Killer Acquisitions in the Platform Economy

Do Tech Giants Acquire Target Firms to Leverage Innovation or Eliminate Competition?

Master Thesis

Supervisor: Prof. Marcus Møller Larsen

Alexander Kolloge (S133465)

Sören Sievers (S133363)

Date of Submission: 17/05/2021

Characters (CBS Pages): 256,640 (113)

Copenhagen Business School

MSc Finance & Strategic Management

Table of Contents

List of Exhibits

List of Appendices

Abbreviations

AI	Artificial intelligence
Amazon	Amazon.com, Inc. (Seattle, Washington/USA)
Apple	Apple Inc. (Cupertino, California/USA)
bn	billion
CEO	Chief Executive Officer
CFO	Chief Financial Officer
COO	Chief Operating Officer
e.g.	exempli gratia (for example)
EU	European Union
EUR	Euro (currency of 19 of the 27 EU member states)
Facebook	Facebook, Inc. (Menlo Park, California/USA)
FY	Fiscal year
GAFAM	Google, Amazon, Facebook, Apple, Microsoft
GBP	Pound sterling (currency of the United Kingdom)
GDP	Gross domestic product
Google	Alphabet Inc. (Mountain View, California/USA)
HopStop.com	HopStop.com, Inc. (New York City, New York/USA)
i.e.	id est (that is)
IoT	Internet of Things
Like.com	Like.com, Inc. (San Mateo, California/USA)
m	million
M&A	Mergers and acquisitions
Microsoft	Microsoft Corporation (Redmond, Washington/USA)
n/a	not available
Oculus VR	Oculus VR, LLC (Irvine, California/USA)
OECD	Organization for Economic Co-operation and Development
R&D	Research and development
TMT	Top management team
tril	trillion
UAE	United Arab Emirates
UK	United Kingdom of Great Britain and Northern Ireland

USA	United States of America
US FTC	United States Federal Trade Commission
USD	US Dollar (currency of the United States of America)
WhatsApp	WhatsApp LLC (Mountain View, California/USA)

Abstract

Killer acquisitions describe transactions in which an incumbent player decides to acquire a target firm solely to bring its innovation to a halt, thereby preempting future competition. This type of acquisition is inherently different from traditional acquisition motives based on the realization of operating and financial synergies in terms of the role of the target's innovative capacity, product development stage, and impact on consumer welfare. Cunningham, Ma, and Ederer (2021) have found that killer acquisitions account for a significant share of transactions in the pharmaceutical industry, raising the question whether these types of innovation-inhibiting killer acquisitions might also take place in other sectors of the economy. One sector of particular interest is the platform economy, describing the economic activity of online matchmakers that connect producers and consumers through the use of multisided digital frameworks. Due to their high entry barriers, strong network effects, and data-driven economies of scale and scope, platform markets naturally tend to develop towards winner-take-all markets. Killer acquisitions could impede the only opposing trend, i.e. disruptive innovation through challenger firms, thus cementing the incumbents' market power in the long term. These theoretical insights are underlined by observations from business practice as the five largest platform firms, Google, Amazon, Facebook, Apple, and Microsoft, have already reached dominant market positions throughout most relevant platform markets and engage in an unprecedented level of acquisition activity.

This thesis develops an ex-post framework to increase our understanding of the dynamics, structures, and incentives that affect acquisitions in the platform economy. Its basic contention is that killer acquisitions are harmful since they lead to a loss of the target's innovative capacity, thereby reducing consumer welfare and jeopardizing market competition. It is further hypothesized that the innovative capacity of platform firms follows distinct lifecycle phases, entailing implications with regard to the timing of killer acquisitions, the role of product market overlap, and competitive dynamics. Furthermore, four archetypes of acquisitions are derived based on the acquirer's choices with regard to dealing with the target's present and future innovative capacity. The acquirer can market the present and future innovative capacity (*transformational acquisition*), withhold the present and leverage the future innovative capacity (*visionary acquisition*), eliminate the present and future innovative capacity (*visible killer acquisition*), or market the present and eliminate the future innovative capacity (*hidden killer acquisition*). In order to showcase how the framework can be applied to business practice, four real-life cases are illustrated.

1. Introduction

An acquisition, sometimes also referred to as a takeover, is the process of one company i.e. the acquiring firm, purchasing another company, i.e. the target firm, with the objective of creating value (Anderson, Havila, and Nilsson, 2013). The research focus of traditional finance and management literature regarding acquisition motives has been placed on the realization of operating and financial synergies, whereby adverse effects of acquisitions mainly pertain to the post-acquisition entity reaching a dominant market position through combining two firms with a significant market share (Capron, Dussauge, and Mitchell, 1998; Eckbo, 1983; Rabier, 2017; Seth, 1990a, 1990b; Stillman, 1983). This view has been contested by the award-winning paper of Cunningham, Ma, and Ederer (2021), who proposed a novel acquisition motive, i.e. an incumbent deciding to acquire a target firm solely to bring its innovation to a halt, thereby preempting future competitions. They have identified the trend that pharmaceutical companies acquire nascent competitors not to adopt the acquired products or realize synergies but to discontinue competing drug development in order to improve the market position of their own product offering. These acquisitions, which have been labeled 'killer acquisitions' by Cunningham *et al.* (2021), are inherently different from acquisitions motivated by realizing synergies. The underlying rationale is that they lead to a loss of the target's innovative capacity, thereby worsening consumer welfare and deteriorating the competitive environment (Cunningham *et al.*, 2021; OECD, 2020a). The evidence from the pharmaceutical industry raises the question whether these types of innovation-inhibiting killer acquisitions might also take place in other sectors of the economy.

One sector of particular interest is the platform economy, i.e. the economic and social activity of digitally-enabled platforms, encompassing a wide range of markets and disrupting traditional linear business models (Kenney and Zysman, 2016). Platforms create value by fulfilling the role of online matchmakers through a shared ecosystem, i.e. they connect producers and consumers through the use of multisided digital frameworks (Deloitte, 2019). Due to their high entry barriers, network effects, and data-driven economies of scale and scope, platform markets naturally tend to develop towards winner-take-all markets (Crémer, De Montjoye, and Schweitzer, 2019; Nadler and Cicilline, 2020; Schilling, 2002; Stigler Center, 2019). Killer acquisitions could impede the only opposing trend, i.e. disruptive innovation through challenger firms, thus cementing the incumbents' market power in the long term. These theoretical insights are underlined by observations from business practice as the five largest platform firms, Google, Amazon, Facebook, Apple, and Microsoft ("GAFAM"), have already reached dominant market positions throughout most relevant platform markets and engage in an unprecedented level of acquisition activity (Gautier and Lamesch, 2021; Nadler and Cicilline, 2020; OECD, 2020a; Stigler Center, 2019). In 2020, the GAFAM firms were the five most valuable companies globally, jointly accounting for a brand value of USD 815bn (Forbes, 2020).

The advent of the platform economy has been spurred by innovation, disrupting and reshaping a host of industries (Crémer *et al.*, 2019). The reason for innovation being so vital is that it might enable firms to improve

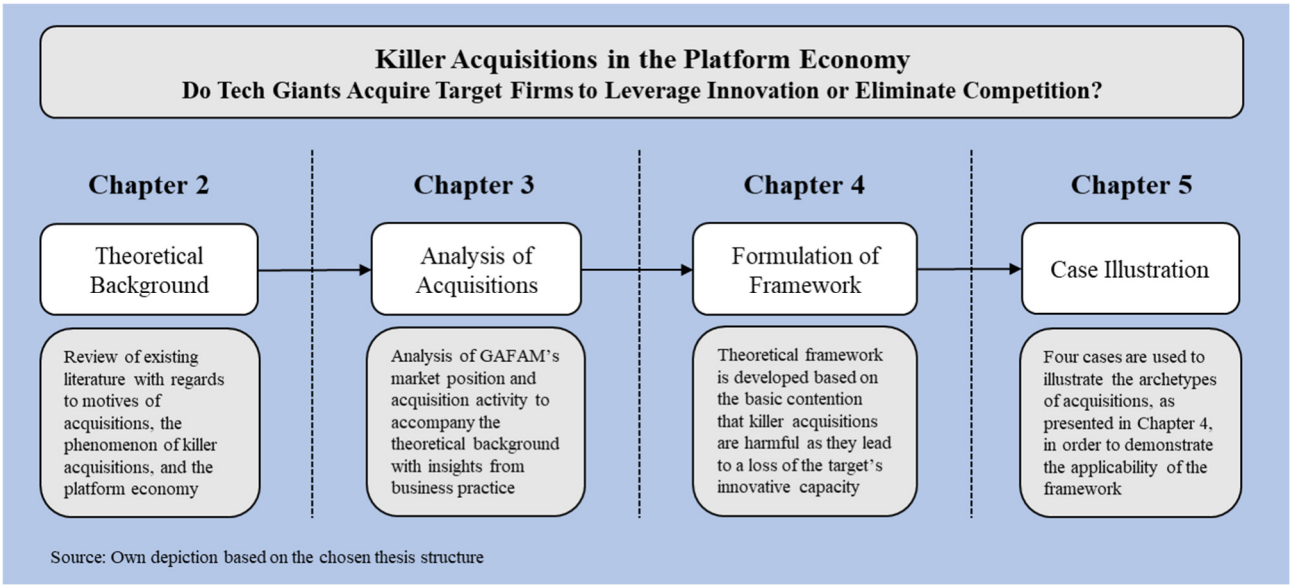
their existing product offering, create novel products and services, reduce costs, and develop entirely new business models (Furman *et al.*, 2019). The innovation in the platform economy is inherent in individual companies through their innovative capacity (Vermeulen and Barkema, 2001). The latter describes the outputs of a firm's innovation system, i.e. "a coherent set of interdependent processes and structures that dictate how the company searches for novel problems and solutions synthesizes ideas into a business concept and product designs, and selects which projects get funded" (Pisano, 2016, p. 4). The platform economy is subject to an unprecedented level of acquisition activity; solely the GAFAM firms have acquired 800 innovative technology firms between 1987 and 2021 (Appendices F-J). Consequently, the question arises what happens to the innovative capacity of these target firms after the acquisition. Two alternative explanations are offered by the traditional literature on synergy-based acquisition motives and emerging research on killer acquisitions, as described in the paper of Cunningham *et al.* (2021). The traditional literature argues that these acquisitions are motivated by the realization of operating and financial synergies, thus sustaining or leveraging the innovative capacity of the target firm (Karim and Kaul, 2015; Rabier, 2017). Contrary to this line of reasoning, the acquisitions could also be motivated by eliminating the innovation of target firms, thereby preempting future competition (Cunningham *et al.*, 2021). Thus, in order to elaborate on these two contradictory basic contentions, the thesis aims to answer the following research question:

Do Tech Giants Acquire Target Firms to Leverage Innovation or Eliminate Competition?

This question is both novel and highly relevant in research, business practice, and policymaking alike. From a research perspective, the focus on the innovative capacity of target firms offers a new perspective on acquisition motives, centering around the "innovation theory of harm" (p. 609), entailing that acquisitions can lead to the elimination of innovation and therefore negatively impact consumer choice, consumer welfare, and market competition (Holmström *et al.*, 2019). Particularly against the background of the global importance and ubiquity of platform markets, this perspective could facilitate a more comprehensive understanding of acquisition motives in non-linear markets. From a business practice perspective, the question has far-reaching ramifications on the positioning of individual companies in platform markets, the prospects of being acquired, and the competitive dynamics. Hereby, the relevance extends to companies without platform-based business models since platform markets increasingly disrupt traditional markets, entailing radical changes to how consumers and producers interact, how firms compete with each other, and how economic value is created and captured (Kenney and Zysman, 2016). From a policymaking perspective, understanding the motives of acquisitions can support decisions related to merger control and antitrust regulation, aiming at maintaining competition and safeguarding consumer choice and welfare. Research on killer acquisitions challenges the assumption that the market share of the post-acquisition entity is a reliable indicator for the potential harm that an acquisition can cause to the competitive environment.

Exhibit I: Overview of Thesis Structure and Rationale

The overview illustrates the thesis structure, guiding the reader throughout the thesis.



Source: Own depiction based on the chosen thesis structure

In order to answer the research question, the thesis follows a 4-step approach, combining findings from theory and practice (Exhibit I). In a first step, the theoretical background is presented, encompassing traditional acquisition motives, killer acquisitions, and the market characteristics of the platform economy. It is demonstrated that killer acquisitions are inherently different from acquisitions motivated by realizing operating and financial synergies in terms of the role of the target's innovative capacity and the impact on consumer welfare. Moreover, it is shown that the platform economy is prone to killer acquisitions due to its specific market characteristics, favoring the emergence of winner-take-all markets. In a second step, GAFAM's market position and acquisition activity are analyzed to accompany the theoretical background with insights from business practice. It is found that the GAFAM firms have dominant market positions in most platform markets, highlighting the relevance of the research question. Moreover, they purchased an increasing number of innovative, early-stage companies located in existing geographic markets and mainly operating in unrelated product markets, showing the need for a theoretical framework to identify killer acquisitions. In a third step, a theoretical framework is developed based on the primary contention that killer acquisitions are harmful since they lead to a loss of the target's innovative capacity. It is hypothesized that the innovative capacity of platform firms follows distinct lifecycle phases, deriving implications with regard to the timing of killer acquisitions, the role of product market overlap, and competitive dynamics. Moreover, four different archetypes of acquisitions based on the choices of the acquirer to deal with the target's present and future innovative capacity are presented. In a fourth step, four cases are used to illustrate these types of acquisitions in order to

demonstrate the applicability of the framework. Ultimately, the objective of the thesis is to identify a research gap in a highly relevant field and to contribute to theory development closely linked to business practice, thereby altering our understanding of acquisition motives by challenging and extending existing knowledge (Whetten, 1989).

2. Theoretical Background

This chapter outlines the theoretical background on traditional acquisition motives, killer acquisitions, and the platform economy, thereby serving as the cornerstone of the subsequent theory development, case illustration, and discussion. First, acquisitions are introduced and defined in order to outline the scope of this paper. Moreover, findings in the current finance, strategic management, and behavioral economics literature on traditional acquisition motives are presented, entailing the realization of operating and financial synergies. Second, the new phenomenon of killer acquisitions is delimited from these traditional acquisition motives, focusing in particular on the research of Cunningham *et al.* (2021). Furthermore, the legal background of killer acquisitions, as well as recent developments, are depicted. Third, the platform economy is presented in closer detail, encompassing its scope, market characteristics, and market segments. A particular focus is placed on how its specific market characteristics distinguish the platform economy from other industries, including the prevalence of winner-take-all markets, high entry barriers, and the overarching role of innovation. The purpose of this chapter is to present the literature on traditional acquisition motives, outline how killer acquisitions are a radically new phenomenon not covered by the current jurisdiction, and showcase why the platform economy is particularly vulnerable to this new phenomenon.

2.1. Traditional Motives of Acquisitions

In this section, acquisitions are defined and delimited from related phenomena, such as mergers and alliances, in order to specify the scope of the proposed framework. Thereafter, current literature on acquisition motives and findings on their expected post-acquisition performance are outlined to facilitate the distinction from killer acquisitions in the following section.

2.1.1. Introduction to Acquisitions

An acquisition, sometimes also referred to as a takeover, is the process of one company, i.e. the *acquiring firm* or *acquirer*, purchasing another company, i.e. the *target firm* or *target*, with the objective of creating value (Anderson *et al.*, 2013). Acquisitions include partial acquisitions with a majority share of at least 51%, resulting in significant control of the target firm's future course of direction (Vermeulen and Barkema, 2001). The execution of an acquisition can be distinguished from the process of integration, as an acquisition does not necessarily imply that the acquiring firm integrates administration and operations of the target firm (Shaver, 2006). A related phenomenon is a merger, in which two companies create a new joint organization under common ownership (Yin and Shanley, 2008). Mergers and acquisitions are commonly referred to as “M&A”. Mergers are not discussed in this paper since they are out of the scope of the proposed framework. The same applies to alliances as alternative governance structures in which two or more firms collaborate closely to reach a certain strategic objective (Wang and Zajac, 2007).

An extensive body of research deals with acquisitions and covers a broad range of related topics, including post-acquisition performance (Huang, Zhu, and Brass, 2017; King *et al.*, 2004; Rabier, 2017; Schmidt and Fowler, 1990), learning effects (Vermeulen and Barkema, 2001; Zollo and Singh, 2004), the role of stakeholder management and executive compensation (Bettinazzi and Zollo, 2017; Tong, Wang, and Xia, 2020; Wright, Kroll, and Elenkov, 2002), target firm characteristics and organizational fit (Chen *et al.*, 2020; Jemison *et al.*, 1986), and the effect of institutional and cultural differences (Bauer and Matzler, 2014; Calori, Lubatkin, and Very, 1994; Kumar, 2009). Another topic that is often discussed in the strategic management and finance literature relates to the motives of acquisitions, whereby the underlying rationale is that acquiring firm and target firm combined are worth more than the sum of the individual firms (Seth, 1990a). The individual motives are typically divided into operating and financial synergies (Rabier, 2017) as well as other motives, which are discussed in the following section.

2.1.2. Motives of Acquisitions

Acquisition motives can be classified along three categories: First, there are operating synergies, whereby the value created stems from enhancements in revenue, growth, or performance. Second, financial synergies describe the additional value resulting from more favorable financial structure combinations between acquirer and target. The third category contains other acquisition motives, which can neither be classified as operating nor financial synergies (Rabier, 2017). The subsequent overview covers a broad range of theoretical approaches, including contributions from traditional finance, behavioral finance, strategic management, and organizational literature. An overview of all mentioned acquisition motives can be found in Exhibit II at the end of this section.

2.1.2.1. Operating Synergies

Operating synergies, being the prevalent motive for acquisition of 69% of acquiring firms, include economies of scale and scope, expanding the geographic reach, expanding the product offering, reaching a greater pricing power, and combining different functional strengths (Rabier, 2017). Several studies have found that operating synergies are the primary driver of superior post-acquisition performance as they allow for an enhanced recombination of the entities' resources and capabilities (Capron *et al.*, 1998; Rabier, 2017; Rumelt, 1982). However, this view is contested by other studies that found that financial synergies are more profitable since they are easier to value and implement (Chatterjee, 1986; Rabier, 2017; Ravenscraft and Scherer, 1987).

Economies of scale and scope. The first type of operating synergies relates to economies of scale, whereby the acquirer incurs cost savings through an increased level of production of the same good, and economies of scope, whereby the acquirer incurs cost savings through the production of a variety of goods (Walter and

Barney, 1990). These are particularly pertinent if an industry is characterized by high fixed costs, e.g. through required up-front investments, and low variable costs. Economies of scale and scope can often be assigned to horizontal acquisitions, with acquirer and target being active in the same market or adjacent markets (Seth, 1990a). While creating economic value in theory, researchers could not unambiguously confirm that substantial efficiencies from economies of scale and scope exist (Federal Trade Commission, 1981; Seth, 1990a).

Expand geographic reach. Another value source relates to revenue growth through reaching a customer base in a different geographic market (Rabier, 2017). Main advantages of an acquisition compared to a greenfield investment include that the target can reach critical mass within a short period and overcome the "liability of foreignness" (p. 342), i.e. to avoid the problem that the acquirer might not profit from the political goodwill of regulators and might be subject to additional regulation compared to domestic firms (Zaheer, 1995).

Expand product offering. Revenue growth can also be reached through an expansion of the target's product offering, whereby an acquisition of a target with superior innovation capabilities can be an alternative to or an addition to own R&D efforts (Rabier, 2017). Hitt *et al.* (1996) have found that a primary motivation behind seeking external innovation through an acquisition is to gain a competitive advantage. Bena and Li (2014) support these findings by showing that combining innovation capabilities in a quasi-experiment increased post-acquisition innovation.

Greater pricing power. The fourth type of operating synergies relates to a greater pricing power, i.e. the value created stems from the combined post-acquisition entity being able to use the higher market share and reduced competition to charge higher prices (Chatterjee, 1986). This type of acquisition can be subject to antitrust policy measures if the transaction would result in the post-acquisition entity reaching a dominant market position. Policymakers have been found to restrict acquisitions particularly often if deals were expected to be highly profitable (Eckbo, 1983). However, while this operating synergy creates value in theory, researchers could not unambiguously confirm that the greater pricing power is in fact linked to value creation on the acquiring firm's side (Eckbo, 1983; Seth, 1990a; Stillman, 1983).

Combine functional strength. The final operating synergy relates to the combination of functional strengths, i.e. interlinked, mutually stimulating qualities of acquirer and target in different business areas are utilized to create value. For instance, a company with a strong product portfolio and leading R&D capabilities might acquire a target with superior marketing skills and an extensive customer network to accelerate its revenue growth (Walter and Barney, 1990). The motive to combine functional strengths is closely linked to the phenomenon of "hiring by acquisition" (p. 11), i.e. purchasing a company in order to employ skilled workers with a proven track record that might be difficult to hire in the normal labor market (Holmström *et al.*, 2019).

2.1.2.2. Financial Synergies

Acquisition motives related to financial synergies include a higher debt capacity, tax benefits, a reduced operational risk through the diversification of cash flow streams, and value added through the use of excess cash (Rabier, 2017).

Debt capacity. The first potential financial synergy relates to a higher debt capacity. If a company buys a target firm with imperfectly correlated activities, the post-acquisition entity's cash flows become more stable compared to the acquiring and target firm individually. These more stable cash flows have a "coinsurance effect" (p. 767), i.e. they reduce the default risk for the post-acquisition entity and, as a result, increase the debt capacity (Leland, 2007). In addition to the opportunity to borrow more, the firm can also profit from tax advantages due to higher utilization of leverage (Lewellen, 1971). However, it needs to be underlined that the benefit of higher leverage is controversial in the finance literature, as it could increase the default risk of the post-acquisition entity and thus the cost of equity (Modigliani and Miller, 1958). Moreover, the tax advantages are conditional upon the respective institutional environment's tax code (Auerbach and Reishus, 2019).

Tax benefits. Another financial synergy relates to tax savings, which occur when the post-acquisition entity has a more tax-favorable financial structure than the two individual entities (Rabier, 2017). Besides the tax advantage that arises from the utilization of the higher debt capacity, there are two other main reasons for the realization of tax benefits: First, if a profitable acquirer buys an unprofitable target, the net gains and losses can be offset, reducing the overall tax burden (Auerbach and Reishus, 2019). Second, an acquirer might be able to increase its depreciation, reducing the short-term net gains and tax payments (Dammon and Senbet, 1988). However, these tax benefits heavily depend on factors related to the acquirer's home country, such as tax code, bankruptcy costs, and information asymmetries (Leland, 2007).

Diversification of cash flow streams. Another financial synergy related to acquiring a target firm is the diversification of cash flow streams. Through the acquisition, the variability in the combined entity's performance should be reduced to minimize the risk of operations (Rabier, 2017). Diversification occurs when one company acquires another with an unrelated business model to stabilize the combined revenue streams, i.e. reduce their variance (Seth, 1990b). While Amit and Livnat (1988) could confirm that diversification of cash flow streams adds value to the post-acquisition entity. Other researchers question these insights, arguing that diversification on firm-level does not add value since investors can diversify on their own, and linking underperformance to behavioral distortions due to managers' self-interest and irrationality (Berger and Ofek, 1995; Lamont and Polk, 2001; Lang and Stulz, 1994; Modigliani and Miller, 1958).

Excess cash. Finally, an acquisition can add value if an acquirer with excess cash holdings buys a target with a promising high-return project pipeline but a lack of financial resources. The value thereby stems from the post-acquisition entity's ability to realize the pipeline projects in case the target as a stand-alone entity does not have access to other financing opportunities (Iyer and Miller, 2008). While research indicates that excess

cash increases the chances of an acquisition, it is contested whether cash slack as a significant acquisition motive in fact adds value to the post-acquisition entity. The main rationale for the downside of this motive is that excess cash can yield to overinvestment and immature target selection (Harford, 1999; Iyer and Miller, 2008).

2.1.2.3. Other Motives

While most acquisitions are motivated by considerations about operating and financial synergies, research also mentions a few other motives that cannot be assigned to these two categories. These other motives include Chief Executive Officer ("CEO") overconfidence, managerial self-interest resulting from agency problems, acquiring undervalued firms as stand-alone entities, and taking over firms to replace sub-performing managements in order to increase the firm value.

CEO overconfidence. The first motive relates to overconfidence of an acquirer's CEO, i.e. the tendency to overestimate personal abilities and, as a result, to attribute positive outcomes to own actions and negative outcomes to coincidence. Overconfidence increases the odds of an investment decision since the CEO overestimates the returns of the target's project pipeline and underestimates the costs of external funding (Malmendier and Tate, 2005; Miller and Ross, 1975). In a study conducted by Malmendier and Tate (2008), the relationship between CEO overconfidence and the likelihood of acquisitions was investigated. The result was that overconfident CEOs are 65% more likely to acquire a target; this effect has been found to be even higher in combination with the existence of excess cash.

Managerial self-interest. In business practice, it is the managers that make acquisition decisions on behalf of the stockholders, wherefore some motives are determined by agency conflicts between these two parties. Thus, the outcome of the decision process is heavily influenced by managerial self-interest (Harford, 1999; Jensen and Meckling, 1976). The latter includes the objectives of managers to promote visibility within and outside the organization (e.g. banks, governments, investors, supervisory board, and top management team ("TMT")), to fulfill own ambitions (e.g. empire building), and to increase personal gains through compensation schemes linked to the stock price of the organization (Gaughan, 2004; Walter and Barney, 1990). Research suggests that the role of managerial self-interest is underestimated (Morck, Shleifer, and Vishny, 1990; Roll, 1986) and that the effect is even more pronounced in the abundance of excess cash (Jensen, 1986).

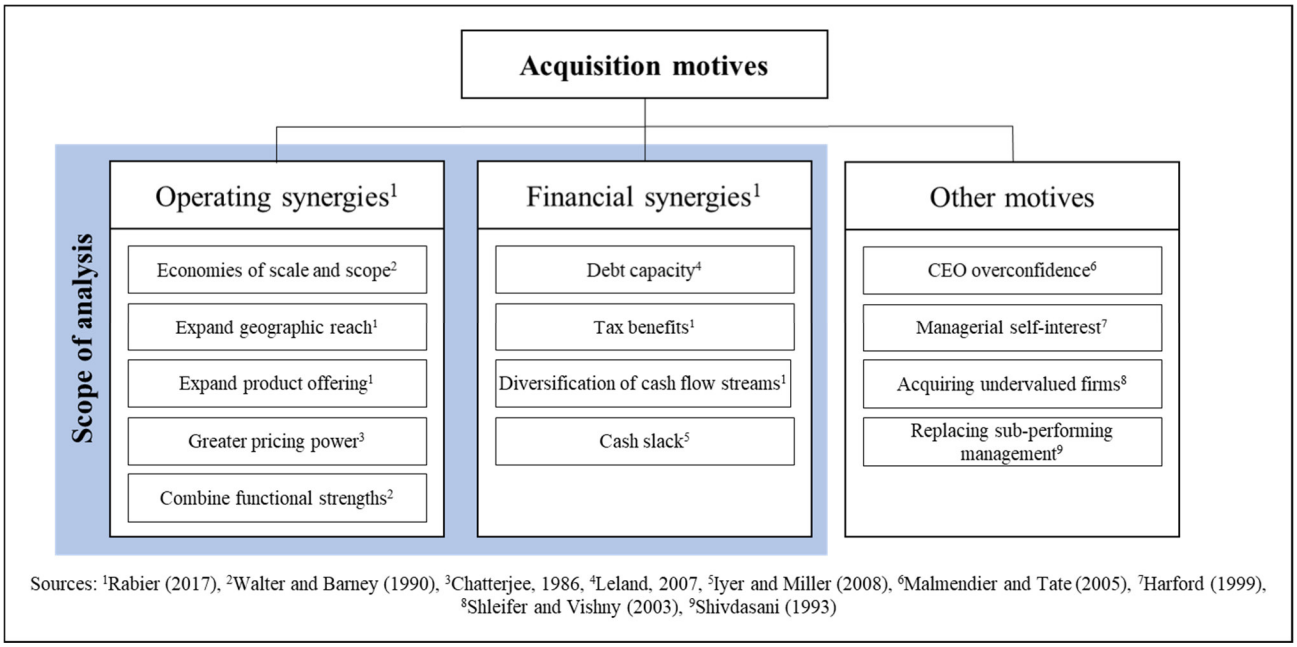
Acquiring undervalued firms. Another motive for an acquisition could be the acquirer's assessment of mispricing in the target's valuation, whereby the difference to the actual value of the firm could be gained as a surplus through the acquisition (Shleifer and Vishny, 2003). However, it is contested whether the target is superior in evaluating the real firm value compared to the stock market, assuming the absence of insider

information. Moreover, the difference between the actual target value and the current valuation needs to be larger than the transaction costs in order to make the deal profitable (Dai *et al.*, 2017).

Replacing sub-performing management. The final motive for an acquisition is to acquire a poorly managed target and change the existing management in order to increase the firm value. This external takeover is often considered as the last resort in case of failing internal control mechanisms (Shivdasani, 1993) and usually occurs in the form of a "hostile takeover" (p. 812), i.e. the investor directly approaches the shareholders with the objective of restructuring the firm and/or the management (Lambrecht and Myers, 2007). However, it needs to be highlighted that it is difficult to empirically determine whether the management is in fact the reason for low performance and that a hostile takeover also encompasses significant financial risks and costs (Franks and Mayer, 1996).

Exhibit II: Overview of Acquisition Motives

The table depicts the motives of acquisitions alongside the three categorizations of operating and financial synergies as well as other motives. The scope of analysis includes operating and financial synergies as these are considered the main drivers of acquisitions (Rabier, 2017).



Sources: [1]Rabier (2017), [2]Walter and Barney (1990), [3]Chatterjee, 1986, [4]Leland, 2007, [5]Iyer and Miller (2008), [6]Malmendier and Tate (2005), [7]Harford (1999), [8]Shleifer and Vishny (2003), [9]Shivdasani (1993)

2.2. The Phenomenon of 'Killer Acquisitions'

After having introduced the traditional motives of acquisitions, the focus is now placed on killer acquisitions, a new phenomenon that has evolved in recent literature. First, killer acquisitions are introduced and defined, focusing on the paper of Cunningham *et al.* (2021). Second, the characteristics of killer acquisitions and traditional acquisition motives are compared to showcase their fundamental inherent differences. Third, the current jurisdiction concerning killer acquisitions is outlined.

2.2.1. Killer Acquisitions in the Academic Literature

The traditional focus of both finance and strategic management literature as well as policymakers, with regard to negative effects of acquisitions, has been placed on acquirers reaching dominant market positions, enabling them to charge higher prices in the absence of a sufficiently competitive environment (Chatterjee, 1986; Šmejkal, 2020). This focus has recently started to shift, accelerated by the publication of the paper of Cunningham *et al.* (2021), of which a previous version has been published as a working paper in 2018 and received the Robert F. Lanzillotti Prize for the best paper in antitrust economics and the AdC Competition Policy Award (Ferriello, 2020a, 2020b). The paper proposed a new type of acquisition labeled 'killer acquisition', defined as a scenario in which "an incumbent firm may acquire an innovative target and terminate the development of the target's innovations to preempt future competition" (Cunningham *et al.*, 2021, p. 650). Due to their novelty and relevance, the term, concept, and findings of Cunningham *et al.* (2021) have recently been cited both by several national and international agencies, including the Organization for Economic Co-operation and Development ("OECD") and European Union ("EU"), and by leading finance and management journals (Crémer *et al.*, 2019; Gautier and Lamesch, 2021; Letina, Schmutzler, and Seibel, 2020; OECD, 2020a).

Cunningham *et al.* (2021) provide a theoretical framework about killer acquisitions, supported by an empirical study, in which they examine acquisitions in the pharmaceutical industry in the USA. They find that 5.3%-7.4% of acquisitions are killer acquisitions, whereby the acquirer purchases an innovative target firm that develops a drug overlapping with the acquirer's product portfolio. Cunningham *et al.* (2021) classified acquisitions as killer acquisitions if the only underlying motive has been found to be ending the competing drug development. The underlying rationale is that the development of a new drug is very cost-intensive and highly uncertain. If a company receives the regulatory approval for a product, it can profit from it for the entire period of patent validity. This creates a strong incentive from the perspective of the acquiring firm to discontinue the development of competing substitute drugs that have the potential to erode sales of the existing product portfolio (Cunningham *et al.*, 2021; Holmström *et al.*, 2019).

In the paper, Cunningham *et al.* (2021) investigate 16,000 drug development projects of more than 4,000 pharmaceutical firms from 1989 to 2010, of which 24% were acquired mid-development. In addition to

observing acquisition events, the study also provides data on development milestones, allowing to follow the development stage progress. The analysis focuses on the comparison between projects acquired by firms with and without overlapping products. A baseline regression analysis has then been used to estimate the annual probability of development activity, which equals a continuation of R&D and thus the absence of a 'killed' project. One central hypothesis of the paper is that the likelihood of continued development of projects with an overlap is lower compared to those projects where the target's product could not substitute the one of the acquirer. Cunningham *et al.* (2021) could confirm their hypothesis by finding that overlapping drugs decrease the likelihood of continued R&D after an acquisition by 23.4% compared to non-overlapping drugs. This effect has been found to be amplified if the market is subject to a low degree of competition or if the patent is still valid for a long period. These findings can be considered consistent with the model. The underlying rationale is that acquirers have higher incentives to purchase a target if they lose a larger market share or additional time to market a product under patent protection in case the target as a stand-alone firm marketed a substitute drug. Moreover, the authors discovered that the same effect applies to a lower rate of research continuation from Phase I to Phase II trials if a project was acquired by a target firm with an overlapping product portfolio (Cunningham *et al.*, 2021; Holmström *et al.*, 2019).

While Cunningham *et al.* (2021) found strong evidence for the presence of killer acquisitions, they did not prove that they negatively impact consumer welfare, i.e. "the difference between what consumers would have been willing to pay for a good and what they actually had to pay" (Albaek, 2013, p. 70). However, the study indicates that a negative impact on consumer welfare is likely since killer acquisitions lead to a lack of price competition and a lower product development rate, the latter resulting in the absence of future products (Cunningham *et al.*, 2021). Moreover, start-ups could be incentivized to develop overlapping products in order to be acquired and 'killed' instead of inventing novel products in order to substitute current products and disrupt markets, thus not leading to an increase in consumer welfare (Holmström *et al.*, 2019). Another vital contribution of Cunningham *et al.* (2021) is the focus on innovation as a driver of economic growth and a potential loss of innovative capacity resulting from a killer acquisition. This sheds light on an under-researched area, as most previous papers have focused on concerns of large market shares and dominant market positions of post-acquisition entities (Chatterjee, 1986; Šmejkal, 2020).

However, some limitations of the paper need to be emphasized. First of all, it can be questioned whether the findings from the pharmaceutical industry are transferable to other sectors. This is particularly relevant as the development of drugs is subject to certain industry-specific characteristics, such as a clearly observable overlap in application areas, a comparatively low degree of competition, the requirement for regulatory approval, and the presence of strong patent protection (Holmström *et al.*, 2019). Furthermore, the model does not include the initial innovation decision that determines whether a start-up decides to invest in R&D in the first place (Letina *et al.*, 2020). Moreover, the proposed framework relies on two additional assumptions, which are difficult to

observe in other sectors. These assumptions are that innovation is considered a binary variable, not allowing for gradual adaptations, and that the development status of products is observable (Cunningham *et al.*, 2021).

While Cunningham *et al.* (2021) were the first to define the phenomenon of killer acquisition and concretize it based on theory development and empirical research, there have been previous mentions of similar concepts under different terms. First, The Economist (2016) mentioned "shoot-out acquisitions" (p. 2) to describe purchases of start-ups with the objective of eliminating a future rival. The article mainly criticized that policymakers did not require digital, platform-driven firms to get approval from antitrust authorities, particularly for acquisitions in unrelated markets. Second, in a similar vein, a report on behalf of the German Ministry for Economic Affairs and Energy argued that large digital firms might acquire innovative start-ups with the objective of "neutralizing" (p. 122) them through an integration that ensures that the start-up cannot pose a competitive threat in the future (Holmström *et al.*, 2019; Schweitzer *et al.*, 2018). This report links the problem to the topic of a data sharing obligation in order to reduce the risk of a digital firm reaching a dominant market position (Schweitzer *et al.*, 2018). Third, a further article of The Economist (2018) presented the idea of a "kill zone" (p. 2), in which technology firms tried to embrace, intimidate, or extinguish young rival companies in order to secure their respective market territory. Examples of a kill-zone strategy include partnering with start-ups, acquiring them, or simply publicly mentioning a planned market entry in the same field to decrease the stock price of competitors (The Economist, 2018).

There are two proposed additions and modifications to the model of killer acquisitions, as presented by Cunningham *et al.* (2021). First, Marty and Warin (2020) propose to distinguish between "defensive acquisitions" (p. 7) and "offensive acquisitions" (p. 7), whereby the prior describes an acquirer protecting his market position through neutralizing potential rivals and the latter describes the objective of extending the dominating position to other markets. Second, Caffarra, Crawford, and Valletti (2020) introduce the concept of a "reverse killer acquisition" (p. 5), i.e. the acquiring firm terminates its own innovation efforts and replaces them with those of the target firm. This can be modeled as a "buy vs. build" (p. 1) decision, in which the acquirer willingly foregoes its innovation efforts and decides to let rival firms compete for the most innovative and cost-efficient technology in order to buy it. Therefore, from a consumer welfare perspective, the innovation efforts of the incumbent firm are lost (Caffarra *et al.*, 2020).

Several papers analyze how killer acquisitions could influence scope, scale, and field of innovation, reaching different conclusions. At the center of the debate is the "innovation theory of harm" (p. 609), i.e. the assumption that killer acquisitions lead to a loss of the innovative capacity of the target firm (Holmström *et al.*, 2019). However, there are several hypotheses with regard to how the presence of killer acquisitions changes the incentive structure for start-ups to innovate. Bryan and Hovenkamp (2020) suggest that start-ups tailor their innovations to the needs of the technology leader, who is most likely to acquire them, and neglect the technology of laggards, depriving them of a potential technology catch-up. This would further strengthen the

leader's market position and negatively influence competition. The Economist (2018) proposes that incentives for target firms are shifted from building entire platforms to developing "small morsels that (are) tasty to be acquired by one of the giants" (p. 2). This is likely to reduce the potential for disruptive innovations (Kumaraswamy, Garud, and Ansari, 2018). However, Letina *et al.* (2020) challenge this view by arguing that killer acquisitions can increase the incentive for start-ups to innovate in the first place and boost entrepreneurial spirit, while stronger merger control for acquisitions could negatively influence the initial innovation decision of start-ups.

The preceding introduction has shown that the new phenomenon of killer acquisitions differs from traditional acquisition motives, such as operating and financial synergies, particularly with respect to the perspectives of innovation and welfare. Therefore, the following section delimits killer acquisitions from traditional acquisition motives in closer detail.

2.2.2. Delimitation to Traditional Motives of Acquisitions

There are several dimensions in which traditional acquisitions motives and killer acquisitions differ, including the role of innovation, consumer welfare aspects, and the influence on the competitive environment. In order to serve as a foundation for a comprehensive analysis and theory development, these dimensions are explored in closer detail in the following. A comparison of typical characteristics of operating synergies, financial synergies, and killer acquisitions can be found in Exhibit III at the end of this section.

Role of target's innovative capacity. The innovative capacity of a firm describes the outputs of its innovation system, i.e. "a coherent set of interdependent processes and structures that dictates how the company searches for novel problems and solutions, synthesizes ideas into a business concept and product designs, and selects which projects get funded" (Pisano, 2016, p. 4). When an acquirer buys a target in order to realize operating synergies, it is typically the objective to combine and fully leverage the capabilities of both firms. In case functional strengths are to be combined and innovation constitutes a core strength, the post-acquisition entity typically attempts to recombine the available knowledge, aiming to unlocking its full innovative potential and enabling disruptive innovation (Karim and Kaul, 2015). If realizing financial synergies is the objective of an acquisition, the target's operations are typically continued on a stand-alone basis, as the focus is placed on the benefits of financial structure combinations. Thus, the innovative capacity of the target is generally sustained (Rabier, 2017). In contrast, killer acquisitions aim at the elimination of the target's innovative capacity in order to preempt a potential future rival (Cunningham *et al.*, 2021). Therefore, killer acquisitions are the only acquisition motive that entails the systematic and large-scale elimination of innovative capacity.

Impact on consumer welfare. Consumer welfare describes the perceived added value for consumers resulting from the purchase of goods and services, i.e. the difference between consumers' willingness to pay and the

actual price (Albaek, 2013). Acquisitions targeting the realization of operating synergies tend to have a mostly positive impact on consumer welfare, as economies of scale and scope entail cost reductions that might be forwarded to consumers and as an expanded geographic reach and product offering improve consumer choice (Rabier, 2017; Walter and Barney, 1990). However, if the operating synergies relate to greater pricing power, and thus the market develops towards oligopolistic or monopolistic structures, prices tend to increase at the expense of consumers. Therefore, consumer welfare might be negatively impacted (Chatterjee, 1986). Acquisitions aimed at obtaining financial synergies also tend to have a mostly positive impact on consumer welfare. The underlying rationale is that corporate structure enhancements can lead to an increased debt capacity, reduced tax rates, lower operational risk through more diversified cash flow streams, and the realization of more pipeline projects through the use of cash slack. These financial impacts can result in lower prices for consumers as well as an improved consumer choice resulting from more projects (Amit and Livnat, 1988; Auerbach and Reishus, 2019; Iyer and Miller, 2008; Leland, 2007). Unlike operating and financial synergies, killer acquisitions most likely reduce consumer welfare as they decrease price competition as well as the product development rate, reducing future consumer choice (Cunningham *et al.*, 2021). However, this view is not uncontested, as Letina *et al.* (2020) argue that killer acquisitions could lead to the foundation of more start-ups, as their presence increases the prospect of an acquisition.

Target's Top Management Team. The TMT consists of the firm's employees that span the boundary between the organization and the external environment and determine the company's strategic direction (Cyert and March, 1963). If operating and financial synergies are the objective of an acquisition, the TMT of the target is often retained, as it has tacit, firm-specific knowledge, understands the market environment, and is able to provide oversight with regard to the processes and procedures within the firm (Kroll, Walters, and Le, 2007). However, acquirers aiming at the elimination of the target have the incentive to dismiss the TMT or deprive it of effective influence, as the TMT's experience and insights are not only dispensable but could also have a detrimental effect on the planned elimination of the company (Cunningham *et al.*, 2021; Kroll *et al.*, 2007).

Growing entity. Furthermore, there are differences between traditional and killer acquisitions regarding which of the entities involved in the process are expected to grow. If an acquisition is motivated by operating synergies, the most common objective is to grow the entire post-acquisition entity consisting of acquirer and target. The motivation behind this strategy is usually to fully leverage all resources and capabilities available in order to reach the planned objective, e.g. expand the product offering or combine functional strengths (Bena and Li, 2014; Walter and Barney, 1990). If realizing financial synergies is the main motive of an acquisition, growing the target is typically of subordinate importance, as other motives, such as increasing the debt capacity or realizing tax benefits, are prevalent. The target is usually managed as a stand-alone entity, and its TMT steers the firm's strategic direction and plans its growth opportunities (Auerbach and Reishus, 2019; Iyer and Miller, 2008; Leland, 2007). In contrast, killer acquisitions often aim to grow the stand-alone firm of the

acquirer, as eliminating the target serves the purpose of securing and expanding the acquirer's market share (Caffarra *et al.*, 2020; Cunningham *et al.*, 2021; The Economist, 2018).

Incentive to innovate (pre-acquisition). The incentive to innovate describes the motivation from the target firm's perspective to allocate resources and capabilities to R&D (Bryan and Hovenkamp, 2020b). The presence of an active acquisition market based on operating and financial synergies tends to encourage target firms to spend more on R&D, as the prospect of acquisition provides an additional financial incentive (Phillips and Zhdanov, 2013). However, this might not be the case if M&A activities occur between direct competitors, leading to a high degree of market concentration (Fulghieri, 2011). In sum, it can be assumed that an active acquisition market based on operating and financial synergies rather increases the incentive to innovate. The research findings on killer acquisitions are contrary to this, as several constraints could apply to innovation incentives. Killer acquisitions could encourage start-ups to focus on the needs of the technology leader and disregard the technology laggards (Bryan and Hovenkamp, 2020a), develop tiny morsels instead of entire platforms (The Economist, 2018), and disregard disruptive innovation (Kumaraswamy *et al.*, 2018). Nevertheless, this view is not uncontested, as Letina *et al.* (2020) argue that killer acquisitions might foster the incentive for start-ups to innovate in the first place and boost entrepreneurial spirit, as their presence increases the likelihood of an acquisition. However, the overall assessment of killer acquisitions demonstrates that the incentive to innovate is likely to be rather reduced.

