

The Role of Small Tech in the Concentration and Centralization of Capital

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Abstract

In Chapter XXV of Capital's first volume, Marx briefly presents his theory of concentration and centralization of capital - later advanced by Lenin and Hilferding. According to Marx, concentration (which would be "only another name for reproduction on an extended scale") occurs through accumulation, that is, by reinvesting profits aiming for more modern and efficient methods of production. Centralization, in turn, denotes the process in which capital amasses in one hand, having been pulled out of many an individual one. Centralization is leveraged by competition, which benefits large-scale investment and pushes small capital out of business, and credit, which provides capitalists with the large sums necessary for making sizable investments or acquisitions. The technology sector is a showcase for such processes of centralization and concentration: not only do big tech companies feature among the world's largest ones in terms of revenue and market cap, they are also notorious for acquiring small tech companies (or driving them out, if they do not comply) to improve their market position with the absorbed capital and expertise. Thus, "small tech" seemingly functions as laboratories for Big Tech, testing the economic viability of new demands and solutions, which once proven, lead to the absorption of such small capitals by tech giants. That hypothesis gains strength when we notice that tracing those multifarious acquisitions over time helps us peer into those companies' expansion strategies: according to the GAFAM Empire project, for instance, out of the five tech giants, Amazon is the one that made more acquisitions in the robotics sector in the last quinquennium, focusing on autonomous vehicles for the delivery of goods. Through those acquisitions, Big Tech is then able to expand accumulation (concentrating and centralizing capital), shedding off to the either acquired or bankrupt small companies part of the risk that productive investment would entail.

Keywords: Information technology sector. Mergers and acquisitions. Concentration and centralization of capital.

Introduction

With the purpose of investigating the acquisitions performed by the largest five technology companies in the world - Google, Apple, Facebook, Amazon and Microsoft - the United States Federal Trade Commission (FTC) requested from those companies documents and information with respect to the purpose, scope, terms and structure of acquisitions which had not been reported to national antitrust agencies under the aegis of the Hart-Scott-Rodino (HSR) Act¹, spanning over from January 1st, 2010 to December 31st, 2019. In total, the FTC analyzed 616 transactions above US\$ 1 million (FEDERAL TRADE COMMISSION, 2021, p. 3).

The investigation found that approximately two thirds of transactions targeted domestic firms and that over three quarters of those acquisitions required founders or key employees in the acquired companies to abide by non-compete clauses - and the higher the transaction value, the

¹ The Hart-Scott-Rodino Antitrust Improvements Act of 1976 amends the Clayton Act, mandating companies to submit pre-merger notifications to the FTC and the Justice Department's Antitrust Division for certain acquisitions, instituting waiting periods before these acquisitions can be completed, and requiring a filing fee based on transaction size, divided between the FTC and the Antitrust Division.

more likely it included such clauses. Also, most of those acquisitions were asset or control transactions. Among the transactions for which the acquired companies' ages were available (which were 86.9% of the total number), 39.3% were less than five years old (FEDERAL TRADE COMMISSION, 2021, p. 36-37).

Such acquisitions, which grant large companies control over assets and innovations produced by small, young technology companies, have already been acknowledged as a key factor for the high concentration observed in the technology sector. Those transactions allow Big Tech to kill two birds with one stone: amassing knowledge, tools and skilled labor while eliminating potential competitors (ALCANTARA ET AL, 2023).

This paper is aimed at peering into how the acquisition of small technology companies contributes to the concentration and centralization of capital, as initially studied by Marx in the first volume of *Capital* and further developed by later authors. Our hypothesis is that these companies function as laboratories for the development of new tools and hiring and harvesting new talents. As soon as the innovations brewed in those startups prove to be a viable investment - and preferably before they turn into a menace -, the small firms are taken over by the largest technology companies, whose scale and user base allow them to leverage such innovations to an extent the startups would not be capable of achieving. To evaluate that hypothesis, we examine characterizations of small companies that have been lately acquired by Big Tech, expecting that they clue us in on the motive behind those acquisitions.

