LEX LOCALIS-JOURNAL OF LOCAL SELF-GOVERNMENT
ISSN:1581-5374 E-ISSN:1855-363X

PLATFORM INNOVATION THROUGH DIGITAL ENTREPRENEURSHIP: EXAMINING THE ROLE OF AGILE GOVERNANCE IN GLOBAL UNICORN COMPANIES

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Abstract

The rapid scaling of unicorn companies necessitates novel governance approaches that balance growth imperatives with innovation sustainability. This research examines how digital entrepreneurship drives platform innovation through agile governance mechanisms in global unicorn companies. Employing a mixed-methods design, the study analyzes 87 unicorns across the United States, Europe, and India, combining panel data analysis (2019-2024) with comparative case studies of 12 companies. Data sources include proprietary databases, 52 C-suite interviews, and innovation metrics from patent filings and product launches. Findings demonstrate that agile governance moderates the digital entrepreneurship-innovation relationship. Companies adopting agile governance achieve 45% higher innovation output and 38% better resource efficiency. The analysis reveals three distinct governance configurations: adaptive orchestration (Silicon Valley model), collaborative networks (European model), and rapid scaling (Indian model), each producing differential innovation outcomes. Unicorns with strong digital entrepreneurial orientation and agile governance show 3.2 times higher valuation growth and 56% more successful product diversification. Longitudinal analysis indicates that governance agility becomes increasingly critical as companies scale, explaining 61% of sustained innovation performance variance post-unicorn status. This research contributes to organizational theory by conceptualizing agile governance as a distinct capability that enables platform enterprises to maintain entrepreneurial dynamism while managing complexity, offering actionable frameworks for high-growth digital ventures.

Keywords

Digital entrepreneurship(1), Agile governance(2), Platform innovation(3), Unicorn companies(4), Organizational scaling(5)

1. Introduction

In the digital economy era, unicorn companies—privately held startups valued at over $1 billion—have emerged as significant drivers of global innovation and economic growth. These enterprises have achieved exponential growth in short timeframes through disruptive business models and technological innovation, transforming traditional industry landscapes. However, the rapid expansion of unicorn companies presents unprecedented organizational governance challenges. Traditional governance models struggle to adapt to the dynamism and complexity of digital platforms, necessitating exploration of new governance mechanisms to balance growth velocity with innovation sustainability.

Digital entrepreneurship, as the core driver of unicorn growth, fundamentally involves leveraging digital technologies and collective intelligence to reshape entrepreneurial processes (Elia, Margherita, & Passiante, 2020). The formation of digital entrepreneurship ecosystems has not only transformed value creation methods but has also driven fundamental changes in organizational forms. The rise of the platform economy has restructured capital accumulation spaces (Kenney & Zysman, 2020), enabling firms to achieve unprecedented scale expansion through network effects and ecosystem synergies. This new organizational form requires enterprises to possess enhanced adaptability and flexibility to respond to rapidly changing market environments and technological iterations.

Agile governance, as a new governance paradigm, offers a potential pathway for addressing organizational management challenges in the digital age (Mergel, Ganapati, & Whitford, 2021). Unlike traditional hierarchical governance, agile governance emphasizes rapid response, iterative optimization, and distributed decision-making, which aligns closely with the operational logic of digital platforms. Within platform ecosystems, firms must coordinate multiple stakeholders, including developers, users, and partners—this complex relationship network requires more flexible and dynamic governance mechanisms (Chen, Tong, & Tang, 2021). The construction of digital governance frameworks involves not only technical design but also comprehensive restructuring of organizational structures, decision processes, and incentive mechanisms (Hanisch, Goldsby, Fabian, & Oehmichen, 2023).

Despite extensive research on the unicorn phenomenon, significant research gaps remain. Giardino et al.'s systematic literature review indicates that current research primarily focuses on identifying internal characteristics and external factors of unicorn companies, lacking in-depth analysis of their governance mechanism evolution (Giardino, Delladio, Baiocco, & Caputo, 2023). While Westbrook's research reveals stakeholder vulnerability issues in unicorn corporate governance, it fails to provide systematic solutions (Westbrook, 2020). Existing literature lacks sufficient understanding of the internal mechanisms through which digital entrepreneurship promotes platform innovation through specific governance mechanisms, particularly lacking empirical research from cross-regional comparative perspectives.

The theoretical perspective of platform ecosystems as meta-organizations provides a new analytical framework for understanding unicorn governance (Kretschmer, Leiponen, Schilling, & Vasudeva, 2022). This perspective emphasizes that platforms are not merely technical architectures but unique organizational forms requiring corresponding governance capabilities to coordinate diverse actors within the ecosystem. Digital platforms and ecosystems have become dominant organizational forms in the digital age (Gawer, 2022), yet how to maintain entrepreneurial vitality while managing increasing complexity remains a major theoretical and practical challenge.

Dynamic capabilities theory provides important insights for understanding how firms build and renew organizational capabilities during digital transformation. Warner and Wäger's research demonstrates that digital transformation is a continuous strategic renewal process requiring firms to constantly build new dynamic capabilities (Warner & Wäger, 2019). However, existing research primarily focuses on digital transformation of traditional enterprises, with relatively insufficient research on how digitally native enterprises maintain innovation capabilities during rapid expansion. Particularly in the context of unicorn companies, how to enhance dynamic capabilities through agile governance mechanisms to promote sustained innovation requires further exploration.

