Open innovation governance for the Big Tech (BT) platform-ecosystems: a multi-level stakeholder framework

Ibrahim Shaikh and Marcel Bogers

Abstract

Purpose – *Silicon Valley Big Tech (BT), representing Alphabet, Apple, Meta and Amazon, wields substantial influence over their platform users, leading to calls for more stringent digital regulation. The purpose of this study is to conceptualize "open innovation governance" for the BT platform ecosystems. This involves the balanced use of both incentives and controls to address stakeholder power imbalances at the corporate (BT senior manager), platform (complementor) and ecosystem (end-users) levels to share ecosystem value.*

Design/methodology/approach – *A conceptual review methodology systematically examines various academic articles, books and 10 K annual reports on BT firms. This study dissects the business models of each BT firm while drawing on empirical examples from the high-tech sectors to advance general propositions. This research presents a prescriptive open innovation (OI) governance framework based on the literature synthesis.*

Findings – *This research advances a "managerial toolkit" leveraging Objectives and Key Results and Key Performance Indicators tied to specific incentives and controls to enable BT senior managers to generate OIs, complementors to absorb and end-users to disseminate open digital platform-ecosystem value.*

Originality/value – *This study has implications for both theory and practice. Theoretically, to the best of the authors' knowledge, this study is the first to conceptualize a prescriptive OI governance framework that BT managers can use to generate shared values. Practically, the conceptual framework has implications for digital policymakers governing BT, representing a middle ground between advocates for breaking up BT platforms and proponents of limited digital regulation.*

Keywords *Open innovation,"Big Tech", Digital governance, Regulation, Platform ecosystems*

Paper type *Conceptual paper*

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1. Introduction

Open innovation (OI) is defined as "a distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model" (Chesbrough and Bogers, 2014). Google, Apple, Facebook (Meta) and Amazon – collectively known as Big Tech (BT) or GAFA – exemplify firms that use open, two-sided platform business models to create and capture value within digital ecosystems (Chen *et al.*, 2022; Mukhopadhyay and Bouwman, 2019) [1].

BT senior managers often extend their platforms into adjacent markets to leverage resource synergies and envelop users around a unified value proposition (Foerderer *et al.*, 2018). However, these same managers may also exploit their bottleneck position to eliminate rivals through hostile M&As, self-preferencing or tolerating harmful user content like fake reviews and hate speech (Cusumano *et al.*, 2019, Parker *et al.*, 2021). Once stakeholders are locked in, BT leaders gain considerable bargaining power, which they may use to expropriate co-created

value (Granstrand and Holgersson, 2020). Paradoxically, while BT platforms thrive on openness, they often reinforce stakeholder asymmetries that OI research has yet to fully address (Cusumano *et al.*, 2019). Today, mounting regulatory scrutiny is forcing BT managers to embrace some form of self-regulation (Cusumano *et al.*, 2021; Khan, 2016).

Despite extensive work on OI and digital regulation, there remains a gap in conceptualizing how to govern OI within BT ecosystems (Koskinen *et al.*, 2023). Studies have acknowledged tensions – between knowledge sharing and protection (Bogers, 2011) or value creation and capture (Laursen and Salter, 2014) – but often ignore the multi-level governance needed to address stakeholder power imbalances. This paper fills that gap by proposing a framework for OI governance tailored to BT platforms – one that balances incentives and controls across stakeholder levels to mitigate asymmetries and foster shared value. *How can OI governance reduce power imbalances and enable fair value sharing in BT platform ecosystems?*

This study addresses this OI paradox by extending Chesbrough's (2020) *generation–absorption–dissemination* model to the context of open BT platforms. OI governance is defined as the strategic alignment of primary (BT senior managers), secondary (complementors) and tertiary (end-users) stakeholders through a balanced use of incentives and controls (Shaikh and Randhawa, 2022). BT platforms can only *generate* long-term value when complementors can *absorb* returns on their platform-specific investments and when end-users are motivated to *disseminate* value in ways that benefit the broader digital platform ecosystem.

Using a conceptual review approach, this study synthesizes literature and analyzes GAFA's business models to develop practical propositions. The authors conceptualize a prescriptive governance framework that outlines how BT platforms can evolve from closed, shareholder-centric business models to stakeholder-centric OI governance (Cheng and Wang, 2022; Jacobides and Lianos, 2021). The framework integrates digital governance tools like Objectives and Key Results (OKRs) and Key Performance Indicators (KPIs) linked to specific pecuniary and non-pecuniary incentives, as well as outcome and relational controls, to create shared values (Adner, 2022). To the best of the authors' knowledge, this is the first study to prescribe how BT managers can ethically govern OI digital platform ecosystems. The research contributes a novel "managerial toolkit" that bridges theoretical insight with actionable guidance for scholars, practitioners and policymakers.

This paper is structured as follows: Section 2 briefly reviews the literature on BT platforms. Section 3 highlights the conceptual review methodology. Section 4 synthesizes the literature to provide results, leading to an actionable "managerial toolkit" to recalibrate and create shared values. Section 5 discusses the importance of the results for theory and practice. Section 6 mentions future research, implications and conclusions.

2. Background: the "dark side" of open Big Tech platforms

Open BT platforms invert traditional "pipeline" innovation models by relying on modular, open architectures that facilitate third-party innovation (Chesbrough, 2020; Parker *et al.*, 2016). They generate value through cross-sided network effects between *end-users* (e.g. sellers and buyers) and third-party *complementors* (e.g. app developers), who build on core digital platforms like iOS and Android (McIntyre *et al.*, 2021) [2]. Initially celebrated for enabling openness, these platforms are now frequently criticized for leveraging ecosystem dominance to extract disproportionate value (Ezrachi and Stucke, 2022; Foroohar, 2021). Amazon has been accused of self-preferencing its products to marginalize third-party sellers (Zhu and Liu, 2018). Meta and Google monetize user data while tolerating content that fuels misinformation and social division (Furman, 2019). Apple and Google impose restrictive licensing terms on complementors to retain control over their app ecosystems (Parker *et al.*, 2021). OI governance literature acknowledges that big data and AI have shifted value creation toward users and complementors – while value capture increasingly rests with platform owners

(Altman *et al.*, 2022; Shaikh and Randhawa, 2022). This imbalance raises serious questions about the ethical and regulatory future of BT ecosystems. In effect, this study focuses on three specific stakeholder asymmetry risks:

1. *Corporate level*: BT senior managers prioritize shareholder value over long-term ecosystem sustainability (Lazonick, 2014).
2. *Platform level*: BT's incursion into complementary markets undermines complementors' ability to earn fair returns (Zhu, 2019).
3. *Ecosystem level*: End-users, while vital to platform scale, often lack representation in governance decisions and are structurally vulnerable in digital ecosystems (Kretschmer *et al.*, 2022).

