INNOVATION & RESEARCH CAUCUS

MAPPING THE UNKNOWNS: UNDERSTANDING DIGITAL PLATFORMS AND THE SEARCH FOR UK EVIDENCE

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Mapping the unknowns: Understanding digital platforms and the search for UK evidence

KEY IMPLICATIONS

- Owners of digital platforms are structurally positioned to leverage their authority, power and instruments to distribute profits among the participants within their ecosystems.

- Because these owners are typically multinational tech giants, the value generated by UK firms and individuals often fails to translate into local value retention.

- Credible regulation is required to level the playing field for UK firms that operate in the ecosystems of digital platforms. However, some specific policy instruments could also address privacy concerns and safeguard innovation. Enforcing regulation in an equitable and effective manner remains complex.

- There currently remains a lack of clear evidence on digital platform businesses in the UK. Despite operational challenges, closing this evidence gap will enable more targeted policymaking to support innovative UK firms and retain value within the UK.

- Our analysis suggests four overarching implications for UK innovation and platform policy:
    - Advance research on platform business models and value capture.
    - Address inequalities within platform ecosystems through targeted regulation of dominant platforms and direct support for complementors.
    - Design innovation interventions that reflect UK platform dynamics, including grants and tax incentives.
    - Develop governance and investment models that safeguard public value, leveraging public-private partnerships and strategic investment mechanisms to support long-term innovation and value creation and retention in the UK.

EXECUTIVE SUMMARY

Digital platforms have become a key organising force in modern economies, changing how value is generated, retained, and shared among firms, workers, and regions. Platform-based business models now support many of the world's most valuable companies and tend to achieve higher growth and profitability than traditional models across various sectors. However, despite their economic significance, there remains limited understanding of how the value created through platforms stays within a nation, how it is distributed within platform ecosystems, and what these dynamics imply for innovation policy in the UK.

The project context

- This report is part of a broader project supported by Innovate UK that seeks to better understand the evolving structure of the UK's digital platform economy, the economic models underpinning platformisation and the policy and investment implications.

- The aim of this report is to clarify how platforms operate, generate economic value, and are governed, with a particular focus on how the UK can better support innovative firms to retain economic value in this context.

The problem: gatekeeping and value drain

Instead of traditional open markets, today's digital economy operates as a network of private ecosystems ("meta-organisations"). Within these ecosystems, platform owners (often large multinational tech firms) act as landlords. They own the essential technologies, control the data, and establish the rules.

Because of "network effects" (where a platform becomes more valuable the more users it has), it becomes difficult for individual and business users to exit once a platform reaches a certain size. This grants platform owners significant power. They can use this power to control the "bottlenecks" in the market, allowing them to charge high fees, set conditions, and capture a disproportionate share of the profits, while partners typically provide most of the platform's value. As a result, domestic value generation fails to translate into local capital retention, as profits are largely diverted to international headquarters.

Moving beyond self-governance

History and market dynamics suggest that dominant platforms tend not to voluntarily govern themselves in ways that benefit the broader economy if doing so would impact their bottom line. Meaningful self-governance typically happens in the presence of credible government regulation.

The UK is taking action through the Digital Markets, Competition and Consumers Act 2024 (DMCCA). This empowers the Competition and Markets Authority (CMA) and its Digital Markets Unit (DMU) to actively regulate tech giants designated as having "strategic market status" (SMS) in relevant digital activities within the UK. Through enforcing conduct rules, restricting anti-competitive mergers, and championing interoperability (mandating that different

systems can communicate and work together), the UK aims to prevent businesses from being unfairly locked into closed digital platform ecosystems.

Closing the evidence gap for more targeted policy making

To effectively support UK firms and innovation, we need better evidence of exactly what, where, and how in the economy is affected. The data on UK-based digital platform businesses is currently highly fragmented, partly because the operational definitions of "digital platforms" vary widely. Capturing a clear picture of such business practices within the fast-changing technological and market environment is operationally challenging. There is a lack of systematic understanding of the ownership of UK-based platforms and the businesses impacted. We propose methods and specific tools that, when combined, could help fill this evidence gap. Moving forward, a more solid evidence base will enable more targeted policy development to support innovative UK firms and retain value within the UK.

1. Introduction

Digital platforms have become vital infrastructure for modern economic activity, enabling everything from service delivery and content sharing to workplace coordination and creative teamwork. While platforms provide new efficiencies and business prospects, they also transform how value is created, captured, and shared – often shifting economic power away from local firms, workers, and governments towards a small number of global technology corporations.

This report is part of a larger project supported by Innovate UK (IUK) that aims to better understand the changing structure of the UK's digital platform economy, the economic models behind platformisation, and the policy and investment consequences. A major concern is that the value created in the UK is probably not well retained within the country, which affects ongoing economic growth. Gaining insight into this shift is crucial for developing interventions that foster innovation, promote fairer economic outcomes, and ensure value stays within the nation.

The report provides a conceptual foundation for understanding digital platforms, using existing literature to explain how platforms function, create economic value, and are governed. Section 2 describes the key features of digital platforms, their ecosystem interactions, and the unique governance issues they present, both through platform self-regulation and public regulation. In particular, "digital platform ecosystems" and "meta-organisations" are included to illustrate the environments in which UK companies operate and the roles they may assume, alongside multinational platform firms. These concepts also help clarify why and how platform owners are structurally positioned to capture value. Consequently, they have implications for why the value created in the UK might not be fully retained, and for how UK companies might generate or maintain more value.

Furthermore, in our search for empirical evidence of platform owners' value capture in the UK, we encountered inconsistent identification of UK digital platform companies and a lack of existing data to support a systematic understanding of their scale and characteristics. Therefore, in Section 3, we propose some approaches for identifying UK-based digital platform owners and evaluating their value capture.

This report recognises the difficulties of gathering empirical evidence for UK digital platform businesses. It emphasises the need for further research and more effective strategies to address these challenges.

2. Digital Platforms

2.1 What is a digital platform?

Digital platforms have been defined and classified from different perspectives across several fields such as economics, technology management and information systems. Each discipline tends to focus on specific aspects of digital platforms, such as business models and ecosystem

orchestration, technological architecture and interoperability, or labour dynamics and social-technical power structures.

From a technical viewpoint, digital platforms can be understood as artefacts centred on an extensible codebase, with third-party modules complementing it to form a broader ecosystem (Tiwana et al., 2010; Boudreau, 2012). At the same time, they can also be described as integrated socio-technical systems that combine technical components (software/hardware) with organisational practices and standards (Tilson et al., 2012). Building on Tiwana and colleagues' idea (2010), Ghazawneh and Henfridsson (2015) characterised digital platforms as software-based structures comprising a core that delivers essential functions and interfaces enabling other external modules to connect and interact.

These varied definitions highlight the interplay between technical and organisational dynamics in shaping digital platform ecosystems (De Reuver et al., 2018). Meanwhile, De Reuver et al. (2018) pointed out that management research on (digital) platforms has overlooked the unique characteristics of digital technology itself. Instead, it tends to treat all technological platforms as uniform, characterising them only by organisational arrangements. Although some studies (e.g. Thomas et al., 2014) acknowledged the foundational role of technologies in (digital) platform ecosystems, they did not distinguish digital technologies as a distinct category from broader technological elements. Similarly, some (e.g., Gawer, 2014) discuss platforms like Apple and Google without explicitly conceptualising the role of technology in these platforms.

