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PATHWAYS FOR ACCELERATED DEVELOPMENT OF DIGITAL INDUSTRIES IN EMERGING ECONOMIES: A CONFIGURATIONAL ANALYSIS OF LEADING INTERNET PLATFORMS

Abstract

Against the backdrop of rapid global digital technology development, emerging economies universally face challenges such as slow transformation of traditional industries and weak digital foundations, urgently requiring exploration of accelerated digital industrialization pathways suited to their specific conditions. This study aims to systematically identify the key condition combinations and implementation pathways driving the high growth of digital enterprises in emerging economies, exploring tailored accelerated digital industrialization paths for these economies amid traditional industry transformation slowdown and weak digital foundations. Based on the Technology-Organization-Environment (TOE) theoretical framework, the study adopts fuzzy set qualitative comparative analysis (fsQCA). It uses 2020–2024 financial data of 21 representative leading internet platform companies in emerging economies as observation samples to conduct configurational analysis of factors influencing the high growth of digital firms. The scientific significance of this work lies in breaking through the limitations of traditional single factor analysis, revealing the synergistic driving effects of multi-dimensional factors. Practically, it provides emerging economies with actionable insights for digital industrial policy design. The value of this research is its provision of a novel configurational perspective for digital industry studies in emerging markets, constructing four differentiated high growth pathways: scale driven, R&D supervision driven, lean R&D, and collaborative expansion. The practical implications suggest that no single factor is a necessary condition for high growth; instead, enterprises and policymakers should select tailored development paths based on technological endowments, organizational scale, and environmental characteristics, thereby accelerating digital industrialization in emerging economies.

Keywords: emerging economies, digital industries, accelerated growth, internet platform companies, technological, organizational and environmental context, comparative analysis, high-growth pathways.

Introduction

Driven by globalization and the widespread adoption of digital technologies, the digital industry is emerging as a vital sector for developing economies to optimize their economic structures and

achieve sustained growth. Currently, many emerging nations have long relied on traditional industries such as energy and agriculture to sustain economic development. They face challenges including a narrow industrial structure and weak resilience to risks, urgently requiring digital means to cultivate new economic momentum. However, these countries commonly encounter practical obstacles in developing their digital industries, such as weak technological foundations, fragmented innovation resources, and unclear growth pathways for enterprises. Against this backdrop, emerging developing countries, China and Kazakhstan, have achieved significant progress in digital development. For instance, by 2024, China's digital industry scale had surpassed 30 trillion yuan, with over 4,000 5G application projects deployed in production sectors, giving rise to leading enterprises like Alibaba, JD.com, and Pinduoduo. Kazakhstan has actively advanced its Digital Kazakhstan national strategy, achieving annual e-retail sales of 3.156 trillion tenge—a 33% year-on-year increase—and nurturing Kaspi, a fintech company valued at billions of dollars. In order to enhance the universal explanatory power of the path, this study covers a sample of enterprises with different levels of development in emerging economies, including both globally leading mature platforms (China sample) and latecomers who have achieved leapfrog growth in specific markets (Kazakhstan sample).

Prior research on digital industry growth. Scholars have long studied the preconditions for rapid digital enterprise development, focusing on strategic drivers, digital technology empowerment, and resource allocation. Strategic drivers serve as a key guide for resource allocation, and an effective strategy can drive digital firms to enhance their innovation capabilities and expand their business boundaries. Digital firms are inherently adept at using digital technology to empower their operations and reduce costs. For instance, Sadreddin & Chan (2023) note that digital firms can accelerate growth through proactive innovation [1]. However, strategy must fit a firm's actual circumstances, and an excessive focus on innovation may consume limited resources. Therefore, digital firms should respect their own characteristics, adopt open strategies to absorb and integrate external knowledge [2], or build digital ecosystems to promote value co-creation [3]. Regarding digital technology empowerment, scholars have mainly explored the enabling role of digital technology from the perspective of dynamic capability theory. Dynamic capabilities are the core conditions for firms to integrate internal and external resources in response to environmental changes, and therefore the iteration of digital technology is a key factor triggering the reconstruction of Internet firms' capabilities. For example, Von Briel et al. (2018) quantitatively verified that firms can use digital technology to compress innovation cycles and achieve higher market penetration rates. In terms of resource allocation, theory of firm growth and the resource-based view suggest that the growth of digital firms is constrained by valuable, scarce, inimitable, and non-substitutable data assets [4]. Digital firms acquire and allocate core digital assets through data collection and analysis, thereby building competitive barriers. Guo et al. (2022) found that combining internal digital resources with external demands through diversification strategies facilitates the construction of Internet ecosystems. Digital firms should leverage their flexibility to dynamically allocate limited resources, thereby achieving accelerated expansion [5].

Drawing on dynamic capabilities and resource-based views, digital enterprises in emerging economies are unlikely to achieve high growth through a single factor alone [6]; instead, their accelerated development likely depends on the coordinated interaction of multiple conditions. The Technology-Organization-Environment (TOE) framework provides an integrative lens to capture such configurational effects, as it has been widely applied to explain innovation adoption and firm growth in complex settings. At the technological level, prior research has concentrated on R&D investment and returns on R&D. Adequate R&D investment is a prerequisite for technological breakthroughs and sustained innovation [7]. Innovation capability, in turn, improves resource integration efficiency and market responsiveness [8]. Simon (2022) further notes that digital firms can achieve flexible transformation of production processes through innovation, thereby enhancing delivery speed [9]. At the organizational level, enterprise scale and financial resources are central. Drawing on longitudinal data from UK emerging industries, Audretsch & Belitski (2024) find that digitally advanced firms grow faster, and that this relationship is positively moderated by firm size [10]. This suggests that in the digital economy, size functions as an amplifier of resource mobilization capacity. Clemente-Almendros et al., (2024) identify significant size heterogeneity in the drivers and effects of digital transformation, with firms of different sizes following distinct digital paths [11]. Financial resources directly shape resource allocation: firms that allocate sufficient cash flow to R&D tend to achieve

higher product margins. This resource-focused model is particularly evident in digital platform firms [12]. Chen et al. (2024) further demonstrate a positive interaction between financial slack and digital transformation. At the environmental level, commercial credit and institutional supervision are critical. Favorable financing conditions can ease liquidity constraints [13]. In recent years, commercial credit has come to be viewed not merely as a substitute for short-term financing but as an important external resource channel for corporate innovation. Using a sample of Chinese A-share listed firms, Meng et al. (2026) find that commercial credit significantly promotes corporate innovation by improving information transparency, optimizing human capital structure, and raising executives' innovation awareness [14]. Institutional supervision and regulation serve as a quality signal in emerging markets, bolstering international investor confidence. Xu et al. (2025) find that stable institutional investors effectively promote corporate digital technology innovation, primarily by alleviating financing constraints, strengthening internal control, and improving ESG performance [15].

