1 Introduction

This Element investigates the tension between innovation and financialisation in the global pharmaceutical industry, with a focus on two leading UK companies – AstraZeneca (AZN) and GlaxoSmithKline (GSK) – from the time of the mergers that created them (1999 and 2000, respectively) to the present. The tension between innovation and financialisation is central to modern capitalism and its capacity to deliver sustainable prosperity. Overall, financialisation reflects the rise of shareholder-value ideology and the resulting shift from a 'retain-and-reinvest' to a 'downsize-and-distribute' resource-allocation regime. Financialisation manifests differently across enterprises, industries, and economies.

Against this backdrop, and drawing on other empirical works conducted by various authors over the years, we place the study of these two UK-based companies in the context of innovation and competition among twenty Big Pharma companies based in Europe and the United States. We argue that companies that mitigate financialisation and support innovation perform better in global competition. This conclusion may seem obvious to those who understand the critical importance of dynamic capabilities for competitive performance, but it is not at all obvious to those financial economists, corporate executives, and hedge-fund managers who argue that 'maximising shareholder value' (MSV) promotes superior economic performance. In our view, a critique of this flawed ideology through industry studies is central to 'reinventing capitalism', especially in the context of the health industry and its impact on human well-being.

Our comparative study of AZN and GSK is part of that research agenda and provides new evidence for informing concrete sets of corporate-governance reforms. Using 'the theory of innovative enterprise' framework, through empirical studies such as the ones offered in this Element, we analyse the interaction of strategy, organisation, and finance at each of the companies. The evidence we collect is new and updated to early 2022. Our analysis speaks to recent discussions on 'stakeholder capitalism' and 'rethinking the purpose of the corporation', especially in key industries such as health.

We have found that in the decade after their mergers both companies adopted US-style governance models, manifested by stock buybacks, in addition to dividends, and US-style stock-based pay, which rewarded senior executives for boosting the company's stock price, even if the price increases were driven by manipulation (via buybacks) and speculation rather than innovation. In the aftermath of the 2008–9 financial crisis, however, key directors and shareholders in both companies began to rethink their business

models, with AZN decisively shifting from financialisation to innovation in 2013 with the appointment of Pascal Soriot as CEO. Central to this transition was the cessation of buybacks in order to focus as many resources as possible, including executive attention, on investing in the drugs pipeline. This process continues at AZN and is a prime reason why it was chosen to partner with Oxford University in the development, manufacture, and delivery of the COVID-19 vaccine. It took GSK a few years longer to begin transitioning from financialisation to innovation, with the reorientation of the company's focus towards innovation becoming more evident when Emma Walmsley replaced Andrew Witty as CEO in March 2017, with buybacks ceasing completely in 2018.

Our study also uncovers important differences in corporate-governance institutions in the United Kingdom from those which prevail in the United States. The UK institutions, expressed in part in the UK Corporate Governance Code, ultimately provided support to AZN and GSK in shifting from financialisation to innovation. Like the United States, the United Kingdom has a shareholder model of capitalism, but, in part because of British business reactions to the extreme US orientation towards MSV from the late 1980s, the UK governance institutions include defences against financialisation that are not present in the United States. We raise these issues in the conclusion of the study to argue that, despite globalisation, 'reinventing capitalism' still needs to recognise the importance of national institutions.

2 Innovation and Competition in the Global Pharmaceutical Industry

Within any business firm, there is a resource-allocation tension between innovation and financialisation. Innovation entails the generation of a product that is of higher quality and lower cost than the previously available one (Lazonick 2019a). In the pharmaceutical industry, the measures of higher quality are the safety and effectiveness of a medicine. The availability of a safer and more effective medicine enables the pharmaceutical company to access a large extent of the market (i.e., patients whose health can be improved by taking the drug), thus transforming the high fixed cost of developing the safer and more effective drug into a low unit cost. The lower unit cost is the result of 'economies of scale', which means that the drug has been made more accessible to patients. A lower unit cost can also permit lower pricing of the medicine to make it more affordable to patients. Alternatively, a higher drug price can provide the pharmaceutical company with higher profits that can be reinvested in drug innovation (Collington and Lazonick 2022).