Bearing with this concern, this report, which emphasises understanding the value generated through digital platforms, views digital platforms with reference to the following definition (Parker et al., 2016, p.5):[1]

> *A platform is a business that enables value-creating interactions between external producers and consumers. The platform provides an open, participative infrastructure for these interactions and sets governance conditions for them. The platform's overarching purpose is to consummate matches among users and facilitate the exchange of goods, services, or social currency, thereby enabling value creation for all participants.*

[1] By following this definition, those that focus on deriving value from a single group of users and do not allow autonomous interactions among different user groups (e.g. retailer online shops that do not connect consumers and third-party sellers or suppliers) are not within the focus of the discussions in this report, although such "platforms" may be used as examples given their familiarity to the general public, for the sole purpose of illustrating the point made locally. In addition, platformisation is not simply the digitalisation of a business. Platforms are characterised by multi-sidedness of their business model and cross-side network effects (Gawer, 2021). There are stark differences between single-sided businesses and multi-sided platforms (Evans and Schmalensee, 2016). The former typically purchase inputs from suppliers, may transform them into finished goods or services, and sell them to customers, focusing primarily on attracting buyers and making profitable sales; in contrast, multi-sided platforms attract two or more distinct user groups, and facilitate valuable interactions between them (Evans and Schmalensee, 2016).

Based on their major function and mechanism of value creation, platforms can be classified into three types (Cusumano et al., 2019):

- *Transaction platforms* act as intermediaries or marketplaces facilitating exchanges of goods, services or information. Examples of this type of platform include Google search, Amazon Marketplace, and Uber.

- *Innovation platforms* provide shared technological foundations for partners to develop complementary products and services, thereby enhancing the platform's utility through added functionality. Examples of this include Apple's IOS and Google's Android.

- *Hybrid platforms* combine transaction and innovation platform strategies within a single company or infrastructure, leveraging both marketplace intermediation and collaborative innovation to maximise value creation. Platforms such as Facebook, X and Expedia are all hybrid platforms.

2.2 Understanding platform dynamics

2.2.1 Digital platform ecosystem

Digital platforms rely heavily on decentralised, self-governing contributors for their value proposition (Teece, 2018). Platforms enable and coordinate diverse participants within their ecosystems, despite their natural interdependencies (Hein et al., 2020). These ecosystems are shaped not only by the platforms' core technologies and organisational structures but also by their interactions with external actors, including users, communities, and business partners such as providers of complementary assets and advertisers.

The interdependencies between platform and agents involve both economic and structural components (Hein et al., 2020; Kappor, 2018; Adner, 2017).

Economically, digital platform ecosystems are characterised by complementarities that define how products or services interact with the system. *Unique complementarities* occur when one product (e.g., an application) cannot function without another (e.g. an operating system). In comparison, *supermodular complementarities* arise when the value of one product increases as another product is used or used more (e.g. more applications make the application store more attractive) (Jacobides et al., 2018; Teece, 1986). At the same time, digital platforms have *generativity*, which refers to spontaneous innovation through decentralised contributions (Zittrain, 2006; Nambisan et al., 2019). For example, third-party developers create new applications using digital tools and shared knowledge, adding value to the ecosystem without direct prompting.

Structurally, ecosystems are shaped by activities, actors and architectures. *Activities* are value co-creation efforts within an ecosystem that can face bottlenecks when interdependencies among actors and products limit the ecosystem's value proposition (Kapoor, 2018). *Actors* include autonomous complementors, who contribute by providing complementary products or services and consumers who contribute through feedback that

helps improve offerings (Lusch and Nambisan, 2015). *Architecture* determines whether ecosystems are platform-based or product-based. *Platform-based ecosystems* rely on modular designs to balance scalability with governance (Tiwana et al., 2010), while *product-based ecosystems* typically involve one-sided interactions between a company and its consumers (Kapoor, 2018).

A digital platform ecosystem is a system in which a platform owner enables value creation by providing modular infrastructure, governance, and coordination with a network of autonomous complementors and consumers (Hein et al., 2020). It consists of three building blocks: platform ownership, value-creating mechanisms and complementors' autonomy.

Platform ownership determines who controls the ecosystem and how power is distributed within it. In centralised ecosystems — such as Facebook or Apple's iOS — a single company holds most of the power, enabling swift decision-making and greater security but raising concerns about monopolistic control. *Consortium-based ecosystems*, such as Cloud Foundry, distribute power across multiple companies, including Cisco, SAP and IBM, supporting shared governance. *Decentralised ecosystems*, exemplified by blockchain platforms such as Ethereum and District0x, use peer-to-peer governance, allowing users to directly influence decisions.

In platform-based ecosystems, governance mechanisms coordinate interactions by defining rules for participation, revenue sharing and technical integration. Platform owners manage trade-offs between openness and control, often acting as bottlenecks that control and limit interactions within the ecosystem (Boudreau, 2010; Kapoor, 2018).

Value-creating mechanisms focus on how platforms generate and sustain value. First, platforms act as *intermediaries*, facilitating transactions between users and leveraging network effects. Airbnb, for instance, matches property owners with renters, creating a two-sided market where more listings attract more users, and vice versa. Second, platforms *drive innovation* by providing tools and resources that enable complementors to create or develop new products and services. SAP's Cloud Platform, for example, enables partners to build niche applications, which complement SAP's core software. In addition, new opportunities for *market diversification* or *competitiveness* can emerge through ecosystem generativity and be leveraged by platform owners, for example, Uber expanding into adjacent markets, such as food delivery through Uber Eats.

Complementor autonomy reflects the independence of third-party contributors. *High autonomy complementors* operate loosely. Their contributions increase variety but can be channelled by platform owners through boundary resources. In contrast, *low autonomy complementors* form tightly coupled partnerships with mutual dependencies. Their relationships rely on contracts, shared goals and trust. These close relationships strengthen the platform's core focal-value proposition but limit flexibility. These two types of complementors can coexist. For instance, a wide network of independent app developers (i.e., high-autonomy complementors) generates value-adding complements to Android, while the

key partners in the Open Handset Alliance (i.e., low-autonomy complementors) complement Android in improving core system development.

Hein et al. (2020) illustrate a digital platform ecosystem with the diagram depicted in Figure 1.