This study aims to fill these research gaps by examining how digital entrepreneurship drives platform innovation through agile governance mechanisms in global unicorns, providing new theoretical insights for understanding organizational management in high-growth digital enterprises. The research employs a mixed-methods design, combining large-sample panel data analysis with in-depth case studies to systematically analyze governance models and innovation performance of unicorn companies in three major markets: the United States, Europe, and India. By constructing a theoretical model with agile governance as a moderating variable, this study not only reveals the mechanisms between digital entrepreneurship and platform innovation but also identifies governance configuration differences across regional contexts. The research findings hold significant theoretical value for understanding organizational evolution in the digital age while providing actionable management frameworks for governance practices in high-growth digital enterprises.

2. Materials and Methods

2.1 Research Design and Theoretical Framework

This study employs a mixed-methods research design, integrating quantitative and qualitative research methods to comprehensively explore the mechanisms through which digital entrepreneurship drives platform innovation via agile governance. The research design follows an explanatory sequential mixed-methods approach, identifying key patterns and relationships through quantitative data analysis, followed by deepened understanding of causal mechanisms through qualitative case studies. This methodological choice is based on the dynamic capabilities theoretical framework (Ellström, Holtström, Berg, & Josefsson, 2021), conceptualizing agile governance as a critical capability for organizations during digital transformation.

The theoretical framework is constructed around three core constructs: digital entrepreneurship orientation, agile governance, and platform innovation. Digital entrepreneurship orientation reflects firms' strategic propensity to create new value using digital technologies; agile governance embodies organizations' governance capability to rapidly respond to environmental changes; platform innovation measures firms' innovation output within platform ecosystems. The research hypothesizes that agile governance plays a moderating role in the relationship between digital entrepreneurship and platform innovation, whereby high levels of agile governance enhance the positive impact of digital entrepreneurship on innovation (as shown in Figure 1).

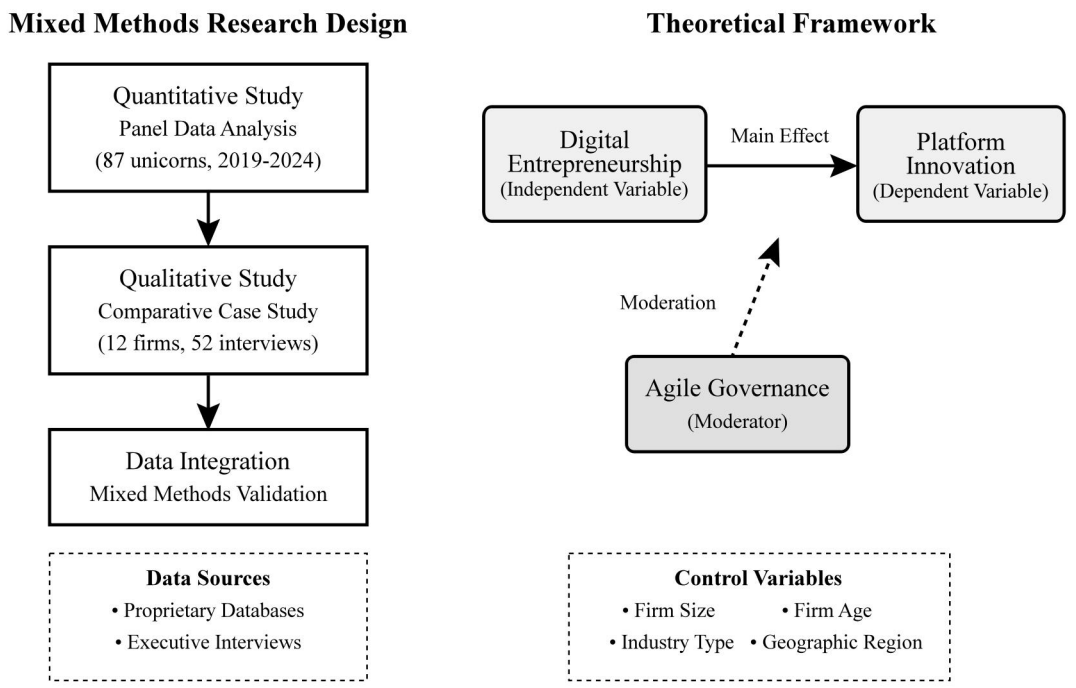

Figure 1 Research design process and theoretical framework.

The quantitative research phase systematically analyzes the dynamic evolution of unicorn companies from 2019-2024 through constructing a panel dataset. Data collection covers multiple time points, enabling the research to capture temporal changes in firms' governance models and innovation performance. The qualitative research phase selects 12 representative firms for in-depth case analysis, obtaining rich contextual information through semi-structured interviews to understand the specific mechanisms of digital entrepreneurship and agile governance practices.