Product development stage. The product development stage describes the respective phase within the process of product development, i.e. the entire journey required to convert an idea or concept into a marketable good or service (Urbig *et al.*, 2013). Acquisitions aiming to realize operating and financial synergies can be found during all stages of the target's product development, depending on the respective strategic or financial objectives (Walter and Barney, 1990). In contrast, killer acquisitions typically occur in companies in their early stages of product development, i.e. companies in their seed, growth, or expansion phase. The underlying rationale is that the acquirer attempts to eliminate the target before the fully developed product or service can materialize and pose a competitive threat (Cunningham *et al.*, 2021).

Role of the target. Finally, the envisaged role of the target firm, i.e. the way in which it is intended to support the strategic and financial objectives of the post-acquisition entity, differs depending on the underlying acquisition motive. With regard to operating synergies, the target is envisaged to contribute to the planned geographic expansion, product development, combination of functional strengths, and economies of scale and scope through its resources and capabilities (Rabier, 2017; Seth, 1990a). If financial synergies are the main motivation behind the acquisition, the target is expected to pay off in the form of tax benefits, an increased debt capacity, and a reduced risk resulting from a higher diversification (Amit and Livnat, 1988; Auerbach and Reishus, 2019; Leland, 2007). This is fundamentally different in the case of a killer acquisition, where the

primary role of the target is to vanish from the marketplace in order to protect the competitive position of the acquirer (Cunningham *et al.*, 2021; Letina *et al.*, 2020).

The preceding comparison has shown that the characteristics of killer acquisitions differ fundamentally from traditional acquisition motives, driven by operating and financial synergies. This is particularly the case regarding the target's innovative capacity, the impact on consumer welfare, and the envisioned role of the target firm in the post-acquisition entity. Thus, these results question many central assumptions of the traditional M&A literature regarding the underlying assumptions of acquisitions from a strategic management, finance, and policymaking perspective. This raises the question whether the current antitrust jurisdiction might also be tailored to traditional acquisition motives and disregard potential killer acquisitions, possibly requiring adaptations. The following section therefore elaborates on the current antitrust and merger control jurisdiction.

Exhibit III: Delimitation of Acquisition Motives

The table depicts a comparison of operating synergies, financial synergies, and killer acquisitions alongside various acquirer, target, and macroeconomic characteristics in order to delimit killer acquisitions from other acquisition motives and showcase their particularity in terms of the role of innovation, welfare aspects, and other factors.

Characteristic	Operating synergies	Financial synergies	Killer acquisitions
Role of target's innovative capacity[1,2,3]	Leverage	Sustain	Eliminate
Impact on consumer welfare[2,3,4,5,6,7,8]	Mostly positive	Mostly positive	Mostly negative
Target's Top Management Team[3,9]	Retain	Retain	Dismiss
Growing entity[3,4,6,7,8,9,10,11]	Acquirer + Target	Target	Acquirer
Incentive to innovate (pre-acquisition)[10,12,13,14,15,16]	Rather increase	Rather increase	Rather decrease
Product development stage[3,4]	All stages	All stages	Early stages
Role of the target[2,3,5,6,8,17]	Contribute	Pay off	Vanish

Sources: [1]Karim and Kaul (2015), [2]Rabier (2017), [3]Cunningham et al. (2021), [4]Walter and Barney (1990), [5]Amit and Livnat (1988), [6]Auerbach and Reishus, [7]Iyer and Miller (2008), [8]Leland (2007), [9]Kroll, Walters, and Le (2007), [9]Bena and Li (2014), [10]The Economist (2018), [11]Caffarra et al. (2020), [12]Philipps and Zhdanov (2013), [13]Fulghieri (2011), [14]Bryan and Hovenkamp (2020a), [15]Kumaraswamy et al. (2018), [16]Letina et al. (2020), [17]Seth (1990a)

2.2.3. Current Jurisdiction

This section outlines the status quo of the legal situation with regard to killer acquisitions in order to determine whether the current jurisdiction is likely to recognize, and potentially prohibit, killer acquisitions. First, the historical focus of merger control and antitrust enforcement is depicted, followed by an assessment of the degree to which the systems in place might be able to detect killer acquisitions. Thereafter, the current antitrust

and merger control jurisdiction in the EU, USA, and UK is outlined in closer detail, as these markets are highly relevant for the platform economy.

Traditionally, the focus of antitrust agencies has been placed on M&A activities of larger firms which could result in the post-acquisition entity reaching a market-dominating position, negatively impacting the competitive environment and consumer choice. The acquisition of smaller firms, as often the case in killer acquisitions, was generally assessed as a positive market signal by antitrust agencies for two reasons. First, the presence of many smaller firms has been interpreted as a sign of low entry barriers and a growing as well as increasingly competitive market. Second, antitrust agencies assumed that the acquisition of small firms would enable acquirers to leverage the full innovative capacity of the targets. Blocking high-risk transactions related to innovative firms was generally considered a potential roadblock to innovation. The only major concern of policymakers regarding the acquisition of small firms pertained to the "gradual acquisition of market share through 'salami' slices that eventually added up to a significant acquisition" (OECD, 2020, p. 5). Thus, the acquisition of individual, innovative firms with a small market share was generally no subject to rigid antitrust legislation (Furman *et al.*, 2019; OECD, 2020a).

There are three different types of antitrust notification systems to determine whether an acquisition requires approval: revenue threshold systems, market share threshold systems, and flexible systems. Most OECD members rely on absolute threshold systems, i.e. an absolute turnover threshold is used to distinguish between acquisitions that require approval by national entities and those that do not. If the planned transaction is below the defined threshold, authorities lack the jurisdiction to scrutinize or prohibit an acquisition. The OECD (2020b) ascertained that 52 of 55 surveyed jurisdictions relied at least in part on threshold systems. The second system is a share-based test, i.e. approval is required if a relative proportion of the overall market supply would be exceeded through the transaction. Several European countries, including Spain and Portugal, use a market share-based system in addition to a revenue threshold system. Another example is the UK, in which M&A transactions are subject to a rigid review if the post-acquisition entity would achieve a market share of at least 25% (The National Archives, 2002). Third, some governments rely on flexible systems that include other criteria than absolute revenue and relative market share. These systems tend to offer more flexibility to lawmakers but also complicate the evaluation for companies to determine whether an M&A transaction is subject to governmental approval. Flexible system can contain directives that require companies from certain sectors or firms with market-dominating positions to notify lawmakers ahead of a planned transaction, independent of the resulting turnover and market share. Even though these flexible systems offer more adaptability to the respective competitive environment in theory, very few countries have adopted them in practice. One of the few countries that have adopted the system is Norway, in which certain targeted firms are required to notify lawmakers ahead of all planned transactions (OECD, 2020a; Šmejkal, 2020).

With the advent of current literature on killer acquisitions, it became apparent that the existing legislation places a strong emphasis on absolute revenue and relative market share of the post-acquisition entity. However, the jurisdiction does not reflect the occurrence of potential killer acquisitions and, thus, their resulting loss in innovative capacity could stay under the radar. This is emphasized by the finding of Cunningham *et al.* (2021) that acquisitions in the pharmaceutical industry that were 5% below the turnover threshold of the United States Federal Trade Commission ("US FTC") were 11.3% more likely to be killer acquisitions than those that were 5% above the threshold (OECD, 2020a). When policymakers need to determine rules to decide between approving and declining an acquisition, the most common overall objective is to minimize the sum of expected error and implementation costs, as indicated in Joskow and Klevorick's (1979) error-cost framework. This implies that a balance between type I errors, i.e. incorrect intervention, and type II errors, i.e. incorrect clearance, needs to be found, taking their respective costs into account (Crémer *et al.*, 2019). A report from the Stigler Committee on Digital Platforms noted that the harm from type II errors is significantly larger than the harm from type I errors, as the prior error type can result in oligopolistic and monopolistic market structures (Stigler Center, 2019). Moreover, a report by Furman *et al.* (2019), published for the UK Chancellor of the Exchequer, came to the conclusion that there have been no type I errors in digital platform markets, as all transactions have been approved, implying that no over-enforcement against the acquisition of technology start-ups exists. Combined, these findings indicate that a recalibration of the merger control and antitrust legislation towards accepting more type I and fewer type II errors might have a positive effect on consumer welfare (OECD, 2020a).

In the following, the legislation of three economic regions, i.e. EU, UK, USA, is outlined in closer detail. The paper focuses on these three regions as both the five big players of the platform economy as well as a large share of acquisition targets are headquartered in one of these regions (see Appendices F-J).

European Union. The EU is an economic area with a common internal single market of standardized laws and policies, covering 27 member states, encompassing a total of 447m inhabitants, and accounting for 18% of the global nominal gross domestic product ("GDP") in 2020 (Eurostat, 2021; International Monetary Fund, 2021). EU policies also extend into the realm of antitrust and data privacy legislation and apply to all member states, rendering EU policy decisions a relevant factor on a global scale (Šmejkal, 2020). In addition to EU legislation, member states might decide to introduce national laws. Merger control and antitrust legislation on an EU level are currently based on an absolute threshold system, meaning that the monetary turnover of the entities involved in the transaction decides about notification requirements (Bourreau and de Streel, 2020). There are two alternatives in which the level of the threshold is determined: First, the European Commission examines mergers and acquisitions if (i) the firm's combined worldwide turnover is above EUR 5bn and (ii) the EU-wide turnover for each entity above EUR 250m. Second, M&A transactions are examined if (i) the global combined turnover of all entities is above EUR 2.5bn, and (ii) the combined turnover of all entities is above

EUR 100m in at least three EU countries, and (iii) the turnover of each entity is EUR 25m in at least two of the three member states to which the EUR 100m threshold applies, and (iv) a turnover above EUR 100m of at least two firms in EU countries (EUR-Lex, 2004). The underlying rationale for the current jurisdiction is that only those transactions are reviewed and potentially rejected that would have the potential to "significantly impede effective competition in the common market or in a substantial part of it" (Šmejkal, 2020, p. 4). As the current legislation is anchored in a pre-digitalized world without the existence of platforms, more attention has been devoted towards adapting the legislation to the new circumstances of the global economy. For instance, Margrethe Vestager, the European Commissioner for Competition, has frequently voiced concerns over acquisitions in the digital economy that lead to a loss of ideas in start-ups because "bigger businesses buy them in order to kill them" (Holmström *et al.*, 2019, p. 4). The EU is currently considering to implement stricter antitrust and data policy legislation, aiming at increasing transparency, prohibiting unfair market practices, and preventing the development towards monopolistic market structures (Drozdiak, 2020; The Economist, 2020).

United Kingdom. The United Kingdom ("UK") is a sovereign country, covering the island of Great Britain, the north-eastern part of Ireland, and several small islands within the British Sea. It had a population of 66.8m and accounted for 3% of the global GDP in 2020, placing it on the fifth rank of the largest economies by GDP (International Monetary Fund, 2021; Office for National Statistics, 2021). After the withdrawal of the UK from the EU in 2020, the country could play a significant role in antitrust and merger control legislation, primarily due to its membership in several influential organizations, such as the G7, the Commonwealth of Nations, and NATO, its central location between the US and EU market, and its large number of innovative technology start-ups (see Appendices F-J). The UK antitrust and merger control regulation revolves around revenue and market share thresholds. A transaction can be investigated if (i) the turnover of the target firm in the UK exceeds GBP 70m or if (ii) the combined market shares of acquirer and target post-transaction equals at least 25% of the products and services belonging to a certain category in the UK, whereby notification of the Competition and Markets Authority is voluntary (McIver and Heemsoth, 2021). However, in 2018, the UK has introduced stricter rules for "relevant enterprises", i.e. companies active within the fields of quantum technology, processing units, military goods, artificial intelligence ("AI"), cryptographic authentication, and advanced materials. For these firms, the target's annual turnover threshold is reduced to GBP 1m (Competition & Markets Authority, 2018; McIver and Heemsoth, 2021). The UK Treasury department has recently placed a stronger focus on antitrust legislation for digital companies by establishing an independent expert panel in 2018, which has proposed to introduce regulatory changes in order to keep up with fast-paced platform markets. Proposals include a stronger emphasis on a potential loss of innovation and increased scrutiny for platform firms with a strategic market status (Furman *et al.*, 2019; Holmström *et al.*, 2019). In a similar vein, the House of Lords' Select Committee on Communications proposed to adequately consider the importance of "long-term innovation" (p. 43) in digital markets in order to ensure that acquisitions are in the public interest

and that consumer welfare is not negatively impacted by them (House of Lords' Select Committee on Communications, 2019).

United States of America. The United States of America ("USA"), the location of most large platform companies' and many innovative tech start-ups' headquarters, encompassed a total of 328m inhabitants and reached a GDP of USD 20.9tril in 2020, accounting for 25% of the global GDP (United States Census Bureau, 2021). Merger control is based on an absolute revenue threshold of the post-acquisition entity as well as a size-of-transaction threshold, whereby transactions above the thresholds require acquirers to make a filing with the US Federal Trade Commission. The agency only approves transactions if it finds that they do not adversely affect competition under the antitrust laws. According to the Hart-Scott-Rodino Antitrust Improvements Act of 1976 in combination with more recent adjustments, an acquirer needs to notify the Federal Trade Commission if the acquiring firm has annual net sales or total assets of at least USD 188m and the target has annual net sales or total assets of at least USD 19m. Moreover, a size-of-transaction threshold applies that stipulates that a transaction is subject to merger control if the sum of voting securities, noncorporate interests, and assets is valued at more than USD 376m. Several exceptions and special rules apply based on ownership, sector, and type of assets acquired (Jones Day, 2020; Mucchetti *et al.*, 2021). While there is no legislation in place that specifically targets killer acquisitions, government agencies as well as policymakers increasingly direct awareness to the topic. For instance, the Bureau of Competition has launched a 'Technology Task Force' to monitor the competitive situation in platform markets, the Federal Trade Commission held a hearing on "acquisitions of nascent and potential competitors in digital technology markets", and Senator Richard Blumenthal expressed his intention to introduce legislation that prohibits killer acquisitions (Federal Trade Commission, 2018, 2019; Holmström *et al.*, 2019; United States Senate Judiciary, 2019).

In summary, the current antitrust policy in the EU, UK, and US is deeply rooted in a pre-digital economy and mostly relies on market share and revenue thresholds in order to determine whether an acquisition is reviewed or requires approval by government agencies. Even though taken into consideration by several agencies and politicians, there are no large-scale flexible systems or sector-specific regulations in place that might detect killer acquisitions. Thus, it seems likely that the current legislation does not prevent large companies from acquiring innovative firms and eliminating their innovative capacity. An overview of the current legislation can be found in Exhibit IV below.

Exhibit IV: Comparison of Merger Control and Antitrust Legislation in the EU, UK, and USA

The table depicts a comparison of merger control and antitrust legislation in the EU, UK, and USA, covering the three major types of notification systems (revenue threshold system, market-share threshold system, flexible system). Moreover, it shows whether special regulations for platform companies are in place and if the target's innovative capacity is considered in the decision to approve an acquisition.

Merger control and antitrust legislation	**EU[1,2]**	**UK[3,4]**	**USA[5,6]**
Revenue threshold system	✓	✓	✓
Market-share threshold system	(✗)	✓	(✗)
Cross-sector flexible system	✗	✗	✗
Special regulations for platform companies	✗	(✓)	✗
Consideration of target's innovative capacity	✗	✗	✗

Sources: [1]European Union (2004), [2]Šmejkal (2020), [3]McIver and Heemsoth (2021), [4]Competition & Markets Authority (2018), [5]Jones Day (2020), [6]Mucchetti *et al.* (2021)

2.3. The Platform Economy

After having outlined the phenomenon of killer acquisitions, this section introduces the platform economy, which has disrupted and reinvented many traditional sectors and might be particularly prone to killer acquisitions due to its specific market characteristics. First, the platform economy is introduced and delimited from traditional linear business models. Second, its key characteristics are analyzed more closely in order to showcase how the platform economy is inherently different from most of the economic activity of traditional 20th-century business models. Third, some of the biggest sectors of the platform economy, including online marketplaces and social networks, are presented in closer detail.

2.3.1. Introduction and Definition

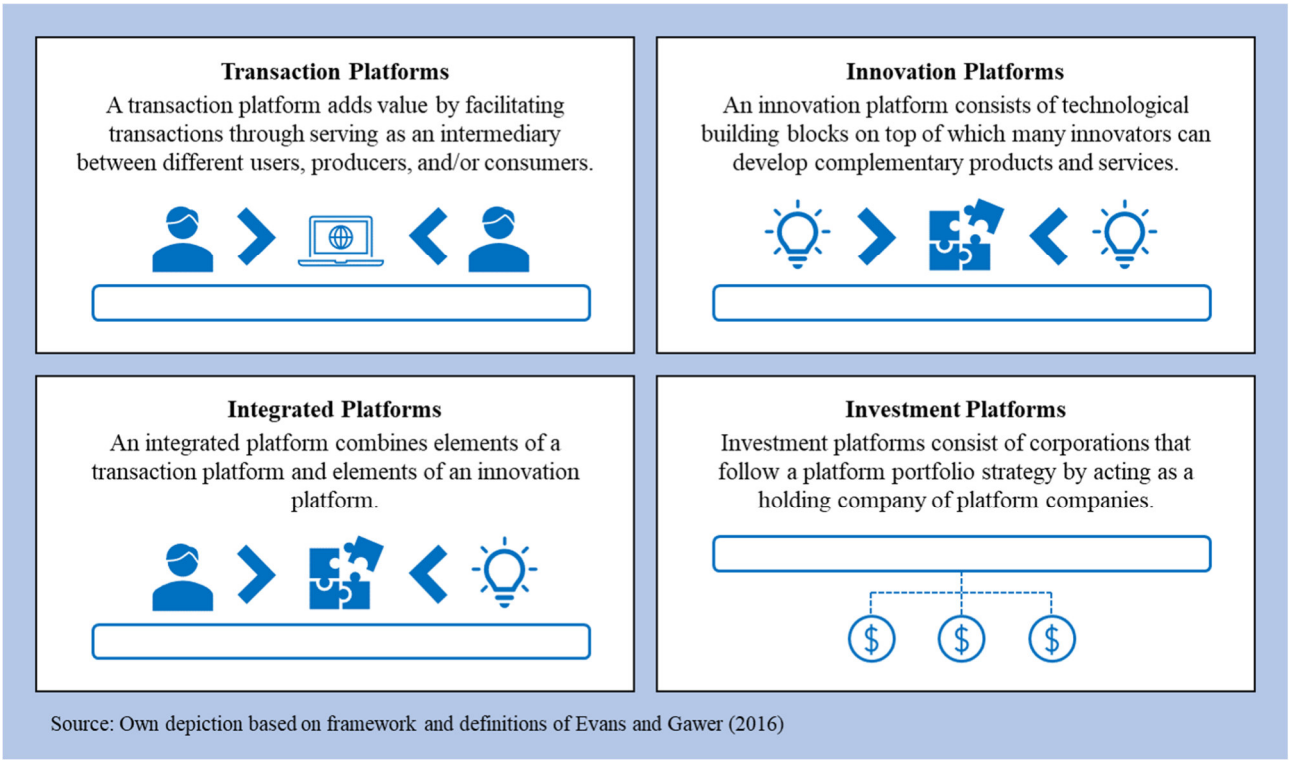
The global economic system is currently undergoing a process of reorganization, entailing radical changes to how consumers and producers interact, how firms compete with each other, and how economic value is created and captured. While the last global transformation of a similar magnitude, the industrial revolution, was centered around factories, the 21st-century transformation revolves around digital platforms (Kenney and Zysman, 2016). Platforms create value by fulfilling the role of online matchmakers through a shared ecosystem, i.e. they connect producers and consumers through the use of multisided digital frameworks (Deloitte, 2019). This is fundamentally different from traditional linear business models, whereby the producer owns the means of production, develops a pipeline, and sells products to consumers through certain sales channels (Kenney and Zysman, 2016). Strengths of platforms compared to linear business models include that they foster interaction, accelerate speed and scale of innovation, and create an open ecosystem for market participants to co-evolve, co-create, and co-develop (Evans and Gawer, 2016).

For the subsequent framework development, the platform economy is defined as the economic and social activity of these digitally-enabled platforms, encompassing a wide range of functions and structures (Kenney and Zysman, 2016). Related notions include the ‘Sharing Economy’, which emphasizes the positive impact of resource-sharing, and the ‘Gig Economy’, which rather points at the negative impact on workers as a result of short-term employment. While these notions tend to imply a judgment on this economic transformation, the term ‘platform economy’ can be considered as more neutral and encompasses the entire spectrum of digitally facilitated, platform-based activity in the business and social realm (Kenney and Zysman, 2016). The term ‘platform’ also needs to be distinguished from the term ‘technology platform’, whereby the former relates to a facilitator of online matchmaking business models and the latter simply refers to the online technology necessary to streamline the deployment of resources (Wu, 2020). Moreover, some studies also refer to the ‘digital economy’ or ‘digital markets’, which typically entail a broader scope than the notion of the ‘platform economy’, as they often refer to all business processes that are based on digital computing technologies (Calvano and Polo, 2021; Gautier and Lamesch, 2021). However, a clear differentiation might be challenging,

as stand-alone digital computer technologies can develop towards or be integrated into platforms at a later stage.

Exhibit V: Typology of Platform Companies

The figure displays the typology of Evans and Gawer (2016), classifying platform companies into transaction platforms, innovation platforms, integrated platforms, and investment platforms.



Source: Own depiction based on framework and definitions of Evans and Gawer (2016)

Following Evans and Gawer (2016) definition, four types of platforms can be distinguished: transaction platforms, innovation platforms, integrated platforms, and investment platforms. Transaction platforms add value by facilitating transactions or interactions by serving as an intermediary between different users, producers, and/or consumers (Evans and Gawer, 2016). This type of platform is sometimes also being referred to as a 'two-sided market' or 'multi-sided market', connecting two or more entities that benefit from interacting through a common platform (Rochet and Tirole, 2003; Weyl, 2010). Examples of transaction platforms include Uber, Amazon Marketplace, and the eBay online auction website (Evans and Gawer, 2016). The second type is an innovation platform, which "consists of technological building blocks that are used as a foundation on top of which a large number of innovators can develop complementary services or products" (Evans and Gawer, 2016, p. 6). These innovators jointly form an innovation ecosystem around the platform, e.g. the iPhone technology serves as the basis for a myriad of applications that were developed by innovators around the world (Evans and Gawer, 2016). The third type is an integrated platform that combines elements of a transaction and

innovation platform, e.g. Amazon both offers an online platform to connect producers and consumers as well as facilitates an innovation ecosystem through its streaming service Twitch. The fourth type are investment platforms, i.e. corporations that follow a platform portfolio strategy by acting as a holding company of platform companies (Evans and Gawer, 2016).

2.3.2. Market Characteristics

The platform economy is subject to a set of specific characteristics that increase the potential attractiveness of killer acquisitions. These include the tendency towards winner-take-all markets, high entry barriers, and the paramount role of innovation as a disruptor of incumbent firms. In the following, the state-of-the art research regarding the characteristics of the platform economy is outlined in closer detail.

2.3.2.1. Winner-take-all Markets

The market structure in the platform economy differs significantly from other sectors with regard to the emergence of "winner-take-all markets" (p. 387), i.e. economic systems that enable one or very few players to capture a predominant share of the overall market (Schilling, 2002). Platform economies are prone to winner-take-all markets due to certain special features, including economies of scale and scope, the role of big data, and high entry barriers through network effects and user switching costs (Nadler and Cicilline, 2020). These factors, in many cases being interlinked and reinforcing each other, are outlined in the subsequent paragraphs. The result of winner-take-all markets is that competition in the market is replaced by competition for the market, raising incentives for incumbents to invest significantly into securing their market position (Stigler Center, 2019). The competition for the market could be enormous due to prospect of a long-term dominant market position, particularly in early market stages (The Economist, 2016); however, competition might in turn be reduced through high entry barriers in later stages, making it difficult for start-ups to grow their platform-based business models (Nadler and Cicilline, 2020). A report from the Subcommittee on Antitrust, Commercial and Administrative Law of the US House of Representatives confirms that the market concentration tends to be high in the platform economy, concluding that Facebook and Google hold a "monopoly" (pp. 12/14) and Amazon and Apple have "significant and durable market power" (pp. 15/16) in their respective markets (Nadler and Cicilline, 2020).

2.3.2.2. Network Effects

The platform economy is subject to strong network effects, i.e. the technology-based products and services gain additional value through an increasing number of users (Suarez, 2005). There are two types of network effects that apply to the platform economy, direct and indirect network effects. Direct network effects arise if the more people use a technology, the higher its value for new users becomes. Examples include online commerce platforms that connect producers and consumers from different market segments as well as social networks that connect individual people, both becoming more valuable the more users join them (Nadler and

Cicilline, 2020). Indirect network effects exist if the widespread use of a product or service leads to the emergence of a technology standard, increasing the incentive to develop compatible technologies and thereby further reinforcing the market position of the technology standard (Nadler and Cicilline, 2020; Schilling, 2002). This phenomenon is related to the previously mentioned concept of an 'innovation platform', enabling the development of an entire ecosystem around the core technology (Evans and Gawer, 2016). Indirect network effects are widespread in the platform economy and can be observed in many products and services, such as application platforms for smartphones and recommendation systems building upon the large datasets of users (Stigler Center, 2019). These strong network effects can serve as an entry barrier and might have the potential to turn market concentration into durable market power (Nadler and Cicilline, 2020). Since an innovative start-up with a growing user base on a platform-based business model might become a future competitor of an incumbent, even if no product overlap exists in the beginning, a preemptive acquisition might be an attractive strategy from the perspective of the incumbent to protect its market position (Gautier and Lamesch, 2021). However, network effects might increase competition in the early market stages, as companies are incentivized to attract customers to gain market share and profit from a bandwagon effect, i.e. early adopters create social pressure and fear of missing out for non-adopters to mimic their behavior (Namara, 2008). This effect of increased competition has been found to disappear, though, once a company reaches a dominant market position (Stigler Center, 2019).

2.3.2.3. Switching Costs

Switching costs describe the expenses and effort that a consumer needs to incur when changing products, services, or brands; these costs include direct and indirect expenses, such as search costs, loyalty programs, learning requirements, and contractual obligations (Demirhan, Jacob, and Raghunathan, 2007). Platforms markets tend to have high switching costs due "platform lock-in" (p. 319) effects, i.e. switching providers is so expensive that they can prevent users from changing to a superior platform provider (Nuccio and Guerzoni, 2019). Three aspects are causing platform lock-in: network effects, lack of data portability, and interconnectivity of services. First, network effects, as described in the previous chapter, imply that the value of the platform significantly depends on the number of users. The consequence is that it is very difficult for emerging platform start-ups to find users that are willing to switch to an incompatible technology and risk being stranded, making a large user base a valuable asset for incumbent firms (Crémer *et al.*, 2019; Shapiro and Varian, 2000). Second, it is often not possible to transfer data from one platform to another, e.g. a user cannot easily move his data between different social networks and a product vendor cannot transfer reviews to another marketplace (Nadler and Cicilline, 2020). Third, large incumbents regularly offer a large number of interconnected services, of which new entrants are usually only able to provide a small subset, reducing the incentives to switch platforms (Nadler and Cicilline, 2020). Jointly, these factors increase switching costs. Moreover, incumbent platforms might also attempt to prevent users from "multi-homing" (p. 62), i.e. using

several platforms at the same time, through rewarding exclusivity directly, e.g. through bundling rebates, or indirectly, e.g. through seller reputation mechanisms based on sales numbers (Crémer *et al.*, 2019).

2.3.2.4. Economies of Scale and Scope

Another characteristic of the platform economy is the presence of strong economies of scale and scope, i.e. cost savings through offering more of the same good or through offering a variety of goods (Stigler Center, 2019; Walter and Barney, 1990). First, economies of scale are pertinent in the platform economy, as most markets are characterized by high up-front and low variable costs, leading to a significant decrease in unit costs if sales increase (Nadler and Cicilline, 2020). This effect is exacerbated by the role of data, as large tech firms can use machine learning based on extensive data sets to further raise the product quality, e.g. through technology-driven customization to user preferences, at low costs (Stigler Center, 2019). Second, economies of scope play a part of at least equal importance, as platform companies can extend their reach into adjacent markets through their innovation platform ecosystems, typically at very low cost (Nadler and Cicilline, 2020). Access to extensive sets of user data also facilitates these economies of scope, as insights from one market can often be transferred to other markets. This is particularly relevant for advertising, as user insights from an ecosystem encompassing a variety of products can help to facilitate hyper-targeted advertising, significantly increasing advertising revenues per customer at low cost (Stigler Center, 2019). These economies of scale and scope, accelerated by data analysis in combination with machine learning technologies, can increase market concentration and contribute to the development of winner-take-all markets (Nadler and Cicilline, 2020; Stigler Center, 2019).

2.3.2.5. The Role of Data

The overarching role of data distinguishes the platform economy from traditional linear business models and has three major implications: data access supports product development, serves as an entry barrier, and helps companies identify new business opportunities. First, large population, high-dimensional datasets can support the product development of platform companies. By collecting detailed information about a large number of users, platforms can not only improve targeting of their products to the respective user based on the information available but also infer additional insights by relying on machine learning and artificial intelligence technology. This can function as a self-reinforcing mechanism, as companies with more data sets are able to better target users with improved products, thus adding more new users and, consequently, being able to collect more data (Nadler and Cicilline, 2020; Stigler Center, 2019). Second, as many products and services in the platform economy are highly reliant on customization through machine learning and artificial intelligence, the lack of data required for the use of these technologies can serve as a substantial entry barrier to companies lacking vast financial resources (Stigler Center, 2019). Third, big data can be used to explore new business opportunities. The underlying rationale is that data collected for one purpose might be used to detect gaps in the supply of another purpose (Furman *et al.*, 2019; Nadler and Cicilline, 2020). However, it needs to be

underlined that big data alone does not necessarily help companies reach these objectives, as risks of unsuitable data selection, spurious correlations, and overfitting are omnipresent in machine learning and artificial intelligence technologies (Nuccio and Guerzoni, 2019).

2.3.2.6. The Role of Innovation

The advent of the platform industry has been spurred by innovation, disrupting and reshaping a host of industries (Crémer *et al.*, 2019). The importance of innovation, compared to more traditional linear business models, is underlined by the fact that Google, Apple, Facebook, Amazon, and Microsoft have spent a total of EUR 66bn on R&D in 2017, which equaled an average of 10.6% of the firms' annual turnover (Auer *et al.*, 2018; Holmström *et al.*, 2019). The reason for innovation being so vital in the platform economy is that it can help firms to improve their current product and service offering, reduce costs, and develop entirely new business models (Furman *et al.*, 2019). Moreover, much of the R&D activity is data-driven; companies that rely on data-driven innovation have been found to outperform with 5-10% faster productivity growth (Furman *et al.*, 2019; OECD, 2016). However, while most researchers agree on the imperative role of innovation for the development of the platform industry and the global economy as a whole, measuring innovation has proven to be a major challenge (Bloom, Van Reenen, and Williams, 2019; Calvano and Polo, 2021; Crémer *et al.*, 2019; Holmström *et al.*, 2019; Stigler Center, 2019). Reasons include that innovation in the platform economy tends to be in constant evolution, less discrete through recombining technologies for new business ideas, and less structured, since phases of development, implementation, and testing occur simultaneously (Crémer *et al.*, 2019). Nadler and Cicilline (2020) hypothesize that the high degree of market concentration in the platform economy could reduce incentives to innovate, as large incumbents can eliminate young start-ups through killer acquisitions and competitive pressure, supported by the above-mentioned market characteristics. While being difficult to measure, many researchers agree that a decline in innovation could have severe negative effects on consumer welfare and product variety in the platform economy (Crémer *et al.*, 2019; Holmström *et al.*, 2019; Nadler and Cicilline, 2020; Stigler Center, 2019).

2.3.2.7. Competition

The combination of these specific characteristics of the platform economy, i.e. the emergence of winner-take-all markets with high entry barriers and substantial, data-driven economies of scale and scope, has far-reaching implications on the competitive environment (Crémer *et al.*, 2019). In general, competition serves the role of an engine of economic development through incentivizing firms to improve their business model and disrupt industries as well as spur capital investments into R&D (Nadler and Cicilline, 2020). Two trends can be observed that might be indicative of a decreasing degree of competition in the platform economy: a growing market concentration and the rise of gatekeepers. First, platform economies have become increasingly concentrated, both through higher entry barriers and a large number of acquisitions through the incumbent players (Nadler and Cicilline, 2020). Even though a single acquisition might not have a substantial impact on

competition, as it is a "low-likelihood event" (p. 19) that a young start-up challenges an incumbent, the combined impact of many acquisitions over a short time horizon most likely has an adverse effect on competition (Holmström *et al.*, 2019). Second, large technology platforms often function as gatekeepers, i.e. they control key distribution channels and can decide about the extent to which companies using the platforms can reach external parties, such as users and customers (Nadler and Cicilline, 2020; Tushman and Katz, 1980). Incumbent platforms might misuse this gatekeeping power by dictating terms and conditions that companies might not agree to in a competitive market or by discriminating against individual firms, e.g. through less favorable placement in search engines (Nadler and Cicilline, 2020). This problem is exacerbated by the dual function that many platform providers fulfill, as they often serve as intermediaries for third-party providers and direct competitors of these firms at the same time. There are several instances in which incumbent platforms were criticized for exploiting this dual role through ranking their own products more prominently, using sensitive information of competitors, and replicating ideas of rival firms (Albergotti, 2019; European Commission, 2019; Mickle, 2019; Nadler and Cicilline, 2020).

When evaluating the market structure of the platform economy, none of the characteristics discussed above – in isolation – appear unusual or significantly different compared to more traditional sectors. However, the combination of these characteristics, such as strong network effects, high switching costs, data-driven economies of scale and scope of remarkable magnitude, is very unusual. These factors all favor the emergence of winner-take-all markets and make the platform economy prone to a process that the Stigler Committee on Digital Platforms refers to as "tipping" (p. 35), i.e. an emerging monopoly eliminates most of the innovation and competition at the detriment of the consumers (Stigler Center, 2019).

2.3.3. Market Overview

The platform economy spans across many different markets and sectors, both traditional and newly emerging ones. In the following, ten major platform markets are presented, as outlined by Nadler and Cicilline (2020). The list only encompasses markets of major size that can be classified – at least to some extent – as platform markets, meaning that they encompass most of the characteristics described in the previous section. Thus, they are prone to develop towards winner-take-all markets and could offer high incentives for incumbent firms to engage in killer acquisitions. The list is by no means exhaustive and new markets are likely to develop through innovation platforms and integrated platforms in the future (Evans and Gawer, 2016).

Search engines. A search engine enables users to retrieve relevant web pages or information on products and services, corresponding to the previously entered query, from the internet. One can distinguish between 'information search engines' (also referred to as horizontal search engines) that provide a comprehensive list of general results and 'product search engines' (also referred to as vertical search engines) that retrieve a narrower category of content, such as hotel offers and holiday destinations (Ghose, Ipeirotis, and Li, 2014;

Nadler and Cicilline, 2020). Most search engines provide the services to users free of charge and finance themselves through advertising revenue (Nadler and Cicilline, 2020). While several larger providers offer product search engines, often with a particular focus area, the market of information search engines is highly concentrated. Since 2010, Google has maintained a global market share above 80% for desktop users, reaching 87% in February 2021 (Statista, 2021a). Reasons for the high market concentration include significant economies of scale through enormous fixed costs for crawling and indexing the entire internet, access to large population data sets, strong network effects, and the integration into other applications by default (Competition & Markets Authority, 2021; Nadler and Cicilline, 2020).

Online marketplaces. An online marketplace is a platform that connects buyers and sellers, allowing the former group to compare and purchase goods and the latter group to list products on the platform (Chu, Nazerzadeh, and Zhang, 2020). In addition to that, several online marketplaces offer vendors further services, such as inventory management, advertising, and pricing recommendations (Nadler and Cicilline, 2020). Some marketplaces do not only offer third-party sellers the option to list products on the platform but also offer their own products and services, leading to potential conflicts of interest (Mattioli, 2020). A few larger companies dominate the market, with Amazon accounting for 39% of e-commerce sales in the US (Lipsman, 2020; Nadler and Cicilline, 2020). Online marketplaces are likely to develop towards winner-take-all markets, as they are characterized by high entry barriers through strong network effects, as an attractive marketplace requires a large number of buyers and sellers, and through high up-front costs to provide the required infrastructure (Nadler and Cicilline, 2020). Moreover, data insights can be used to improve the relevance of the product ranking for customers (Chu *et al.*, 2020).

Social networks & social media. Social networks enable users to connect, interact, and network with other users through a host of different services, including comments, messages, pictures, and videos (Sismeiro and Mahmood, 2018). Social media platforms serve a similar function; however, their focus is placed less on the interaction with other users, typically belonging to the personal network, and more on the consumption of content, usually targeting a broader audience (Nadler and Cicilline, 2020). Most social networks and social media sites do not charge users directly but finance themselves through advertising revenues (Nadler and Cicilline, 2020). Both markets tend to be highly concentrated. Facebook, the biggest social network, had 2.7bn active users globally in January 2021; YouTube, the biggest social media platform, 2.3bn monthly users (Statista, 2021b). Social networks and social media sites are prone to winner-take-all markets due to their specific characteristics, in particular high entry barriers through very strong network effects as well as data-driven economies of scale and scope (Bundeskartellamt, 2019; Nadler and Cicilline, 2020).

Mobile operating systems. A mobile operating system is the interface between the hardware of a smartphone and its applications. It is pre-installed on phones, cannot be changed or substituted, and determines which ecosystem of products and services the user has access to (Nadler and Cicilline, 2020). The market for mobile

operating systems is highly concentrated, as Android by Google and iOS by Apple had a combined global market share of 99.4% in January 2021 (Statista, 2021c). While Android is used by most smartphone producers, including Samsung, LG, and Motorola, iOS is only available on Apple devices (Nadler and Cicilline, 2020). The market is characterized by high switching costs, as users do not only have to buy a different phone but also need to become accustomed to different operating settings and interface design as well as might encounter problems when transferring data between operating systems. Moreover, strong network effects through a technology lock-in come into play, as most app developers only customize their software to Android and iOS, encompassing the major share of the global user base (Nadler and Cicilline, 2020).

Mobile app stores. Mobile app stores are digital platforms that allow software developers to distribute mobile software applications to users. In addition to this, app stores typically include further functionalities, such as search functions, application ratings, and tools to develop their own apps (Nadler and Cicilline, 2020). App stores are closely linked to the ecosystem of operating systems, as the provider of the operating system can decide which app stores users have access to. Since Android and iOS have combined market share of 99.4%, as outlined in the previous paragraph in closer detail, this complicates the market entry for new mobile app stores (Evans and Gawer, 2016; Nadler and Cicilline, 2020; Statista, 2021c). Similar to operating systems, app stores are subject to high switching costs, strong network effects, and data-driven economies of scale and scope (Nadler and Cicilline, 2020; Stigler Center, 2019).

Online mapping. Online mapping services provide users and businesses with "virtual maps of the physical world" (p. 107), facilitating navigation, logistics, and the production of customized maps (Nadler and Cicilline, 2020). The market tends to be highly concentrated, as shown by the fact that market leader Google Maps served more than 154m unique users in the US alone in April 2018, followed by Waze with 26m users and Apple Maps with 23m users (Statista, 2018). This high market concentration can be explained by several characteristics of online mapping services. First, developing online maps on a global scale requires high up-front costs and is subject to significant economies of scale and scope when growing the user base. Second, data from adjacent business lines, including search engines and social networks, can be used to improve online maps, favoring large providers of integrated platforms. Third, the integration into a broader platform offering can lead to high switching costs for users (Crémer *et al.*, 2019; Evans and Gawer, 2016; Nadler and Cicilline, 2020).

Cloud computing. Cloud computing describes the on-demand availability of configurable computing resources, mostly for the purposes of accessing remote data storage and computing power (National Institute of Standards and Technology, 2011). Many platform industries, such as social media and online mapping, heavily rely on cloud computing, as it enables companies to access massive volumes of data in real time and, thus, to rapidly scale the business to the respective demand (Nadler and Cicilline, 2020). The cloud computing market consists of few big players, with Amazon Web Services accounting for 32% and Microsoft Azure for

20% of the global cloud infrastructure market by service revenue (Statista, 2021d). Similar to many other platform markets, cloud computing is also prone to develop towards a winner-take-all market. Reasons include high up-front costs, economies of scale through being able to balance supply with large data centers across the globe, network effects through third-party providers developing additional services around the platform, and high switching costs in the form of fees and required time (Nadler and Cicilline, 2020).

Intelligent virtual assistants. Intelligent virtual assistants are software agents that serve as an interface between user and technology, encompassing functionalities like voice recognition, context understanding, and machine learning (Winarsky, 2015). Virtual assistants can be integrated into applications, platforms, and devices, and might be either general or specialized to serve individual verticals (Nadler and Cicilline, 2020). The most common general virtual assistants are Google Assistant and Apple's Siri, both being used by 36% of users in 2018. Together with Amazon's Alexa and Microsoft Cortana, these assistants accounted for over 99% of the general voice assistant market (Microsoft, 2019). The high degree of market concentration, despite the virtual assistant market being nascent, can be linked to its specific characteristics. These include a technology lock-in through being integrated in smartphones or other products, strong network effects, high upfront costs, and data-driven economies of scale and scope, jointly raising entry barriers and resulting in the emergence of a winner-take-all market (Furman *et al.*, 2019; Nadler and Cicilline, 2020).

Web browsers. A web browser is an application software to access the internet. It consists of a browser engine, which transforms information into visual depictions, as well as toolbars, menus, and additional features. The providers of web browsers usually generate revenues from search royalties and advertisements (Nadler and Cicilline, 2020). Advertisements can be highly personalized, as algorithms track the websites visited and predict user interests based on large population datasets (Doffman, 2021). In March 2021, Google Chrome had a global market share of 64%, followed by Apple's Safari with 19% (Statista, 2021e). This high concentration in the market for web browsers can partly be explained by default settings, as many computers and smartphones have certain browsers pre-installed. However, it is possible to download and use a different browser, entailing low switching costs compared to other platform markets. Due to large economies of scale and scope, the value of data insights, and strong network effects in combination with other technologies, the market for web browsers is still prone to become a winner-take-all market (Nadler and Cicilline, 2020; Stigler Center, 2019).

Digital advertising. The notion of digital advertising typically refers to ad content displayed on websites, which is accessed through web browsers. Digital advertisement is integrated into other platforms, such as search engines, online marketplaces, social networks, or online maps. Tech companies typically sell ads in two markets: first-party and third-party. A first-party market implies that ad space is sold on an own platform, e.g. directly on Facebook. Third-party markets are run by intermediaries that connect advertisers and publishers, e.g. Google integrates ads from a clothing company into the website of a newspaper publisher (Nadler and Cicilline, 2020). The market for digital advertising is concentrated, with Google accounting for 29% and

Facebook for 25% of US revenues in 2020 (Graham, 2021). Similar to most other platform markets, digital advertising is subject to high entry barriers through data-driven economies of scale and scope as well as network effects through the integration of ads into digital ecosystems of large tech companies (Furman *et al.*, 2019; Nadler and Cicilline, 2020).

In this chapter, ten of the largest platform markets were outlined in closer detail. It can be confirmed that most of the characteristics of the platform economy do indeed apply to a host of individual markets, such as online marketplaces, social networks, and app stores. These specific characteristics were found to be likely to contribute to the development of winner-take-all markets in theory and, in fact, all markets analyzed were subject to a high degree of market concentration. As previously explored, this market concentration could have detrimental effects on competition, innovation, and consumer welfare, and might be further exacerbated through killer acquisitions. Thus, the ubiquity and interconnectedness of platform markets in combination with their high degree of market concentration, both in theory and practice, increases the relevance of research on killer acquisitions as a guiding force for antitrust policy.

3. Analysis of Acquisition Activity in the Platform Economy

The preceding chapter provided a theoretical foundation for killer acquisitions in the platform industry by introducing the motives of acquisitions, delimiting the novel phenomenon of killer acquisitions, and characterizing the platform economy. The following chapter now synthesizes the theoretical components and applies them to business practice by examining the acquisition activity in the platform economy. In order to support the framework development in Chapter 4, this chapter contains the following consecutive steps: First, the major players of the platform economy are presented, and their current market positions are evaluated, particularly against the background of platform sectors' tendency to develop towards winner-take-all markets. For that purpose, their business models, key figures, financials, and market shares in different platform sectors are depicted. Second, the acquisition activity of these players is investigated alongside several quantitative and qualitative dimensions in order to understand which types of firms platform companies typically acquire. These insights could be highly relevant to determine which role acquisitions play in the platform economy with regard to firms reaching dominant market positions as well as the potential existence of killer acquisitions. Finally, the last section summarizes how empirical studies and policymakers assess the acquisition activity of the GAFAM firms.

