

to do so is defended by some authors.[20] The bottom line here is that innovation as a competitive relevant strategy in Schumpeterian competition may create a new market/product/service by destroying the preceding one.

An important issue is what to measure in the relevant market dimension. In particular, Gilbert and Sunshine (1995) presented one solution to do this in a market where innovation is at stake: the innovation market analysis (IMA). The authors suggest using R&D market share as a concentration measure as firms compete through R&D spending. Even though this approach was heavily criticized (especially due to the lack of an empirical link between concentration and innovation and to the notion that a high share of the innovative effort is made by smaller firms), it inaugurated the debate about the possibility of using an alternative approach of merger analysis in Schumpeterian markets.

Alternatively, there could be greater focus on potential competition. A firm that has the capabilities needed to develop a new product that may compete in a relevant market is a potential competitor: in a market where competition is innovation-based, any successful innovator has a chance to enter the market. If innovation cycles are short, the threat is even more credible. Therefore, in order to fully define the relevant market in a Schumpeterian one, it is necessary to include the firms with the capabilities needed to eventually develop a product and enter the market (even if this product is not under development yet). This view may be referred to as the 'capabilities approach'.

By following this approach, any firm with the capabilities to develop a product able to compete in the product market is a potential competitor. Cases such as: (i) the firm has the capabilities to develop a new product, but is not developing one yet; and (ii) the firm is already developing an innovative product, but its introduction to the market has not happened yet, are cases in which the firm has no market share in the present time but its competitive significance may be enormous. Startups usually fit these cases.

Nevertheless, the measuring issue is still present here. Even though projected market shares can be a good way to assess entry in traditional price competition markets, it is not accurate to proceed in this manner in a Schumpeterian market, as we have shown. Both the capabilities of the firms and potential competitors must be taken into account in order to fully analyze the competition in an innovation-driven market. Even though measuring capabilities may be a difficult task due to their subjective nature, assessing the firms' R&D strategy (not the amount of total R&D expenditure, but its technological cumulative advances as well as its successes and failures) may be

[20] Authors such as Jorde and Teece (1990), Katz and Shelanski (2007) and Sidak and Teece (2009) suggest different approaches to relevant market definition.

a good way to analyze which firms may be considered competitors or not, following the suggestion of Sidakand Teece (2009). Furthermore, the problem observed in the traditional approach is more than just dynamic product definition, considering the difficulties of calculating the relevance of the acquired firm from its current market share or revenue. We will get back to this point.

2.2.3. THE POST-MERGER EFFECT ON INNOVATION: DIVERSITY ARGUMENT AND SHAPIRO'S PRINCIPLES

There are two main theoretical contributions in the antitrust literature concerning the effects of mergers on innovation: the diversity argument and Shapiro's Principles. The diversity argument, defended by some authors,[21] reinforces the capabilities approach, as if it is assumed that the higher the number of firms capable of innovating in a given area, the bigger the chance of having successful innovative products. In other words, it is better to have many potential capable competitors. It is important to preserve diversity in the market: if a merger unifies two firms with different innovation paths, one of these paths (maybe even both) may be eliminated.

On that note, Sidak and Teece (2009, p. 31) state that antitrust agencies should make an effort to protect diversity in the market:

> Competition policy authorities as well as other agencies must be concerned with protecting economic diversity and meaningful variety in organizational forms. Policymakers need not focus on a particular market; their focus should be broader because some of the best candidates for new entry and radical innovation exist outside the market.

Kerber (2011, p. 14) states that there are two different types of diversity reducers:

> Two different effects should be distinguished: (1) Mergers and R&D agreements can lead to a reduction of parallel experimentation with new problem solutions, for example, by eliminating parallel research projects (or competing products or services). This might be directly restricting competition from a competition law perspective, because the research projects or products are substitutes aiming at the

[21] Jorde and Teece (1990b) make a series of suggestions to the US antitrust law in order to preserve innovation and one of them is that the rule of reason should account for the diversity of sources of new technology. Sidak and Teece (2009) discuss the importance of preserving diversity.

> solution of the same problems. (2) It is a different effect, if the lower number of firms through larger firm size and firm concentration leads generally to fewer sources of innovation and therefore to fewer search activities for new problem solutions.

However, this would leave us a result in which all horizontal mergers of innovative firms would lead to a reduction in innovation. In fact, concentration could also lead to more innovation in some markets. Diversity may be more relevant in some markets than others.

Thus, an additional question is how to evaluate the merger effect in innovation incentives. Shapiro (2011, p. 383) offers three guiding principles that may define how incentives/abilities will be affected by some merger.

The first is the Contestability Principle, which is the incentive to gain and protect profitable sales by providing greater value to consumers, enhancing innovation incentives. In other words, a sale is contestable if other firms may take away this sale by providing a better product or a more innovative one. For example, Contestability works as an incentive for both the potential competitor (incentive to enter the market and gain sales) and for the incumbent (incentive to protect its own sales). The Appropriability Principle is the second one and it says, in general, that the greater the fraction of welfare generated by its own innovation the innovative firm can capture, the larger the incentives to innovate. The Contestability and Appropriability are basically about the incentives to innovate, while the last principle, the Synergies Principle, regards the actual ability to innovate. Synergies are enhancements of innovation capabilities generated by the combination of complementary assets (SHAPIRO, 2011).[22]

The three guiding principles are useful to assess post-merger incentives. By checking how the merger affect these three principles, one can infer how it affects innovation. If the acquired firm is a maverick, in antitrust language terms (or a disruptive and more aggressive competitor, more generally), eliminating it is even more problematic to innovation. Given the uncertain nature of innovation, checking how incentives behave with the merger may be a good way to assess its effects.