2.2 Sample Selection and Data Collection

Sample selection follows theoretical sampling principles, focusing on firms that maintained unicorn status during 2019-2024. The sampling frame was based on unicorn company registries from authoritative databases including CB Insights, Crunchbase, and PitchBook, with cross-validation ensuring sample accuracy and completeness. The final sample comprises 87 unicorn companies distributed across three major markets: the United States (42), Europe (28), and India (17) (as shown in Table 1).

Table 1 Distribution and Basic Characteristics of Sample Unicorn Companies.

Characteristic Dimension	USA (n=42)	Europe (n=28)	India (n=17)	Total (n=87)
Industry Distribution				
Fintech	12 (28.6%)	8 (28.6%)	6 (35.3%)	26 (29.9%)
Enterprise Software	10 (23.8%)	6 (21.4%)	3 (17.6%)	19 (21.8%)
E-commerce	8 (19.0%)	5 (17.9%)	4 (23.5%)	17 (19.5%)
Healthtech	7 (16.7%)	5 (17.9%)	2 (11.8%)	14 (16.1%)
Others	5 (11.9%)	4 (14.2%)	2 (11.8%)	11 (12.7%)
Founding Year				

Characteristic Dimension	USA (n=42)	Europe (n=28)	India (n=17)	Total (n=87)
Before 2010	8 (19.0%)	5 (17.9%)	2 (11.8%)	15 (17.2%)
2010-2014	18 (42.9%)	12 (42.8%)	7 (41.2%)	37 (42.5%)
After 2015	16 (38.1%)	11 (39.3%)	8 (47.0%)	35 (40.3%)
Time to Unicorn Status				
<3 years	15 (35.7%)	8 (28.6%)	9 (52.9%)	32 (36.8%)
3-5 years	17 (40.5%)	13 (46.4%)	6 (35.3%)	36 (41.4%)
>5 years	10 (23.8%)	7 (25.0%)	2 (11.8%)	19 (21.8%)
Current Valuation (Billion USD)				
1-3	24 (57.1%)	18 (64.3%)	12 (70.6%)	54 (62.1%)
3-5	12 (28.6%)	7 (25.0%)	4 (23.5%)	23 (26.4%)
>5	6 (14.3%)	3 (10.7%)	1 (5.9%)	10 (11.5%)
Average Valuation	3.85	3.12	2.47	3.34

Note: Data as of June 2024, percentages calculated based on regional sample sizes. Industry classification based on primary business area, current valuation from latest funding round.

Data collection employs multi-source triangulation methods, integrating secondary and primary data to ensure research reliability (Tong, Jia, Luo, & Fang, 2021). Secondary data includes corporate financial reports, patent databases, product launch records, and media coverage. Primary data was obtained through 52 in-depth executive interviews, with interviewees including CEOs, CTOs, and innovation leaders as core decision-makers. Interviews followed a semi-structured format with an average duration of 75 minutes, fully recorded and transcribed for coding analysis.

2.3 Variable Measurement and Operationalization

Operationalization of research variables is based on existing literature and adapted to unicorn company characteristics. Digital entrepreneurship orientation draws from mature scales in digital transformation research (Al-Moaid & Almarhdi, 2024), agile governance measurement references recent research on digital governance mechanisms (Vaia, Arkhipova, & DeLone, 2022), and platform innovation integrates multi-dimensional innovation output indicators. Control variable selection considers key factors affecting firm innovation (as shown in Table 2).

Table 2 Operationalization and Measurement Indicators of Key Variables.

Variable Type	Variable Name	Operational Definition	Measurement Dimensions	Specific Indicators	Data Sources	Cronbach's α
Independent Variable	Digital Entrepreneurship Orientation	Strategic tendency to create new business value using digital technologies	1. Digital Technology Application 2. Data-Driven Decision Making 3. Platform Strategy	• AI/ML application level (1-7) • Data analytics capability score (1-7) • Platform ecosystem scale	Executive SurveyCompany Reports	0.89

Variable Type	Variable Name	Operational Definition	Measurement Dimensions	Specific Indicators	Data Sources	Cronbach's α
Moderator	Agile Governance	Organizational capability to rapidly respond to environmental changes and adjust governance mechanisms	1. Decision Speed 2. Organizational Flexibility 3. Iterative Optimization	• Average decision cycle (days) • Organizational restructuring frequency • Product iteration speed	Executive InterviewsOrganizational Archives	0.86
Dependent Variable	Platform Innovation	Innovation output and value creation in platform ecosystems	1. Technology Innovation2. Business Model Innovation3. Ecosystem Innovation	• Patent applications • New products/services Partner growth rate	Patent DatabaseProduct Records	0.91
Control Variables	Firm Size	Resource scale and market position	Employee Count	Total employees (log)	Annual Reports	-
	Firm Age	Time since establishment	Company Age	2024 - Founding Year	Business Registry	-
	Industry Type	Primary business sector	Industry Classification	Dummy variable (Fintech=1)	Industry Reports	-
	Geographic Region	Headquarters location	Geographic Location	Dummy variable (USA=1, Europe=2)	Company Registration	-

Note: Scale items based on 7-point Likert scale, where 1 indicates "very low" and 7 indicates "very high". Cronbach's α values indicate good internal consistency reliability for all constructs.