A review on concentration & centralization of capital

In Chapter XXV of *Capital's* first volume, Marx briefly presents his theory of concentration and centralization of capital. According to Marx, each individual capital is itself a concentration, larger or smaller, of means of production, plus the respective command over a larger or smaller labor-army. It is through the expansion of many individual capitals as such that the growth of social capital - read the sum of individual capitals, including state and joint-stock capital (Sau, 1979, p. 4) - is achieved (Marx, 1867/2015, p. 849-850). That expansion is attained by appropriating surplus value through the maximization of the rate of profit (Sau, 1979, p. 5).

Thus, concentration of capital is identical to accumulation itself. Such concentration is distinguished by two features: 1) it is limited, *ceteris paribus*, by the degree of increase of social wealth and; 2) accumulation presents itself, at one time, as an increasing concentration of means of production and command over labor, and as mutual repulsion of individual capitals (Marx, 1867/2015, p. 851).

The fragmentation of such individual capitals, and their mutual repulsion, is countervailed by the attraction one to another. Said attraction, differently from concentration - which presupposes the creation of capital - is an aggregation or redistribution of capital already created and in operation. This is the centralization of capital; it is the suppression of individual capitals' independence and the consolidation of many small capitals into few larger ones, in Marx's words, an "expropriation of capitalist by capitalist". Centralization also differs from concentration in that the former is not constrained by accumulation, it is not limited by the (absolute) growth of social wealth (Marx, 1867/2015, p. 851). Then again, concentration always involves the growth of social capital, while centralization does not (Sau, 1979, p. 9).

Marx then proceeds to outline the dynamics of centralization: cheapening of commodities, the main device in the battle of competition, depends, all else unchanged, on labor productivity, which in turn is conditioned by the scale of production. Here, larger capitals shall defeat smaller ones. As a result, given that, as accumulation develops, the minimum volume of capital required to conduct business typically increases, smaller capitals pursue bailiwicks not yet dominated by big industry. In those bailiwicks, competition is fiercer the larger the number and the smaller the size of individual capitals, and therewith concentration and centralization further ensue (Marx, 1867/2015, p. 851-852).

While, on one hand, concentration foments centralization by enlarging the scale of production thus increasing labor productivity and cheapening commodities, the other way round is also true: when it coalesces the scattered individual capitals, centralization promotes the dynamization of the production process, usually making once tailor-made methods more productive and expanding the scale of operations, and so boosts accumulation (Sau, 1979, p. 8-9).

Building on Marx's contributions, Bukharin investigated concentration and centralization of capital on a world scale and identified changes in the forms of both processes at his time. According to him, concentration of capital in an individual enterprise, the initial form thereof, prevailed until the last fourth of the nineteenth century, up to the advent of joint-stock companies. Concentration, which used to manifest as accumulation of individual capitalists in competition with each other, then took the form of concentration in trusts, when it became possible to engage in tandem the capital of multiple individual entrepreneurs, ultimately paving the way for large monopolistic enterprises (Bukharin, 1917/1988, p. 110).

Centralization, too, changed form: once expressed in the absorption of small individual capitals and in the ensuing emergence of large individual enterprises, as the number of competitors decreased but competition itself intensified, it manifested as fierce competition among a few capitalist behemoths. Concentration and centralization thus gave rise to trusts. Bukharin still distinguished two types of centralization: horizontal, where an economic unit incorporates another of similar kind, and vertical, where the absorbed unit is of a different kind. The latter is what engendered combined enterprises (Bukharin, 1917/1988, p. 111-113).

In a more contemporary take, Dutta (2021, p. 3) points out the absence of independence of enterprises that are absorbed through centralization, to such an extent that miscellaneous undertakings are subordinate to a unified management structure. The author also acknowledges the role of takeovers, mergers and the sheer liquidation of competitors - phenomenal expressions of capital centralization - in the formation of such combined enterprises (Dutta, 2021, p. 4).