The most recent American Horizontal Merger Guidelines clearly addresses these principles and considers two different ways that a merger can reduce the incentives to innovate:

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[22] About synergies, it is important to state that the American Horizontal Merger Guidelines considers the ability of better to conduct R&D more effectively as a form of efficiency (DOJ and FTC, 2010, p. 31).

> That curtailment of innovation could take the form of reduced incentive to continue with an existing product-development effort or reduced incentive to initiate development of new products. The first of these effects is most likely to occur if at least one of the merging firms is engaging in efforts to introduce new products that would capture substantial revenues from the other merging firm. The second, longer-run effect is most likely to occur if at least one of the merging firms has capabilities that are likely to lead it to develop new products in the future that would capture substantial revenues from the other merging firm. The Agencies therefore also consider whether a merger will diminish innovation competition by combining two of a very small number of firms with the strongest capabilities to successfully innovate in a specific direction. (DOJ and FTC, 2010, p. 23)

Finally, considering the literature raised so far, we are distant from a stage that both academic and practical literature are organized in such a manner that can be systematically applied just as it is when price competition is the main concern.

2.3. SPECIFICITIES OF THE STARTUPS AND YOUNG INNOVATIVE FIRMS AND THEIR IMPLICATIONS

Now we can consider some special issues that arise when a startup firm or young technological firm is involved. Among these peculiarities, it is possible to highlight the following characteristics:

i) **Startups and young innovative firms as potential competition.** We can easily assume that startups have as its main feature an innovative potential and may act in innovative industries. The innovative competition dimension is intrinsic, and it is imperative to deal with it for a clear understanding of how the market works. In this sense, potential competition is a central matter here, since this sort of companies are usually the source of innovation – the company that, when successful, creates or enhances a new market, product or technology.

ii) **The buying and selling of startups or young innovative firms as a relevant way of incorporating innovation (and capacity) by incumbents.** As pointed out in the introduction, through corporate venturing, big corporations are working and acquiring startups and young innovative firms in order to maintain innovative dynamism and competitive levels. However, in some cases this interaction does not display the best competitive and innovative results because the corporations may try to block (or absorb) a maverick business model.

iii) **Startups and young innovative firms may have inexpressive results in terms of sales and revenues in the short run or when they are negotiated.** This makes the antitrust evaluation much more difficult, because despite the possibility that the startup has no relevant current sales, the prospective markets or sales could be excessively profitable.

A direct consequence of the characteristics listed above is that all the issues identified in this section will apply to the startups' case. Price effect hegemony and static analysis are a problem. Having said that, there are two concerns more relevant when we consider the acquisition of startups or young technological companies: (i) relevant market delimitation and revenues and shares as bad proxy of market power and startups' competitive potential; (ii) the buying and selling as a common startup consolidation strategy and the seller's identity issue.

First, here the relevant market delimitation and the size of the firm as proxy of market power is still an issue. Firstly, as any innovative firm the market shares may be too volatile. Secondly, there is no doubt that independent startups are born as small firms. As we have seen, when a merger involves a firm that is not big enough to reach the minimum criteria for notification, the merger is automatically approved as it does not pass through the authority's scrutiny. Also, if a merger causes a small variation in concentration indexes, that merger will not undergo deeper analysis. Albeit, it is not possible to assert that the acquisition of a startup will not increase the market power of the buyer firm nor that it will not have significant anticompetitive effects, especially on innovation. A case-by-case analysis must be carried out.

Thus, in some cases, a startup or young innovative company may be a relevant competitor, despite its null or reduced market share measured in revenues, due to an innovation that can radically alter the dynamics of the market or may be strategically expensive to replicate. Potential competition through innovation and capabilities of both firms affected by the deal play an important role here. In order to evaluate whether a startup is a relevant competitor or not, antitrust agencies may check first if the innovative product is already in the product market. Or whether their innovative capacity will define their ability to carry out a major change in the market or not. When it is not already in the product market definition, the agency can check if it is possible or not to evaluate the innovation process, in other words, check the stage of development of the new product and its value in terms of strategy to the acquiring firm. By doing so, the agency can answer if the innovation is likely to succeed. In this case, the startup may also be a relevant competitor regardless of its size. Thus, the capability to innovate will determine the merger effect to the market, not the size of the firms involved.

Secondly, there are the changes in incentives after the merger. As O´Connor (2013) says:

> Sometimes, new entrants or startups are actually more of a pro-competitive force if they are acquired by a major company and integrated into their platform and products (Apple's acquisition of Siri and Google's acquisition of Android being recent examples of this). In fact, acquisition is an extremely common startup exit strategy, and many startups wouldn't have an exit scenario without it. However, there are certainly instances where the acquisition of disruptive technologies can be anticompetitive. When a disruptive competitor threatens to undercut the revenue of an incumbent (or their entire business model), incumbents have an incentive to buy the competitor and bury its technology, so regulators should be suspicious about the acquisition.

The argument presents an important issue: buying and selling is a common strategy to independent startup business. Further, O'Connor's points are directly related to Shapiro's debate about Synergies and Contestability: the integration of the startup in the acquirer's platform may be a synergy related to the merger, and the discontinuity of startup's technology path as a result of the acquisition, when it is the case, clearly occurs based on the contestability principle.