In short, although multiple stakeholders invest in the OI processes of *generation*, *absorption* and *dissemination*, misaligned governance exacerbates power asymmetries. OI governance is, therefore, essential to recalibrate stakeholder relationships and restore trust and value-sharing in BT ecosystems. Despite growing attention to OI, existing research has not adequately addressed how governance mechanisms can be operationalized to manage stakeholder asymmetries in BT ecosystems. Studies have traditionally focused on knowledge flows or value capture (Bogers, 2011; Laursen and Salter, 2014) but have not extended governance frameworks to include strategic metrics (OKR/KPIs) that link stakeholder incentives with regulatory accountability. Moreover, few frameworks account for the multi-level dynamics of senior managers, complementors and end-users simultaneously, creating a gap in OI theory and practice that this paper addresses.

3. Methodology

This study uses a conceptual review methodology to synthesize insights from OI, digital governance and platform ecosystem studies (Cheng and Wang, 2022; Jacobides and Lianos, 2021). Given this paper's normative and prescriptive aims, a bibliometric or empirical approach was not feasible. Legal and organizational opacity constrains executive-level process data from BT firms, limiting traditional case study or survey-based methods (Yin, 2018).

3.1 Conceptual review approach and literature selection

The methodology draws from three sources:

1. *Scholarly literature*: peer-reviewed journals in innovation, strategy and governance (e.g. *Research Policy*, *Technovation*, *Digital Policy and Regulation and Governance*);
2. *Policy reports*: regulatory documents from agencies such as the FTC, European Commission and US Congress; and
3. *BT firm disclosures*: analysis of 10-K filings from Alphabet, Apple, Meta and Amazon to understand governance practices and business models.

Following best practices in conceptual research (Altman *et al.*, 2022; Bogers, 2011), we adopted a purposive sampling strategy to identify theoretical, empirical and normative contributions relevant to the BT context. An iterative purposive sampling process was used to select over 100 sources with relevance to stakeholder governance, platform asymmetries and OI mechanisms. These insights were coded and mapped onto Chesbrough's (2020) generation–absorption–dissemination framework, forming the basis for six propositions and a prescriptive managerial toolkit. This approach builds on prior conceptual work in OI governance (Shaikh and Randhawa, 2022) and adapts it to the BT platform context. The emphasis is on developing a practical governance framework linking OKRs/KPIs to stakeholder-level OI incentives and controls across corporate, platform and ecosystem levels.

4. Results

4.1 Open Big Tech innovation governance

4.1.1 Stakeholder boundaries. OI governance begins with safeguarding the firm-specific investments of BT senior managers (primary agents). The stakeholder theory holds that those who invest most in firm-specific assets should retain residual control over strategic decisions (Hoskisson *et al.*, 2018; Klein *et al.*, 2019). While BT ecosystems benefit from distributed innovation through external contributors (Yoo *et al.*, 2012), the strategic vision and technical expertise of BT senior managers remain central to ecosystem renewal (Altman and Tushman, 2017). Thus, granting executives strategic control over platform evolution enables a shift toward stakeholder-centered governance.

Second, governance must protect platform-specific investments made by co-specialized complementors (secondary agents). Complementors generate most of the ecosystem's value (Jacobides *et al.*, 2018, 2021) but often face appropriation risks. If unable to earn equitable returns, then complementors may disengage or challenge the platform leader (Adner, 2021; Gawer and Cusumano, 2014). For example, Apple has pressured high-traffic complementors like Fortnite and X/Twitter into unfavorable IP licensing agreements (Scott Morton, 2019), while Alphabet's expansion into adjacent app markets has reduced complementors' incentives and raised end-user costs (Parker *et al.*, 2021). Amazon has leveraged seller data to self-preference its offerings over those of independent merchants (Zhu and Liu, 2018). In response, complementors are increasingly disintermediating and multihoming to retain independence (Cutolo and Kenney, 2021; Gu and Zhu, 2021). OI governance must, therefore, enable equitable value absorption, even for complementors with limited bargaining power.

Third, governance should extend to generic end-users (tertiary agents), who disseminate platform value but often lack protection. End-users are vulnerable because of weak data privacy laws and exploitative design practices. For instance, Amazon's fake reviews and rogue sellers damage brand equity and erode trust (Jap *et al.*, 2022), while Facebook and YouTube have faced backlash over privacy breaches and misinformation (Furman, 2019; Reich *et al.*, 2021). Although end-users contribute less direct investment, they generate critical network effects and are indispensable to value co-creation (McIntyre *et al.*, 2021). In short, empowering BT senior managers to generate innovation requires that complementors can absorb fair returns and that end-users are incentivized to disseminate value responsibly. Therefore:

P1. Open innovation governance must empower Big Tech senior managers to lead the ecosystem, protect the cospecialized complementor's investments and respect the claims of the generic end-users.

4.1.2 Open innovation governance mechanisms. Effective OI governance requires aligning stakeholder motivations through incentives and control mechanisms (Shaikh and Randhawa, 2022).

