THE FUTURE MEANS BUSINESS

The investment implications of transformative new corporate models

Fall 2019

FOREWORD

The modern firm is one of society's most powerful inventions, with more than 50% of economic transactions taking place internally within firms rather than through market mechanisms.[1] The decisions made by firms are major drivers of value creation and destruction – and matter immensely to long-term investors given over half of a typical institutional portfolio is comprised of corporates.[2]

This is especially true today, as a host of disruptive factors are leading to the emergence of new business models that use dramatically different factors of production, leverage new technologies and network effects to aggressively dominate markets, and are governed by a new and evolving set of stakeholders pushing for broader social purpose beyond near-term profit maximization.

To explore the new opportunities, as well as the changing investment calculus and portfolio choices resulting from these transformative business models, we draw on the insights of more than 25 PGIM investment professionals across our asset managers – as well as leading academics, industrial organization experts and policymakers.

We also conducted a groundbreaking survey of over 300 public and private companies in the U.S., Germany and China to better understand the inner motivations and future aspirations of companies around the world – and ensure our investment themes are grounded in the actual actions and decisions of the corporate world.

The resulting investment implications are striking, and at PGIM, we believe investors who best navigate this rapidly changing corporate landscape will be well positioned to succeed over the long term.

David Hunt

President and Chief Executive Officer
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Megatrend Series

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About PGIM

PGIM, the investment management business of Prudential Financial, Inc. (PFI),* is a top 10 investment manager with $1.3 trillion in assets under management worldwide (as of June 30, 2019).** With global scale and specialized asset class expertise across public and private markets, our 1,100 investment professionals deliver a broad range of actively managed solutions in fixed income, equities, real estate, alternatives and private capital to serve clients' needs. Built on a foundation of strength, stability and disciplined risk management, our deep investment expertise across asset classes helps achieve superior long-term performance for our clients. To learn more about PGIM, please visit www.pgim.com.

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** Pensions & Investments' Top Money Managers list, May 28, 2019; based on Prudential Financial total worldwide institutional assets under management as of December 31, 2018.

CHAPTER 1

The Evolution of the Firm

Firms are now evolving more rapidly and radically than ever before, with profound implications for their growth, profitability and returns.

Companies are powerful economic, political and social influencers on the world stage. Representing an estimated two-thirds of global employment and gross domestic product, they are essential to the fabric of modern economies.[3] At their best, firms drive innovation and growth, satisfy ever-changing customer needs, generate jobs, train workers and revitalize communities. At their worst, however, firms collude, engage in fraud, arbitrage regulations, influence elections and can contribute to natural calamities.

Most importantly for investors, firms are now evolving more rapidly and radically than ever before, with profound implications for their growth, profitability and returns. Not that firms haven't gone through transformation before: From the first joint-stock funds of ancient Anatolia, through the state-directed companies of mercantilist Europe, the limited liability corporations of the late 19th century, the transnational corporations of the post-WWII era, and most recently the shareholder-profit-maximizing firms of the 1980s, the firm has undergone dramatic transformation (Exhibit 1).

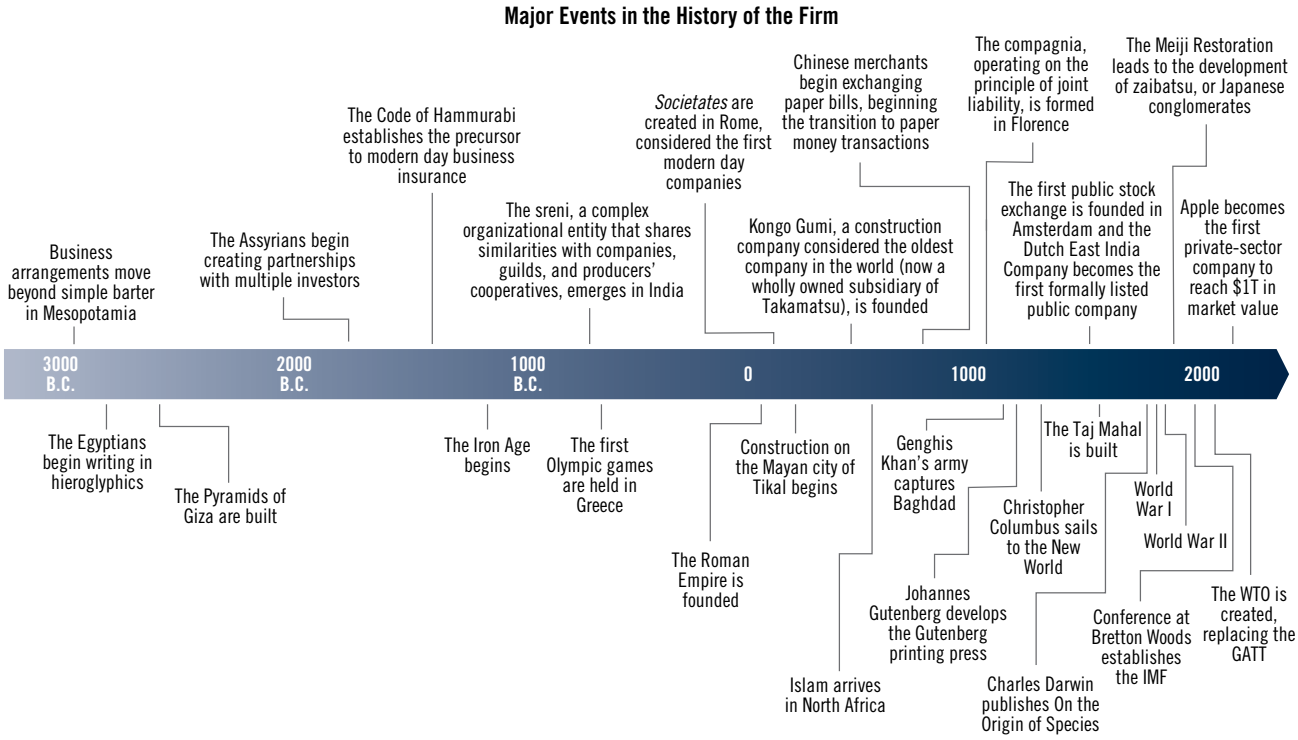
Modern Disruption

We are now witnessing the next stage of evolution in firm orientation. A range of disruptive forces have led to the emergence of innovative business models that are creating new opportunities for investors and radically changing their investment calculus and portfolio allocations across public and private equity, debt and real assets. We believe three new business models will be especially transformational:

The Weightless Firm: Firms are shifting at a dramatic pace away from physical capital (factories, machinery and equipment) to a "capital-light" model centered on investments in intangible assets like R&D, software, intellectual property, data, brand, design and platforms. Intangible assets as a share of market value have more than doubled in the U.S. since 1985.[4]

The Superstar Firm: Firms are leveraging technology, proprietary data and network effects to build scale as well as a productivity edge over peers – and are thriving in an increasingly "winner-takes-all" environment. In 1975, half the earnings of U.S. public corporations came from

Exhibit 1: **The firm has been developing since 3000 B.C.**



Source: John Micklethwait and Adrian Wooldridge, "The Company: A Short History of a Revolutionary Idea," Modern Library, 2005; Paul Walker, "The Theory of the Firm: An overview of the economic mainstream," Routledge, 2017.

109 firms; today, that same share of corporate earnings is generated by fewer than 30 firms.[5]

The Purposeful Firm: Companies are increasingly measuring themselves by more than just financial profit and loss. Customers, employees, regulators and shareholders are holding them accountable to a broader set of community values that go beyond maximizing quarterly earnings. Today, the global Fortune 500 spend three times as much annually on corporate social responsibility as the combined development and humanitarian aid spending of the United Nations Development Programme and UNICEF.[6]

Critically, these three increasingly important features of the 21st-century firm extend well beyond niche technology hubs. We believe these new characteristics are overlapping, often mutually reinforcing, and cannot be ignored by any company seeking to innovate, grow, or at a minimum, avoid obsolescence risk. PGIM's 2019 survey of companies in China, Germany and the United States corroborates this thesis.[i] Almost 60% of surveyed firms said intangible assets had grown in importance over the last three years – with more than 80% of Chinese firms believing intangible assets would become even more critical over the next three years. Similarly, two out of every five firms globally – and well over half the companies surveyed in Germany – said they now balanced profit maximization with the potentially broader goals of other stakeholders, especially employees, customers and country.

In other words, even traditional "brick and mortar" firms with storied histories will need to consider how they respond to the growing prominence of intangible assets, the threat and opportunity from rising superstar firms, and the increasing emphasis – from customers, employees, investors and regulators – on broader "purpose" as the true mission of companies. Indeed, these characteristics are likely to be critical factors in determining winners and losers across a range of industries for years to come.

What Do These Changes Mean for Investors?

To be prepared for the impact of these new business models, institutional investors will need to pay close attention to the changing structures and behaviors of the firms in which they invest. Some critical questions they will need to ask include:

- Has the shift to R&D-intensive, capital-light firms shrunk the need for public markets, and what does this mean for my mix of public and private market investing?
- Do "winner-takes-all" superstar firms erode business dynamism and what does that imply for my concentration levels and security selection choices across corporate equity and debt?
- How should private and public market investors value companies that prioritize network size and data "moats" over cash flow and near-term profitability?
- How should investors respond to companies that are incorporating broader social goals into their business charter and appealing to a broader set of stakeholders beyond their equity owners? Conversely, how can investors sensibly evaluate and support such companies given their own ESG objectives?

> *Even traditional "brick and mortar" firms will need to consider how they respond to the growing prominence of intangible assets, the threat and opportunity from rising superstar firms, and the increasing emphasis on broader purpose.*

The next three chapters analyze the opportunities arising from each of these disruptive new business models. The collective impact of this transforming global corporate landscape will clearly have critical investment implications for chief investment officers, including the need to:

- **Re-evaluate public-private allocations.** Weightless firms are staying private for longer, driven by lower capital requirements compared to physical capital-intensive firms, a lower fixed-cost base, and easy access to the glut of late-stage private capital. Investors seeking to participate in the new weightless economy, in

[i] PGIM commissioned CoreData Research to survey C-suite executives with involvement in setting strategic priorities at a wide variety of public and private businesses in the U.S., Germany and China. In June 2019, a quantitative online survey with 49 questions was conducted among 300 respondents (100 per country) from companies that had a minimum annual revenue of $50 million in China and $100 million in Germany and the U.S. In addition to the quantitative survey, there were 24 qualitative interviews conducted by phone with respondents that had similar specifications.

particular technology-forward companies in developed markets, will want to evaluate shifting allocations towards private equity and debt.

- **Adjust risk models to appropriately evaluate intangible-driven firms.** Rating agencies continue to emphasize tangible assets in their evaluation of credit risk. Firms of the future will be leaner on tangible capital than their predecessors, but their cash flows can be just as stable and dependable, especially with high variable costs and limited capex requirements. The resulting mispricing of risk can potentially create opportunities in both public and private debt markets for savvy investors.
- **Develop an investment framework to identify next-generation national superstars, while evaluating the portfolio for growing obsolescence risk.** With rising firm concentration, fewer new entrants, and expanding "kill zones," successful investors will need to identify potential superstars with strong staying power relatively early on. We identify a handful of indicators that characterize successful superstars across multiple sectors based on an active equity investment approach. Equally important, CIOs will want to find ways to safeguard against obsolescence risk in their portfolios. They may consider increasing the frequency of portfolio reviews and forming a cross-asset-class team to evaluate the impact of disruptive new business models on their corporate holdings. Investments with especially long lock-up periods or long durations are particularly susceptible to disruptive change from these emerging trends.
- **Transition to next generation ESG approaches: ESG metrics are not a "one size fits all" proposition and no single ESG metric is material for all firms across all industries.** It follows, therefore, that formulaic approaches to ESG may not be very useful for achieving either investment or ESG objectives. Instead, by employing a more active, nuanced framework that emphasizes only the relevant metrics for an industry, or even an individual firm, investors can "do good, while doing well."

We explore these and other investment themes in the rest of this report and hope this analysis of the changing nature of companies is a useful guide to the investment possibilities and potential risks arising from the rapid evolution of how companies are organized and run around the world.