Given existing and new medical needs, the development of a safe and effective medicine requires investment in the productive capabilities of people who can engage in organisational learning within research labs operated by government, business, and civil society organisations. For a drug developer, the implementation of an innovation strategy requires investment in teams of researchers who have specialised knowledge, acquired much more through work experience than through advanced formal education (as necessary as higher education is in this industry). This accumulation of unique knowledge occurs at the discovery stage, through clinical trials, in the drug manufacturing process, and from data collected of an approved medicine in use.

A pharmaceutical firm's innovative capabilities reside largely in its human resources. With the rapid advancement of technology within the pharmaceutical industry, drug development using novel methods has tended to be done by start-ups, the most successful of which are highly focused on new areas of specialised learning. Once an innovative company has a successful product, its senior executives may allocate the firm's resources to further investments in organisational learning that, for the sake of developing a new round of innovative products, builds on the specialised knowledge that it has accumulated. Key to the success of these investments in human capabilities is 'organisational integration': the enabling, coordinating, and incentivising of large numbers of people with different functional specialties and hierarchical responsibilities to devote their skills and efforts to the innovation process.

Through sustained innovation across generations of products, a small pharmaceutical company can grow to be large as a distinct business firm, or what can be called a unit of strategic control. Alternatively, by selling itself or merging with another company, its further growth may occur as part of another unit of strategic control. The success or failure of a merger or acquisition will depend on the organisational integration of the employees of the two business units into the unified firm that now exercises strategic control.

The growth of the pharmaceutical firm requires sustained commitment of financial resources to an innovation process that is *collective*, *cumulative*, and *uncertain*. It is collective because it entails the organisational integration of large teams of people. It is *cumulative* because what the organisation learned yesterday provides a foundation for what it is capable of learning today. It is uncertain because the investments in organisational learning may fail to develop a safe and effective medicine.

Hence, in exercising strategic control, the abilities and incentives of senior pharmaceutical executives are of critical importance to the allocation of resources to the innovation process. They bear the responsibility to make decisions to invest in certain types of medicines in the face of the uncertainty

of whether the firm will be able to develop a higher-quality, lower-cost drug than is currently available. To implement the innovation strategy, they make investments in productive capabilities, largely embodied in people engaged in collective and cumulative learning, that, through organisational integration, can enable these capabilities to generate an innovative product. The most high-powered means of organisational integration is provision of personnel with the sustained employment through which they can accumulate productive capabilities, attain incomes commensurate with those capabilities, and build rewarding careers.

This organisational-learning process unfolds over time from the point at which investments in innovation are made to the point at which a commercial product, if it is indeed generated, can result in financial returns. Early drug development has three distinct stages: *target identification*, *lead identification*, and *lead optimisation*. During the target-identification stage, scientists engage in extensive learning to gain insight into the biology and mechanism of a disease of interest. Enhanced understanding of the disease mechanism enables drug discovery efforts to focus on lead identification of potential targets in the disease mechanism. In this stage, drug discovery efforts also concentrate on identifying the number of potential leads (chemical compounds) to pursue as effective pharmaceutical interventions (Figure 1).

Drug safety is a paramount concern for scientists to address in the lead-optimisation stage when designing compounds that are intended for long-term use. Scientists may choose to bring several variations of a lead compound as backups to be further examined during preclinical studies outside (in vitro) or inside (in vivo) living organisms. Engaging in deep learning to better understand a disease during the early discovery stages has major implications for preclinical and clinical stages of the drug-development process. Any increase in the number of lead compounds advancing into the preclinical stage can potentially undermine the productivity of the entire drug-development effort and

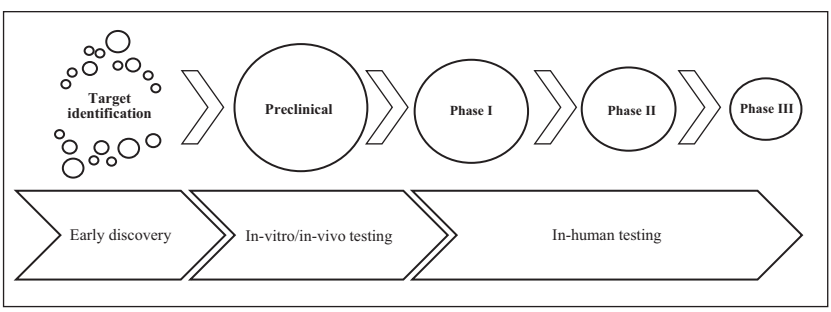

Figure 1 Drug discovery process
Source: Authors' own illustration.

result in an increased compound failure rate in the preclinical or first-in-human toxicology testing phases.