In an acquisition of a startup by a large and well established firm, the incentive to eliminate the startup's product is greater the larger the share of profits that are won from the startup's product at the expense of the acquirer's product, as indicated by Shapiro's Contestability Principle and its application in the *Horizontal Merger Guidelines* (DOJ and FTC, 2010, p. 24) as we noted above. The same interpretation is possible considering the threat of contestability that the innovation project and developments by the startup impose to the acquirer in terms of their capabilities and potential competition. On the other hand, there may be synergies because of the merger, such as getting together the expertise of both firms, the financial robustness of the large or incumbent firm with the innovation project being developed by the startup (which may increase its chance of success). There are also other complementary assets in general and the access to the consumer's base of the large firm by the startup. As both cases can happen, the antitrust agencies must check if the acquirer has incentives to discontinue its own innovation project or the startup's, diminishing innovation developments in the market and welfare. If the acquiring firm actually has incentives to diminish innovation, there may be two results from the merger: eliminating a source of innovation (the startup's project or product) or just eliminating an independent competitor and maintaining the development of its project.

As argued before, the selling and buying is a common part of the startup strategy, although it is relevant to consider that either positive or negative impacts to competition and innovation may be expected and the results of the acquisition will depend on the identity of the buyer and the firms' incentives and capabilities.[23]

Summarizing, analyzing a merger or acquisition involving a startup is not easy. Prospect decisions concerning price or innovation effects are already challenging even when it involves merging firms with large sizes. Therefore, some of the issues that the antitrust agency has to deal with, as presented above, are: minimum size for notification, the small and volatile (or even non-existent) market share and revenues, capabilities and incentives post-merger to innovation, and uncertainty about future performance.

3. GOOGLE/WAZE, FACEBOOK/WHATSAPP AND THE BRAZILIAN EXPERIENCE

In this section, we present and analyze briefly two important cases: Google/Waze (US approach) and Facebook/WhatsApp (EU approach). We set up the cases with the available information and by combining it with the conceptual insights discussed in the previous sections. As stated in the introduction, there are not many cases that fit our discussion. Those that exist are mainly published in specialized blogs or magazines, but they generally do not present a complete analysis and were not part of an antitrust merger review. These two cases are particularly relevant since they converse with the conceptual discussion mentioned earlier. Later, we present an interesting view of the Brazilian framework, with the intention of opening the subject and identifying further questions and challenges for competition policy in this country.

3.1. GOOGLE/WAZE

Google, primarily known for being the largest internet search engine in the Western world, has the reputation of continuously seeking new directions in its growth and its innovation strategy. This growth-by-acquisitions strategy has opened the path for some research in Europe, such as ICOMP's (2011, 2012), discussion about Google's growth strategy and its focus on the monopolization of the internet market. According to Popper (2012), from 2001 to 2011, Google has purchased and integrated over 110

[23] Saying that the identity of the buyer matters is the same as stating that who is going to buy the startup is an antitrust concern.

companies. In 2014 alone, it bought 25 companies, one firm every two weeks. If we count the firms acquired for patents and intellectual property between 2001 and 2011, the total number is 79. Larry Page took over as CEO in April 2011 and, under his administration, the company abandoned a number of small initiatives and redirected Google's focus around 7 core product divisions.[24] As Popper (2012) points out:

> Google has taken plenty of flack for its extremely broad –some would say lack of focus. But by and large it's been the most successful among the massive tech firms when it comes to incorporating new companies. Double click and AdSense, both acquired, are major drivers of Google's revenue. YouTube dominates online video. Android goes head-to-head with Apple in mobile. And it's not just companies that are bolted on whole cloth. Premier products like Google Maps, Docs, Analytics, and Voice were also crafted in large part by teams brought in from outside.

In 2013, Google bought Waze, a four-year-old Israeli firm that developed a free application currently available for iPhone and Google Android devices, which incorporates real-time GPS data from its nearly 50 million users to deliver highly accurate and useful traffic and navigation information. Waze users can edit maps with details like gas prices, speed traps, road construction and traffic accidents. According to its CEO, Noam Bardin, Waze is 'an innovative mobile mapping platform that crowd-sources user data to help drivers avoid traffic congestion, road construction and police speed traps' adding that: 'We feel that we're the only reasonable competition to [Google] in this market of creating maps that are really geared for mobile, for real-time, for consumers, for the new world that we're moving into' (TIME, 2013). Waze was founded in 2007, and at the moment of the takeover it had about 100 employees, mostly based in Israel, with offices in the Silicon Valley and New York. According to CrunchBase, the company raised US$ 67 million in venture-capital funding. Microsoft was an early investor, but apparently did not make a bid for the company.

From Google's side, the purchase could be seen as part of a growth strategy through acquisitions, either to eliminate or incorporate competitors or/and in order to acquire skills to build a broader scope of products and services (POPPER, 2012; O'CONNOR, 2013). Google Maps had been launched by Google in 2005 as a desktop web mapping service and in September 2008 Google released it for mobile devices. Only to give an

[24] Taking a look at Google's competitors, it becomes clear how astonishing these numbers are: Facebook acquired ten companies in 2011; Apple, Amazon, and Microsoft only three. These acquisitions are not irrelevant ones, as it is showed in Annex 1, the acquired firms are central players in Google's products/services portfolio.

approximate idea, according to StatCounter, in 2004, Google concentrated 84% of mobile search market share. So, according to Time (2013), the deal was seen by FTC officers as a defensive play to remove a competitor to Google Maps and keep the service out the hands of rival tech giants Apple and Facebook, that had also been interested in buying the company.