CHAPTER 2

The Weightless Firm

> *Companies are increasingly untethered from the conventional trappings of production: physical assets, employees, and company-owned headquarters.*

Companies are increasingly untethered from the conventional trappings of production: physical assets, employees, and company-owned headquarters. These tangible assets have historically defined the firm. The consequences for investors of new "weightless" companies will be quite profound – and will require a significant shift in evaluating investment opportunities in public and private companies, and real estate, around the world (Exhibit 2).[i]

CAPITAL

The increasing reliance on and share of intangible assets

LABOR

The rise of the gig economy and flexible work arrangements

CORPORATE REAL ESTATE

WeWork and other flexible office space providers transforming commercial office space

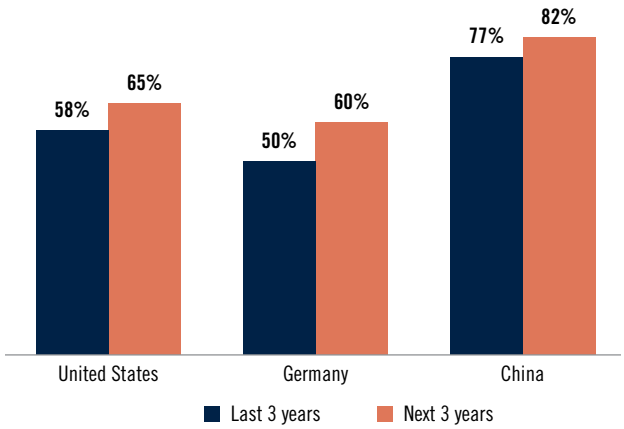
Capital: The Rise of Intangible Assets

Investment in intellectual property and other intangible capital has become a critical driver of growth in the knowledge economy. In fact, in many developed economies spending on intangibles is now greater than on "brick and mortar" assets.

New technologies are emerging to disrupt even industries where physical capital has long been prominent. For instance, vertical farming techniques espoused by commercial farmers are poised to reduce their need for land. Each firm's proprietary techniques for vertical farming will become their intellectual property and add to their intangible capital. Similarly, within the oil and gas sector, advanced drilling technologies and measurement-while-drilling systems have become commonplace in wells, effectively automating many traditionally capital- and labor-intensive processes.

Over 70% of the market value of the S&P Europe 350 and 85% of the S&P 500 in the U.S. is now comprised of intangible assets.[7] The trend is most striking in the U.S., where intangible investments as a share of GDP overtook tangible investments in the 1990s and continues to rise (Exhibit 3).[8] While primarily a developed-market phenomenon, there is new evidence that intangibles are

Exhibit 2: **The percentage of companies that consider intangible assets to be more important than tangible assets**



Source: PGIM 2019 proprietary survey of over 300 public and private companies across the United States, Germany and China.

[i] In addition to firms' decreasing reliance on physical factors of production, firms are also becoming "stateless," seamlessly operating across different markets and regulatory regimes. For a discussion of the trend and its investment implications, see "The End of Sovereignty: Globalization, Nationalism and the Implications for Institutional Investors," PGIM, Spring 2018.

What's behind the rising share of intangible assets?

Intangible assets are defined as assets that are not physical in nature.* They typically include: research and development, data, design, patents, software, training, intellectual capital, business practices and processes, marketing, digitization and branding, among other things. Conversely, tangible assets are physical in nature, and typically include land, vehicles, machinery, equipment, inventory and business-owned real estate.

While every company and industry has its own unique mix, certain intangible assets are becoming increasingly important across broad swaths of the global economy. A few notable examples:

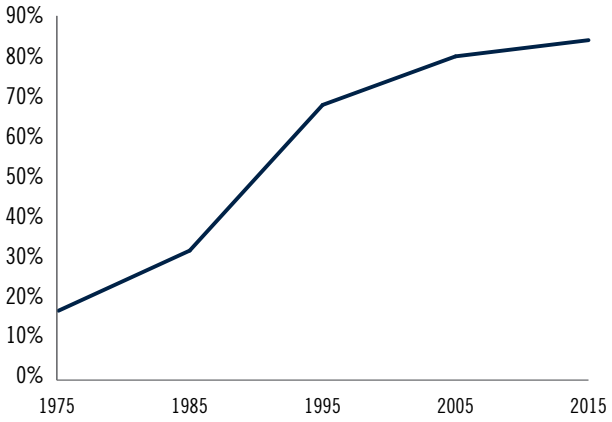
- **Research and development:** The rapid pace of technological change and shortening product cycles have made it essential for companies to innovate to remain competitive and avoid obsolescence risk.
- **Data:** As artificial intelligence, machine learning, algorithms and personalization become more entrenched in the global economy, data has become an integral source of value for most business operations.
- **Design:** The increasing complexity of modern technology and goods has made it imperative for businesses to emphasize product and process design to make these technologies and processes simple, intuitive and pleasurable for customers.
- **Software:** As computer technology continues to advance, an increasing number of companies are looking to software to digitize, automate, and analyze their business processes, helping to drive increased productivity levels.
- **Business process automation:** With the introduction of advanced robotics and the digitization of processes, firms are increasingly automating parts of their workflow to reduce person hours, overhead costs and errors, as well as to enhance operational stability and improve the customer experience.

* Note that investments in intangible capital are not captured as an 'asset' under GAAP rules and are instead treated as expenses.

also a growing share of total global assets, indicating this shift in developed markets does not merely reflect the offshoring of manufacturing to emerging markets, but a more profound global shift.[9, ii]

The dramatic shift from tangible to intangible assets in many developed-market economies has also been a key factor in making the public markets in these countries less attractive for many weightless firms.[10] Indeed, the number of listed firms in the U.S. has steadily declined, dropping from a peak of just over 8,000 in 1996 to fewer than 4,500 by the end of 2018.[11] While there are several factors driving this decline, including the abundance of private capital and the high reporting and regulatory costs of being public, the significant decline in the number of listings in intangible-heavy markets such as the U.S., U.K.

Exhibit 3: **Intangible assets as a share of S&P 500 market value have increased dramatically over the past 40 years**



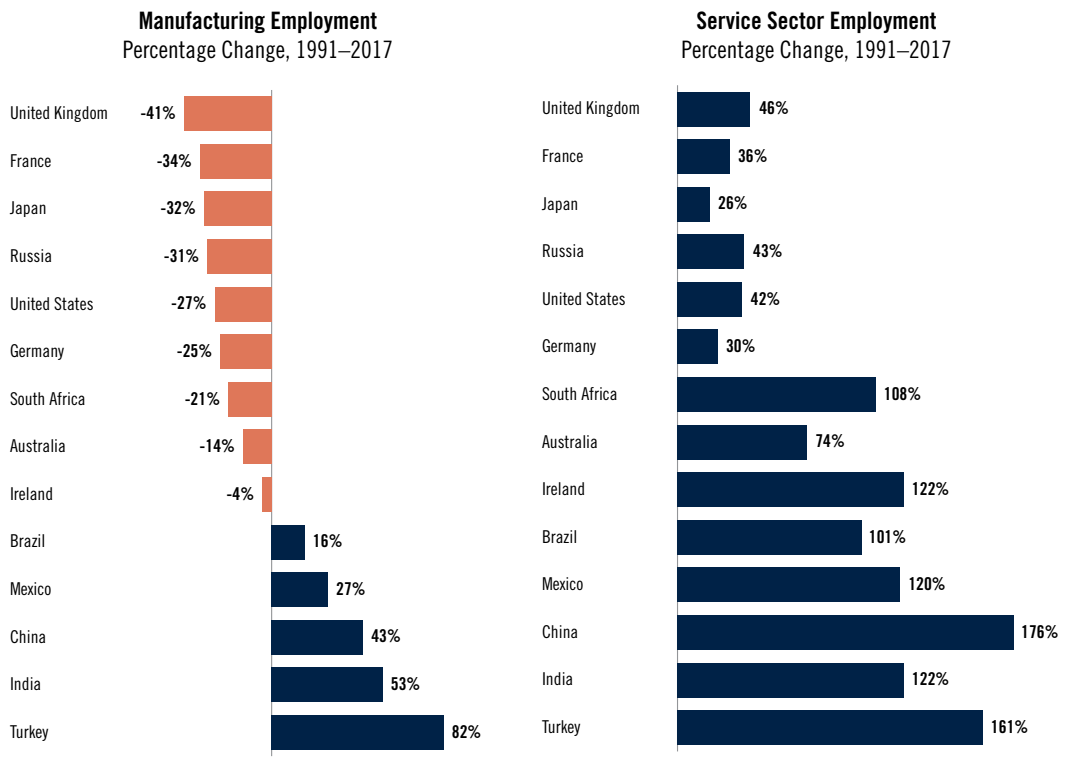
Source: "Intangible Asset Market Value Study," Ocean Tomo, 2017.

[ii] For example, the economist Dani Rodrik has talked about the phenomenon of "premature deindustrialization" in many developing countries that have experienced falling shares of traditional manufacturing in terms of both employment and real value-add. For more information, see Dani Rodrik, "Premature deindustrialization," Journal of Economic Growth, Springer, Vol. 21(1), Pages 1-33, March 2016.

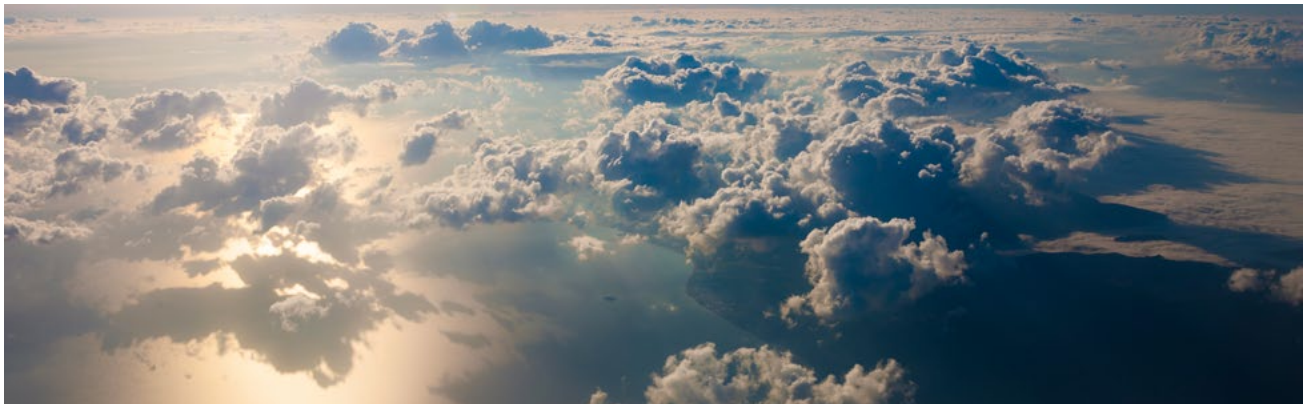
and the euro area is driven in part by the strong, secular shift towards weightless firms:

- R&D and intangible-heavy firms have a longer path to profitability and are deterred by the drumbeat of quarterly earnings and the whims of impatient public capital markets.
- GAAP has an inherent bias against intangible assets, as it treats R&D investment as an expense.
- Unlike physical assets, which cannot easily be expropriated, firms do not want to disclose the details of their intellectual property as other firms can build on those ideas.
- Weightless firms typically need less capital compared to firms in physical capital-intensive industries, meaning they rely less on public markets to scale their businesses.

Exhibit 4: **Manufacturing employment has declined across many developed markets, while service sector employment has increased**



Source: "International Comparisons of Manufacturing Productivity & Unit Labor Costs," Conference Board, as of June 2, 2019; International Labor Organization, as of June 4, 2019.