To sustain this innovation process until it results in financial returns, executives who exercise strategic control mobilise funds that provide financial commitment. In the pharmaceutical industry, start-ups are typically financed by venture capital, which can 'exit' from its investment (often before the firm has even generated a commercial product) through a listing on a stock exchange (of which NASDAQ is the most important) or through the sale of the company to an established firm (Lazonick and Tulum 2011). In pharmaceuticals, as in any other industry, once the firm has generated profitable products, the net income that it retains becomes the foundation of financial commitment.

Through this process of retaining profits and reinvesting in productive capabilities, both internally and through strategic acquisitions, it is possible for an innovative enterprise to grow to become a multi-product pharmaceutical company, with the capability of developing more complex drugs. The most successful companies also invest in manufacturing and marketing capabilities, including committing resources to specialised productive assets and facilities (Chang and Andreoni 2020). A fully integrated pharmaceutical company can grow to employ tens of thousands of highly qualified and well-paid personnel, who then, through stable employment and promotion opportunities, can become more experienced and productive over the course of their careers. In the global medicinal drug industry, these types of firms, many of them dating back a century or more, have become known as 'Big Pharma'.[1]

There is always the possibility, however, that the executives who exercise strategic control over a firm that has become profitable through innovation may decide to allocate its enhanced cash flow to a process that we call 'financialisation': the extraction of value from the firm for the benefit of certain parties above and beyond rewards justified by the contributions that these parties have made to the value-creating processes that have resulted in innovation and profits (Lazonick and Shin 2020). It can be the case that certain groups of powerful employees are the beneficiaries of financialisation; historically, across a range of industries, trade unions have often been blamed (whether deservedly or not) for using their collective power to bargain for pay and benefits that exceed their value-creating contributions.

In the twenty-first century, however, these 'value-extracting' employees are more likely to be senior corporate executives, enriched by stock-based pay and lavish pensions. In the name of MSV, these value-extracting executives bestow

[1] Big Pharma is a term that refers collectively to a small number of large, established global pharmaceutical companies that engage in manufacturing and marketing in addition to R&D.

benefits on shareholders, including themselves, in the form of cash dividends and share repurchases. In addition, stock traders, who acquire corporate shares on the stock market, may be able to assert their power over corporate resource allocation for the sake of value extraction, achieved by timing the selling of the shares that they previously purchased (Lazonick 2019b; Lazonick and Shin 2020). The value extracted by these executives and traders is often far in excess of any contributions that they have made to the firm's value-creating process.

This value extraction takes the form of the yields on the company's stock, enhanced by cash dividends and share repurchases (aka stock buybacks). As we explain in this Element, stock buybacks done as open-market repurchases are a much more deleterious mode of financialisation than dividends. All shareholders of a class of stock benefit from dividends by *holding* shares. In contrast, the purpose of buybacks done as open-market repurchases is generally to manipulate the company's stock price to reward well-positioned stock traders for *selling*, not holding, shares in the company.

In the extreme, when the company downsizes its labour force, divests production capacity, and takes on debt for the sake of increasing payouts to shareholders, corporate resource allocation becomes what Lazonick and Shin (2020) call 'predatory value extraction'. In their analysis, based on recent US experience, predatory value extraction results from the combined power of corporate managers as value-extracting insiders, asset managers as value-extracting enablers, and hedge-fund managers as value-extracting outsiders, operating in a national institutional environment that permits, and even encourages, this value-extracting activity (Lazonick 2018; Lazonick and Shin 2020; Lazonick and Jacobson 2022).