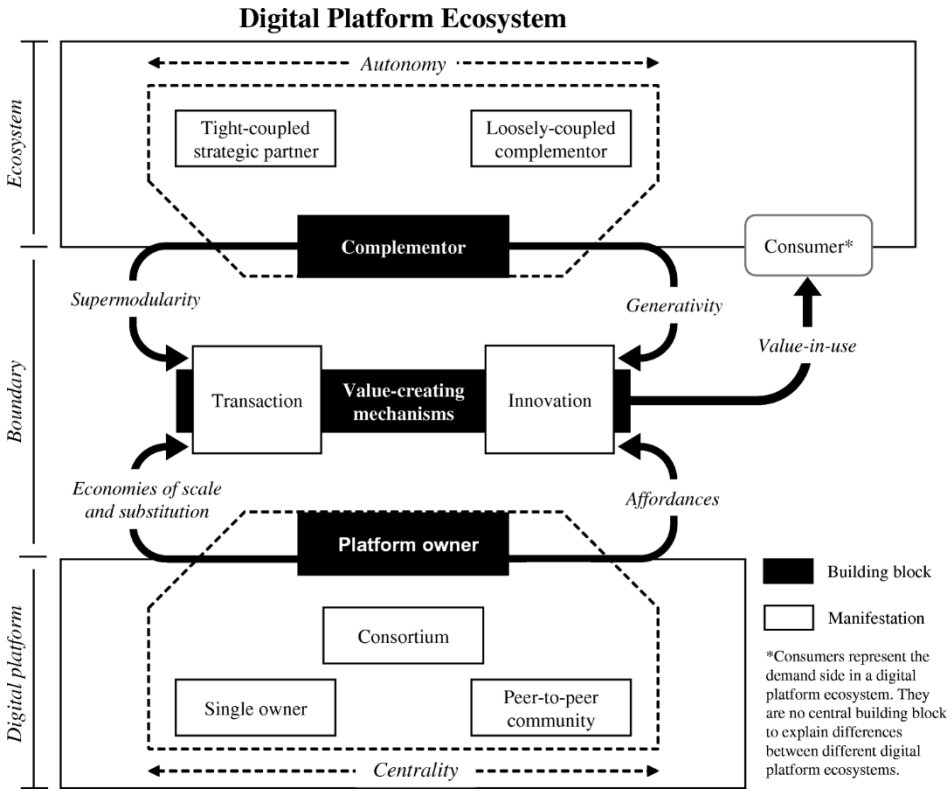

Figure 1. Digital Platform Ecosystem

Source: Hein et al., 2020

2.2.2 Digital platform business models

The three types of digital platforms mentioned earlier, namely transaction, innovation, and hybrid platforms, illustrate three different business models of digital platforms, highlighting their value-creation mechanisms.

Despite extensive exploration of value creation, existing knowledge of digital platform business models highlights significant gaps in understanding value-capture mechanisms. While studies have focused on how platforms generate value through network effects, user adoption, and interactions between actors, the process of converting these into sustainable revenue streams remains ambiguous. Critical questions, such as which side of a multi-sided platform bears costs, how pricing models are structured, and how costs and revenue timing are managed, are often context-dependent or unresolved (McIntyre et al., 2021; Afuah, 2018). Moreover, while platform owners and complementors collaborate to co-create value, it is unclear how this value is distributed among them. The relevant issues, such as bargaining power, governance structures and equity in profit-sharing, remain underexplored (Hein et al., 2020; Helfat and Raubitschek, 2018).

The role of network effects and actor dynamics in shaping value capture is also poorly understood. Interactions between actors drive platform evolution. However, how these interactions translate into viable revenue models, particularly as platforms scale or face competition, remains to be studied further (Kapoor et al., 2021). While business model innovation (e.g. dynamic capabilities, open innovation, business model design and reconfiguration) is recognised as critical for adapting to technological disruptions, the relationship between platform configuration activities and competitive strategies remains unclear (Cennamo, 2021; Massa et al., 2017).

Overall, existing knowledge of the operational mechanisms of value capture in digital platform business models, including monetisation, distribution, and adaptation over time, remains fragmented and context-specific, warranting further research.

Platform-based businesses demonstrate significantly higher profitability and growth rates than non-platform businesses (Cusumano et al., 2020), achieving higher revenues with lower costs and staffing requirements (Kapoor et al., 2021). Platform-based models were reported to generate 32% higher revenue growth and 27% higher profit margins than traditional product-based models and generate half or more of the revenue for 60 of the world's 100 largest corporations ranked by market value (Cennamo, 2021; Weill & Woerner, 2013; Eisenmann et al., 2011). A 2015 global survey underscored a significant surge in the adoption of platform-based models by businesses; 176 platform companies were identified, with approximately $ 1 billion in market capitalisation (Kapoor et al., 2021; Evans and Gawer, 2016; Langley and Leyshon, 2017). 7 of the 10 companies with the highest market value globally by 2019 operate one or more notable platforms (McIntyre et al., 2021). A 2018 survey showed that companies that owned and/or cooperate with platforms had a 1.4% annual growth in earnings before interest and taxes (EBIT), compared to 0.3% for those that did not engage in platforms (Bughin et al., 2019b); and top performers by EBIT were 39% more often than others to report using digital platforms to access new partners and customers (Bughin et al., 2019a).

Nevertheless, issues of inequality in value capture among participants in digital platform ecosystems are often reflected in platform leaders disproportionately benefiting from their control over bottleneck assets, such as proprietary technologies, data, and governance structures. For instance, Apple and Google leverage their dominance in mobile operating systems and app stores to impose revenue models that leave complementors, such as application developers, with limited margins (Teece, 2018).[2] Complementors, such as gig workers or content creators, can often bear risks without equitable rewards. They can lack bargaining power despite generating the core value of platforms. Such inequalities can be further entrenched by high switching costs and lock-in effects, which limit the ability of other participants of digital platform ecosystems to negotiate fair terms (Teece, 2018). Standards

[2] Apple charges 10%-27% commission for distributing paid apps, in-app purchases and linking out purchases through the App Store. Source: https://developer.apple.com/help/app-store-connect/distributing-apps-in-the-european-union/commissions-fees-and-taxes/

and intellectual property rights enforcement also complicate equity in value capture among the stakeholders (Teece, 2018).

The table below provides some examples of digital platform revenue models, which should help understand aspects of value capture of digital platform business models.

Table 1. Digital Platform Revenue Models

Revenue model	Description	Example
Transaction fees/commissions	Platforms charge a percentage or fixed fee for facilitating exchanges between users.	Airbnb (a typical 3% host service charge plus a guest service fee that is typically less than 14.2%; or a typical 14-16% host-only service fee.)[3]
Subscription	Users pay recurring fees for access or features.	Netflix (fixed subscription fees)[4]
Advertising	Platforms monetize user attention through targeted ads.	Google Search Ads (cost per click (CPC), cost per thousand viewable impressions (vCPM) or cost per action (CPA); the costs depend on the advertisers' budgets and bids.)[5]
Freemium	Platforms offer free basic services with paid upgrades.	Dropbox (free basic plan has 2GB storage; fees charged for upgrades)[6]
Data monetization	Platforms trade aggregated user analytics or insights.	Fitbit
Licensing/API	Platforms charge third parties for platform infrastructure.	Google Maps Platform
Affiliate	Platforms charge for promoting third-party products or services and collect commission on subsequent sales.	Instagram
Pay-per-view access	Users pay a one-time fee to access specific digital content, events or services for a limited time or single use.	Sky Sports Box Office
Direct sales	Platforms sell their own products, services or content directly to customers.	Apple.com

Note: The examples are included in this table for a distinct illustration of the corresponding revenue models. Digital platform businesses commonly combine multiple revenue models. Applying certain revenue models listed in this table does not necessarily designate a platform as defined in this report. For example, the platforms that only generate revenue by selling their own goods or services directly to customers are not within the scope of the main discussion in this report.

[3] Source: https://www.airbnb.co.uk/help/article/1857
[4] Source: https://www.netflix.com/signup/planform
[5] Sources: https://support.google.com/google-ads/answer/2459326?hl=en-GB; https://support.google.com/google-ads/answer/7054229
[6] Source: https://www.dropbox.com/en_GB/plans?billing=monthly

2.3 Market and labour dynamics in the platform economy

Digital platforms are reshaping global economies and societies, generating both opportunities and challenges. Their impacts can be understood across multiple dimensions:

Opportunities and risks in platform-driven market transformation

Digital platforms are transforming markets at an unprecedented scale, creating new opportunities for innovation and exchange while also raising important risks related to market power, competition, and consumer outcomes.