Google's Waze acquisition deal was closed in one billion dollars. Given that Waze's turnover was less than 70.9 million dollars, the deal was not formally submitted to the US antitrust system, even though the FTC did some preliminary inquiry about the case. As can be obtained by the specialized media, some antitrust analysts and consumers' associations pressured the agency to investigate the merger and its implications for innovative terms.[25] Despite the fact that the transaction did not fill the threshold and it was not submitted, the FTC decided to open a preliminary inquiry, although it was not clear whether the authority was concerned to review the potential effects of the merger or the submitting criteria itself.

According to O'Connor (2013), the fact that Waze's turnover was less than 70.9 million at the time of the deal was no doubt a restraint to the intervention of the FTC, which should intervene *ex officio*. The exemption was particularly the case of Waze because it was a foreign company.[26] Solomon (2013) discusses whether Waze's intellectual property, as value of assets in the US, would not be higher than the limit imposed by the threshold, since the value of the transaction was close to USD 1 billion.

Therefore, without taking the speculation side, we can state that there are two main concerns to competition policy: (i) how to calculate the value of intellectual property, or other assets, such as the consumer's information, that are not reflected into sales in the country; (ii) how to deal with the virtual property of digital markets, as the geographic location is not well defined. The first concern definitely applies directly to our subjects, as it is one of the properties of startups or young innovative firms. The second one

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[25] The US advocacy group Consumer Watchdog wrote a letter recommending the rejection of the deal. For more info check Simpson (2013).

[26] According to Rules 802.50 - 802.53, 16 C.F.R. §§ 802.50 - 802.53: "**§ 802.50 Acquisitions of foreign assets. (a)** The acquisition of assets located outside the United States shall be exempt from the requirements of the act unless the foreign assets the acquiring person would hold as a result of the acquisition generated sales in or into the U.S. exceeding $50 million (as adjusted) during the acquired person's most recent fiscal year. **(b)** Where the foreign assets being acquired exceed the threshold in paragraph (a) of this section, the acquisition nevertheless shall be exempt where: **(1)** Both acquiring and acquired persons are foreign; **(2)** The aggregate sales of the acquiring and acquired persons in or into the United States are less than $110 million (as adjusted) in their respective most recent fiscal years; **(3)** The aggregate total assets of the acquiring and acquired persons located in the United States (other than investment assets, voting or nonvoting securities of another person, and assets included pursuant to§ 801.40(d)(2) of this chapter) are less than $110 million (as adjusted); and **(4)** The transaction does not meet the criteria of Section 7A(a)(2)(A)." (UNITED STATES OF AMERICA, 2005). Revised limits can be found in Federal Trade Commission (2018).

derives from the properties of digital markets. Nevertheless, both issues show us how important the delimitation of a threshold is to the transaction value, which is the actual complementary procedure in the US and in the EU, as seen above.

The FTC decided not to challenge the merger, and, for this reason, it is not possible to consider the decision under its merits, because the analysis' content as well as the information about the market and the decision is not available. Under the traditional approach, the relevant market definition is the first central topic to the analysis. In this case, it has to do with whether the relevant market is the market of apps for smartphones, dominated by Google and Apple, or whether it is the broader market of turn-by-turn navigation systems, which would include dash-mounted and other types of automobile GPS units, such as those made by other firms such as TomTom and Magellan. Certainly, the later configuration would rise fewer anticompetitive concerns, as this includes players in the market such as Telenav and TCS, offered by AT&T and Verizon platforms, respectively.

Concerning the modification of market structures involved, disruptive competition often undercuts the business model of big incumbents by providing a similar good and service at much cheaper prices, better quality or more innovation. In evaluating the barriers to entry, to assess the potential anticompetitive effects for the case of Waze, O'Connor (2013) says:

> Since a dynamic open source mapping project exists, OpenStreetMaps (in fact, Foursquare used OpenStreetMaps to replace Google Maps), it is not that much of a stretch to think that other social networks or major tech companies could build their own Waze competitor if they were so inclined. Barriers to entry, particularly for companies that already have a large user base, appear low.

However, as Solomon's arguments point out, the barrier to entry may not be low since large companies such as Apple failed entering the navigation apps market. Thus, in Solomon's words: '[j]ust witness the difficulties Apple faced with the controversy over the accuracy of its own map app. If Apple can't do this easily with its built-in user base of 400 million iPhone users, not many others can'.

The existence of Google Maps makes the operation a horizontal merger. Regarding the assessment of anti-competitive effects and competitive conditions, O'Connor (2013) points out that the questions to answer are:

> Is Waze's social mapping business model one that might undercut Google's revenue stream...? Or is it likely that Google will integrate the best of its own mapping features (and advertising business models) with Waze to create a better, more competitive product?

Since price is not the main concern in this market, but other ways of exercising market power, such as lower innovation, quality or consumer information control or misuse, in addition to high barriers to entry to other app developers and there is no efficiency or positive outcomes from the merger itself. The incumbent could acquire the dynamic startup for the purpose of killing it or slowing down the disruptive innovation or/and cooling down the competitive pressure. Still, this is one type of analysis that cannot be done when information is widely unavailable.