The rise in intangible assets has been driven by three forces:

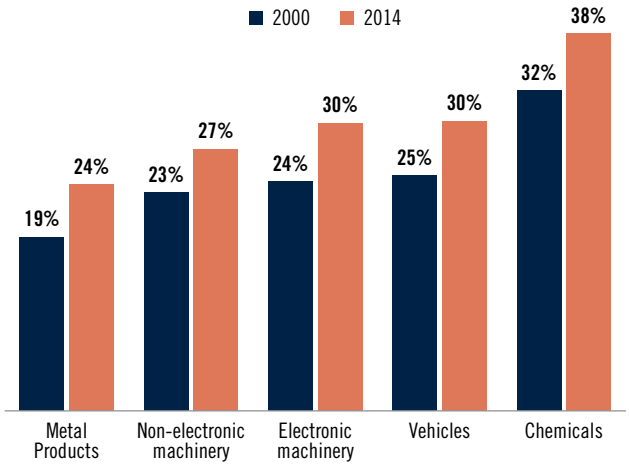
First, there has been a secular global shift away from manufacturing employment towards services (Exhibit 4). In the U.S., for example, the professional and business services sector has grown at 10 times the pace of the manufacturing sector.[12] And while outsourcing of manufacturing to emerging markets might account for some of the shift in developed markets, the shift in employment away from manufacturing towards a service-based economy is a global trend.[13]

Second, far-reaching, complex supply chains have increased the need for software and automated business processes. As companies have expanded beyond narrow geographical areas, it has become important for them to invest in more local branding, local managerial expertise, as well as information, communication and technology to help coordinate complex production and distribution processes.

Third, intangible assets have surged within brick-and-mortar, capital-heavy industries as well (Exhibit 5). Traditional industrial sectors, for instance, are increasingly required to spend on intellectual property, data, software, R&D and branding to avoid obsolescence.

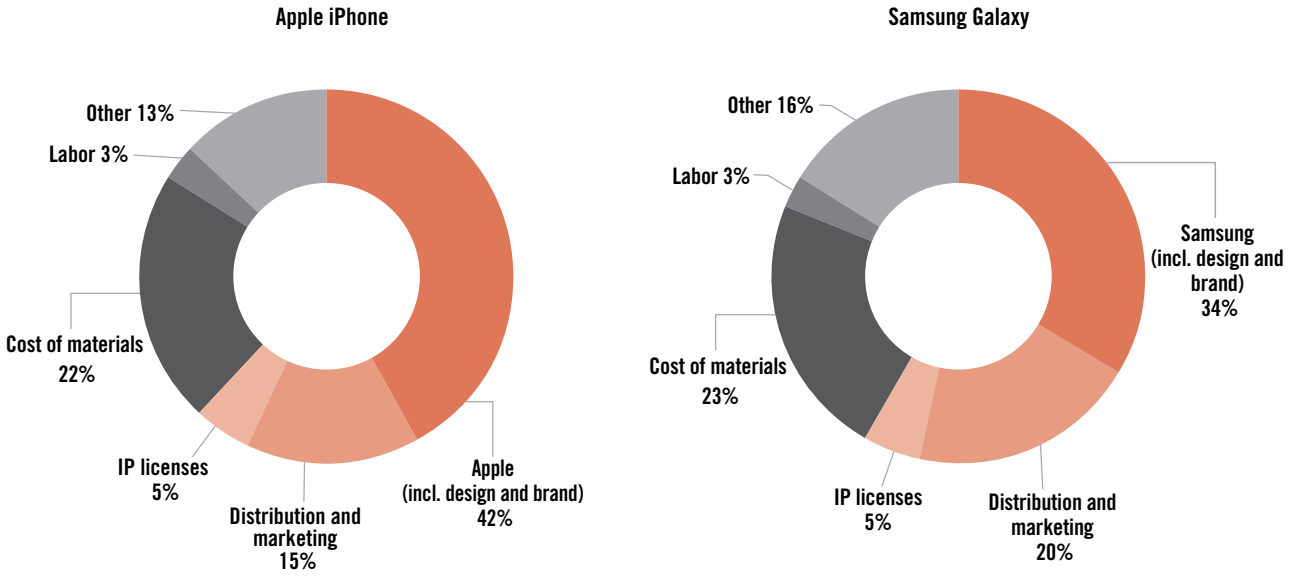
Furthermore, intangible assets account for most of the value created in contemporary manufacturing. Labor and the cost of materials generate only about 25% of the value of the leading smartphones, for example, while design, branding, distribution networks, marketing and IP make up about two-thirds (Exhibit 6).

Exhibit 5: **Rising value of intangible capital**



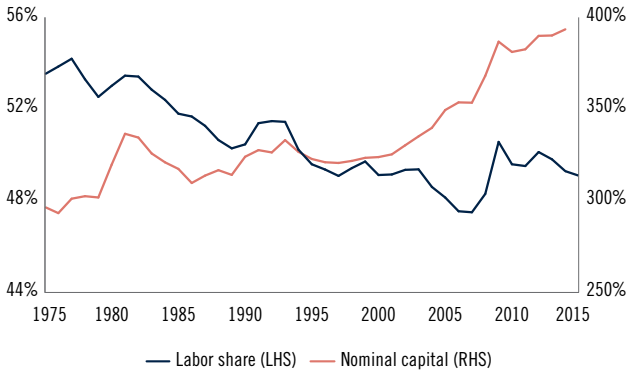
Source: Wen Chen, Bart Los, and Marcel P. Timmer, "Factor Incomes in Global Value Chains: The Role of Intangibles," NBER Working Paper No. w25242, November 2018.

Exhibit 6: **Smartphone value is mainly driven by intangible assets**



Source: "World Intellectual Property Report 2017," World Intellectual Property Organization, 2017. May not total 100% due to rounding.

Exhibit 7: **Capital as a share of global GDP has grown while labor has declined**



Source: "World Economic Outlook April 2019," International Monetary Fund, 2019.

Labor: The Vanishing Employee

In 1990, the Big Three Detroit automakers had revenues of $250 billion and 1.2 million employees. Today, the top three tech companies have more than twice the revenues and fewer than one-third the number of workers.[14] While the growing reliance on research and intellectual property has led to strong demand for highly skilled human capital, the intangible asset-fueled productivity gains generated by these companies allow them to employ overall far fewer employees than 30 years ago.

The Detroit-Silicon Valley dichotomy is indicative of a broader global trend: Labor is capturing a smaller share of the economic gains from production, while capital is claiming a larger share (Exhibit 7).

There are three primary drivers of this trend:

First, productivity currently seems low in the aggregate in many developed markets as technology adoption has been uneven within industries and across them as well. Winning firms – defined as larger, more profitable and more patent-intensive firms – show strong productivity gains since 2000 and drive the trend towards labor-light models.[iii] Firms are typically able to accomplish this through technology and intangible-driven productivity improvements as well as new models of labor outsourcing, mainly in the form of the gig economy.

Second, the U.S. job market has been "hollowed out" with many middle-income occupations vanishing due to automation or other technological innovations. A recent study by PGIM Fixed Income suggests a large swath of middle-income occupations have seen a rapid decline in the U.S. over the last decade compared to high- and low-paying jobs. Fewer manufacturing jobs in maintenance and production as well as reduced employment in office and business administration reflect broad technological and productivity enhancements.[15]

> *Many middle-income occupations are vanishing due to automation or other technological innovations.*

Third, there has been a decline in full-time employees as the shared economy model grows. Online platforms and marketplaces define the gig economy and provide access to assets rather than transfer ownership. While gig workers remain a relatively small percentage of the global workforce – roughly 4% of the working-age population in the U.S. and U.K. is now working for on-demand platforms – the gig worker model is beginning to dominate some of the largest and fastest-growing companies in the world.[16] Notably,

Exhibit 8: **Gig-economy firms generate significant revenue with very few employees**[17]

Uber	Airbnb	Didi	Ola
22,000 employees	4,000 employees	13,000 employees	8,000 employees
3,900,000 drivers	650,000 hosts	31,000,000 drivers	1,000,000 drivers
$11.3B in revenue	$2.8B in revenue	$38.3B in revenue	$265M in revenue

Source: Uber, Statista, Airbnb, Owler, Forbes, Economic Times, The Tribune, TechCrunch, China Daily, South China Morning Post.

[iii] For more information on why productivity is likely to increase in the coming years see our previous paper, "The Technology Frontier: Investment Implications of Disruptive Change," PGIM, Fall 2018.

companies such as Airbnb (U.S.), Uber (U.S.), Fetchr (UAE), Careem (UAE), Ola (India), and Didi Chuxing (China) may not hire many "full-time employees," but they contract with many more "independent entrepreneurs," and this portion of their labor model is growing rapidly (Exhibit 8).

The gig economy labor model provides clear benefits. It enhances the allocation of underutilized assets and potentially reduces the cost of services for global consumers. It also offers today's workers something new: substantially more freedom and flexibility with their time. Today's workers are better able to mold their working hours around other higher priority goals and commitments.

However, significant concerns remain as well. For example, under labor laws in the U.S. and Europe, independent contractors do not enjoy the same legal and economic protections as full-time employees. These protections include minimum wage and unfair dismissal laws as well as Social Security, pensions and other retirement savings programs.[18] According to a McKinsey study, for instance, approximately 30% of independent workers in the U.S. and Europe are independent out of necessity, not out of choice.[19] This might help explain why the wages of "entrepreneurs" are consistently lower than wages of full-time employees. Some estimates show gig-economy workers can earn as little as $2 an hour after accounting for business-related expenses, which would be covered by a traditional employer.[20]

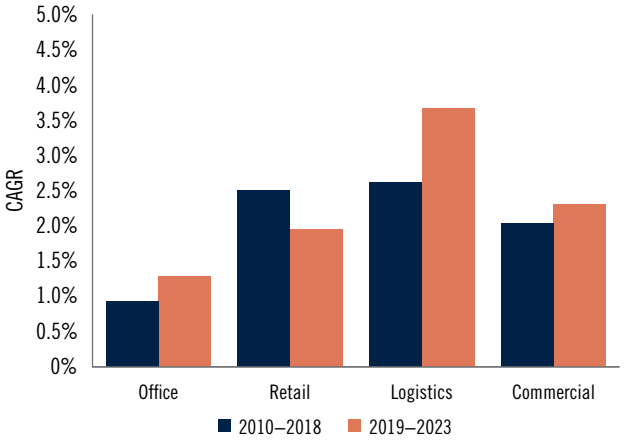
> *Dramatic shifts in the preferences of employers and employees are altering the landscape for commercial office space.*

Real Estate: The Flexible Office

Dramatic shifts in the preferences of employers and employees, as well as advances in office design and use, are altering the landscape for commercial office space. Three main trends are emerging: rising occupant density, greater use of flexible work arrangements and the emergence of co-working space.

Denser office spaces. Firms have become more cost efficient with their physical space because of shrinking technological footprints and new layout designs. This has resulted in higher employee density and slower growth in office space demand. In the U.S., average office space per worker has declined from over 200 square feet in the early 1990s to around 180 today.[21] Global growth for office space in the future is forecast to be subdued compared to other real estate sectors (Exhibit 9). This is at least in part due to the greater density of workers in office spaces.

Exhibit 9: **Global real estate supply growth by sector**



Source: "Trends for 2019: Global Real Estate Trends Set to Shape the Next 12 Months," PGIM Real Estate, December 2018.

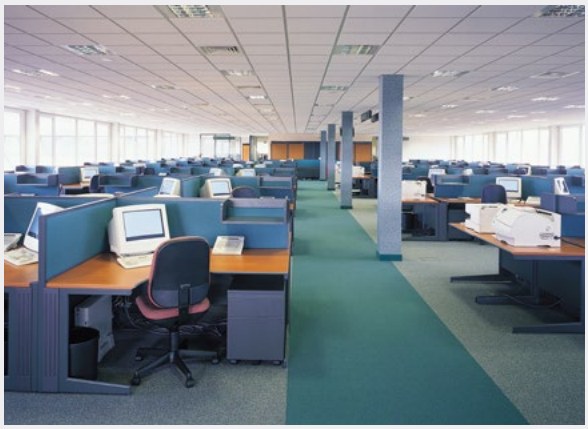
Remote work arrangements. In recent years there has been an explosion in the range of options for workplace flexibility, including discretion in the number and structure of hours worked and alternate work locations. While much of the hype has been around flexible arrangements in developed countries like the U.S. and the U.K., this trend has taken hold all around the world.[iv] More than half of the 100 Chinese public and private firms surveyed by PGIM already utilize flexible office space, for example.