The empirical findings of Brancaccio et al. (2018) not only illustrate the centralization of share capital in a few hands, but also indicate the intensification of the process, especially since the 2007 crisis. Performing a network analysis of the ownership and control structures of capital, the authors depict the high level of centralization of corporate control, where at most 2% of the top holders seize cumulatively up to 80% of the economic value of the firms considered in the study (Brancaccio et al., 2018, p. 103).

Concentration and centralization of capital in the technology sector

Overview

The technology sector stands out as it pertains to the dynamics of the world economy, taking into account that, as displayed in Table 1, four out of the world's five largest companies by market capitalization are among the so-called Big Tech: Apple, Microsoft, Alphabet (Google's holding company), and Amazon (Companies MarketCap, 2023). Those four companies - all based in the United States of America, it is worth mentioning - along with Meta (formerly Facebook), ranked 7th in the same list, are referred to by the acronym GAFAM (Google, Apple, Facebook, Amazon and Microsoft) or, more loosely, as Tech Giants, due to their dominance of the sector.

Rank	Company	Market Cap	Country
1	Apple	\$ 2.977 T	United States of America
2	Microsoft	\$ 2.805 T	United States of America
3	Saudi Aramco	\$ 2.159 T	Saudi Arabia
4	Alphabet (Google)	\$ 1.714 T	United States of America
5	Amazon	\$ 1.510 T	United States of America

Table 1: Top 5 companies by market capitalization.

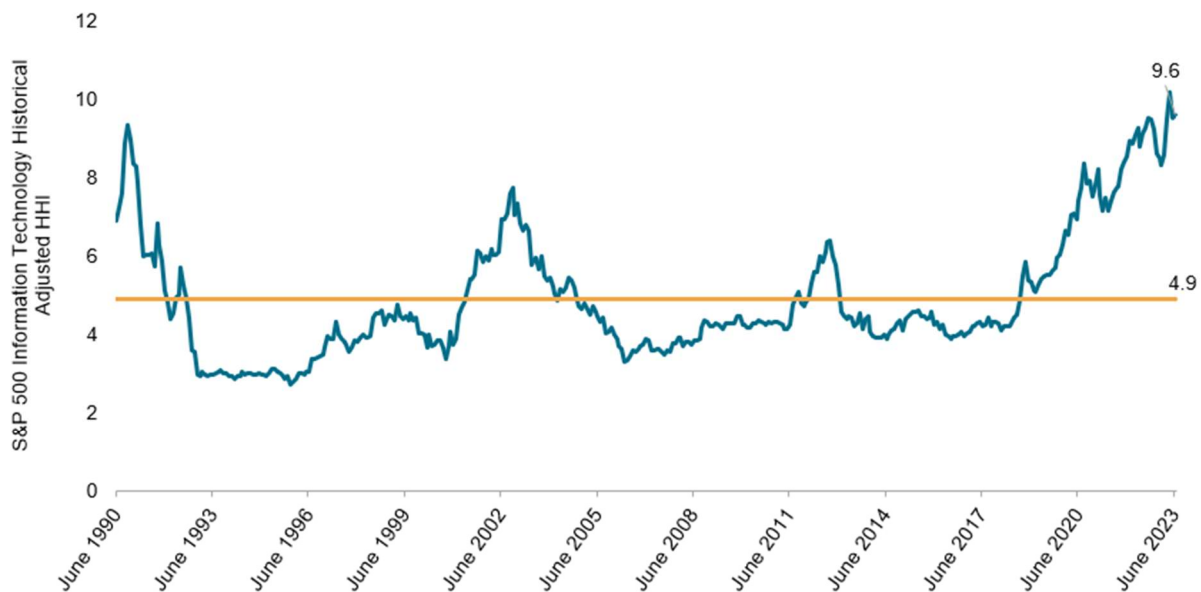
Source: Adapted from CompaniesMarketCap.com (2023).