3.1. Market Position of Big Players

This section presents the major players of the platform industry and assesses their market position across the largest platform segments. The detailed analysis encompasses five major platform companies, i.e. Google, Amazon, Facebook, Apple, Microsoft ("GAFAM"), as they are particularly relevant in theory and business practice for three reasons. First, GAFAM are the five most valuable firms globally in terms of brand value, as stated by Forbes (2020), underlining their pivotal role for economic systems across the world. The brand value ranking places Apple on rank one with a brand value of USD 241.2bn, followed by Google at USD 207.5bn, Microsoft at USD 162.9bn, Amazon at USD 135.4bn, and Facebook at USD 70.3bn (Exhibit VI). Other statistics rank the GAFAM firms differently. For instance, Statista (2020) ranks Amazon, Apple, Microsoft, and Google, in that order, on places one to four, and Facebook on rank eight (Statista, 2020). However, both statistics illustrate that the GAFAM firms are among the most valuable and influential companies in the world. Second, GAFAM engaged in extensive acquisition activity in recent years, underlining their importance for the subsequent theory development and case study illustration. Third, several researchers and government agencies have pointed to the market power of the five leading Big Tech players, highlighting their relevance for potential killer acquisitions as an enabler for securing their market position (Gautier and Lamesch, 2021; Nadler and Cicilline, 2020). Therefore, to lay the foundation for the analysis, the GAFAM firms are introduced in further detail and the most pertinent key facts are presented in the following. Furthermore, it is analyzed to what extent each of the companies might have a dominant market position in the platform economy, supported

by insights from a report of Nadler and Cicilline (2020) conducted for the US House of Representatives. Thereafter, other important market participants are briefly presented. As an extension to the introduction of the GAFAM firms, company profiles with their most important key facts, financials, and platform markets are shown in Appendices A-E. Moreover, several Exhibits are used to support the analysis, giving insights into GAFAM's brand values (Exhibit VI), key facts (Exhibit VII), market shares in platform segments (Exhibit VIII), and the biggest platform companies globally by revenue (Exhibit IX).

Exhibit VI: Forbes List of 'The World's Most Valuable Brands 2020'

This list shows the ten most valuable brands worldwide in 2020, as stated by Forbes (2020). Moreover, further information regarding the ten companies' country of origin, industry, and platform-based business model is provided.

Rank	Brand/Company	Country of origin	Brand value (in USDbn)	Industry	Platform-based business model
1	Apple	USA	241.2	Technology	Yes
2	Google	USA	207.5	Technology	Yes
3	Microsoft	USA	162.9	Technology	Yes
4	Amazon	USA	135.4	Technology	Yes
5	Facebook	USA	70.3	Technology	Yes
6	Coca-Cola	USA	64.4	Beverages	No
7	Disney	USA	61.3	Leisure	No
8	Samsung	South Korea	50.4	Technology	No
9	Louis Vuitton	France	47.2	Luxury	No
10	McDonald's	USA	46.1	Restaurants	No

Source: Forbes (2020)

Alphabet Inc. Alphabet Inc. ("Google") is a global technology conglomerate that owns the search engine Google, which was founded in 1998 by Stanford University Ph.D. students Larry Page and Sergey Brin. In 2015, the original company of Google was restructured to its current company structure with Alphabet Inc. as a holding, aiming at allowing greater autonomy to the group companies. While the company's headquarters are located in Mountain View, California/USA, Google has a global business presence through offices in South America, North America, Europe, and Asia-Pacific. Besides its original business of web search engines, Google offers a wide variety of platform products, including online mapping service Google Maps, cloud computing provider Google Cloud, and web browser Google Chrome, mobile operating system Android, and

social media website YouTube. Furthermore, it offers connected hardware solutions, such as Google Pixel smartphones and Google Nest smart home devices. Google further expanded its product offering through acquisitions, for instance those of Android and YouTube. Moreover, the company acquired a large number of start-ups focused on disruptive technologies, such as analytics, data management, and artificial intelligence. Following Evans and Gawer's (2016) typology, Google can thus be classified as an integrated platform. In fiscal year ("FY") 2020, Google reached sales amounting to USD 182.53bn, which was an increase of 12.8% compared to 2019. After deduction of costs and depreciation and amortization, Google's net income amounted to USD 40.2bn. The holding company has diverse sources of income, such as advertising, operating systems, platforms, hardware products, and subscriptions. At the end of 2020, the company had 135,301 employees. In August 2004, Google went public with an initial stock price of USD 85, increasing to USD 2,265 as of 08th April 2021. This resulted in a market capitalization of USD 1,527bn as of 08th April 2021. Furthermore, Google's brand is worth USD 207.5bn, making it the second most valuable company globally (see Exhibit VI). Larry Brin and Sergey Brin, two of Google's founders, are controlling shareholders of the holding company (Forbes, 2020; MarketLine, 2021a; Yahoo Finance, 2021a, Appendix A).

Google is an established player within the platform economy and is ubiquitous in many platform segments. The firm has a remarkable market share of almost 92% in the global search engine market, leading to a market position that Nadler and Cicilline (2020) describe as a "durable monopoly" (p. 177). Furthermore, the firm operates in eight out of the ten platform markets analyzed in Section 2.3.3., with notable market shares of 72% in mobile operating systems, 69% in online mapping, and 64% in web browsers (Exhibit VIII). Due to these large market shares, Google has been targeted by antitrust authorities several times in recent years. Multiple antitrust cases have been opened against Google, including allegations that the company exploits its market power to drive competitors out of the market (Romm, 2019). Many of the antitrust and merger control cases pertain to the market of search engines since Nadler and Cicilline (2020) alleged Google to be "immune to competition or threat of entry" (p.177), facilitated through the platform characteristics favoring the emergence of winner-take-all markets.

Amazon.com, Inc. Founded in the garage of current President, CEO, and Chairman Jeff Bezos in 1994 as an online bookstore, Amazon.com, Inc. ("Amazon") today belongs to the five tech giants, offering a wide range of business-to-consumer and business-to-business platform services globally. The firm is headquartered in Seattle, Washington/USA, and employed 1,298,000 people by the end of 2020, which was an increase of 40% in just one quarter, compared to October 2020. Its business focus is placed on e-commerce, cloud computing, digital streaming, logistics solutions, and artificial intelligence. Amazon started as an online marketplace and grew from this core business into many adjacent and unrelated markets over the last few years. Many of these market entries were facilitated through acquisitions of companies, such as video streaming service Twitch and audiobook and podcast provider Audible. Following the framework of Evans and Gawer (2016), Amazon thus

evolved from a transaction platform into an integrated platform. Amazon provides a variety of third-party products to its customers through its e-commerce channel, e.g. books, apparel, home and garden tools, and toys. Moreover, it also offers own-branded electronic devices, such as Fire tablets, Kindle e-readers, Echo devices, and Fire TV sticks. In addition, it sells a membership program named Amazon Prime, which has more than 100m subscriptions worldwide. In 2020, the total revenue of Amazon amounted to USD 386.06bn and its net income to USD 21.3bn, the latter representing an increase of almost 50% compared to 2019. Broken down on a business segment level, the largest turnover share was contributed by North America (USD 236.3bn), followed by International (104.4bn) and cloud computing platform Amazon Web Services (USD 45.4bn). Between becoming publicly listed in May 1997 and April 2021, Amazon's stock price has increased from USD 18 to USD 3,299, resulting in a current market capitalization of USD 1,661bn. The firm's brand value is also among the highest in the world at USD 135.4bn, placing it on rank four globally (Exhibit VI). At the beginning of February 2021, it was announced that founder Jeff Bezos would retire as the CEO and that this position will be filled by Andy Jassy, who is currently in charge of Amazon Web Services, in the third quarter of 2021. Due to its shareholdings in Amazon increasing drastically in value over the past years, Jeff Bezos is reported to be the wealthiest man worldwide as of 09th April 2021 (Forbes, 2020, 2021; Haselton, 2021; MarketLine, 2021b; Statista, 2021f; Yahoo Finance, 2021b, Appendix B).

In its core business of online marketplaces, Amazon is the leading market participant with a market share of 39% in the US. Moreover, Amazon has a strong market position in the platform markets of cloud computing, intelligent virtual assistants, and digital advertising (Exhibit VIII). Furthermore, its video streaming service Amazon Prime Video had 117m users globally in 2020, placing it on rank two in the market after Netflix (Stoll, 2021). Thus, it is plausible that Nadler and Cicilline (2020) claim that Amazon has a "significant and durable market power in the U.S. online retail market" (p. 254), and that this dominant market position also extends into adjacent and unrelated platform markets. They further stated that Amazon serves as a gatekeeper in the online retail market and has a "monopoly power over most third-party sellers and many of its suppliers" (Nadler and Cicilline, 2020, p. 257). In the past years, there were several reports of Amazon mistreating its third-party sellers, for instance, through using third-party user data to develop own competing products, indicating that the firm might have misused its dominant market position (Mattioli, 2020; Nadler and Cicilline, 2020).

Facebook Inc. Facebook Inc. ("Facebook"), which operates the eponymous social network, was founded in February 2004 by current CEO Mark Zuckerberg along with fellow Harvard students and flatmates Andrew McCollum, Chris Hughes, Dustin Moskovitz, and Eduardo Saverin. The company is headquartered in Menlo Park, California/USA, and operates 17 data centers and 80 offices across North America, Latin America, Asia Pacific, Europe, the Middle East, and Africa. Its core business is to provide networking services through Facebook and social media services through Instagram, both allowing for personalized advertising. Facebook

has steadily grown organically as well as through acquisitions over the past years. As a result, the tech company has a diverse product offering, which encompasses messaging app Facebook Messenger, messaging service WhatsApp, and virtual reality company Oculus. As of April 2021, Facebook's social network has 2.7bn active users, of which 1.8bn users can be considered active on a daily basis (Statista, 2021b). Consequently, Facebook is the largest social networking platform in the world. In FY 2020, Facebook generated a total revenue of USD 85.97bn and a net income of USD 29.15bn. Facebook's main income source is personalized advertising on its platforms, accounting for 98% of total revenue. At the end of 2020, the firm had 52,535 employees. Facebook went public in 2012 and increased its stock price from initially USD 38 to USD 312, implying a market capitalization of USD 889.98bn as of 07th April 2021. Facebook's brand value USD 70.3bn, placing it on rank five globally (Exhibit VI). Mark Zuckerberg, one of its founders and the current CEO, acts as a controlling shareholder, owning more than 57% of voting shares. This large share in Facebook's stocks is one of the main reasons for Zuckerberg being the fifth richest man in the world (Forbes, 2020, 2021; MarketLine, 2021c; Statista, 2021b; Yahoo Finance, 2021c, Appendix C).

Exhibit VII: Key Facts GAFAM Firms

The table depicts important key facts (year of foundation, founder, country of origin, revenue and net income, number of employees, and market capitalization) of Google, Amazon, Facebook, Apple, and Microsoft.

Firm	Year of foundation	Founder(s)	Total revenue 2020 (in USDbn)	Net income 2020 (in USDbn)	Number of employees (30/12/2020)	Market capitalization (in USDbn)
Google[1,2]	1998	Larry Page & Sergey Brin	182.53	40.27	135,301	1,527.00
Amazon[3,4]	1994	Jeff Bezos	386.06	21.30	1,298,000	1,661.00
Facebook[5,6]	2004	Mark Zuckerberg & fellow students	85.97	29.15	52,535	889.98
Apple[7,8]	1976	Steve Jobs, Steve Wozniak & Ronald Wayne	274.52	57.41	147,000	2,200.00
Microsoft[9,10]	1975	Bill Gates & Paul Allen	143.00	44.30	166,475	1,951.00

Sources: [1]MarketLine (2021a), [2]Yahoo Finance (2021a), [3]MarketLine (2021b), [4]Yahoo Finance (2021b), [5]MarketLine (2021c), [6]Yahoo Finance (2021c), [7]MarketLine (2021d), [8]Yahoo Finance (2021d), [9]MarketLine (2021e), [10]Yahoo Finance (2021e)

Even though Facebook was founded only 16 years ago, the company today has a "monopoly power in the market for social networking" (Nadler and Cicilline, 2020, p. 134). The underlying rationale is that Facebook has an "unassailable position in the social network market for nearly a decade" (p. 134) despite significant technological changes and market developments (Nadler and Cicilline, 2020). Facebook's total share in the global market of social networks and social media amounted to 45% in January 2021, driven by

Facebook and Instagram. Moreover, it held a market share of 25% in the US market for digital advertising (Graham, 2021; Statista, 2021b; Exhibit VIII). The UK Competition & Markets Authority stated that Facebook has "significant market power in digital advertising" (p. 211), mostly due to strong network effects in the social network and social media markets (Competition & Markets Authority, 2021). Thus, it can be concluded that Facebook has a strong market position in several winner-take-all markets with high entry barriers and strong network effects (Morton and Dinielli, 2020). There are several public discussions on potential misuse of this power, for instance, regarding the Cambridge Analytica scandal, in Facebook sold user data for political advertising purposes (Confessore, 2018). Despite having implemented several compliance procedures, there are still concerns regarding Facebook's data security (Fuller, 2019; Tuttle, 2019). These problems are exacerbated by Mark Zuckerberg having full control over the company as founder, CEO, and controlling shareholders, raising corporate governance issues with regard to oversight and control functions (Sozzi, 2019).

Apple Inc. Apple Inc. ("Apple") was founded by Steve Wozniak, Steve Jobs, and Ronald Wayne in April 1975, starting out with the three founders developing and selling personnel computers. Over the years, their company emerged as a multinational technology company that designs, produces, and markets mobile communication and media devices, personnel computers, as well as portable and wearable devices. In addition, Apple provides related software, accessories, services as well as networking solutions to its customers. As this creates an ecosystem of interconnected products and as the firm fulfills a market matching function, Apple can be categorized as an integrated platform company based on the typology of Evans and Gawer (2016). The product portfolio of the firm includes their flagship products, such as iPhone, iPad, and Mac, with the corresponding operating systems iOS and macOS, as well as services, such as AppleCare and Apple Pay. The company sells its products via digital and physical stores in North America, Europe, the Middle East, and Asia-Pacific. Currently, its headquarters are located in Cupertino, California/USA. By the end of 2020, the firm had 147,000 employees. Apple went public in December 1980, starting with an initial stock price of USD 22, which increased to USD 130.78 (as of 09th April 2021) over the years. This results in a market capitalization of USD 2,200bn as of 08th April 2021. In FY 2020, Apple generated a total revenue of USD 274.52bn and a net income of USD 57.41bn, entailing a net margin of 20.9%. Broken down into products, the iPhone contributed the highest share (50%) to the total revenue in 2020. From a geographic perspective, the USA is still the key market for Apple, accounting for approximately 45% of the overall revenue, followed by Europe contributing 25% to the total turnover. Because of its successful business model and well-known brand, Forbes considers Apple as the most valuable brand in the world at USD 241.3bn (see Exhibit VI). After one of the founders, Steve Jobs, died in 2011, the former Chief Operating Officer ("COO") of the company became CEO and still holds this position (Forbes, 2020; MarketLine, 2021d; Statista, 2021g; Yahoo Finance, 2021d, Appendix D).

With regard to the ten platform markets presented in Section 3.3.3., it can be observed that Apple operates in five of them, underlining its wide-ranging presence and significant influence in the platform economy. The company has its highest market share in intelligent virtual assistants (31%), followed by mobile operating systems (27%) and web browsers (19%); the share in mobile app stores could not be determined but is likely to be significant as well (Exhibit VIII). According to Nadler and Cicilline (2020), Apple has a "significant and durable market power in the market for mobile operating systems and mobile app stores" (p. 333) and also serves as a gatekeeper in these markets by restricting access to third-party platforms. Due to these restrictions, Apple even has a "monopoly power over software distribution on iOS devices" (p. 335), being exacerbated through its tendency towards winner-take-all markets (Nadler and Cicilline, 2020). Several countries charged the firm with antitrust violations, e.g. the European Union has recently claimed that it is an unfair practice to require rival music streaming apps to use Apple's in-app payment system (Schechner, 2021).

Exhibit VIII: Market Share of GAFAM in Platform Markets

The figure displays the market share of Google, Amazon, Facebook, Apple, and Microsoft in different markets. The data is based on the most reliable information available and partly refers to the US and partly to the global share, for details see comments below.

Platform market	Google	amazon	facebook	Apple	Microsoft	Total
Search engines[1]	87%	/	/	/	7%	**94%**
Online marketplaces[2]	/	39%	/	/	/	**39%**
Social networks & social media[3]	14%	/	45%	/	/	**59%**
Mobile operating systems[4]	72%	/	/	27%	/	**99%**
Mobile app stores[5]	n/a	n/a	n/a	n/a	n/a	**n/a**
Online mapping[6]	69%	/	/	10%	/	**79%**
Cloud computing[7]	9%	32%	/	/	20%	**61%**
Intelligent virtual assistants[8]	31%	21%	/	31%	16%	**99%**
Web browsers[9]	64%	/	/	19%	3%	**86%**
Digital advertising[10]	29%	10%	25%	/	/	**64%**

Sources & comments: [1]Statista (2021a) – Global, 02/2021, desktop market share, [2]Lipsman (2020) – US, 03/2020, sales market share, [3]Statista (2021b) – Global, 01/2021, share of active users of Top17 platforms, [4]Statista (2021c) – Global, 01/2021, market share, [5]No reliable statistics available – mobile operating system number might be approximation, [6]Statista (2018) – US, 04/2018, share of monthly users of Top 6 platforms, [7]Statista (2021d) – Global, Q4/2020, market share, [8]Microsoft (2019) – Survey in US, UK, Canada, Australia, India, mid-2018, general voice assistant market, scaled to 100% to correct for use of multiple voice assistants, [9]Statista (2021e) – Global, 03/2021, market share of leading internet browsers, [10]Graham (2021) – US, 2020, share of digital ad market

Microsoft Corporation. Founded by Bill Gates and Paul Allen in April 1975 in Albuquerque, New Mexico/USA, Microsoft Corporation ("Microsoft") is the oldest of the GAFAM firms. Over the years, the company's headquarters moved to Redmond, Washington/USA, and the number of employees increased to 166,475 people by the end of 2020. The firm's business model is to develop, license, sell, and service a wide range of software products. The product portfolio encompasses operating systems, cross-device productivity applications, and server applications. Flagship products of Microsoft include the operating system Microsoft Windows, software suite Microsoft Office, web browser Internet Explorer, video game console Xbox, and notebook Microsoft Surface. As the company provides a comprehensive ecosystem of products and services in the platform economy, it can be considered an innovation platform according to Evans and Gawer (2016). The business activities have been expanded from the USA across America, Europe, Asia-Pacific, the Middle East, and Africa. The company went public in March 1986 and increased its stock price from initially USD 21 to USD 254, implying a market capitalization of USD 1,951bn as of 09th April 2021. In the mid-2000s, Microsoft started to diversify its product portfolio by acquiring large firms, including enterprise resource planning app Navision (2002), video chat software Skype (2011), and professional social network LinkedIn (2016). Over the course of FY 2020, Microsoft earned revenues of USD 143.00bn, resulting in a net income of USD 44.30bn. The company's revenue streams are classified alongside three business segments: More Personal Computing, Productivity & Business Processes, and Intelligent Cloud. The segment More Personal Computing encompassing Windows, hardware, and gaming devices, accounted for 33.7% of revenues in 2020. Productivity & Business Processes, which mainly includes Microsoft office products and LinkedIn, accounted for 32.4% of revenues and the segment Intelligent Cloud, which entails cloud solutions for private and business users, for 33.8%. From a geographic perspective, the US is the main market for Microsoft, with approximately 50% revenue share. Due to its successful business operations and strong brand, Microsoft is listed on position three in the list of most valuable firms with a brand value of USD 162.9bn (see Exhibit VI). Furthermore, one of its founders, Bill Gates, who has been considered the wealthiest person in the world for a long period, still ranks at position four of the Forbes list in April 2021 (Forbes, 2020, 2021; MarketLine, 2021e; Yahoo Finance, 2021e, Appendix E).

Microsoft is an established player within the global economy and has a large share in the market of software products. Moreover, the company plays an important role in many platform markets as it has double-digit market share numbers in cloud computing (20%) through Microsoft Azure and intelligent virtual assistants (16%) through Microsoft Cortana (Exhibit VIII). In contrast to the other GAFAM firms, Microsoft was not investigated by Nadler and Cicilline (2020) in their report. However, the market of operating systems for personnel computers can be categorized as oligopolistic since Apple (with macOS) and Microsoft (with Windows) are by far the two most powerful players in terms of market share. This also applies to the market for one of its core products, Microsoft Office, that is the leading client and server software system and makes intensive use of network effects (Nuccio and Guerzoni, 2019). In 2001, the US government opened a lawsuit

against Microsoft, accusing the firm of maintaining a monopoly position in the market of personal computing through the installation of default products and restrictions of third-party software. The district court ruled several actions unlawful monopolization and required Microsoft to open its product offering to third-party providers (Justia US Law, 2001).

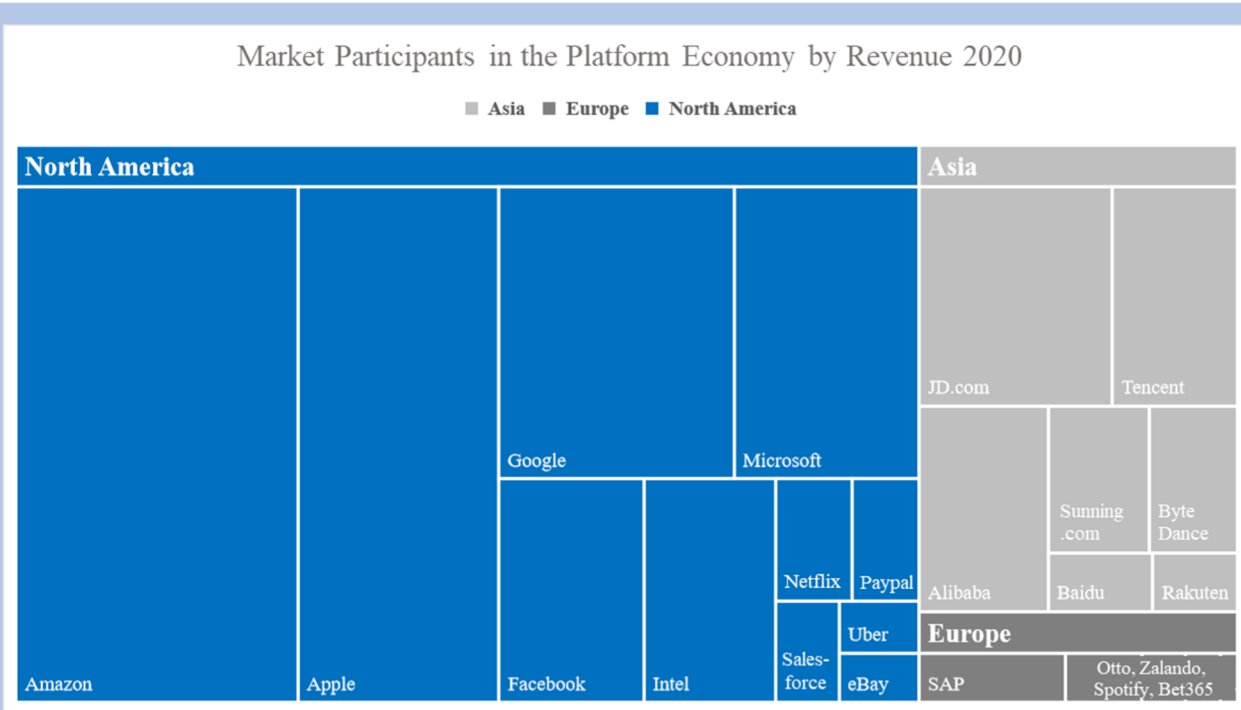
Other platform companies. As outlined in the previous sections, the GAFAM firms are the five leading players in the platform economy. However, other platform companies exist that were able to invent and scale digital business models, drive technological change, and build up significant revenue streams over the past years. The treemap in Exhibit IX shows the largest platform companies by revenue in 2020. It becomes apparent that North America is home to most platform companies, followed by Asia and Europe. The attractiveness of the North American market for platform companies is also underlined by the fact that all GAFAM companies were founded and still earn their highest revenue share in the USA (MarketLine, 2021a, 2021b, 2021d, 2021e; Nasdaq.com, 2021). Other big platform companies in the USA include streaming provider Netflix, semiconductor chip and software company Intel, and ridesharing and food delivery provider Uber. Despite the strong market position of the GAFAM firms, competitors from other countries have caught up in terms of revenue. Emerging challenger firms in Asia include e-commerce company JD.com, retail holding Alibaba, and technology conglomerate Tencent; all of them headquartered in China. Moreover, some platform companies were founded in Europe, including software company SAP, audio streaming service Spotify, and e-commerce company Zalando (Alibaba, 2021; Baidu, 2021; ByteDance, 2021; Harrison, 2021; Intel, 2021; Netflix Inc., 2021; Otto Group, 2021; PayPal, 2021; Rakuten, 2021; Salesforce.com, 2021; SAP, 2021; Spotify, 2021; Statista, 2021h; Tencent, 2021; Uber, 2021; Yahoo Finance, 2021f; Zalando, 2021). On a higher level, the treemap underlines the significant size of the GAFAM firms compared to other players. Moreover, it illustrates that the largest competitors of GAFAM in terms of revenue are located in Asia, more precisely in China (Exhibit IX).

In summary, this section has underlined the strong market position and importance of the five GAFAM firms, not only in the platform economy but also in a global economic context. Combined, these firms earned a total revenue of USD 1,072bn, resulting in a cumulated net income of USD 192bn in 2020. Furthermore, they employed 1,799,311 people as of 31st December 2020 and reached a market capitalization of more than USD 8,000bn in April 2021 (see Exhibit VII and Exhibit IX). In terms of brand value, the GAFAM companies are worth more than USD 815bn, which is even higher than the accumulated brand values of the firms on rank 10 to 60 in the Forbes list (see Exhibit VI). Furthermore, it is remarkable that all GAFAM firms have their origins in the USA. In terms of market shares in the ten platform markets analyzed in Section 2.3.2., the GAFAM firms are the dominating and prevailing players as they have a cumulated market share of over 50% in at least eight of the ten markets. This is one of the reasons for several investigations of antitrust agencies with regard to GAFAM's potentially market-dominating positions. It could be the case that the extensive acquisition

activity in the past has served as a building block of the platform companies' current market power. Therefore, the next section describes, categorizes, and analyzes acquisition activity in terms of regions, industries, target characteristics, and further factors to yield a more in-depth understanding.

Exhibit IX: Market Participants in the Platform Economy by Revenue 2020

The Treemap shows the players of the platform economy which earned the highest revenues in 2020 are compares them to outline the revenue share and continent of origin difference from the GAFAM firms to remaining participants.



Source: Own depiction based on data of Alibaba (2021), Baidu (2021), Bet365 (2021), ByteDance (2021), Intel (2021), Netflix (2021), Otto Group (2021), PayPal (2021), Rakuten (2021), Salesforce.com (2021), SAP (2021), Spotify (2021), Statista (2021c), Tencent (2021), Uber (2021), Yahoo Finance (2021f), Zalando (2021)

3.2. Analysis of Acquisitions of GAFAM

This section examines the acquisition activity of the GAFAM firms in closer detail. In total, they acquired exactly 800 firms between 1975, the founding year of first GAFAM member Microsoft, and today (see Appendices F-J and Exhibit X). This large number, in combination with GAFAM's rapidly growing market share, raises the question whether the acquisition activity could be positively related to their market dominating position, requiring further analysis. In order to draw a comprehensive picture of their acquisition history, the following steps of analysis are performed: First, an analysis of GAFAM's acquisition activity is conducted, incorporating quantitative (number of acquisitions; transactions per country; market relatedness) and qualitative parameters (characteristics of targets, e.g. innovative capacity and firm maturity). The objective is to obtain valuable insights with regard to which targets GAFAM firms typically acquire and if they would fit into the profile of killer acquisitions. Thereafter, the core insights are summarized in order to support the theory development in Chapter 4.

3.2.1. Acquisition Activity by Quantitative and Qualitative Parameters

To shed light on the characteristics and development of GAFAM's acquisitions, this section analyzes how the number of acquisitions developed over time, whether acquisitions mostly pertained to related or unrelated markets, which geographic scope acquisitions covered, and whether there are any characteristics that many target firms have in common. Detailed lists of all transactions can be found in Appendices F-J.

3.2.1.1. Acquisitions by Temporal Distribution

First, it is quantitatively analyzed how many acquisitions the GAFAM firms have conducted and how their purchasing activity has evolved over time. With regard to killer acquisitions, the frequency of acquisitions is an important topic, as the likelihood that a single acquired company would have become a disruptive innovator is a "low-likelihood event" (p. 19); however, the combined impact of many potential killer acquisitions over a short time horizon most likely has a long-lasting impact on competition (Holmström *et al.*, 2019). Thus, if a market sector is subject to substantial M&A activity, it increases the potential relevance of the topic of killer acquisitions.

In total, GAFAM firms have acquired exactly 800 targets between 1987, the year of the first acquisition, and today. No transactions have occurred between 1975, founding year of oldest GAFAM member Microsoft, and 1987. Broken down by companies, most acquisitions have been conducted by Microsoft (245), followed by Google (241), Apple (122), Amazon (104), and Facebook (88). This sequence results in some peculiarities that require a closer look. At first sight, it might seem surprising that Microsoft engaged in significantly more acquisitions than Facebook; however, it needs to be taken into consideration that the former was founded in

1975 and the latter in 2004. Therefore, it makes sense to correct the number of acquisitions for the number of years in existence. When comparing the average number of acquisitions per year, Google is leading the ranking with 10.5 acquisitions per year, followed by Microsoft with 5.3, Facebook with 5.2, Amazon with 3.9, and Apple with 2.7. Google is not only by far leading this ranking but has also engaged in most acquisitions in the last 20 years. Thus, it seems likely that Google will soon overtake Microsoft as the leader in terms of the number of acquired targets (Exhibits VII and X).

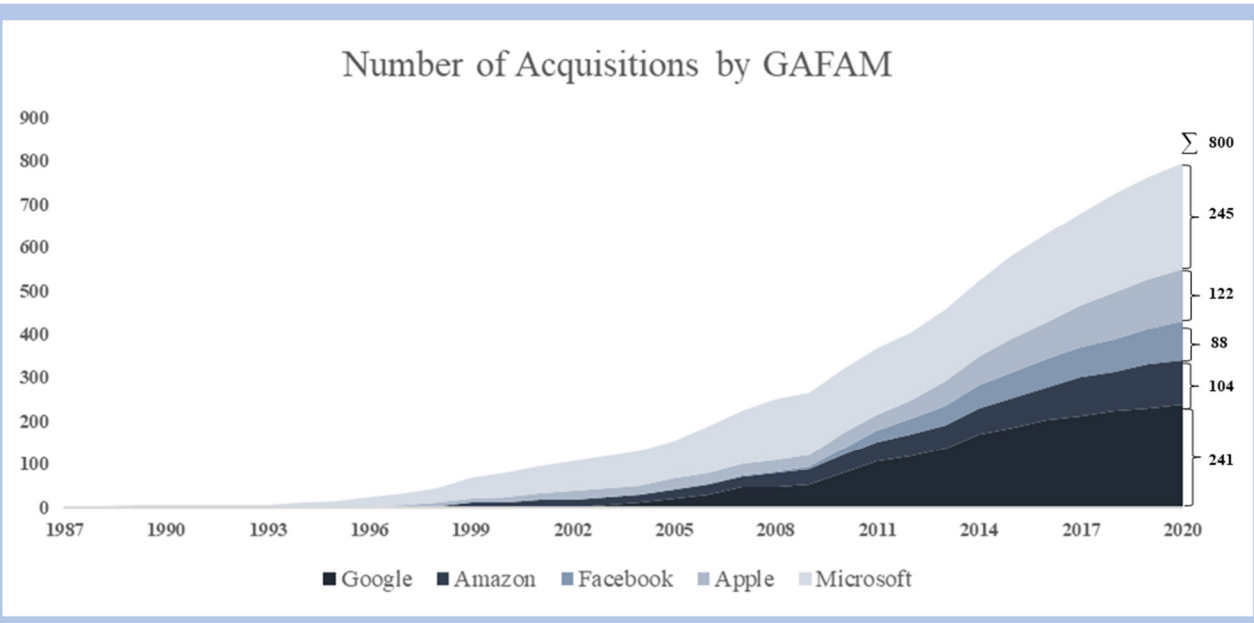
In the next step, it is evaluated if the GAFAM firms engaged in an unusually high number of acquisitions compared to companies of similar size but from different sectors. For that purpose, the acquisition activity of the firms that are positioned on rank 5 to 20 in the Forbes list of most valuable firms by brand value has been investigated. The underlying rationale is that the firms mentioned in the list are of comparable size and encompass a variety of sectors, including beverages, luxury products, entertainment, and communications. The firm selection encompasses Coca-Cola, The Walt Disney Company, Samsung, the LVMH conglomerate, McDonald's, Toyota, Intel, Nike, AT&T, Cisco, Oracle, Verizon, Visa, Walmart, and General Electric. The analysis showed that the companies within the scope purchased a total of 712 target firms until April 2021. Cisco was the most active within the companies examined, with 232 acquisitions, followed by Oracle (142 acquisitions) and Intel (101 acquisitions). These findings provide two valuable insights regarding acquisitions of the GAFAM firms, in particular in the platform economy as a whole. First, it could be confirmed that the number of 800 acquisitions pursued by the five GAFAM firms is high, as the following 15 firms in the Forbes list only acquired 712 companies combined. Second, the companies Cisco, Oracle, and Intel, which also engage in significant M&A activity, have business models that either belong directly to the platform economy or at least partly overlap with platform-based sectors. These findings further confirm the assumption that the platform economy might be an industry which members frequently make use of acquisitions, increasing the potential impact of killer acquisitions (Crunchbase, 2021i, 2021a, 2021k, 2021l, 2021m, 2021n, 2021o, 2021c, 2021d, 2021e, 2021f, 2021g, 2021h, 2021b, 2021j; Forbes, 2020).

In addition to comparing the total numbers, the paper is now taking a closer look at the timing of the acquisitions to gain further insights. Exhibit X provides an overview that depicts the cumulated number of acquisitions per GAFAM firm between the occurrence of their first acquisition in 1987 and April 2021. It can be observed for all GAFAM companies that there are differences concerning the point in time when the first acquisition after the foundation took place. Amazon, Facebook, and Google acquired firms from early on, engaging in the first transaction only a few years after entering the market themselves. Apple and Microsoft acquired firms at a later stage, having made their first purchases twelve years after their own foundation. However, it needs to be highlighted that the latter two companies were founded in earlier years before the advent of the platform economy. When examining Exhibit X, it is also remarkable that the acquisition activity increased significantly over time. More precisely, it can be observed for all companies that few acquisitions

took place after the foundation and that this number went up recently, even more so since 2010. Besides, it can be seen in Appendices F-J that, in some cases, 'acquisition waves' occurred in which several companies with a similar product or type of technology were bought in short succession. This is be elaborated on in the next paragraph. To sum up, the analysis showed that all five GAFAM firms engaged in significant acquisition activity, which they intensified in the last two decades, underlining the relevance of more in-depth analyses (Appendices F-J; Exhibit X).

Exhibit X: Number of Acquisitions by GAFAM 1987 - 2021

The graph depicts the cumulative number of acquisitions that have been conducted by the GAFAM firms in the time period 1987, the year of their first acquisition, until April 2021.



Sources: Own depiction based on data shown in Appendices F-J

3.2.1.2. Acquisitions by Market Relatedness

This section investigates whether the GAFAM firms engaged in acquisitions of targets in related or unrelated markets. Moreover, it is analyzed whether any trends in changing priorities regarding market relatedness can be observed. This topic is particularly relevant for the subsequent theory development, as market relatedness might be linked to acquisition motives. The underlying rationale is that a killer acquisition could be particularly attractive if a product overlap exists, as this would help the incumbent eliminate competing technologies (Cunningham *et al.*, 2021). However, platform markets are characterized by the abundance of integrated platforms, allowing technological buildings blocks to be recombined into novel products and services. Thus,

killer acquisitions might also occur in unrelated businesses, as incumbents could aim at preventing new business models from evolving in the first place (Evans and Gawer, 2016). This explanation was also supported by Gautier and Lamesch (2021) who found that many acquisitions in non-overlapping business areas of the platform economy led to products and services being discontinued. It needs to be noted, though, that both related and unrelated acquisitions can also be motivated by operating and financial synergies, for instance when leveraging a technological overlap to improve the existing product offering (Bena and Li, 2014).

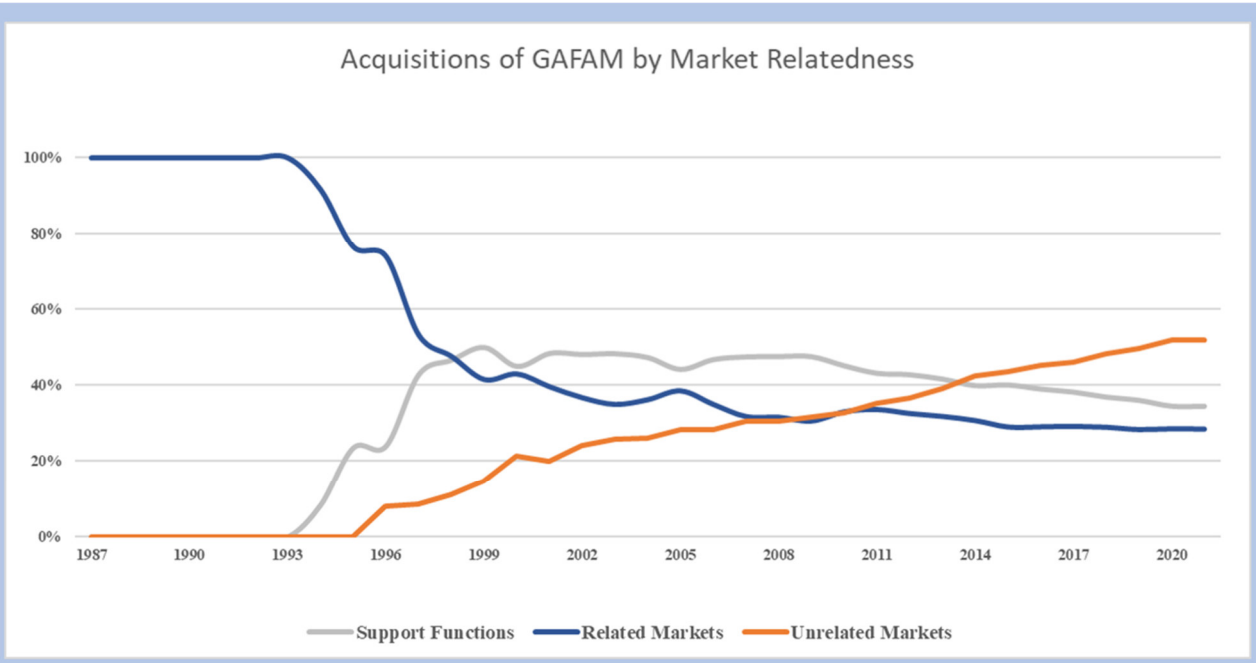
To pursue this analysis, the market relatedness is investigated alongside three classifications: related markets, unrelated markets, and support functions. The first classification, i.e. related markets, encompasses the original core businesses of the company. For instance, Google's core business is defined as the market for search engines, Amazon's core business as online marketplaces, and Facebook's core business as social networks. The second classification, i.e. unrelated markets, consists of segments that the GAFAM firm has previously not been active in. For instance, the acquisition of video live streaming service Twitch by Amazon was classified as unrelated, as it does not belong to Amazon's core business. The third classification, i.e. support functions, includes companies that serve the role of supporting the operations of the acquirer but do not offer a platform-based product themselves. A common characteristic of these firms is that they are typically not clearly assignable to one or several platform markets. An example is the acquisition of a cyber security start-up that might improve the safety of the acquirer's product offering. However, the classification should be handled with caution, as assigning some acquisitions to the previously mentioned categories was not unambiguous. Moreover, there is some leeway with regard to the delimitation of related and unrelated industries, particularly as some targets might span the boundaries of overlapping technologies. Thus, the subsequent analysis can be regarded as an approximation to the market relatedness of acquisitions but can be contested in individual cases.

When analyzing the trend of relatedness in GAFAM acquisitions, one can recognize a clear shift from related acquisitions to unrelated acquisitions over the years. In closer detail, all acquisitions were found to pertain to related markets until 1993. After that, the share of companies from unrelated markets rapidly increased so that the total share of all unrelated acquisitions exceeded 50% in 2020. Acquisitions of companies offering support functions remained relatively stable over the years, with a slightly decreasing tendency from 2008 onwards. Exhibit XI provides a detailed summary by showing the percentage of total acquisitions that each category accounted for. One potential explanation for this development could be that many of the platform companies started as transaction platforms and first focused on gaining a larger market share in the core market through purchasing competing firms and improving the product offering through buying valuable know-how. Later, most of the GAFAM firms became integrated platforms, i.e. they also offered technological building blocks for innovators to co-develop a complementary product offering. This could have incentivized the firms to acquire firms from unrelated industries to build a large platform ecosystem, spanning a host of different

services. However, the acquisition of target's from unrelated markets could also be explained by the presence of excess cash, as the GAFAM firms could have been looking for ways to use free cash flows (Iyer and Miller, 2008). The slightly decreasing share of support functions could result from the GAFAM firms already having optimized most of the processes required to safeguard smooth operations.

Exhibit XI: Acquisitions of GAFAM by Market Relatedness

The line chart below classifies acquisitions of GAFAM by market relatedness, distinguishing between acquisitions in related markets, unrelated markets, and support functions.



Sources: Own depiction based on data shown in Appendices F-J

While the acquisitions might be motivated by operating or financial synergies, as suggested in the previous paragraph, another potential explanation is linked to killer acquisitions. It could be the case that the early-stage GAFAM firms tried to purchase as many competitors in the core business as possible in order to eliminate their innovation and take over their users, aiming at becoming a market leader. As soon as the GAFAM firms had reached the status of a dominant transaction platform in their respective markets, they could have tried to expand their market power to unrelated markets through acquisitions, thereby becoming an integrated platform (Evans and Gawer, 2016). Once a company had reached significant market power in a winner-take-all market, it might have been attractive to continue acquiring tech companies from related and unrelated markets in order to preempt future competition. However, while this explanation could (partly) rationalize the acquisition

behavior of the GAFAM firms, the underlying motives cannot be determined with certainty due to the lack of a theoretical framework.

Another phenomenon that could be observed are 'acquisition waves', i.e. when the GAFAM firms entered a new unrelated market or invested in a novel technology, they often acquired several similar companies at the same time. For example, Google entered the video market between 2009 and 2011 and acquired six different companies within that time horizon, i.e. Quiksee, On2, Episodic, Global IP Solutions, Green Parrot Pictures, and Next New Networks (Appendix F). This trend of acquisition waves could indicate that GAFAM firms often take a rather aggressive approach when entering new markets by acquiring several firms in the same business. This could further improve the market position of the incumbent players, as the acquisition of many competitors from the same field in a short horizon prevents large user networks from developing and, thus, further supports the emergence of a winner-take-all market.

3.2.1.3. Acquisitions by Geographic Scope

This section analyzes the geographic scope of the 800 acquisitions executed by the GAFAM firms. The home countries of target firms are particularly interesting to investigate in order to determine whether a major objective of the acquirer is to expand the geographic reach. As outlined in Section 2.1.2.1., purchasing firms from other countries could provide an opportunity to reach a new customer base within a short time horizon (Rabier, 2017). Moreover, the analysis of the geographic scope of GAFAM's activity might yield further insights regarding the institutional environments and level of technological advancements of the target's home countries.