Perhaps most notable has been the shift to remote working. This trend began back in 1979 when IBM began an experiment: To relieve crowding at its Silicon Valley research center, the company installed at-home terminals for five employees.[22] This was the beginning of "telecommuting" – and over the decades, technologies such as videoconferencing, remote network access and high-speed internet have enabled people and firms to operate from anywhere, anytime. As these technologies have flourished, the number of remote workers has increased in lockstep: a recent study of over 18,000 professionals from a range of different industries across 96 companies found that 70% of

[iv] In Malaysia the government began a pilot program in March 2019 to allow civil servants to work flexible hours. Similarly, in May 2019, the government of Cape Town, South Africa, introduced a draft strategy to work with local businesses to introduce flexible working hours and remote working to cut down on congestion.

Exhibit 10: **Flexible office space has gone through a radical transformation**

Past



Present

employees are working at least one day a week somewhere other than the office, and 53% work remotely for half of the week or more.[23]

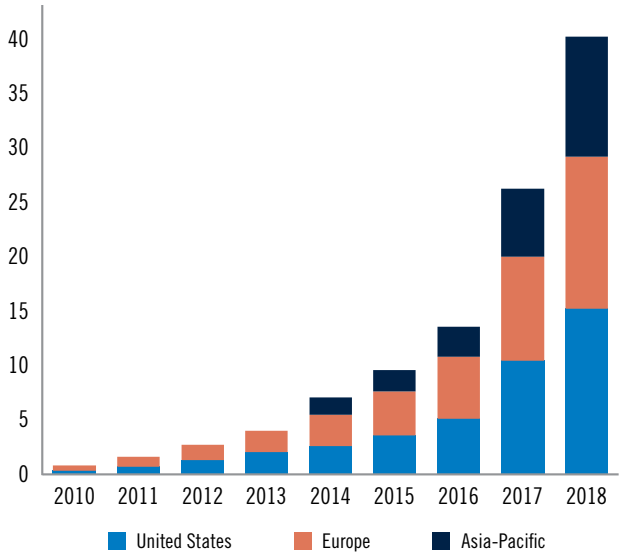
Flexible office space. The shift to remote work arrangements, alongside changing employer and employee preferences, has led to the rapid expansion of flexible, co-working office space. This is because employers, especially weightless firms, are demanding increasingly flexible lease terms and a higher level of service, further amplified by the late stage of the current economic cycle. And because a new generation of employees prefers modern, convenient and shared workspaces with open plan layouts, collaborative and communal spaces, and new amenities.

Once dominated by Regus (now IWG), the co-working market has gone through a radical transformation since the Great Recession, evolving from a spartan office cubicle design with limited services and comforts to a design pioneered by WeWork featuring collaborative working spaces with abundant natural lighting as well as modern designs and amenities (Exhibit 10).

With this evolution came the rapid growth of the market. While still nascent – less than 2% of office stock in most major markets is occupied by flexible office providers today – and mostly confined to Tier 1 cities in developed markets, there is now an estimated 40 million square feet of flexible space across the U.S., Asia-Pacific and Europe, an impressive fourfold increase since 2015 (Exhibit 11).

Exhibit 11: **Estimated flexible office stock by region**

Aggregate stock, square feet, millions



Source: "Trends for 2019: Global Real Estate Trends Set to Shape the Next 12 Months," PGIM Real Estate, December 2018.

Questions remain about the viability of WeWork and other co-working operators through the next recession, especially given the Regus bankruptcy during prior downturns. According to WeWork's IPO prospectus, for example, the company has future lease payment obligations of $47 billion as of June 30, 2019, versus a revenue backlog of $4 billion. However, tenant and employee expectations for flexibility and well-appointed shared space are likely here to stay.

Portfolio Implications

The weightless firm generates an array of investment and asset allocation opportunities. We highlight four major implications forward-looking institutional investors will want to consider:

1. **Exploit opportunities in public and private corporate debt issued by weightless firms.** As companies have moved toward more intangible-heavy business models, credit rating agencies have not fully adjusted their risk models and tend to mark down companies with low tangible asset levels. This is because tangible assets are regarded positively by credit rating agencies who view them as collateral. Physical capital can provide collateral for lenders to recover their investment in the event of a default. Weightless firms are consequently seen as lacking in this regard. As of 2017, roughly three-quarters of all agency-rated tech issuers in the U.S. were rated BB+ or lower, with the largest rating category being B. However, many of these companies have very predictable and stable cash flows, with limited need for capex, making them high-quality borrowers. Notably, since 2007, the U.S. speculative-grade default rate in the high-tech sector has been consistently below the total speculative-grade default rate.[24] Additionally, many of these companies have high IP moats and their products are relatively sticky once adopted by customers. For example, it takes a lot of effort for companies to switch operating systems or install new software programs.

   Of course, the technology sector is broad, with several subsectors ranging from commoditized hardware makers to high margin, IP-driven software companies. Investors will want to be cognizant of these differences to ensure they minimize their exposure to companies with high obsolescence risk and no added protection of scale.

   Similarly, in private capital markets, companies with large physical asset bases have been viewed more favorably by many private lenders. However, the mindset of many private lenders is evolving: lighter, nimbler, "weightless" companies have been able to switch from a high fixed-cost basis to a high variable-cost basis. Indeed, according to PGIM's proprietary survey of over 300 C-level executives, 45% of firms in the U.S., Germany and China have increased their variable costs as a portion of total costs over the past three years, and more than half believe their variable cost share will increase further over the next three years. As a result, these firms are potentially better able to respond to business cycles by more easily scaling their variable costs up or down and adjusting business processes in response to a downturn or competitive threats.[v]

> *Credit rating agencies have not fully adjusted their risk models and tend to mark down companies with low tangible asset levels.*

2. **Evaluate increasing developed-market allocations to privates given the changing investment opportunity set in a weightless world.** Weightless firms are staying private for longer and taking advantage of the greater availability of late-stage private capital, reduced disclosure requirements and more limited capital needs than their physical capital-intensive predecessors. As a result, investors wanting to capture weightless sectors of the global economy, in particular technology-forward companies in developed markets, may consider shifting their developed-market allocations towards private equity and debt markets.

   While private markets provide access to sectoral growth opportunities that may be more limited in public markets and have proven to generate a market premium, investors must also weigh the illiquidity risk of a more significant allocation to privates.[25] Specifically, investors will want to understand their cash liabilities before increasing their allocation to private assets. Finding the optimal allocation to private assets requires a targeted, individual approach, by which investors can quantify the cost of liquidity and adjust their portfolios accordingly.[vi]

[v] A study by the Bank of Japan found that intangible assets that enhance a firm's technological capability and senior management's qualifications are just as predictive as financial data for assessing a company's default rate. For more information, see Saiki Tsuchiya and Shinichi Nishioka, "Estimation of Firms' Default Rates in terms of Intangible Assets," Bank of Japan Working Paper Series, February 2014.

[vi] For more information on how to achieve this optimal allocation, see "The Tradeoff Between Liquidity and Performance: Private Assets in Institutional Portfolios," PGIM Institutional Advisory Solutions, January 2019.

3. **Realign public equity investment by increasing allocations to emerging markets.** Going forward, public equity issuance and growth are likely to be increasingly driven by emerging markets. The universe of publicly listed firms is shrinking in Europe, the U.K. and the U.S. The number of listed firms in the U.S., for instance, has declined by 50% since the late 1990s. Yet, the number of listed firms in emerging markets has remained steady, and since 2000, their share of global market cap has grown from 8% to over 21%.[26]

   Furthermore, emerging markets will continue to be the primary driver of global growth over the next decade. Emerging markets already represent nearly 60% of global GDP on a purchasing-power-parity basis and are forecast to contribute over 90% of global population growth and middle-class spending growth between 2017 and 2030.[27]

4. **Reposition real estate portfolios for the rise of the WeWork model and the gig economy.** Flexible office space and remote working are altering the landscape of the broad real estate market and creating opportunities for real estate investors regardless of their allocations to flexible office spaces.

   - **Prepare for shorter office real estate lease terms and higher capital investment with the rise of the WeWork model.** Shorter lease terms are the natural outcome of greater demand from businesses for flexibility in office space. The length of office leases has in fact declined and break clauses are becoming a more regular feature. According to MSCI, average commercial lease lengths in the U.K. have declined from about 10 years in 1997 to just over seven years today, with 42% of new tenancy agreements having lease durations of less than five years.[28] When evaluating cash flows from office properties, investors will need to raise discount rates to account for the elevated risks associated with shorter leases.

     Furthermore, flexible office space users often favor buildings with new and more elaborate amenities for workers. The pressure to continuously invest in keeping amenities fresh and current will require building owners to increase capital expenditures as the amenity wars heat up. Owners will be well served to keep the amount of flexible workspaces limited to less than 20% of total square footage as that is roughly the tipping point where flexible office space drags on a property's return.[29]

   - **Evaluate new co-working opportunities in multifamily housing.** Increasing demand for well-appointed, technology-forward workspaces closer to home has driven multifamily housing owners and operators to experiment with top-notch co-working spaces *within* residential buildings. These spaces feature many of the amenities of prime office space such as high-speed Wi-Fi, huddle spaces, lavish conference rooms, booths, office-grade printers and private offices.

     For investors interested in accessing the broader co-working trend, but hesitant to invest in large co-working brands or commercial buildings, multi-use residential buildings may provide a comfortable entry point into the space. Furthermore, placing state-of-the-art co-working spaces directly in a residential property can attract new tenants and renters.

     The co-working trend offers opportunities for property owners as well. Co-working spaces within multifamily housing can provide a new way to monetize unused space and create new, steady revenue streams. Building operators are often able to set up co-working spaces in areas that were underutilized, such as basements or large storage spaces without windows. Similarly, other multifamily housing owners are renting out these unused spaces to established co-working brands.

CHAPTER 3

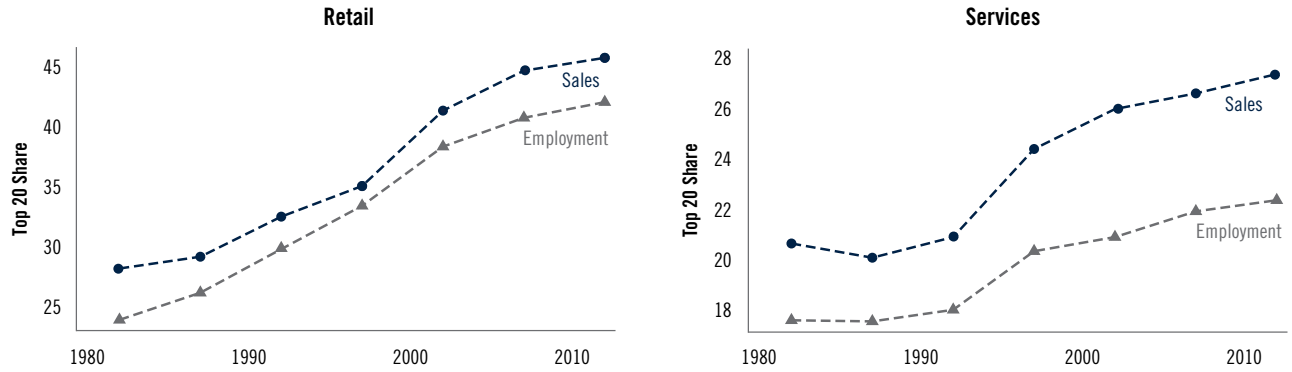
The Superstar Firm

> *A small cohort of winner-takes-all firms across a range of industries has created a long tail of firms at growing risk of irrelevance and obsolescence.*

The intangible capital underpinning the modern "weightless firm" – data, software, IP, brand and new technologies – has been a real differentiator for 21st-century firms. Those firms that utilize it effectively and leverage it with a successful platform have achieved productivity gains that dwarf their peers.

This divergence in productivity has fueled another transformation in the global corporate landscape: the increase in monopoly power and concentration of a small cohort of winner-takes-all firms across a range of industries (Exhibit 12). A new breed of "superstar firms," evident in both developed and emerging markets, has created a long tail of firms at growing risk of irrelevance and obsolescence. This section explores the macroeconomic and investment implications of this new winner-takes-all economy and the superstar firms that dominate it.