Regarding the effects on innovation, from adiversity point of view, the merger eliminates one source of innovation and the diversity of innovation paths. In Shapiro's conceptual bases, it is important to analyze Google's incentives to innovate when acquiring Waze and how those incentives changed after the merger. The latter was contesting a market that belonged to Google through Google Maps, so Google could have the perspective of losing market share. Applying the Contestability principle, this perspective may have influenced Google, as Waze could be a threat itself or be acquired by a relevant player outside the market. On the other hand, pro-competitive claims related to possible synergies could be valid if Waze benefited from Google's platforms, knowhow, clients and financial support.

The fact that, at the first, we were far away from a case that undoubtedly had no potentiality of leading to anticompetitive effects leaves the concern of competition policy submissions' threshold as the main issue revealed by this case.[27]

3.2. FACEBOOK/WHATSAPP

Another important merger case was the acquisition of WhatsApp by Facebook in 2014. Facebook agreed to spend US$ 19 billion to acquire the company that offers instant messaging service to 600 million users worldwide.[28] The FTC gave the green light to the proposed acquisition without investigating it longer than the usual first 30-day period to decide whether the Commission would ask for further information or close investigations. On the other hand, the European Commission (DG-Comp) took longer to decide whether the deal should be approved, but ended up allowing it. When it comes to notification criteria, transaction value was more than enough to

[27] It is important to highlight that, as far as we know, the case was not submitted to the EU and Brazilian authorities.

[28] According to the European Commission, WhatsApp had 600 million users around the globe by June 2014.

match the minimum requirements of the size of transaction test[29] in the American system. On the other hand, in Europe, there are only turnover thresholds to define whether a merger has Community dimension or not (in that case national competition authorities review the mergers). WhatsApp did not have enough revenue to have Community dimension, but the Commission reviewed the case due to the voluntary procedure defined in Article 4(5) of the Merger Regulation.[30]

DG-Comp delimited the relevant market definitions into three dimensions: consumer communication services (the product market was defined as communication apps for smartphones), social networking services and online advertising.

In the consumer communication services relevant market, one critical issue raised was the dynamic environment of competition, especially the presence of short innovation cycles, great number of players and great condition of entry (DG-COMP, 2014). In addition, the authority argued that the data collection used to produce markets shares was not reliable and underestimated the parties' market shares in the consumer communication services relevant market. Thus, these aspects make market share a bad proxy for market power because the structure of the market can change within months. An example is Telegram, a competitor that reached 35 million users in March 2014, six months after launch. In this case, 'high market shares are not indicative of market power and, therefore, lasting damage to competition.' (DG-COMP, 2014, p. 18).[31] Also, the Commission concluded that the parties' products were not close substitutes and that there were no significant switching costs.

When assessing the barriers to entry, the Commission found low barriers to entry due to: (i) disruptive innovation, dynamism, and fast-growing; (ii) small initial investments; (iii) no significant barriers in the form of patents, or knowledge/technology access; (iv) absence of risks of foreclosure or increasing of barriers; (v) ease of distribution; (vi) quick growth of consumer base; and (vii) no network effect concern.

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[29] If the transaction exceeds a previously defined threshold, the transaction must be notified independently of the result of the size of person test. In 2014, the minimum was $ 303.4 million. In 2018 the threshold was 337.6 million (FEDERAL TRADE COMMISSION, 2018).

[30] There is a voluntary procedure defined in Article 4(5) of the EC Merger Regulation under which the undertakings may ask to have the merger handled by the Commission even though the merger does not fit the requirements defined in Articles 1. If no national competition authorities that have jurisdiction to analyze the merger under their own national regulation objects, the merger is then analyzed by the Commission (EUROPEAN COMMISSION, 2004b). Facebook/Whatsapp requested this procedure and were successful.

[31] A similar view was used by DG-Comp in the previous year. The assessment of Microsoft's acquisition of Skype (2011) showed as one of major arguments the influence of the short innovation cycle to show the great and constant contestability of the market (DG-COMP, 2011).

The network effect and its ability to limit entry or rivalry through foreclosure of accessing new customers drew special attention from the Commission. Despite that, this issue was actually a minor concern in this case, according to the Commission, because of: (i) the dynamism, fast growing and low switching cost; (ii) their consumers used more than one app in the same device; (iii) there was no lock in and parties did not control any essential parts of the network or any mobile operating system; and (iv) there was no potential risk and technological reasoning to the integration of platforms. However, after the decision, with the update of the company's consumer terms of use in 2016 by adding the possibility of relating WhatsApp mobile numbers to social network contacts, the merger has again caught the attention of antitrust agencies. Thus, it was concluded that contrary to the declarations during the process in 2014, the possibility of adjusting the information between the two platforms had existed since then, characterizing a serious infraction. Therefore, the European Commission, just like other authorities from France, Germany, Italy, Belgium and the Netherlands fined Facebook € 110 million for providing misleading information.

In the social network relevant market, the Commission concluded that there was no concern, basing its opinion on the complementarities between WhatsApp and Facebook, and on the low risk of both platforms integration (or cross-platform communication). In regards to the relevant market of online advertising services, although the Commission identified that there was no horizontal overlap, the potential harm was analyzed and refuted because there were enough established rivals to compete. There was also Internet user data availability, even if the merged company decided to introduce advertising on WhatsApp or started using WhatsApp data to improve Facebook's online advertising.