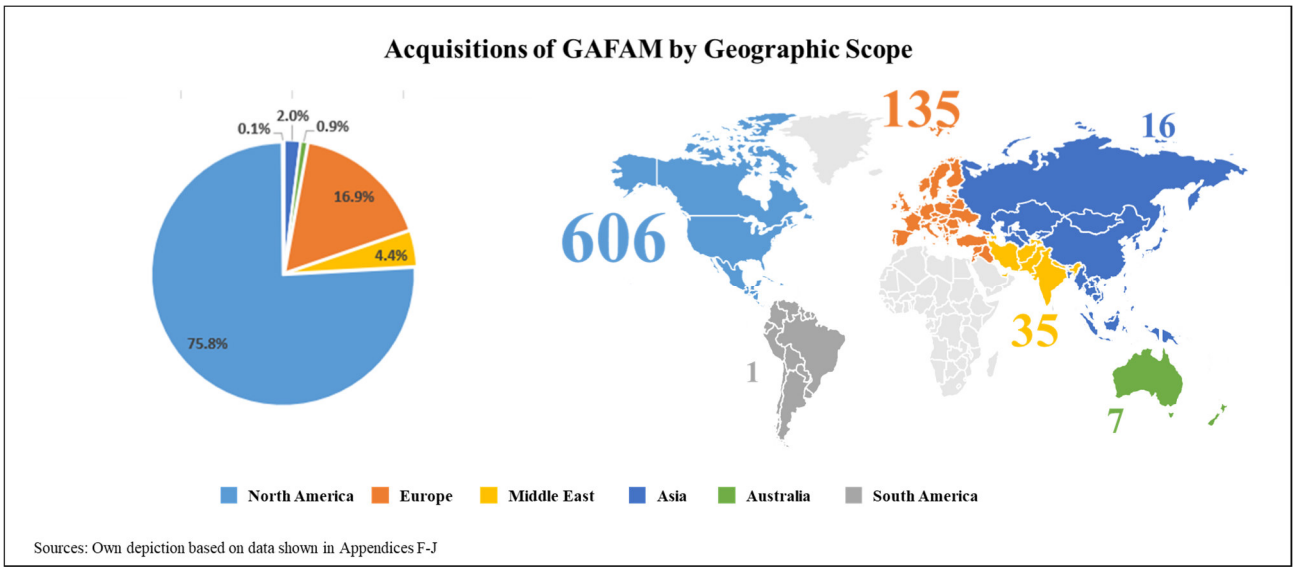
In the past, GAFAM invested in targets in six geographic regions: North America, Europe, Middle East, Asia, Australia, and South America. However, while the acquisition activity spans five continents, not a single investment has taken place in Africa. The highest number of acquisitions by far, namely 606, took place in North America. Of the acquisitions of targets located in North America, 565 can be assigned to the USA and 41 to Canada. Thus, the USA account for 70.6% of all acquisitions globally conducted by GAFAM. The second-largest share of acquisitions can be assigned to Europe, amounting to 135. These are spread across many different countries; most acquisitions occurred in the United Kingdom (49), Germany (15), France (11), Sweden (11), and Finland (9). The Middle East accounts for 35 transactions, of which 33 pertain to Israel. Surprisingly, the GAFAM firms only purchased 16 companies in the Asia-Pacific region, thereof two from China. Finally, Australia accounts for seven acquisitions and South America for one. An overview of acquisitions by geographic region can be found in Exhibit XII.

These findings provide novel insights regarding the acquisition motives of GAFAM firms. As 70.6% of all acquisitions pertained to targets in GAFAM's home country, it can be assumed that reaching user bases in

other geographic regions has most likely not been a major objective of GAFAM's acquisition strategies. In fact, almost all acquisitions occurred in countries in which the GAFAM firms already had a large market share before most acquisitions occurred. A total of 96.8% of acquisitions can be assigned to core markets of GAFAM, i.e. North America, Europe, and Israel. This raises the question whether some acquisitions might have been motivated by other strategies, such as eliminating competitors in the same geographic market to secure the already strong market position. However, it needs to be underlined that the analysis only considered the headquarters of the respective target which, in individual cases, might deviate from the most common country of origin of the user base.

Exhibit XII: Acquisitions of GAFAM by Geographic Scope

On the left-hand side, a pie chart shows the distribution of acquisitions of GAFAM by six world regions. On the right-hand side, a world map depicts the number of acquisitions per region, using the same colors as the pie chart.



Sources: Own depiction based on data shown in Appendices F-J

Moreover, the analysis allows for some more general conclusions regarding the institutional environments and level of technological advancements of the target's home countries. First, GAFAM firms prefer to acquire targets in highly developed countries, as 98.3% of target home countries were classified as "highly developed" according to the Human Development Index (United Nations Development Programme, 2020). Exceptions include acquisitions of targets located in Brazil (1), China (2), India (7), Malaysia (1), Taiwan (1), Thailand (1), and Ukraine (1). Furthermore, many acquisitions pertain to countries with a high density of tech start-ups. This might be an explanation for the high share of targets located in Israel, accounting for 33 acquisitions. Israel has set incentives in place to reduce bureaucratic burdens and attract global talent, making Israel one of the global tech start-up hubs (Bridgwater, 2020). Many countries in North America and Europe are also home to a large number of innovative start-ups, above all the USA, having created a breeding ground for tech start-

ups ahead of most other countries (Martins, Dias, and Khanna, 2016). Finally, it is noticeable that GAFAM firms acquired very few targets located in Asia, particularly China, despite their market size, technological capabilities, and central role for the platform economy. Potential reasons could include cultural differences and tight government regulations to protect domestic firms from competition. These have been found to be major contributors to failed market entries (Ghemawat, 2001; Goel, 2017, 2019; Kharpal, 2019).

The analysis has shown that GAFAM firms mostly acquire targets in geographic markets with an already large existing user base, particularly in the USA and Europe. Thus, it can be deduced that the majority of acquisitions are most likely not motivated by expanding the geographic reach. Moreover, it has been shown that most acquisitions pertain to countries with a high level of development, a large tech start-up scene, and strong institutions. Combined, these insights allow for two potential explanations: The enormous acquisition activity in existing geographic markets could be explained both by eliminating future rivals to secure the already strong market position or purchasing the best tech start-ups to improve the product offering.

3.2.1.4. Acquisitions by Target Characteristics

The last parameter investigated is qualitative and refers to common characteristics of target firms. Three factors are depicted in particular: the target's purchase price, stage in the company life cycle, and innovative capacity.

The purchase price of most acquired firms is assumed to be rather on the lower end. The reasons is that it is only publicly available for 220 of 800 companies (27.5%), indicating that nearly three quarters of transactions were below the respective notification thresholds. The reporting thresholds were outlined in closer detail in Section 2.2.3 for the EU, UK, and US, which jointly account for most acquisitions. As described, the revenue- and market share-based thresholds vary from country to country but typically do not apply to smaller firms. However, it needs to be highlighted that the purchase price could indeed be high despite low revenues in case the target is a growth firm with low revenues but high expected future potential. Of the firms with publicly available purchase prices, the average purchase price amounts to USD 788.2m. However, this number is driven by few large transactions, such as the acquisition of LinkedIn by Microsoft for USD 26.2bn or the purchase of WhatsApp by Facebook for USD 19.0m. When excluding the largest 50 transactions, the average acquisition price of the publicly available transactions amounts to USD 72.5m.

With regard to the target's phase within the company life cycle, it can be derived from an analysis of purchase prices that most of the acquisitions most likely took place in an early stage of the target's life (Appendices F-J). The underlying rationale is that the purchase prices of many transactions are not publicly available, indicating that the prices were below the reporting thresholds of the respective legislations. Since platform markets lean towards winner-take-all markets, facilitating strong growth of successful players, one might argue that a low purchase price could be related to an early company stage (Nadler and Cicilline, 2020; Schilling,

2002; Stigler Center, 2019). However, it needs to be stressed that there are exceptions to the low purchase prices and that the relationship between purchase price and company stage is highly uncertain (Appendices G and H). Supporting these assumptions, some studies have found that the targets purchased by GAFAM companies were indeed largely in early market stages. For example, Argentesi et al. (2019) found that the median ages of the targets of Amazon, Facebook, and Google were all under 6.5 years (Argentesi et al., 2019; Gautier and Lamesch, 2021; Appendices F-J).

Finally, it can be derived from Appendices F-J that the vast majority of the 800 targets on the list are operating in the high-tech sector, including innovative technologies such as artificial intelligence, cloud computing, machine learning, and virtual reality. As indicated in Section 2.3.2.6., this focus on innovative technologies combined with their application fields in the platform industry most likely entails that the targets have a large inherent innovative capacity (Crémer *et al.*, 2019). However, there are very few exceptions with regard to the high-tech focus, for instance Facebook's purchase of the Facebook.com domain name and Amazon's acquisition of book publisher Westland. Gautier and Lamesch (2021) confirm that the GAFAM firms engage in extensive acquisition activity in high-tech sectors, especially data-driven ones.

In summary, it has been found that GAFAM firms most likely acquire the majority of targets with a purchase price below USD 100m, in an early stage of the firm life cycle, and with a high innovative capacity.

3.2.2. Summary of Core Findings

The preceding analysis provides insights into the temporal development, industry relatedness, geographic scope, as well as target characteristics regarding acquisitions of GAFAM companies. Furthermore, some conclusions about their underlying motives can be derived. First, GAFAM firms have acquired a total of 800 target firms between 1987 and 2021, significantly more than companies of comparable size that are active in non-platform industries. Furthermore, the GAFAM firms' increased acquisition activity over the past years temporally correlated with them reaching a stronger market position. While this does not necessarily imply a causal relationship, it underlines the potential relevance of killer acquisitions in the platform economy. Second, it can be observed that GAFAM firms shifted their focus from acquisitions in related markets to those in unrelated markets. This development temporally coincides with many GAFAM firms developing from a sole transaction platform to an integrated platform with an ecosystem of interconnected technologies. Third, 96.8% of acquisitions occurred in countries in which the GAFAM firms already had a large market share, indicating that reaching new user bases in untapped geographic markets has most likely not been a major driver of acquisitions. Fourth, the analysis indicated that the majority of targets had a value below USD 100m, were in an early stage of the company life cycle, and contained a high innovative capacity. These characteristics seem to match those that one could expect in a killer acquisition, as outlined in Section 2.2.2., but again do not allow for conclusions regarding a potential causal relationship.

Combined, the analysis has shown that the GAFAM firms acquired an increasing number of innovative, early-stage companies which are located in existing geographic markets and mainly operated in unrelated product markets. This particular combination of market and target firm characteristics in winner-take-all markets with high entry barriers and switching costs most likely strengthened the market position of the incumbent players. However, while these findings indicate that killer acquisitions could indeed play a certain role in the platform economy, they do not allow for unambiguous conclusions regarding their presence due to the lack of an applicable theoretical framework. Therefore, the next section summarizes how empirical studies and policymakers assess the acquisition activity of the GAFAM firms.

3.3. Assessment of Researchers and Policymakers

After having analyzed the acquisition activity of the GAFAM firms in closer detail, this final section summarizes how researchers and policymakers assess the acquisition activity of the GAFAM firms. Due to the novelty of the research on killer acquisitions and lack of a theoretical framework, no reports of governmental agencies or empirical studies explicitly answer the questions whether the GAFAM firms engaged in killer acquisitions. However, the study of Gautier and Lamesch (2021), dealing with the question of discontinued products of GAFAM's target firms, as well as reactions of policymakers, are briefly outlined in order to provide an overview of the current assessment of GAFAM's acquisition activity by researchers and policymakers.

Researchers. Even though the topic of killer acquisitions, particularly in combination with extensive acquisition activity in the platform industry, is increasingly gaining attention from researchers, only one study could be found that focuses specifically on GAFAM's acquisition activity. Gautier and Lamesch (2021) investigated a total of 175 acquisitions by the GAFAM firms between 2015 and 2017, encompassing small start-ups as well as large transactions, to determine whether the product of the target was discontinued after the transaction. The authors have found that a total of 60% of the targets' products disappeared from the market after the transaction. However, the study of Gautier and Lamesch (2021) does not allow for a distinction between the underlying motives. The authors hypothesize that potential reasons include lack of commercial success or product functionality, a main interest in the assets or R&D capabilities in the target firm, or a killer acquisition. Nevertheless, due to extensive acquisition activity of the GAFAM firms in combination with the large share of product discontinuation, the authors of the study recommend that antitrust authorities should scrutinize tech acquisitions more thoroughly. They argue that two reasons led to a too narrow focus of antitrust policy: First, the target companies were often too small to reach the notification threshold and, therefore, did not evoke competitive concerns. Second, the acquired targets developed products that were not overlapping with the core market of the acquirer. Therefore, despite the target's potential market power in its core market, the acquisitions were classified as conglomerate acquisitions and were not further investigated by authorities (Gautier and Lamesch, 2021). Several researchers, despite not being able to classify killer acquisitions, are also calling for a revision of the existing antitrust legislation to account for acquisitions aimed at eliminating future rivaling innovation (Bryan and Hovenkamp, 2020a, 2020b; Fayne and Foreman, 2020; Katz, 2021; Letina *et al.*, 2020; Šmejkal, 2020).

Policymakers. In Section 2.2.3., the current merger control and antitrust legislation in the EU, UK, and US has already been outlined. Several politicians have argued that the current legislation does not fulfill its objective to prevent anticompetitive acquisitions in the platform economy. In the EU, Margrethe Vestager, the European Commissioner for Competition, has frequently voiced concerns over GAFAM acquiring smaller technology start-ups. In the American Bar Association antitrust conference in March 2021, Vestager highlighted that "we have an increasing unease with the kind of transactions that we're discussing here where you have a really big

company acquiring a much smaller player that generates little or no turnover", continuing that she believes these transactions could have a strong adverse effect on competition in the platform economy (White, 2021). As several policymakers share her view, the EU is currently considering to implement stricter antitrust and data policy legislation (Drozdiak, 2020; The Economist, 2020). The UK has recently implemented stricter antitrust rules for enterprises from certain business sectors, including AI, quantum technology, and cryptographic authentication (Competition & Markets Authority, 2018; McIver and Heemsoth, 2021). Even though not all platform markets are covered by these new regulations yet, the increasing focus on the impact of acquisitions on innovation could lead to an extension of the current rules (Furman *et al.*, 2019; House of Lords' Select Committee on Communications, 2019). Finally, the topic of killer acquisitions also receives increased awareness in the US. In October 2020, the Democratic majority staff published a report suggesting that dominant platform companies could be prohibited from entering adjacent businesses through acquisitions, that platforms could be required to ensure compatibility with third-party providers, and that the burden of prove that an acquisition does not hurt competition could be laid on the acquirer (Nadler and Cicilline, 2020). Several other politicians and government agencies have called for similar reforms (Federal Trade Commission, 2018, 2019; Holmström *et al.*, 2019; United States Senate Judiciary, 2019).

Summary and outlook. In summary, this chapter has shown that the GAFAM firms have significant market power in the platform economy, engage in an unprecedented level of acquisition activity, and evoke increasing attention from researchers and policymakers. However, while there are clear indications that some of GAFAM's acquisitions might be killer acquisitions, e.g. Gautier and Lamesch's (2021) finding that 60% of products are discontinued, it is difficult to rationalize the motives ex-post due to the lack of a theoretical framework. In particular, it proves challenging to distinguish between GAFAM firms aiming at realizing operating and financial synergies on the one hand and actually 'killing' the target on the other hand. Despite these classification problems, several researchers and policymakers across the globe have urged to take action to regulate and restrict potential killer acquisitions. This has initiated legal considerations and developments, some of which have already been implemented or are in the planning stages of implementation. Finally, the findings demonstrate the topicality of the research question and the need to formulate a framework that outlines the decision-making options of technology companies regarding acquisitions of highly innovative targets in order to better classify different types of acquisitions.

4. Formulation of Theoretical Framework

After having outlined the theoretical background of killer acquisitions in Chapter 2 and having focused on the acquisition activity of the GAFAM firms in Chapter 3, this chapter proposes a novel framework to classify different types of acquisitions. First, the major findings from the previous chapters are outlined to specify the existing research gap. After that, it is hypothesized how the innovative capacity of a platform company develops over its lifetime, delimiting four distinct lifecycle phases. Based on these assumptions, it is further theorized during which of these phases a killer acquisition can be expected and which ramifications this timing has for the innovative capacity of the target firm. It is subsequently postulated that the innovative capacity of the target at the time of the acquisition can be divided into its present and future innovative capacity, giving the acquirer two distinct choices. Based on these choices, four different types of acquisitions are mapped out. Finally, the influence of product market overlaps on the likelihood of killer acquisitions as well as competitive dynamics are examined.

4.1. Research Gap

The previous sections have shown that prior research on traditional acquisition motives is deeply rooted in a pre-digital economy and focuses its attention with regard to adverse effects of acquisitions on post-acquisition entities reaching a dominant market position by combining two firms with a significant market share. This emphasis is also reflected in the current antitrust policy in the EU, UK, and the US, mostly relying on market share and revenue thresholds to determine whether an acquisition requires approval. The emerging literature on killer acquisitions, mainly initiated by the paper of Cunningham *et al.* (2021), impressively illustrates that the current literature and legislation do not cover a new acquisition motive, i.e. acquiring targets with the sole purpose of eliminating competing innovation and preventing rivaling business models from emerging in the first place. These killer acquisitions are radically different from acquisitions motivated by realizing operating or financial synergies, as they lead to a loss of the target's innovative capacity, worsen consumer welfare, and deteriorate the competitive environment. While killer acquisitions could negatively impact many markets, such as the pharmaceutical industry (Cunningham *et al.*, 2021), their presence is likely to be most pronounced in the platform economy. Due to their high entry barriers, network effects, and data-driven economies of scale and scope, platform markets naturally tend to develop towards winner-take-all markets. Killer acquisitions could impede the only opposing trend, i.e. disruptive innovation through challenger firms, thus cementing the incumbents' market power in the long term. These theoretical insights are supported by an analysis of the current platform economy, as the GAFAM firms have already reached dominant market positions throughout most relevant platform markets and engage in an unprecedented level of acquisition activity in related and unrelated markets.

This paper aims to develop an ex-post framework that can be used to determine whether an acquisition in the platform economy can be classified as a killer acquisition. For this purpose, the target's innovative capacity is taken as a starting point since its elimination would, by definition, motivate a killer acquisition. It is then outlined which decisions the acquirer faces regarding the target's present and future innovative potential. On this basis, a classification of different types of acquisitions is presented, and hypotheses regarding the occurrence of killer acquisitions are developed. While prior research generates valuable insights into many separate areas, such as acquisition motives, underlying decision mechanisms, and the platform industry, it does not yield such a comprehensive framework. The closest approximation is provided by Cunningham *et al.* (2021), proposing a model for killer acquisitions in the pharmaceutical industry. However, their paper is based on three underlying assumptions that do not match the characteristics of the platform economy. First, innovation is seen as a binary variable, i.e. either a product is in its development phase or it is finished and marketable. While this is undoubtedly the case for medications, most IT-driven companies continually develop their products. Thus, it could be the case that their pre-acquisition innovation might already lead to marketable products or services. Second, the model does not incorporate the value of a fully developed product for future innovation. While a marketable medication can be seen as a stand-alone product, this is clearly not the case in the platform industry, where innovation platforms regularly and intensively facilitate the development of complementary products and services on top of existing ones (Evans and Gawer, 2016). Third, the model depicts innovation as a linear process with pre-defined phases. In the platform economy, innovation is in constant evolution, less discrete, and often follows exponential tendencies (Crémer *et al.*, 2019).

4.2. Innovative Capacity of Platform Companies

The framework presented in this thesis provides a novel approach in order to increase our understanding of the dynamics, structures, and incentives that affect acquisitions in the platform economy. The basic contention is that killer acquisitions are harmful since they lead to a loss of the target's innovative capacity, i.e. its ability to deliver innovative products and services in line with the needs of the industry, thus potentially depriving consumers of new products and services (Medina and Medina, 2018). This phenomenon is also being referred to as the "innovation theory of harm" (p. 609), entailing that acquisitions can lead to the elimination of innovation and therefore negatively impact consumer choice, consumer welfare, and market competition (Holmström *et al.*, 2019). This approach is based on the paper of Cunningham *et al.* (2021) and radically differs from most traditional literature on adverse effects of acquisitions, which mainly focuses on the harmful effects of a dominant market position as a consequence of combining two entities with a significant market share (Chatterjee and Lubatkin, 1990; Eckbo, 1983). In order to shed light on the role of the target's innovative capacity in killer acquisitions, this section follows a three-step process: In the first step, the innovative capacity is defined and outlined in closer detail. In the second step, it is hypothesized how the innovative capacity is likely to develop over the target's lifespan, given the specific characteristics of platform markets. In the third step, hypotheses are developed concerning the point in time when a killer acquisition can be expected.

The innovative capacity of a target firm can be described as the sum of outputs of the firm's innovation system, i.e. "a coherent set of interdependent processes and structures that dictates how the company searches for novel problems and solutions synthesizes ideas into a business concept and product designs, and selects which projects get funded" (Pisano, 2016, p. 4). This broad definition entails that the innovative capacity does not only incorporate novel products and services but also ideas, concepts, processes, and business models. Compared to innovation in linear markets, platform innovation is less discrete, i.e. technologies can be recombined for new business ideas, less structured, i.e. phases of development, implementation, and testing occur simultaneously, and in constant evolution, i.e. new products and services continually emerge (Crémer *et al.*, 2019). The innovative capacity of firms is an overarching driver of platform markets, as innovation platforms allow to build new technologies on top of existing ones, facilitating co-creation, co-development, and co-evolution (Evans and Gawer, 2016). Consequently, the innovative capacity of platform companies is of paramount importance to support the enhancement of the existing product offering, facilitate cost reductions, and allow for the development of disruptive business models (Furman *et al.*, 2019).

After having acknowledged the value of target firm's innovative capacity, the question arises how it might develop over a firm's lifetime. This paper hypothesizes that the innovative capacity follows a similar pattern to the products in Vernon's (1966) lifecycle model: In the beginning, the firm is founded from scratch and slowly builds up innovative capabilities, then its innovation increases exponentially, and finally, it declines once the firm's offering is matured. The underlying rationale is that Wernerfelt (1984) observed that the firm's

products, on the one hand, and its resources and capabilities, on the other hand, are two sides of the same coin and thus concluded that resources and capabilities must also have comparable, recognizable lifecycle stages. This view is also supported by Helfat and Peteraf's (2003) model of "capability lifecycles", i.e. the idea that the development of a capability follows a similar lifecycle as the development of a product, whereby previously developed capabilities can be recombined and redeployed to develop new capabilities. The exponential growth of innovative capabilities can be explained by relying on Nonaka's (1994) framework, outlining knowledge development from the perspective of the knowledge-based view. He illustrated that the process of knowledge-sharing leads to an integration of new ideas into the organizational knowledge base. Thus, each new unit of knowledge accelerates the development of future novel ideas, leading to a self-reinforcing cycle. This development is likely to be exacerbated in the platform economy, as its tendency towards winner-take-all markets implies that one single company can often serve as an innovation platform, inviting other innovators to develop new products and services on top of existing technological buildings blocks, all within the ecosystem of the market leader (Evans and Gawer, 2016).

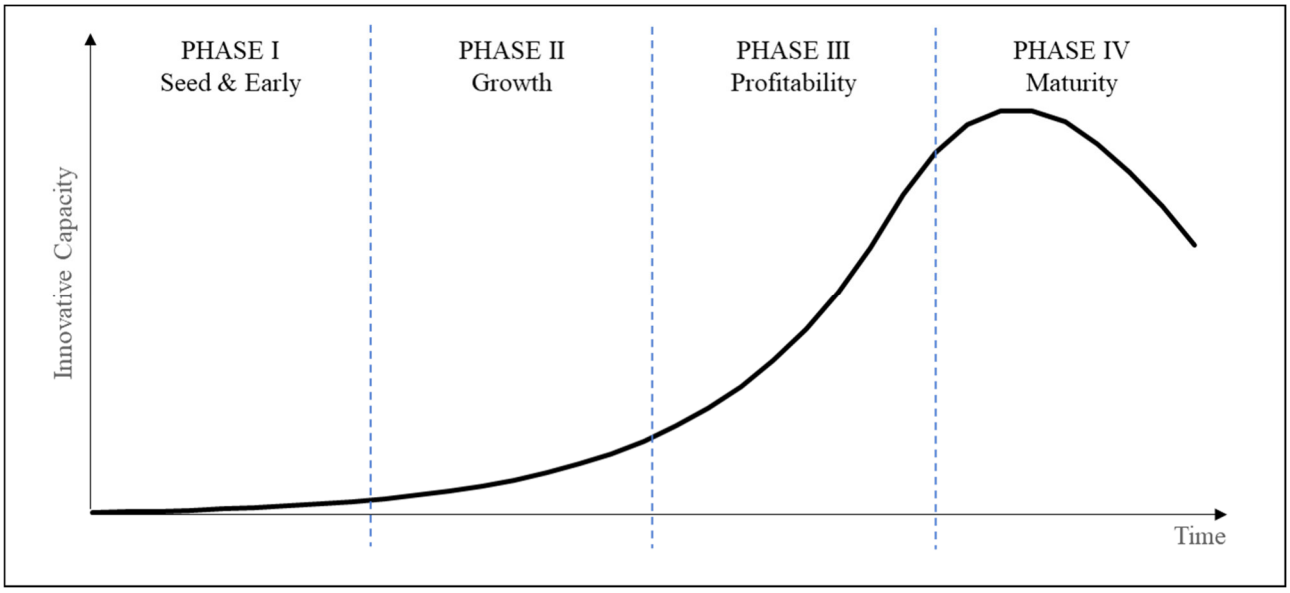
> *Proposition 1: The development of a platform company's innovative capacity follows distinct lifecycle stages that mirror Vernon's (1966) product lifecycle.*

Exhibit XIII shows an archetypical development of a platform company's innovative capacity over its lifetime, divided into four phases. In Phase I, the company is founded from scratch based on a novel business idea. This phase encompasses early product development, testing of prototypes, and market research. The innovative capacity of the firms slowly builds up through forming the organizational knowledge base (Nonaka, 1994). Many firms start as transaction platforms, aiming to serve as matchmakers between different groups of people (Evans and Gawer, 2016). In Phase II, a marketable product or service exists and is scaled to reach a growing number of customers. This allows for direct network effects and data-driven economies of scale, accelerating the generation of new knowledge. In Phase III, the firm reaches profitability within the core business by establishing a large user base and expanding into unrelated business areas, evolving into an integrated platform with its own technology ecosystem (Evans and Gawer, 2016). On top of the firm's technological building blocks, new innovators can co-create and co-develop complementary products and services, further accelerating the growth of the firm's innovative capacity through knowledge-sharing (Nonaka, 1994). Even though these innovators might technically not be part of the organization, the high market power of the firm, fueled by high switching costs and data-driven economies of scale and scope, enables it to set the rules within the platform ecosystem. In Phase IV, the firm is fully matured and typically holds a significant degree of market power in its platform markets. New technological, regulatory, or macroeconomic developments, e.g. a forced breakup of the firm (Mims, 2020) or a technology ban (Keane, 2021), might fundamentally disrupt the market and initiate the slow decline of the platform company.

However, it needs to be stressed that there are significant variations to be expected across the lifecycles of individual platform companies. Most importantly, only a tiny share of companies goes through all company phases since competitive forces drive firms out of the market prematurely. Reaching a dominant market position in a winner-take-all market is a "low-likelihood event" (Holmström *et al.*, 2019, p. 19), surrounded by a high degree of uncertainty.

Exhibit XIII: Innovative Capacity Lifecycle of Platform Companies

The graph depicts an archetype development of the innovative capacity of a platform company. The innovative capacity follows a similar pattern as products in Vernon's (1966) lifecycle model: In the beginning, the firm is founded from scratch and slowly builds up innovative capabilities that result in an emerging transaction platform, then its innovation increases exponentially as the firm develops towards an integrated platform with a technology ecosystem, and finally, it declines once the firm's offering is matured.



4.3. Timing of Killer Acquisitions

Now the question arises at which point in time a killer acquisition is likely to occur. As previously stated, the underlying motive of a killer acquisition is to eliminate the target's innovative capacity to preempt future competition. Thus, one major determinant of acquisition timing is the degree to which a target represents a competitive threat to the acquirer. It can be argued that a challenger firm becomes a likely competitor for incumbents as soon as it reaches Phase III of the lifecycle, providing it with sufficient resources to expand into unrelated business areas, thereby becoming an integrated platform with a technology ecosystem. This could pave the way for creating a monopoly in winner-take-all markets, threatening the market position of incumbents. Thus, a killer acquisition is likely to occur in Phase I or Phase II of the target's lifecycle as this allows the incumbent to protect his market position.

> *Proposition 2: A killer acquisition most likely occurs in Phase I or Phase II of the target's lifecycle, i.e. before the target reaches the status of an integrated platform and thus becomes a competitive threat to the acquirer.*

The exact point in time to be expected most likely varies from firm to firm and depends on target-specific determinants, e.g. network size, switching costs, economies of scale, technology readiness, expected purchase price development, access to financial resources to scale the business, and the chance of survival, as well as macroeconomic determinants, such as antitrust regulation and public interest. However, in general, it can be assumed that most acquisitions – at least those of promising challenger firms – occur in earlier company stages within Phase I and Phase II due to the lower purchase price, which both entails fewer antitrust measures, particularly if the price is below the notification threshold, and lower expenses for the acquirer. Even though the preceding analysis of GAFAM's acquisition activity does not allow for any conclusions regarding the presence of killer acquisitions, it was noticeable that the purchase price of three quarters of acquired targets was below the notification threshold of the respective institutional environment (Section 3.2.1.4.).

In order to illustrate the proposed framework, it is now assumed that an acquirer purchases a target in its growth phase at t=0. However, it needs to be noted that the dynamics and structures presented can also be applied to acquisitions at different company stages. The *total innovative capacity* of the target can now be divided into its *present innovative capacity*, i.e. the sum of outputs of the firm's innovation system up to the point of the acquisition, and its *future innovative capacity*, i.e. the sum of outputs of the firm's innovation system that it would have developed in the future if no acquisition had taken place. While the present innovative capacity is known at the time of the acquisition, the future innovative capacity cannot be determined ex-ante and is subject to a high degree of uncertainty.

Exhibit XIV illustrates an archetypical development of a platform company going through all four lifecycle phases, i.e. developing towards an integrated platform with a large technology ecosystem, spanning across various platform markets. Even though it is a "low-likelihood event" (Holmström *et al.*, 2019, p. 19) that a

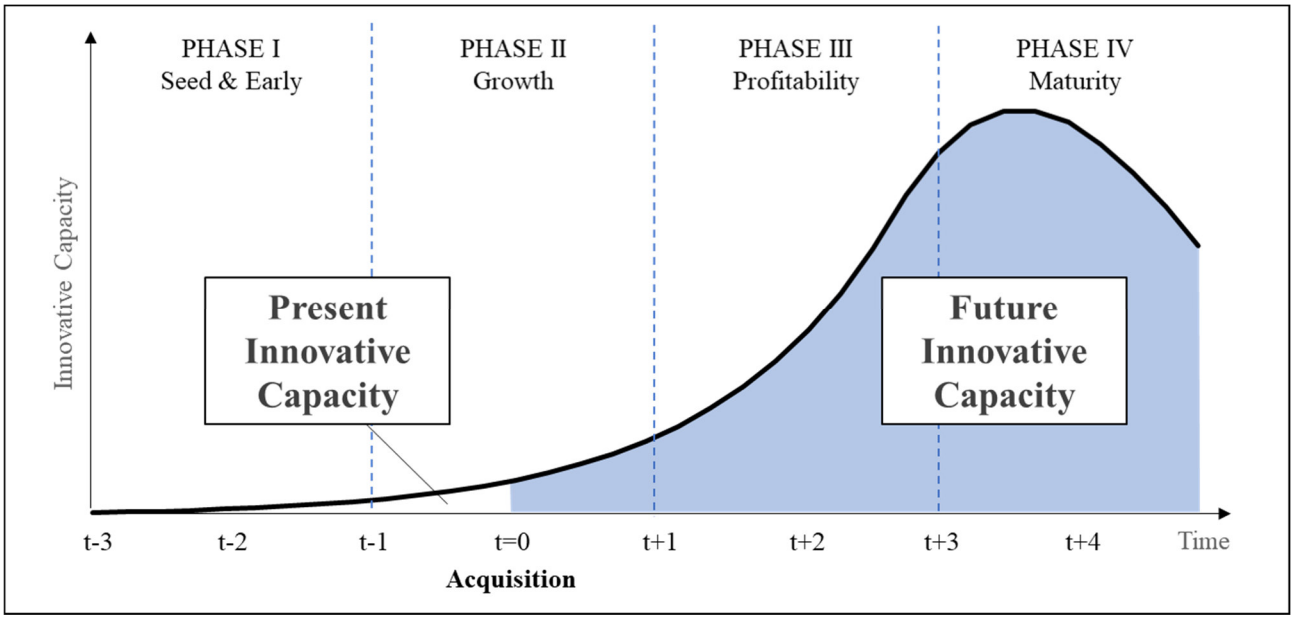
target reaches such a dominant market position, this archetype strikingly illustrates that the future innovative capacity can significantly exceed the present innovative capacity in scale. Due to the exponential growth trend in developing innovative capacity, the future innovative capacity can be substantial in scale even if the target does not cover all four lifecycle stages, e.g. through a premature bankruptcy. In other words, when evaluating a potential killer acquisition, it does not suffice to focus on the products and services that the target has already developed, but it is vital to incorporate the firm's future innovative potential in the analysis. Furthermore, it can be deduced that the earlier an acquisition of a platform company occurs, the more significant the relative proportion of the future innovative capacity compared to the present innovative capacity. Or, formulated differently: If an early-stage tech start-up without a marketable product or service is acquired, this does not necessarily imply that the total innovative capacity of the firm is low.

Proposition 3a: If a target with a platform-based business model is acquired, its total innovative capacity encompasses the present innovative capacity, i.e. the sum of outputs of the firm's innovation system up to the point of the acquisition, and its future innovative capacity, i.e. the sum of future outputs of the firm's innovation system that it would have developed if no acquisition had taken place.

Proposition 3b: The earlier a target is acquired, the larger (smaller) is the relative share of the future (present) innovative capacity on the total innovative capacity.

Exhibit XIV: Present and Future Innovative Capacity

The graph illustrates an archetypical development of a platform company's innovative capacity lifecycle. Assuming an acquisition occurs at t=0, the firm's total innovative capacity can be divided into its present and future innovative capacity.



4.4. Choices of the Acquirer

The previous section has shown that both the target's present innovative capacity and its future innovative capacity are important determinants that an analysis of potential killer acquisitions needs to encompass. Continuing with the previous example of a platform company acquiring a target at t=0, it is further assumed that the acquisition entails that ownership and control of the target firm are transferred to the acquiring firm (Vermeulen and Barkema, 2001). Thus, the acquirer can also decide how to deal with the target's innovative capacity, e.g. whether it is leveraged to support product innovation or eliminated to preempt competitive technologies.

After the acquisition, the acquirer faces two choices:

> Choice (1): Market or withhold the target's present innovative capacity?
>
> Choice (2): Leverage or abandon the target's future innovative capacity?

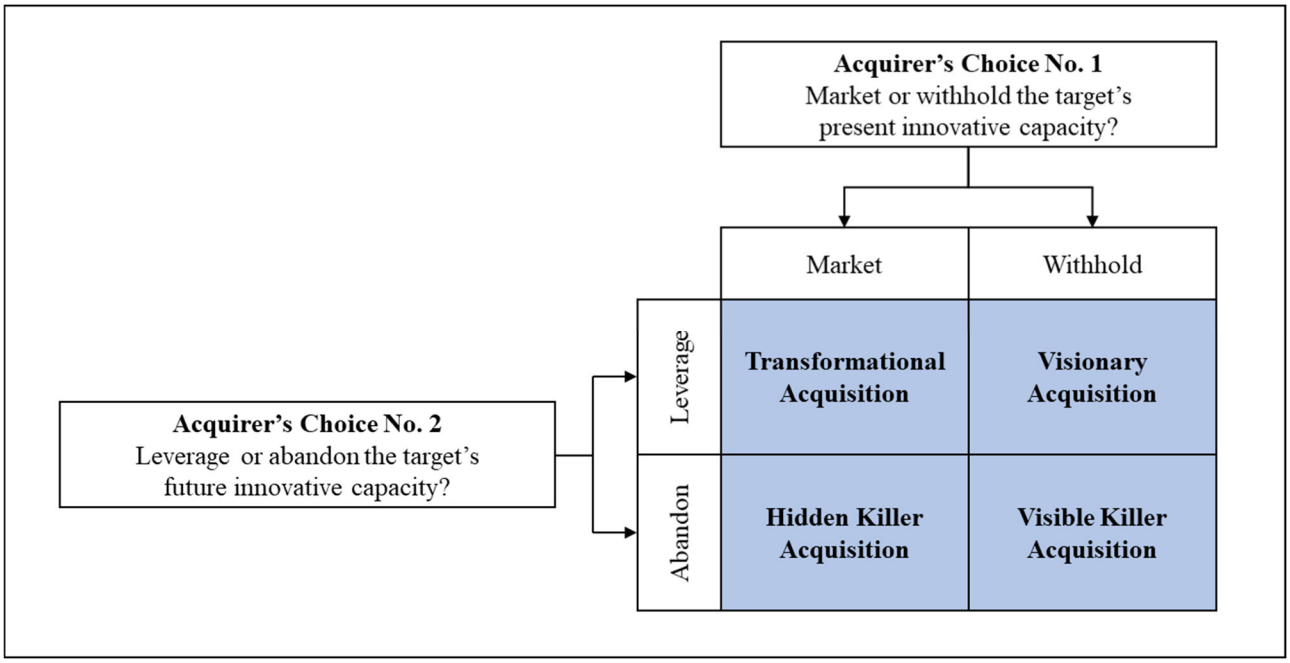
It is hypothesized that the present innovative capacity is incorporated in the target's existing products and services, e.g. an online platform, software, algorithm, or technology. The underlying rationale is that innovation in the platform industry is in constant evolution, unstructured, and characterized by co-creation and co-development, thus new products and services continually emerge and are constantly refined (Crémer *et al.*, 2019; Evans and Gawer, 2016). It is therefore considered as plausible that the firm's innovation system produces outputs that are in most cases directly integrated into emerging products, services, and technologies, entailing a fluid understanding of innovation. This is contrary to linear industries, in which innovation follows a discrete, structured process that leads to marketable products, such as the pharmaceutical industry, making it possible to distinguish between products in their development phase and finished products (Cunningham *et al.*, 2021). Moreover, it is further hypothesized that future innovative capacity can only be brought to the surface through continued research and development. Choice (1) can be categorized as a *visible signal*, i.e. external stakeholders can observe whether the acquirer brings the target's products and services to the market (or continues to offer them in case they were already on the market). Choice (2) can be categorized as an *invisible action*, i.e. external stakeholders cannot easily observe whether the acquirer leverages the future innovative capacity of the target firm, for instance through R&D investments, or discontinues its innovation.

> *Proposition 4a: At the time of the acquisition, the acquirer gains control of the target's present and future innovative capacity.*
>
> *Proposition 4b: The present innovative capacity is incorporated in the target's products and services; the future innovative capacity can be brought to the surface through research and development. This gives the acquirer two independent choices regarding the course of action related to (1) the present innovative capacity and (2) the future innovative capacity.*

Based on these two decisions of the acquiring firm, one can distinguish between four different types of acquisitions. These are outlined in the following paragraphs and are illustrated in Exhibit XV.

Exhibit XV: Classification of Killer Acquisitions

The illustration below shows the classification of four different types of acquisitions depending on two choices of the acquiring firm.



Transformational Acquisition. In a transformational acquisition, the acquirer makes full use of both the target's present innovative capacity through marketing products and services as well as its future innovative capacity through investing in R&D. This type of acquisition entirely leverages the full innovative capacity of the target, and it can thus be deduced that the transaction does not constitute a killer acquisition. Leveraging innovative capacity can spur the invention of new products and services, the advancements of the existing product offering, and the development of new business models, thereby positively impacting consumer choice and welfare. Transformational acquisitions may be motivated by the realization of operating synergies or financial synergies, such as expanding the product offering or achieving economies of scale and scope. However, while it can be concluded that a transformational acquisition does not entail a loss of innovation, it can still have adverse effects on competitive dynamics in case the post-acquisition entity seizes a large market share and misuses its pricing power.

Visionary Acquisition. In a visionary acquisition, the acquiring firm first withholds the products and services of the target firm but continues R&D investments. At first, this type of acquisition might appear like a killer acquisition since the acquirer does either not launch the products and services of the target firm or even

withdraws the existing offering from the market, sending a visible signal of (seemingly) not using the innovative capacity inherent in the target's offering. However, the acquirer continues to research and develop the technologies of the target with the objective of leveraging the innovation at a later point in time. Potential reasons for the delayed launch might include that the acquirer perceives the existing product offering of the target as premature, that additional R&D can facilitate disruptive breakthrough innovations, or that competitive catch-up is attempted to be delayed. Similar to transformational acquisitions, no innovative capacity is lost, thus not adversely impacting consumer welfare or choice in this regard. Operating synergies might be reached in the long run, e.g. through combining functional strengths, expanding the product offering, or realizing economies of scale and scope. Similar to transformational acquisitions, visionary acquisitions can still have a detrimental impact on the competitive market environment should the post-acquisition entity reach a dominant market position.

Visible Killer Acquisition. In a visible killer acquisition, the acquirer withholds the target's existing product offering from the market (or withdraws it if it has been marketed before) as well as abandons the target's future innovative capacity through bringing R&D to a halt. The signal of withholding products is visible for external stakeholders; the action of abandoning R&D is typically invisible. All innovative capacity of the firm is lost and thus, consumers are deprived of potential new products, adaptations and improvements to existing products, and novel platform-based business models that could have arisen from the target. Thus, a visible killer acquisition can be detrimental to consumer welfare and choice. Moreover, it can harm the competitive market environment, both through reducing the number of market participants and negatively impacting the incentives to innovate with new challenger firms. A visible killer acquisition is solely motivated by competitive considerations and does not entail the realization of any operating or financial synergies.

Hidden Killer Acquisition. In a hidden killer acquisition, the acquirer decides to market the target's existing products (or leaves them on the market) but at the same time discontinues future R&D investments. This type of killer acquisition is invisible to external stakeholders as the target's products continue to exist. However, the acquirer consciously lets the target firm fall behind in the market in terms of innovation in order to eliminate it as a potential future competitor. In a hidden killer acquisition, the target's present innovative capacity is preserved, but its future innovative capacity is lost. As shown in Exhibit XVI, the future innovative capacity might be significant in scale. Thus, a hidden killer acquisition could deprive consumers of new products and business models and is likely to negatively impact consumer welfare and choice. Furthermore, the market competition can be adversely affected, both directly through eliminating a potential future rival and indirectly through reducing the incentives to innovate in the first place. Since platform-based business models heavily rely on continuous innovation, discontinuing R&D is likely to render the target's product offering irrelevant, thus most likely, no operating and financial synergies can be realized in the long run.

4.5. Product Market Overlap

A central question related to killer acquisitions is if a product market overlap between acquirer and target influences the likelihood of a killer acquisition. Regarding the pharmaceutical industry, Cunningham *et al.* (2021) have observed that killer acquisitions occur more frequently if the acquirer and the target have an overlapping product portfolio. The underlying rationale is that that the acquirer has a higher incentive to protect his market position if the target attracts similar customers with a product offering in the same segment. These dynamics are likely to be more complex in the platform economy due to its specific market characteristics. Most importantly, platform markets are subject to a strong, data-driven interconnectedness across segments as well as significant economies of scale and scope, favoring the emergence of winner-take-all markets.

In order to develop assumptions with regard to the impact of product overlap between acquirer and target on the likelihood of killer acquisitions, the focus is first placed on the markets that platform companies cover over their lifetime. Nagji and Tuff (2012) distinguish between three different types of innovation ambitions: core, adjacent, and transformational. They further characterize core innovation as optimizing the existing product offering, adjacent innovation as expanding into similar markets, and transformational innovation as breakthrough developments in unrelated markets (Nagji and Tuff, 2012). Due to the specific characteristics of the platform economy, mainly the high upfront costs to enter new markets and its tendency to develop towards interconnected winner-take-all-markets, it is hypothesized that platform companies are likely to follow a similar innovation strategy over their lifetime. As shown in Exhibit XVI, most companies start in a certain core market, e.g. social networks or online marketplaces, primarily due to the high upfront costs for the technology development and high entry barriers, requiring firms to focus their resources and capabilities on a specific market. As soon as firms build a large user base and reach the growth phase, they focus on improving and extending the current offering through adjacent innovation, such as additional functionalities. Those companies that develop an integrated platform with a technology ecosystem and reach the profitability phase are active across many different markets, leveraging significant data-driven economies of scale and scope and network effects in order to reach a dominant market position. Innovators inside and outside the organization contribute transformational innovation through co-creating and co-developing complementary products and services on top of the firm's technological buildings blocks.