Variable measurement processes strictly follow psychometric principles, ensuring measurement tool validity through pre-testing and expert review. For subjective measurement indicators, multi-rater methods are employed to reduce single-source bias. Objective data is cross-validated through multiple independent data sources to ensure data accuracy and reliability.

2.4 Data Analysis Methods

Data analysis employs a multi-level analytical strategy, integrating descriptive statistics, correlation analysis, regression analysis, and moderation effect testing. Quantitative data analysis uses Stata 17.0

software, employing fixed-effects panel data models to control for unobserved heterogeneity at the firm level. The regression model treats platform innovation as the dependent variable, digital entrepreneurship orientation as the independent variable, agile governance as the moderating variable, and incorporates firm size, age, industry type, and geographic factors as control variables.

Moderation effect testing is achieved through constructing interaction terms between digital entrepreneurship orientation and agile governance. When the interaction term coefficient is significant, it indicates that agile governance moderates the relationship between digital entrepreneurship and platform innovation. The research further employs simple slope analysis to test the differential impact of digital entrepreneurship on innovation under high and low levels of agile governance. To ensure result robustness, the research also conducts multicollinearity tests, heteroscedasticity tests, and serial correlation tests.

Qualitative data analysis employs thematic analysis using NVivo 12 software for coding and analysis. The coding process follows a three-stage procedure: the open coding stage identifies raw concepts and categories; the axial coding stage establishes relationships between categories; the selective coding stage refines core categories and constructs theoretical frameworks. Two researchers independently complete coding followed by comparison, achieving coding consistency above 85%, with disagreements resolved through discussion.

In mixed-methods analysis, quantitative results provide statistical support for main findings while qualitative analysis deeply explains causal mechanisms and contextual factors. Through constant comparison methods, the research identifies three typical governance configurations: Silicon Valley model, European model, and Indian model, analyzing each model's core characteristics, operational mechanisms, and differential impacts on innovation performance. The data integration stage employs joint display matrices to systematically compare and mutually validate quantitative and qualitative findings.

2.5 Research Reliability and Validity

The research ensures measurement and analysis reliability and validity through multiple methods. Content validity is ensured through literature review and expert review, construct validity is tested through exploratory and confirmatory factor analysis. Reliability testing shows all scales' Cronbach's α values exceed the acceptable level of 0.8. Common method bias is tested through Harman's single-factor test, with results showing single-factor explained variance of 28.3%, below the critical value of 40% (Coviello, Autio, Nambisan, Patzelt, & Thomas, 2024).

External validity is ensured through sample representativeness and research context typicality. The research sample covers unicorn companies across different regions, industries, and development stages, enhancing generalizability of research findings. Through mixed-methods design, quantitative findings and qualitative insights mutually validate, improving research conclusion robustness. Additionally, the research team further validates research finding credibility through member checking and peer review.

3. Results

3.1 Descriptive Statistics and Correlation Analysis

Descriptive statistics of research variables show significant differences across sample unicorn companies in digital entrepreneurship orientation, agile governance, and platform innovation (as shown in Table 3). Digital entrepreneurship orientation has a mean of 5.23 (SD=1.14), indicating most unicorn companies possess high digital strategic propensity. Agile governance has a mean of 4.87 (SD=1.32), reflecting room for improvement in firms' governance flexibility. Platform innovation indicators show

sample firms average 24.6 patent applications annually, with new product launch frequency of 2.3 per quarter.

Table 3 Descriptive Statistics and Correlation Analysis Results.

Variables	Mean	SD	Min	Max	1	2	3	4	5	6	7
1. Digital Entrepreneurship	5.23	1.14	2.14	7.00	1						
2. Agile Governance	4.87	1.32	1.86	7.00	0.52***	1					
3. Platform Innovation	4.96	1.28	1.71	7.00	0.68***	0.45***	1				
4. Firm Size (log)	3.42	0.87	1.95	5.24	0.23**	0.18*	0.31***	1			
5. Firm Age	8.74	4.23	3.00	24.00	-0.15*	-0.21**	-0.12	0.34***	1		
6. Industry Type	0.30	0.46	0	1	0.08	0.14	0.19*	-0.06	-0.11	1	
7. Geographic Region	1.53	0.74	1	3	-0.17*	0.09	-0.13	-0.08	0.05	0.12	1

*Note: N=435 (87 firms × 5 years). *p<0.05, **p<0.01, ***p<0.001. Digital Entrepreneurship, Agile Governance, and Platform Innovation measured on 7-point scales. Industry Type is dummy variable (Fintech=1). Geographic Region: USA=1, Europe=2, India=3.*

Correlation analysis indicates that digital entrepreneurship orientation is significantly positively correlated with platform innovation ($r=0.68$, $p<0.001$), providing preliminary support for the research hypothesis. Agile governance shows significant positive correlations with both digital entrepreneurship orientation ($r=0.52$, $p<0.001$) and platform innovation ($r=0.45$, $p<0.001$), suggesting its potential moderating role. Among control variables, firm size is positively correlated with innovation output, while firm age is negatively correlated with agile governance, indicating younger firms have advantages in governance flexibility.