Pecuniary incentives include financial rewards like royalty-sharing, licensing deals or cash prizes, encouraging participation and platform adoption (Boudreau *et al.*, 2022). For instance, Google Play Awards or Meta's Instagram Reels promotions financially reward top complementors and increase content visibility (Rietveld *et al.*, 2019; Foerderer *et al.*, 2021). In contrast, non-pecuniary incentives appeal to intrinsic motivations – such as autonomy, learning or social recognition (Manso, 2017). These are often embedded in a platform's boundary resources, the Application Programming Interface (APIs) and Software Development Kit (SDKs), which mediate developer interaction and innovation (Ghazawneh and Henfridsson, 2013). Boundary resources can be selectively open or closed, subtly shaping complementor and user behavior (Eaton *et al.*, 2015). Governance mechanisms also include two types of controls. Outcome-based controls monitor stakeholder performance

using ratings, audits or penalties (Belavina *et al.*, 2020; Fan *et al.*, 2016). Platforms use these to reduce opportunistic behavior and ensure compliance. Conversely, relational controls build trust through ongoing engagement and mutual adjustment over time. While more costly, they foster collaboration and ecosystem longevity (Khanagha *et al.*, 2022; Zobel and Hagedoorn, 2020). Examples include Intel and Cisco, which support ecosystem partners through long-term relational governance – hosting developer conferences and co-developing solutions even when short-term profits are limited (Gawer and Cusumano, 2015).

Importantly, OI governance mechanisms must extend beyond employees to include diverse external actors – startups, non-governmental organizations and policymakers – who invest in the ecosystem. These partners require tailored incentives and oversight mechanisms to ensure platform health and trust (Boudreau, 2017; Gawer, 2021). Over-reliance on financial rewards linked to shareholder returns often fails to sustain OI, as it incentivizes short-termism (Shaikh and Randhawa, 2022; Wilden *et al.*, 2022). Instead, BT senior managers must combine pecuniary and non-pecuniary incentives with outcome and relational controls to promote inclusive value sharing. In sum:

P2. Open innovation governance requires a balanced mix of incentives and controls. Big Tech senior managers should leverage pecuniary and non-pecuniary rewards, alongside outcome and relational controls, to align stakeholder interests and foster value-sharing.

4.2 Big Tech platforms (closed) governance

Understanding current BT governance models is essential to envisioning a shift toward OI. BT platforms follow either ad-driven or product/service-driven business models, each exhibiting shareholder-centric governance that limits stakeholder value sharing. Table 1 in the online appendix outlines the shareholder-centric governance adopted by each BT platform.

Alphabet and Meta rely heavily on freemium models. Alphabet's ecosystem – Google Search, YouTube, Chrome and Android – collects user data for monetization through targeted advertising (Schmidt and Rosenberg, 2014). Meta's platforms (Facebook, Instagram and WhatsApp) similarly monetize engagement through advertiser demand. In both cases, end-users become the product, and content quality is deprioritized in pursuit of scale (Knee, 2021). Both BT firms face increasing regulatory pressure, particularly under the General Data Protection Regulation and the California Consumer Privacy Act, which constrain their data monetization models (Kira *et al.*, 2021). Despite these pressures, both firms have made moves to diversify – Alphabet through hardware (Pixel and Nest) and Meta through ventures like Oculus and the Metaverse (Ball, 2022) – but advertising remains dominant [3].

Apple and Amazon, by contrast, generate revenue primarily through products and services. Apple earns from premium hardware (iPhones, Macs), app store commissions and licensing deals – most notably, its $15bn arrangement to make Google the default search engine on Safari (Ezrachi and Stucke, 2022). While Apple promotes data privacy as a brand value, it still enforces tight control over its ecosystem through restrictive APIs and App Store terms (Sokol and Zhu, 2021). Amazon profits mainly through seller fees on its Amazon Marketplace (AMP), logistics and Amazon Web Services (AWS), with its strategy centered on platform integration and Prime-driven loyalty (Stone, 2022). However, the company has been widely criticized for self-preferencing its products and for weak enforcement against counterfeit goods, fake reviews and third-party exploitation (He *et al.*, 2022; Jap *et al.*, 2022) [4].

Across all four firms, shareholder primacy drives decision-making. Complementors contribute significantly to ecosystem value but receive little strategic protection (Furman, 2019). To illustrate: Alphabet has promoted its apps over third-party developers; Apple enforces app payment restrictions; Meta and Google tolerate harmful content to maximize ad impressions; and Amazon extracts rents from small sellers through high fees and exclusionary logistics (Ezrachi and Stucke, 2022). This model leads to a misalignment between stakeholder value

creation and appropriation. Complementors generate innovation and market growth, while BT senior managers and shareholders capture most of the value [5]. In turn, end-users are manipulated through behavioral design and lack agency in ecosystem governance. Ultimately, these firms operate under a "winner-takes-most" logic where growth and platform control precede equitable value sharing. In effect, innovation incentives for non-shareholder stakeholders (complementors/end users) are undermined, creating long-term risks for ecosystem health. To sum up:

P3. Shareholder-driven pressures to achieve "winner-takes-most" outcomes result in co-specialized complementors generating most ecosystem value, while Big Tech senior managers disproportionately absorb returns for themselves and short-term shareholders.

4.3 Future Big Tech platform governance

Senior managers at BT must take proactive steps to align platform governance with long-term strategic goals. Using OKRs and KPIs will help drive OI, enhance transparency and balance the interests of different stakeholders. OKRs/KPIs are quantifiable goal-setting tools set by senior managers for tracking long-term innovation progress and governance compliance. OKRs are long-term aspirational goals BT firms use to set strategic objectives and ecosystem alignment every quarter (Doerr, 2018). KPIs are tied to OKRs but are more process-oriented and help continuously track operational performance (Kiron and Schrage, 2019; Ries, 2017). Table 2A illustrates how each BT platform (Meta, Alphabet, Apple and Amazon) can implement novel strategic OKRs/KPIs to measure digital governance effectiveness. However, because OKRs/KPIs are primarily long-term goal-setting tools, they must be tied with motivational incentives and internal controls to realign multi-level stakeholder imbalances. Table 2B connects the proposed model digital metrics (OKR/KPIs) with actual OI governance mechanisms discussed earlier in Section 4.1.3. Both tables are based on a meticulous synthesis of the literature below and are provided in the online supplementary appendix for ease of reference.