> *Proposition 5: Platform companies focus their innovation efforts on their core product offering in Phase I, extend it to encompass adjacent innovation in Phase II, and further broaden their scope to include transformational innovation in Phase III of the Innovative Capacity Lifecycle.*

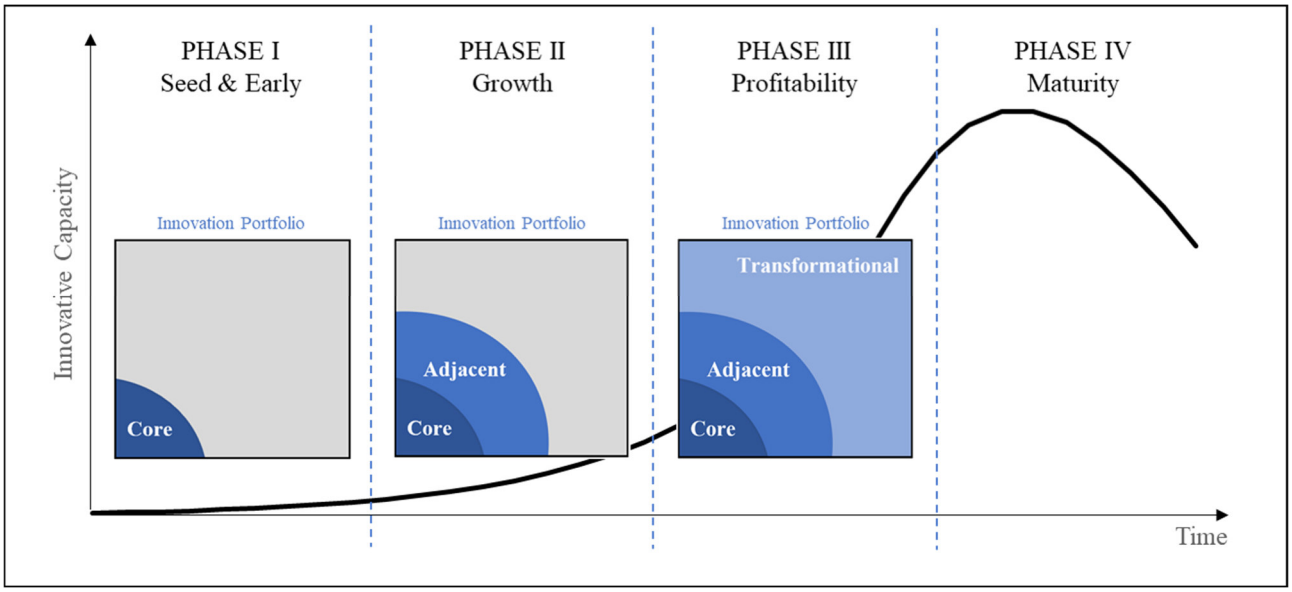
These hypotheses regarding the innovation strategies of platform companies have direct ramifications on the likelihood of killer acquisitions. It is further hypothesized that companies have indeed a higher incentive to eliminate competitors if they attract similar customers with a product offering in the same markets, as proposed by Cunningham *et al.* (2021) with regard to the pharmaceutical industry. This entails that killer acquisitions

can be expected in core markets of Phase I acquirers, core and adjacent markets of Phase II acquirers, and core, adjacent, and transformational markets of Phase III acquirers. The underlying rationale is that platform companies focus their killer acquisition efforts on those competitors that could directly attract the same customer base in the respective markets, protecting the existing network effects and economies of scale and scope. However, it needs to be maintained that a killer acquisition requires significant financial resources, rendering an acquisition from an earlier-stage acquirer less likely. Moreover, it needs to be underlined that the product market overlap could also be related to a technological overlap, thus an acquisition can also be motivated by realizing operating synergies (Bena and Li, 2014). Even though the preceding analysis of GAFAM's acquisition activity in Section 3.2.1.2. does not allow for any conclusions regarding the existence of killer acquisitions, one could observe a trend from related to unrelated acquisitions as these firms went through Phase I to III of the Innovative Capacity Lifecycle.

> *Proposition 6: Killer acquisitions are more likely in core markets of Phase I acquirers, core and adjacent markets of Phase II acquirers, and core, adjacent, and transformational markets of Phase III acquirers.*

Exhibit XVI: Innovation Portfolio of Platform Companies over their Lifetime

The illustration below shows the classification of four different types of acquisitions depending on two choices of the acquiring firm.



4.6. Competitive Dynamics

The previous framework was based on the assumption of single agency, i.e. one acquirer purchasing one target firm. However, there have been reported cases in which several technology firms intended to purchase a target, for instance, when Facebook and Tencent Holding Ltd. both attempted to acquire multimedia messaging app Snapchat (Rusli and MacMillan, 2013). Thus, the question arises of how these competitive dynamics would influence a potential killer acquisition.

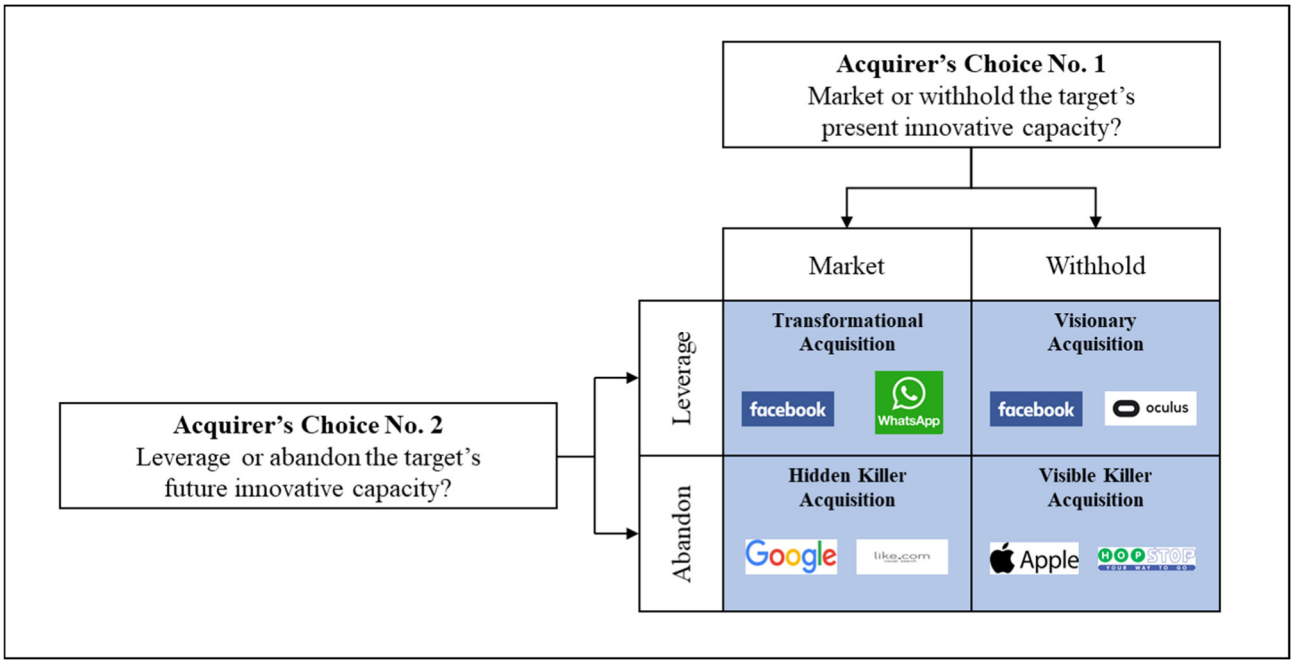
In order to come closer to answering this question, one needs to distinguish between the direct value of an acquisition, i.e. the value added through the target's stand-alone offering plus potential operating and financial synergies, and the indirect value of an acquisition, i.e. advantages related to the overall market environment. Since a killer acquisition is solely motivated by the objective to eliminate rivaling competition, the direct value of an acquisition, per definition, equals zero. The sole motivation of a killer acquisition is the indirect value, i.e. securing the acquirer’s market position through eliminating a potential future rival. Thus, assuming that two acquirers are interested in eliminating a target firm through an acquisition and both being aware of the intentions of the other acquirer, one could expect that only one firm will make an offer. The reason is that, in the absence of a direct acquisition value, both companies would profit from the indirect value, i.e. having eliminated a potential future rival, irrespective of who purchases the target. Thus, several companies making an offer for a single target might be an indicator of other acquisition motives, such as the operating synergies outlined in Section 2.1.2.1. However, more complex cases, e.g. one acquirer being interested in leveraging the target’s innovation and one acquirer being interested in eliminating its innovation, are beyond the scope of this paper and are interesting starting points for future research.

5. Case Illustration of Theoretical Framework

After having formulated the framework in Chapter 4, this chapter relies on four cases relating to the GAFAM firms in order to illustrate the theoretical framework and showcase how it can be applied to classify acquisitions in business practice. Due to the topic's complexity as well as its novelty, the cases are presented with the objective of showing the described process in a manner that is "transparently observable" (Eisenhardt, 1989, p.537). Thus, the cases depict archetypes and do not provide the reader with statistical evidence on the distribution of acquisition types or other variables. Instead, the objective is to highlight the contrasts between the cases in order to develop a more comprehensive understanding of the structures and incentives that underlie different types of acquisitions. As shown in Exhibit XVII, the four cases that are presented include Facebook's purchase of WhatsApp (transformational acquisition), Facebook's acquisition of Oculus VR (visionary acquisition), Apple's acquisition of HopStop.com (visible killer acquisition), and Google's acquisition of Like.com (hidden killer acquisition). The cases include a brief description of the target's business model and transaction details, an analysis of the timing of the acquisition, an assessment of product market overlap between target and acquirer, and an outline of the two choices that the acquirer has made with a subsequent framework classification.

Exhibit XVII: Overview of Case Illustrations

The overview below assigns the four cases to different archetypes of acquisitions depending on the two choices of the acquiring firm.



In order to determine the two choices that the acquirer has made with regard to the target's innovative capacity, two types of data are used. The first choice of the acquirer is whether to market or withhold the target's innovative capacity. It has been hypothesized in Proposition 4b that the present innovative capacity is incorporated in the target's products and services. Thus, it will be evaluated whether the acquirer has decided to market the target products or withhold/withdraw them after the acquisition. Publicly available information sources, such as newspaper articles, websites, and company publications, are used as a basis for this qualitative assessment. It needs to be maintained that this assessment is, to a certain degree, subject to own judgment, particularly with regard to the timing of the acquirer's Choice (1). The assessment is made on a case-by-case basis, taking all available information into account. The second choice of the acquirer is whether to leverage or abandon the target's future innovative capacity. It has been hypothesized in Proposition 4b that the future innovative capacity can be brought to the surface through research and development. Therefore, the patent activity of the target after the acquisition is analyzed in closer detail. The underlying rationale is that the number of filed patents over time can be considered a decent proxy for the development of R&D effort and technological strength (Awate, Larsen, and Mudambi, 2015; Narin, Noma, and Perry, 1987). The global patent database Espacenet, developed by the European Patent Office and the member states of the European patent organization, is used to determine the number of patents assigned to the target firm. The application date is used to classify the temporal development of the target's R&D activity. Only granted patents are included, thus the number of patents in the most recent time periods could be underestimated. As outlined in closer detail in the discussion, this approach is subject to several weaknesses, e.g. it disregards the relevance of patents, does not consider trade secrets that are deliberately not patented, and excludes innovations that are not patentable (Holmström *et al.*, 2019). However, since the framework only attempts to give insights into whether the innovative capacity was leveraged after the acquisition, and not its extent, assessing the target's patent activity over time is considered a sufficiently accurate indicator of the acquirer's Choice (2).

5.1. Transformational Acquisition: Facebook/WhatsApp

The first case illustrates a transformational acquisition by showcasing the example of Facebook's purchase of messenger service WhatsApp LLC, which was founded in Mountain View, California/USA ("WhatsApp") (MarketLine, 2014). First, WhatsApp is shortly introduced, and the details of the acquisition are outlined. Second, the case takes a closer look at the transaction's timing to determine WhatsApp's phase in the Innovative Capacity Lifecycle at the time of the acquisition. Third, the product market overlap between target and acquirer is evaluated. Thereafter, Choice (1) of Facebook whether to market or withhold WhatsApp's present innovative capacity is presented, focusing on WhatsApp's product offering. Subsequently, Choice (2) of Facebook regarding the decision to leverage or abandon WhatsApp's future innovative capacity is evaluated, taking a closer look at the development of WhatsApp's filed patents. Finally, the results of the preceding evaluation are used to classify the transaction as a transformational acquisition, according to the framework presented in the previous chapter.

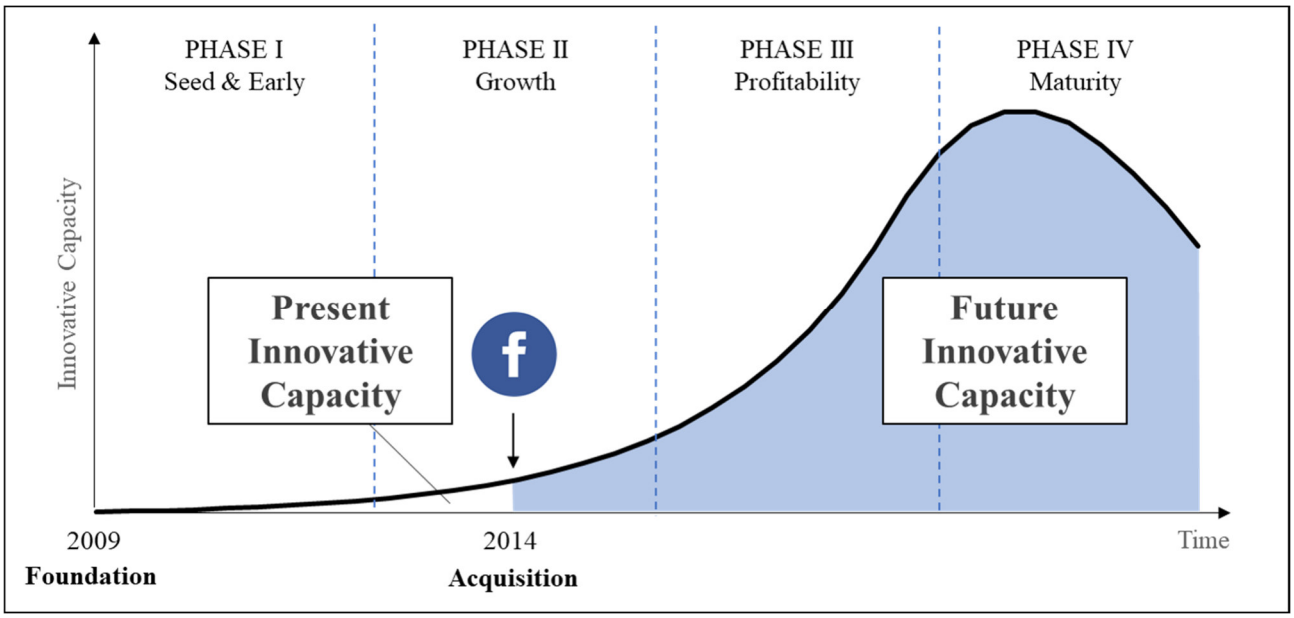
Business model & transaction details. In 2014, the social media corporation Facebook acquired the instant messenger service WhatsApp for USD 19bn. WhatsApp was founded by former Yahoo employees Brian Acton and Jan Koum in 2009. Before the acquisition, WhatsApp was only available on smartphones and offered its users a platform to send and receive text messages, voice messages, pictures, documents, and other content. The messenger was compatible with both widespread operating systems, Google's Android and Apple's iOS. In most countries, the services of WhatsApp were available for USD 1 per year; in addition, the company had access to behavioral data and personal information of users. In 2013, WhatsApp had 450m users, reported annual revenues of USD 20m, and employed 50 people (MarketLine, 2014). One year before the acquisition, WhatsApp received a venture capital funding round, placing it at a valuation of USD 1.5bn (Tsotsis, 2014). At the time, the subsequent purchase by Facebook was the largest venture-backed acquisition in history (Albergotti, MacMillian, and Rusli, 2014). Following the classification of Evans and Gawer (2016), WhatsApp can be classified as a transaction platform, facilitating the exchange between different users as an intermediary. The market for messaging services can be categorized as a platform market, being characterized by high network effects, the availability of large population datasets, as well as strong economies of scale and scope, favoring the emergence of a winner-take-all market (Facebook, 2014a; Schilling, 2002; Stigler Center, 2019). Facebook offered a competing service, Facebook Messenger, with similar functionalities (MarketLine, 2014).

Timing of the acquisition. At the time of the acquisition, WhatsApp was in Phase II, i.e. the growth phase of the Innovative Capacity Lifecycle, as shown in Exhibit XVIII. The underlying rationale is that WhatsApp already had a marketable product at the time of the acquisition that the firm scaled to reach a growing number of customers. In 2013, the instant messenger service had 450m users, of which 70% were daily active (Facebook, 2014a; MarketLine, 2014). WhatsApp's core product, the messaging service, was gradually extended by an adjacent offering, such as voice messaging and geolocation sharing. The large user base

allowed WhatsApp to profit from strong network effects, use large population datasets, and realize significant economies of scale. An indication for these economies of scale is that WhatsApp only needed 50 employees to service 450m users (MarketLine, 2014). Despite its enormous user base and high valuation, WhatsApp had not reached Phase III of the Innovative Capacity Lifecycle in 2014, mainly due to the fact that it did not expand into unrelated markets that would have led to the emergence of a technology ecosystem, rendering the firm an integrated platform. As hypothesized in Proposition 2, WhatsApp as a Phase II company might be an attractive target of a killer acquisition, as acquirers are incentivized to eliminate rivals before reaching Phase III of the Innovative Capacity Lifecycle.

Exhibit XVIII: Innovative Capacity Lifecycle Phase of WhatsApp

The illustration displays that WhatsApp was in Phase II, the growth phase, of the Innovative Capacity Lifecycle, at the time of the acquisition by Facebook.



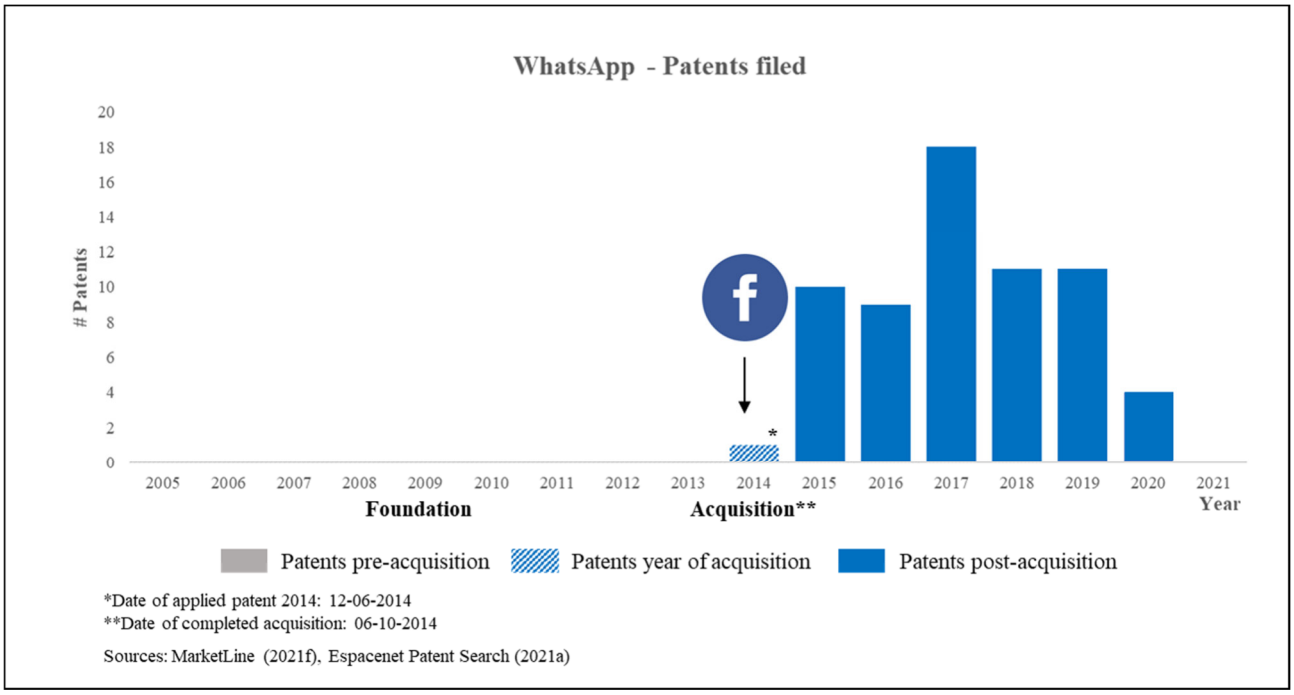
Product market overlap. A central question related to killer acquisitions is whether there is a product market overlap between the acquiring and target firm. The underlying rationale is that a company has a higher incentive to eliminate competitors if they attract similar customers with a product offering in the same markets (Cunningham et al., 2021). The acquirer, Facebook, is an integrated platform with a technology ecosystem spanning across many platform markets, including social networks, social media, and digital advertising. Thus, it can be categorized as a Phase III company, following the classification of the Innovative Capacity Lifecycle. The target, WhatsApp, can be categorized as a transaction platform in Phase II of the Innovative Capacity Lifecycle, focusing on the core market of instant messaging (Exhibit XVIII). As hypothesized in Proposition 5, Phase III acquirers are incentivized to engage in killer acquisitions in core, adjacent, and transformational

markets. Therefore, a killer acquisition could be attractive from Facebook's perspective to secure its market position as a Phase III company. Therefore, the choices (1) and (2) of the acquirer are assessed in more detail to determine whether the transaction can be classified as a killer acquisition.

Choice (1) of the acquirer. The first choice that the acquirer can make is whether to market or withhold the target's present innovative capacity. In the case being illustrated, Facebook has decided to market WhatsApp's present innovative capacity. As outlined in the theory formulation, it is hypothesized that the present innovative capacity is incorporated in the target's existing product offering. With regard to WhatsApp, its product offering that drives the value of the firm mainly encompasses the messaging service platform with its wide-ranging communication technologies. Facebook decided to leave WhatsApp on the market without any additional costs or hurdles for users. This can also be seen in the growing user numbers of WhatsApp since the firm reached 1bn users in February 2016 and 2bn users in March 2020 (Statista, 2021i). The messenger service was not integrated into the Facebook brand and remained an autonomous software until May 2021 (MarketLine, 2021f).

Exhibit XIX: Patents Filed by WhatsApp as an Applicant

The illustration displays that WhatsApp filed a total of 64 granted patents (thereof 0 patents before and 64 after the acquisition by Facebook) over its lifetime until 2021. This number only includes patents that were granted until May 14, 2021.



Choice (2) of the acquirer. The second choice that the acquirer can make is whether to leverage or abandon the target's future innovative capacity. As described in the theory, leveraging innovation can spur the invention of new products and services as well as advancements of the existing product offering. In the present case, Facebook has decided to leverage WhatsApp's future innovative capacity through investing significantly in R&D, as indicated by the number of filed patents over time used as a proxy. Although WhatsApp already had a marketed product, a large user base, and revenue streams when Facebook acquired it, the company did not file a single patent to secure its products and services (Espacenet Patent Search, 2021a; MarketLine, 2014; Statista, 2021i; Exhibit XIX). However, shortly after the acquisition, WhatsApp started to apply for patents and ended up with 64 filed patents until May 2021. A closer assessment of the patents shows that the company only applied for patents that were related to its existing messenger service (Espacenet Patent Search, 2021a). Thus, it can be concluded that the future innovative capacity has been leveraged through R&D, focusing on advancing the existing product offering.

Summary. Following the proposed framework, the preceding case illustration shows that WhatsApp's acquisition by Facebook can be classified as a transformational acquisition. The underlying rationale is that Facebook decided to market WhatsApp's product offering and leverage its future innovative capacity through investing heavily in R&D. The latter has been shown by a strong increase in the number of filed patents post-acquisition. Thus, even though WhatsApp seemed prone to a killer acquisition due to its phase in the Innovative Capacity Lifecycle and a product market overlap with the acquirer, Facebook made full use of both WhatsApp's present and future innovative capacity, resulting in a transformational acquisition.

5.2. Visionary Acquisition: Facebook/Oculus VR

The second case showcases that Facebook's purchase of virtual reality company Oculus VR, LLC, founded in Irvine, California/USA ("Oculus VR"), can be classified as a visionary acquisition (MarketLine, 2021g). First, Oculus VR and its acquisition by Facebook are depicted. After that, the paper sheds light on the timing of the transaction to better understand Oculus VR's phase in the Innovative Capacity Lifecycle at the point in time at which Oculus VR was acquired. Thereafter, its product market overlap with Facebook is evaluated. Moreover, Facebook's Choice (1) regarding Oculus VR's present innovative capacity is determined by evaluating how Facebook handled Oculus VR's existing product offering. Subsequently, Choice (2) pertaining to Oculus VR's future innovative capacity is presented by taking a closer look at the firm's filed patents after the acquisition. Lastly, the findings are synthesized based on the proposed framework to classify the purchase of Oculus VR by Facebook as a visionary acquisition without any loss in innovative capacity.

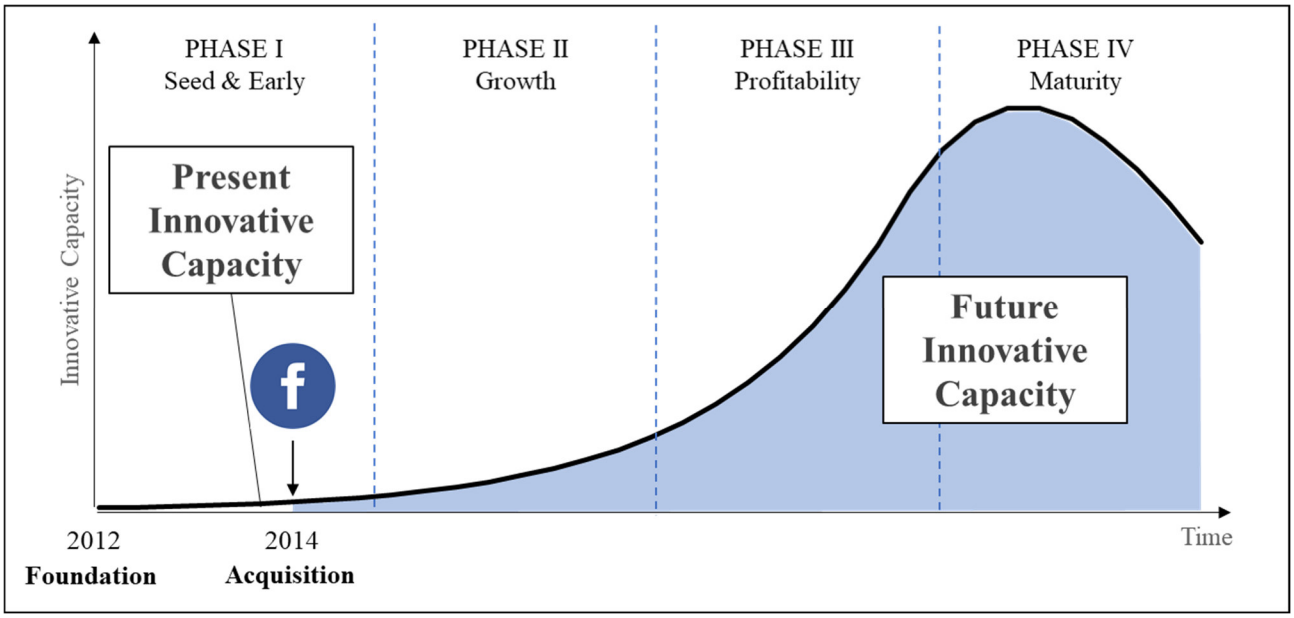
Business model & transaction details. In 2014, the social network corporation Facebook acquired the virtual reality company Oculus VR for USD 2.3bn. The company was founded in 2012 by Palmer Luckey, Brendan Iribe, Michael Antonov, and Nate Mitchell. Oculus VR started its business researching virtual reality, aiming to enable people to "experience anything, anywhere, with anyone through the power of virtual reality" (Crunchbase, 2021p). The company had already an advanced prototype of its virtual reality headset when Facebook acquired the company in 2014, even it was not yet offered on the market. Despite no revenues at the time of the acquisition, Oculus VR had already secured USD 91m in funding (Crunchbase, 2021p; Facebook, 2014b; MarketLine, 2021g). Following the definition of Evans and Gawer (2016) regarding platform companies, Oculus VR could not be assigned to a platform type at the time of acquisition due to its early company stage. However, the virtual reality technology could have the potential to develop towards a transaction or innovation platform, with the technologies connecting users and providing building blocks for complementary products and services still in development. Thus, the virtual reality market can be categorized as a platform market due to its strong direct and indirect network effects and significant economies of scale and scope (Nadler and Cicilline, 2020; Schilling, 2002). At the time of the acquisition, Facebook did not offer a competing service with similar functionalities (MarketLine, 2021f).

Timing of the acquisition. As shown in Exhibit XX, Oculus VR was in Phase I of the Innovative Capacity Lifecycle, i.e. the seed & early phase, at the time of the acquisition. This can be explained by the fact that Oculus VR was founded from scratch based on a novel business idea in 2012, i.e. approximately two years before it was acquired. With its first prototypes ready but not yet marketed, the company's main activities revolved around product development, testing, and market research. Consequently, Oculus VR did not have any customers, did not generate revenues, and could not rely on network effects (Crunchbase, 2021p; Facebook, 2014b; MarketLine, 2021g; Takahashi, 2013). As hypothesized in Proposition 2, Oculus VR as a

Phase I company might be an attractive target of a killer acquisition, as acquirers are incentivized to eliminate rivals before reaching Phase III of the Innovative Capacity Lifecycle.

Exhibit XX: Innovative Capacity Lifecycle Phase of Oculus VR

The illustration displays that Oculus VR was in Phase I, the seed & early phase of the Innovative Capacity Lifecycle, at the time of the acquisition by Facebook.



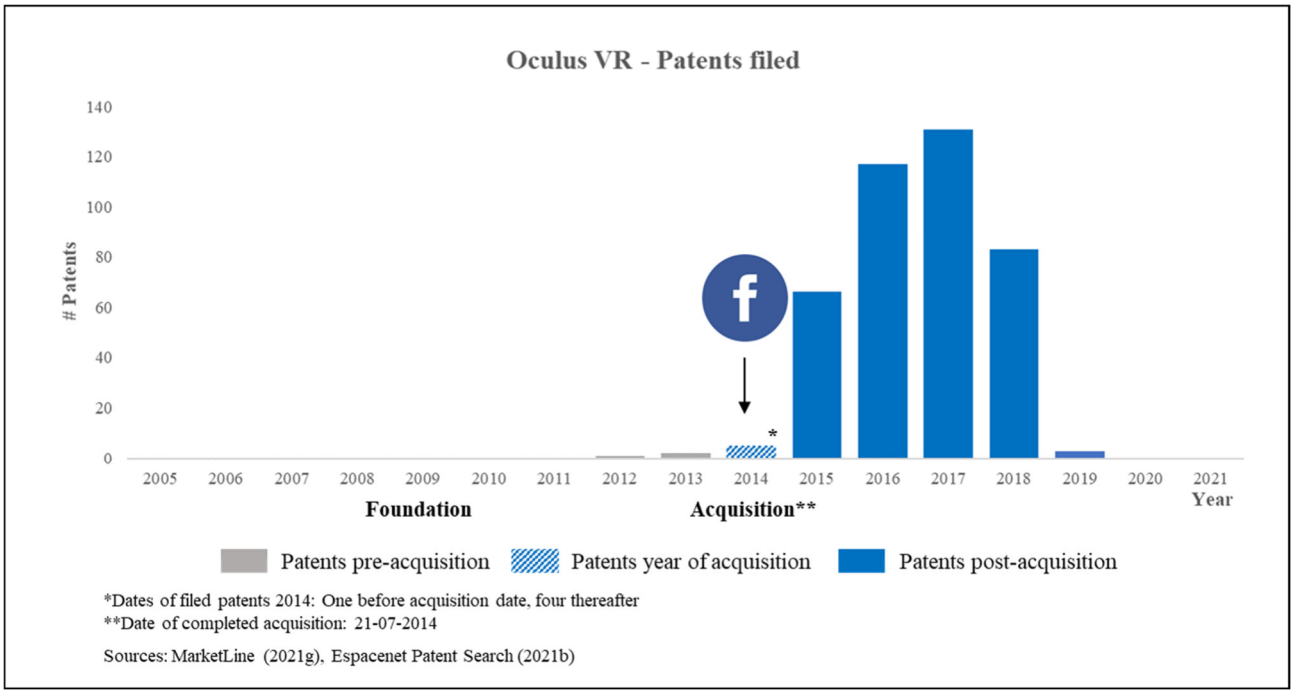
Product market overlap. A key question related to killer acquisitions is whether there is a product market overlap between acquirer and target. The underlying rationale is that a company has a higher incentive to eliminate competitors if they attract similar customers within the same product markets (Cunningham et al., 2021). The acquirer, Facebook, is an integrated platform with a technology ecosystem spanning across many platform markets, including social networks, social media, and digital advertising. Thus, it can be categorized as a Phase III company, following the classification of the Innovative Capacity Lifecycle. As outlined in the preceding paragraph, high-tech start-up Oculus VR can be assigned to Phase I, focusing on the core market of virtual reality. As hypothesized in Proposition 5, Phase III acquirers are incentivized to engage in killer acquisitions in core, adjacent, and transformational markets. Subsequently, a killer acquisition could be attractive from Facebook's perspective to avoid that Oculus VR could entice customers away from Facebook's platform in the future. Therefore, the choices (1) and (2) of the acquirer are assessed in closer detail to determine whether the transaction can be classified as a killer acquisition.

Choice (1) of the acquirer. The first choice of the acquirer is whether to market or withhold the target's present innovative capacity. In the case being investigated, Facebook has decided to first withhold Oculus VR's present

innovative capacity, although initial models of virtual reality headsets were already available (Welch, 2013). This can be interpreted as a visible signal to withhold the present innovative capacity, potentially creating the (false) impression of a killer acquisition. However, after Facebook has withheld the innovations for two years and leveraged the future innovative capacity of Oculus VR through R&D investments, the first consumer headset (i.e. Oculus Rift) of the company was released in 2016 with many innovative features (Gilbert, 2016). After that, several product extensions (e.g. a mobile virtual reality headset) of the consumer headset have been launched. While Oculus VR was not integrated into the Facebook brand and remained an autonomous product provider until mid-2020, the company was renamed Facebook Reality Labs and has been connected to Facebook's social network in August 2020. From then on, it became mandatory for users of the virtual reality technology to connect a Facebook account (Parlock, 2020). Consequently, Oculus VR was fully integrated into Facebook's integrated platform (Evans and Gawer, 2016).

Exhibit XXI: Patents Filed by Oculus VR as an Applicant

The illustration displays that Oculus VR filed in total 408 granted patents (thereof four patents before and 404 after the acquisition by Facebook) over its lifetime until 2021. This number only includes patents that were granted until May 14, 2021.



Choice (2) of the acquirer. The second choice of the acquirer is whether to leverage or abandon the target's future innovative capacity, which can yield product improvements, new products, and disruptive business models. In the case being illustrated, Facebook has decided to leverage Oculus VR's future innovative capacity through investing significantly in R&D, thereby leading the product to market readiness. This is shown by an

almost exponential increase of filed parents by Oculus VR as an applicant in the years following the acquisition. Before Facebook has purchased the company, only four patents have been filed, followed by 404 patents after the acquisition (Espacenet Patent Search, 2021b; Exhibit XXI). This is a strong indicator that, in this case, the acquirer decided to leverage to target's future innovative capacity, making use of the full potential of future innovation.

Summary. At first sight, the acquisition of Oculus VR by Facebook could have seemed to be a killer acquisition since the acquirer decided to withhold the target's products for two years. However, the proposed framework shows that the transaction can be classified as a visionary acquisition instead. Even though Facebook first withheld the innovative capacity of Oculus VR, the firm continued R&D investments in order to leverage the future innovative capacity. In 2016, a marketable product was launched and later integrated into Facebook's integrated platform. Even though the acquisition's timing and product market overlap might have incentivized a killer acquisition, Facebook's purchase of Oculus VR can be classified as a visionary acquisition, entailing no loss of innovative capacity.

5.3. Visible Killer Acquisition: Apple/HopStop.com

The third case illustrates how Apple's purchase of online mapping company HopStop.com, Inc., founded in New York City, New York/USA ("HopStop.com"), can be categorized as a visible killer acquisition (MarketLine, 2021h). First, HopStop.com's business model and the details of the acquisition are briefly introduced. Second, the case investigates the timing of the transaction in order to determine HopStop.com's phase in the Innovative Capacity Lifecycle as well as the existence of a product market overlap between Apple and HopStop.com. Third, Apple's Choice (1) whether to market or withhold HopStop.com's present innovative capacity is presented, focusing on the online mapping firm's product offering. Fourth, Apple's Choice (2) regarding the decision to leverage or abandon HopStop.com's future innovative capacity is evaluated, relying on the target's filed patents as a proxy for R&D activity. Finally, the transaction is classified as a visible killer acquisition based on the results of the preceding evaluation, encompassing the loss of HopStop.com's present and future innovative capacity.

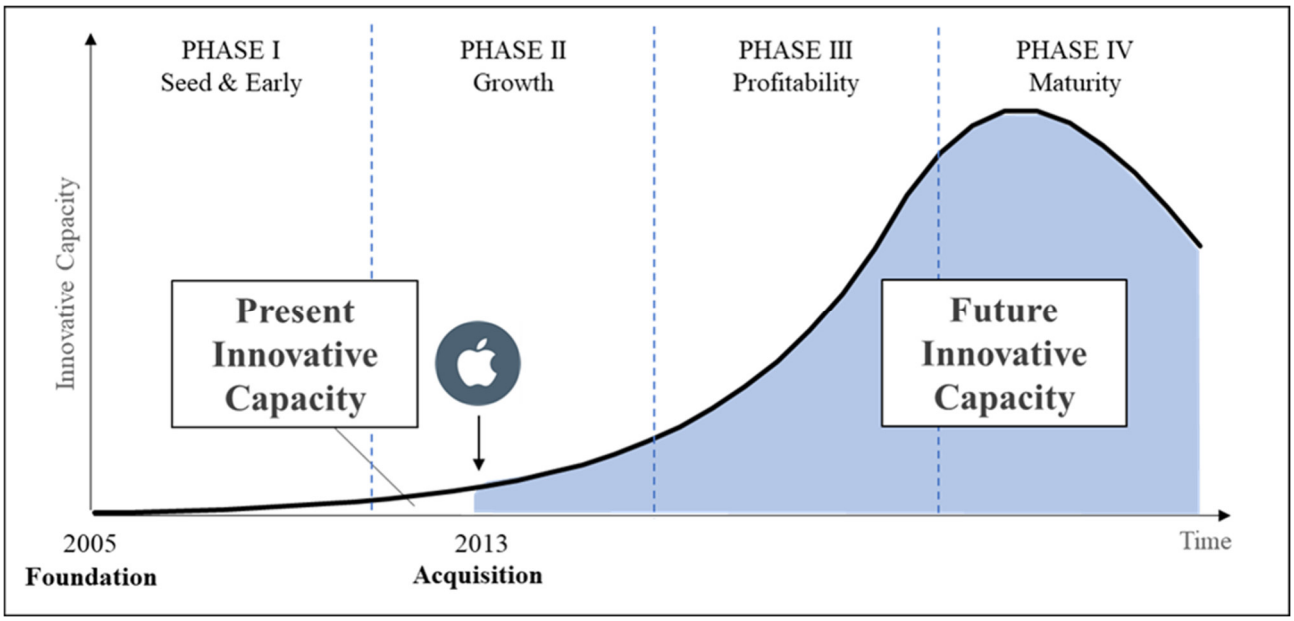
Business model & transaction details. In 2013, the online mapping company HopStop.com was acquired by GAFAM firm Apple for an undisclosed sum (Burrows and Frier, 2013). HopStop.com was founded in 2005 by Chinedu Echeruo and was headquartered in New York City, New York/USA. At the time of the acquisition by Apple, the company offered products in the platform market of online mapping. It provided city transit guides allowing customers to plan their routes and determine walking directions in real-time. In 2011, HopStop.com was one of the software companies with the fastest business growth in the US and marketed its products in more than 600 cities around the world. However, the company did not disclose any information regarding its financials or other related key performance indicators (Burrows and Frier, 2013; Crunchbase, 2021q; MarketLine, 2021h; Nusca, 2015). Following the classification of Evans and Gawer (2016), HopStop.com can be described as a transaction platform company, facilitating the exchange of information between different users. The market for online mapping can be categorized as a platform market, being subject to high switching costs and data-driven economies of scale and scope, as outlined in Section 2.3.3. (Nuccio and Guerzoni, 2019; Stigler Center, 2019). At the time of the acquisition, Apple offered a competing service, Apple Maps, with similar functionalities (MarketLine, 2021h).

Timing of the acquisition. At the time of the acquisition, HopStop.com was in Phase II, i.e. the growth phase of the Innovative Capacity Lifecycle, as shown in Exhibit XXII. The underlying rationale is that HopStop.com already had a marketable product, i.e. its navigation app, at the time of the acquisition that the start-up scaled to reach a growing number of customers. The application was already available in 600 cities and extended by an adjacent product offering in the form of additional functionalities, including city guides and community tabs (Burrows and Frier, 2013; Crunchbase, 2021q; MarketLine, 2021h; Nusca, 2015). Despite its growing user base and wide geographic reach, HopStop.com had not reached Phase III of the Innovative Capacity Lifecycle in 2013, mainly due to the fact that it did not expand into unrelated markets that would have enabled

the firm to create a technology ecosystem, rendering the firm an integrated platform. As stated in Proposition 2, HopStop.com, as a Phase II company, might be an attractive target of a killer acquisition since acquirers are incentivized to eliminate rivals before reaching Phase III of the Innovative Capacity Lifecycle.

Exhibit XXII: Innovative Capacity Lifecycle Phase of HopStop.com

The illustration displays that HopStop.com was in Phase II, the growth phase of the Innovative Capacity Lifecycle, at the time of the acquisition by Apple.

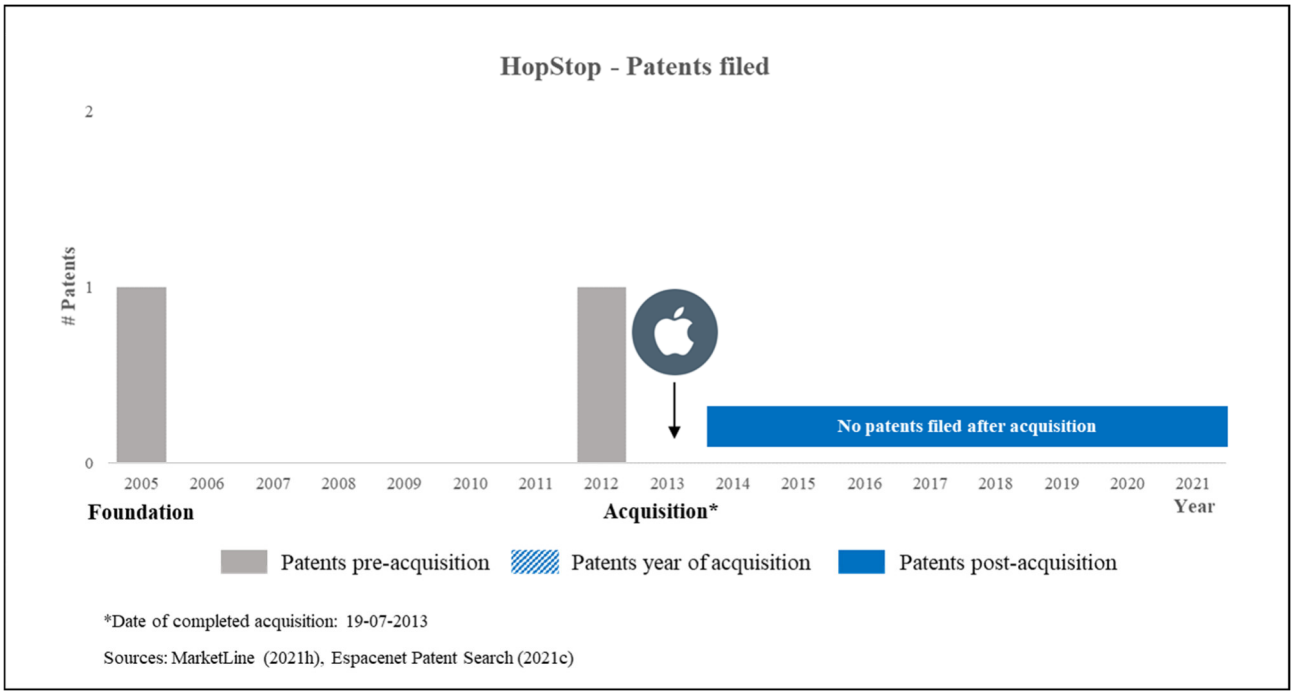


Product market overlap. A key determinant of the analysis of killer acquisitions is the product market overlap between acquirer and target, potentially giving the acquirer a higher incentive for a killer acquisition in case the target attracts similar customers in shared markets (Cunningham et al., 2021). The acquirer, Apple, is an integrated platform with a technology ecosystem spanning across many platform markets, including mobile operating systems, intelligent virtual assistants, and online mapping. Thus, it can be categorized as a Phase III company, following the classification of the Innovative Capacity Lifecycle. The target, HopStop.com, can be categorized as a transaction platform in Phase II of the Innovative Capacity Lifecycle, focusing on the core market of online mapping (Exhibit XXII). As hypothesized in Proposition 5, Phase III acquirers are incentivized to engage in killer acquisitions in core, adjacent, and transformational markets to secure their market position. Since there is a direct product market overlap between HopStop.com and Apple Maps, this increases the attractiveness of a killer acquisition from Apple's perspective. Therefore, the two choices of the acquiring firm are outlined in the subsequent paragraphs to determine whether the transaction was in fact a killer acquisition.