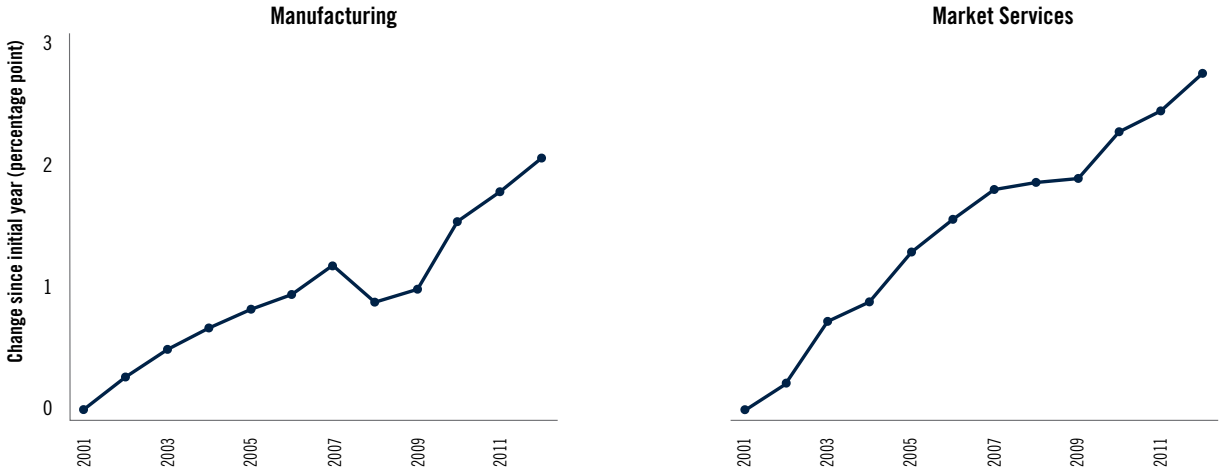
Exhibit 12A: **Industry concentration has increased across key sectors in the U.S.**



Source: David Autor et al., "The Fall of the Labor Share and the Rise of Superstar Firms," NBER Working Paper No. w23396, May 2017.

Exhibit 12B: **Industry concentration has increased across key sectors in Europe**

Share of gross output produced by the top decile of firms (as measured by sales)



Source: Matej Bajgar et al., "Industry Concentration in Europe and North America," OECD Productivity Working Papers No. 18, January 2019. Note: Countries included in the study include Belgium, Germany, Finland, France, Norway, Portugal and Sweden. Gross output measures the value of products produced or sold to a firm's customers, including both intermediate user and final consumer. The measure may differ slightly from 'total sales' due to accounting rule differences across industries.

A "Winner Takes All" World

The emergence of the superstar firm goes well beyond the formal tech sector. While disruptive technology companies provide obvious examples of superstar firms, the trend goes well beyond that sector. Firms across a range of industries and countries have proven quite capable of exploiting technology-driven opportunities. For example, in the U.S., retail pharmacy CVS has used both acquisitions and vertical mergers to control the way in which Americans access pharmaceutical products.[30] And in China, Alibaba and Tencent have a dominant presence in everything from money-market funds to video gaming.

Superstar firms deploy technology more effectively than their peers, driving productivity growth. Leveraging technological innovations has made superstar firms more efficient than their rivals and given them a material competitive advantage. As they seize outsized market share, they capture economies of scale and widen the disparity between the top firms and those at the bottom. While this productivity gap has been growing for decades, recent research suggests it has intensified since the financial crisis.[31]

> *The rise of national superstars in China and India, for example, has led to greater competition and weakened global concentration of U.S. and European firms.*

Counterintuitively, national superstar firms outnumber global superstars. Industry leaders from developed economies once dominated global markets. But now, incumbent industry leaders from developed markets are being displaced by local superstar firms in many sectors as the increased competition from local and regional entrants has resulted in the weakening of once globally dominant firms. The rise of national superstars in China and India, for example, has led to greater competition and weakened global concentration of U.S. and European firms. In 2006, only 138 emerging market firms ranked in the global top 1,000 by revenue, compared to nearly 250 today.[32]

Drivers of the Superstar Firm

Technology-enabled gains are amplified by scale and the network effect. Superstar firms successfully employ disruptive technology and intangible assets – algorithms, proprietary IT systems and other intellectual capital. By deploying technology *before* their rivals, they have amplified their advantage even further. Early adoption of technology enables even a small edge to be compounded by the network effect and economies of scale. The competitive advantage in productivity gained by first movers has been tremendous and nearly insurmountable, making it nearly impossible for late entrants to displace the early disruptors. The additive effect of these dynamics has enabled a select number of firms to establish dominant positions in their markets. This has led to the emergence of digital conglomerates such as Google, Tencent, Facebook, Apple, Alibaba, Amazon and MercadoLibre as well as companies with oligopolistic power in a single market such as Flipkart, Uber, Airbnb and DHL.[33]

These scale and scope advantages also allow superstar firms to invest in proprietary innovation, typically in private companies outside of the public glare. Indeed, recent evidence suggests industry concentration is highly correlated with the growth of patenting intensity and investments in proprietary IT systems.[34]

Effectively creating a "kill zone." Superstar firms have been able to maintain their dominant position by exploiting the innovations of others or acquiring strategic competitors. These actions solidify their technological superiority or kill potentially competing applications. Such practices give 21st century superstar firms a wider moat and create a "kill zone" when upstart competitors get too close.[35]

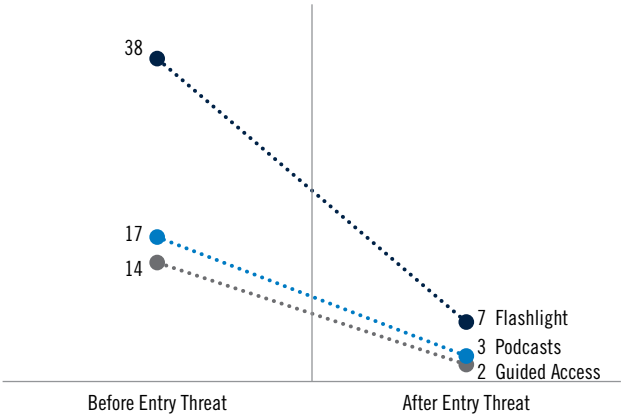
Examples of this "kill zone" are especially prominent in the tech sector.[36, i] Platform companies such as Amazon, Apple, Microsoft and Google have perhaps the most enduring advantage, as they are able to easily determine the most successful offerings and use their asymmetric knowledge to directly compete. For example, a recent study highlighted that Amazon is more likely to enter into markets where third-party sellers have had the most success. This, in turn, discourages affected third-party sellers from subsequently pursuing other growth opportunities on the platform.[37]

[i] Take Life on Air, a company that in 2015 released Meerkat, a live video-streaming app. Dubbed the "star app of 2015," Meerkat was soon removed from the app store after Twitter acquired and promoted Periscope, a competing app, and Facebook released its own version of live video. Additionally, one could look to Facebook's acquisition of virtual reality business Oculus, which, according to Harvard professor Kenneth Rogoff, was done as an attempt to kill off the start-up's promising operating system.

Likewise, there is new evidence showing the average number of copycat apps released declines dramatically after Google releases its own version of the app in Google Play (Exhibit 13).

This phenomenon is present outside of the technology realm as well. For instance, electronic health record vendors such as Cerner or Epic are developing their own solutions to compete with digital start-ups that may be challengers.[38] Another example is in chemicals, where Monsanto has acquired more than 30 companies over the past decade, thereby appropriating new advances and eliminating upstart competitors.[39]

Exhibit 13: **Average number of new similar apps released per month before and after Google released its own version**



Source: Wen Wen and Zhu Feng, "Threat of Platform-Owner Entry and Complementor Responses: Evidence from the Mobile App Market," Strategic Management Journal 40, No. 9, Pages 1336–1367, September 2019.

Macroeconomic Consequences of Superstardom

Superstar firms generate tangible benefits for society. They provide sophisticated search engines and social networks free of charge, for example. Their disruptor mind-set allows them to displace entrenched incumbents, often creating better value and faster service for end consumers. Their dominant position also allows them to invest in long-term research and innovation. These are significant societal benefits, many of which may not be adequately captured in the national accounts. However, some important macroeconomic implications stemming from the rise of superstar firms are worth noting as well.

Growing share of income captured by capital rather than labor. The rise of superstar firms has also been directly linked to the decline in the labor share globally. Industries with dominant superstar firms – defined by their high profit levels and relatively low levels of labor – have experienced some of the steepest declines in the labor share of income. This pattern is common across the U.S. and other OECD countries.[40] Importantly, this dynamic has been driven by earnings inequality *between* firms, rather than *within* firms. This implies that the small fraction of workers employed at superstar firms have been able to capture an increasing share of wage incomes and an outsized portion of the global wealth – at the cost of workers not employed at high-productivity, winner-takes-all firms.[41]

The birth of the digital conglomerate. Data is the fuel for the superstar firm. Companies such as Facebook, Amazon and Google are finding it easier to discover synergies between products that might seem different but ultimately serve to attract more users. Importantly, digital models have seemingly repealed the law of diminishing returns – generating immense returns to scale through network effects and positive feedback loops. Additionally, common platforms make it easier to offer different products that typically revolve around the core business model of collecting data. Notably, digital firms have been able to take advantage of their technology prowess to disrupt sectors that have yet to develop the same technologies (e.g., Alibaba disrupted the global payments sector with the establishment of Alipay). These firms are also adept at leveraging significant balance-sheet flexibility and identifying inorganic growth opportunities early on in a firm's life cycle.[42] For example, Tencent has over 600 companies in its portfolio, entering into 163 deals throughout Asia, Europe, Oceania, Africa and the Americas last year alone (Exhibit 14).[43] It naturally follows that incumbent firms (and investors) should be mindful when digital conglomerates seek to enter their markets and attempt to disrupt their businesses.

Looming regulatory challenges. Superstar firms initially gained dominant market positions by successfully competing on the merits of their innovation and technological advantages. However, there is growing concern they are now using their commanding positions to erect barriers to entry in an effort to protect their dominance.[44] While the empirical evidence is still unclear, there are signs this current trend

Exhibit 14: **Digital conglomerates have a far-reaching ecosystem**

CATEGORY	ALIBABA	TENCENT
B2B E-Commerce	✓	✓
Big Data Marketing	✓	✓
Bike Sharing	✓	✓
Cloud Service	✓	✓
Education Platform	✓	✓
Financial Media	✓	✓
Financial Services	✓	✓
Food Delivery	✓	✓
Grocery Chain	✓	
Home Appliance Manufacturer	✓	
Home Appliance Shopping Platform	✓	
Insurance	✓	✓
Life Service Information	✓	✓
Local Service Provider	✓	✓
Logistics	✓	✓
Maps and Navigation	✓	✓
Medical Health Services Provider	✓	✓
Mobile Application Store		✓
Mobile Chat	✓	✓
Mobile Security Software	✓	✓
Music Streaming	✓	✓
New Technology Media	✓	✓
Online Discount	✓	✓
Online Shopping	✓	✓
Original Video Content	✓	✓
Payment	✓	✓
Private Equity	✓	✓
Ride Hailing	✓	✓
Search Engine	✓	✓
Social Media	✓	✓
Travel Booking Engine	✓	✓
Travel Information and Services	✓	✓
TV Network	✓	
Video Gaming	✓	✓
Video Streaming	✓	✓
Weather Report Provider	✓	✓

Source: "A New Kind of Conglomerate: Bigtech in China," Institute of International Finance, November 2018.

towards industry concentration may begin to turn. This is because politicians, bureaucrats and antitrust regulators are increasingly examining the potential negative externalities created by monopolistic superstar firms. Data privacy, freedom of speech and monopolistic bundling of technology services are just some of the concerns governments have begun to examine in the U.S., the European Union and several emerging markets. In the summer of 2019, for example, the U.S. Justice Department opened an antitrust review surrounding dominant tech firms and whether they are illegally smothering competition. Indeed, there is discussion of whether antitrust laws themselves need to be updated to accommodate the unique characteristics of new superstar firms.[45]