- Digital platforms create large, multi-sided markets where goods and services can be exchanged more easily and on a much larger scale than before. However, they also tend to concentrate market power in the hands of a few dominant firms. This is driven by economies of scale and scope, network effects, and high switching and entry barriers (PwC, 2020).
- When market power becomes too concentrated, it can harm consumers. Negative outcomes may include higher prices, lower product quality, fewer choices, and reduced innovation (PwC, 2020).
- At the same time, digital platforms can also support innovation and creativity. There is evidence that they can help improve the quality of innovation (Han et al., 2024) and foster greater creativity among users and businesses (Bhatti et al., 2024).

Business competition and ecosystem dynamics

Digital platform ecosystems are transforming the way businesses compete and collaborate. They introduce new competitive dynamics and tensions within and across ecosystems, particularly affecting how value is created and captured.

- Competition is shifting from individual firms to networks of interconnected businesses. Within these platform ecosystems, companies often compete and collaborate simultaneously – a phenomenon known as "coopetition" (Plekhanov et al., 2023).
- Platform ecosystems help reduce information gaps and make it easier for businesses and stakeholders to share knowledge. Advanced data processing also enhances the speed at which stakeholders can reach agreements, which supports positive economic and environmental outcomes (Plekhanov et al., 2023).
- Platform ecosystems also blur traditional industry boundaries. Companies can expand into new markets and compete with their partners, which complicates the capture of value for smaller businesses. While the ecosystem as a whole may generate broad benefits, smaller players can struggle to compete effectively.

Value chain intermediation and labour impacts

Digital platforms are reshaping market value chains and labour markets. They create new forms of market exchange and employment, but also raise important risks related to job quality, income security, and labour protections.

- Digital platforms act as intermediaries in market value chains. By connecting fragmented suppliers and users, they help unlock underutilised resources and support new forms of market exchange. They also bring new entrants into markets, mobilise new capital, and create new employment opportunities – but often at the cost of disrupting existing industries (Strowel & Vergote, 2016).
- While digital platforms foster new economic opportunities, they also blur the boundaries between formal and informal employment. This raises concerns about labour conditions, social security, and the sustainability of welfare systems (Strowel & Vergote, 2016).
- The gig economy illustrates the dual nature of these impacts. Gig platforms can improve efficiency and flexibility in the labour market, expanding consumer access to affordable services and boosting productivity and overall employment (Schwellnus et al., 2019). However, they can also negatively affect dependent jobs and wages, as they often replace traditional self-employment and lower earnings for workers drawn from self-employed or unemployed pools (Schwellnus et al., 2019).

The rise of digital platforms not only disrupts industries and reshapes market and labour dynamics but also tests jurisdictional boundaries and regulatory frameworks, making platform governance an increasingly critical area of concern (Strowel & Vergote, 2016).

2.4 The governance of digital platforms (ecosystems)

As platform governance becomes increasingly critical, there is no simple answer to how digital platforms should be governed. Platform companies, complementors, users, governments and other stakeholders all share responsibilities for shaping the role of digital platforms (Gorwa, 2019; Helberger et al., 2018).

This section focuses on two key aspects: first, how platform companies govern their ecosystems, including how they exercise authority, structure interactions, and manage relationships to create and capture value; and second, the role of government regulation in shaping platform governance through legal and policy frameworks.

2.4.1 Platform authority, power and governance mechanisms

A digital platform ecosystem can be considered as an “organisation of organisations”. That is, a meta-organisation – a collective structure that brings together multiple organisations, actors, and activities around shared social or economic value propositions or business models (Kretschmer et al., 2020). While entities within a platform ecosystem often remain legally independent, they frequently engage in collaborative investments, co-specialisation, or exclusivity agreements that create enduring interdependencies. Their relationships are more flexible and varied than short-term market contracts, but not as persistent or substantial as those within a hierarchical organisation. Digital platform ecosystems “can be viewed as hybrid structures between organisations and markets, providing a mixture of market-based and

hierarchical power, and a mixture of market-based and hierarchical incentives" (Kretschmer et al., 2020, p.407).

Building on this perspective, digital platform ecosystems can differ from traditional hierarchical organisations in three aspects (Kretschmer et al., 2020):

(1) Authority

In traditional hierarchical organisations, authority derives from asset ownership and managerial power through employment contracts. Managers can directly assign tasks and control outcomes through well-defined organisational hierarchies.

In contrast, in platform ecosystems, authority rests on control over the platform's technological architecture and the platform's relational centrality within a broader network of participants. Platform owners control who can participate, the rules of participation and how value is allocated across the ecosystem. They have the capabilities and willingness to manage coordination among complementors, creating more value than could be achieved by them individually or through two-way cooperation.

(2) Incentives

In traditional hierarchical organisations, incentives are typically low-powered and direct, such as recurring wages paid through formal employment contracts, whereas incentives in platform ecosystems are usually high-powered and indirect. By providing "nudges" and indirect incentives (e.g. valuable resources such as customer preference, development kits/APIs, and performance feedback/awards) for desired quality or quantities, digital platforms tend to enable participants to create and capture value through interactions among themselves. Because platforms commonly need complementors to attract consumers, they need to design incentives and to guide complementors to contribute effectively. Since participation is voluntary, the incentives need to outweigh alternative uses of participants' time or income opportunities and compensate for the platforms' lower level of direct authority over their actions.

(3) Governance and coordination

In traditional hierarchical organisations, decision rights are allocated top-down: managers and executives hold the authority to make key decisions, which are passed down through formal organisational structures. In digital platform ecosystems, decision-making is distributed among autonomous participants, but within the boundaries set by the platform owner. Platform-enabled activities are typically organised in a more decentralised manner, supported by modular tasks, standardised interfaces, and digital communication channels. As a result, once the participants are accepted into the platform ecosystems, control over the joint value-creating activities is shared: platform owners retain decision rights over core infrastructure, while participants control their own contributions.

Moreover, digital platform ecosystems differ from markets in that platform meta-organisations tend to exhibit an intermediate level of interdependence among participants – more than in markets but less than in hierarchical organisations. Although modularity and standardisation reduce interdependencies, participants still influence each other through network effects,

where one party's success can benefit others. Unlike markets, platform ecosystems have leaders who act as a "visible hand" as opposed to the "invisible hand" of markets. The leaders actively shape the ecosystems. How they operate greatly influence the platform ecosystems' nature and competitiveness. (Kretschmer et al., 2020)

The aforementioned meta-organisational features in the three aspects shape how platforms compete with traditional organisations and other platforms, as well as competition and cooperation within platforms (see Table 2). Notably, in relation to sources of power and authority, new platforms challenging traditional incumbents often highlight the autonomy and flexibility that participants can have on the platforms; in contrast, established platforms competing with other platforms or overseeing interactions within platform ecosystems tend to focus on architectural control of the ecosystems and the power to distribute profits among participants. Specifically, the within-platform cooperation and competition reflect the phenomenon of coopetition (Plekhanov et al., 2023; He et al., 2020).