Choice (1) of the acquirer. The acquirer's first choice is to market or withhold the target's present innovative capacity. In the present case, Apple has decided to withhold HopStop.com's present innovative capacity by withdrawing its product from the market. HopStop.com was removed from the Android Play Store only two months after the acquisition and, less than two years later, removed from all platforms. Moreover, product support was discontinued. As the mapping service was highly reliant on recent information, this decision effectively rendered the application unusable. Instead, Apple promoted its own competing product, Apple Maps. As outlined in Section 4.4., the signal of withholding the present innovative capacity is visible to external stakeholders, leading to public criticisms in response to HopStop.com's shutdown (Burrows and Frier, 2013; MarketLine, 2021h; Whitwam, 2013).

Exhibit XXIII: Patents Filed by HopStop.com as an Applicant

The illustration shows that HopStop.com filed in total two granted patents over its lifetime, none of them after its acquisition by Apple. This number only includes patents that were granted until May 14, 2021.



Choice (2) of the acquirer. The second choice of the acquirer is whether to leverage or abandon the target's future innovative capacity, which can be brought to the surface through R&D. In order to determine which choice was selected in the illustrated case, the filed patents of the target HopStop.com have been investigated. The examination shows that Apple did not only withdraw HopStop.com's existing product from the market but also abandoned the target's future innovative capacity by bringing R&D to a halt. Consequently, the previously innovative company that registered patents to secure its core product before the acquisition did not

file for a single patent after the transaction and left the market two years after the acquisition (Espacenet Patent Search, 2021c). As a result, all innovative capacity of the firm was lost, at the detriment of consumer welfare and choice.

Summary. The preceding case illustration shows that HopStop.com's acquisition by Apple can be classified as a visible killer acquisition, according to the theory developed in Chapter 4. The underlying rationale is that Apple withdrew HopStop.com's product from the market and abandoned the target's future innovative capacity by bringing R&D to a halt. The previously innovative company that registered patents to secure its core product before the acquisition did not file for a single patent after the transaction, thus falling behind in terms of innovation and being withdrawn from all platforms two years later. Thereby, the signal of withholding the product was visible for external stakeholders; the action of abandoning R&D was, as outlined in Section 4.4., invisible. Following Propositions 2 and 5, Hotstop.com being in Phase II of the Innovative Capacity Lifecycle and having an overlapping product market with Apple made a killer acquisition more attractive from the acquirer's perspective. As a result, all innovative capacity of HopStop.com is lost, and thus, consumers are deprived of the existing mapping service, potential new product adaptations and improvements, and possibly novel platform-based business models that could have arisen from the target.

5.4. Hidden Killer Acquisition: Google/Like.com

The fourth case showcases that Google's acquisition of visual search engine Like.com, Inc., founded in San Mateo, California/USA ("Like.com"), can be classified as a hidden killer acquisition (MarketLine, 2021i). In a first step, Like.com's business model and its acquisition by Google are briefly presented. After that, the case illustration sheds light on the timing of the transaction to determine the visual search engine's phase in the Innovative Capacity Lifecycle at the point of the transaction. Furthermore, the product market overlap between Google and Like.com is analyzed. Thereafter, Google's Choice (1) with regard to Like.com's present innovative capacity is determined concerning the target's existing product offering. Subsequently, Choice (2) pertaining to Like.com's future innovative capacity is presented by taking a closer look at the firm's filed patents after the acquisition. Lastly, the findings are synthesized based on the theoretical framework proposed to classify the purchase of Like.com by Google as a hidden killer acquisition, entailing the loss of the target's future innovative capacity.

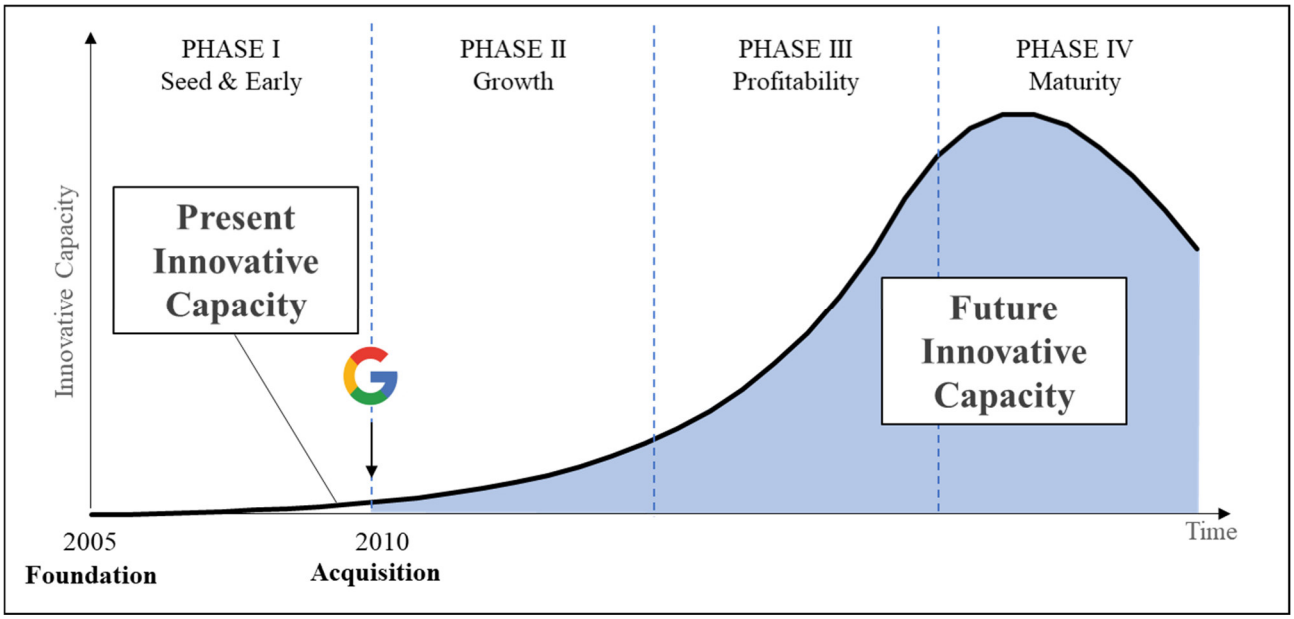
Business model & transaction details. In 2010, the web search engine firm Google acquired the visual search engine Like.com for USD 100m. In 2005, the target company was founded under its former name Riya, Inc. by Azhar Khan, Burak Gokturk, Mehul Nariyawala, and Munjal Shah. Like.com offered a visual search engine with several novel functionalities. These included the option to take a picture of a product and search for similar-looking items in the database, enabling customers to find comparable products. Moreover, customers could also highlight certain parts of the product search to receive more specific results, e.g. search for similar patterns, colors, and shapes. Like.com listed about two million products from 200 distributors in its database prior to the acquisition by Google. Furthermore, it had received funding from several investors (Arrington, 2010; Crunchbase, 2021r; Hof, 2009; MarketLine, 2021i). Applying the definition of Evans and Gawer (2016), Like.com is a transaction platform company, facilitating the exchange between vendors and consumers as an intermediary. The market for visual search engines can be classified as a platform market, with its market participants profiting from high economies of scale and scope (Stigler Center, 2019). At the time of the acquisition, Google offered a competing service, its visual search engine Google Image, with similar functionalities, which was launched in 2001 (Zipern, 2001).

Timing of the acquisition. At the time of the acquisition, Like.com can be classified as being in the transition from Phase I, i.e. the seed & early phase of the Innovative Capacity Lifecycle, to Phase II, i.e. the growth phase of the Innovative Capacity Lifecycle, as shown in Exhibit XXIV. The underlying rationale is that Like.com already offered a marketable visual search engine at the time of the acquisition, giving consumers the possibility to search for similar products and customize the search according to certain criteria. It seems likely that the firm was on the verge of scaling its product to attract a larger user base; however, this could not be confirmed due to a lack of reliable information regarding user numbers and revenues. Like.com had not yet extended its product offering into adjacent innovations but was likely to be on the verge of doing so, as it

announced to include a price comparison functionality that would yield a provision for every sale (Arrington, 2010; Crunchbase, 2021r; Hof, 2009; MarketLine, 2021i). As stated in Proposition 2, Like.com as a Phase I/II company might be an attractive target of a killer acquisition since acquirers are incentivized to eliminate rivals before reaching Phase III of the Innovative Capacity Lifecycle.

Exhibit XXIV: Innovative Capacity Lifecycle Phase of Like.com

The illustration displays that Like.com was in the transition from Phase I, the seed & early phase, to Phase II, the growth phase of the Innovative Capacity Lifecycle, at the time of the acquisition by Google.

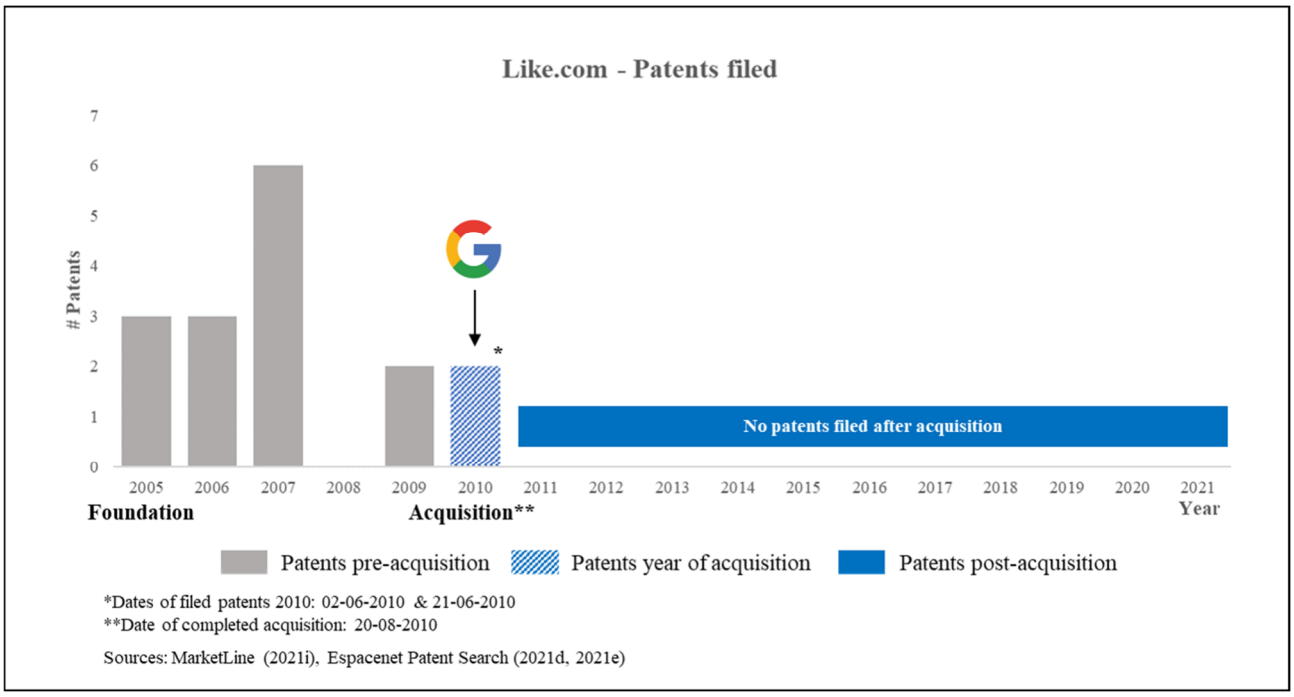


Product market overlap. A key question related to killer acquisitions is whether there is a product market overlap between the acquiring and target firm. The underlying rationale is that a company has a higher incentive to eliminate competitors if they attract similar customers with a product offering in the same markets (Cunningham et al., 2021). The acquirer, Google, is an integrated platform with a technology ecosystem spanning across many platform markets, including search engines, mobile operating systems, online mapping, and web browsers. Thus, it can be categorized as a Phase III company, following the classification of the Innovative Capacity Lifecycle. The target, Like.com, can be categorized as a transaction platform in between Phase I/II of the Innovative Capacity Lifecycle, focusing on the core market of visual search engines (Exhibit XXIV). As hypothesized in Proposition 5, Phase III acquirers are incentivized to engage in killer acquisitions in core, adjacent, and transformational markets. Thus, a killer acquisition could be attractive from Google's perspective. In this particular case, Like.com's visual search engine platform might even have the potential to disrupt Google's core market of search engines, further increasing the potential competitive threat that Like.com posed to Google.

Choice (1) of the acquirer. The first choice of the acquirer is whether to market or withhold the target's present innovative capacity. In the case being investigated, Google has decided to leave Like.com's existing product on the market, even though it already offered a similar product. Furthermore, Google stated that Like.com should operate independently, not be integrated into the Google brand, and remain an autonomous web search engine. Thus, as outlined in the theory, the visible signal was that Like.com continued to exist as a brand. However, Google consciously let Like.com fall behind in the market in terms of innovation (as outlined in the following paragraph) and took Like.com off the network five years later, in 2015. From then on, customers were redirected to Google's shopping search engine (MarketLine, 2021i).

Exhibit XXV: Patents Filed by Like.com as an Applicant

The illustration shows that Like.com filed a total of 16 granted patents over its lifetime, none after its acquisition by Google. This number only includes patents that were granted until May 14, 2021.



Choice (2) of the acquirer. The second choice of the acquirer is whether to leverage or abandon the target's future innovative capacity. In order to determine which choice was selected in the illustrated case, the filed patents of the target Like.com (and its predecessor firm Riya, Inc.) have been investigated. The examination shows that even though Google decided to leave Like.com's existing product on the market, it discontinued R&D investments. Consequently, the previously very innovative company that registered 16 patents before the acquisition did not file for a single patent after the transaction, thus falling behind in terms of innovation and slowly developing towards irrelevance (Espacenet Patent Search, 2021d, 2021e).

Summary. The preceding case illustration shows that Like.com's acquisition by Google can be classified as a hidden killer acquisition. The underlying rationale is that Google marketed Like.com's product but at the same time discontinued future innovative R&D investments, thereby letting the company fall behind in terms of innovation and slowly develop towards irrelevance. The previously very innovative company that registered 16 patents before the acquisition did not file for a single patent after the transaction. Finally, the website was removed from the market in 2015 and redirected users to Google's competing service. Following Propositions 2 and 5, Like.com's early stage in the Innovative Capacity Lifecycle as well as its product market overlap with Google made the target prone to a killer acquisition. A hidden killer acquisition is not visible to external stakeholders, as the brand continues to exist, even though all future innovative capacity is lost.

6. Discussion & Limitations

The preceding chapters have discussed and challenged the existing research on acquisitions in the platform economy and proposed a novel framework to advance our theoretical understanding of the topic, focusing on the pivotal role of innovation in high-tech start-ups. This chapter takes a high-level view and revisits the central contributions of this thesis, discusses resulting implications for research, business practice, and policymaking, and emphasizes limitations of the proposed framework. It thereby broadly follows Whetten's (1989) list of key questions that determine what constitutes a value-adding theoretical contribution.

What's new? The thesis has proposed a novel framework to identify killer acquisitions based on the decisions of the acquirer to deal with the innovative capacity of the target. Its basic contention is that killer acquisitions are harmful since they lead to a loss of the target's innovative capacity, thereby reducing consumer choice and welfare and jeopardizing market competition. This contention offers a novel perspective that fundamentally differs from the focus of traditional research on acquisitions motivated by operating and financial synergies, whereby adverse effects mainly pertain to the post-acquisition entity reaching a dominant market position through combining two firms with a significant market share (Capron *et al.*, 1998; Eckbo, 1983; Rabier, 2017; Seth, 1990a, 1990b; Stillman, 1983). The thesis builds on the theory of Cunningham *et al.* (2021), outlining the role of killer acquisitions in the pharmaceutical industry. However, it differs in four central dimensions, aiming at better matching the specific market characteristics of platform markets. First, innovation is modeled as non-binary, i.e. the innovative capacity of a firm follows distinct lifecycle stages through re-combining knowledge from inside and outside the organization, allowing products and services to continually emerge and develop. Second, the framework incorporates the value of marketable products for future innovation. Through modeling platform innovation as a non-linear process in constant evolution, it is incorporated that innovation platforms regularly and intensively facilitate the development of complementary products and services on top of existing ones (Evans and Gawer, 2016). Third, the framework distinguishes between the target's present and future innovative capacity, offering an intuitive explanation for the potentially significant harm that a killer acquisition of a nascent venture can entail. Fourth, it adds a more dynamic understanding of the role of product market overlap between acquirer and target, incorporating the innovation lifecycle phases of both firms.

So what? The thesis, combining findings from theory and practice, entails implications that could alter practices in research, business, and policymaking. From a research perspective, the thesis sheds more light on the adverse effects of acquisitions with regard to the target's innovative capacity, centering around the "innovation theory of harm" (Holmström *et al.*, 2019, p. 609). The target's innovative capacity as a new unit of analysis could contribute towards a more comprehensive understanding of the implications of an acquisition, going beyond the traditional focus on market share and revenues of the post-acquisition entity. While the thesis provides new concepts and propositions, it aims at inspiring further theory development and empirical research to extend the existing knowledge on killer acquisitions. From a business perspective, the research question has

far-reaching ramifications on the positioning of individual companies in platform markets, the prospects of being acquired, and competitive dynamics. The relevance hereby extends to companies without platform-based business models since platform markets increasingly disrupt and transform traditional linear business models (Kenney and Zysman, 2016). From a policymaking perspective, gaining a more holistic understanding of acquisition motives can support decisions relating to merger control and antitrust regulation, aiming at maintaining competition and supporting consumer choice and welfare. As outlined in Section 2.2.3., the current antitrust policy in the EU, UK, and US mostly relies on market share and revenue thresholds in order to determine whether an acquisition is reviewed by government agencies. An introduction of a flexible antitrust system that reflects the impact on platform innovation, incorporates sector-specific regulations, and expands the market definition for platform-based business models could enable policymakers to better detect potential killer acquisitions.

Why so? The basic contention of the framework is that killer acquisitions are harmful since they lead to a loss of the target's innovative capacity. Based on this contention, several propositions are developed that build on one another. They rely on a review of the existing literature, accompanied by observations from business practice, and draw from different theoretical perspectives, such as Vernon's (1966) product lifecycle model, Helfat and Peteraf's (2003) capability lifecycles, and Nonaka's (1994) knowledge-based view. Grounded in these existing theories, the thesis recombines ideas and tailors them to the specific characteristics of the platform industry, incorporating the emergence of winner-take-all markets with integrated platform ecosystems (Evans and Gawer, 2016). Thereby, the killer acquisition concept of Cunningham *et al.* (2021) can be transferred from the pharmaceutical industry to the platform economy, adopting and supplementing parts of their underlying logic and compelling argumentation.

Why now? The global economy is currently undergoing a process of reorganization, entailing radical changes to how consumers and producers interact, how firms compete with each other, and how economic value is created and captured. While the last global transformation of a similar magnitude, the industrial revolution, was centered around factories, the 21st-century transformation revolves around digital platforms (Kenney and Zysman, 2016). These platform markets are inherently different from linear business models since they are subject to strong network effects, high switching costs, and data-driven economies of scale and scope, thus being prone to winner-take-all markets. In business practice, this tendency became clear in the analysis of GAFAM's market power across many platform segments as well as their unprecedented level of acquisition activity. Since innovation is the major driver of platform-based business models (Crémer *et al.*, 2019), its consideration is of overarching importance to safeguard competition and consumer welfare in platform markets globally, rendering killer acquisitions a top priority for researchers and policymakers alike.

Limitations? While the thesis sheds light on a highly relevant research area and proposed a novel framework, several limitations need to be outlined. First, the theory assumes single agency, i.e. one acquirer purchasing

one target. More complicated constellations, e.g. one prospective acquirer being interested in leveraging the target's innovative capacity and a second prospective acquirer being motivated by a killer acquisition, are not covered by the present framework. Second, the theory does not reflect the intentions of the TMT. Thus, the framework allows determining whether a transaction can be classified as a killer acquisition, entailing a loss of innovation, but does not distinguish between friendly and hostile takeovers. Third, the theory development was supported by real-life observations from selected institutional contexts, mainly focusing on the EU, UK, and US. The thesis has placed less emphasis on emerging markets with different institutional settings, such as the Asia-Pacific region, despite their growing relevance. Finally, while the application of the framework can be straightforward in some cases, it might prove challenging in others. This mostly pertains to the question of how it can be measured whether the acquirer decides to continue to invest in the target's R&D. Measuring R&D activity in the platform economy has proven a major challenge (Bloom *et al.*, 2019; Calvano and Polo, 2021; Crémer *et al.*, 2019; Holmström *et al.*, 2019; Stigler Center, 2019). Using the number of patents as a proxy for innovation, as suggested in the case illustration, can disregard the significance of patents, excludes innovations that are not patentable, does not consider trade secrets that are deliberately not patented, and disregards institutional factors that might impede patenting. Moreover, it is a possible scenario that a firm invests heavily in R&D but does accomplish an innovation, particularly in highly uncertain and disruptive technological areas.

7. Avenues for Future Research

The thesis has shown that the current management, finance, economics, and public policy literature already yields interesting insights into many individual areas of the research question, such as acquisition motives and characteristics of the platform economy, but lacks a comprehensive theory to classify killer acquisitions in the platform economy. This thesis has taken a first step towards such a comprehensive theory by proposing a framework that distinguishes between different types of acquisitions based on the acquirer's choices of how to deal with the target's innovative capacity. This chapter now takes a bird's eye view on the topic to demonstrate general shortcomings and challenges in current research and identify future opportunities to enhance our understanding of killer acquisitions in the platform economy. Three proposals are made: *advancing conceptual development* to facilitate empirical research, *adjusting the research focus* to reflect recent economic and social developments, and *accelerate interdisciplinary research* to enable learnings at the intersection of different disciplines.

Advancing conceptual development. There are several areas in which future research can specify, extend, and challenge the propositions made in this thesis. First, future theory-building research can go beyond the assumption of single agency and incorporate scenarios with several acquirers and/or targets. Game-theoretical applications might be of particular interest, investigating how the behavior of one market participant influences the behavior of other market participants. This could yield a more comprehensive understanding of the competitive dynamics in the platform economy. Second, future research could focus on the role of the TMT, distinguishing between hostile and friendly takeovers. The TMT's role and intentions might also have an impact on the incentives to innovate pre-acquisition, adding an additional layer to the present theoretical framework. Third, the influence of different institutional environments on market dynamics and structures in the platform industry could be examined in closer detail. Potential topics to evaluate include the role of institutional voids and the level of technological advancement. Fourth, future research could also illuminate potential positive ramifications of killer acquisitions. One potential aspect could be that killer acquisitions lead to a higher market concentration, which in some cases might be desirable from a welfare perspective. The underlying rationale is that the strong network effects in combination with significant economies of scale and scope imply that one large provider is more efficient than several smaller ones, duplicating resources (Crémer *et al.*, 2019). Ultimately, the conceptual development can serve as a foundation for empirical research in the future.

Adjusting the research focus. As previously outlined, platform markets increasingly replace traditional linear business models and become a ubiquitous phenomenon on a global scale. The GAFAM firms alone hold a market share of more than 50% in the markets for search engines, social networks & social media, mobile operating systems, online mapping, cloud computing, intelligent virtual assistants, web browsers, and digital advertising (Exhibit VIII). Moreover, they have been found to engage in an unprecedented level of acquisition

activity, accounting for 800 transactions since 1987, mostly related to innovative technology start-ups (Section 3.2.). The current literature does not adequately reflect the entire spectrum of potential adverse effects of acquisitions in the platform economy. Very few studies deal with the impact on innovation and cases of product discontinuation (Gautier and Lamesch, 2021), while most research on adverse effects of acquisitions focuses on the post-acquisition entity reaching a dominant market position through combining two firms with a significant market share (Capron *et al.*, 1998; Eckbo, 1983; Rabier, 2017; Seth, 1990a, 1990b; Stillman, 1983). Furthermore, due to the specific characteristics of platform economies, early-stage technology companies and their impact on innovation and competition are important research objects.

Accelerate interdisciplinary research. The development of platform markets is accompanied by a rapid process of economic and social reorganization, entailing far-reaching consequences for business management, finance, and public policy. Therefore, it is a highly relevant topic for several different research disciplines. Combining theories and perspectives from different disciplines might have the potential to develop a holistic understanding of killer acquisitions in the platform economy, overcoming silo thinking of individual disciplines. This paper has attempted to make a first step by combining insights and findings from theory and business practice, being deeply rooted in management and finance literature but incorporating macroeconomic and legal perspectives as well. Another major purpose of interdisciplinary research is to accelerate the dispersion of knowledge and its translation into antitrust and merger control legislation, ensuring the continued existence of competitive markets and high levels of consumer choice and welfare.

8. Conclusion

In their award-winning paper, Cunningham *et al.* (2021) have challenged the existing view on traditional acquisition motives based on the realization of operating and financial synergies by proposing a scenario in which "an incumbent firm may acquire an innovative target and terminate the development of the target's innovations to preempt future competition" (p. 650). This new acquisition motive labeled 'killer acquisition', has been found to account for 5.3%-7.4% of all acquisitions in the pharmaceutical industry, entailing potentially adverse effects on innovation, consumer welfare, and competition (Cunningham *et al.*, 2021). While this phenomenon has been found to have significant ramifications for the pharmaceutical industry, it might be even more pronounced in the platform economy. The underlying rationale is that the latter is characterized by a tendency to develop towards winner-take-all markets in theory as well as a high degree of market concentration across many emerging platform markets in practice. In order to examine the impact of killer acquisitions in the platform economy, this thesis has investigated the research questions *Do Tech Giants Acquire Target Firms to Leverage Innovation or Eliminate Competition?*

To answer this question, the thesis followed a 4-step process, encompassing insights from theory and business practice. First, the theoretical background was presented, encompassing traditional acquisition motives, killer acquisitions, and the market characteristics of the platform economy. Second, GAFAM's market position and acquisition activity were analyzed to accompany the theoretical background with insights from business practice. Third, a theoretical framework was developed to illuminate the structures and incentives that underlie different types of acquisitions and classify killer acquisitions. Fourth, four cases were used to illustrate these types of acquisitions in order to demonstrate the applicability of the framework.

In the theoretical background, it was demonstrated that killer acquisitions are a novel phenomenon that inherently differs from acquisition motives related to the realization of operating and financial synergies. The main differences pertain to the role of the target's innovative capacity, the impact on consumer welfare, and the product development stage of the target firm. Regarding adverse effects of acquisitions, the current finance and strategic management literature focus on combining two entities with a significant market share. This emphasis is also reflected in the current antitrust legislation in the EU, UK, and US, mostly relying on market share and revenue thresholds in order to determine whether an acquisition is reviewed. Thus, the current legislation, rooted in a pre-digital economy, most likely does not prevent large acquirers from purchasing nascent high-tech targets and eliminating their innovative capacity. This was found to be particularly problematic in the platform economy, which is prone to develop towards winner-take-all markets due to strong network effects and high entry barriers for challenger firms. Finally, the thesis has determined that platform markets are ubiquitous, encompassing online marketplaces, social networks, and digital mapping, and are in the process of disrupting further linear markets, underlining their relevance.

In order to accompany the theoretical background with insights from business practice, GAFAM's market position and acquisition activity were analyzed. It was found that the GAFAM firms have dominant positions in most platform markets, including search engines, mobile operating systems, and intelligent virtual assistants. Moreover, they engaged in an increasing level of acquisition activity between 1987 and 2021, acquiring a total of 800 firms, significantly more than companies of comparable size that are active in non-platform industries. Furthermore, it could be observed that the GAFAM firms shifted their focus from acquisitions in related markets to those in unrelated markets, temporally coinciding with most of them developing from a sole transaction platform to an integrated platform with an ecosystem of interconnected technologies. 96.8% of acquisitions occurred in countries in which the GAFAM firms already had a large market share, indicating that reaching new user bases in untapped geographic markets has most likely not been a major driver of acquisitions. Finally, the analysis indicated that the majority of targets had a value below USD 100m, were in an early stage of the company life cycle, and contained a high innovative capacity.

The preceding insights from theory and practice showed the need for theory-building research in order to delimit traditional acquisition motives from killer acquisitions. Thus, the thesis formulated a framework, providing a novel approach in order to increase our understanding of the dynamics, structures, and incentives that affect acquisitions in the platform economy. The basic contention is that killer acquisitions are harmful since they lead to a loss of the target's innovative capacity. It is further hypothesized that the innovative capacity of platform firms follows distinct lifecycle phases, entailing implications with regard to the timing of killer acquisitions, the role of product market overlap, and competitive dynamics. Propositions include that the target's total innovative capacity can be divided into present and future innovative capacity and that the acquirer gains control of both at the time of the acquisition. It is hypothesized that this gives the acquirer two independent choices with regard to dealing with the target's present and future innovative capacity, deriving four archetypes of acquisitions. The acquirer can market the present and future innovative capacity (transformational acquisition), withhold the present and leverage the future innovative capacity (visionary acquisition), eliminate the present and future innovative capacity (visible killer acquisition), or market the present and eliminate the future innovative capacity (hidden killer acquisition). In order to showcase how the framework can be applied to business practice, four real-life case illustrations were presented in closer detail.

In conclusion, the thesis has provided a comprehensive overview of killer acquisitions in the platform economy and proposed a coherent framework to determine whether tech giants acquire target firms to leverage innovation or eliminate competition. Thereby, it sheds light on a highly relevant and under-researched field in an economic area that is likely to transform the ways in which consumers and producers interact, firms compete with each other, and economic value is created and captured. Moreover, by proposing a novel framework tailored to acquisitions in the platform economy, the thesis challenges the status quo in research, business

practice, and policymaking, striving to alter our understanding, foster conceptual development, and open up new perspectives.

Bibliography

Albaek S. 2013. Consumer welfare in EU competition policy. In *Aims and values in Competition Law*, Heide-Jorgensen C, Bergqvist C, Neergaard UB, Poulsen ST (eds). DJØF Publishing: Copenhagen, Denmark: 67–88.

Albergotti R. 2019, September 5. How Apple uses its App Store to copy the best ideas. *The Washington Post*. Available at: https://www.washingtonpost.com/technology/2019/09/05/how-apple-uses-its-app-store-copy-best-ideas/ [11 April 2021].

Albergotti R, MacMillian D, Rusli ME. 2014, February 19. Facebook to pay $19 billion for WhatsApp. *The Wall Street Journal*. Available at: https://www.wsj.com/articles/facebook-to-buy-whatsapp-for-16-billion-1392847766 [09 May 2021].

Alibaba. 2021. *Alibaba Group Holding Limited: Fiscal year 2020 annual report*. Available at: https://doc.irasia.com/listco/hk/alibabagroup/annual/2020/ar2020.pdf [10 April 2021].

Amit R, Livnat J. 1988. Diversification, capital structure, and systematic risk: An empirical investigation. *Journal of Accounting, Auditing & Finance* **3**(1): 19–43.

Anderson H, Havila V, Nilsson F. 2013. *Mergers and acquisitions: The critical role of stakeholders*. Routledge: New York, New York/USA.

Argentesi E *et al.* 2019. Ex-post assessment of merger control decisions in digital markets. *Document prepared by Lear for the Competition and Markets Authority*. Available at: https://www.learlab.com/wp-content/uploads/2019/06/CMA_past_digital_mergers_GOV.UK_version-1.pdf [10 March 2021].

Arrington M. 2010, August 16. Google to acquire Like.com after leaving them at the altar in 2005. *TechCrunch*. Available at: https://techcrunch.com/2010/08/15/google-to-acquire-like-com-after-leaving-them-at-the-altar-in-2005/?guccounter=1&guce_referrer=aHR0cHM6Ly9lbi53aWtpcGVkaWEub3JnLw&guce_referrer_sig=AQAAANiz1J1hgNcnRLtwq-jWr12VNBWHExSxZ8AypmPnovNF4aFgUhA7cHe24ciD7IKDEf9 [20 April 2021].

Auer D, Manne GA, Portuese A, Schrepel T. 2018. Why sound law and economics should guide competition policy in the digital economy. *International Center for Law and Economics (ICLE)*.

Auerbach AJ, Reishus D. 2019. *The impact of taxation on mergers and acquisitions*. University of Chicago Press: Chicago, Illinois/USA.

Awate S, Larsen MM, Mudambi R. 2015. Accessing vs sourcing knowledge: A comparative study of R&D internationalization between emerging and advanced economy firms. *Journal of International Business Studies* **46**(1): 63–86.

Baidu. 2021. Baidu announces fourth quarter and fiscal year 2020 results. Available at: https://ir.baidu.com/news-releases/news-release-details/baidu-announces-fourth-quarter-and-fiscal-year-2020-results#:~:text=%22Baidu revenue reached US%2416.4,Herman Yu %2C CFO of Baidu. [11 April 2021].

Bauer F, Matzler K. 2014. Antedents of M&A success: The role of strategic complementarity, cultural fit, and degree and speed of integration. *Strategic Management Journal* **35**(2): 269–291.

Bena J, Li K. 2014. Corporate innovations and mergers and acquisitions. *The Journal of Finance* **69**(5): 1923–1960.

Berger PG, Ofek E. 1995. Diversification's effect on firm value. *Journal of Financial Economics* **37**(1): 39–65.

Bettinazzi ELM, Zollo M. 2017. Stakeholder orientation and acquisition performance. *Strategic Management Journal* **38**(12): 2465–2485.

Bloom N, Van Reenen J, Williams H. 2019. A toolkit of policies to promote innovation. *Journal of Economic Perspectives* **33**(3): 163–184.

Bourreau M, de Streel A. 2020. *Big Tech acquisitions: Competition and innovation effects & EU merger control*. *Center on Regulation in Europe*. Available at: https://cerre.eu/publications/big-tech-acquisitions-competition-and-innovation-effects-eu-merger-control/ [20 April 2021].

Bridgwater A. 2020, February 21. How Israel became a technology startup nation. *Forbes*. Available at: https://www.forbes.com/sites/adrianbridgwater/2020/02/21/how-israel-became-a-technology-startup-nation/?sh=6b1d3d43780e [21 April 2021].

Bryan KA, Hovenkamp E. 2020a. Startup acquisitions, error costs, and antitrust policy. *The University of Chicago Law Review* **87**(2): 331–356.

Bryan KA, Hovenkamp E. 2020b. Antitrust limits on startup acquisitions. *Review of Industrial Organization* **56**(4): 615–636.

Bundeskartellamt. 2019. *Administrative Proceedings. Decision under Section 32(1) German Competition Act (GWB). Public version*. Available at: https://www.bundeskartellamt.de/SharedDocs/Entscheidung/EN/Entscheidungen/Missbrauchsaufsicht/2019/B6-22-16.pdf?__blob=publicationFile&v=5 [15 April 2021].

Burrows P, Frier S. 2013, July 21. Apple said to buy HopStop, pushing deeper into maps. *Bloomberg*. Available at: https://www.bloomberg.com/news/articles/2013-07-19/apple-said-to-buy-hopstop-pushing-deeper-into-maps [13 May 2021].

ByteDance. 2021. ByteDance's revenue doubled to $37b in 2020. Available at: https://www.techinasia.com/bytedances-revenue-doubled-37b-2020-sources [11 April 2021].

Caffarra C, Crawford GS, Valletti T. 2020. "How Tech Rolls": Potential competition and "reverse" Killer Acquisitions. *Competition Policy International* **2**(2): 1–8.

Calori R, Lubatkin M, Very P. 1994. Control mechanisms in cross-border acquisitions: An international comparison. *Organization Studies* **15**(3): 361–379.

Calvano E, Polo M. 2021. Market power, competition and innovation in digital markets: A survey. *Information Economics and Policy* **54**: 100853.

Capron L, Dussauge P, Mitchell W. 1998. Resource redeployment following horizontal acquisitions in Europe and North America, 1988-1992. *Strategic Management Journal* **19**(7): 631–661.

Chatterjee S. 1986. Types of synergy and economic value: The impact of acquisitions on merging and rival firms. *Strategic Management Journal* **7**(2): 119–139.

Chatterjee S, Lubatkin M. 1990. Corporate mergers, stockholder diversification, and changes in systematic risk. *Strategic Management Journal* **11**(4): 255–268.

Chen G, Huang S, Meyer-Doyle P, Mindruta D. 2020. Generalist versus specialist CEOs and acquisitions: Two-sided matching and the impact of CEO characteristics on firm outcomes. *Unpublished manuscript for the Strategic Management Journal*.

Chu LY, Nazerzadeh H, Zhang H. 2020. Position ranking and auctions for online marketplaces. *Management Science* **66**(8): 3617–3634.

Competition & Markets Authority. 2018. *Guidance on changes to the jurisdictional thresholds for UK merger control*. Available at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/903147/guidance_on_changes_to_the_jurisdictional_thresholds_for_UK_MC.pdf [30 March 2021].

Competition & Markets Authority. 2021. *Online platforms and digital advertising. Market study final report 1 July 2020*. Available at: https://assets.publishing.service.gov.uk/media/5fa557668fa8f5788db46efc/Final_report_Digital_ALT_TEXT.pdf [30 March 2021].

Confessore N. 2018, April 4. Cambridge Analytica and Facebook: The scandal and the fallout so far. *The New York Times*. Available at: https://www.nytimes.com/2018/04/04/us/politics/cambridge-analytica-scandal-fallout.html [05 May 2021].

Crémer J, De Montjoye YA, Schweitzer H. 2019. *Competition policy for the digital era. European Commission*. Available at: http://ec.europa.eu/competition/publications/reports/kd0419345enn.pdf [27 March 2021].

Crunchbase. 2021a. Crunchbase company profile - Coca Cola. Available at: https://www.crunchbase.com/search/acquisitions/field/organizations/num_acquisitions/the-coca-cola-company%0A [16 April 2021].

Crunchbase. 2021b. Crunchbase company profile - The Walt Disney Company. Available at: https://www.crunchbase.com/organization/the-walt-disney-company%0A [16 April 2021].

Crunchbase. 2021c. Crunchbase company profile - Samsung. Available at: https://www.crunchbase.com/organization/samsung-electronics%0A [16 April 2021].

Crunchbase. 2021d. Crunchbase company profile - LVMH. Available at: https://www.crunchbase.com/organization/lvmh%0A [16 April 2021].

Crunchbase. 2021e. Crunchbase company profile - McDonald's. Available at: https://www.crunchbase.com/organization/mcdonalds%0A [16 April 2021].

Crunchbase. 2021f. Crunchbase company profile - Toyota. Available at: https://www.crunchbase.com/organization/toyota%0A [16 April 2021].

Crunchbase. 2021g. Crunchbase company profile - Intel. Available at: https://www.crunchbase.com/organization/intel [16 April 2021].

Crunchbase. 2021h. Crunchbase company profile - Nike. Available at: https://www.crunchbase.com/organization/nike [16 April 2021].

Crunchbase. 2021i. Crunchbase company profile - AT&T. Available at: https://www.crunchbase.com/organization/at-t [16 April 2021].

Crunchbase. 2021j. Crunchbase company profile - Cisco. Available at: https://www.crunchbase.com/organization/cisco [16 April 2021].

Crunchbase. 2021k. Crunchbase company profile - Oracle. Available at: https://www.crunchbase.com/organization/oracle%0A [16 April 2021].

Crunchbase. 2021l. Crunchbase company profile - Verizon. Available at: https://www.crunchbase.com/organization/verizon%0A [16 April 2021].

Crunchbase. 2021m. Crunchbase company profile - Visa. Available at: https://www.crunchbase.com/organization/visa%0A [16 April 2021].

Crunchbase. 2021n. Crunchbase company profile - Walmart. Available at: https://www.crunchbase.com/organization/walmart%0A [16 April 2021].

Crunchbase. 2021o. Crunchbase company profile - General Electric. Available at: https://www.crunchbase.com/organization/general-electric%0A [16 April 2021].

Crunchbase. 2021p. Crunchbase company profile - Oculus VR. Available at: https://www.crunchbase.com/organization/oculus-vr [11 May 2021].

Crunchbase. 2021q. Crunchbase company profile - HopStop.com. Available at: https://www.crunchbase.com/organization/hopstop-com [11 May 2021].

Crunchbase. 2021r. Crunchbase company profile - Like.com. Available at: https://www.crunchbase.com/organization/like [1 May 2021].

Cunningham C, Ma S, Ederer F. 2021. Killer acquisitions. *Journal of Political Economy* **129**(3): 649–702.

Cyert RM, March JG. 1963. *A behavioral theory of the firm*. Blackwell: Malden, Massachusetts/USA.

Dai R, Massoud N, Nandy DK, Saunders A. 2017. Hedge funds in M&A deals: Is there exploitation of insider information? *Journal of Corporate Finance* **47**: 23–45.

Dammon RM, Senbet LW. 1988. The effect of taxes and depreciation on corporate investment and financial leverage. *The Journal of Finance* **43**(2): 357–373.

Deloitte. 2019. *The rise of the platform economy*. Available at: https://www2.deloitte.com/content/dam/Deloitte/nl/Documents/humancapital/deloitte-nl-hc-the-rise-of-the-platform-economy-report.pdf [10 April 2021].

Demirhan D, Jacob VS, Raghunathan S. 2007. Strategic IT investments: The impact of switching cost and declining IT cost. *Management Science* **53**(2): 208–226.

Doffman Z. 2021, April 10. Why iPhone, iPad and Mac users should avoid Google Chrome's FLoC update. *Forbes*. Available at: https://www.forbes.com/sites/zakdoffman/2021/04/10/why-you-should-never-use-google-chrome-on-your-apple-iphone-ipad-imac-or-macbook/ [10 April 2021].

Drozdiak N. 2020, July 10. Tech firms face pressure to report 'Killer Acquisitions' to EU. *Bloomberg*. Available at: https://www.bloomberg.com/news/articles/2020-07-10/tech-firms-face-pressure-to-report-killer-acquisitions-to-eu [15 March 2021].

Eckbo BE. 1983. Horizontal mergers, collusion, and stockholder wealth. *Journal of Financial Economics* **11**(1–4): 241–273.

Eisenhardt KM. 1989. Building theories from case study research. *Academy of Management Review* **14**(4): 532–550.

Espacenet Patent Search. 2021a. List of 64 patents filed by WhatsApp as applicant. Available at: https://worldwide.espacenet.com/searchResults?submitted=true&locale=en_EP&DB=EPODOC&ST=advanced&TI=&AB=&PN=&AP=&PR=&PD=&PA=whatsapp&IN=&CPC=&IC= [11 May 2021].

Espacenet Patent Search. 2021b. List of 408 patents filed by Oculus VR as applicant. Available at: https://worldwide.espacenet.com/searchResults?submitted=true&locale=en_EP&DB=EPODOC&ST=advanced&TI=&AB=&PN=&AP=&PR=&PD=&PA=oculus+vr+&IN=&CPC=&IC=&Submit=Search [11 May 2021].

Espacenet Patent Search. 2021c. List of 2 patents filed by HopStop as applicant. Available at: https://worldwide.espacenet.com/searchResults?submitted=true&locale=en_EP&DB=EPODOC&ST=advanced&TI=&AB=&PN=&AP=&PR=&PD=&PA=hopstop&IN=&CPC=&IC= [11 May 2021].

Espacenet Patent Search. 2021d. List of 13 patents filed by Like.com as applicant. Available at: https://worldwide.espacenet.com/searchResults?submitted=true&locale=en_EP&DB=EPODOC&ST=advanced&TI=&AB=&PN=&AP=&PR=&PD=&PA=like.com&IN=&CPC=&IC= [11 May 2021].

Espacenet Patent Search. 2021e. List of 3 patents filed by Riya, Inc. as applicant. Available at: https://worldwide.espacenet.com/searchResults?submitted=true&locale=en_EP&DB=EPODOC&ST=advanced&TI=&AB=&PN=&AP=&PR=&PD=&PA=riya+inc&IN=&CPC=&IC= [11 May 2021].