> *Venture capital investors should be mindful of "kill zones" around superstar firms.*

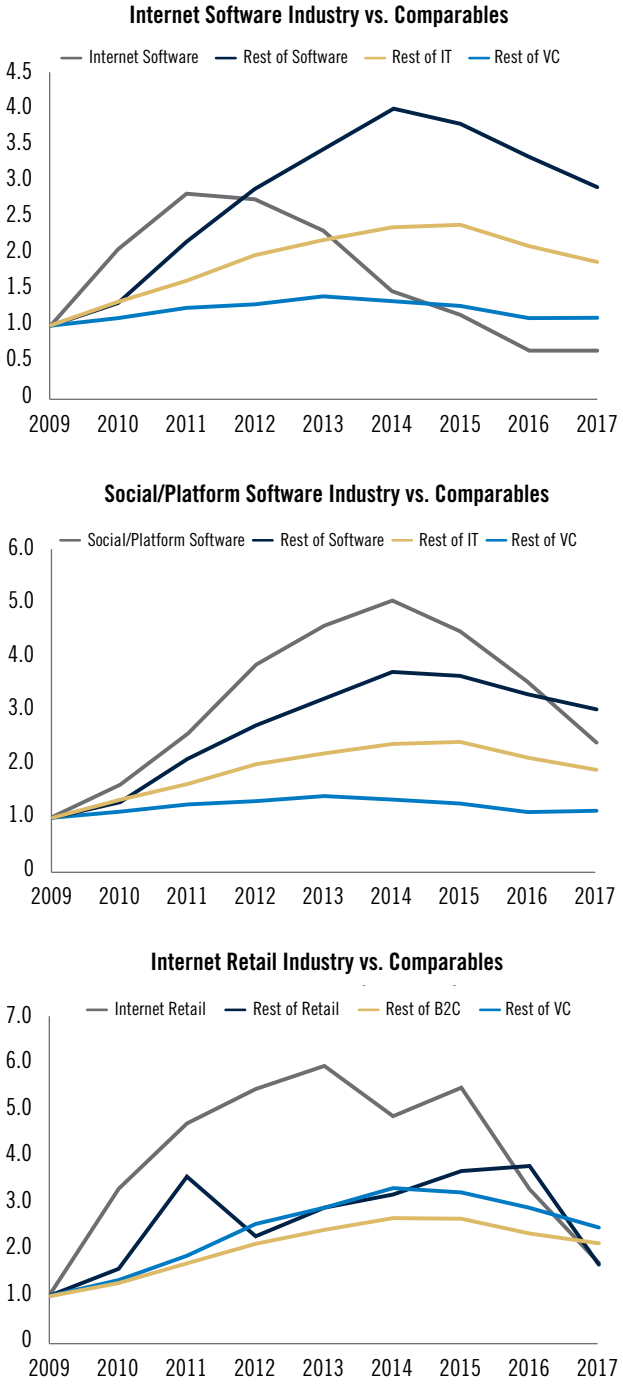
Portfolio Implications

1. **Tread cautiously into venture capital given the "kill zone" surrounding superstar firms.**

   The venture capital (VC) industry now speaks of a "kill zone" surrounding the major technology firms' main product lines. This is because a growing number of start-ups are bought out prematurely by dominant superstar firms who want to shut down challenger products or assimilate new capabilities that might provide a competitive challenge in the future. This has discouraged VC financing in the kill zone where the prospects of generating 10x or 20x growth returns are stymied by the increasing probability of a speedy acquisition by monopolistic incumbents, such as the FAANGs or the BATs.[ii] Many VC firms now actively aim to keep the corporate venture arms of superstar firms off their start-ups' boards to avoid the superstars prematurely absorbing these portfolio companies rather than continuing to deliver exponential growth and an exit via IPO. As indirect evidence of this trend, annual first financings have seen dramatic declines in recent years in internet software, social media and platform applications, and internet retail – industries dominated

[ii] BATs: Baidu, Alibaba and Tencent.

Exhibit 15: **Change in Annual First Financings**
Indexed to 2009=1



Source: Ian Hathaway, "Platform Giants and Venture-Backed Startups," October 12, 2018. Note: Data is global. First financings are defined as the first round of venture capital financing a startup receives, typically referred to as a Series A funding round.

by Google, Facebook and Amazon – with the declines outpacing the rest of software, the IT industry overall, and all VC in aggregate (Exhibit 15).

This may be one factor explaining the tepid performance of VC funds, which have generated little net alpha: Since 2000, VC has, on average, delivered just under 4%, a similar risk and return as the Russell 3000 index.[46, iii] To be sure, there is enormous variability within the industry, and leading VC firms have shown reasonably strong persistency. However, the combination of fewer opportunities from a widening kill zone and more capital inflows into the space has led to higher valuations and diminished potential return for investors. Indeed, more money chasing fewer deals is likely to depress returns for the current vintage of investments. Furthermore, the average series C financing 10 years ago was around $9 million and is now over $40 million, allowing companies to stay private for longer, which means investors may require an even longer timeline to realize their returns.[47]

Investors still committed to VC should consider seeking investments that don't directly compete with large incumbents, notably in areas with low industry concentration and the absence of a dominant superstar. Alternatively, investors looking to capture the growth opportunities typically found in VC will need to look toward larger, scaled companies that are effective in building or acquiring new technologies, products and services.

2. **Develop an investment framework to identify next generation national superstars.**

With rising firm concentration, fewer entrants and expanding kill zones, successful investors will need to identify potential superstars with strong staying power, ideally relatively early on. The next generation of sectors where opportunities may exist include digital payments, corporate security services, and gaming. Though this may require investors to invest in several firms initially, the goal is to steadily consolidate positions into the likely winner, based on tracking a handful of characteristics demonstrated by successful superstars. In addition to the five characteristics of technology-driven

[iii] For more analysis on venture capital, see "Revisiting the Role of Alternatives in Asset Allocation," PGIM, July 2016.

leaders identified by PGIM in *The Technology Frontier*, a handful of additional factors come into play in the broader context of superstar firms:[iv]

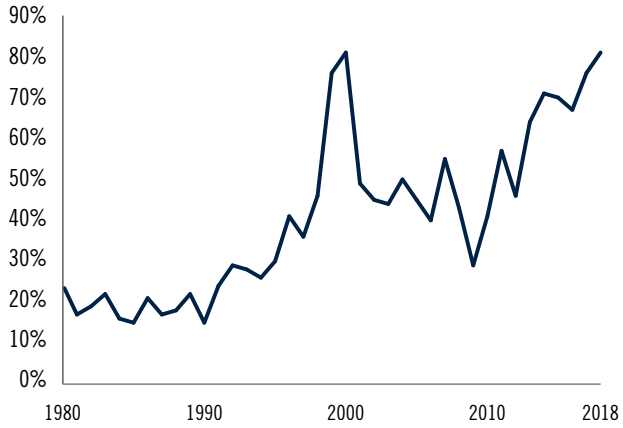
- **Firms that effectively use proprietary data to protect or enhance their leading position.** Companies with an ability to use data to detect market trends and understand their customers will have an advantage, particularly those that are able to collect proprietary data from their existing products.
- **Firms that have a strong recruitment pipeline for acquiring high-end talent.** Highly skilled employees are increasingly clustering in superstar firms, in both the U.S. and Europe, that can attract and retain talent by offering large salaries and bonuses.[48] As a result, many competing start-ups are unable to meet their talent acquisition goals, making it increasingly difficult to break into the market.[49]
- **Firms that exhibit increasing returns to scale as they capture network effects.** It is important for investors to understand not just where network effects exist, but how those effects play out in practice. First, network effects must lead to operating leverage (i.e., decreasing or constant marginal costs) or else the company will not benefit from the growth. Second, network effects should exhibit increasing returns to scale. For example, eBay, Instagram and OpenTable face increasing marginal returns as they scale up, while ridesharing does not exhibit this type of network effect. The marginal benefit of an increase in the number of Uber drivers plateaus at around a five-minute wait time, after which riders become indifferent to whether there are more drivers available in the network.[50] Third, the company must prove capable of growing its network with users that contribute, rather than pollute, the network; this is playing out among the top social media platforms, for example, where the growth in fraudulent accounts, trolls, and fake news outlets is causing some users to quit.
- **Firms that are national leaders, including within emerging markets.** Investors can look well beyond well-known U.S.-based superstar firms and seek out national superstars, often in Asian or emerging markets. For example, investors looking to capture opportunities in global e-commerce will need to look beyond Amazon, which has captured an outsized share of the U.S. market, to evaluate companies such as MercadoLibre (Argentina), Alibaba (China), Flipkart (India) and Rakuten (Japan), which are emerging as superstars in their own markets. As another example, investors looking to capture the global ridesharing phenomenon may want to consider superstar firms abroad such as Didi (China), Careem (UAE) or EasyTaxi (Brazil), besides familiar names like Uber and Lyft.

3. **Monitor the IPO market closely given the potential public-private dichotomy in valuing the trade-off between profitability and network size.**

   Many superstar firms are only as good as their number of users and breadth of their data. This incentivizes private firms to prioritize expanding their network. The rationale is straightforward: the strong increasing returns to scale mean it's possible the net present

> *Investors will need to develop a framework to identify next generation superstars.*

Exhibit 16: **The percentage of total IPOs with earnings per share of less than zero**



Source: Jay Ritter, "Initial Public Offerings: Updated Statistics," University of Florida Warrington College of Business, April 9, 2019.

[iv] The five factors identified in The Technology Frontier are: 1) firms that can capture network effects in their product offering; 2) firms that disproportionately invest in research & development, especially in proprietary mission-critical IT systems that others can't replicate; 3) firms that actively supplement in-house tech development with technology-driven M&A; 4) firms that consciously structure their business models around the adoption of technology; and 5) firms that disrupt new markets with defensive business models. For more information, see "The Technology Frontier: Investment Implications of Disruptive Change," PGIM, Fall 2018.

value of profit harvesting would be materially larger if deferred to the future. Therefore, firms prioritize keeping prices low to increase scale and expand their network.

For many start-ups this means delaying profitability to build out their network. Last year only 19% of all companies that went public were profitable (Exhibit 16). Private investors have been eager to overlook profitability and tend to focus on alternative metrics (like network size) to value these companies. They have a high tolerance for the uncertainty around eventual profitability.

> *With a wave of IPOs coming, valuation judgments will shift from private to public equity markets.*

In effect, private equity investors have made a bold bet. They have spent dramatically in the belief that their chosen firms will ultimately disrupt and dominate their category. Only after doing so can they hope to transition to a profitable business model. Until critical size is reached, the financial losses are sizable and relentless. Uber alone lost $1.8 billion in 2018, despite a valuation approaching $75 billion.[51]

While the value placed on upstart firms has already been determined by a select group of private investors, the coming wave of IPOs means valuation judgment will now shift to the public markets. How public markets evaluate this trade-off for each firm will have significant impact on the investment performance of future IPOs. It remains to be seen how public markets will assess this trade-off between scale and profitability. Will public markets be as willing as private investors to absorb the size and duration of losses? Historically, public markets have not been as patient with profitability. Furthermore, entry into the public market arena enables investors to bet against a management's view by shorting the shares. Such contrarian views have no real outlet in private markets and keep valuations lofty. Investors should consider a highly active approach to play in this space, picking fundamental managers that have a long-term track record in successfully building concentrated exposures.

CHAPTER 4

The Purposeful Firm

> *The ethos of firms "doing good while doing well" being proactively embraced by founders and management has significant implications for investors in these companies.*

The growing influence of superstar firms, combined with eroding trust in public institutions, has led some to argue companies ought to go beyond maximizing shareholder value and work to improve their communities and society more broadly. Corporate success, the new mantra goes, must be measured not only by balance-sheet strength and return on equity but by broader, long-term positive impact on society. Indeed, according to PGIM's proprietary survey of more than 300 C-level executives, over 40% of companies across the U.S., Germany and China now focus on broader stakeholder objectives beyond short-term profit maximization for equity holders (Exhibit 17).