Based on the above, this study takes Chinese and Kazakh internet platform enterprises as the research object, comprehensively considers the conditions that drive rapid development, and extracts six prerequisite factors: R&D investment, return on R&D investment, enterprise scale, financial resources, commercial credit, and institutional supervision and regulation. A TOE configurational model is established, as shown in figure 1.

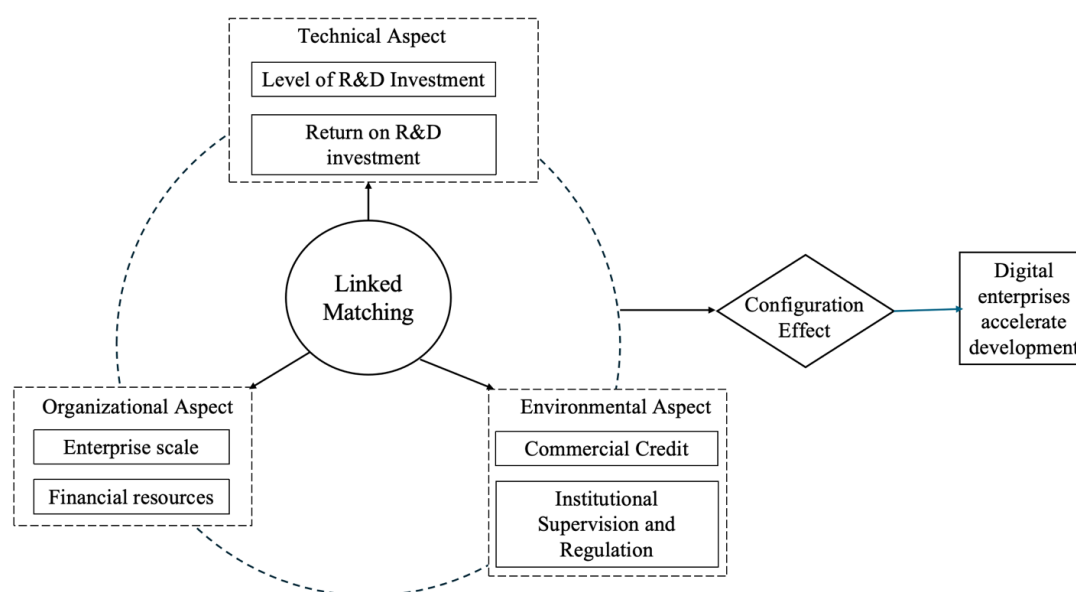


Figure 1– Condition Configuration Framework

Note: Compiled by the authors.

Therefore, this study focuses on summarizing effective pathways for the development of the digital industry in emerging economies. This study adopts the Technology-Organization-Environment (TOE) framework as its theoretical foundation. Using internet platform enterprises in emerging economies as research samples, it investigates the configurational pathways of high growth in the digital industry within emerging economies. Using internet firms' revenue growth rate as the outcome variable to reflect digital industry development speed, this study employs Fuzzy Set Qualitative Comparative Analysis (fsQCA) to identify synergistic effects and pathway mechanisms among multiple conditional variables within the TOE framework. It aims to provide theoretical foundations and practical recommendations for optimizing digital economy support policies, cultivating local technical talent, and accelerating socioeconomic development in emerging economies.

Materials and methods

Given the complex interactive effects among the preceding conditions and their combined influence on the rapid development of digital enterprises in emerging economies, traditional regression

models, which can only decompose the “net effects” of single variables, are limited in effectively analyzing the interdependent mechanisms of multiple conditions. Fuzzy set qualitative comparative analysis (fsQCA) is a configurational analysis method employing fuzzy set theory. Its core mechanism lies in testing sufficient and necessary subset relationships among multiple antecedents and observed outcomes. Its advantage lies in revealing, at the holistic level, the diverse combinations of antecedents leading to the same outcome—that is, multiple concurrent causal relationships.

High growth potential (HG). This study draws on Delmar (2019) research on corporate growth performance, selecting revenue growth rate as the core metric for measuring the growth performance of internet platform companies. This metric has broad academic consensus and a solid application foundation in corporate growth research [16]. The specific calculation method is as follows: taking the revenue growth rate of company i in year t as an example, it is calculated by subtracting the revenue of year $t-1$ from the revenue of year t , then dividing by the revenue of year $t-1$. The specific formula is as follows:

$$\text{Growth}_{i,t} = \ln\left(\frac{X_{i,t} - X_{i,t-1}}{X_{i,t-1}}\right). \quad (1)$$

Technical Aspect:

Level of R&D Investment (RD). Referring to existing studies [17], this paper uses the R&D intensity indicator to quantify a firm’s level of R&D expenditure.

Return on R&D investment (ROI_{RD}). R&D investment is the direct economic input for innovation activities, but high investment does not necessarily translate into effective output. This paper uses the R&D investment return rate as an indicator to measure a firm’s level of R&D returns [18].

Organizational Aspect:

Enterprise scale (SIZE). Considering the scientific rigor and accuracy of data in empirical tests, this paper uses the natural logarithm of a firm’s total assets at the end of the period to measure its scale [19].

Financial resources (FR). Cash and cash equivalents represent a company’s “flexible financial resources” that can be immediately mobilized to meet sudden demands. Therefore, this study uses the ratio of cash and cash equivalents to other assets to measure a company’s financial resources [20].

Environmental Aspect:

Commercial Credit (CCF). Digital enterprises typically have light assets and high turnover, relying on supply chain credit as the core source of short-term financing. Therefore, this study uses commercial credit financing to reflect the external commercial credit environment in which the enterprise operates, directly reflecting the ability of enterprises to convert commercial credit into financing [21].

Institutional Supervision and Regulation (ISR). This study uses the proportion of institutional holdings to measure the extent to which a company is subject to oversight by institutional investors, reflecting the supervisory environment in which the company operates [22]. Institutional investors, as professional capital agents, possess advantages in information acquisition and analysis.

