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Validation and Application of the Digital Linguistic Entrepreneurship Index for Enterprises

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ABSTRACT

This paper presents a framework for evaluating Digital Linguistic Entrepreneurship in enterprises, which includes three primary indicators: digital linguistic entrepreneurial philosophy, capability, and resources, along with seven secondary indicators. Reliability and validity tests confirm that this framework is both reliable and practical for assessing digital linguistic entrepreneurship. An analysis of 31 Chinese enterprises shows generally positive performance, with strengths in digital innovation and communication efficiency. However, areas for improvement include adopting advanced digital technologies and integrating multilingual platforms, particularly among state-owned enterprises. The study emphasizes the need to improve digital linguistic capabilities, cultivate digital talent, and leverage external resources and policies to support digital transformation. These findings provide valuable insights for Chinese enterprises aiming to enhance their global competitiveness, better utilize digital linguistic resources, and sustain growth in an increasingly digital world. The study offers both a practical framework and strategic recommendations for enterprises seeking to strengthen their digital linguistic entrepreneurship.

Keywords: Digital Linguistic Entrepreneurship; Language Services; Evaluation Index System; Validation and Application

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1. Introduction

Improving new productivity requires not only technological innovation but also optimizing the allocation of production factors. This optimization facilitates the integration of new and traditional productivity models, boosting enterprise capabilities in the digital era. Digital linguistic entrepreneurship refers to the innovative use of digital resources within the language services sector, enhancing efficiency and competitiveness in global markets, particularly in areas like translation, multilingual communication, and language data management. Language services are essential in the digital economy, enabling businesses to communicate effectively across linguistic and cultural boundaries.

The concept of new quality productive forces highlights the need for both technological advances and innovative resource allocation. It emphasizes the digitization and intelligent transformation of production and service methods, which are crucial for businesses seeking to stay competitive in a digital world. Digital linguistic entrepreneurship plays a key role in this transformation by providing the tools and frameworks businesses need to enhance their communication capabilities, optimize digital resources, and foster innovation in language services. By leveraging digital platforms, businesses can improve language resource production and dissemination, making operations more agile and scalable.

Effective language services are crucial for information transmission in the digital age. As businesses engage with global audiences, communication efficiency becomes a critical success factor. Optimizing digital language services not only enhances operational efficiency but also contributes to broader digital transformation goals. This transformation involves integrating digital technologies across business functions, from customer interactions to strategic decision-making. Improved communication efficiency helps businesses reduce delays, enhance customer satisfaction, and make faster, data-driven decisions, all of which are vital in competitive markets.

Digital linguistic entrepreneurship enables the efficient use of digital resources like machine translation, AI-driven language models, and data analytics, which speed up and improve language processing. This helps businesses respond quickly to market changes and innovate continually. Moreover, it creates new opportunities by opening markets, connecting with diverse linguistic groups, and offering culturally

relevant services.

In a globalized digital landscape, strengthening digital linguistic entrepreneurship is essential for enhancing productivity. By improving communication efficiency and promoting technological innovation, digital linguistic entrepreneurship supports enterprises, especially in China, as they navigate digital transformation and compete globally. As Chinese enterprises expand internationally, integrating digital linguistic strategies into operations will be a key factor in their success. Moreover, this aligns with the broader trend of digitalization, which drives competitiveness in the modern economy. Companies that embrace this transformation will not only optimize internal operations but also contribute to the global digital ecosystem.

2. Literature Review

2.1. Current Research on Digital Entrepreneurship

Digital entrepreneurship has been a focal point of academic research and commercial practice due to its positive impacts on job creation and economic growth. Hull et al., proposed a typology for digital entrepreneurship, categorizing emerging digital enterprises into mild, moderate, and extreme types, exploring the characteristics of success factors for each type^[1]. They emphasized the crucial role of digital or virtual products and services, workplaces, and computer-mediated communication (CMC) in digital entrepreneurship. Davidson et al., further explored digital entrepreneurship through the lens of socio-material practice, using the eHarmony case to illustrate the manifestations and synergy of these practices^[2]. They proposed a research agenda aimed at further developing these concepts and advancing the understanding of digital entrepreneurship. Hair et al. discussed market orientation issues within digital entrepreneurship, proposing propositions and exploring the advantages and challenges that the Internet provides for market-oriented digital entrepreneurs^[3]. Nambisan highlighted the importance of digital technology perspectives in entrepreneurship research, suggesting enriching existing theories by considering less clearly defined entrepreneurial processes and outcomes and less predetermined entrepreneurial actors^[4]. Sussan et al. introduced a conceptual framework for studying entrepreneurship in the digital age, integrating the concepts of