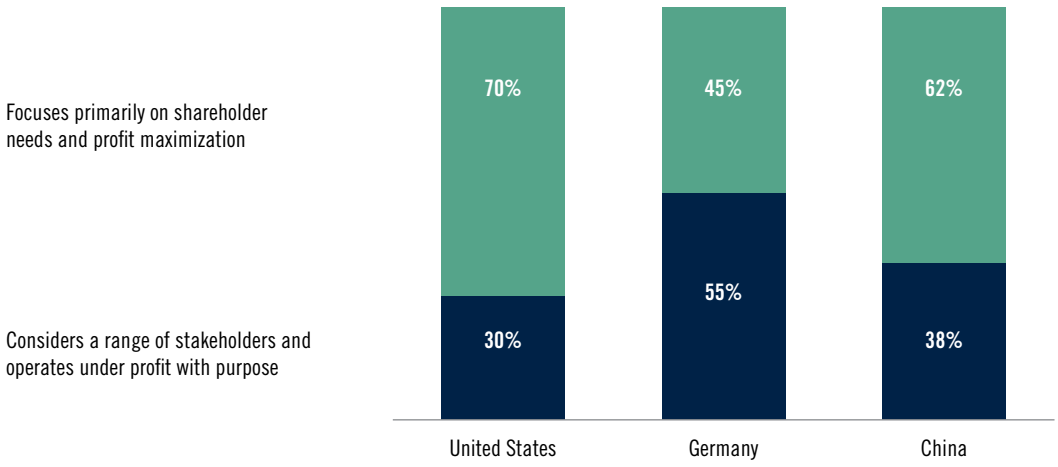
Such sentiment represents a radical shift from the 1970s when Milton Friedman unequivocally argued for companies maximizing shareholder value, with broader societal and ethical issues left to the state or to individual charity.[52, i] The Friedman doctrine provided the intellectual foundations for the leveraged buyouts of the 1980s, with academics arguing that private equity firms cut through managerial clutter to refocus companies on delivering returns to shareholders. This orthodoxy also underpinned the conventional wisdom in corporate law classes, MBA courses and consultant training through the 1990s and 2000s.

Today's reality is somewhat different. The ethos of firms "doing good while doing well" is propelled by a broad coalition of stakeholders pushing for purpose. Today's firm essentially has *no choice* but to balance maximizing profits with broader social goals. This new compulsion, whether thrust upon companies by external stakeholders or proactively embraced by founders and management, has significant implications for investors in these companies.

Five Key Stakeholders Pushing for Purpose

"Enlightened" owners. Some owners and managers expect their companies to act with purpose simply because they see this as a fundamental reason for the company's existence. As Howard Schultz, the former CEO of Starbucks, famously asked at a 2014 shareholder meeting, "What is the role and responsibility of a for-profit public company?" Answering his own question, he stated, "That question implied a

Exhibit 17: **Purpose is being adopted by a growing number of companies**
Which of the following statements applies more to your company?



Source: PGIM 2019 proprietary survey of over 300 public and private companies across the United States, Germany and China.

[i] As Friedman famously wrote in his New York Times Magazine article, "The Social Responsibility of Business is to Increase its Profits," "The businessmen believe that they are defending free enterprise when they declaim that business is not concerned 'merely' with profit but also with promoting desirable 'social' ends; that business has a 'social conscience' and takes seriously its responsibilities for providing employment, eliminating discrimination, avoiding pollution and whatever else may be the catchwords of the contemporary crop of reformers… Businessmen who talk this way are unwitting puppets of the intellectual forces that have been undermining the basis of a free society these past decades."

company's role in society went beyond making money."[53] Another example of "enlightened" corporate leadership is TOMS Shoes. After volunteering to help distribute donated shoes in Argentina, TOMS founder Blake Mycoskie devised a business model to increase the scale of donations: He would manufacture shoes himself, and for every pair he sold, he would donate another pair. Today, after donating more than 60 million pairs, his for-profit company is valued at over $600 million.[54]

External Investors. Asset owners are increasingly seen as agents of socially responsible and sustainable change, especially given their corporate equity and debt holdings (either directly or via asset managers). Their beneficiaries and boards increasingly expect them to demonstrate active leadership through asset allocation decisions and corporate engagement that advances this position. While not all institutional investors are comfortable focusing on issues beyond their fiduciary duties, socially responsible investing (SRI) – defined as any investment strategy that takes into account both financial returns and environmental, social and governance (ESG) considerations – has grown considerably in the past three decades.[55] Nearly $31 trillion in AUM globally met one or more SRI-related criteria, according to the Global Sustainable Investment Alliance, up from $18 trillion in 2014.[56] Many institutional investors are signatories to the UN Principles for Responsible Investing. The focus on investing with an ESG mindset is particularly strong in Europe, which represents over half of the global assets invested in ESG or SRI strategies.

Perhaps the most telling trend is the growth of shareholder activism on ESG issues. For example, shareholder proposals related to ESG in the U.S. have more than doubled in the past two decades, and currently account for nearly 40% of all shareholder proposals submitted to Russell 3000 companies.[57] In a high-profile 2018 example, two large institutional investors – JANA Partners and California State Teachers' Retirement System (CalSTRS) – worked together to publicly press Apple to create better parental controls for children's cellphone use.[58]

Regulators. Regulation has always played a vital role in setting the rules for how businesses operate. Yet, it wasn't until the 1970s that governments were willing to take a more proactive stance on social and environmental issues.[59, ii] Today, Europe is perceived as the global leader on this front; in 2018, for example, the EU required about 6,000 EU companies to disclose their climate policies.[60]

There are numerous other examples of regulators bringing a broader purpose-driven lens to corporate practices. In 2017, the Australian government launched a royal commission to investigate misconduct across the broad financial services industry. It had an explicit goal of defining and identifying "whether any conduct, practices, behavior or business activities by financial services entities fall below community standards and expectations."[61] Similarly, governments have begun to implement a range of reforms to meet the emissions targets set out by the 2016 Paris Agreement. Notably, India mandated that a broad range of highly polluting industries must install continuous monitoring systems to track emissions levels, with the data available to be used in court in case of violations.[62]

Perhaps the most telling trend is the growth of shareholder activism on ESG issues.

Employees. As the economy shifts away from reliance on physical assets to intellectual and intangible assets, human capital has become critical for companies' success. Importantly, this dynamic enhances the influence of high-skilled – and often younger – employees. Millennial employees increasingly want their firm's purpose, mission and culture to reflect their own values.[63] Recent surveys show 50% and 86% of millennials in the U.K. and U.S., respectively, prefer purposeful work to a higher salary.[64] With these trends in place, the expectation of firms to act with purpose is poised to increase.

Customers. Consumer activism centered on individual choice has long been a powerful driver of social change. In the early 19th century, for example, the "free produce movement" encouraged consumers to avoid slave-made goods. Today's form of consumer activism is propelled by social media and centered on areas such as the environment, gender and income equality, climate change and socially responsible supply chains. According to a

[ii] This led to the creation of new national environmental agencies (France's Ministry of Environment in 1971, Japan's Environmental Agency in 1971, and Germany's Federal Environmental Agency in 1974) and a range of multinational agreements (the UN Environment Program in 1972 and the European Economic Community's first Environmental Action Program in 1973).

recent Euromonitor International survey, 17% of all global consumers consider themselves to be "empowered activists," defined as consumers who prioritize global issues when making purchases.[65] In a shift from the more traditional product boycotts of the past, a new form of consumer activism is the "*buycott*," or the deliberate purchasing of products from a company with suitable social policies. Eighty-three percent of consumer activists claim it is more important now than ever to show support for companies that do the right thing by buying from them, compared to 59% who think it is more important now than ever to participate in boycotts.[66]

The Corporate Response to Purposefulness

Companies are more proactively becoming agents of social change. With a network of stakeholders demanding more purposeful practices, companies are spending more time on how to brand, position and communicate their broader social contributions. Some also allocate resources towards social or environmental goals that may not maximize monetary profits. The number of companies providing some ESG disclosure increased to 9,000 by 2016 – orders of magnitude higher than the 20 or so firms that reported in the early 1990s.[67] Firms are actively spending on areas such as corporate social responsibility (CSR), with Fortune Global 500 firms now spending $20 billion per year on CSR (Exhibit 18).

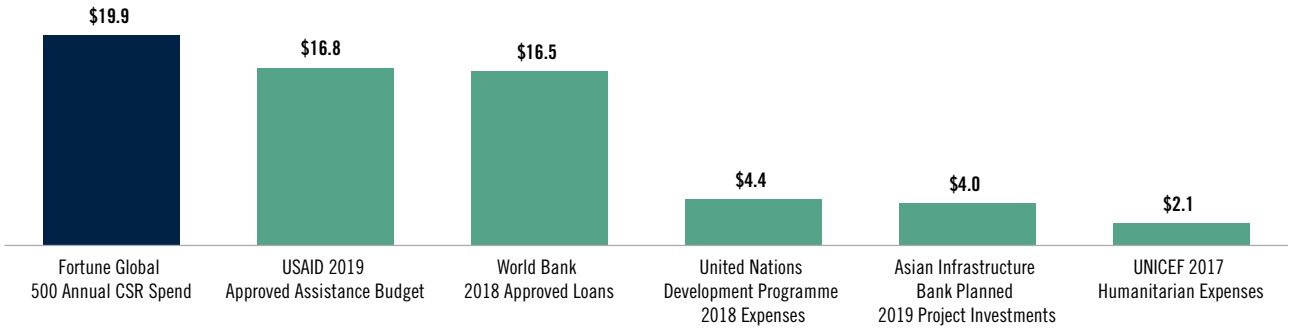
Furthermore, firms are taking action based on their corporate values: explicitly picking their vendors and clients, altering their supply chains and even sacrificing profit at times. For example, following public resignations and a petition signed by 4,000 employees, Google backed out of a contract to supply the U.S. Department of Defense with AI services that some within the company believed could potentially lead to a multibillion-dollar contract.[68]

Finally, firms are taking public stances on social issues, whether by launching social media campaigns, developing socially conscious advertising, lobbying governments, or widely expressing their views in the media. A few notable examples include Yoplait's "Mom On" campaign aimed at addressing common criticisms of mothers, Airbnb's "We Accept" commercial discussing race and diversity, and Budweiser's "Born the Hard Way" commercial highlighting the story of its immigrant founder.

New socially conscious business models are emerging. While many corporate boards are now recognizing that good social and environmental outcomes enhance long-term enterprise value, some firms are going a step further and building social responsibility into their business models and corporate governance structures more explicitly.

For example, in Northern Europe, industrial foundations – defined as firms that are partly or fully owned by charitable or private foundations – have become more common over the last two decades. These firms now account for 70% of the total stock market capitalization in Denmark and

Exhibit 18: **Global CSR spending accounts for a large share of global social spending**
$ billions



Source: "Business Backs Education," UNESCO, 2015; "Annual Report 2018: Ending Poverty. Investing in Opportunity," World Bank, 2018; "2019 Business Plan and Budget Summary," Asian Infrastructure Investment Bank, December 2018; "Fiscal Year (FY) 2019 Development and Humanitarian Assistance Budget," USAID, 2019; "UNDP Transparency Portal," UNDP, 2018; "UNICEF Humanitarian Action Study 2017: A synthesis of UNICEF's response," UNICEF, 2017.

25 of the 100 largest Danish corporations. They include prominent companies such as Bertelsmann, Heineken, Ikea and Carlsberg.[69] While still pursuing profit, this model enshrines social purpose into the company's management by ceding some control to a charity or foundation and using the financial returns to fund social goals.[iii]

> *Integrating relevant ESG metrics into the investment process is imperative for both ESG champions and skeptics.*

In the U.S., a new legal structure called the Benefit Corporation ("B Corp") is emerging to increase accountability and embed social purpose directly into governance structures. Importantly, by choosing to become a B Corp, firms place a legal obligation on corporate boards to consider environmental and social factors, as well as the financial interests of shareholders. This structure has been codified into law in 36 states, and includes companies such as Kickstarter, Laureate Education Inc., King Arthur Flour Company and Patagonia.[70] These companies commit to additional reporting requirements that allow shareholders to hold them accountable for meeting their mandated public benefit goals.