And historical financial data supports that both concentration and centralization in the technology sector are at an all-time high. Between January and June 2023, Standard & Poor's 500 information technology sector² outperformed the overall S&P 500 by 26% (S&P Dow Jones Indices, 2023b). Additionally, the sector's level of market concentration (which, in light of the aforesaid operationalization of concepts, would hint the degree of centralization) reached a historical high: as it is shown in Fig. 1 (S&P Dow Jones Indices, 2023b), the adjusted HHI³ for June 2023 was the highest of the 33-year period under consideration, standing in the 99th percentile of observed values (S&P Dow Jones Indices, 2023b).

² The Standard and Poor's 500 index (or S&P 500) is a weighted index that takes into account the market capitalization of the top 500 publicly held companies in the United States (Investopedia, 2023). The S&P 500 information technology sector comprises the intersection of companies in S&P 500 and those which the Global Industry Classification Standard (GICS) classifies as IT companies (S&P Dow Jones Indices, 2023a).

³ The Herfindahl-Hirschman Index (or HHI) is a statistical measure of market concentration, employed by the United States Department of Justice and the Federal Reserve, among other institutions, to appraise the effects of company mergers on competition (Rhoades, 1993, p. 188). The adjusted HHI for a sector, as used by S&P Dow Jones Indices, is given by the ratio of the HHI of that sector to the HHI of an evenly-weighted portfolio containing the same number of stocks. Such adjustment allows comparisons over time (S&P Dow Jones Indices, 2023b).

Exhibit 1: Concentration in the Tech Sector Is Relatively High Compared to History



Source: S&P Dow Jones Indices LLC. Data from January 1990 to June 2023. Past performance is no guarantee of future results. Chart is provided for illustrative purposes.

Figure 1: Adjusted HHI for the technology sector between June 1990 and June 2023.

Source: S&P Dow Jones Indices, 2023b.

The role of small tech

Among the devices that allow the Tech Giants to reach the magnitude they have are their merger and acquisition operations - preeminent mechanisms of concentration and centralization of capital. In 2017 only, GAFAM made 55 acquisitions, mostly of young start-ups. A few reasons for the one of the Tech Giants to acquire such growing, newfangled business ventures are a) an interest in product developed by those startups; b) an interest in valuable assets held by those startups, such as patents, innovations, or user base; and c) a will to restrict competition in order to consolidate one's market position (Gautier & Lamesch, 2021, p. 1-2).

Gautier and Lamesch (2021) conducted a research that aimed to peer into the GAFAM's merger strategies, having gathered data on the acquisitions those companies performed, between 2015 and 2017, as well as the on the companies themselves. Their findings also help to shed light on the profile of the small companies acquired by the Big Techs.

As expected, a large part of the acquisitions target small companies in the same core income segment as the acquirer; however, two segments showed noteworthy intense activity: the digital content segment, which encompassed 26% of the acquisitions, involving all five companies, and the business segment, in which Google, Amazon and Microsoft stood out. The authors indicate that as a sign of increasing competition in those two segments (Gautier & Lamesch, 2021, p. 2).

A recurrent outcome of those acquisitions is the discontinuation of the acquired company's operation or product: that was the case for over 60% of the acquisitions under analysis. A product was considered to be discontinued when it was "no longer supplied, maintained or upgraded under its original brand name" (Gautier & Lamesch, 2021, p. 2).

The authors list some reasons for the recurrence of discontinuations following acquisitions: 1) the product might have turned out to be less successful than anticipated, leading the acquirer to give it up; 2) the motivation behind the acquisition was not the product itself, but rather the startup's assets or innovation effort; and 3) the acquired company's product was seen as a potential threat and the acquisition was aimed at protecting the acquirer's market position - this is what the authors label as a "killer merger". Their research also identified two determinant factors for discontinuation: a) the age of the acquired company, so younger firms were more likely to be discontinued; and b) competition, so firms in the same core segment as the giant that acquired them were more prone to be discontinued (Gautier & Lamesch, 2021, p. 2).