In the world of Big Pharma, extreme financialisation undermines the processes of drug innovation and the sustainability of the firm as an innovative enterprise. By the same token, those major pharmaceutical companies that have resisted financialisation have emerged as or remained global leaders in drug innovation (Lazonick and Tulum 2011; Tulum 2018; Tulum and Lazonick 2018; Lazonick et al. 2019). As shown in Table 1, in 2020, the world's ten largest companies in the global pharmaceutical industry generated 50 per cent of the industry's revenues. The two leaders, Roche and Novartis, both based in Switzerland, are, like most Europe-based pharmaceutical firms, less-financialised companies than their US-based competitors such as Merck and Pfizer. Nevertheless, Novartis is much more financialised than Roche. Less-financialised companies have gained market share in global pharmaceuticals (Tulum and Lazonick 2018; Lazonick et al. 2019).

Table 1 Worldwide prescription drug sales, top ten companies, and national bases, 2021

Company	National base	Worldwide prescription drug sales, $billions	Worldwide market share, percentage
AbbVie	USA	56.2	5.9
Roche	Switzerland	49.2	5.2
Novartis	Switzerland	42.0	4.4
Johnson & Johnson	USA	52.1	5.5
Merck & Co.	USA	42.8	4.5
Sanofi	France	37.7	4.0
Pfizer	USA	79.6	8.4
Bristol-Myers Squibb	USA	45.1	4.7
AstraZeneca	UK and Sweden	36.5	3.9
GlaxoSmithKline	UK	33.1	3.5
Top ten worldwide sales total		**474.1**	**50.0**
All pharma worldwide sales total		**949.0**	**100.0**

Source: Authors' calculations are based on company annual reports and Evaluate Pharma, World Preview 2021, Outlook to 2026, 14th edition, July 2021.

In this Element, we focus on the two UK-based companies in the top ten: AZN and GSK. Given the extreme financialisation of US Big Pharma companies (Tulum and Lazonick 2018; Lazonick et al. 2019), which make up 50 per cent of the world's top ten, it is of great importance to the global pharmaceutical industry as well as to the innovative capability of the UK economy that these two UK-based companies avoid the adoption of the US business model. This Element provides an in-depth analysis of the evolving tension between innovation and financialisation at AZN and GSK from the time of the mergers in 1999 and 2000, respectively, to the present.

The key findings of our study, which we document in detail in this Element, are that, influenced by US-style corporate governance, both AZN and GSK became more financialised in the decade after the mergers that formed them, but, then, over the course of the following decade both companies altered their resource-allocation strategies to shift away from financialisation towards innovation. Our analysis of the processes of corporate-governance transformation at AZN and GSK provides unique insights into the UK institutional environment

relevant to corporate governance. It also sheds light on the ways in which UK corporate-governance institutions differ from those in the United States, where, as we have shown, predatory value extraction has become the norm (Tulum and Lazonick 2018; Lazonick et al. 2019; Lazonick and Shin 2020; Lazonick 2022a).

The United Kingdom derives several benefits from the existence and persistence of these two UK-based companies as innovative competitors in the global pharmaceutical industry. According to the most recent data, AZN employs 8,300 people from seventy nations at its UK sites (AstraZeneca 2021). As can be seen in Table 2, AZN has been increasing the number of UK employees since 2017 as part of its global expansion. In 2021, GSK employed 16,000 people at eighteen UK sites (GSK 2021). Table 2 also shows GSK's total employment from 1997 to 2021.

The presence of major global competitors in the United Kingdom provides the government with a rationale for investing in the advanced-technology knowledge base (O'Sullivan et al. 2013; BEIS 2017; BEIS 2021). Some of the scientists who gain experience at these large companies leave to form new ventures, and we can assume that those who gain career experience and establish social connections while working in the United Kingdom are more likely to seek out entrepreneurial opportunities there. The COVID-19 pandemic has demonstrated the importance of both AZN and GSK to the United Kingdom's participation in the global vaccine response. GSK is one of only four Big Pharma companies (along with Merck, Pfizer, and Sanofi) that possessed vaccine capabilities coming into the pandemic. Even though AZN does not have vaccine capabilities, Oxford University chose AZN to manage the manufacture and distribution of its COVID-19 vaccine, in large part because it is UK-based (Tulum et al. 2021).