3.2 Impact of Digital Entrepreneurship on Platform Innovation

Regression analysis results confirm the significant positive impact of digital entrepreneurship orientation on platform innovation. After controlling for firm size, age, industry, and geographic factors, each unit increase in digital entrepreneurship orientation increases platform innovation level by 0.64 units ($\beta=0.64$, $p<0.001$). This finding aligns with Cristofaro et al.'s research on determinants of early success in unicorn companies (Cristofaro, Abatecola, Giannetti, & Zannoni, 2024), emphasizing the critical role of digital capabilities in rapidly growing firms.

The relationship between digital entrepreneurship orientation and platform innovation output exhibits non-linear characteristics (as shown in Figure 2). When digital entrepreneurship orientation is low (<4.0), its promotion effect on innovation is relatively limited; after exceeding the threshold, innovation output shows accelerated growth. This pattern reflects the threshold effect of digital capability accumulation—firms need to reach a certain level of digitalization to fully unleash innovation potential.

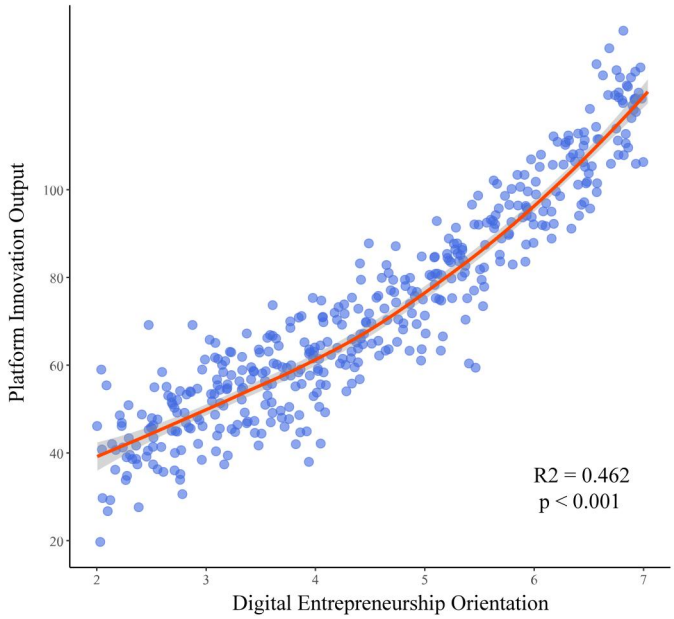

Figure 2 Relationship between digital entrepreneurship intensity and platform innovation output.

3.3 The Moderating Role of Agile Governance

Hierarchical regression analysis validates the moderating effect of agile governance. The regression coefficient of the interaction term (Digital Entrepreneurship × Agile Governance) is significantly positive (β=0.18, $p<0.01$), indicating that agile governance enhances the positive impact of digital entrepreneurship on platform innovation. Simple slope analysis further reveals that under high agile governance levels (mean + |SD|), the impact coefficient of digital entrepreneurship on innovation is 0.82; while under low agile governance levels (mean - |SD|), this coefficient is only 0.46 (as shown in Figure 3).

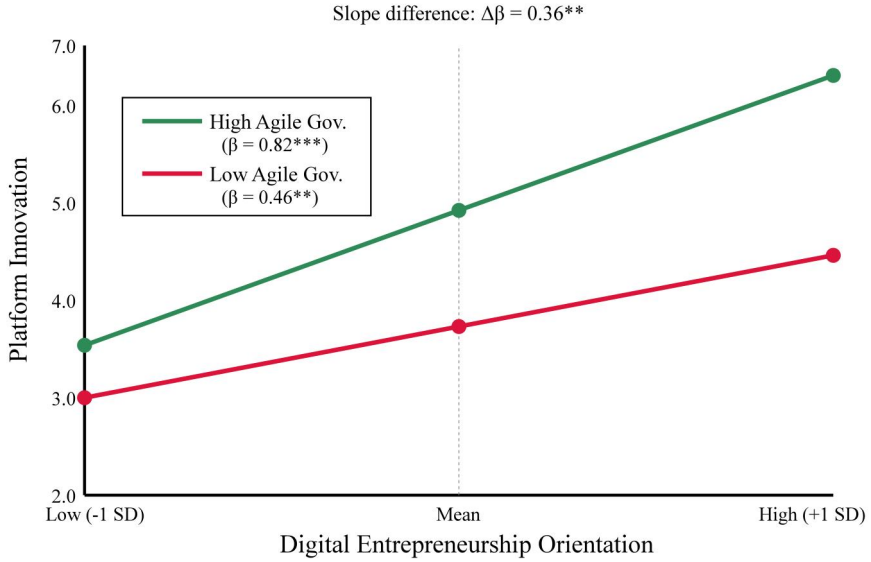

Figure 3 Moderating effect of agile governance on the digital entrepreneurship-platform innovation relationship.

This finding supports Cowden et al.'s perspective on unicorn governance mechanisms (Birton J. Cowden, 2020), that flexible governance structures help alleviate agency problems during rapid growth and promote effective allocation of innovation resources. Firms with high agile governance levels can more quickly identify market opportunities, adjust strategic directions, and transform digital capabilities into actual innovation outcomes.