Extending the work of Gautier & Lamesch (2021), Maitry (2022) examines the merger and acquisitions by the same companies over a longer period of time (2015-2021) in an attempt to explain GAFAM's market power. The author focuses particularly on the age of the acquired companies, whether their economic activity overlaps with those of the acquirers, and the role of data in the small companies' business (Maitry, 2022, p. 2).

Some of the author's findings echo the results from Gautier & Lamesch (2021): most of the companies acquired by GAFAM in the period (more precisely, 54%) were discontinued (Maitry, 2022, p. 33). Given his deeper emphasis on the acquired companies' characteristics, he provides a finer picture of those companies.

According to the study, the firms acquired by GAFAM are notably young: their median and average age are 5 and 7 years, respectively, and the total funding until the points of acquisition is low. Additionally, 60% of acquired companies were from the United States. As it pertains to their economic activity, more acquisitions were made in the cloud infrastructure cluster⁴ than in any other (40% of all acquisitions considered); this was also the cluster with the highest discontinuation-after-acquisition rate: 64%. The author understands that, even though it does not indicate causality, the analysis demonstrates that companies in that sector are more likely to be discontinued (Maitry, 2022, p. 33).

The author thereby deduces that the acquisitions in that cluster, considering the companies' young age, have less to do with getting rid of a menacing competitor and more with getting ahold of said competitor's assets. The startups in that sector come up with an innovative idea, but they are short of data or scalable infrastructure to leverage that idea, to use it to maximum advantage. Thus it ensues that the Tech Giants take hold of such innovations when they acquire and discontinue those startups. That outline leads the author to infer that acquisitions of startups in the cloud infrastructure segment might have "an anti-competitive motive" (Maitry, 2022, p. 34-35).

Conclusions

In view of its high level of oligopolization, the information technology sector is a showcase for the processes of concentration and centralization of capital, as regards the investigation conducted by Marx (1867/2015) and further developed by authors such as Bukharin (1917/1988), Sau (1979) and Dutta (2021). In this frame of reference, the goal of the present

⁴ The clustering used by Maitry (2022) refers to that defined by Argentesi et al. (2021), according to which the cloud infrastructure cluster comprises services a) of remote storage and file transfer, b) of artificial intelligence, data science, and analytics, and c) that cannot be pigeonholed into other clusters (namely, communication apps and tools, digital content *etc*) and are thus labeled *other* (Maitry, 2022, p. 11, 14).

study was to understand the role that small technology startups play (if any) in the consolidation of GAFAM's dominance over the market.

Our hypothesis was that these incipient companies, from the perspective of the Tech Giants, work as laboratories of the economic availability of new products and services or sources of valuable assets, as skilled labor or innovative tools. Once those small firms stand out, offering a potentially competitive product or amassing assets GAFAM, with their economies of scale, can leverage, they are absorbed (and oftentimes discontinued) by the behemoths that dominate the technology market.

To put that hypothesis to test, we looked into investigations aimed at building a characterization of firms recently targeted by GAFAM's merger and acquisitions. Their results showed that young companies (with low total funding and, on average, 7 years old) are the bulk of the ones targeted by GAFAM's acquisitions. And the majority of those small technology firms are discontinued following acquisition.

Furthermore, while a substantial portion of the acquisitions involve small companies in the same core income segment of the acquirer (instances of horizontal centralization, according to Bukharin's taxonomy), the cloud infrastructure segment stood out as one of intense competition and interest for all five Tech Giants. That is seen in the large number of acquisitions and the succeeding discontinuation of small companies in the segment.

Finally, there is a common understanding in the studies that the appropriation of valuable assets owned by those technology startups may be the primary reason behind the acquisitions - perhaps even stronger a factor than the menace such startups might represent as competitors.

Two possible advancements in the investigation about the role played by small technology companies in the concentration and centralization of capital could be 1) dig deeper into the nationality as a factor in the decision for acquisition, given that the lion's share of the acquisitions targeted U.S. companies; and 2) scrutinize GAFAM's investment structure to understand how it is affected, if so, by the appropriation of assets from small companies (Does that appropriation replace investments in innovation? Does it complement those?).

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