digital ecosystems and entrepreneurial ecosystems^[5]. They put forward propositions for each concept and utilized a multilateral platform theoretical framework to better understand the digital entrepreneurial ecosystem. Sahut et al. pointed out the importance of understanding the environment and reasons driving digital entrepreneurship, proposing a micro-level research method, supplementing studies focusing on digital entrepreneurship ecosystems and digital platform economies^[6]. Elia et al., and Secundo et al., further explored the phenomenon of reshaping the entrepreneurial process through digital technology and collective intelligence, emphasizing the necessity of structured literature reviews and research agendas in the digital entrepreneurship field^[7, 8]. Bican et al., proposed definitions and a conceptual framework for digital business models, digital transformation, and digital entrepreneurship from the perspective of innovation and R&D managers, exploring how digital readiness, digital technology, and digital business models promote sustainable innovation through the digital transformation process^[9]. Jafari-Sadeghi et al., explored the impact of digital transformation on technological entrepreneurship and technological market expansion, focusing on the roles of technology readiness, exploration, and exploitation in digital entrepreneurship^[10].

Digital entrepreneurship has emerged as a transformative force in the global economy, driven by advancements in technology and the increasing digitization of business operations. Scholars have explored various facets of digital entrepreneurship, emphasizing its capacity to disrupt traditional industries and foster innovation. For instance, Nambisan highlights how digital platforms enable entrepreneurs to overcome geographical and operational constraints, creating opportunities for global market penetration^[11]. Similarly, Sussan and Acs argue that digital ecosystems provide the infrastructure necessary for entrepreneurial activities to thrive in a highly connected world^[12].

2.2. Linguistic Entrepreneurship

Peter De Costa et al., discuss how language learning is increasingly seen as a form of linguistic , aligning with the moral imperative to strategically exploit language-related resources to enhance one's worth in the world. This concept is further explored in their 2018 paper, where they highlight the affective regime and audit culture that have resulted in

certain languages and identities being assigned greater value over others. The and instantiation of linguistic entrepreneurship in various educational contexts are explained in the 2020 special issue, emphasizing its contribution to , , and language policy research on^[13-15]. Bianco delves into the links between linguistics and the economics of entrepreneurship, noting tensions between language skills valued in Australia's Asia literacy project and its multicultural aims^[16]. Dalmau analyzes English-Medium-Instruction (EMI) lecturers' orientations towards neoliberal language policies and linguistic entrepreneurship, showing how they navigate these policies in higher education settings^[17]. Starr et. al., examine the discourse of Mandarin enrichment centers in , focusing on how these programs position learners in relation to linguistic entrepreneurship^[18]. Wang et. al., explore the impact of the local tea industry on the language ecology of the Blang community in , taking an ecology perspective in^[19]. Yu et. al., present narratives of at Chinese universities, highlighting their language ideologies and linguistic entrepreneurship as responses to China's rise^[20]. Xu discusses international students' linguistic entrepreneurship, motivation, 'Chinese Fever,' and the neoliberal burden they face in pursuing language learning opportunities^[21].

2.3. Digital Entrepreneurship and Linguistic Entrepreneurship

Digital entrepreneurship refers to the ability to identify and develop digital entrepreneurial opportunities and utilize digital technology to drive entrepreneurial activities in the digital economy era. It involves several elements, including digital technology, digital entrepreneurial capability, digital entrepreneurial opportunities, digital entrepreneurial resources, and digital business models^[22]. The focus is on using digital platforms and tools to create and promote new products and services, adapting to the development trends of the digital economy.

On the other hand, linguistic entrepreneurship focuses more on the application of language abilities in entrepreneurship. Language abilities include knowledge, skills, ethics, and governance, which are crucial in the digital age as language data has become a key production factor^[23]. Linguistic entrepreneurship often involves language services, translation, education, and other areas that operate through digital platforms to achieve entrepreneurial objectives^[24].