Table 2. Meta-organisational features and platform competition

Meta-organisational features	Strategic dimension		
	Platform entry	**Between-platforms competition**	**Within-platform competition**
Sources of power and authority	Technological and/or relational hub to facilitate coordination; enables modularity and loose coupling for participant autonomy and flexibility	Architectural control of the ecosystem to capture more value	Power to influence the distribution of profits across stakeholders
Sources of motivation for participation	Incentives to attract participants under uncertainty	Incentives for users, and participants to offer high quality complements that create value in the platform ecosystem; incentives to encourage loyalty	Incentives to balance cooperation and competition with participants
Modes of governance and coordination	Use technology to lower coordination costs and enable search and matching; create technology-based trust and security	Balance rules and decision rights with openness; balance coordination and participant contributions; balance cooperation and competition with other platforms	(De)centralise decision rights to manage cooperation and competition among complementors

Source: Kretschmer et al., 2020

Platform governance can be viewed as the strategies that platform owners employ to create and appropriate value. It consists of a set of overarching rules, constraints, and incentives that are developed and utilised to address market challenges, such as externalities (where one

participant's actions have unintended effects on others, either positively or negatively) and information asymmetries (where one side in a transaction possesses information advantages over another), which can impact platform adoption and how existing participants act and innovate. Because platform owners control critical assets, they can decide which actions are allowed, blocked or required. They can also build specific design features or instruments into the platforms to steer participant behaviour and achieve desired outcomes of platform governance. Platform governance and design shape how value is created and shared on platforms. Especially in digital platforms, much of the governance is built directly into the platforms' technical design (Chen et al., 2022).

Table 3 shows an overview of the governance mechanisms and design features that platform owners can utilise to incentivise and/or control complementors and shape their activities in relation to the platforms. See the appendix for alternative categorisations of platform governance mechanisms.

Table 3. Digital platform governance mechanisms and design features

	Governance mechanisms	Definitions	Design features
Incentive	Sharing of resources	Sharing of resources with complementors that can assist the latter in their value-creating activities	- API, SDK, code library, reference design, etc.
	Provision of information	Provide complementors with interface- or customer-related information	- Developer conferences, workshops - Communication channels with and between complementors and users
	Conferring autonomy	The extent to which digital platform owners confer autonomy to complementors in conducting value-creating activities	- Decentralisation of decision rights - Modularity
	Giving rewards	Giving pecuniary and nonpecuniary rewards to complementors	- Revenue sharing schemes - Fee-based features - Recommendations, certifications, featuring, etc.
Control	Access control	Governance mechanisms determine who is allowed to join the platform and use the digital interface	- Screening mechanisms - Restriction on the use of boundary resources - Access fees
	Output control	Evaluation and monitoring of complementors' outputs and outcomes	- Reputation scores, online reviews, ratings, etc.
	Behavioural control	Deciding on the types of interactions allowed or	- Antimanipulation techniques - Restriction on the exchange of contact information

	Governance mechanisms	Definitions	Design features
		deemed appropriate on the platform	
	External relationship control	The extent to which digital platform owners allow complementors to interact with other platforms	- Exclusive relationships: reduction of compatibility

Source: Extracted by the authors from Table 2 in Chen et al. (2022).

2.4.2 Government regulation of digital platforms

While some believe that self-governance can be faster, better and cheaper for consumers and companies, it has a primary limitation. There is often no clear mechanism to ensure that platform owners' incentives align with broader interests. In particular, it is uncertain whether the owners(leaders?) of dominant digital platforms are willing to maintain strong self-governance and tighter oversight of their platforms and platform ecosystems, especially if this comes at the expense of short-term financial performance (Cusumano et al., 2021).

Platform owners are probably more likely to commit to meaningful self-governance when faced with a credible risk of government regulation (Cusumano et al., 2021). This highlights the important role of government intervention in promoting fair and effective platform governance. To improve competition between and within digital platforms, regulatory tools are needed to supplement self-regulation and address potential market failures (Jacobides and Lianos, 2021; Parker et al., 2021).

Government regulation can take many forms. It may involve direct tools such as legislation and penalties for noncompliance, or more indirect forms, including taxes, subsidies, permits and licenses (Cusumano et al., 2021). The policy prescriptions for platform governance vary in their level of complexity and regulatory risk (Owen, 2019). A report (Owen, 2019) analysed what a platform governance agenda might look like and listed some of the policy areas with corresponding scales of action and regulatory risks (Table 44).

Table 4. Platform governance policy areas

Theme	Policy	Scale	Regulatory Risk
Content	Content moderation	Nationally led	High
	Ad transparency	International coordination	Low
	Bot and agent identification	International coordination	Moderate
	Civic journalism	Nationally led	Low
	Misinformation-focused cyber security	International cooperation	Moderate

Theme	Policy	Scale	Regulatory Risk
	Research	International coordination	Low
	Digital literacy	Nationally led	Low
	Liability	International coordination	High
Data	Algorithmic accountability	International cooperation	High
	Data rights	International coordination	High
Competition	Modernized antitrust	International coordination	Moderate
	Mergers and acquisitions restrictions	National led	Moderate
	Data portability and interoperability	International cooperation	Moderate
	Fair taxation	International cooperation	Low

Source: Owen, 2019.

In practice, governments worldwide are already implementing a wide range of regulatory measures to address concerns about digital platforms. These initiatives demonstrate how various regulatory approaches are being implemented across different jurisdictions.

Regulatory developments in the European Union

In the European Union, governments are acting through three main policy areas (Gorwa, 2019): strengthening privacy and data protection regulation (e.g. the EU's 2016 General Data Protection Regulation (GDPR)); removing intermediary liability protections (e.g. German Network Enforcement Act (NetzDG)); and using competition and monopoly law. The GDPR imposes strict data-handling rules and imposes severe penalties for non-compliance, while NetzDG mandates the swift removal of illegal content and promotes greater transparency in reporting.

In 2019, the EU also introduced several additional regulations targeting platform business practices and market dynamics. The Platform-to-Business (P2B) Regulation aims to improve trading conditions for businesses that use online platforms, ensuring fairer practices and greater transparency (Gineikytė-Kanclerė et al., 2023). Further, in 2022, the EU adopted the Digital Markets Act (DMA) to regulate large digital platforms that provide core platform services (such as online search engines, app stores, and messenger services) as "gatekeepers" (European Commission, n.d.-a).

Since 2023, online platforms in the EU have been regulated by the Digital Services Act (DSA). The Act aims to combat illegal and harmful online activities and the spread of disinformation by establishing clear and proportionate rules. The DSA enhances user safety, safeguards their

fundamental rights online, and creates a fair and open online platform environment (European Commission, n.d.-b).

Regulatory developments in the United Kingdom

The United Kingdom is developing its regulatory framework to address competition concerns in digital markets, with a particular focus on large platforms with significant market power. Recent reforms aim to regulate competition, strengthen consumer protection, and modernise existing competition law to better reflect the realities of the digital economy.

In the UK, the **Digital Markets, Competition and Consumers Act 2024 (DMCCA)** establishes a new regulatory framework specifically designed to regulate competition in digital markets. The Act updates existing legislation, including the Competition Act 1998 and the Enterprise Act 2002, and introduces enhanced consumer protection measures. It also provides new consumer rights to strengthen users' positions in digital markets.

Importantly, DMCCA empowers the Competition and Markets Authority (CMA), specifically, the Digital Markets Unit (DMU), to enforce the new **Digital Markets Competition Regime (DMCR)** (CMA, 2024).

The DMCR applies only to companies that are designated as having "strategic market status" (SMS) in a digital activity relevant to the UK. To qualify, a firm must hold significant, long-term market power and occupy a strategically important position in the digital activity. In addition, firms must meet specific financial thresholds, including a global turnover of more than £25 billion or a UK turnover of over £1 billion. SMS designations are reviewed at least once every five years to ensure they remain current and appropriate.