This paper investigates the pathways through which emerging economies drive the accelerated development of the digital industry. To this end, it examines the development of internet platform companies to reflect the growth of the digital industry in emerging economies. Based on the Global Industry Classification Standard (GICS), this study selects internet companies listed on the NASDAQ and New York Stock Exchange in the United States as its research subjects. To obtain dynamic and comprehensive data results while avoiding the inherent differences in corporate growth rates before and after the COVID-19 pandemic, this study uses data from 2020 to 2024 and excludes companies with annual revenue below US\$1 billion for five consecutive years. A total of 21 listed companies from emerging economies were selected, all of which are leading internet platform companies in their respective fields, ensuring the representativeness of the sample companies. The data used in this study primarily comes from the Choice database and the annual reports of listed companies. The specific sample companies are listed in the table below.

Table 1 – Variable definitions and measurement methods

Variable type	Variable symbol	Measurement method	Source
Outcome variables	High growth potential (HG)	Revenue growth rate	Calculated
Conditional variables	Level of R&D Investment (RD)	R&D expenditure ratio = R&D expenditure / Operating revenue	Company Annual Report
	Return on R&D investment (ROIRD)	R&D return on investment = Net profit / R&D expenditure	Company Annual Report
	Enterprise scale (SIZE)	Natural logarithm of total assets at the end of the period	Company Annual Report
	Financial resources (FR)	Cash and cash equivalents / (Total assets - Cash and cash equivalents)	Company Annual Report
	Commercial Credit (CCF)	Commercial credit financing = Accounts payable / Revenue	Company Annual Report
	Institutional Supervision and Regulation (ISR)	Institutional shareholding ratio	Choice Database
Note: Compiled by the authors based on the source.			

Table 2 – Sample Company Basic Information Table

Number	Code	Name	GICS
1	JD.O	JD.com, Inc.	E-commerce
2	PDD.O	Pinduoduo Inc.	E-commerce
3	BIDU.O	Baidu, Inc.	New infrastructure
4	VIPS.N	Vipshop Holdings Limited	E-commerce
5	NTES.O	NetEase, Inc.	Entertainment
6	BEKE.N	KE Holdings Inc.	New infrastructure
7	TCOM.O	Trip.com Group Limited	Online marketing
8	KSPI.O	Joint Stock Co Kaspi.kz ADR	Software services
9	IQ.O	iQIYI, Inc.	Entertainment
10	TME.N	Tencent Music Entertainment Group	Entertainment
11	BILI.O	Bilibili Inc.	Entertainment
12	DDL.N	Dingdong (Cayman) Limited	E-commerce
13	QFIN.O	Qifu Technology, Inc.	Internet finance
14	JOYY.O	JOYY Inc.	Social networking
15	YI.O	1Jian Pharmaceutical Network Technology (China) Co., Ltd.	Public services
16	LX.O	LexinFintech Holdings Ltd.	Internet finance
17	FINV.N	FinVolution Group	Internet finance
18	WB.O	Weibo Corporation	Social networking
19	MOMO.O	Hello Group Inc.,	Social networking
20	BZUN.O	Baozun Inc.	E-commerce
21	BABA.N	Alibaba Group Holding Limited	E-commerce
Note: Compiled by the authors based on the source.			

Variable calibration refers to the process of converting continuous variables into fuzzy sets. This study employs direct calibration to process conditional and outcome variables into fuzzy sets. This study sets the 5% (complete non-membership), 50% (intersection point), and 95% (complete membership) quantiles as calibration anchors. The Calibrate function in fsQCA software converts the

original data into membership values within the [0,1] interval to accommodate QCA's set-relational analysis. The calibration anchor points for each variable are shown in the table below.

Table 3 – fsQCA calibration

The name of the variable	Fuzzy set calibration		
	Full Affiliation (95%)	Intersections (50%)	Not affiliated at all (5%)
HG	0.743	0.053	-0.198
RD	0.026	0.006	0.001
ROIRD	5.102	0.856	-2.776
SIZE	5.093	2.172	-0.702
FR	0.547	0.176	0.064
CCF	0.077	0.013	0.000
ISR	0.933	0.546	0.228

Note: Compiled by the authors based on the source.

Results and discussion

In fsQCA, necessity analysis identifies conditions that are indispensable for an outcome. A condition is necessary if its consistency score exceeds 0.90. Table 4 reports the results.

Table 4 – Analysis of necessary conditions

Conditional variables	HG		HG	
	Consistency	Coverage	Consistency	Coverage
RD	0.628291	0.594716	0.652865	0.714801
RD	0.698700	0.635053	0.629833	0.662150
ROIRD	0.690136	0.678516	0.644914	0.733396
ROIRD	0.728830	0.639577	0.717302	0.728082
SIZE	0.745322	0.672582	0.629284	0.656840
SIZE	0.619727	0.591047	0.686318	0.757108
FR	0.627973	0.605875	0.662737	0.739596
FR	0.730098	0.651755	0.646833	0.667894
CCF	0.656518	0.660919	0.621881	0.724138
CCF	0.725975	0.624046	0.708802	0.704744
ISR	0.660958	0.613482	0.661366	0.710038
ISR	0.687599	0.637085	0.639978	0.685865

Note: Compiled by the authors based on the source. “~” indicates the negation of a conditio.

All consistency scores are below 0.90. No single antecedent condition is necessary for high growth. This confirms that high growth in the digital industry is a configurational outcome of multiple interacting conditions rather than the result of any single factor.

Following standard fsQCA procedures, the frequency threshold was set at 1, the raw consistency threshold at 0.85, and the PRI consistency threshold at 0.5. Complex, parsimonious, and intermediate solutions were obtained. The intermediate solution is reported in Table 5. Core conditions are indicated by large black circles (●), peripheral conditions by small black circles (•), absence by crossed-out circles (⊗), and irrelevant conditions by blank spaces.

As can be seen from the table above, there are four configuration paths that lead to sustainable development, namely S1, S2, S3, and S4. The overall coverage rate is 0.5030, indicating that the four configurations together explain 50.3% of the reasons for the rapid development of the sample.