EUR-Lex. 2004. Council regulation on the control of concentrations between undertakings (the EC merger regulation). Available at: https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX%3A32004R0139 [1 April 2021].

European Commission. 2019. Antitrust: Commission opens investigation into possible anti-competitive conduct of Amazon. Available at: https://ec.europa.eu/commission/presscorner/detail/en/IP_19_4291 [16 April 2021].

Eurostat. 2021. Population EU on 1st January 2021. Available at: https://ec.europa.eu/eurostat/databrowser/view/tps00001/default/table?lang=en [8 April 2021].

Evans PC, Gawer A. 2016. *The rise of the platform enterprise. A global survey*. Available at: https://www.thecge.net/app/uploads/2016/01/PDF-WEB-Platform-Survey_01_12.pdf [15 April 2021].

Facebook. 2014a. Facebook to acquire WhatsApp. Available at: https://about.fb.com/news/2014/02/facebook-to-acquire-whatsapp/ [5 May 2021].

Facebook. 2014b. Facebook to acquire Oculus. Available at: https://about.fb.com/news/2014/03/facebook-to-acquire-oculus/ [10 February 2021].

Fayne K, Foreman K. 2020. To catch a killer: Could enhanced premerger screening for 'Killer Acquisitions' hurt competition? *Antitrust Magazine* **34**(2): 8–13.

Federal Trade Commission. 1981. *Statistical report on mergers and acquisitions*. Washington D.C., Columbia/USA.

Federal Trade Commission. 2018. FTC announces agenda for the third session of its hearings on competition and consumer protection in the 21st century. Available at: https://www.ftc.gov/news-events/press-releases/2018/10/ftc-announces-agenda-third-session-its-hearings-competition [9 April 2021].

Federal Trade Commission. 2019. FTC's Bureau of Competition launches task force to monitor technology markets. Available at: https://www.ftc.gov/news-events/press-releases/2019/02/ftcs-bureau-competition-launches-task-force-monitor-technology [9 April 2021].

Ferriello E. 2020a. Best paper in antitrust economics: Killer Acquisitions. Available at: https://som.yale.edu/blog/best-paper-in-antitrust-economics-killer-acquisitions [9 April 2021].

Ferriello E. 2020b. Prof. Song Ma wins award for research on 'Killer Acquisitions'. Available at: https://som.yale.edu/blog/prof-song-ma-wins-award-for-research-on-killer-acquisitions [9 April 2021].

Forbes. 2020. The most valuable brands 2020. Available at: https://www.forbes.com/the-worlds-most-valuable-brands/#4bd47128119c [7 April 2021].

Forbes. 2021. The richest people in the world - List of billionaires. Available at: https://www.forbes.com/billionaires/ [7 April 2021].

Franks J, Mayer C. 1996. Hostile takeovers and the correction of managerial failure. *Journal of Financial Economics* **40**(1): 163–181.

Fulghieri P. 2011. Mergers, spinoffs, and employee incentives. *The Review of Financial Studies* **24**(7): 2207–2241.

Fuller M. 2019. Big data and the Facebook scandal: Issues and responses. *Theology* **122**(1): 14–21.

Furman J, Coyle D, Fletcher A, McAuley D, Marsden P. 2019. *Unlocking digital competition: Report of the*

Digital Competition Expert Panel. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/785547/unlocking_digital_competition_furman_review_web.pdf [01 April 2021].

Gaughan PA. 2004. M&A lesson: Beware of empire builders. *The Journal of Corporate Accounting & Finance* **15**(2): 21–23.

Gautier A, Lamesch J. 2021. Mergers in the digital economy. *Information Economics and Policy* **54**(9): 1–25.

Ghemawat P. 2001. Distance still matters: The hard reality of global expansion. *Harvard Business Review* **79**(8): 137–162.

Ghose A, Ipeirotis PG, Li B. 2014. Examining the impact of ranking on consumer behavior and search engine revenue. *Management Science* **60**(7): 1632–1654.

Gilbert B. 2016, January 6. Facebook's Oculus Rift VR headset costs $600. *Business Insider*. Available at: https://www.businessinsider.com/oculus-rift-price-release-date-announced-2016-1?r=US&IR=T [10 February 2021].

Goel V. 2017, December 5. Google missed out on China. Can it flourish in India? *The New York Times*. Available at: https://www.nytimes.com/2017/12/05/technology/google-india.html [18 April 2021].

Goel V. 2019, February 14. India proposes Chinese-style internet censorship. *The New York Times*. Available at: https://www.nytimes.com/2019/02/14/technology/india-internet-censorship.html [18 April 2021].

Graham M. 2021, April 7. Digital ad spend grew 12% in 2020 despite hit from pandemic. *CNBC*. Available at: https://www.cnbc.com/2021/04/07/digital-ad-spend-grew-12percent-in-2020-despite-hit-from-pandemic.html#:~:text=Google's share was 28.9%25 of,25.2%25%2C [7 April 2021].

Harford J. 1999. Corporate cash reserves and acquisitions. *The Journal of Finance* **54**(6): 1969–1997.

Harrison R. 2021. Bet365 revenue declines 8% to £2.81bn in 2019-20. Available at: https://igamingbusiness.com/bet365-revenue-declines-8-in-2019-20/ [11 April 2021].

Haselton T. 2021, February 3. Jeff Bezos to step down as Amazon CEO, Andy Jassy to take over in Q3. *CNBC*. Available at: https://www.cnbc.com/2021/02/02/jeff-bezos-to-step-down-as-amazon-ceo-andy-jassy-to-take-over-in-q3.html [10 April 2021].

Helfat CE, Peteraf MA. 2003. The dynamic resource-based view: Capability lifecycles. *Strategic Management Journal* **24**(10): 997–1010.

Hitt MA, Hoskisson RE, Johnson RA, Moesel DD. 1996. The market for corporate control and firm innovation. *Academy of Management Journal* **39**(5): 1084–1119.

Hof R. 2009, November 8. Like.com: Visual shopping search. *Bloomberg*. Available at: https://www.bloomberg.com/businessweek/the_thread/techbeat/archives/2006/11/likecom_visual.html [10 October 2020].

Holmström M, Padilla J, Stitzing R, Sääskilahti P. 2019. Killer acquisitions? The debate on merger control for digital markets. *2018 Yearbook of the Finnish Competition Law Association*: 609–626.

House of Lords' Select Committee on Communications. 2019. *Regulating in a digital world. 2nd report of session 2017-19*. Available at: https://publications.parliament.uk/pa/ld201719/ldselect/ldcomuni/299/299.pdf [05 April 2021].

Huang Z, Zhu H, Brass DJ. 2017. Cross-border acquisitions and the asymmetric effect of power distance value difference on long-term post-acquisition performance. *Strategic Management Journal* **38**(4):

972–991.

Intel. 2021. Intel reports fourth-quarter and full-year 2020 financial results. Available at: https://d1io3yog0oux5.cloudfront.net/_f209ff380778875545ac1629b9630953/intel/news/2021-01-21_Intel_Reports_Fourth_Quarter_and_Full_Year_2020_1439.pdf [11 April 2021].

International Monetary Fund. 2021. World economic outlook database - Gross domestic products by regions. Available at: https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases#sort=%40imfdate descending [8 April 2021].

Iyer DN, Miller KD. 2008. Performance feedback, slack, and the timing of acquisitions. *Academy of Management Journal* **51**(4): 808–822.

Jemison DB *et al.* 1986. Corporate acquisitions: A process perspective. *Academy of Management Review* **11**(1): 145–163.

Jensen MC. 1986. Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review* **76**(2): 323–329.

Jensen MC, Meckling WH. 1976. Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics* **3**(4): 305–360.

Jones Day. 2020. U.S. merger notification threshold increases to $94 Million. Available at: https://www.jonesday.com/en/insights/2020/01/ftc-announces-2020-merger-notification-thresholds [9 April 2021].

Joskow PL, Klevorick AK. 1979. A framework for analyzing predatory pricing policy. *The Yale Law Journal* **89**(2): 213–270.

Justia US Law. 2001. United States of America, Appellee v. Microsoft Corporation, Appellant, 253 F.3d 34 (D.C. Cir. 2001). *US Court of Appeals for the District of Columbia Circuit*. Available at: https://law.justia.com/cases/federal/appellate-courts/F3/253/34/576095/ [1 May 2021].

Karim S, Kaul A. 2015. Structural recombination and innovation: Unlocking intraorganizational knowledge synergy through structural change. *Organization Science* **26**(2): 439–455.

Katz ML. 2021. Big Tech mergers: Innovation, competition for the market, and the acquisition of emerging competitors. *Information Economics and Policy* **54**: 100883.

Keane S. 2021, April 15. Huawei ban timeline: Company tries to blame US sanctions for global chip shortage. *CNET*. Available at: https://www.cnet.com/news/huawei-ban-full-timeline-us-sanctions-global-ship-shortage-china/ [20 April 2021].

Kenney M, Zysman J. 2016. The rise of the platform economy. *Issues in Science and Technology* **32**(3): 61–69.

Kharpal A. 2019, April 19. Amazon is shutting down its China marketplace business. Here's why it has struggled. *CNBC*. Available at: https://www.cnbc.com/2019/04/18/amazon-china-marketplace-closing-down-heres-why.html [12 April 2021].

King DR, Dalton DR, Daily CM, Covin JG. 2004. Meta-analyses of post-acquisition performance: Indications of unidentified moderators. *Strategic Management Journal* **25**(2): 187–200.

Kroll M, Walters BA, Le SA. 2007. The impact of board composition and top management team ownership structure on post-IPO performance in young entrepreneurial firms. *Academy of Management Journal* **50**(5): 1198–1216.

Kumar N. 2009. How emerging giants are rewriting the rules of M&A. *Harvard Business Review* **87**(5): 115–121.

Kumaraswamy A, Garud R, Ansari S (Shaz). 2018. Perspectives on disruptive innovations. *Journal of Management Studies* **55**(7): 1025–1042.

Lambrecht BM, Myers SC. 2007. A theory of takeovers and disinvestment. *The Journal of Finance* **62**(2): 809–845.

Lamont OA, Polk C. 2001. The diversification discount: Cash flows versus returns. *The Journal of Finance* **56**(5): 1693–1721.

Lang LHP, Stulz RM. 1994. Tobin's q, corporate diversification, and firm performance. *The Journal of Political Economy* **102**(6): 1248–1280.

Leland HE. 2007. Financial synergies and the optimal scope of the firm: Implications for mergers, spinoffs, and structured finance. *The Journal of Finance* **62**(2): 765–807.

Letina I, Schmutzler A, Seibel R. 2020. Killer acquisitions and beyond: Policy effects on innovation strategies. *Working Paper Series University of Zurich* **2**(358): 1–36.

Lewellen WG. 1971. A pure financial rationale for the conglomerate merger. *The Journal of Finance* **26**(2): 521–537.

Lipsman A. 2020. *Top 10 US ecommerce companies 2020. Walmart and Target climb rankings on click-and-collect gains*. Available at: https://www.emarketer.com/content/top-10-us-ecommerce-companies-2020 [07 April 2021].

Malmendier U, Tate G. 2005. CEO overconfidence and corporate investment. *The Journal of Finance* **60**(6): 2661–2700.

Malmendier U, Tate G. 2008. Who makes acquisitions? CEO overconfidence and the market's reaction. *Journal of Financial Economics*, Journal of Financial Economics **89**(1): 20–43.

MarketLine. 2014. *Facebook: The Whatsapp acquisition*. Available at: https://advantage-marketline-com.esc-web.lib.cbs.dk:8443/Analysis/details/facebook-the-whatsapp-acquisition-27578 [9 March 2021].

MarketLine. 2021a. *Alphabet Inc. - Company profile*. Available at: https://store.marketline.com/report/ml1408443sa--alphabet-inc-strategy-swot-and-corporate-finance-report-2/ [1 March 2021].

MarketLine. 2021b. *Amazon.com, Inc. - Company profile*. Available at: https://store.marketline.com/report/ml2580641sa--amazon-com-inc-strategy-swot-and-corporate-finance-report-2/ [1 March 2021].

MarketLine. 2021c. *Facebook Inc. - Company profile*. Available at: https://store.marketline.com/report/ml2624017sa--facebook-inc-strategy-swot-and-corporate-finance-report-3/ [1 March 2021].

MarketLine. 2021d. *Apple Inc. - Company profile*. Available at: https://store.marketline.com/report/ml1439305sa--apple-inc-strategy-swot-and-corporate-finance-report-3/ [1 March 2021].

MarketLine. 2021e. *Microsoft Corporation - Company profile*. Available at: https://store.marketline.com/report/1be9e66f-8e79-4bc2-81d0-3637e8b27cda--microsoft-corporation-strategy-swot-and-corporate-finance-report-3/ [1 March 2021].

MarketLine. 2021f. Facebook acquires Whatsapp - Key facts about the acquisition. Available at: https://advantage-marketline-com.esc-web.lib.cbs.dk:8443/Deals/Facts/facebook-acquires-whatsapp_ml_493210_1532163 [5 May 2021].

MarketLine. 2021g. Facebook acquires Oculus VR - Key facts about the acquisition. Available at: https://advantage-marketline-com.esc-web.lib.cbs.dk:8443/Deals/Facts/facebook-acquires-oculus-vr_ml_562692_1203570 [5 May 2021].

MarketLine. 2021h. Apple acquires HopStop- Key facts about the acquisition. Available at: https://advantage-marketline-com.esc-web.lib.cbs.dk:8443/Deals/Facts/apple-acquires-hopstop_wmi_578111 [11 May 2021].

MarketLine. 2021i. Google acquires Like.com (Riya) - Key facts about the acquisition. Available at: https://advantage-marketline-com.esc-web.lib.cbs.dk:8443/Deals/Facts/google-acquires-like-com-riya-_ml_354415_1610431 [5 May 2021].

Martins H, Dias Y, Khanna S. 2016. What makes some silicon valley companies so successful. *Harvard Business Review*. Available at: https://hbr.org/2016/04/what-makes-some-silicon-valley-companies-so-successful [13 April 2021].

Marty FM, Warin T. 2020. Visa acquiring Plaid: A tartan over a killer acquisition? reflections on the risks of harming competition through the acquisition of startups within digital ecosystems. *CIRANO Working Paper*.

Mattioli D. 2020, April 23. Amazon scooped up data from its own sellers to launch competing products. *The Wall Street Journal*. Available at: https://www.wsj.com/articles/amazon-scooped-up-data-from-its-own-sellers-to-launch-competing-products-11587650015 [23 April 2021].

McIver T, Heemsoth AM. 2021. Merger control in the UK (England and Wales): Overview. *Thomson Reuters Practical Law*. Available at: https://uk.practicallaw.thomsonreuters.com/0-500-7317?transitionType=Default&contextData=(sc.Default)&firstPage=true [9 April 2021].

Medina R, Medina A. 2018. The linkage between learning capabilities and innovative capacity: A case study. *Journal of Leadership, Accounting & Ethics* **15**(1): 125–142.

Mickle T. 2019, July 23. Apple dominates App Store search results, thwarting competitors. *The Wall Street Journal*. Available at: https://www.wsj.com/articles/apple-dominates-app-store-search-results-thwarting-competitors-11563897221 [20 April 2021].

Microsoft. 2019. *Voice report. From answers to action: customer adoption of voice technology and digital assistants*. Available at: https://advertiseonbing-blob.azureedge.net/blob/bingads/media/insight/whitepapers/2019/04 apr/voice-report/bingads_2019_voicereport.pdf [20 April 2021].

Miller DT, Ross M. 1975. Self-serving biases in the attribution of causality: Fact or fiction? *Psychological Bulletin* **82**(2): 213–225.

Mims C. 2020, October 10. 'Too complex to break up' is the new 'too big to fail'. *The Wall Street Journal*. Available at: https://www.wsj.com/articles/too-complex-to-break-up-is-the-new-too-big-to-fail-11602302406 [9 May 2021].

Modigliani F, Miller MH. 1958. The cost of capital, corporation finance and the theory of investment. *The American Economic Review* **48**(3): 261–297.

Morck R, Shleifer A, Vishny RW. 1990. Do managerial objectives drive bad acquisitions? *The Journal of Finance* **45**(1): 31–48.

Morton F, Dinielli DC. 2020. *Roadmap for an antitrust case against Facebook. Omidyar Network*. Available at: https://www.omidyar.com/wp-content/uploads/2020/06/Roadmap-for-an-Antitrust-Case-Against-Facebook.pdf [15 March 2021].

Mucchetti P, Pozen S, Cornell T, Lee E, Pak J. 2021. Merger control in the United States: Overview.

Thomson Reuters Practical Law. Available at: https://uk.practicallaw.thomsonreuters.com/5-501-2849?transitionType=Default&contextData=(sc.Default)&firstPage=true [9 April 2021].

Nadler J, Cicilline DN. 2020. *Investigation of competition in the digital markets*. Available at: https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf?utm_campaign=4493-519 [30 April 2021].

Nagji B, Tuff G. 2012. Managing your innovation portfolio. *Harvard Business Review* **1**(5): 67–74.

Namara GMMC. 2008. The performance implications of participating in an acquisition wave: Early mover advantages, bandwagon effects, and the moderating influence of industry characteristics and acquirer tactics. *Academy of Management Journal* **51**(1): 113–130.

Narin F, Noma E, Perry R. 1987. Patents as indicators of corporate technological strength. *Research Policy* **16**(2): 143–155.

Nasdaq.com. 2021. Facebook Inc. Class A common stock. Available at: https://www.nasdaq.com/market-activity/stocks/fb [8 April 2021].

National Institute of Standards and Technology. 2011. *The NIST definition of cloud computing. Recommendations of the National Institute of Standards and Technology*. Available at: https://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-145.pdf [19 April 2021].

Netflix Inc. 2021. *Netflix Inc.: Annual report 2020*. Available at: https://d18rn0p25nwr6d.cloudfront.net/CIK-0001065280/8f311d9b-787d-45db-a6ea-38335ede9d47.pdf [11 April 2021].

Nonaka I. 1994. A dynamic theory of organizational knowledge creation. *Organization Science* **5**(1): 14–37.

Nuccio M, Guerzoni M. 2019. Big data: Hell or heaven? Digital platforms and market power in the data-driven economy. *Competition & Change* **23**(3): 312–328.

Nusca A. 2015, September 12. Apple Maps vs. Google Maps heats up as Apple shuts down HopStop. *Fortune*. Available at: https://fortune.com/2015/09/12/hopstop-apple-shutdown/ [7 March 2021].

OECD. 2016. *Big data: Bringing competition policy to the digital era. Background note by the secretariat.* Available at: https://one.oecd.org/document/DAF/COMP(2016)14/en/pdf [10 February 2021].

OECD. 2020a. *Start-ups, killer acquisitions and merger control - Background note*. Available at: http://www.oecd.org/daf/competition/start-ups-killer-acquisitions-and-merger-control.htm [10 February 2021].

OECD. 2020b. *OECD competition trends 2020*. Available at: http://www.oecd.org/competition/oecd-competition-trends.htm [10 February 2021].

Office for National Statistics. 2021. Overview of the UK population: January 2021. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/overviewoftheukpopulation/january2021 [18 April 2021].

Otto Group. 2021. Otto Group key figures. Available at: https://www.ottogroup.com/en/about-us/daten-fakten/Key-Figures.php [11 April 2021].

Parlock J. 2020, August 26. VR industry leader oculus has been renamed to Facebook Reality Labs. *Forbes*. Available at: https://www.forbes.com/sites/joeparlock/2020/08/26/vr-industry-leader-oculus-has-been-renamed-to-facebook-reality-labs/?sh=765d077b10ea [27 April 2021].

PayPal. 2021. PayPal reports fourth quarter and full year 2020 result. Available at: https://investor.pypl.com/news-and-events/news-details/2021/PayPal-Reports-Fourth-Quarter-and-Full-Year-2020-Results/default.aspx [11 April 2021].

Phillips GM, Zhdanov A. 2013. R&D and the incentives from merger and acquisition activity. *Review of Financial Studies* **26**(1): 34–78.

Pisano G. 2016. You need an innovative strategy. *Harvard Business Review* **93**(6): 44–54.

Rabier MR. 2017. Acquisition motives and the distribution of acquisition performance: Motives and distribution of performance. *Strategic Management Journal* **38**(13): 2666–2681.

Rakuten. 2021. *FY2020 and Q4 FY2020 financial results highlights*. Available at: https://global.rakuten.com/corp/news/press/2021/0212_05.html#:~:text= ・The Rakuten Group recorded revenue,consecutive revenue growth since founding [11 April 2021].

Ravenscraft D j., Scherer FM. 1987. *Mergers, sell-offs, and economic efficiency.* Brookings Institution Press: Washington D.C., Columbia/USA.

Rochet J-C, Tirole J. 2003. Platform competition in two-sided markets. *Journal of the European Economic Association* **1**(4): 990–1029.

Roll R. 1986. The hubris hypothesis of corporate takeovers. *The Journal of Business* **59**(2): 197–216.

Romm T. 2019, September 9. 50 US states and territories announce broad antitrust investigation of Google. *The Washington Post*. Available at: https://www.washingtonpost.com/gdpr-consent/?next_url=https%3A%2F%2Fwww.washingtonpost.com%2Ftechnology%2F2019%2F09%2F09%2Fstates-us-territories-announce-broad-antitrust-investigation-google%2F [28 February 2021].

Rumelt RP. 1982. Diversification strategy and profitability. *Strategic Management Journal* **3**(4): 359–369.

Rusli EM, MacMillan D. 2013, November 13. Messaging service Snapchat spurned $3 billion Facebook bid. *The Wall Street Journal*. Available at: https://www.wsj.com/articles/SB10001424052702303789604579196023009484870 [9 May 2021].

Salesforce.com. 2021. Salesforce announces record fourth quarter and full year fiscal 2020 results. Available at: https://s23.q4cdn.com/574569502/files/doc_financials/2020/q4/CRM-Q4-FY20-Earnings-Press-Release-w-financials.pdf [11 April 2021].

SAP. 2021. SAP announces fourth quarter and full-year 2020 results. Available at: https://news.sap.com/2021/01/sap-announces-fourth-quarter-and-full-year-2020-results/ [11 April 2021].

Schechner S. 2021, April 30. EU charges Apple with App Store antitrust violations in Spotify Case. *The Wall Street Journal*. Available at: https://www.wsj.com/articles/apple-faces-eu-antitrust-charges-over-app-store-payments-in-spotify-case-11619777595 [7 May 2021].

Schilling MA. 2002. Technology success and failure in winner-take-all markets: The impact of learning orientation, timing, and network externalities. *Academy of Management Journal* **45**(2): 387–398.

Schmidt DR, Fowler KL. 1990. Post-acquisition financial performance and executive compensation. *Strategic Management Journal* **11**(7): 559–569.

Schweitzer H, Haucap J, Kerber W, Welker R. 2018. *Modernisierung der Missbrauchsaufsicht für marktmächtige Unternehmen (Modernizing abuse control for dominant companies). English executive summary available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3250742 [10 April 2021]*.

Seth A. 1990a. Sources of value creation in acquisitions: An empirical investigation. *Strategic Management Journal* **11**(6): 431–446.

Seth A. 1990b. Value creation in acquisitions: A re-examination of performance issues. *Strategic Management Journal* **11**(2): 99–115.

Shapiro C, Varian HR. 2000. Information rules: A strategic guide to the network economy. *Academy of Management Review* **25**(2): 441–443.

Shaver JM. 2006. A paradox of synergy: Contagion and capacity effects in mergers and acquisitions. *Academy of Management Review* **31**(4): 962–976.

Shivdasani A. 1993. Board composition, ownership structure, and hostile takeovers. *Journal of Accounting & Economics* **16**(1): 167–198.

Shleifer A, Vishny RW. 2003. Stock market driven acquisitions. *Journal of Financial Economics* **70**(3): 295–311.

Sismeiro C, Mahmood A. 2018. Competitive vs. complementary effects in online social networks and news consumption: A natural experiment. *Management Science* **64**(11): 5014–5037.

Šmejkal V. 2020. Concentrations in digital sector - A new antitrust standard for 'Killer Acquisitions' needed? *InterEU Law East* **7**(2): 1–16.

Sozzi B. 2019, September 18. Mark Zuckerberg 'has so much control' that Facebook doesn't have good corporate governance. *Yahoo Finance*. Available at: https://finance.yahoo.com/news/mark-zuckerberg-has-so-much-control-that-facebook-doesnt-have-good-corporate-governance-183515943.html?guccounter=1 [20 April 2021].

Spotify. 2021. Spotify Technology S.A. announces financial results for fourth quarter 2020. Available at: https://investors.spotify.com/financials/press-release-details/2021/Spotify-Technology-S.A.-Announces-Financial-Results-for-Fourth-Quarter-2020/default.aspx [11 April 2021].

Statista. 2018. Most popular mapping apps in the U.S. 2018, by audience. Available at: https://www.statista.com/statistics/865413/most-popular-us-mapping-apps-ranked-by-audience/ [21 April 2021].

Statista. 2020. Leading companies worldwide in 2020, by brand value. Available at: https://www.statista.com/statistics/269444/brand-value-of-the-most-valuable-companies-worldwide/ [30 April 2021].

Statista. 2021a. Worldwide desktop market share of leading search engines from January 2010 to February 2021. Available at: https://www.statista.com/statistics/216573/worldwide-market-share-of-search-engines/ [21 April 2021].

Statista. 2021b. Most popular social networks worldwide as of January 2021, ranked by number of active users. Available at: https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/ [18 April 2021].

Statista. 2021c. Market share of mobile operating systems worldwide 2012-2021. Available at: https://www.statista.com/statistics/272698/global-market-share-held-by-mobile-operating-systems-since-2009/ [18 April 2021].

Statista. 2021d. Amazon leads $130-billion cloud market. Available at: https://www.statista.com/chart/18819/worldwide-market-share-of-leading-cloud-infrastructure-service-providers/ [21 April 2021].

Statista. 2021e. Global market share held by leading internet browsers from January 2012 to March 2021. Available at: https://www.statista.com/statistics/268254/market-share-of-internet-browsers-worldwide-since-2009/ [21 April 2021].

Statista. 2021f. Annual net revenue of Amazon from 2006 to 2020 by segment in USDbn. Available at: https://www.statista.com/statistics/266289/net-revenue-of-amazon-by-region/ [9 April 2021].

Statista. 2021g. Google, Amazon, Facebook, Apple, and Microsoft (GAFAM) - statistics & facts. Available at: https://www.statista.com/topics/4213/google-apple-facebook-amazon-and-microsoft-gafam/ [1 April 2021].

Statista. 2021h. Annual net revenue of eBay from 2013 to 2020. Available at: https://www.statista.com/statistics/507881/ebays-annual-net-revenue/ [11 April 2021].

Statista. 2021i. Number of monthly active WhatsApp users worldwide from April 2013 to March 2020. Available at: https://www.statista.com/statistics/260819/number-of-monthly-active-whatsapp-users/ [9 May 2021].

Stigler Center. 2019. *Stigler Committee on Digital Platforms, Final Report*. *Stigler Center for the Study of the Economy and the State, The University of Chigago Booth School of Business*. Available at: https://research.chicagobooth.edu/stigler/media/news/committee-on-digital- platforms-final-report [04 April 2021].

Stillman R. 1983. Examining antitrust policy towards horizontal mergers. *Journal of Financial Economics* **11**(1–4): 225–240.

Stoll J. 2021. Amazon Prime Video - Statistics & facts. *Statista*. Available at: https://www.statista.com/topics/4740/amazon-prime-video/ [30 April 2021].

Suarez FF. 2005. Network effects revisited: The role of strong ties in technology selection. *Academy of Management Journal* **48**(4): 710–720.

Takahashi D. 2013. Oculus VR raises $75M round led by web browser inventor Marc Andreessen's VC firm to launch virtual-reality goggles. Available at: https://venturebeat.com/2013/12/12/oculus-vr-raises-75m-from-andreessen-horowitz-to-create-consumer-version-of-its-virtual-reality-goggles/ [11 May 2021].

Tencent. 2021. Tencent announces 2020 fourth quarter and annaul results. Available at: https://static.www.tencent.com/uploads/2021/03/24/b83f5784d0579b51cf8515cf560b4256.pdf [11 April 2021].

The Economist. 2016. Online platforms. Nostrums for rostrums. *The Economist, May 2016 Edition*. Available at: https://www.economist.com/leaders/2016/05/26/nostrums-for-rostrums [28 March 2021].

The Economist. 2018. Into the danger zone. American tech giants are making life tough for startups. *The Economist, June 2018 Edition*. Available at: https://www.economist.com/business/2018/06/02/american-tech-giants-are-making-life-tough-for-startups [28 March 2021].

The Economist. 2020. The EU unveils its plan to rein in big tech. *The Economist, Dezember 2020 Edition*. Available at: https://www.economist.com/business/2020/12/15/the-eu-unveils-its-plan-to-rein-in-big-tech [10 March 2021].

The National Archives. 2002. UK Enterprise Act. Available at: https://www.legislation.gov.uk/ukpga/2002/40/section/23# [14 March 2021].

Tong L, Wang H, Xia J. 2020. Stakeholder preservation or appropriation? The influence of target CSR on market reactions to acquisition announcements. *Academy of Management Journal* **63**(5): 1535.

Tsotsis A. 2014, February 22. Whatsapp was valued at ~$1.5B in final round before sale. *TechCrunch*. Available at: https://techcrunch.com/2014/02/21/whatsapp/?guccounter=1&guce_referrer=aHR0cHM6Ly9lbi53aWtpcGVkaWEub3JnLw&guce_referrer_sig=AQAAAEbHmvhgkHkA67n5fAQK7bD3pctWZcLHbOhVXsvHeAp2swOwJjtWo4OM02FeqCChWynIaFXDEEL3K_67ao03oVfIxY7UMg51XTI3aor1bk7iLNd5i-mWKNWuM1vZY9c [3 May 2021].

Tushman ML, Katz R. 1980. External communication and project performance: An investigation into the role of gatekeepers. *Management Science* **26**(11): 1071–1085.

Tuttle H. 2019. Facebook scandal raises data privacy concerns. *Risk Management Magazine*. Available at: http://www.rmmagazine.com/2018/05/01/facebook-scandal-raises-data-privacy-concerns/#:~:text=The quiz-takers had to,evening of Friday%2C March 16 [13 April 2021].

Uber. 2021. Uber announces results for fourth quarter and full year 2020. Available at: https://investor.uber.com/news-events/news/press-release-details/2021/Uber-Announces-Results-for-Fourth-Quarter-and-Full-Year-2020/default.aspx [11 April 2021].

United Nations Development Programme. 2020. *Human Development Report 2020. The next frontier. Human development and the Anthropocene*. Available at: http://hdr.undp.org/sites/default/files/hdr2020.pdf [1 May 2021].

United States Census Bureau. 2021. QuickFacts United States. Available at: https://www.census.gov/quickfacts/fact/table/US/PST045219 [9 April 2021].

United States Senate Judiciary. 2019. "Competition in digital technology markets: Examining acquisitions of nascent or potential competitors by digital platforms." Questions for the record for Bruce Hoffman. Submitted by Senator Richard Blumenthal on October 8, 2019. Available at: https://www.judiciary.senate.gov/imo/media/doc/Hoffman Responses to QFRs1.pdf [9 April 2021].

Urbig D, Bürger R, Patzelt H, Schweizer L. 2013. Investor reactions to new product development failures: The moderating role of product development stage. *Journal of Management* **39**(4): 985–1015.

Vermeulen F, Barkema H. 2001. Learning through acquisitions. *Academy of Management Journal* **44**(3): 457–476.

Vernon R. 1966. International investment and international trade in the product cycle. *The Quarterly Journal of Economics* **80**(2): 190–207.

Walter GA, Barney JB. 1990. Management objectives in mergers and acquisitions. *Strategic Management Journal* **11**(1): 79–86.

Wang L, Zajac EJ. 2007. Alliance or acquisition? A dyadic perspective on interfirm resource combinations. *Strategic Management Journal* **28**(13): 1291–1317.

Welch C. 2013, March 25. Facebook buying Oculus VR for $2 billion. *The Verge*. Available at: https://www.theverge.com/2014/3/25/5547456/facebook-buying-oculus-for-2-billion/in/3631187 [15 March 2021].

Wernerfelt B. 1984. A resource-based view of the firm. *Strategic Management Journal* **5**(2): 171–180.

Weyl EG. 2010. A price theory on multi-sided platforms. *American Economic Review* **100**(4): 1642–1672.

Whetten DA. 1989. What constitutes a theoretical contribution? *Academy of Management Review* **14**(4): 490–495.

White A. 2021, March 26. EU merger reviews seek to scoop up big firms' killer deals. *Bloomberg*. Available at: https://www.bloomberg.com/news/articles/2021-03-26/eu-weighs-extending-review-of-mergers-in-warning-to-big-tech [1 April 2021].

Whitwam R. 2013. Transit app HopStop pulled from Play Store following Apple acquisition, users weep softly into their paper bus schedules. Available at: https://www.androidpolice.com/2013/09/13/transit-app-hopstop-pulled-from-play-store-following-apple-acquisition-users-weep-softly-into-their-paper-bus-schedules/ [14 May 2021].

Winarsky N. 2015. The president of SRI Ventures on bringing Siri to life. *Harvard Business Review* **93**(9):

39–42.

Wright P, Kroll M, Elenkov D. 2002. Acquisition returns, increase in firm size, and chief executive officer compensation: The moderating role of monitoring. *Academy of Management Journal* **45**(3): 599–608.

Wu K. 2020. The platform economy. *Sparkline Capital*. Available at: https://www.sparklinecapital.com/post/the-platform-economy [10 April 2021].

Yahoo Finance. 2021a. Alphabet Inc. - Financial data. Available at: https://finance.yahoo.com/quote/GOOG/?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAAMVw8uRYsY8S9n4TzI2WnjSWfY1-HbAYmaPeKZQAsIQNFbePogZNmT5A1TWfY6gYgsDBlUouTa2fTcywhUPs7AzvgZzzCrC0OcqN-9Mp-O8ZSwA815g3O6pWyW6vzr0PSYf-dlFD [9 April 2021].

Yahoo Finance. 2021b. Amazon.com, Inc. - Financial data. Available at: https://uk.finance.yahoo.com/quote/AMZN?ltr=1 [9 April 2021].

Yahoo Finance. 2021c. Facebook Inc. - Financial data. Available at: https://finance.yahoo.com/quote/FB?p=FB&.tsrc=fin-srch [7 April 2021].

Yahoo Finance. 2021d. Apple Inc. - Financial data. Available at: https://finance.yahoo.com/quote/AAPL%3Fp=AAPL/ [9 April 2021].

Yahoo Finance. 2021e. Microsoft Corporation - Financial data. Available at: https://finance.yahoo.com/quote/MSFT?p=MSFT&.tsrc=fin-srch [9 April 2021].

Yahoo Finance. 2021f. Suning.com - Financial data. Available at: https://finance.yahoo.com/quote/002024.SZ/financials?p=002024.SZ [11 April 2021].

Yin X, Shanley M. 2008. Industry determinants of the 'merger versus alliance' decision. *Academy of Management Review* **33**(2): 473–491.

Zaheer S. 1995. Overcoming the liability of foreignness. *Academy of Management Journal* **38**(2): 341–363.

Zalando. 2021. Key figures 2020 - Zalando. Available at: https://corporate.zalando.com/en/investor-relations/key-figures-2020 [11 April 2021].

Zipern A. 2001, July 11. A quick way to serach for images on the web. *The New York Times*. Available at: https://www.nytimes.com/2001/07/12/technology/news-watch-a-quick-way-to-search-for-images-on-the-web.html [11 November 2020].

Zollo M, Singh H. 2004. Deliberate learning in corporate acquisitions: Post-acquisition strategies and integration capability in U.S. bank mergers. *Strategic Management Journal* **25**(13): 1233–1256.

Appendices

Appendix A: Company Profile Google

Sources: Forbes (2020); MarketLine (2021a); Yahoo Finance (2021a), Exhibit VII, and Exhibit VIII

Company Profile Google

Legal name	Alphabet Inc.
Founded	September 4th, 1998
Founders	Larry Page and Sergej Brin
Headquarters	Mountain View, California/United States
Key people	Sundar Pichai (CEO), Ruth Porat (CFO)
Total revenue 2020 (in USDbn)	182.53
Net income 2020 (in USDbn)	40.27
Number of employees (30/12/2020)	135,301
Short business overview	Google started its business with offering a **web search engine**. However, over time the company expanded its business model in several markets within the platform economy. Thus nowadays Google is active in **social networking**, **mobile operating systems**, **mobile app stores**, **online mapping**, **cloud computing**, **intelligent virtual assistants**, **web browsers** and **digital advertising**
Total number of acquisitions (as of 01/04/2021)	241
Top 3 largest acquisitions (by acquisition price)	1st: Motorola Mobility (12,500 USDm) 2nd: Nest Labs (3,200 USDm) 3rd: DoubleClick (3,100 USDm)

Appendix B: Company Profile Amazon

Source: Forbes (2020); MarketLine (2021b); Yahoo Finance (2021b), Exhibit VII, and Exhibit VIII

Company Profile Amazon

Legal name	Amazon.com, Inc.
Founded	July 5th, 1994
Founders	Jeff Bezos
Headquarters	Seattle, Washington/United States
Key people	Andy Jassy (CEO-elect), Brian Olsavsky (CFO)
Total revenue 2020 (in USDbn)	386.06
Net income 2020 (in USDbn)	21.30
Number of employees (30/12/2020)	1,298,000
Short business overview	Amazon started its business with running an **online marketplace** . However, over time the company expanded its business model in several markets within the platform economy. Thus nowadays Amazon operates in **cloud computing**, **intelligent virtual assistants**, and **digital advertising**
Total number of acquisitions (as of 01/04/2021)	104
Top 3 largest acquisitions (by acquisition price)	1st: Whole Foods Market (13,700 USDm) 2nd: Zappos (1,200 USDm) 3rd: Twitch (970 USDm)

Appendix C: Company Profile Facebook

Source: Forbes (2020); MarketLine (2021c); Yahoo Finance (2021c), Exhibit VII, and Exhibit VIII

Company Profile Facebook

Legal name	Facebook, Inc.
Founded	February 4th, 2004
Founders	Mark Zuckerberg, Eduardo Saverin, Andrew McCollum, Dustin Moskovitz, and Chris Hughes
Headquarters	Menlo Park, California/United States
Key people	Mark Zuckerberg (CEO), David Wehner (CFO)
Total revenue 2020 (in USDbn)	85.97
Net income 2020 (in USDbn)	29.15
Number of employees (30/12/2020)	52,535
Short business overview	Facebook started its business with running a **social network**. However, over time the company expanded its business model in a further market within the platform economy. Thus nowadays Facebook also operates in **digital advertising**
Total number of acquisitions (as of 01/04/2021)	88
Top 3 largest acquisitions (by acquisition price)	1st: WhatsApp (19,000 USDm) 2nd: Oculus VR (2,000 USDm) 3rd: Instagram (1,000 USDm)

Appendix D: Company Profile Apple

Source: Forbes (2020); MarketLine (2021d); Yahoo Finance (2021d), Exhibit VII, and Exhibit VIII

Company Profile Apple

Legal name	Apple Inc.
Founded	April 1st , 1976
Founders	Steve Jobs, Steve Wozniak, and Ronald Wayne
Headquarters	Cupertino, California/United States
Key people	Tim Cook (CEO), Jeff Williams (COO)
Total revenue 2020 (in USDbn)	274.52
Net income 2020 (in USDbn)	57.41
Number of employees (30/12/2020)	147,000
Short business overview	Apple started its business with running an **mobile operating system**. However, over time the company expanded its business model in several markets within the platform economy. Thus nowadays Amazon operates in **mobile app stores**, **intelligent virtual assistants**, **online mapping,** and **web browsers**
Total number of acquisitions (as of 01/04/2021)	122
Top 3 largest acquisitions (by acquisition price)	1st: Beta Electronics (3,000 USDm) 2nd: Smartphone modem business of Intel (1,000 USDm) 3rd: Dialog Semiconductor (600 USDm)

Appendix E: Company Profile Microsoft

Source: Forbes (2020); MarketLine (2021e); Yahoo Finance (2021e), Exhibit VII, and Exhibit VIII

Company Profile Microsoft

Legal name	Microsoft Corporation
Founded	April 4th, 1975
Founders	Bill Gates and Paul Allen
Headquarters	Redmond, Washington/United States
Key people	Satya Nadella (CEO), Bill Smith (President)
Total revenue 2020 (in USDbn)	143.00
Net income 2020 (in USDbn)	44.30
Number of employees (30/12/2020)	166,475
Short business overview	Microsoft started its business with selling an **computer software**. However, over time the company expanded its business model in several markets within the platform economy. Thus nowadays Microsoft operates in **mobile app stores**, **cloud computing**, **intelligent virtual assistants**, and **web browsers**
Total number of acquisitions (as of 01/04/2021)	245
Top 3 largest acquisitions (by acquisition price)	1st: LinkedIn (26,200 USDm) 2nd: Skype (8,500 USDm) 3rd: GitHub (7,500 USDm)

Appendix F: List of Acquisitions of Google and its Subsidiaries

Source: "List of mergers and acquisitions by Alphabet", Wikipedia, retrieved on 2021/03/29 (https://en.wikipedia.org/wiki/List_of_mergers_and_acquisitions_by_Alphabet)

Acquired company	Located in (country)	Year of acquisition	Purchase price (in USDm)	Business segment
Dejavue	USA	2001	n/a	Usenet
Outride	USA	2001	n/a	Web search engine
Pyra Labs	USA	2003	n/a	Weblog software
Neotonic Software	USA	2003	n/a	Customer relationship management
Applied Semantics	USA	2003	102.0	Online advertising
Kaltix	USA	2003	n/a	Web search engine
Sprinks	USA	2003	n/a	Online advertising
Genius Labs	USA	2003	n/a	Blogging
Ignite Logic	USA	2004	n/a	HTML editor
Picasa	USA	2004	n/a	Image organizer
ZipDash	USA	2004	n/a	Traffic analysis
Where2	Australia	2004	n/a	Map analysis
Keyhole	USA	2004	n/a	Map analysis
Urchin	USA	2005	n/a	Software corporation
Dodgeball	USA	2005	n/a	Social networking service
Akwan	Brazil	2005	n/a	Information technologies
Reqwireless	Canada	2005	n/a	Mobile browser
Android	USA	2005	50.0	Mobile operating system
Skia	USA	2005	n/a	Graphics library
Phatbits	USA	2005	n/a	Widget engine
allPAY	Germany	2005	n/a	Mobile software
bruNET	Germany	2005	n/a	Mobile software
dMarc	USA	2006	102.0	Advertising
Measure Map	USA	2006	n/a	Weblog software
Upstartle	USA	2006	n/a	Word processor
@Last Software3D	USA	2006	n/a	3D modeling software
Orion	Australia	2006	n/a	Web search engine
2Web Technologies	USA	2006	n/a	Online spreadsheets
Neven Vision Germany	Germany	2006	n/a	Computer vision
YouTube	USA	2006	1,650.0	Video sharing
JotSpot	USA	2006	n/a	Web application
Endoxon	Switzerland	2006	28.0	Mapping
Adscape	USA	2007	23.0	In-game advertising
Trendalyzer	Sweden	2007	n/a	Statistical software
Crusix	USA	2007	n/a	Social networking service

Tonic Systems	USA	2007	n/a	Presentation program
Marratech	Sweden	2007	15.0	Videoconferencing
DoubleClick	USA	2007	3,100.0	Online advertising
GreenBorder	USA	2007	n/a	Computer security
Panoramio	Spain	2007	n/a	Photo sharing
FeedBurner	USA	2007	100.0	Web feed
PeakStream	USA	2007	n/a	Parallel processing
Zenter	USA	2007	n/a	Presentation program
GrandCentral	USA	2007	45.0	Voice over IP
ImageAmerica	USA	2007	n/a	Aerial photography
Postini	USA	2007	625.0	Communications security
Zingku	USA	2007	n/a	Social networking service
Jaiku	Finland	2007	n/a	Microblogging
Omnisio	USA	2008	15.0	Online video
TNC	South Korea	2008	n/a	Weblog software
On2	USA	2009	133.0	Video compression
reCAPTCHA	USA	2009	n/a	Security
AdMob	USA	2009	n/a	Mobile advertising
Gizmo5	USA	2009	30.0	Voice over IP
Teracent	USA	2009	n/a	Online advertising
AppJet	USA	2009	n/a	Collaborative real-time editor
Aardvark	USA	2010	50.0	Social search
reMail	USA	2010	n/a	Email search
Picnik	USA	2010	n/a	Photo editing
DocVerse	USA	2010	25.0	Microsoft Office files sharing site
Episodic	USA	2010	n/a	Online video platform start-up
Plink	Ireland	2010	n/a	Visual search engine
Agnilux	USA	2010	n/a	Server CPUs
LabPixies	Israel	2010	n/a	Gadgets
BumpTop	Canada	2010	30.0	Desktop environment
Global IP Solutions	USA	2010	68.2	Video and audio compression
Simplify Media	USA	2010	n/a	Music streaming
Ruba.com	USA	2010	n/a	Travel
Invite Media	USA	2010	81.0	Advertising
Metaweb	USA	2010	n/a	Semantic search
Zetawire	Canada	2010	n/a	Mobile payment, NFC
Instantiations	USA	2010	n/a	Java/Eclipse/AJAX developer tools
Slide.com	USA	2010	228.0	Social gaming