Given the centrality of mergers and acquisitions (M&A) in the global pharmaceutical industry over the past few decades, the survival of AZN and GSK as UK-based companies was not inevitable. As we document in this Element, complex and intersecting social factors in the global pharmaceutical industry paved the way for the 'merger mania' of the 1990s and early 2000s, and the movements for absorption and concentration continue to have major impacts on the industry (Gagnon and Volesky 2017; Liu 2021). Whether as an attempt to reduce costs or to develop new revenue sources, a proliferation of mergers has transformed the corporate identities, including the national home bases, of leading companies in the global pharmaceutical industry.

The fact is that in 2021 these two UK-based companies were major competitors in the consolidated industry. The merger of Zeneca with Astra occurred in 1999 and that of Glaxo Wellcome with SmithKline Beecham (SKB) in 2000

Table 2 AZN and GSK employees, by geographic area, 1997–2021

	AZN					GSK			
	Global	United Kingdom	Europe	Americas	Rest of world	Global	Europe	USA	Rest of world
Year	FYA thousand	% of global				FYA thousand	% of global		
1999	**47.2**	20.6	40.7	27.3	11.4	**112.9**	43.8	19.5	36.7
2000	**50.1**	20.0	40.7	28.3	11.0	**108.3**	42.7	21.2	36.1
2001	**52.6**	19.4	37.8	31.7	11.0	**107.5**	43.3	22.0	34.8
2002	**57.5**	18.6	39.3	31.0	11.1	**106.0**	44.0	22.5	33.4
2003	**61.0**	18.2	39.2	29.3	13.3	**102.7**	44.2	23.8	32.0
2004	**64.2**	17.9	39.9	28.8	13.4	**100.5**	44.7	23.8	31.6
2005	**64.9**	17.9	40.4	27.6	14.2	**100.4**	43.7	23.6	32.7
2006	**66.6**	17.7	39.9	27.3	15.0	**101.7**	44.6	24.1	31.4
2007	**67.9**	17.4	37.7	29.7	15.2	**103.1**	45.3	24.0	30.7
2008	**66.1**	16.6	34.9	31.6	16.8	**101.2**	45.1	21.4	33.5
2009	**63.9**	16.6	33.2	31.0	19.2	**99.5**	42.1	22.6	35.3
2010	**61.7**	16.4	32.6	29.7	21.4	**98.2**	41.4	18.2	40.4
2011	**59.8**	14.5	32.1	30.1	23.2	**96.9**	39.7	17.2	43.1
2012	**53.5**	14.8	30.1	28.6	26.5	**98.4**	39.0	17.3	43.7

Table 2 (cont.)

	AZN					GSK			
	Global	United Kingdom	Europe	Americas	Rest of world	Global	Europe	USA	Rest of world
Year	FYA thousand	% of global				FYA thousand	% of global		
2013	**51.6**	14.0	27.1	28.3	30.6	**99.5**	38.6	16.6	44.8
2014	**55.9**	12.9	24.7	30.1	32.4	**98.7**	38.7	16.9	44.4
2015	**60.1**	11.8	24.6	29.1	34.4	**99.6**	43.0	14.5	42.5
2016	**61.5**	11.4	23.9	28.9	35.8	**100.3**	42.6	14.6	42.8
2017	**60.0**	11.5	24.2	27.2	37.2	**98.9**	43.7	14.8	41.6
2018	**63.2**	11.4	23.4	26.4	38.8	**97.0**	43.9	14.5	41.6
2019	**67.3**	11.0	23.0	24.7	41.3	**97.5**	40.8	16.8	42.5
2020	**74.8**	10.6	22.2	23.1	44.1	**96.8**	43.3	16.7	40.0
2021	**79.6**	11.2	23.0	23.6	42.2	**92.1**	43.1	15.9	41.1

Note: Fiscal year average (FYA).
Source: Authors' calculations are based on company annual reports.