Table 5 – Configuration analysis results of the rapid development of internet companies

Conditional configuration	S1	S2	S3	S4
Level of R&D Investment (RD)	⊗	●		⊗
Return on R&D investment (ROIRD)	●	⊗	●	●
Enterprise scale (SIZE)	●	●	•	•
Financial resources (FR)	⊗	•	⊗	
Commercial Credit (CCF)		⊗	●	●
Institutional Supervision and Regulation (ISR)	⊗	●	⊗	⊗
consistency	0.8826	0.8723	0.8914	0.8990
Raw coverage	0.3457	0.3206	0.3045	0.2737
Unique coverage	0.0457	0.0295	0.0200	0.0790
Consistency of solutions	0.8620			
The coverage of the solution	0.5030			
Note: Core conditions are indicated by ●; peripheral conditions by •; nonexistent conditions by ⊗; blank spaces denote “irrelevant” scenarios. Compiled by the authors.				

Rather than identifying a single dominant growth model, the findings indicate that digital enterprises can achieve similar high-growth outcomes through different combinations of technological, organizational, and environmental conditions. This confirms that high growth is characterized by causal complexity, where the effectiveness of any individual factor depends on how it interacts with other conditions. As a result, technological investment alone cannot explain enterprise performance without considering organizational capabilities and the surrounding institutional environment. At the same time, the identified configurations reveal that firms with different resource endowments follow distinct development trajectories. Large enterprises tend to capitalize on economies of scale and the efficient commercialization of innovation, whereas smaller firms rely more heavily on the effective allocation of limited resources and the rapid conversion of technological inputs into market value. These findings demonstrate that multiple strategic pathways can lead to sustainable high growth in the digital economy.

(1) Path One: Scale-Driven Path

Enterprise scale (SIZE) and higher return on R&D investment (ROIRD) constitute the core conditions of this configuration, combined with the absence of high R&D investment (RD), institutional supervision (ISR), financial resources (FR), and commercial credit (CCF). In technological terms, the absence of high RD indicates that these enterprises do not rely on traditional high-intensity R&D activities. Instead, high ROIRD suggests that they achieve technological breakthroughs and market expansion primarily through the innovative optimization and integration of existing businesses. In organizational terms, enterprise scale provides inherent advantages in resource integration, market penetration, and risk resistance, enabling these firms to reduce unit innovation costs through economies of scale. In environmental terms, the absence of strong institutional supervision indicates that this path relies on a relatively lenient regulatory environment, giving enterprises greater flexibility to adjust their strategies. From the perspective of dynamic capability theory, the key to large-scale enterprises maintaining innovation capabilities with low R&D investment lies in mature internal knowledge management systems and technology transfer mechanisms, such as innovation accumulation through technology introduction, cooperative R&D, or iterative optimization of existing technologies. Empirical data show that the consistency of this path is 0.8826, with an original coverage rate of 0.3457, indicating high explanatory power among Chinese and Kazakh internet companies. The source of high-performance growth for such enterprises is a “scale–innovation synergy effect”: scale advantages amplify the market value of innovation outcomes, while innovation further consolidates market position.

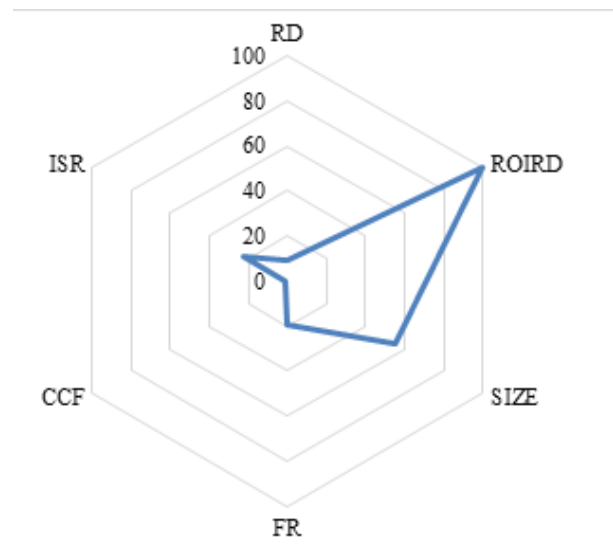


Figure 2 – KSPI.O Percentile Radar Chart of Various Conditional Variables

Note: Compiled by the authors.

Kaspi (KSPI.O) is a representative company along this path. In 2023, Kaspi achieved a high ROIRD of 9.5736 and a high SIZE of 2.6767; however, its RD was low at 0.0046 and its ISR was low at 0.3528, with FR at 0.1457, close to the crossover point of 0.176 but still relatively low. Kaspi’s massive user base, exceeding 10 million active users as of 2023 and covering the majority of Kazakhstan’s population, enables it to spread the marginal costs of technological development and operations across substantial transaction volumes, thereby boosting profit margins. Leveraging its existing platform and user data, Kaspi rapidly expands into new businesses such as lending, insurance, and e-commerce without requiring substantial R&D investment. This “platformization” strategy allows the company to enter new markets by integrating existing resources – such as payment networks and logistics systems – rather than developing new technologies from scratch.

(2) Pathway Two: R&D – Supervision-Driven Path

This pathway centers on enterprise scale, R&D investment levels, and institutional supervision as core conditions, with financial resources as a supporting condition, while ROIRD is absent and CCF is not a core condition. In technological terms, high levels of R&D investment compensate for lower R&D return rates. Such enterprises can rapidly apply mature technologies while also attempting original breakthroughs in new business areas. In organizational terms, enterprise scale ensures the sustainability of R&D investment, while financial resources play a supporting role by facilitating technology transfer. In environmental terms, strict institutional investor oversight ensures the effective allocation of R&D resources through supervisory guidance or third-party assessment mechanisms, thereby avoiding inefficient investment. According to institutional theory, the essence of the high-growth strategy of such companies is to achieve technological leadership through sustained R&D investment within a compliant framework. Empirical results show that the consistency of this path is 0.8723, with an original coverage rate of 0.3206, but its unique coverage rate is only 0.0295. This indicates that its applicability is relatively limited, with only a small number of large-scale, strong internet companies capable of becoming industry innovation leaders.

TCOM (TCOM.O) of China is a representative company under this pathway. In 2023, TCOM achieved an RD of 0.0272, a SIZE of 3.3420, an ISR of 0.6880, and a FR of 0.2343, all at high levels. As a giant in China’s online travel industry, TCOM’s core business innovations may be relatively limited. However, the company leverages its massive scale advantages and robust financial strength – evidenced by its 2023 financial report showing annual revenue exceeding RMB 44.5 billion and holding over RMB 65 billion in cash reserves – to provide solid backing for sustained, high-intensity R&D investments. These investments focus not on pioneering foundational technologies but on deepening the application and business integration of mature technologies such as artificial intelligence and big data. Examples include the “Intelligent Airfare Comparison System” and “Dynamic Hotel Bundling,”

aimed at optimizing booking processes and improving service efficiency. Simultaneously, TCOM operates under rigorous oversight from global top-tier institutional investors such as BlackRock and T. Rowe Price. This external governance mechanism, facilitated through board committees and market expectations, helps ensure that substantial R&D resources are allocated to projects with clear market prospects and strategic synergy, effectively preventing inefficient spending.