By considering the agency's view regarding the potential effects on innovation, although the Commission defined the market as dynamic characterized by disruptive innovation, it did not evaluate this sort of effect separately. As there is no price competition, firms compete through innovation, service improvements and consumer base network. Eliminating an innovative player such as WhatsApp could be seen as a possible limiter to innovation. However, as we can conclude from the arguments stated above, the Commission found that there would be remaining competitive pressure for innovation: there were doubts as to the possibility of network effects as well as lock-in and there were many players, enough rivalry or low barriers to entry. In this way, it was unlikely that innovation would be diminished. Thus, competitive pressure would continue strong post-merger and diversity should be maintained. Finally, as we have discussed before, if a successful innovator is able to capture sales after releasing its product, the market is contestable, and the other firm may have incentives to acquire the innovator in order to prevent losing sales, as the Contestability Principle says.

However, DG-Comp did not consider Facebook and WhatsApp as close competitors, but as complementary (the user base overlaps significantly, meaning that many consumers used both services), what mitigates the possibility of an acquisition to reduce or eliminate innovation.

The Facebook/WhatsApp case gave us an indicative of the difficulties when analyzing this sort of market. Here the market shares measuring limits were observed and the threshold criteria was not fully satisfied in the European Commission rules (neither in Brazil, since it was not submitted). Moreover, we can certainly identify an improvement since the agency considered the possibility of platform integration, and the risk of lock-in and network effects, which are not directly our concern here, although there was not a clear analysis regarding the effects on innovation. However, a relevant restriction to the Commission's interpretation about the limits on consumer information sharing between platforms seemed to be out-of-date, as the fines applied to the merged company later revealed.

3.3. BRAZILIAN INSTITUTIONAL FRAMEWORK AND POTENTIAL RESEARCH AGENDA

In this section we present the Brazilian institutional framework and draw some conclusions in order to introduce the knowledge-based startup takeovers discussion in the Brazilian context. We were not able to collect significant case information because there is no systematic data available or significant case law in the Brazilian Authority concerning our subject. Nevertheless, this is one of our further research goals.

First, we shall briefly present the Brazilian antitrust institutional framework. The competition authority in Brazil, *CADE* (*Conselho Administrativo de Defesa Econômica*), is responsible for analyzing mergers and anticompetitive practices, as defined in the Federal Law nº 12,529/2011. The minimum requirements for submission of mergers in Brazil are: (i) one of the parties must display annual revenue of at least R$ 750 million; and (ii) at least one of the other parties must have annual revenue of at least R$ 75 million.[32] As in many cases startups usually make less than R$ 75 million, most of the acquisitions are not submitted for further analysis.[33] Both the mergers analyzed

[32] Using the exchange rate of June 11th, 2017, R$ 750 million and R$ 75 million corresponds to around US$ 227.5 million and US$ 22.7 million respectively.

[33] Some identified cases of startup acquisitions not submitted to CADE (and their respective sectors): the acquisitions of Takerna (2013), Ideas Tecnologia (2013), Sieve (2015) by B2W (E-commerce); Studiare (2015) by Kroton (Education), Chaordic (2015), Neemu (2015). Shopback (2017), Percycle (2017), DCG (2018) by Linx (E-commerce), Love Mondays (2016) by Glassdoor (Employer Review), One Cloud

on previous sections, Facebook/WhatsApp and Google/Waze, had a relevant effect in the Brazilian market but were not submitted under the threshold defined by the Brazilian Law. However, it is important to note that there is a prerogative in the law (Art. 88, § 7), which allows CADE to request, within one year, the submission of a merger case that does not fit the limits of merging parties' revenues. Still, this prerogative is rarely used.

Mergers submitted to CADE may be reviewed through the simple procedure, which may take only a few weeks to get approval, or the complex procedure, taking up to around one year for the final decision. The simple procedure applies only to cases that show no overlap between firms, less than 20% joint market share (30% in cases of vertical mergers), low increase in concentration (variation in HHI of less than 200 points when joint market-share is inferior to 50%), joint ventures made to act in non-related markets and substitution of economic player.[34] The complex procedures may be approved, blocked or subjected to remedies according to the imposition by the General Superintendence. The last two cases are sent to the Court, which holds the final call.

Another important aspect of the Brazilian institutional framework to be discussed is the role of innovation in merger analysis. The Brazilian Horizontal Merger Guidelines[35] (i) includes changes in innovation as a possible type of coordinated effects resulting from a merger and (ii) mentions in the section about elimination of mavericks that if one of the parties involved in the merger holds a leading position in terms of innovation, its elimination may diminish competition (CADE, 2016).

After presenting the institutional framework, some insights and potential topics for a new research agenda can be identified. First, Brazilian analysis still has to deepen in terms of the innovation effects analysis issues mentioned before, as none of them appears clearly in the merger guidelines. Equally important is the merger threshold limits. Brazilian authority is far from having a big picture of startup or small tech-firms' acquisitions, even when we think of acquisitions made by large companies in related (horizontal/vertical) markets. The Facebook/WhatsApp and Google/Waze, as well as other cases, were not submitted under the threshold defined by the Brazilian Law.

Also, as the prerogative given by the Brazilian Law that CADE may request the submission of a merger case, in spite of it not fitting the submission thresholds, is

(2016) by Tivit (Business Process Management), Dr. Vem (2017) by Docway (Health Apps) and AppProva (2017) by Somos Educação (Education).

[34] Art. 8 of CADE's Resolution nº 2/2012 list the cases which may be reviewed under the simple procedure.