4.3.1 Big Tech senior managers. The most effective strategies for motivating technological innovation rely on non-pecuniary rewards – such as tolerance for failure – and relational controls built on trust. These mechanisms often outperform shareholder-centric models emphasizing monetary rewards and outcome-based controls (Manso, 2017; Shaikh and O'Connor, 2020). In the early stages of platform growth, shareholders and directors typically support senior managers by tolerating failure and prioritizing long-term vision to achieve rapid network effects (Gawer, 2021; Khan, 2016). Even after IPO, some BT firms retain startup-like governance structures that grant founders and top management teams (TMTs) enduring strategic control (Ries, 2017). For instance, Meta and Alphabet use dual-class voting structures to grant senior executives outsized voting power (Govindarajan and Srivastava, 2018) [6]. Although Apple and Amazon do not use dual-class shares, their boards are structured to reinforce CEO authority. Apple's CEO, Tim Cook, remains unchallenged on the board by other TMT members (Mickle, 2022), while Amazon's founder Jeff Bezos, despite stepping down as CEO, still chairs the board and holds the most significant non-institutional equity stake (Stone, 2022) [7].

Despite these safeguards, post-IPO financial incentives – such as stock options tied to quarterly earnings per share – can pressure managers to prioritize short-term shareholder value (Flammer and Bansal, 2017). Institutional investors and activist shareholders often reinforce these pressures, even as managers retain substantial power (Lazonick and Shin, 2019). The result is a governance model that disproportionately benefits platform owners – BT managers and short-term shareholders – at the expense of the broader OI ecosystem (Shaikh and Randhawa, 2022) [8].

To address these challenges, BT firms increasingly use Big Data and AI to develop internal, platform-specific metrics – such as OKRs and KPIs – to monitor ecosystem performance and inform strategic decisions (Agrawal *et al.*, 2018; Iansiti and Lakhani, 2020). However, traditional financial accounting has not evolved to capture the intangible and knowledge-based value creation that defines BT business models (Haskel and Westlake, 2022). As a result, key internal metrics – such as daily or monthly active users – are not consistently disclosed, allowing firms to obscure how value is captured. For example, Apple concealed the market dominance of its App Store from partners like Epic Games; Amazon delayed disclosing AWS revenue; and Alphabet was slow to report YouTube's financials to the SEC (Mazzucato *et al.*, 2021, 2023).

Some BT firms have initiated self-regulatory mechanisms to preempt external oversight. Meta's creation of an "Oversight Board" aims to address stakeholder concerns over platform misuse (Klonick, 2020), while many firms now have internal AI ethics committees (Agrawal *et al.*, 2018; Tiell, 2019). However, these efforts often lack independence and are vulnerable to regulatory capture, as illustrated by the disbanding of Alphabet's Advanced Technology External Advisory Council because of conflicts of interest (Reich *et al.*, 2021). Stakeholders frequently view such mechanisms as superficial, especially when they fail to translate into meaningful value-sharing across the ecosystem (Ezrachi and Stucke, 2022).

This paper proposes recalibrating financial incentives and control systems for BT senior managers. Specifically, TMT compensation should include long-term equity with strict vesting restrictions to discourage short termism (Lazonick, 2014). These equity packages should be explicitly tied to digital governance metrics (OKRs/KPIs) co-developed with complementors and end-users, ensuring that compensation reflects value creation across the ecosystem. To mitigate regulatory capture and promote transparency, these metrics should be publicly disclosed in 10-K filings and used to standardize reporting across firms. While not directly proposed by Khan (2016), this builds on her broader call for updating antitrust frameworks and regulatory oversight (Klobuchar, 2022). Moreover, voting rights on dual-class shares could be subject to a sunset provision based on platform performance against these new governance metrics (Govindarajan and Srivastava, 2018).

In short, OKRs/KPIs should serve as internal management tools and governance instruments that align stakeholder interests, promote transparency and guide long-term value creation. When paired with a balanced mix of OI incentives and controls – see Table 2B in the Supplementary Appendix – these mechanisms offer a pathway toward equitable and sustainable platform governance. Thus:

P4. Enfranchising Big Tech senior managers to lead Big Tech platforms requires non-pecuniary incentives (e.g. tolerance for failure) and relational controls (e.g. trust), combined with long-term pecuniary rewards (e.g. restricted TMT equity) tied to publicly disclosed digital metrics (OKRs/KPIs), to effectively share ecosystem value.

4.3.2 Complementors. To sustain OI, BT senior managers must safeguard complementors' platform-specific investments (Cusumano *et al.*, 2021). Complementors often cite unfavorable IP licensing, exclusionary acquisitions and restricted data access as barriers (Ezrachi and Stucke, 2022). To address this, Alphabet and Meta can combine pecuniary and non-pecuniary incentives to strengthen ecosystem performance (Shaikh and Randhawa, 2022).

High-traffic complementors – those driving user engagement on Instagram, YouTube and Google Play – should receive improved IP licensing terms (Boudreau *et al.*, 2022) [9]. The authors propose lowering platform commission fees to 15% for complementors earning over $1m, with a phased plan to eliminate fees on in-app purchases. For small developers, who often rely on informal appropriability mechanisms like secrecy and lead time, stronger IP protections through patents and copyrights are essential (Miric *et al.*, 2019). Where IP transfer is impractical, waiving fees for small developers is recommended. These pecuniary incentives should be tied to complementor-level OKRs and KPIs. For instance, Alphabet's

KPI of deriving 60% of Play Store revenue from independent developers and Meta's goal to achieve 70% of creator income from non-advertising sources (Table 2A) require fee reductions, licensing reforms and improved monetization tools. Linking financial rewards to these targets ensures strategic alignment between platform and complementor interests (Doerr, 2018; Mazzucato *et al.*, 2023).