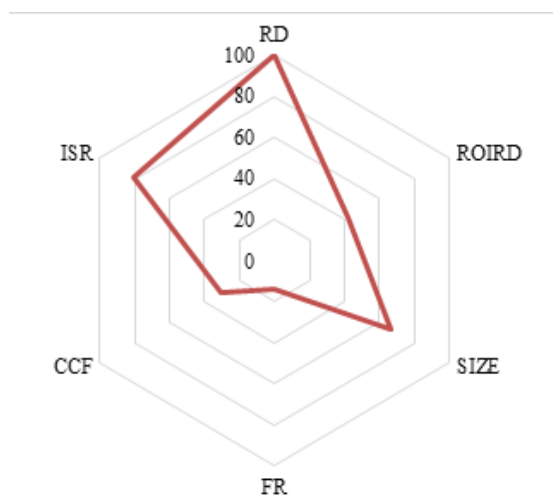


Figure 3 – TCOM.O Percentile Radar Chart of Various Conditional Variables

Note: Compiled by the authors.

(3) Path Three: Lean R&D Path

This path focuses on return on R&D investment and commercial credit as core conditions, making it suitable for the rapid growth of relatively smaller internet platform companies. In technological terms, outstanding ROIRD enables companies to build competitive advantages through technological differentiation, while limited R&D investment reflects the “lean innovation” strategy of smaller companies operating under resource constraints. In organizational terms, enterprise scale is a supporting factor: although scale is not as large as in the first two paths, internet companies still need a certain scale foundation to achieve high-speed development. This ensures basic market and technical response capabilities, but the lack of financial resources reflects that such enterprises typically lack sufficient cash flow, with operations still facing pressure. Within environmental conditions, relaxed institutional supervision and favorable commercial credit jointly create conducive conditions for innovation incubation. Empirical data indicate that the consistency of this pathway is 0.8914, with an original coverage rate of 0.3045 and a unique coverage rate of 0.0200.

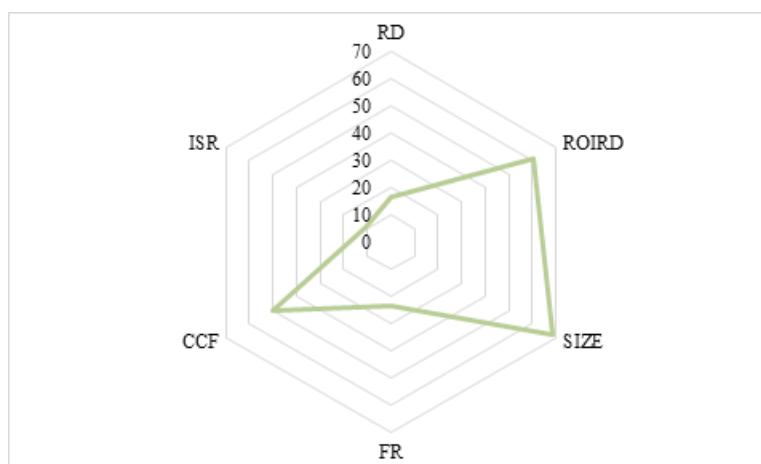


Figure 4 – PDD.O Percentile Radar Chart of Various Conditional Variables

Note: Compiled by the authors.

Pinduoduo (PDD.O) represents a leading company on this path. In 2024, Pinduoduo achieved an ROIRD of 8.8815, a CCF of 0.0233, and a SIZE of 4.2522 – all at high levels; its FR was 0.1292 and ISR was 0.4376, both at low levels. Pinduoduo’s high growth stems not from massive R&D investment, but from building unique competitive advantages through exceptionally high R&D returns and outstanding commercial credit. Despite once having a smaller revenue scale compared with established e-commerce players, Pinduoduo accumulated a user base sufficient to support efficient operations through innovative business models and low prices. Operating under relatively constrained resources, it adopted an intensely focused “lean innovation” strategy, concentrating limited R&D capabilities on core value-creating functions. For instance, it pioneered algorithmic solutions to precisely match dispersed agricultural products from production regions with massive nationwide orders. This lightweight technological approach unlocked incremental markets inaccessible to traditional e-commerce, achieving remarkable R&D efficiency. Simultaneously, the company safeguarded consumer rights through its “10 Billion Yuan Subsidy” strategy and strict “refund-only” after-sales policy, rapidly establishing commercial credibility and platform trust, boosting user stickiness and repurchase rates.

(4) Path Four: Collaborative Expansion Path

This path also takes return on R&D investment and commercial credit as core conditions and is suitable for enterprises with high technical maturity and market expansion potential. Among technical conditions, ROIRD as a core condition helps enterprises apply their technological investments, while the lack of R&D investment indicates that enterprises need to shift more resources toward the market. In organizational terms, a certain scale of enterprise size indicates that the company has completed initial market expansion and user accumulation and can further reduce marginal costs through standardized services. In environmental terms, commercial credit plays a critical role in scaled expansion, while moderate institutional supervision provides a margin for rapid trial and error. Empirical results show that the consistency of this path is as high as 0.8990, the highest among the four paths, with an original coverage rate of 0.2737 and a unique coverage rate of 0.0790, indicating a clear competitive advantage in specific market segments. The growth characteristics of such companies are characterized by a “technology–market dual-drive” model: they rapidly capture the market through scenario-based application of mature technologies while leveraging market feedback to optimize technological iterations, thereby reducing the marginal costs of market expansion and transforming technological advantages into market scale advantages.