The DMCR provides the Competition and Markets Authority (CMA) and its Digital Markets Unit (DMU) with a set of targeted regulatory tools to address the risks posed by SMS firms. The regime is built on three core elements (CMA, 2024):

- **Conduct requirements**, which define how SMS firms are expected to behave in relation to their designated activities, ensuring fairer interactions within the market;
- **Pro-competition interventions**, which allow the CMA to implement measures where competition is being harmed or restricted; and
- **Merger reporting obligations**, which require SMS firms to notify the CMA of relevant mergers valued at £25 billion or more that involve a UK connection.

Interoperability: a cross-cutting strategy in platform regulation

Across these regulatory developments, a cross-cutting objective is to promote greater openness, contestability, and fairness in digital platform markets. One instrument emerging from both the EU and the UK is the use of interoperability. While the specific mechanisms and requirements vary, interoperability is increasingly recognised as a critical regulatory lever to

counter market concentration, to enhance consumer choice, and to encourage innovation across digital ecosystems.

Interoperability, data portability and open standards are policy instruments that can be utilised to regulate competition in digital platform markets where significant network effects are at play. Specifically, interoperability (which, in competition law, usually means protocol interoperability, as opposed to data interoperability) ensures complete compatibility between systems and that complementary services can be provided (Crémer et al., 2019).

By fostering interoperability, regulators aim to support more contestable and fairer digital markets. These measures aim to reduce the need for direct product regulation while facilitating more efficient market entry and expansion. In doing so, interoperability requirements can contribute not only to lowering market concentration but also to increasing consumer welfare. Moreover, by enabling cross-platform interactions and reducing barriers to innovation, interoperability has the potential to further stimulate technological dynamism in digital markets.

At the same time, interoperability requirements are not without challenges and risks. Potential downsides include slower innovation cycles due to regulatory delays, reduced scope for competitor differentiation, and privacy concerns related to data flows across platforms. Enforcing interoperability in an equitable and effective manner also remains complex, with risks of industry capture and limitations in compliance and enforcement (Morton et al., 2023).

Overall, interoperability represents a relatively low-intrusion regulatory approach that aligns well with the dynamic nature of digital markets. Nevertheless, its success will depend on meticulous design and continuous assessment to find the right balance between the advantages of openness and the need to safeguard innovation, competition, and consumer rights.

3. UK Digital Platform Economy

Existing evidence on UK-based digital platforms is mostly fragmented. At present, there is no systematic understanding of where and to what extent different parts of the UK economy are becoming platform-based.

Several factors contribute to this evidence gap. The fast-changing nature of digital technologies and business models continues to blur sector boundaries and challenge existing classifications. In parallel, different fields of practice adopt varying definitions of what constitutes a “platform”, leading to inconsistencies in how data are collected and reported. As a result, even basic questions, such as how many platform-based businesses operate in the UK, or how much value they capture through platforms, remain difficult to answer with precision.

Against this backdrop, we compiled available information on the number of firms and/or revenues associated with selected categories of digital platforms, organised by sector (see Table 5). These categories were selected based on data availability, economic relevance, and their clear identification as platform-based models in industry or official sources. While not

exhaustive, they provide a starting point for understanding patterns of platformisation across the economy.

It is important to note that the data in Table 5 originates from a variety of sources, each using different criteria to define what constitutes a digital platform and how platform activity should be measured. For example, in the transportation sector, some sources distinguish between "shared mobility" and "car-sharing" platforms, each with distinct firm counts and revenue estimates, reflecting different assumptions about what constitutes a platform-based activity. These inconsistencies make cross-sector comparisons challenging and reflect the broader difficulty of working with fragmented and methodologically diverse evidence. As such, the figures presented should be interpreted as indicative rather than comprehensive; they provide a helpful starting point for understanding how platformisation may be unfolding across different parts of the UK economy.

Table 5. UK Digital Platform description

Sector/industry	Description
Food and beverage services	137 "online food ordering and delivery platforms" in the UK in 2024, with £3.8bn revenue estimated,[7] representing c.0.09% and c.4% of the UK food and beverage services[8] by number of businesses (over 152,000) and turnover (over £93bn) respectively[9]
Information and communication	- 276 "social media platforms" in the UK in 2024, with £9.8bn revenue estimated; [10] accounted for c.0.1% of the UK information and communication industries (SIC Section J)[8] by number of businesses (more than 187,000)[11] - 1,441 "search engine" businesses in the UK in 2024, with £5.1bn revenue estimated, within which over 96% came from Alphabet, followed by Microsoft and Ask.com;[12] accounted for c.0.8% of the UK information and communication industries (SIC Section J) [8] by number of businesses [11]
Transport and storage	- 17 "shared mobility" companies in the UK in 2024, generated a market of nearly £2.39bn, within which 70% came from 4 brands, which are: Uber (21.2%), Gett (20.6%), FREENOW (16.8%) and Bold (11.2%);[13] accounted for c.0.01% of the UK transport and storage sector (SIC Section H) [8] by number of businesses (more than 116,000) [11]

[7] Source: IBISWorld, 2024. https://www.ibisworld.com/united-kingdom/industry/online-food-ordering-delivery-platforms/14618/#FinancialBenchmarks
[8] Authors' calculation
[9] Source: ONS, 2024. https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/adhocs/2426foodandbeverageservingactivitiesbysmesizebandwithintheuk
[10] Source: IBISWorld, 2024. https://www.ibisworld.com/united-kingdom/industry/social-media-platforms/14668/
[11] Source: ONS, 2024. https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/datasets/ukbusinessactivitysizeandlocation
[12] Source: IBISWorld, 2024. https://www.ibisworld.com/united-kingdom/industry/search-engines/3630/
[13] Source: Euromonitor passport, 2025.

Sector/industry	Description
	- 72 “car sharing” businesses in the UK in 2024, with £241.2m revenue estimated;[14] accounted for c.0.06% of the UK transport and storage sector (SIC Section H)[8] by number of businesses[11]
Travel agency	474 “online travel agencies” in the UK in 2024, with £1.9bn revenue estimated;[15] accounted for c.9.2% of the UK travel agency industry (SIC 7199)[8] by number of businesses (c.5,150)[11]
Retailing	Internet sales account for over 25% of total retail sales in the UK in recent years.[16]
Finance	- c.2,500 FinTech companies in the UK in 2020,[17] accounted for c.4% of the UK finance and insurance industries (SIC Section K)[8] by the number of businesses (over 62,000 companies)[18] - 134 “peer-to-peer lending platforms” in the UK in 2024,[19] accounted for c.0.2% of the UK finance and insurance industries (SIC Section K)[8] by number of businesses (58,800)[11]
Education	1,017 EdTech companies in England in 2022, estimated 4% of the English educational market and 3% of the English digital market by GVA[20]
Life sciences	More than 4,300 HealthTech companies in the UK in 2023/24, 31% of the UK life sciences sector by turnover.[21,22]

Another perspective on platform use by UK firms comes from a recent UK-wide survey on the adoption of digital technologies and platforms (Massini et al., 2025). It found that platform adoption was higher among larger firms, with at least 10% of micro firms (excluding sole traders) reporting use of digital platforms. Adoption was most prominent in London, followed by the