Non-pecuniary incentives such as expanded access to boundary resources (APIs and SDKs) also play a key role (Ghazawneh and Henfridsson, 2013). Platforms have used these interfaces to block rivals – Meta limited data access to Snapchat and Vine; Alphabet required Android OEMs to pre-install Google apps (Gawer, 2021; Parker *et al.*, 2021). These tactics suppress multihoming and restrict value capture for complementors (Jacobides *et al.*, 2018). Alphabet and Meta must promote data portability and open interface design to meet broad governance goals promoting fairness and reduced platform bias (Rietveld and Schilling, 2021; Scott Morton, 2019).

Promotional awards further enhance ecosystem participation. Alphabet's Google Play Awards and Meta's "We the Culture" programs incentivize underrepresented creators and foster multihoming (Foerderer *et al.*, 2021; Rietveld *et al.*, 2019). Complementors that tackle platform challenges – for example, misinformation, political bias or hate speech – should be publicly recognized and financially rewarded (Reich *et al.*, 2021). Social innovation contests at universities or hackathons can crowdsource solutions, with top entries featured on Google Search or Meta's social platforms (Fang *et al.*, 2021).

While OKRs and KPIs set long-term strategic goals, they must be implemented alongside OI governance mechanisms – outcome and relational controls (Zobel and Hagedoorn, 2020). Outcome controls monitor performance using metrics like misinformation takedown rates or fairness audits. For example, Alphabet and Meta can introduce new KPIs tracking the removal speed of fake news, reported publicly via their 10 K filings (Doerr, 2018; Mazzucato *et al.*, 2023). Though harder to quantify, relational controls involve long-term collaboration to build trust and reduce regulatory risk. Intel and Cisco's enduring partnerships exemplify how such governance builds reputational capital while avoiding abuse of dominance (Gawer and Cusumano, 2014).

The authors posit that BT firms should co-develop OKRs/KPIs with complementors to enhance legitimacy. This ensures their relevance and fosters buy-in. For example, Alphabet's AI teams could build regulated interfaces supporting third-party data access on YouTube and interoperability with rival search engines like DuckDuckGo, Bing, etc. (Klobuchar, 2022). Meta could leverage its Oversight Board and internal AI researchers to support partner multihoming in emerging spaces like the Metaverse (Ball, 2022; Klonick, 2020).

Apple and Amazon should pursue similar reforms. Apple's secure APIs promote privacy but often sideline smaller developers, reducing knowledge sharing (Knee, 2021; Zhang *et al.*, 2022). Amazon controls the AMP ecosystem through high seller fees and mandatory logistics services (Khan, 2016; Stone, 2022). Both platforms should offer improved IP terms and greater visibility for smaller complementors – for example, sideloading on iOS or Buy Box access on AMP (Cusumano *et al.*, 2019; Ezrachi and Stucke, 2022; Teece, 2018) [10].

Monitoring and support mechanisms should reflect complementor diversity. Apple's App Store audits and Amazon's seller KPIs must accommodate the technical and logistical constraints faced by small or rural developers (Kang, 2022; Koo and Eesley, 2021). Platforms should provide offline relational governance – such as community certification programs and physical infrastructure support – to strengthen inclusion (Rietveld *et al.*, 2019). Accordingly, combining AI-powered outcome controls with trust-based relational mechanisms will enable platforms to support complementors at scale. These strategic metrics, incentives and governance tools provide BT managers a practical model for enabling complementors to appropriate a fair share of ecosystem value. To sum up:

P5. Big Tech senior managers can enable complementors to appropriate ecosystem value by offering pecuniary incentives (e.g. improved IP royalties) and non-pecuniary incentives (e.g. promotions and data portability). Additionally, combining outcome controls (OKRs/KPIs) with relational controls (trust and offline support) can help protect smaller complementors.

4.3.3 End-users. Although end-users hold the weakest structural position in the BT ecosystem, they can still undermine platform value when governance fails (Kretschmer *et al.*, 2022). The lax regulatory environment of the 1990s, particularly Section 230 of the US Communications Decency Act, granted internet firms broad immunity for user-generated content (Cusumano *et al.*, 2021; Mazzucato *et al.*, 2021). Platforms such as YouTube, Instagram and Facebook have been criticized for exploiting behavioral biases to increase engagement while inadequately moderating harmful content, especially when it conflicts with advertising revenue (Reich *et al.*, 2021). As a result, misinformation – which is more emotionally provocative – spreads more rapidly than factual information (Vosoughi *et al.*, 2018) [11].

Meta and Alphabet bear unique responsibility in preserving the health of the OI ecosystem because of their dominance in search, news and social networking (Kende, 2021). Their freemium business models limit the effectiveness of pecuniary appropriability mechanisms, such as formal IP rights, to incentivize responsible user behavior (Teece, 2018; Zobel *et al.*, 2016). Instead, both firms rely on non-pecuniary boundary resources – open APIs, algorithmic visibility and engagement-based rewards – to shape user behavior. OKRs and KPIs, such as watch time or click-through rates, are often used to monitor engagement (Doerr, 2018; Ries, 2017). However, when such metrics prioritize volume over content quality, they can inadvertently promote harmful content (Foroohar, 2021).

In recent years, both companies have improved platform governance by investing in AI and human moderators, although critics highlight that such efforts often remain opaque and corporately driven (Gillespie, 2018). YouTube now emphasizes "quality watch time" and uses "Google Preferred" to promote ad-friendly creators (Cusumano *et al.*, 2021; Kiron and Schrage, 2019). Meta has updated its content moderation guidelines and prioritizes "trustworthy" news sources verified by independent fact-checkers (Barwise and Watkins, 2018) [12]. These steps reflect outcome control mechanisms intended to monitor and improve the quality of user contributions.