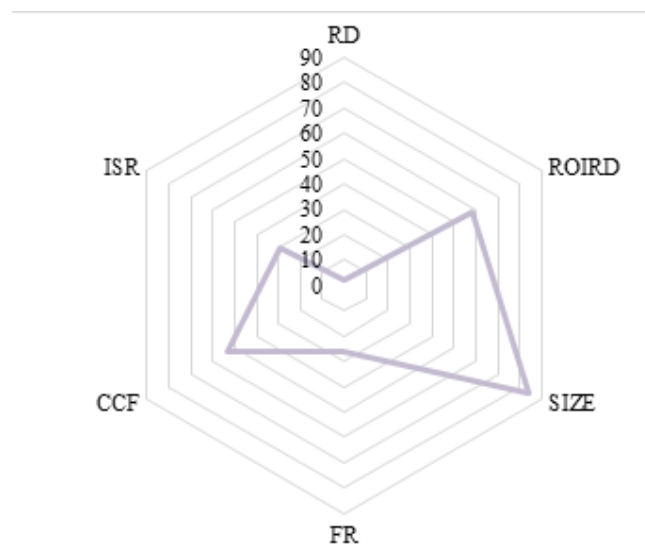


Figure 5 – JD. O Percentile Radar Chart of Various Conditional Variables

Note: Compiled by the authors.

JD.com (JD.O) is a representative company under this path. In 2024, JD’s ROIRD was 2.6223, CCF was 0.0188, and SIZE was 4.5761, all at high levels; RD was 0.0015 and ISR was 0.4387, indicating a low level. Leveraging efficient conversion of mature technologies and exceptional commercial

credibility, JD maximizes marginal benefits from market expansion upon its established scale. As a company with substantial scale, JD transforms technological investments into significant operational efficiency gains and cost optimization through its highly automated “Asia No.1” smart warehouses and efficient big-data-driven supply chain systems, achieving high R&D returns. Simultaneously, its long-cultivated user perception of “authentic products and fast delivery” constitutes a powerful commercial credit asset. This not only solidifies its core user base in first- and second-tier cities but also serves as a crucial trust foundation for expanding into lower-tier markets and omnichannel operations. Examples include deepening user trust and stickiness through enhanced “211 Express Delivery” service commitments and the JD PLUS membership system.

The primary methods for assessing the robustness of configuration studies typically involve adjusting consistency thresholds, calibration thresholds, or the frequency of cases in change studies. This study validated the reliability of configuration analysis conclusions through a dual robustness testing strategy. First, the consistency threshold was strictly adjusted from 0.85 to 0.90, and no structural shifts occurred in the core configuration paths. Second, the PRI consistency standard was raised from 0.5 to 0.6, resulting in a subset of the original configuration solution. This indicates that the conclusions of this study are robust. Furthermore, in consideration of the sampling issues within this study, a subsample analysis was conducted. Specifically, after removing the Kazakhstani case from the sample, a separate configurational analysis was performed solely on the Chinese sample. The core driving pathways identified in this study remained structurally unchanged. This demonstrates that the findings regarding the antecedents of high-growth configurations in digital enterprises are robust and reliable. Overall, the empirical evidence suggests that there is no single optimal pathway to high growth in digital industries. Instead, sustainable competitive advantages emerge from the effective alignment of technological capabilities, organizational resources, and environmental conditions. These findings contribute to a more nuanced understanding of digital enterprise growth by demonstrating that multiple configurations can lead to comparable performance outcomes, while emphasizing the importance of context-specific strategic choices.

Taken together, the four configurations demonstrate that the antecedents of high growth are not mutually exclusive but complementary. Although the importance of individual conditions varies across configurations, enterprise scale and the efficient transformation of technological capabilities into market outcomes emerge as recurring elements in several pathways. This suggests that competitive advantage in digital industries is created not by maximizing a single resource but by aligning technological capabilities with organizational resources and external institutional conditions. These findings also enrich the TOE framework by showing that the same technological conditions may produce different outcomes depending on their organizational and environmental context. From a managerial perspective, this implies that firms should avoid adopting a standardized growth strategy. Instead, they should develop growth models that reflect their own resource base, innovation capabilities, and institutional environment, thereby improving the effectiveness of strategic decision-making.

Conclusions

This study focuses on the topic of high-performance growth in the digital industry of emerging countries. Based on the technology-organization-environment (TOE) theoretical framework and using fuzzy set qualitative comparative analysis (fsQCA), this study systematically explores the antecedent configurations and their mechanisms of high growth of Internet platform enterprises in emerging economies. The results show that high growth in the digital industry does not depend on a single factor, but rather on the synergistic effects of multiple conditions in the dimensions of technology, organization, and environment. Specifically, four differentiated paths are presented: First, the “scale-driven path” relies on the synergy between enterprise scale and return on R&D investment, leveraging the internal knowledge management systems of large internet firms to amplify their scale effects, achieving incremental innovation with low R&D investment, suitable for large firms with abundant resource endowments; second, the “R&D – supervision-driven path” builds on the core condition of enterprise scale, with level of R&D investment and institutional supervision and regulation as key elements, ensuring the efficient use of R&D investment through supervisory constraints, suitable for

leading digital firms with capital reserves; third, The “lean R&D path” focuses on the synergistic effects of return on R&D investment and commercial credit, achieving technological breakthroughs through lean innovation and open-source collaboration, and continuously attracting more resources based on these breakthroughs to promote mutual growth in technological development and performance. The fourth, the “collaborative expansion path” emphasizes the integration of return on R&D investment and market expansion, rapidly capturing niche markets through the practical application of technology, suitable for internet companies with a certain level of technological capability seeking to deepen their presence in vertical fields and achieve rapid breakthroughs. The consistency level of the four paths is 0.8620, with a coverage rate of 50.35%, which adequately explains the underlying pathways of the high growth of internet platform companies in emerging economies. For individual companies, path selection should be based on a comprehensive consideration of technological endowments, organizational scale, and environmental characteristics. The study further reveals that relying solely on enterprise scale or R&D investment may lead to efficiency bottlenecks, and innovation capability is an important condition for sustainable growth. This has implications for the development of the digital economy in traditional resource-dependent economies.

When promoting rapid growth in the digital industry, emerging economies should avoid blindly pursuing high R&D spending or largescale expansion. Instead, firms need to choose development paths that fit their own resource profiles. First, governments should put in place differentiated support policies. For larger firms that already operate at scale, policies can encourage them to use that scale to lower innovation costs and grow by continuously refining their business models – for example, by offering tax breaks on incremental innovation in existing operations. For smaller digital firms with limited resources, the policy focus should be on improving the commercial credit environment, fostering supplychain finance, and shortening the payment cycle on accounts receivable so that these firms can obtain lowcost financing based on their transaction records, thereby following a lean R&D path. Second, regulators need to rethink the role of institutional investors. Our findings show that firms with higher institutional ownership tend to use their R&D funds more efficiently. Emerging economies could therefore introduce policies that channel longterm capital – such as pension funds and insurance money – into the digital sector, while also requiring institutional investors to set up technology committees on the boards of the firms they invest in, tasked with monitoring how R&D budgets are spent. Third, the commercial credit environment is a critical link between technology and the market. Governments can build a unified creditrating platform for digital firms that incorporates indicators such as historical transaction data, contract performance rates, and user complaint rates. If the ratings are then tied directly to bank loans and government subsidies, this can significantly lower the trustrelated costs of market expansion and allow technologically strong firms to gain market recognition more quickly. Finally, when designing digital industry policies, countries should move away from singlemetric targets – such as focusing solely on R&D as a share of GDP. Instead, they should identify which combination of conditions is most lacking at their current stage of development and then target their resources accordingly.