Portfolio Implications

1. **Integrate relevant ESG metrics into the investment process as it is imperative for both ESG champions *and* ESG skeptics**

   If companies are compelled to embrace a broader purpose, it stands to reason that any ESG metric that is relevant and *not* priced into a security can provide an opportunity for investors – regardless of whether they embrace or reject ESG principles. These metrics should be integrated into investors' security selection process and treated on par with other material factors.

   While poor and inconsistent ESG data quality means the empirical evidence around ESG and performance is mixed, there is an increasing body of research suggesting at least some ESG metrics matter materially for investment returns and downside risk protection for long-term investors. This is even true in areas such as securitized assets, which are not typically thought of as obvious candidates for ESG.[iv] Three anecdotal examples illustrate this:

   - **Environmental:** Which management teams are positioning the business to navigate the risks of transitioning to a low-carbon regulatory environment and economy?
   - **Social:** Which companies face reputational risks (and consumer boycotts) from social activism movements?
   - **Governance:** Which management teams are overly aggressive in reporting earnings and cash flows? Which boards have been lax on privacy issues or monopolistic practices and now face mounting regulatory challenges?

   This leads to a wide range of approaches for investors to choose from: At one extreme, even an ESG skeptic should incorporate ESG metrics that materially impact risk-adjusted performance. At the other, ESG champions looking to support more purposeful companies may employ more elaborate ESG screens and metrics into their investment process – even if it means sacrificing some investment returns in exchange for a tighter focus on purpose-driven companies.

2. **Re-evaluate the potential pitfalls of an exclusionary approach to ESG**

   While exclusion lists allow investors to express their ethical views unambiguously, they also come with unintended consequences. Exclusion lists, by definition, constrain the available investment universe and may limit investment returns. However, two other effects are less well understood by equity investors:

   First, a stock on numerous investor exclusion lists will see reduced demand and likely trade at a lower price with a smaller multiple. At some point, the decline in

[iii] Research is emerging that highlights foundation-owned firms tend to be more resilient to shocks, have high survival rates, and are particularly well-suited for industries with long time horizons. Yet, some studies suggest these firms might be valued at a discount by equity markets. For more information, see Ann-Kristin Achletner et al., "Foundation ownership and shareholder value: an event study," Review of Managerial Science, August 13, 2018 and Steen Thomsen et al., "Industrial Foundations as Long-Term Owners," European Corporate Governance Institute, Copenhagen Business School, Finance Working Paper No. 556/2018, March 2018.

[iv] For more information on applications of ESG to Securitized Assets, see John Vibert, John Di Paolo, and Florence Chan, "Applications of ESG to Securitized Assets," PGIM Fixed Income, February 2019.

price may be sufficient to make it attractive for value investors *without* any exclusionary screen. Furthermore, if a company's valuation continues to fall well below its cash-flow-generating capacity, a private equity buyer may well step in. This might further reduce transparency around ESG metrics given the limited and opaque reporting requirements for private companies.

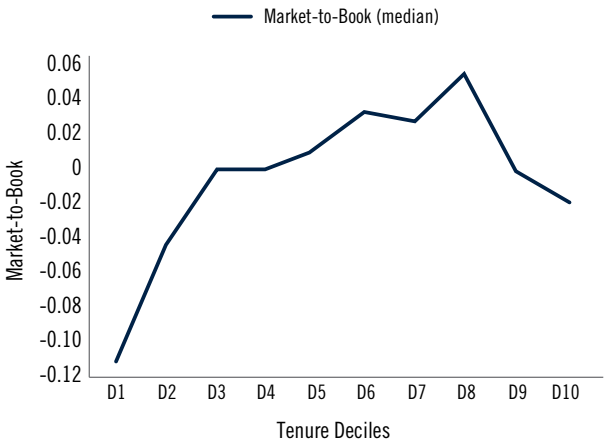
Second, exclusionary tactics also prevent an ESG-aware investor from positively influencing the policies of a company through corporate actions.[71] An interesting question arises as to whether investors with exclusion lists should permit these companies to be shorted using long-short or relative value strategies. By doing so, investors may still exercise some influence over the firm's ESG practices.

3. **Consider the next generation of more sophisticated "ESG 2.0" approaches**

Given the shortcomings of many first-generation approaches to ESG, investors might consider a few potential advances in ESG investing as the space matures:

- **Move beyond formulaic, "check the box" ESG rating methodologies to allow for discretion.** There is little uniformity among the 150 or so different providers of ESG ratings, rankings and indices.[72] The ratings are often inconsistent with each other and have little correlation. Too frequently the "checklist" nature of mainstream rating methodologies misses the point entirely. For example, some companies lack modern-day slavery policies because they operate in countries and along supply chains where human trafficking is simply not an issue. Meanwhile, firms with such policies may have them because of past violations or because their industry has significantly greater trafficking risks. A more sophisticated approach to industry and corporate ESG ratings needs to combine consistency, rigor and discipline with discretion for both equity and bond analysts to refine corporate ratings by leveraging their deep understanding of individual company dynamics.
- **Recognize the complex relationships between ESG factors and investment returns.** One example illustrates the sometimes-counterintuitive relationships between ESG factors and returns. A common ESG mantra is that boards need to be constantly "refreshed," driven by the desire for a fresh, diverse mix of board members. The conventional wisdom is that long-serving board members develop cozy relationships with executives that potentially diminish their ability to effectively advocate for shareholders' interests. However, a study by QMA, a PGIM company, suggests the conventional wisdom may not be right: longer board tenure is positively correlated with both contemporaneous and future market-to-book value, though this relationship reverses after about nine years of average board tenure (Exhibit 19). Contrary to popular belief, equity markets reward firms with long-serving boards with a "stability premium," but only up to a point.[73]
- **Be discerning in identifying ESG factors that are truly material for a specific firm and industry.** PGIM's proprietary research demonstrates that focusing solely on the ESG metrics that are *material* for each firm and industry is preferable to utilizing all available ESG metrics. That is, in the realm of ESG metrics, more is not better. Using the Russell 3000 as an example, companies with good ESG standing on relevant metrics showed a strong tendency to outperform their peers, with an average excess return of 1.7%. Importantly, the results were reversed when companies were classified using all available (rather than just material) ESG items. This result is also replicated when using the S&P 500.[74] A promising dataset that allows investors to focus on the materiality by industry of different ESG metrics is the Sustainability

Exhibit 19: **Market-to-Book Value Sorted by Board Tenure Deciles**



Source: Joshua Livnat, Gavin Smith, Kate Suslava, and Martin Tarlie, "Do Directors Have a Use-By Date? Examining the Impact of Board Tenure on Firm Performance," February 23, 2016.

Accounting Standards Board (SASB) Materiality Map. It maps 30 ESG issues to 79 industries based on evaluations by analysts specialized in each industry, highlighting ESG items that are material to each specific industry. Though only a handful of companies currently use SASB, it has shown to be useful in predicting returns and constructing portfolios.[v]

Corroborating this approach, a recent Harvard Business School study found that, using the SASB Materiality Map, the submission of "material" ESG shareholder proposals led to an increase in long-term valuations, while the submission of "immaterial" ESG shareholder proposals led to a decrease in long-term valuation. This suggests that ESG performance on issues material to a firm's specific industry should be viewed positively by investors, while ESG performance that is immaterial to a firm's industry serves as a distraction for managers that ends up destroying firm value.[75]

4. **Consider a core/satellite approach to ESG investing**

For many institutional investors, ESG investing simply means one of two things: (1) broad exclusion of industries or sectors such as fossil fuels, tobacco, or firearms or (2) targeted allocations to ESG funds, typically to achieve long-term social returns. Both approaches have attracted a significant amount of capital from U.S. and European investors.

However, these traditional approaches lack nuance, are potentially inconsistent, and at times may seem difficult for investors with a fiduciary responsibility to incorporate. This has led to only marginal use of ESG strategies by investors.

Investors wishing to take a whole-portfolio approach to ESG investing may want to consider a core/satellite framework. The core is explicitly focused on delivering strong investment performance, but tilts towards better ESG exposure. Meanwhile, the satellite targets a specialized investment geared explicitly towards generating outsized social returns. As demand for ESG investment continues to grow, institutional investors will have to work with their asset managers to find the right balance between their core and satellite investments based on their individual mandate.

5. **Continue to influence corporate reporting to drive higher-quality ESG data and outcomes**

There is a wide variance in methodology and practices around capturing and reporting ESG data. Typically, ESG data tend to be sparse, lagged and sourced from a dizzying array of voluntary disclosures, surveys, government reports, news accounts and interviews. Indeed, companies have great latitude in selecting the scope of what they report and how often they do so. They can, for example, report on material or immaterial ESG factors, on their own operations or their entire supply chain. They can benchmark their data findings against clear targets or general policies. They can use a globally accepted ESG standard or follow their own criteria. They can even choose whether to have their ESG reporting audited by a third party.[76]

> *Investors will need to identify ESG factors that are truly material for a specific firm and industry.*

As investors look to embed ESG metrics more deeply into their investment processes, it will be vital for them to use their influence to push for greater consistency, quality and frequency of ESG data, especially given that institutional investors represent a significant share of ESG demand.

While this has proven difficult given the broad range of investor goals and data needs, promising efforts are already underway. For example, CDP, formerly the Carbon Disclosure Project, runs a global disclosure system to encourage companies to self-report environmental data. The organization has partnered with 88 investors who direct $10 trillion in AUM to pressure companies that don't report their approach to sustainability.[77]

Regulators can also play a key role in bringing about uniformity. For example, in October 2018, a group of institutional investors, asset managers, state treasurers and municipal pensions submitted a petition to the SEC for mandated, standardized ESG disclosures.[78]

[v] QMA recently used the SASB Materiality Map to show that companies with better material ESG scores have higher valuations than lower-scoring companies but comparable future returns, effectively allowing investors to swap out companies with bad ESG scores for companies with good ESG scores without having to sacrifice returns.

While progress has been slow and official agencies such as the SEC have expressed caution about mandating ESG disclosures, pressure from the investment community is clearly growing.[79] Institutional investors with an ESG agenda should ensure they have a voice at the table and can help shape new reporting standards that are more consistent, more frequent and more reliable.

Conclusion

The companies investors hold in their portfolios today look decidedly different than they did just a decade ago. The growing importance of intangible assets and flexibility, the rise of national superstars, and the shifting stakeholder expectations around a firm's role in society have led to dramatic changes in the way firms think and operate.

At PGIM, we believe these changes will have profound implications for how investors build and protect their portfolios. Across the public and private markets – and across fixed income, equities and real estate – investors must position their investment strategies for the transformations reshaping firms (Exhibit 20).

Though only time will tell what the firm might look like in five – let alone 50 – years, one thing is clear: The firm will remain a key engine of growth and innovation in the global economy and will continue to evolve. It is up to investors and their asset managers to be nimble enough to capture the benefits while navigating the risks of the 21st century firm.

Exhibit 20: **Portfolio Implications of the 21st-Century Firm**

	Public Equities	Public Fixed Income	Alternatives	Real Assets
The Weightless Firm		Exploit opportunities in public and private corporate debt issued by weightless firms		
			Evaluate increasing DM allocations to privates given the changing investment opportunity set in a weightless world	
	Realign public equity investment by increasing allocations to emerging markets			
				Reposition real estate portfolios for the rise of the WeWork model and the gig economy
The Superstar Firm			Tread cautiously into venture capital given the "kill zone" surrounding superstar firms	
	Develop an investment framework to identify next generation national superstars			
			Monitor the IPO market closely given the potential public-private dichotomy in valuing profitability vs. network size	
The Purposeful Firm	Integrate relevant ESG metrics into the investment process as it is imperative for both ESG champions and ESG skeptics			
	Re-evaluate the pitfalls of an exclusion-list approach to ESG			
	Consider the next generation of more sophisticated "ESG 2.0" approaches			
	Consider a core-satellite approach to ESG investing			
	Continue to influence corporate reporting to drive higher-quality ESG data and outcomes			

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