However, significant gaps remain in protecting end-user rights – especially regarding data privacy. Scholars highlight a paradox where users care about privacy, but subtle platform incentives often lead them to trade it away (Ying *et al.*, 2023). For instance, minor friction costs (like complex cancellation steps) and misleading privacy notices can nudge users into consenting to invasive data practices (Athey *et al.*, 2017). Apple's opt-in policy for third-party data tracking, accompanied by ominous warnings, does not apply to its apps – raising fairness concerns (Sokol and Zhu, 2021). Similarly, Meta has been criticized for making account deletion difficult (Frenkel and Kang, 2021). To support OI, this paper recommends that Apple standardize "notice and consent" practices across all apps and that Meta modify its API to facilitate easy account removal.

Regulations such as the General Data Protection Regulation have sometimes unintentionally favored large BT firms over small advertisers and social influencers (Jenny, 2021; Kira *et al.*, 2021). While dominant platforms can absorb the rising costs of customer acquisition under stricter privacy rules, smaller players often cannot. For example, Facebook has become a hub for low-quality products purchasing fake reviews – likely because of smaller sellers' inability to track users via cookies (He *et al.*, 2022). Although Amazon has taken steps like collecting sales taxes to enhance compliance (Cusumano *et al.*, 2019, 2021), further exemptions for small businesses could improve ecosystem equity.

End-users also face increasing limitations in accessing fair advertising opportunities and tools. Meta and Alphabet should consider subsidizing advertising for smaller user-creators or influencers to promote inclusivity and reduce dependency on platform-controlled monetization. Further, they should uphold end-user rights, such as the right to be forgotten and to remove one's data from the platform (Reich *et al.*, 2021).

To support long-term platform health, BT firms should incentivize users to make platform-specific investments – for example, creating high-quality content, sharing verified information or actively participating in content moderation [13]. Pecuniary incentives (e.g. low fees and cash rewards for flagging harmful content) can complement non-pecuniary ones (e.g. visibility through API prioritization or verified badges). These should be linked to user-level OKRs and KPIs that reward trustworthiness and social value creation – not just engagement. For instance, BT firms could establish KPIs tracking misinformation reduction and user retention post-privacy reform.

Critically, these metrics must be embedded in a broader governance structure. While OKRs and KPIs offer strategic direction, they must be accompanied by outcome controls (e.g. algorithmic audits and real-time moderation stats) and relational controls (e.g. respecting data privacy and simplifying consent) (Zobel and Hagedoorn, 2020; Mazzucato *et al.*, 2023). Public disclosure of such metrics in 10-K filings or transparency reports would improve accountability. In turn, empowering end-users as co-creators and protectors of the ecosystem will reduce regulatory risk and promote sustainable OI. Ecosystem value cannot be equitably shared without the end-users' active and ethical participation. Thus:

P6. Big Tech senior managers can use pecuniary (cash rewards and low fees) and non-pecuniary rewards (e.g. APIs and verified visibility) to incentivize end-users to make long-term platform-specific investments. In addition, combining outcome controls (OKRs/KPIs) with relational controls (e.g. data privacy and right to be forgotten) can help monitor and enhance end-user contributions to ecosystem performance.