The findings of this study are not only applicable to emerging developing countries but also offer valuable insights when applied specifically to Kazakhstan’s domestic context. Kazakhstan already has a success story in its digital industry–Kaspi. The Kaspi case is consistent with configuration S1. This suggests that in promoting digital industry development, Kazakhstan should shift its policy focus from simply increasing R&D spending to enhancing R&D conversion efficiency. In configuration S1, RD is absent while ROIRD is a core condition, implying that for firms with an established scale base, the key lies in transforming existing technological resources into market value rather than blindly pursuing R&D intensity. At the same time, Kazakhstan should encourage large digital firms to leverage scale effects and expand into new businesses around their existing platforms, entering new markets by integrating existing resources such as payment networks, user data, and logistics systems, and supporting their collaborative expansion in fintech, e-commerce, and logistics. However, specific approaches should be tailored to firm-level realities and avoid a one-size-fits-all approach. In addition, the regulatory environment should be aligned with firms’ development stages. The absence of ISR in configuration S1 suggests that a relatively lenient regulatory environment may help such firms adjust their strategies flexibly. This does not mean abandoning regulation; rather, it suggests that in

the early stage of digital industry development, Kazakhstan should focus on consumer data privacy protection and market order maintenance, and avoid imposing excessive ex-ante approval or cross-sector restrictions too early, which could dampen firm growth. Finally, Kazakhstan should use Kaspi as a reference but avoid simple replication. Kaspi's success reflects the synergy between scale and R&D conversion efficiency, but not all firms possess the same conditions. Kazakhstan should encourage more firms to explore paths suited to their own resource endowments, rather than uniformly requiring high R&D investment or large-scale expansion. Policy design should be based on firm heterogeneity, identifying which firms are close to the condition combination of configuration S1 and which are better suited to other paths.

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REFERENCES

- 1 Sadreddin A., Chan Y.E. Pathways to developing information technology-enabled capabilities in born-digital new ventures // *International Journal of Information Management*. 2023. Vol. 68. P. 102572.
- 2 Nambisan S., Lyytinen K., Majchrzak A., Song M. Digital innovation management // *MIS Quarterly*. 2017. Vol. 41. No. 1. P. 223–238.
- 3 Autio E., Nambisan S., Thomas L.D., Wright M. Digital affordances, spatial affordances, and the genesis of entrepreneurial ecosystems // *Strategic Entrepreneurship Journal*. 2018. Vol. 12. No. 1. P. 72–95.
- 4 Von Briel F., Recker J., Davidsson P. Not all digital venture ideas are created equal: Implications for venture creation processes // *The Journal of Strategic Information Systems*. 2018. Vol. 27. No. 4. P. 278–295.
- 5 Guo R., Yin H., Liu X. Coopetition, organizational agility, and innovation performance in digital new ventures // *Industrial Marketing Management*. 2023. Vol. 111. P. 143–157.
- 6 Cheng C., Miao Z. Leveraging digital connectivity for innovation performance: A fsQCA study on Chinese high-tech manufacturing firms // *Humanities and Social Sciences Communications*. 2025. Vol. 12. No. 1. P. 58.
- 7 Li T., Wen J., Zeng D., Liu K. Has enterprise digital transformation improved the efficiency of enterprise technological innovation? A case study on Chinese listed companies // *Mathematical Biosciences and Engineering*. 2022. Vol. 19. No. 12. P. 12632–12654.
- 8 Avenyo E.K., Tregenna F., Kraemer-Mbula E. Do productive capabilities affect export performance? Evidence from African firms // *The European Journal of Development Research*. 2021. Vol. 33. P. 304–329.
- 9 Simon H. Hidden champions in the Chinese century. Cham: Springer, 2022. 200 p.
- 10 Audretsch D.B., Belitski M. Digitalization, resource mobilization and firm growth in emerging industries // *British Journal of Management*. 2024. Vol. 35. No. 2. P. 613–628.
- 11 Clemente-Almendros J.A., Nicoara-Popescu D., Pastor-Sanz I. Digital transformation in SMEs: Understanding its determinants and size heterogeneity // *Technology in Society*. 2024. Vol. 77. P. 102483.
- 12 Kamp B., Ruiz de Apodaca I. Leveraging (in)formal early-mover and diligent-follower advantage mechanisms to attain international niche market leadership: insights from Basque “hidden champions” // *Competitiveness Review: An International Business Journal*. 2023. Vol. 33. No. 6. P. 1013–1045.
- 13 Chen R., Zhang B., Chen Y. How does digital transformation influence collaborative green innovation? // *Journal of Global Information Management*. 2024. Vol. 32. No. 1. P. 1–21.
- 14 Meng F., Ma X., Li Z. Trade credit, digital penetration, and green innovation: Micro-level evidence from supply chain networks // *Emerging Markets Finance and Trade*. 2026. Vol. 62. No. 10. P. 3579–3592.
- 15 Xu S., Zhou L., He M. Heterogeneous institutional investor behaviour and corporate digital technology innovation // *Finance Research Letters*. 2025. Vol. 79. P. 107285.
- 16 Delmar F. Measuring growth: methodological considerations and empirical results // *Entrepreneurship and SME research*. London: Routledge, 2019. P. 199–215.
- 17 Chen L., Zhang Y. Can supply chain concentration drive an increase in a company's market share? // *Research in International Business and Finance*. 2025. Vol. 73. P. 102518.
- 18 Hazarika N., Hosseini S. R&D intensity and its curvilinear relationship with firm profitability: Perspective from the alternative energy sector // *Sustainability*. 2021. Vol. 13. No. 9. P. 5060.
- 19 Drempetic S., Klein C., Zwergel B. The influence of firm size on the ESG score: Corporate sustainability ratings under review // *Journal of Business Ethics*. 2020. Vol. 167. No. 2. P. 333–360.
- 20 Pu T. Exploring the impact of digital technology adoption on cash holdings: Financing constraints as a moderator // *Future Business Journal*. 2025. Vol. 11. P. 66.