[35] Translation for 'Guia para Análise de Atos de Concentração Horizontal' (original name in Portuguese).

rarely used, we need to start thinking about the possible corrections we could make to avoid losing important cases or to help identifying anticompetitive effects, or even practices, related to this sort of companies and strategies. The possible sequential strategy of buying innovative firms to interrupt their innovation effort, for example, may be an example of anticompetitive practice. It is equally important to decide what the agency's choice will be when it comes the time of one of the few Brazilian unicorns (USD 1 billion firms) being acquired by arrival. Finally, we also need to identify some other startup acquisitions cases by companies horizontally or vertically related, not only in the ICT industry, but also in other sectors, to consider the strategies involved and their potential impacts on competition.

As an example of change in policy, the German Competition Law was amended recently (by the ninth amendment of the German Act Against Restraints of Competition, put into force since June 2017) showing that some authorities are reviewing their merger approaches to deal with this sort of firms, transactions or industries. The amendment created a new trigger, by which the authority will be able to analyze mergers of companies that include at least one party generating lower turnovers if the transaction has a value of more than EUR 400 million for the buyer. As the Agencies' president stated, 'The purpose of the amendment is, in particular, to be able to examine the acquisition of companies with successful business models which are based on data and the internet' (MUNDT, 2017). Other sources of market power and dominance were included such as: network effect and competition through innovation. Besides, the Facebook/WhatsApp non-notification in the German antitrust system was an important reason for the revision. We definitely need to go further with this subject in the antitrust policy and academic agenda Brazil.

4. CONCLUSION

This paper was devoted to answering two main questions: (i) how the antitrust authorities should consider startups and young innovative firms' acquisitions; and (ii) what the current institutional challenges are. We have looked at the antitrust theoretical and policy debate and examined the recent experience abroad to extract some insights about these questions, since this specific debate was not undertaken in Latin American innovation and antitrust research in general. Besides that, we briefly explored the Brazilian institutional framework, aspiring to draw a policy and academic agenda concerning the innovative startups or young companies' merger control in that country.

Before explaining our conclusions about both questions, some considerations must be made. (i) Concerning the first question, as demonstrated in section 2, the

antitrust arena is not a static field. It has been co-evolving both conceptually and with respect to its enforcement with the different historical and competition challenges faced by the American economy. More recently, the emergence of a new techno-economic paradigm mainly based in the ICT technologies has naturally influenced the ongoing antitrust debate and changes. (ii) About the second one, even though there is still a long way to go, we have seen some institutional change: in the US with the release of the 2010 guidelines and the presence of an explicit concern with innovation effects and more recently, the changes made by the German. (iii) Although more conclusive answers could be expected, there is still no definitive consensus about how to evaluate this sort of mergers, mainly in knowledge-based sectors, in which Schumpeterian competition takes place.

We defined startups or young technological firms as special cases of Schumpeterian competition and assumed that innovation is a central matter in assessing potential anticompetitive effects. Thus, in this context, a first and more obvious conclusion is that the conventional antitrust merger analysis, centered in static settings and price competition, is insufficient. Besides, we could also identify some other contributions in the antitrust debate as two main themes were revealed by our literature review: (i) the potential market created through innovation (which leads us to two issues, the relevant markets concept adequacy and the necessity of considering firm's capabilities to innovate); and (ii) the post-merger effects on innovation, given by the changes in firms' innovation incentives and capabilities caused by the merger.

We also stressed that assessing potential competition and innovation capabilities is crucial, despite market concentration, shares or revenues, as startup or young innovative companies' competitive significance is not well reflected by its actual or relative revenue. In that sense, startups are in the arguments' frontier because not only they do display an innovative dimension of competition in their markets, but also for the reason that they have, by definition, relatively insignificant or null market shares or revenues. Additionally, in some markets we can see a high volatility of market shares, defined by innovation or product cycle.

Related to the effects in innovation, we emphasized, in line with Kerber (2011) and Sidak and Teece (2009), that preserving capabilities and diversity is central in those sectors in which knowledge and intangible assets are of major importance to allow entry. As mergers in many cases reduce diversity, in this line of thought, the Appropriability, Contestability and Synergies principles proposed by Shapiro (2011) are very important conceptual tools to evaluate post-merger incentives to innovate in the literature. In particular, the acquisition of knowledge-based startups, at least with the relevance and speed that occurs in our days, is a fairly new issue. Thus, concerning this kind of mergers, we raised some issues: the minimum size for notification, the

small or even non-existent market share or revenues and the importance of identifying the buyer and their changes in incentives to maintain the innovation path are some characteristics that make the analysis even more complex.

The case selection fits well the concerns raised in the previous sections. In the Google/Waze case, it is clear that Google has a strong strategy of buying startups, and that they may be potential or real competitors. The merger may affect (positively or negatively) the firm's incentives to innovate, considering especially the Contestability and Synergies principles. The merger is also very illustrative when one takes into account that the size limits of the firms and the submission threshold may not be adequate to these markets, as they lead to the non-submission and may be ignored by the antitrust authorities. The US has a mechanism that makes the notification of some of the transactions involving startups easier: if the transaction is valued in more than US$ 323 million, the parties must notify the FTC or the DoJ, regardless of the size of the parties (which does not necessarily mean that it will be investigated, as in this case). Europe, Brazil and many countries check only the size of the parties, what should change in order to give the opportunity for these mergers to be looked at. This last fact certainly turns on a red light to a real problem as Waze is not so irrelevant and this is probably a suitable example of how our current antitrust definition to 'small', or irrelevant in assessing increase of market power, is not compatible. As we have noted, German Law was amended in this direction. The high value of that operation is also a sign that there are some inconsistencies with these two criteria in this sort of markets.