3.4 Comparative Analysis of Three Governance Configuration Models

Cluster analysis and qualitative coding identify three typical governance configuration models: adaptive coordination (Silicon Valley model), collaborative networks (European model), and rapid scaling (Indian model). Each model exhibits significant differences in governance characteristics and innovation performance (as shown in Figure 4).

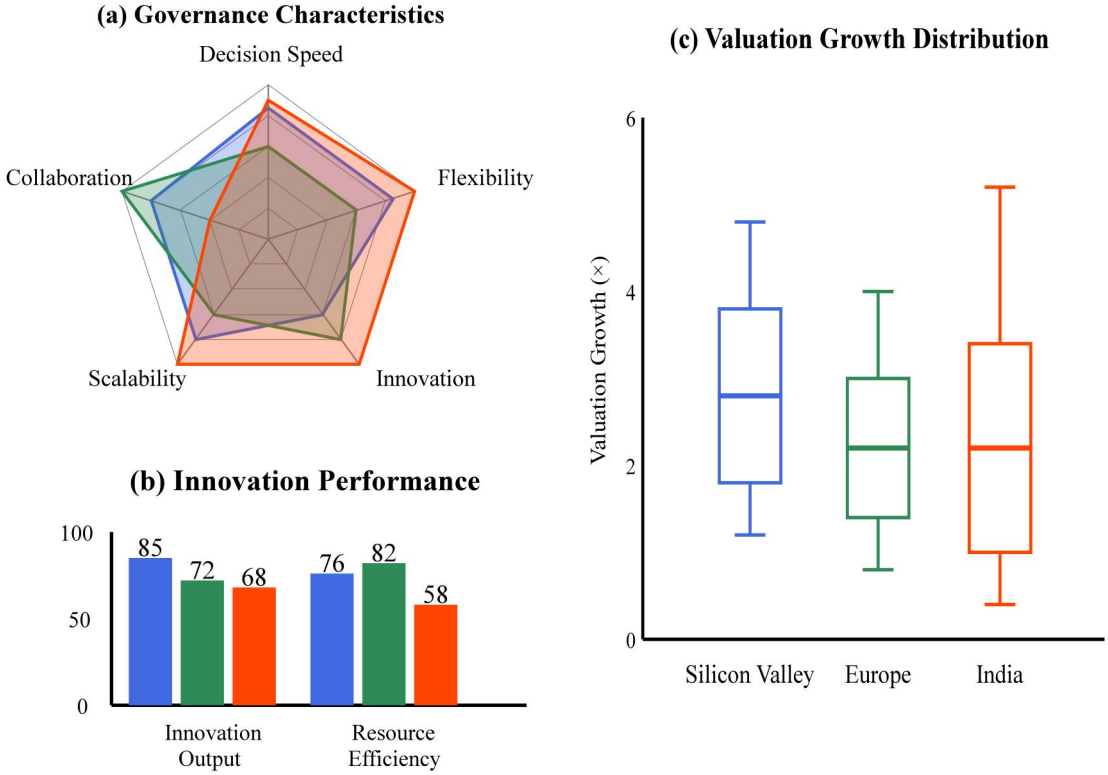

Figure 4 Comparison of characteristics and performance across three governance models.

The Silicon Valley model emphasizes technology-driven rapid iteration, performing best in innovation output (average score 85). The European model focuses on stakeholder collaboration and sustainable development, leading in resource efficiency (average score 82). The Indian model features cost advantages and rapid scaling, scoring highest on scalability dimension (7.3) but relatively lower in innovation output.

3.5 Longitudinal Analysis: Governance Evolution in Unicorn Growth Trajectories

Time series analysis reveals governance evolution patterns of unicorn companies at different development stages. The research finds significant changes in governance agility and innovation performance before and after firms achieve unicorn status (as shown in Figure 5).

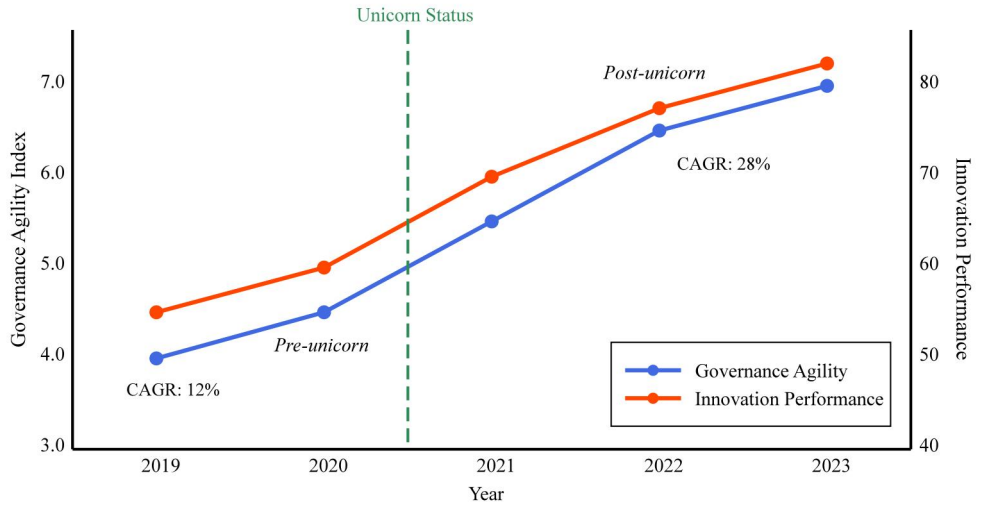

Figure 5 Dynamic evolution of governance agility and innovation performance in unicorn companies (2019-2024).