Jambool	USA	2010	70.0	Social Gold payment
Like.com	USA	2010	100.0	Visual search engine
Angstro	USA	2010	n/a	Social networking service
SocialDeck	Canada	2010	n/a	Social gaming
Quiksee	Israel	2010	10.0	Online video
Plannr	USA	2010	n/a	Schedule management
BlindType	Greece	2010	n/a	Touch typing
Phonetic Arts	UK	2010	n/a	Speech synthesis
Widevine	USA	2010	n/a	Technologies DRM
eBook Technologies	USA	2011	n/a	E-book
SayNow	USA	2011	n/a	Voice recognition
Zynamics	Germany	2011	n/a	Security
BeatThatQuote.com	UK	2011	65.0	Price comparison service
Next New Networks	USA	2011	n/a	Online video
Green Parrot Pictures	Ireland	2011	n/a	Digital video
PushLife	Canada	2011	25.0	Service provider
ITA Software	USA	2011	676.0	Travel technology
TalkBin	USA	2011	n/a	Mobile software
Sparkbuy	USA	2011	n/a	Product search
PostRank	Canada	2011	n/a	Social media analytics service
Admeld	USA	2011	400.0	Online advertising
SageTV	USA	2011	n/a	Media center
Punchd	USA	2011	n/a	Loyalty program
Fridge	USA	2011	n/a	Social groups
PittPatt	USA	2011	n/a	Facial recognition system
Dealmap	USA	2011	n/a	One deal a day service
Motorola Mobility	USA	2011	12,500.0	Mobile device manufacturer
Zave Networks	USA	2011	n/a	Digital coupons
Zagat	USA	2011	151.0	Restaurant reviews
DailyDeal	Germany	2011	114.0	One deal a day service
SocialGrapple	Canada	2011	n/a	Social media analytics service
Apture	USA	2011	n/a	Instantaneous search
Katango	USA	2011	n/a	Social circle organization
RightsFlow	USA	2011	n/a	Music rights management

Clever Sense	USA	2011	n/a	Local recommendations app
Software company	USA	2012	n/a	Software company
TxVia	USA	2012	n/a	Online payments
Meebo	USA	2012	100.0	Social networking
Quickoffice	USA	2012	n/a	Mobile office suite
Sparrow	France	2012	25.0	Mobile apps
WIMM Labs	USA	2012	n/a	Android-powered smartwatches
Wildfire Interactive	USA	2012	450.0	Social media marketing
VirusTotal.com	Spain	2012	n/a	Security
Nik Software	USA	2012	n/a	Photography
Viewdle	Ukraine	2012	45.0	Facial recognition
Incentive Targeting	USA	2012	n/a	Digital coupons
BufferBox	Canada	2012	17.0	Package delivery
Channel Intelligence	USA	2013	125.0	Product e-commerce
DNNresearch	Canada	2013	44.0	Deep Neural Networks
Talaria Technologies	USA	2013	n/a	Cloud computing
Behavio	USA	2013	n/a	Social Prediction
Wavii	USA	2013	30.0	Natural Language Processing
Makani Power	USA	2013	n/a	Airborne wind turbines
Waze	Israel	2013	966.0	GPS navigation software
Bump	USA	2013	n/a	Mobile software
Flutter	USA	2013	40.0	Gesture recognition technology
FlexyCore	France	2013	23.0	DroidBooster App for Android
Schaft	Japan	2013	n/a	Robotics, humanoid robots
Industrial Perception	USA	2013	n/a	Robotic arms, computer vision
Redwood Robotics	USA	2013	n/a	Robotic arms
Meka Robotics	USA	2013	n/a	Robots
Holomni	USA	2013	n/a	Robotic wheels
Bot & Dolly	USA	2013	n/a	Robotic cameras
Autofuss	USA	2013	n/a	Ads and Design
Bitspin	Switzerland	2014	n/a	Timely App for Android
Nest Labs	USA	2014	3,200.0	Home automation
Impermium	USA	2014	n/a	Internet security
DeepMind Technologies	UK	2014	625.0	Artificial intelligence
SlickLogin	Israel	2014	n/a	Internet security

spider.io	UK	2014	n/a	Anti-click fraud
GreenThrottle	USA	2014	n/a	Gadgets
Titan Aerospace	USA	2014	n/a	High-altitude UAVs
Rangespan	UK	2014	n/a	E-commerce
Adometry	USA	2014	n/a	Online advertising attribution
Appetas	USA	2014	n/a	Restaurant website creation
Stackdriver	USA	2014	n/a	Cloud computing
MyEnergy	USA	2014	n/a	Online energy usage monitoring
Quest Visual	USA	2014	n/a	Augmented reality
Divide	USA	2014	n/a	Mobile device management
Skybox	USA	2014	500.0	Imaging Satellite
mDialog	Canada	2014	n/a	Online advertising
Alpental Technologies	USA	2014	n/a	Wireless
Dropcam	USA	2014	555.0	Home monitoring
Appurify	USA	2014	n/a	Automated application testing
Songza	USA	2014	n/a	Music streaming
drawElements	Finland	2014	n/a	Graphics cmpatibility testing
Emu	USA	2014	n/a	IM client
Director	USA	2014	n/a	Mobile video
Jetpac	USA	2014	n/a	Artificial intelligence, image recognition
Gecko Design	USA	2014	n/a	Mechanical design
Zync Render	USA	2014	n/a	Cloud-based visual effects software
Lift Labs	USA	2014	n/a	Liftware
Polar	USA	2014	n/a	Social polling
Firebase	USA	2014	n/a	Application development platform
Dark Blue Labs & Vision	UK	2014	10.0	Artificial intelligence
Revolv	USA	2014	n/a	Home automation
RelativeWave	USA	2014	n/a	Mobile software prototyping
Vidmaker	USA	2014	n/a	Video editing
Launchpad Toys	USA	2015	n/a	Child-friendly apps
Odysee	USA	2015	n/a	Multimedia sharing and storage
Softcard	USA	2015	n/a	Mobile payments
Red Hot Labs	USA	2015	n/a	App advertising and discovery
Thrive Audio	Ireland	2015	n/a	Surround sound technology

Skillman & Hackett	USA	2015	n/a	Virtual reality software
Timeful	USA	2015	n/a	Mobile software
Pulse.io	USA	2015	n/a	Mobile app optimizer
Pixate	USA	2015	n/a	Mobile software prototyping
Oyster	USA	2015	n/a	E-book subscriptions
Jibe Mobile	USA	2015	n/a	Rich Communication Services
Agawi	USA	2015	n/a	Mobile application streaming
Digisfera	Portugal	2015	n/a	360-degree photography
Fly Labs	USA	2015	n/a	Video editing
Bebop	USA	2015	380.0	Cloud software
BandPage	USA	2016	n/a	Platform for musicians
Pie	Singapore	2016	n/a	Enterprise communications
Synergyse	Canada	2016	n/a	Interactive tutorials
Webpass	USA	2016	n/a	Internet service provider
Moodstocks	France	2016	n/a	Image recognition
Anvato	USA	2016	n/a	Cloud-based video services
Kifi	USA	2016	n/a	Link management
LaunchKit	USA	2016	n/a	Mobile tool maker
Orbitera	USA	2016	100.0	Cloud software
Apigee	USA	2016	625.0	API management and predictive analytics
Urban Engines	USA	2016	n/a	Location-based analytics
API.AI	USA	2016	n/a	Natural language processing
FameBit	USA	2016	n/a	Branded content
Eyefluence	USA	2016	n/a	Eye tracking, virtual reality
LeapDroid	USA	2016	n/a	Android Emulator
Qwiklabs	USA	2016	n/a	Cloud-based hands-on training platform
Cronologics	USA	2016	n/a	Smartwatches
Limes Audio	Sweden	2017	n/a	Voice communication
Fabric	USA	2017	n/a	Mobile app platform
Kaggle	USA	2017	n/a	Data science

AppBridge	USA	2017	n/a	Productivity suite
Owlchemy Labs	USA	2017	n/a	Virtual reality studio
Halli Labs	India	2017	n/a	Artificial intelligence
AIMatter	Belarus	2017	n/a	Computer vision
HTC (portions)	Taiwan	2017	1,100.0	Talent and intellectual property licenses
Bitium	USA	2017	n/a	Single sign-on and identity management
Relay Media	USA	2017	n/a	AMP converter
60db	USA	2017	n/a	Podcasts
Redux	UK	2018	n/a	Audio
Tenor	USA	2018	n/a	GIF image search
Velostrata	Israel	2018	n/a	Cloud migration
Cask	USA	2018	n/a	Big data, Hadoop
GraphicsFuzz	UK	2018	n/a	GPU reliability
Senosis	USA	2018	n/a	Health monitoring
Onward	USA	2018	n/a	Machine learning, natural language processing
Workbench Education	USA	2018	n/a	Education technology
Sigmoid Labs	India	2018	40.0	Indian Railways train tracking
DevOps Research and Assessment	USA	2018	n/a	Research and assessment
Superpod	USA	2019	60.0	Question and answer app
Alo Socratic oma	Israel	2019	n/a	Big data, cloud migration
Nightcorn	Germany	2019	n/a	Video sharing
Looker	USA	2019	2,600.0	Big data, analytics
Elastifile	USA	2019	n/a	File storage
Socratic	USA	2019	n/a	Learning apps
CloudSimple	USA	2019	n/a	Cloud hosting
Typhoon Studios	Canada	2019	n/a	Video game development
AppSheet	USA	2020	n/a	Mobile app development
Pointy	Ireland	2020	163.0	Local retail inventory feeds
Cornerstone Technology B.V.	Netherlands	2020	n/a	Mainframe, cloud migration
North	Canada	2020	180.0	Smart glasses
Stratozone	USA	2020	n/a	Cloud assessment
Dataform	UK	2020	n/a	Big data, analytics
Neverware	USA	2020	n/a	Operating system

Actifio	USA	2020	n/a	Backup, Disaster recovery
Fitbit	USA	2021	2,100.0	Wearables

Appendix G: List of Acquisitions of Amazon and its Subsidiaries

Source: "List of mergers and acquisitions by Amazon", Wikipedia, retrieved on 2021/03/29 (https://en.wikipedia.org/wiki/List_of_mergers_and_acquisitions_by_Amazon#cite_note-223)

Acquired company	Located in (country)	Year of acquisition	Purchase price (in USDm)	Business segment
Bookpages	UK	1998	n/a	E-commerce
Telebook	Germany	1998	55.0	Web development
IMDb	UK	1988	55.0	Online database
Junglee	USA	1998	250.0	E-commerce
PlanetAll	USA	1998	280.0	Social networking
MindCorps Incorporated	USA	1999	n/a	Web development
LiveBid.com	USA	1999	300.0	Auctions
Accept.com	USA	1999	101.7	E-commerce
Alexa Internet	USA	1999	250.0	Web traffic analysis
e-Niche Incorporated	USA	1999	n/a	E-commerce
Convergence Corporation	USA	1999	23.0	Enterprise software
Tool Crib of the North	USA	1999	n/a	Tools, e-commerce
Back to Basics Toys	USA	1999	n/a	E-commerce
Leep Technology Inc.	USA	1999	n/a	CRM, Information technology
OurHouse.com	USA	2001	n/a	E-commerce
Egghead Software	USA	2001	6.1	E-commerce
Joyo.com	China	2004	75.0	E-commerce
smallparts.com	USA	2004	n/a	3D-Printing, E-commerce
BookSurge	USA	2005	n/a	Book publishing
Mobipocket	France	2005	n/a	E-book
CustomFlix	USA	2005	n/a	Digital media, DVD
Shopbop	USA	2006	n/a	Online fashion
TextPayMe	USA	2006	3.0	Messaging, Payments
Digital Photography Review	UK	2007	n/a	Camera reviews
Brilliance Audio	USA	2007	n/a	E-commerce
Withoutabox	USA	2008	n/a	Film distribution
Audible	USA	2008	300.0	Audiobook and podcast
Fabric.com	USA	2008	n/a	E-commerce
AbeBooks	Canada	2008	n/a	E-commerce marketplace
Shelfari United States	USA	2008	n/a	Social cataloging website
Reflexive Entertainment	USA	2008	n/a	Video game developer

Box Office Mojo	USA	2008	n/a	Algorithm website
Lexcycle	USA	2009	n/a	Electronic book reading software
SnapTell	USA	2009	n/a	Advertising
Zappos	USA	2009	1,200.0	Online fashion
Touchco	USA	2010	n/a	Hardware, software
Woot	USA	2010	110.0	Internet retailer
Amie Street	USA	2010	545.0	Online music store
BuyVIP	Spain	2010	n/a	E-commerce
Quidsi	USA	2010	312.0	Internet retailer
Toby Press	USA	2010	n/a	Books
LoveFilm	UK	2011	n/a	Video streaming
The Book Depository	UK	2011	n/a	Online book seller
Pushbutton	UK	2011	n/a	Digital agency for interactive television
Yap	USA	2011	n/a	Speech recognition
Double Helix Games	USA	2011	n/a	Video game developer
Teachstreet	USA	2012	n/a	Teaching platform
Kiva Systems	USA	2012	775.0	Hardware, software
Evi	UK	2012	26.0	Search engine software
Avalon Books	USA	2012	n/a	Book publishing
UpNext	USA	2012	n/a	3D Mapping
IVONA Software	Poland	2013	n/a	Software
Goodreads	USA	2013	n/a	Social cataloging website
Liquavista	Netherlands	2013	n/a	Electronics, hardware, software
TenMarks Education, Inc.	USA	2013	n/a	E-Learning, education
ComiXology	USA	2014	n/a	Cloud data services
Amiato	USA	2014	n/a	Analytics
Twitch Interactive	USA	2014	970.0	Social media, video streaming
Rooftop Media	USA	2014	n/a	Content, digital entertainment
GoodGame	USA	2014	n/a	Video games
Annapurna Labs	Israel	2015	350.0	Cloud computing, cloud storage

2lemetry	USA	2015	n/a	Cloud computing, Internet of things ("IoT")
Shoefitr	USA	2015	n/a	E-commerce
ClusterK	USA	2015	35.0	Software
AppThwack	USA	2015	n/a	Cyber security
Biba Systems	USA	2015	n/a	Communication software
Elemental Technologies	USA	2015	500.0	Content delivery network
Safaba Translation Systems	USA	2015	n/a	Software
Orbeus	USA	2015	n/a	Artificial intelligence
Colis Privé	France	2016	n/a	Shipping, delivery, logistics
NICE	Italy	2016	n/a	Cloud infrastructure
Emvantage Payments	India	2016	n/a	Payments
Cloud9 IDE	USA	2016	n/a	Cloud computing
Curse, Inc.	USA	2016	n/a	Digital media
Westland	India	2016	n/a	Publishing
Partpic	USA	2016	n/a	Photo recognition
harvest.ai	USA	2017	20.0	Artificial intelligence
Thinkbox Software	USA	2017	n/a	Software
Do.com	USA	2017	n/a	Meeting software
Whole Foods Market	USA	2017	13,700.0	Food and beverage
Souq.com	UAE	2017	580.0	E-commerce
Graphiq	USA	2017	50.0	Artificial intelligence
GameSparks	UK	2017	10.0	E-commerce
Wing.ae	UAE	2017	n/a	Information technology
Body Labs	USA	2017	60.0	Artificial intelligence
Dispatch	USA	2017	n/a	Robotics
Goo Technologies	USA	2017	n/a	3D technology
Blink Home	USA	2017	90.0	Consumer electronics
Sqrrl	USA	2018	40.0	Cybersecurity
Ring	USA	2018	839.0	Consumer electronics
PillPack	USA	2018	753.0	Pharmacy
Tapzo	India	2018	40.0	E-commerce
CloudEndure	Israel	2019	250.0	Cloud computing
TSO Logic	Canada	2019	n/a	Cloud computing
Eero	USA	2019	97.0	IoT
Canvas Technology	USA	2019	n/a	Robotics

Sizmek Ad Server and Sizmek Dynamic Creative Optimization	USA	2019	n/a	Advertising
Bebo	USA	2019	25.0	Video games
E8 Storage	Israel	2019	n/a	Cloud computing
IGDB	Sweden	2019	n/a	Video games
INLT	USA	2019	n/a	Enterprise applications
Zoox	USA	2020	1,200.0	Autonomous vehicles, robotics
Wondery	USA	2020	n/a	Podcast publishers
Umbra 3D	Finland	2021	n/a	Graphics software technology

Appendix H: List of Acquisitions of Facebook and its Subsidiaries

Source: "List of mergers and acquisitions by Facebook", Wikipedia, retrieved on 2021/03/30 (https://en.wikipedia.org/wiki/List_of_mergers_and_acquisitions_by_Facebook)

Acquired company	Located in (country)	Year of acquisition	Purchase price (in USDm)	Business segment
facebook.com domain name	USA	2005	0.2	Domain name
Parakey	USA	2007	n/a	Computer user interface
ConnectU	USA	2008	31.0	Social networking
FriendFeed	USA	2009	47.5	Real-time feed aggregator
Octazen	Malaysia	2010	n/a	Enterprise software
Divvyshot	USA	2010	n/a	Social networking
Friendster patents	USA	2010	40.0	Social networking
ShareGrove	USA	2010	n/a	Social network
Zenbe	USA	2010	n/a	Diverse social media
Nextstop	USA	2010	2.5	Digital entertainment
Chai Labs	USA	2010	10.0	Software
Hot Potato	USA	2010	10.0	Social media
Drop.io	USA	2010	10.0	Online file sharing
FB.com domain name	USA	2010	8.5	Domain name
Rel8tion	USA	2011	n/a	Advertising
Beluga	USA	2011	n/a	Messaging
Snaptu	Israel	2011	70.0	Mobile application platform
RecRec	USA	2011	n/a	Computer vision
DayTum	USA	2011	n/a	Analytics
Sofa	Netherlands	2011	n/a	Developer tools
MailRank	USA	2011	n/a	Email
Push Pop Press	USA	2011	n/a	Advertising
Friend.ly	USA	2011	n/a	Blogging platforms
Strobe	USA	2011	n/a	Web development
Gowalla	USA	2011	n/a	Social networking
Caffeinatedmind	USA	2012	n/a	File transfer, big data
Instagram	USA	2012	1,000.0	Social networking
Tagtile	USA	2012	n/a	Direct marketing
Glancee	USA	2012	n/a	Diverse digital
Lightbox.com	UK	2012	n/a	Photo blogging platform
Karma	USA	2012	n/a	Food sharing application
Face.com	Israel	2012	100.0	Facial recognition

Spool	USA	2012	n/a	Social bookmarking program
Acrylic Software	Canada	2012	n/a	Gifts, mobile, social
Threadsy	USA	2012	n/a	Messaging
Atlas Solutions	USA	2013	<100.0	Online advertising
Osmeta	USA	2013	n/a	Hardware, Software
Storylane (Mixtent)	USA	2013	n/a	Social media
Hot Studio	USA	2013	n/a	Social media, web design
Spaceport	USA	2013	n/a	Diverse online
Parse	USA	2013	85.0	Backend solutions
Monoidics	UK	2013	n/a	Analytics
Jibbigo	USA	2013	n/a	Translation application
Onavo	Israel	2013	n/a	Web analytics
SportStream	USA	2013	n/a	Consumer electronics
Little Eye Labs	India	2014	15.0	Diverse online
Branch	USA	2014	15.0	Messaging
WhatsApp	USA	2014	19,000.0	Messaging
Oculus VR	USA	2014	2,000.0	Virtual reality
Ascenta	UK	2014	20.0	Aerospace
ProtoGeo Oy	Finland	2014	n/a	Mobile
PrivateCore	USA	2014	n/a	Backend solutions
LiveRail	USA	2014	400.0-500.0	Advertising
WaveGroup Sound	USA	2014	n/a	Music, product design
Wit.ai	USA	2015	n/a	Artificial intelligence
Quickfire Networks	USA	2015	n/a	Cloud data service
TheFind, Inc.	USA	2015	n/a	Diverse online
Surreal Vision	UK	2015	n/a	Software
Endaga	USA	2015	n/a	Communications infrastructure
Pebbles	Israel	2015	60.0	Digital media
MSQRD (Masquerade)	Belarus	2016	n/a	Consumer applications
Two Big Ears	UK	2016	n/a	Consumer electronics
Nascent Objects	USA	2016	n/a	Manufacturing
Infiniled	Ireland	2016	n/a	Lighting
CrowdTangle	USA	2016	n/a	Brand marketing
Faciometrics	USA	2016	n/a	Machine learning
Ozlo	USA	2017	n/a	Artificial intelligence
Fayteq AG	Germany	2017	n/a	Software

tbh	USA	2017	n/a	Social polling application
Confirm	USA	2018	n/a	Identity management
Bloomsbury AI	UK	2018	30.0	Artificial intelligence
Redkix	Israel	2018	100.0	Enterprise collaboration
Vidpresso	USA	2018	n/a	Broadcasting
Dreambit	Israel	2018	n/a	Image search engine
Chainspace	UK	2019	n/a	Blockchain
GrokStyle	USA	2019	n/a	Artificial intelligence
Servicefriend	Israel	2019	n/a	Artificial intelligence
CTRL-labs	USA	2019	n/a	Augmented reality
Packagd	USA	2019	n/a	E-commerce
Beat Games	Czech Republic	2019	n/a	Virtual reality
PlayGiga	Spain	2019	70.0	Digital media
Sanzaru Games	USA	2020	n/a	Virtual reality
Scape Technologies	UK	2020	40.0	Virtual reality
Giphy	USA	2020	400.0	Software
Mapillary	Sweden	2020	n/a	Software, mapping
Ready at Dawn	USA	2020	n/a	Virtual reality
Lemnis Technologies	Singapore	2020	n/a	Virtual reality
Kustomer	USA	2020	1,000.0	Software as a service

Appendix I: List of Acquisitions of Apple and its Subsidiaries

Source: "List of mergers and acquisitions by Apple", Wikipedia, retrieved on 2021/03/25 (https://en.wikipedia.org/wiki/List_of_mergers_and_acquisitions_by_Apple#cite_note-Claris-11)

Acquired company	Located in (country)	Year of acquisition	Purchase price (in USDm)	Business segment
Network Innovations	USA	1988	n/a	Software
Orion Network Systems	USA	1988	n/a	Computer software
Styleware	USA	1988	n/a	Computer software
Nashoba Systems	USA	1988	n/a	Computer software
Coral Software	USA	1989	n/a	Computer software
NeXT	USA	1997	404.0	Unix-like hardware and software platform
Power Computing Corporation	USA	1997	110.0	Macintosh clones
Xemplar Education	UK	1999	4.9	Software
Raycer Graphics	USA	1999	15.0	Computer graphic chips
NetSelector	USA	2000	n/a	Internet software
Astarte-DVD Authoring Software	Germany	2000	n/a	Software
SoundJam MP	USA	2000	n/a	Software
Bluefish Labs	USA	2001	n/a	Productivity software
bluebuzz	USA	2001	n/a	Internet service provider (ISP)
Spruce Technologies	USA	2001	14.9	Graphics software
PowerSchool	USA	2001	66.1	Online info systems services
Nothing Real	USA	2002	15.0	Special effects software
Zayante	USA	2002	13.0	FireWire chips and software
Silicon Grail Corp-Chalice	USA	2002	20.0	Digital effects software
Propel Software	USA	2002	n/a	Internet and network optimization for wireless carriers
Prismo Graphics	USA	2002	20.0	Special-effects titling software for film and video
Emagic	Germany	2002	30.0	Music production software
SchemaSoft	Canada	2005	n/a	Software

FingerWorks	USA	2005	n/a	Gesture recognition company
Silicon Color	USA	2006	n/a	Software
Proximity	Australia	2006	n/a	Software
P.A. Semi	USA	2008	278.0	Semiconductors
Placebase	USA	2009	n/a	Maps
Lala.com	USA	2009	17.0	Music streaming
Quattro Wireless	USA	2010	275.0	Mobile advertising
Intrinsity	USA	2010	121.0	Semiconductors
Siri	USA	2010	n/a	Voice control software
Gipsy Moth Studios	USA	2010	12.0	Application Regionalization Firm
Poly9	Canada	2010	n/a	Web-based mapping
Polar Rose	Sweden	2010	29.0	Facial recognition
IMSense	UK	2010	n/a	High-dynamic-range (HDR) photography
C3 Technologies	Sweden	2011	267.0	3D mapping
Anobit	Israel	2011	500.0	Flash memory
Chomp	USA	2012	50.0	App search engine
Redmatica	Italy	2012	n/a	Audio
AuthenTec	USA	2012	356.0	PC and mobile security products
Particle	USA	2012	n/a	HTML5 Web apps
Novauris Technologies	UK	2013	n/a	Speech recognition
OttoCat	USA	2013	n/a	Search engine
WiFiSlam	USA	2013	20.0	Indoor location
Locationary	Canada	2013	n/a	Maps
HopStop.com	USA	2013	n/a	Maps
Passif Semiconductor	USA	2013	n/a	Semiconductors
Matcha	USA	2013	n/a	Media discovery app
Embark	USA	2013	n/a	Maps
AlgoTrim	Sweden	2013	n/a	Mobile data compression
Cue	USA	2013	50.0	Personal assistant
PrimeSense	Israel	2013	360.0	Structured-light 3D scanners
Topsy	USA	2013	200.0	Analytics
BroadMap	USA	2013	n/a	Maps
Catch.com	USA	2013	n/a	Software
Acunu	USA	2013	n/a	Database analytics

SnappyLabs	USA	2014	n/a	Photography software
Burstly	USA	2014	n/a	Software testing
LuxVue Technology	USA	2014	n/a	microLED displays
Spotsetter	USA	2014	n/a	Social search engine
Swell	USA	2014	30.0	Music streaming
BookLamp	USA	2014	n/a	Book analytics
Beats Electronics	USA	2014	3,000.0	Headphones, music streaming (Beats Music)
Prss	Netherlands	2014	n/a	Digital magazine
Dryft	USA	2014	n/a	On-Screen Keyboard
Camel Audio	UK	2015	n/a	Audio plug-ins and sound libraries
Semetric	UK	2015	50.0	Music analytics
FoundationDB	USA	2015	n/a	Database
LinX	Israel	2015	20.0	Camera
Coherent Navigation	USA	2015	n/a	GPS
Metaio	Germany	2015	n/a	Augmented reality
Mapsense	USA	2015	25.0-30.0	Mapping visualization and data collection
VocalIQ	UK	2015	n/a	Speech technology
Perceptio	USA	2015	n/a	Machine learning, Image recognition
Faceshift	Switzerland	2015	n/a	Realtime Motion Capture
Emotient	USA	2016	n/a	Emotion recognition
LearnSprout	USA	2016	n/a	Education technology
Flyby Media	USA	2016	n/a	Augmented reality
LegbaCore	USA	2016	n/a	Platform security
Turi	USA	2016	200.0	Machine learning
Gliimpse	USA	2016	n/a	Personal health info collection company
Tuplejump	India	2016	n/a	Machine learning
Indoor.io	Finland	2016	n/a	Indoor mapping and navigation
Workflow	USA	2017	n/a	Automation and scripting app
Beddit	Finland	2017	n/a	Sleep tracking hardware

Lattice Data	USA	2017	200.0	Artificial intelligence
SensoMotoric Instruments	Germany	2017	n/a	Eye tracking hardware and software
Vrvana	Canada	2017	30.0	Augmented reality head-mounted display
Regaind	France	2017	n/a	Computer vision
init.ai	USA	2017	n/a	Messaging assistant
PowerbyProxi	New Zealand	2017	n/a	Wireless charging
InVisage Technologies	USA	2017	n/a	Quantum dot-based image sensors
Pop Up Archive	USA	2017	n/a	Tools for searching digital spoken words
Spektral	Denmark	2017	30.0	Computer vision, real-time editing
Laserlike	USA	2018	n/a	Machine learning
Silk Labs	USA	2018	n/a	Artificial intelligence, home monitoring
Tueo Health	USA	2018	n/a	Asthma monitoring
Silicon Valley Data Science	USA	2017	n/a	Data science, data engineering, analytics
Buddybuild	Canada	2018	n/a	Continuous integration, debugging, and testing for mobile apps
Texture	USA	2018	n/a	Digital magazine subscription service
Akonia Holographics	USA	2018	n/a	Lenses for augmented reality glasses
Shazam	UK	2018	400.0	Music and image recognition
Dialog Semiconductor (portions)	UK	2018	600.0	Chip development
Asaii	USA	2018	n/a	Music analytics
Platoon	UK	2018	n/a	Artist development
PullString	USA	2019	n/a	Speech technology
Stamplay	Italy	2019	5.6	Backend workflow development

Drive.ai	USA	2019	n/a	Autonomous vehicles
Intel's smartphone modem business	UK	2019	1,000.0	Smartphone modems
IKinema	UK	2019	n/a	Motion capture
Spectral Edge	UK	2019	n/a	Low-light photography
Xnor.ai	USA	2020	200.0	Edge computing, artificial intelligence
Scout FM	USA	2020	n/a	Podcast artificial intelligence
Dark Sky	USA	2020	n/a	Weather forecasting application
Voysis	Ireland	2020	n/a	Artificial intelligence/voice assistant
NextVR	USA	2020	100.0	Virtual reality events
Fleetsmith	USA	2020	n/a	Mobile device management
Mobeewave	Canada	2020	100.0	Payments start-up
Camerai	Israel	2020	n/a	Augmented reality
Spaces	USA	2020	n/a	Virtual reality
Curious AI	Finland	2021	n/a	Core artificial intelligence

Appendix J: List of Acquisitions of Microsoft and its Subsidiaries

Source: "List of mergers and acquisitions by Microsoft", Wikipedia, retrieved on 2021/03/30 (https://en.wikipedia.org/wiki/List_of_mergers_and_acquisitions_by_Microsoft)

Acquired company	Located in (country)	Year of acquisition	Purchase price (in USDm)	Business segment
Forethought, Inc.	USA	1987	14.0	Computer software
Consumers Software	Canada	1991	n/a	Software
Fox Software	USA	1992	n/a	PC database software
Softimage	Canada	1994	130.0	Wholesale 3-D visualization software
Altamira Software	USA	1994	n/a	Software
NextBase	UK	1994	n/a	Software
One Tree Software	USA	1994	n/a	Software
RenderMorphics	USA	1995	n/a	3D graphics hardware
Network Managers	UK	1995	n/a	Systems design
The Blue Ribbon SoundWorks	USA	1995	n/a	Software
Netwise	USA	1995	n/a	Computer software
Bruce Artwick Organization	USA	1995	n/a	Programming
Vermeer Technologies	USA	1996	133.0	Software
VGA-Animation Software	Germany	1996	n/a	Software
Colusa Software	USA	1996	n/a	Software
Exos	USA	1996	n/a	Video game controllers
Aspect Software Engineering	USA	1996	14.2	Computer software
eShop Inc.	USA	1996	50.0	Software
Electric Gravity	USA	1996	n/a	Electronic games
Panorama Software Sys-On-Line	Canada	1996	n/a	Software
NetCarta	USA	1997	20.0	Internet software
Interse	USA	1997	n/a	Internet software
WebTV Networks	USA	1997	425.0	Internet service provider
Dimension X	USA	1997	n/a	Java-based platforms
Cooper & Peters	USA	1997	n/a	Programming
LinkAge Software	Canada	1997	n/a	Internet software development
VXtreme	USA	1997	n/a	Internet video software
Hotmail	USA	1997	500.0	Internet software
Flash Communications	USA	1998	n/a	Enterprise instant messaging software

Firefly	USA	1998	40.0	Relationship management software
MESA Group	USA	1998	n/a	Data sharing software
Valence Research	USA	1998	n/a	Internet software
LinkExchange	USA	1998	265.0	Internet advertising network
FASA Interactive	USA	1999	n/a	Computer game software
CompareNet	USA	1999	n/a	Shopping online
Numinous	USA	1999	n/a	Technologies Software
Interactive Objects-Digital	USA	1999	n/a	Web music software
Jump Networks	USA	1999	n/a	Internet service provider
ShadowFactor	USA	1999	n/a	Wholesale computer software
Omnibrowse	USA	1999	n/a	Internet software
Intrinsa	USA	1999	58.9	Defect detection software
Sendit	Sweden	1999	125.4	Application software
Zoomit	Canada	1999	n/a	Encryption software
STNC	UK	1999	n/a	Community software
Softway Systems	USA	1999	n/a	Computer programming
Entropic	USA	1999	n/a	Software
Visio Corporation	USA	2000	1,375.0	Wholesale drawing software
Peach Networks	Israel	2000	n/a	Digital TV services
Travelscape	USA	2000	89.8	Internet service provider
Titus Communications	USA	2000	944.8	Cable television
Bungie	USA	2000	n/a	Video games
NetGames	USA	2000	n/a	Software
MongoMusic	USA	2000	65.0	Online music search engine
Pacific Microsonics	USA	2000	n/a	Digital audio technology
Digital Anvil	USA	2000	n/a	Video games
Vacationspot	USA	2001	70.9	Internet service provider
Great Plains Software	USA	2001	939.9	Business management software
Intellisol International	Canada	2001	n/a	Software
Ensemble Studios	USA	2001	n/a	Video games
NCompass Labs	Canada	2001	36.0	Internet software

Maximal Innovative	Israel	2001	20.0	Software
Yupi	USA	2001	n/a	Online Spanish portal
Classic Custom Vacations	USA	2002	78.0	Travel agency
Sales Management Systems	USA	2002	n/a	Software
Navision	Denmark	2002	1,333.0	Software programming
Mobilocity	USA	2002	n/a	Computer consulting
XDegrees	USA	2002	n/a	Security software
Rare	UK	2002	375.0	Video games
Vicinity	USA	2002	95.8	Online enterprise location
Connectix	USA	2003	n/a	Software
DCG	Australia	2003	n/a	Internet software
PlaceWare	USA	2003	200.0	Web conferencing
G.A. Sullivan	USA	2003	n/a	Information technology
GeCAD Software	Romania	2003	n/a	Antivirus technology
3DO Co-High Heat Baseball	USA	2003	0.5	Software
Encore Bus Solutions-IP Asts	USA	2004	n/a	IP assets
ActiveViews	USA	2004	n/a	Reporting systems
Lookout Software	USA	2004	n/a	Personal search tool
GIANT Company Software	USA	2004	n/a	Anti-spyware
en'tegrate	USA	2005	n/a	Software
Groove Networks	USA	2005	n/a	Community software
MessageCast	USA	2005	7.0	Messaging
Tsinghua-Shenxun-Cert Asts	China	2005	15.0	Certain assets
Sybari Software	USA	2005	n/a	Software
Teleo	USA	2005	n/a	VoIP
FrontBridge Technologies	USA	2005	n/a	Email protection
Alacris	USA	2005	n/a	Certificate management software
media-streams.com	Switzerland	2005	n/a	Software
5th Finger	Australia	2005	3.2	Mobile
UMT-Software and IP Assets	USA	2006	n/a	Software
MotionBridge	France	2006	17.9	Search
Seadragon	USA	2006	n/a	Software
Apptimum	USA	2006	n/a	Software
Onfolio	USA	2006	n/a	Software

Lionhead Studios	UK	2006	n/a	Video games
AssetMetrix	Canada	2006	18.0	Enterprise asset intelligence (SaaS)
Massive Incorporated	USA	2006	n/a	Video game advertising
Vexcel	USA	2006	n/a	Mapping software
DeepMetrix	USA	2006	n/a	Web log analysis
ProClarity	USA	2006	n/a	Analysis software
iView Multimedia	UK	2006	n/a	Digital asset management
Softricity	USA	2006	n/a	Application virtualization software
Winternals Software	USA	2006	n/a	Software
Whale	Israel	2006	n/a	Communications Applications
Gteko	Israel	2006	n/a	Applications
DesktopStandard	USA	2006	n/a	Applications
Colloquis	USA	2006	n/a	Natural language software
Medstory	USA	2007	n/a	Internet search engine
devBiz Business Solutions	USA	2007	n/a	Software tools
ScreenTonic	France	2007	n/a	Advertising and marketing
Tellme Networks	USA	2007	n/a	Mobile phone software
SoftArtisans	USA	2007	n/a	Business Intelligence software
Engyro	USA	2007	n/a	Information technology
Stratature	USA	2007	n/a	Master data management
Savvis Inc-Data Centers	USA	2007	200.0	Networking
AdECN	USA	2007	45.0	Ad Exchange
aQuantive	USA	2007	6,333.0	Digital marketing
Jellyfish.com	USA	2007	n/a	Search engine
Parlano	USA	2007	n/a	Enterprise messaging software
Global Care Solutions-Assets	Thailand	2007	n/a	Assets
HOB Business Solutions	Denmark	2007	n/a	Information technology
Musiwave	France	2007	n/a	Mobile music entertainment
Multimap.com	UK	2007	n/a	Mapping
Calista Technologies	USA	2008	n/a	Software
Caligari Corporation	USA	2008	n/a	Software
YaData	Israel	2008	n/a	Software

Rapt	USA	2008	n/a	Advertising yield management software
Komoku	USA	2008	5.0	Rootkit security software
90 Degree Software	Canad	2008	n/a	Business intelligence software
Farecast	USA	2008	75.0	Online search software
Danger Mobile	USA	2008	500.0	Internet software
Fast Search & Transfer	Norway	2008	1,191.0	Enterprise search
Kidaro	USA	2008	n/a	Software
Quadreon	Belgium	2008	n/a	Software
Navic Networks	USA	2008	n/a	Management software
Mobicomp	Portugal	2008	n/a	Mobile applications
Powerset	USA	2008	n/a	Semantic Search
DATAllegro	USA	2008	n/a	Data software
Greenfield Online	USA	2008	486.0	Search and e-commerce services
3DV Systems	Israel	2009	35.0	Developer of ZCam, a time-of-flight camera
BigPark	Canada	2009	n/a	Interactive online gaming
Rosetta Biosoftware	USA	2009	n/a	Bioinformatics solutions for life science research
Interactive Supercomputing	USA	2009	n/a	Software
Opalis Software	Canada	2009	n/a	Software
Sentillion, Inc.	USA	2010	n/a	Software for the healthcare industry
AVIcode, Inc	USA	2010	n/a	.Net monitoring technology
Canesta, Inc.	USA	2010	n/a	3-D sensing technology
Skype Technologies	Luxembourg	2011	8,500.0	Telecommunications
Prodiance	USA	2011	n/a	Software
Twisted Pixel Games	USA	2011	n/a	Video games
Videosurf	USA	2011	100.0	Video search
Yammer	USA	2012	1,200.0	Social networking
Perceptive Pixel	USA	2012	n/a	Multi touch hardware
PhoneFactor	USA	2012	n/a	Two-factor authentication system
StorSimple	USA	2012	n/a	Cloud-storage appliance vendor
MarketingPilot	USA	2012	n/a	Marketing automation firm

id8 Group R2 Studios	USA	2013	n/a	Home automation
Pando Networks	USA	2013	n/a	Peer-to-peer (P2P) media distribution
MetricsHub	USA	2013	n/a	Cloud monitoring
Netbreeze	Switzerland	2013	n/a	Social analytics
InRelease	Canada	2013	n/a	Release management
Nokia mobile phones unit	Finland	2013	7,200.0	Mobile phones, smartphones
HLW Software	Austria	2013	n/a	RDP applications
Apiphany	USA	2013	n/a	API management
Parature	USA	2014	100.0	Customer service software
GreenButton	New Zealand	2014	n/a	Cloud computing
Capptain	France	2014	n/a	(Mobile) application development
SyntaxTree	France	2014	n/a	Developer tools
InMage	USA	2014	n/a	Disaster recovery solutions
Inception Mobile Inc.	Canada	2014	n/a	Software
Mojang	Sweden	2014	2,500.0	Video games
Aorato	Israel	2014	n/a	Enterprise security & machine learning
Acompli	USA	2014	n/a	Mobile email apps
HockeyApp	Germany	2014	n/a	Mobile beta distribution & crash analytics
Equivio	Israel	2015	n/a	Text analytics service
Revolution Analytics	USA	2015	n/a	Statistical computing and predictive analytics
Sunrise Atelier, Inc.	USA	2015	100.0	Sunrise Calendar applications
N-trig	Israel	2015	200.0	Styli and pen input hardware and software
LiveLoop	USA	2015	n/a	PowerPoint collaboration
Datazen Software, Inc	Canada	2015	n/a	Mobile business intelligence & data visualization
6 Wunderkinder GmbH	Germany	2015	n/a	Wunderlist to-do list applications
BlueStripe Software	USA	2015	n/a	Application management
FieldOne Systems LLC	USA	2015	n/a	Enterprise field service
Adallom	Israel	2015	320.0	Cloud security
Incent Games, LLC	USA	2015	n/a	Sales-gamification

VoloMetrix, Inc	USA	2015	n/a	Organisational analytics
Double Labs, Inc.	USA	2015	n/a	Mobile lock screen software
Adxstudio Inc.	Canada	2015	n/a	Web portal and application lifecycle management solutions
Havok	Ireland	2015	n/a	Video game physics engine
Mobile Data Labs, Inc.	USA	2015	n/a	MileIQ, a mileage tracking application
Secure Islands Technologies Ltd.	Israel	2015	n/a	Data protection
Metanautix	USA	2015	n/a	Big data analytics
Talko, Inc.	USA	2015	n/a	Mobile communications
Teacher Gaming LLC	Finland	2016	n/a	Education software
SwiftKey	UK	2016	250.0	Virtual keyboard
Groove	Canada	2016	n/a	Music discovery
Xamarin	USA	2016	n/a	Mobile application development
Solair	Italy	2016	n/a	Internet of Things platform
Wand Labs	USA	2016	n/a	Conversation as a service
Beam	USA	2016	n/a	Video game streaming
Genee	USA	2016	n/a	AI-powered scheduling assistant service
LinkedIn	USA	2016	26,200.0	Professional social network
Maluuba	Canada	2017	n/a	Artificial intelligence
Simplygon	Sweden	2017	n/a	3D graphics optimization
Deis	USA	2017	n/a	Container management
Intentional Software	USA	2017	n/a	Intentional programming
Hexadite	Israel	2017	100.0	Cybersecurity
Cloudyn	Israel	2017	50.0	Cloud business management
Cycle Computing	USA	2017	n/a	Cloud HPC
AltspaceVR	USA	2017	n/a	Virtual reality
SWNG	USA	2017	n/a	Cinemagraphic photo app
Avere Systems	USA	2018	n/a	Data management
Playfab	USA	2018	n/a	Gaming backend service

Semantic Machines	USA	2018	400.0	Conversational AI
Ninja Theory	UK	2018	n/a	Video games
Undead Labs	USA	2018	n/a	Video games
Compulsion Games	Canada	2018	n/a	Video games
Playground Games	UK	2018	n/a	Video games
Flipgrid	USA	2018	n/a	Education, video discussion platform
Bonsai	USA	2018	n/a	Industrial AI platform
Lobe	USA	2018	n/a	Artificial intelligence
Glint	USA	2018	400.0	Employee engagement
GitHub	USA	2018	7,500.0	Software development and version control platform
inXile Entertainment	USA	2018	n/a	Video games
Obsidian Entertainment	USA	2018	n/a	Video games
XOXCO	USA	2018	n/a	Conversational AI
FSLogix	USA	2018	n/a	Application provisioning and virtualization
Spectrum	USA	2018	n/a	Social networks for design and development
Citus Data	USA	2019	n/a	Database management
DataSense	USA	2019	n/a	Database management
Express Logic	USA	2019	n/a	Real-time operating systems
Double Fine Productions	USA	2019	n/a	Electronic game development studio
BlueTalon	USA	2019	n/a	Data privacy and governance service
PromoteIQ	USA	2019	n/a	Retail e-commerce improvement
jClarity	USA	2019	n/a	Java software optimization
Movere	USA	2019	n/a	Cloud migration
Mover	Canada	2019	n/a	File migration
Affirmed Networks	USA	2020	1,350.0	5G networking
Metaswitch Networks	UK	2020	n/a	5G Networking
Softomotive	UK	2020	n/a	Robotic process automation
ADRM	USA	2020	n/a	Software data modeling startup
CyberX	USA	2020	165.0	IoT/OT Security

Orions Systems	USA	2020	n/a	Smart vision
ZeniMax	USA	2020	7,500.0	Video games
Marsden Group	USA	2021	n/a	Group tech in complex industrial environments