21 Ng C.K., Smith J.K., Smith R.L. Does firm-level carbon assurance matter for trade credit? // Finance Research Letters. 2024. Vol. 69. P. 106134.

22 Chung C.Y., Liu C., Wang K. Do firms have target capital structures? Evidence from institutional monitoring // International Review of Economics and Finance. 2019. Vol. 58. P. 65–77.

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ДАМЫП КЕЛЕ ЖАТҚАН ЭКОНОМИКАЛАРДАҒЫ ЦИФРЛЫҚ ИНДУСТРИЯНЫҢ ЖЕДЕЛ ДАМУЫНЫҢ ЖОЛДАРЫ: ЖЕТЕКШІ ИНТЕРНЕТ ПЛАТФОРМАЛАРЫНЫҢ КОНФИГУРАЦИЯЛЫҚ ТАЛДАУЫ

Андатпа

Ғаламдық цифрлық технологиялардың қарқынды дамуы жағдайында дамушы елдер дәстүрлі индустриялардың баяу трансформациялануы және әлсіз цифрлық негіздер сияқты ортақ проблемаларға тап болады, бұл олардың ерекше жағдайларына бейімделген жедел цифрлық индустрияландыру жолдарын іздестіруді шұғыл талап етеді. Бұл зерттеудің мақсаты – дамушы елдердегі цифрлық кәсіпорындардың жоғары өсуіне ықпал ететін негізгі шарт комбинациялары мен іске асыру жолдарын жүйелі түрде анықтау, дәстүрлі индустриялардың трансформациясының баяулауы және әлсіз цифрлық негіздер жағдайында осы елдерге арналған бейімделген жедел цифрлық индустрияландыру жолдарын зерттеу. «Технология-ұйым-орта» (ТОЕ) теориялық шеңберіне сүйене отырып, зерттеуде анық емес жиынтықтардың сапалық салыстырмалы талдауы (fsQCA) қолданылады. Ол дамушы елдердегі 21 репрезентативті жетекші интернет-платформа компаниясының 2020–2024 жылдардағы қаржылық деректерін бақылау үлгілері ретінде пайдалана отырып, цифрлық фирмалардың жоғары өсуіне әсер ететін факторлардың конфигурациялық талдауын жүргізеді. Бұл жұмыстың ғылыми маңыздылығы – дәстүрлі бір факторлы талдаудың шектеулерінен асып, көп өлшемді факторлардың бірлескен ынталандырушы әсерін ашуда. Практикалық тұрғыдан алғанда, ол дамушы елдерге цифрлық индустриялық саясатты жобалау үшін нақты іс-қимылға бағдарланған түсініктер береді. Зерттеудің құндылығы – дамушы нарықтардағы цифрлық индустрияны зерттеуге жаңа конфигурациялық көзқарасты ұсынып, төрт сараланған жоғары өсу жолын (масштабқа негізделген, ҒЗТКЖ-қадағалаумен қамтамасыз етілген, үнемді ҒЗТКЖ және бірлескен кеңейту жолдары) құрастыруында. Практикалық нәтижелер көрсеткендей, жоғары өсу үшін бірде-бір фактор міндетті шарт болып табылмайды; кәсіпорындар мен саясаткерлер технологиялық қуаттарға, ұйымдық масштабқа және сыртқы орта сипаттамаларына сүйене отырып, тиісті даму жолдарын таңдауы қажет, осылайша дамушы елдердегі цифрлық индустрияландыруды жеделдетеді.

Тірек сөздер: дамушы экономикалар, цифрлық салалар, жедел өсу, интернет-платформалық компаниялар, технологиялық, ұйымдық және сыртқы орта, анық емес жиынтықтарға негізделген сапалық салыстырмалы талдау, жоғары өсу траекториялары.

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ПУТИ УСКОРЕННОГО РАЗВИТИЯ ЦИФРОВЫХ ОТРАСЛЕЙ В РАЗВИВАЮЩИХСЯ ЭКОНОМИКАХ: КОНФИГУРАЦИОННЫЙ АНАЛИЗ ВЕДУЩИХ ИНТЕРНЕТ-ПЛАТФОРМ

Аннотация

На фоне стремительного развития глобальных цифровых технологий развивающиеся страны сталкиваются с общими проблемами, такими как медленная трансформация традиционных отраслей и слабая цифровая основа, что требует незамедлительного поиска ускоренных путей цифровой индустриализации, адаптированных к их конкретным условиям. Цель данного исследования – выявить ключевые комбинации условий и пути реализации, обеспечивающие высокий рост цифровых предприятий в развивающихся экономиках, и изучить адаптированные пути ускоренной цифровой индустриализации для этих стран в условиях замедления трансформации традиционных отраслей и слабой цифровой основы. Основываясь на теоретической концепции «технология–организация–среда» (ТОЕ), исследование использует метод качественного сравнительного анализа нечётких множеств (fsQCA). В нем используются финансовые данные 2020–2024 гг. 21 репрезентативной ведущей интернет-платформенной компании в развивающихся экономиках в качестве наблюдаемых образцов для проведения конфигурационного анализа факторов, влияющих на высокий рост цифровых фирм. Научная значимость этой работы заключается в преодолении ограничений традиционного однофакторного анализа и раскрытии синергетического стимулирующего воздействия многомерных факторов. Практически она предоставляет развивающимся странам действенные рекомендации для разработки политики в области цифровой индустрии. Ценность исследования состоит в том, что оно предлагает новый конфигурационный подход к изучению цифровой индустрии на развивающихся рынках, формируя четыре дифференцированных пути высокого роста: масштабно-ориентированный, обусловленный НИОКР и надзором, бережливый НИОКР и совместного расширения. Практические выводы показывают, что ни один отдельный фактор не является необходимым условием для высокого роста; вместо этого предприятия и политики должны выбирать адаптированные пути развития на основе технологического потенциала, организационного масштаба и характеристик внешней среды, тем самым ускоряя цифровую индустриализацию в развивающихся экономиках.

Ключевые слова: развивающиеся экономики, цифровые отрасли, ускоренный рост, интернет-платформенные компании, технологическая, организационная и внешняя среда, нечеткий сравнительный анализ, пути высокого роста, конфигурационный анализ.

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