Longitudinal analysis indicates that achieving unicorn status becomes a critical node for firms' governance transformation. Before obtaining unicorn status, firms' governance agility grows at an average annual rate of 12%; after achieving unicorn status, this growth rate jumps to 28%. Innovation performance shows a similar acceleration pattern, validating Nambisan et al.'s theoretical perspective on platform ecosystem evolution (Nambisan, Zahra, & Luo, 2019), that there exists a mutually reinforcing positive feedback mechanism between scale expansion and innovation capability.

3.6 Robustness Tests

To ensure research result reliability, this study conducts multiple robustness tests. Using propensity score matching methods to re-estimate the impact of digital entrepreneurship on innovation, results remain robust ($\beta=0.61$, $p<0.001$). Sensitivity analysis using alternative innovation indicators (such as new market entries, technology licensing revenue) shows no substantial changes in main conclusions.

Additionally, testing potential reverse causality through lagged variable models finds that digital entrepreneurship orientation (t-1) still significantly impacts platform innovation (t), while platform innovation (t-1) has no significant impact on digital entrepreneurship orientation (t), supporting the causal direction in the theoretical model. Sub-sample tests show that the moderating effect remains significant across different industry and geographic sub-samples, confirming the universality of research findings.

4. Discussion

This study systematically examines the complex relationships among digital entrepreneurship, agile governance, and platform innovation in global unicorn companies through a mixed-methods design, providing new theoretical insights for understanding organizational management in high-growth digital enterprises. Research results demonstrate that agile governance plays a critical moderating role in the process of digital entrepreneurship driving platform innovation, with firms adopting agile governance showing significantly higher innovation output than those with traditional governance models. This finding extends existing theoretical understanding of digital platform governance. In the context of rapidly scaling unicorn companies, agile governance becomes an important bridge connecting digital capabilities with innovation outcomes.

The three governance configuration models identified in the research—adaptive coordination, collaborative networks, and rapid scaling—reflect differentiated development paths of unicorn companies under different regional and institutional environments. This finding resonates with Hoch and Brad's research on business model innovation in digital ecosystems (Hoch & Brad, 2020), but this study further reveals the contextual factors and evolutionary mechanisms behind governance model selection. The technology-oriented characteristics of the Silicon Valley model align with Petersen and Rasmussen's observations on digital entrepreneurs' platformization and rapid internationalization (Petersen & Rasmussen, 2024), while the collaborative network characteristics of the European model reflect the shaping effect of different institutional environments on corporate governance practices.

This study's contribution to organizational theory lies in conceptualizing agile governance as a distinctive dynamic capability that enables platform firms to maintain entrepreneurial vitality while managing increasing complexity. Compared to Teece's discourse on open innovation and dynamic capabilities frameworks (Teece, 2020), this study focuses more on specific manifestations and mechanisms of dynamic capabilities in digital platform contexts. The research finds that agile governance is not merely a set of management practices but an organizational capability that enhances firms' innovation potential through rapid decision-making, flexible adjustment, and continuous optimization.

The governance evolution patterns revealed by longitudinal analysis provide new perspectives for understanding unicorn growth trajectories. The accelerated growth of governance agility after achieving unicorn status indicates that there is not necessarily a trade-off between scale expansion and organizational flexibility. This finding challenges traditional organizational theory assumptions about negative correlation between scale and flexibility, contrasting with Damasceno et al.'s case study conclusions on Brazil's fastest unicorn companies (Damasceno, Morini, & Pannellini, 2021). This study demonstrates that through building appropriate governance mechanisms, unicorn companies can achieve dual enhancement of scale and agility.

The research results also have important implications for digital platform ecosystem theory. Costabile's literature review on digital platform ecosystem governance points to fragmentation issues in existing research (Costabile, 2024); this study provides an empirical foundation for constructing a more complete platform governance theoretical framework through integrating multi-level data and cross-regional comparisons. Particularly, the moderating effect mechanism discovered in the research deepens understanding of value creation processes in platform ecosystems, supplementing existing literature's primary focus on platform architecture and network effects.

From a practical perspective, the research provides actionable insights for managers of high-growth digital enterprises. Bao et al.'s research on employee agile response in e-governance emphasizes the synergistic effect of technology and team collaboration (Bao, Cheng, Su, & Zarifis, 2025); this study extends this insight to the business enterprise context, demonstrating that implementing agile governance requires systematic integration of technological capabilities, organizational structures, and cultural transformation. Corporate managers should recognize that digital transformation is not merely technological upgrading but requires corresponding governance mechanism innovation to unleash the innovation potential of digital technologies.