The Facebook/WhatsApp case presents us an example in which the great number of players and short innovation cycles make the acquisition less likely to be anticompetitive, under the scrutiny of antitrust authorities: diversity was presumed to be maintained through entry and short cycles of innovation/product. The fact that WhatsApp and the competitors offer the free service makes innovation more likely to keep coming up. In the authority's view, short and dynamic innovation cycles and non-price competition were the main argument to diminish the role of market shares in defining market power, making this case important to our discussion even though it may not be considered a small company acquisition. In other words, leaving behind other potential anticompetitive issues about data and personal information's control, the volatility of market share and the intense dynamic of the market reinforced the idea of the continuing path of innovation and absence of any consumer reduction of welfare in the agency's point of view.

We can suggest some implications to the antitrust field and to Brazil, in particular. First, it seems urgent to introduce much more conceptual insights about innovation in antitrust analysis, given that most dynamic markets involve some type of Schumpeterian competition. Second, assuming the specificities and the practical and conceptual

difficulties of the analysis, much more research is needed, particularly with respect to methodological tools and more qualification of the existing principles about the post-merger capabilities and incentives to innovate. Third, it may be relevant to consider the likelihood of anticompetitive effects of mergers, despite the low size of the acquired firms, if they have succeeded in innovation strategies, especially when they directly compete with the acquiring firm or are vertically related. This may not be a minor point in these industries, in which startups or small technological companies are a major source of successful innovation. The introduction of additional or even informal thresholds for the value of transaction may be a starting point. Thus, as competition law does not include any submission threshold criteria regarding the value or assets negotiated in the transaction, but only of the merging entities' revenues, there may be important cases that are not passing under the scrutiny of the Brazilian agency. In addition, in the Brazilian policy point of view, we still have not seen a takeover of a Brazilian unicorn. When it happens, and the minimum threshold of submission is not achieved, the authority should use the prerogative defined in art. 88, § 7 and ask for submission. Maybe the transaction will deserve CADE's scrutiny. Deepening into the Brazilian case list, in ICT, but not only, is a necessary next step to understand what CADE is missing and their real relevance.

Additionally, regarding Brazil and other developing countries introduced in the analysis, a fruitful conceptual area of research is to deepen the dialogue between innovation and competition policies. In this context, some insights may be pointed out. Structural productive heterogeneity is a reality of developing countries, particularly, but not only, Latin American ones (PINTO, 1970; RODRÍGUEZ, 2006). As we said in the introduction, the MERCOSUR's 'catching up' efforts, trough innovation policies that aim to stimulate the emergence and consolidation of a cohort of innovative firms should be contemplated and articulated with competition policy. It would be a contradiction –and a waste of public resources–if the innovative efforts oriented to diversify and modernize the productive structure were locked in by an anticompetitive takeover with considerable curtailment of innovation. In this sense, knowing that there is not a definitive and unique merger 'evaluation', as each case (under certain threshold of analysis) deserves attention to its singularities and derived conclusions, we consider that the preservation of industry incentives to innovate and the avoidance of 'locking in' in the local technological trajectories should be an important goal for merger analysis in the MERCOSUR.

Given that the antitrust debate is an open and not static field (and it is contextualized in each countries' competitive challenges), an alternative is to complement the antitrust gaps with innovation policy initiatives. Different instruments of the industrial and innovation policy can be used to reduce the risk of losing innovative efforts from

mergers. As recently re-introduced by Mazzucato (2013), there are different institutional initiatives to balance the innovation efforts and returns between public and private, but this is beyond this paper's scope. To conclude, we believe that we were able to present an unexplored issue in a systematic way and a first attempt in pointing out improvements for the analysis.

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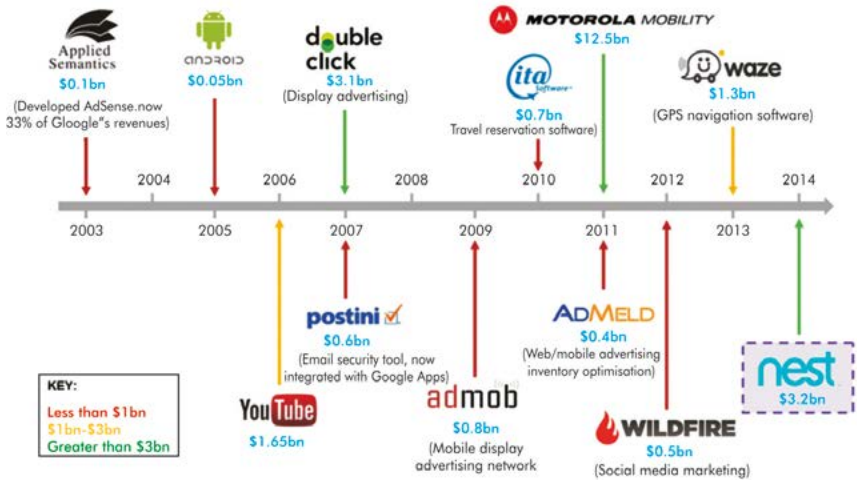
Annex

Figure 1 – Main Google´s acquisitions between 2003 and 2014



Source: STATISTA, 2004.