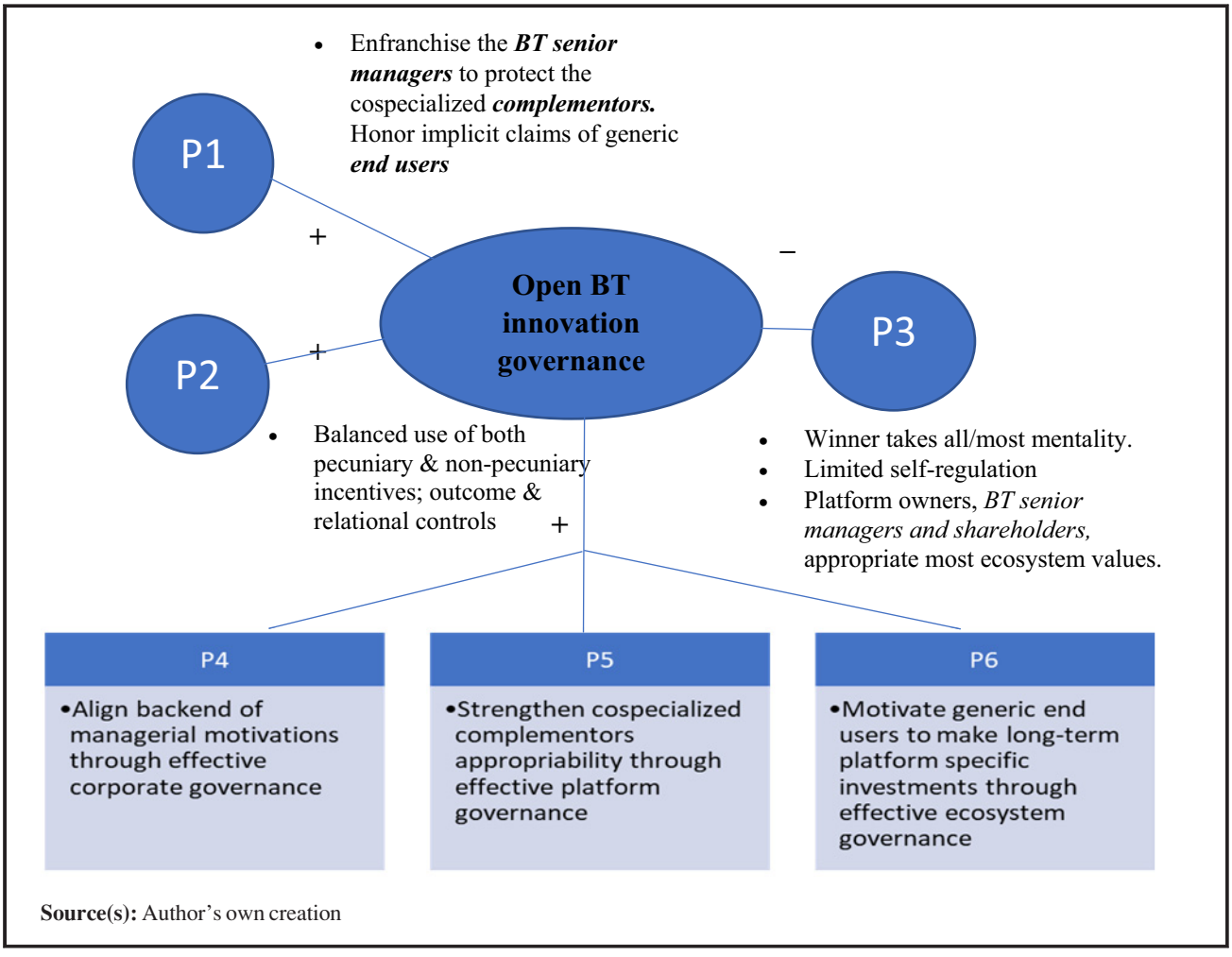
5. Discussion

This study contributes to OI theory and offers critical insights for BT senior managers tasked with leading platform ecosystems. Figure 1 synthesizes and advances prior research on OI governance (Chesbrough, 2020; Shaikh and Randhawa, 2022) by integrating six propositions into a prescriptive framework. To the best of the authors' knowledge, it is the first study to conceptualize a normative governance model that BT managers can apply to foster shared value creation. The framework extends OI and platform ecosystem literature by addressing BT firms' distinct governance challenges in managing stakeholder power asymmetries. For instance, it builds on Chesbrough and Bogers (2014) by embedding multi-level stakeholder governance into the OI paradigm.

Stakeholder symmetry in governance: This article refines prior research on stakeholder boundaries and OI governance (Zobel and Hagedoorn, 2020). As Figure 1 illustrates, effective OI governance in BT ecosystems hinges on balancing inherent asymmetries among senior managers, complementors and end-users. Propositions P1 and P2 emphasize combining pecuniary and non-pecuniary incentives with outcome and relational controls. This dual approach forms the foundation for sustainable platform growth and equitable value distribution. BT senior managers must maintain a dynamic balance to prevent dominance by any stakeholder group.

Addressing the "Paradox of openness": This study extends earlier work identifying the difficulty in balancing openness with ecosystem stability (Brunswicker and Schecter, 2019). Proposition 3 spotlights the "paradox of openness" – the tension between platform growth and long-term ecosystem health (Bogers, 2011; Laursen and Salter, 2014). The pursuit of immediate profitability and shareholder returns often leads BT senior managers to deprioritize the broader dissemination and absorption of value, as shown in Table 1. To

Figure 1 Conceptual model and propositions



Source(s): Author's own creation

navigate this paradox, BT managers must look beyond short-term metrics and prioritize long-term stakeholder engagement and shared value creation.

Harnessing the potential of OI governance: The propositions from P4 to P6 provide a roadmap for aligning governance mechanisms across corporate, platform and ecosystem levels. P4 underscores the potential of retaining certain pre-IPO governance features – such as long-term equity or dual-class share structures – to protect platform strategies from short-term financial pressure. When linked to strategic digital metrics like OKRs and KPIs, these structures can reinforce accountability and stakeholder alignment. OKRs and KPIs, as strategic goal-setting tools, play a distinct role in aligning incentives across stakeholder groups. While governance mechanisms like pecuniary incentives and relational controls operate at the behavioral level, OKRs/KPIs guide direction-setting and performance measurement. This integrated approach supports BT leaders in translating broad governance principles into quantifiable outcomes.

The future of open BT platforms: BT platforms may face increasing regulatory scrutiny or structural break-up without reform. However, Propositions P5 and P6 present feasible alternatives emphasizing interoperability, data portability and redesigned stakeholder incentives. These reforms go beyond surface-level adjustments. They enable a shift toward long-term value creation across stakeholders, aligning platform strategy with societal

expectations. Figure 1 and Tables 2, serve as a diagnostic framework and a practical toolkit. They illustrate how BT managers can implement a governance model that supports platform sustainability and distributes value more equitably across the ecosystem. While the challenges are considerable, they are not insurmountable – mainly when addressed through thoughtful, stakeholder-aligned OI governance design.

A central question remains: Why would BT senior managers voluntarily shift from a shareholder-centric model to a stakeholder-driven governance framework? While current structures are highly profitable, external regulatory pressure is rapidly growing (Furman, 2019; Klobuchar, 2022). Antitrust actions, data transparency mandates and calls to reduce market concentration (Scott Morton, 2019) are becoming more common. These shifting dynamics increase the cost of inaction. A stakeholder-aligned governance framework offers a proactive pathway to mitigate risk, maintain control over platform direction and rebuild trust with complementors, end-users and policymakers.

This study does not advocate for extreme responses – such as complete platform disintegration or *laissez-faire* non-intervention – but presents a balanced, pragmatic alternative. Propositions P4 to P6 suggest actionable solutions: long-term equity tied to ecosystem outcomes, reduced self-preferencing, enhanced data portability and standardized transparency protocols. These interventions are grounded in established theory, operationally feasible and increasingly aligned with regulatory trends. They offer BT senior managers a credible, self-directed alternative to externally imposed reform – and a blueprint for long-term platform sustainability.

The propositions and metrics outlined in this study present a governance model for transitioning BT platforms toward inclusive, stakeholder-oriented innovation. By linking strategic objectives (OKRs/KPIs) with well-calibrated governance mechanisms, BT firms can reframe their value logic from short-term shareholder returns to long-term ecosystem prosperity. This approach enables BT senior managers to engage in meaningful self-regulation, preempt regulatory disruption and promote digital ecosystems that benefit investors and society.