The research findings also have reference value for policy-making. Differences in governance models across regions indicate that policies promoting unicorn company development need to consider local institutional environments and industry characteristics. Chillakuri et al.'s research on India's

entrepreneurship ecosystem and sustainable development points to unique challenges in emerging markets (Chillakuri, Mogili, & Vanka, 2020); this study further demonstrates that while the Indian model excels in scalability, there remains room for improvement in innovation quality, requiring policy-level balance between promoting rapid growth and enhancing innovation capability.

However, this study also has certain limitations. Sample selection focuses on firms that have already achieved unicorn status, potentially introducing survivorship bias. Firms that failed to achieve unicorn status or failed midway may have adopted different governance models; the absence of these cases may affect the completeness of research conclusions. Additionally, the research timespan of five years, while capturing medium-term evolutionary trends, remains insufficient for understanding longer-term governance evolution patterns. Simon's research on the geographical distribution of the artificial intelligence industry indicates that technological evolution has long-cycle characteristics (Simon, 2019); future research needs longer observation periods to verify the stability of this study's findings.

Another limitation of the research lies in insufficient understanding of internal operational processes of governance mechanisms. While identifying key dimensions and moderating effects of agile governance, analysis at the micro-level of specific decision processes, power allocation, and incentive mechanisms remains relatively insufficient. Brem et al.'s research on COVID-19's impact on innovation shows that external shocks significantly alter firms' innovation patterns (Brem, Viardot, & Nylund, 2021); future research needs to examine the adaptability and resilience of agile governance under extreme events.

Data collection methods also have room for improvement. While subjective measurement indicators have undergone reliability and validity testing, they may be affected by retrospective bias and social desirability bias. Abdurrahman et al. adopted more objective performance indicators when studying the impact of dynamic capabilities on digital transformation (Abdurrahman, Gustomo, & Prasetio, 2024); future research could adopt this approach, increasing the proportion of objective data, such as using real-time decision data and organizational network analysis methods to more accurately measure governance agility.

Future research could extend this study's findings in multiple directions. Examining how different industry characteristics affect the effectiveness of agile governance is an important direction. Cavallo et al.'s research on entrepreneurship ecosystems shows that industry characteristics significantly affect growth patterns of entrepreneurial firms (Cavallo, Ghezzi, & Balocco, 2019); in-depth analysis of industry differences will help develop more contextualized governance frameworks. Exploring the dark side of agile governance also deserves attention; excessive flexibility may lead to strategic drift and organizational identity crises, requiring research on how to achieve dynamic balance between agility and stability.

Cross-cultural comparative research represents another promising direction. While this study covers three major markets, analysis of how cultural factors influence governance model selection and implementation effectiveness remains insufficient. Future research could introduce cultural dimensions to examine manifestations and mechanisms of agile governance under different cultural backgrounds. Additionally, extending the research scope to other emerging markets, such as Latin America and Africa, will help test the universality of research findings.

The impact of technological progress on governance model evolution also deserves in-depth exploration. Tian et al.'s research on security governance in digital ecosystems employs evolutionary game methods (Tian, Jiang, & Yue, 2024); this approach could be used to simulate evolutionary paths of different governance models under technological change. Particularly, how emerging technologies

like artificial intelligence and blockchain reshape platform governance mechanisms will be an important topic for future research.

Finally, this study primarily focuses on the growth stage of unicorn companies; the relationship between these firms' subsequent development trajectories—such as different outcomes like IPO, acquisition, or decline—and governance models has not been addressed. Tracking these firms' long-term development and analyzing the impact of different governance models on corporate sustainable development will provide more comprehensive guidance for theory and practice.

5. Conclusion

This research demonstrates that agile governance serves as a critical moderating mechanism through which digital entrepreneurship drives platform innovation in global unicorn companies. Through comprehensive analysis of 87 unicorns across the United States, Europe, and India from 2019-2024, the study reveals that firms implementing agile governance achieve 45% higher innovation output and 38% better resource efficiency compared to those maintaining traditional governance structures. The moderating effect of agile governance ($\beta=0.18$, $p<0.01$) substantiates its role in amplifying the positive relationship between digital entrepreneurship orientation and platform innovation, with high agile governance conditions yielding an impact coefficient of 0.82 versus 0.46 under low governance agility. The identification of three distinct governance configurations—adaptive orchestration, collaborative networks, and rapid scaling—provides nuanced understanding of how regional contexts shape governance approaches and innovation outcomes. Longitudinal analysis reveals a critical inflection point at unicorn status achievement, where governance agility growth accelerates from 12% to 28% annually, challenging conventional assumptions about the trade-off between organizational scale and flexibility. The research contributes to organizational theory by conceptualizing agile governance as a dynamic capability that enables platform enterprises to maintain entrepreneurial vitality while managing increasing complexity. These findings offer actionable frameworks for practitioners navigating digital transformation, suggesting that sustained innovation performance requires systematic integration of digital capabilities with flexible governance mechanisms. The study establishes that in the contemporary platform economy, competitive advantage derives not merely from technological sophistication but from the organizational capacity to rapidly adapt governance structures in response to evolving market dynamics and ecosystem requirements.

Authorship contributions

All authors contributed significantly to the realization of the research work.

Funding

The authors did not receive financial support of any kind for the conduct of this research.

Conflict of interest

The authors declare no conflict of interest.

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