[14] Source: IBISWorld, 2024. https://www.ibisworld.com/united-kingdom/industry/car-sharing-activities/14666/
[15] Source: IBISWorld, 2024. https://www.ibisworld.com/united-kingdom/industry/online-travel-agencies/14643/
[16] Source: ONS, 2025. https://www.ons.gov.uk/businessindustryandtrade/retailindustry/timeseries/j4mc/drsi
[17] Source: HM Treasury, 2021. https://assets.publishing.service.gov.uk/media/607979c7d3bf7f400f5b3c65/KalifaReviewofUKFintech01.pdf
[18] Source: ONS, 2020. https://www.ons.gov.uk/businessindustryandtrade/business/activitysizeandlocation/bulletins/ukbusinessactivitysizeandlocation/2020
[19] Source: IBISWorld, 2024. https://www.ibisworld.com/united-kingdom/industry/peer-to-peer-lending-platforms/14602/
[20] Source: DfE, 2022. https://assets.publishing.service.gov.uk/media/636e7717e90e07186280f7cf/Edtech_market_in_England_Nov_2022.pdf
[21] Source: OLS, 2024. https://assets.publishing.service.gov.uk/media/66f691c7a31f45a9c765edc5/unlocking_the_potential_of_uk_healthtech.pdf
[22] For information, the number of life sciences businesses in the UK was 6,850 in 2021/22. Source: OLS. https://www.gov.uk/government/statistics/bioscience-and-health-technology-sector-statistics-2021-to-2022/bioscience-and-health-technology-sector-statistics-2021-to-2022

South East and North West. In sectoral terms, over 70% of services firms and more than 10% of manufacturing firms reported using digital platforms. Firms also reported positive impacts on efficiency, innovation, customer satisfaction, and competitiveness. However, the survey does not capture whether firms own platforms or simply use them. This limits its ability to fully reflect the structure of the platform economy, as ownership can influence who manages data, defines operating rules, and retains economic value.

Although the power concentration of digital platform businesses has been widely discussed, the gap in empirical evidence significantly limits our understanding of digital platform businesses in terms of their actual scale, characteristics, and impact on the UK economy and society, as well as the way in which the affected businesses and individuals can be supported.

In Table 6, we outline some methods or instruments for identifying UK-based platform owners and analysing their value capture. To understand value extraction, interviews or focus groups revolving around a handful of major platform owners in each area of interest would be feasible. In contrast, ML techniques and questionnaires are better suited to efficiently capturing the scale and demographics of platform owners at large.

Table 6. Methods/instruments for platform owner identification and value capture analysis

Method/instrument	Aim	Description	Pros	Cons	Note
Machine Learning techniques	Identify owners	Supervised machine learning, such as the Data City ML list builder, allows researchers to use a seed training set of known platform owners to build a custom classifier to identify similar platform owners.	• Automated[1] • Scalable[2] • Time saving[3] • Unobtrusive	• Dependent on available training data (e.g. web text, job descriptions, corporate filings)[4] • Website information subject to data decay[5] • Websites may be assigned to platform owners and their affiliates • Seed set bias – the model is only as good as its seed set •Not flexible when encountering new/niche platform categories[6] • Requires specialised knowledge in businesses and specific industries • Specific to the Data City's ML list builder: it is only available for companies registered in the UK[7]	[1,2,3] It is critical for the model to have an effectively and accurately defined target object. An effective definition ensures a manageable scope of homogeneous firms, while an accurate definition clearly distinguishes between the target and the noise. These determine the accuracy of the retrieved companies as a result of every iteration of the ML process, hence the status of the outcome on which the model reaches the point of convergence (where the process yields no further unique matches – ideally, the outcome should build on true targets as much as possible with as little noise as possible), and therefore avoid the need of extensive human review. If the firm identification process for each type of target platforms is efficient, meaning the ML output is not excessive[23] and aligns closely with the final identified companies, the method can be considered a scalable solution for automating platform owner identification.

[23] There is usually not an excessive number of platform owners within an effectively defined scope, because platforms need enough users to survive.

Method/instrument	Aim	Description	Pros	Cons	Note
					[4] The data do not apply to all companies that potentially own/operate platforms in the UK. [5] The data is outdated if companies pivot businesses without updating their sites. [6] To capture new/niche platform categories introduces competing requirements for seed set composition – while high purity is essential for the effective identification of the target platform categories, high diversity (resulting in more noise) is required to discover new/niche platform models. [7] If a digital platform is available in the UK without a relevant UK registered company, the platform owner can not be identified by the Data City ML list builder.
	Analyse value capture	ML techniques can be leveraged to extract financial data from corporate filings from Companies House, and to identify and analyse value capture or value extraction.[8]	• Automated • Scalable • More precise	• Corporate filings could be messy and inconsistent. If the extraction misidentifies the data, the subsequent analyses will be fundamentally flawed.[9] • Requires specialised expertise and compute	[8] In the UK, the CMA benchmarks a firm's Return on Capital Employed (ROCE) (the actual profitability) against its Weighted Average Cost of Capital (WACC).[24] It considers a firm's rate of profit as "normal" when "the minimum level of profits required to keep the factors of production in their current use in the long run",

[24] CMA, 2022

Method/instrument	Aim	Description	Pros	Cons	Note
				power to scrape, clean and model from the large volume of corporate filings	which means, "the rate of return on capital employed for a particular business activity would be equal to the opportunity cost".[25] Therefore, when ROCE is substantially and persistently higher than WACC, the CMA identifies the gap (i.e. economic profit) as excess profit,[26] which acts as the regulatory proxy for economic rent. Economic rent indicates an extraction of value, which is unfair.[27] From a regulatory view, when a platform captures rent stemming from power rather than value creation, it acts as a "tax" on UK innovation. It transfers wealth from productive UK businesses to platform owners without providing a matching increase in service. [9] Human review is required to verify data accuracy and contextualise findings.
Questionnaire	Identify owners	Asking companies about their experience of operating digital platforms	• Scalable • Time saving • Does not rely on web presence	• Self-reported information	-

[25] CMA, 2026, p.118
[26] CMA, 2026
[27] Mazzucato et al., 2023; O'Reilly et al., 2024

Method/instrument	Aim	Description	Pros	Cons	Note
			• Identifies owners of multiple platforms		
	Analyse value capture	Asking potential complementors of digital platforms about their experience of engaging with digital platforms	• Scalable • Time saving • Access to information not disclosed by platform owners	• Participant bias • Challenging to name individual platform owners	-
Interviews/focus groups	Analyse value capture	Utilising qualitative methods such as interviews and focus groups to engage complementors or industry experts of a selection of critical digital platforms	• In-depth • Captures emerging trends • Deep understanding without seeking to be exhaustive[10] • Access to information not disclosed by platform owners	• Difficult to recruit insiders • Time-consuming to achieve a broad coverage •Participant bias • Researcher bias • Lower generalisability	[10] Platforms with limited user bases inherently lack the substantial, persistent economic profits characteristic of value extraction, and assessing value capture by their owners is challenging due to data availability and quality.

4 Conclusions and Implications for the UK Economy

Drawing on existing knowledge, this report shows:

- **Contexts and roles of UK companies**

The digital platform economy currently operates largely as a series of interconnected private "ecosystems". Instead of traditional open markets, UK companies often operate within massive digital networks where independent businesses and users interact, with rules set by a central platform leader.

Within these "ecosystems", most UK businesses are not the platform leaders but users or partners ("complementors"). For example, a UK firm might be an independent app developer for an operating system, a seller on a digital marketplace, a restaurant serving through a food delivery platform, or an infrastructure provider. While some partners have high autonomy to innovate, others are tightly locked into the platforms' core systems. In either case, UK firms often rely on these platforms to reach clients, operate their businesses and generate value.