6. Future research, implications and conclusions

While this study focuses on US-based BT platforms (GAFA), future research could extend the framework to the Chinese context. As the USA and China vie for technological leadership, comparing GAFA with Chinese BT platforms – such as Alibaba, Tencent, Baidu and TikTok – offers fertile ground for further investigation (Lee, 2018). China's state-led capitalism prioritizes scale and control over data privacy, while public stock markets play a less dominant role than in the USA. Exploring differences in stakeholder motivations between US and Chinese digital ecosystems could refine this study's propositions. For the USA and EU, retaining data within platform owners' control while ensuring data portability, interoperability and user rights (P5 and P6) may prove more effective than the Chinese full state data ownership model. Conversely, China may benefit from introducing shareholder rights and market-based reforms to curb excessive state surveillance and promote more OI governance.

This study has important implications for both theory and practice. The framework contributes to OI literature by linking stakeholder governance with digital platform strategy. By integrating OKRs and KPIs, BT managers are equipped with tools to proactively manage power asymmetries, reduce regulatory risk and foster sustainable platform innovation. The propositions provide actionable guidance for promoting an inclusive and stakeholder-aligned OI ecosystem. Integrating incentives, controls and strategic metrics offers a pathway for aligning platform, corporate and ecosystem governance.

Practically, this study delivers insights for digital policymakers and platform leaders by grounding governance recommendations in a rigorous literature synthesis. It supports the design of regulatory and managerial practices that balance competition, data privacy and innovation. Future research should empirically test the framework, examining how OKRs and KPIs – when

embedded in OI governance mechanisms – impact platform outcomes such as complementor participation, user trust and regulatory compliance. Comparative studies across Western and Eastern platform ecosystems would strengthen and globalize the framework's relevance.

Notes

1. This article is primarily concerned with Silicon Valley BT, Google, Apple, Facebook, Amazon (GAFA). Studies often refer to these companies as dominant platforms, Big-tech, gatekeepers, platform owners, orchestrators, leaders, hubs, etc. (Altman, Nagle, and Tushman, 2022). For consistency, the term BT is used throughout the paper. Because Facebook and Google are BT platforms housed within Meta and Alphabet, the parent organizations, sometimes the article uses Meta and Alphabet to make this distinction.
2. In this study, the term *end users* refers to producers, advertisers, etc., from the supply side and customers from the demand side of the platform ecosystem. Conversely, the term *complementors* refers to entrepreneurs, game developers, content providers, etc., who use a digital platform to create innovations, such as app developers on Apple's iOS and Google's Android-OS and video content developers on YouTube. Platforms are of three types: *transactional*, *innovation-based* or *hybrids* that include aspects of both (Cusumano *et al.*, 2019). The GAFA are hybrids that allow end-users and complementors to use their platforms for both transactions and innovation.
3. In their 2023 10-K filings, Alphabet reported that 73.4% of its $324bn revenue came from advertising, while Google Cloud earned $33.1bn in revenue and $3.8bn in profit. Meta reported 97.8% of its $134.9bn revenue from advertising, with Reality Labs posting a $16.1bn loss on $1.89bn revenue. Source: Scholar-GPT.
4. According to their 2023 10-Ks, Apple generated 52% of its $383.3bn revenue from iPhones and 22% from services, including App Store commissions and licensing fees. Amazon earned $90.8bn from AWS, $140bn from AMP seller services and $47bn from advertising. Source: Scholar-GPT.
5. Based on their 2023 10-Ks, Apple authorized $110bn in buybacks, Alphabet $70bn and Meta $50bn, while Amazon earned $24.6bn in operating income from AWS. Buybacks have surged since 2019 – up 47% for Apple, 289% for Alphabet and a striking 1,150% for Meta – underscoring shareholder primacy across all four firms. Source: Scholar-GPT.
6. As of 2023, Meta's Mark Zuckerberg controls over 60% of voting rights with less than 15% equity, and Alphabet's co-founders retain control through Class B shares with 10× voting power. Source: Scholar-GPT.
7. As of their 2023 10-K filing. Source: Scholar-GPT
8. One recent study finds high-tech firms share buybacks during the period of 2000–2019 at 5.66% of net sales in 2007 and recovering to 7.60% of net sales by 2018 after a slight reduction during the Great Financial Crisis (Valeeva *et al.*, 2022; *pg. 8*).
9. As confirmed in Alphabet's 2023 10-K, Google Play charges a 30% commission on in-app purchases for apps that earn over $1m annually, with a reduced rate of 15% for smaller developers. YouTube retains 45% of ad revenue, sharing 55% with creators. Google also allows sideloading of Android apps outside of its Play Store. Meta's 10-K confirms revenue shares favoring the platform (30% fee) and limited IP transfer or licensing rights for creators. Source: Scholar-GPT.
10. Amazon's 2023 10-K reports $140.7bn in revenue from third-party seller services – including fulfillment and referral fees – making complementors a core profit engine, though they operate under strict platform rules. Per Apple's 2023 10-K, it earned $85.2bn from services, including the App Store, where developers face a 30% commission above $1m in revenue and limited IP or distribution flexibility. Source: Scholar-GPT.
11. One recent study using data from Twitter/X from 2006 to 2017 find 126,000 rumors were spread by 3M people. False news diffused faster than truth, where the top 1% of false news cascades spread to between 1,000 to 100,000 people, while the truth seldom diffused to more than 1,000 people. S. Vosoughi, D. Roy, and S. Aral. (2018). The spread of true and false news online. Science, 359(6380), 1146-1151.
12. However, Meta has recently replaced fact-checking with community notes in the USA as Zuckerberg shifts toward promoting "free speech" to gain favor with Trump. https://freespeechproject.georgetown.edu/tracker-entries/meta-overhauls-fact-checking-system-replacing-it-with-community-notes-program/
13. In 2023, YouTube's illegal hate speech removal rate dropped significantly to 58.1%, down from 90.4% in 2022, returning to its 2021 level of 58.8%. Facebook's rate remained nearly flat at 69.0%, compared to 69.1% in 2022 and 70.2% in 2021, reflecting limited year-over-year improvement. https://ec.europa.eu/commission/presscorner/detail/en/ip_23_4976. Source: Scholar-GPT.

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Supplementary material

The supplementary material for this article can be found online.

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