- **Why platform owners are wired to capture the most value**

Platform owners, often large multinational tech giants, control the core technologies, data and digital infrastructure. They act as the gatekeepers between businesses and customers; they decide who gets access, how products are ranked, how data is shared, and how value is split. Platforms become exponentially more valuable the more they are used. More products on a digital marketplace attract more buyers, which in turn attracts more sellers. Once a platform reaches a certain scale, it becomes very difficult for users to leave due to high switching costs. Because of contributions from users and partners, platform owners can generate high profit margins without incurring the high costs of traditional approaches.

- **Why is the value not retained in the UK**

Most dominant platforms are ultimately owned by multinational giants based outside the UK. The UK companies or individuals contribute to the value of the platforms but lack the power to negotiate fair terms. Because platform owners control the bottleneck, they can impose high rents, decide partners' profit margins and harvest valuable local data. The value generated locally is effectively channelled to the platforms' international headquarters, leaving local participants with only a small share of the reward.

- **Retaining value in the UK: what companies can do and how to support them**

To avoid the value drain, UK firms, particularly SMEs, should transition from being passive users to proactive strategic partners.

They can spread activities across multiple ecosystems where possible to maintain strategic autonomy, develop direct client channels alongside platforms, proactively protect their

innovations, and collaborate with other firms to combine expertise and share risks and resources. Alternatively, they can work to stay independent through operational excellence.

Where possible, firms can explore creating or joining alternative platform models, such as consortium-based platforms (where power is shared among multiple companies) and decentralised platforms (which operate without a single entity with complete authority), thereby distributing governance and profits more fairly than platforms controlled by a single company.

Policy makers can address value drain by implementing regulatory frameworks and creating a supportive environment.

They can use credible regulation to mandate interoperability (which requires dominant platforms to allow third-party services to work with their systems), prohibit platforms from giving their own goods or services an unfair advantage over their complementors, ensure fair and transparent trading terms in general, and prevent large platforms from buying small innovative start-ups to eliminate future competition.

Through public procurement, policy makers can ensure public fund spent on the local economy and encourage the creation of local jobs; through funding schemes, policy makers can improve local firms' access to finance and thus reduce reliance on platforms if needed; through promoting digital upskilling, policy makers can help increase the resilience of UK firms, which is critical in the long term.

Furthermore, given that there currently lacks a clear picture of the extent to which the UK economy relies on digital platforms and the extent to which the value generated in the UK outflows, policymakers can support data collection to design more targeted policies.

Beyond the immediate implications above on policy making for mitigating value drain, we propose the following policy recommendations to address wider systemic challenges:

- **Further research into business model innovations.**
  There is a need for further research into business model innovations on digital platforms, including dynamic capabilities, open innovation, and effective business model design. An enhanced understanding of these concepts appears crucial for adapting to technological changes and addressing the challenges of competition and scaling within platform ecosystems.

  Funding for research in these areas, as well as collaborative research programs between academia and industry, can foster innovation and the practical application of new business models. These programs can facilitate knowledge exchange and the development of innovative solutions in digital platforms adapted to the UK's business reality.

- **Addressing inequalities within platform ecosystems.**
  Our research underscores significant inequalities within platform ecosystems, where dominant platform leaders exploit their control over crucial assets to impose revenue

models that limit the earnings potential of complementors, such as app developers and gig workers. These contributors often lack bargaining power, incur high switching costs, and face challenges in negotiating more favourable terms, thereby complicating efforts to achieve equitable value capture.

Implementing regulations that limit the power of dominant platform leaders can help ensure fair earnings and reduce inequalities within platform ecosystems.
Providing support to complementors, such as legal assistance, negotiation training, and access to alternative platforms, can help them negotiate more favourable terms and reduce high switching costs.

- **Designing interventions to support innovation.**
  Understanding the shift in economic power towards dominant global platforms is vital for designing interventions that support innovation, promote more equitable economic outcomes, and retain value nationally.

  Offering grants to businesses and startups that focus on innovative solutions within digital platforms can support research and development, helping UK businesses create new products and services that drive economic growth.

  Providing tax incentives to companies that invest in innovation and technology development can encourage businesses to allocate resources to innovative projects and contribute to more equitable economic outcomes.

- **Governance and investment models.**
  Our research underscores the necessity for governance and investment models that safeguard public value and promote long-term innovation in the UK. This aligns with Innovate UK's strategic role as a convener and enabler within the UK's research and innovation system. Effective governance models are essential for ensuring that the benefits of digital platforms are widely distributed and that innovation is sustained over the long term.

  Establishing public-private partnerships to support long-term innovation and protect public value can leverage government resources and private sector expertise to drive innovation and ensure sustainable growth.

  Creating strategic investment funds that focus on supporting innovative projects and startups within the digital platform ecosystem can provide financial support and mentorship to help businesses thrive.

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APPENDIX 1. Platform governance mechanisms

Table A1 and TableA2 are alternative categorisations of platform governance mechanisms. Table A1 categorises platform governance mechanisms into cooperation, resourcing, control, and market, with corresponding platform features and findings for each. TableA2 presents another way to categorise platform governance mechanisms, comprising six dimensions: governance structure, resources and documentation, accessibility and control, trust and perceived risk, pricing, and external relationships.

Table A1. Platform governance mechanisms, platform features and findings

	Cooperation	Resourcing	Control	Market
Definition	Establishment of inter-firm relationships with or among complementors	Provision of resources at the boundary that third parties can use to co-create value	Enforcement of rules and exertion of power to reduce undesirable behaviour	Regulation of supply or demand through market measures
Source of value	Establishment of relational capital	Access to resources	Reduction of low-quality complements	Promotion of complement differentiation
Empirical examples	- Value co-creation - Partnership ranks - Endorsements - Developer conferences	- Software development kits - Application programming interfaces - Information	- Exclusion of complementors - Rules for participation - Policy changes	- Membership pricing - Subsidising complementor entry - Owner entry into complementary markets
Findings	- Cooperation to co-create value - Cooperation as a reward for good behaviour	- Resources necessary to enable development - Trade-off between the scalability of resources and capacity	- Trade-off between control and generativity - Effectiveness of soft control mechanisms	- Complementor-side crowding is negative for platform outcomes - Competition can be value-enhancing

Source: extracted by authors from Table 2 in Halckenhaeusser et al., 2020.

Table A2. Platform governance mechanisms are divided into six categories

Dimensions	Mechanisms	Description
Governance structure	Governance structure Decision rights Ownership status	Is the set-up centralised or diffused? How are authority and responsibility divided between the platform owner and module developers? Is the platform proprietary to a single firm or do multiple owners share it?
Resources & documentation	Platform transparency Platform boundary resources	Does the documentation ensure an easy understanding and usability of the platform? Are governance decisions concerning the platform's marketplace easy to follow and understandable? Are Application Programming Interfaces (APIs) used to cultivate platform ecosystems through third-party development?
Accessibility & control	Output control & monitoring	How are outputs evaluated, penalised, or rewarded?
	Input control securing	What mechanisms are in place to control which products or services are allowed? How to assess the quality of services or products?
	Platform accessibility Process control Platform openness	Who has access to the platform, and are there any restrictions on participation? Who controls the process and sets up regulations? Is the platform open or closed?
Trust & perceived risk	Strengthen trust Reduce perceived risk	Does the platform enhance trust? How can the perceived risk of platform participants be minimised?
Pricing	Pricing subsidy Revenue	Who is setting the price? Who decides on participation, who is paying and who values?
External Relationship	External relationship management	How are inter-firm dependencies managed? What is the architecture of participation? Does the platform allow technical interoperability between other systems?

Source: Schreieck et al., 2018.

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