Though digital entrepreneurship and linguistic entrepreneurship differ conceptually, they can influence each other in practice. For instance, in the digital economy context, the industrialization trend of language data advances the language industry, presenting new opportunities and challenges for linguistic entrepreneurship^[25]. Meanwhile, the development of digital technologies provides technical support for linguistic entrepreneurship, enabling more efficient matching of language services to market needs.

Furthermore, language abilities play a significant role in digital entrepreneurship. For example, students majoring in Business English can enhance their entrepreneurial qualities by improving their language skills, better utilizing language as an economic tool and human capital^[26]. This synergetic training model not only enhances students' entrepreneurial qualities but also offers new educational directions for local colleges and universities.

In the digital economy, there exists a certain intersection and complementarity between digital entrepreneurship and linguistic entrepreneurship. Digital entrepreneurship provides technical support and market opportunities for linguistic entrepreneurship, while linguistic entrepreneurship offers important service and content support to digital entrepreneurship. Thus, their interaction and integration will have a profound impact on future entrepreneurial activities in the digital economic context.

2.4. The Integration of Digital Entrepreneurship and Multilingual Communication

As businesses expand into global markets, multilingual communication becomes a critical factor for success. Studies emphasize that effective multilingual strategies enhance customer engagement, facilitate cross-border collaboration, and build brand equity in diverse linguistic and cultural settings^[27]. Moreover, research by Feely and Harzing^[28] underscores the importance of language management in reducing communication barriers and fostering trust among international stakeholders.

The intersection of digital entrepreneurship and multilingual communication has gained scholarly attention in recent years. Karakose et al.^[29] provide insights into the role of digital tools in managing linguistic diversity within global entrepreneurial ventures. Their bibliometric analysis reveals that digital platforms enable real-time translation,

multilingual customer support, and culturally adaptive marketing strategies, which are pivotal for scaling businesses internationally.

Similarly, Papadakis et al.^[30] explore the intellectual structure of digital leadership and its implications for multilingual communication. They argue that digital leaders who leverage language technologies, such as AI-powered translation and speech recognition tools, can bridge linguistic gaps and create more inclusive digital environments. These findings align with the work of Yirci et al.^[31], who identify mentorship and professional development as key components in equipping entrepreneurs with the skills needed to navigate multilingual challenges.

While the benefits of integrating multilingual communication into digital entrepreneurship are well-documented, challenges remain. Research by Rugman and Verbeke^[32] highlights the complexities of cultural adaptation, noting that linguistic nuances often lead to misinterpretations in cross-cultural interactions. Additionally, Li and Zhang^[33] argue that resource limitations, such as inadequate access to advanced language technologies, can hinder small and medium-sized enterprises (SMEs) from adopting effective multilingual strategies.

Recent studies suggest a growing interest in the application of artificial intelligence (AI) and machine learning (ML) in multilingual communication for digital entrepreneurship. For example, Huang et al.^[34] examine how AI-driven content generation and sentiment analysis tools can optimize marketing strategies across different linguistic markets. Similarly, Wang et al.^[35] highlight the potential of blockchain technology in ensuring secure and transparent multilingual transactions.

Another emerging trend is the emphasis on localized content creation. Karakose et al. argue that tailoring digital content to align with the linguistic and cultural preferences of target markets enhances customer engagement and brand loyalty. This aligns with findings by Sánchez and Martínez^[36], who advocate for the integration of user-generated content to capture diverse linguistic perspectives and foster community-driven innovation.

The integration of digital entrepreneurship and multilingual communication represents a dynamic and evolving field of study. Recent research underscores the transformative potential of leveraging digital tools to address linguistic

diversity, enhance global market access, and foster cross-cultural collaboration. However, challenges such as cultural adaptation and resource constraints remain significant barriers. Future studies should focus on exploring innovative technologies and strategies to overcome these challenges, ensuring the equitable participation of diverse linguistic groups in the digital economy.

2.5. The Impact of Digital Linguistic Entrepreneurship on Enterprise Performance

Digital linguistic entrepreneurship involves the process of using language and digital technology to develop, market, and innovate products and services to create value. In the knowledge economy era of digitalization, enterprises need to effectively plan, acquire, and utilize internal and external language resources, engaging in digital linguistic strategic management to achieve business goals. This capability directly affects a firm's market competitiveness and innovative capability.

Digital linguistic entrepreneurship enhances an enterprise's resource acquisition ability. In situations where digital resources are limited, businesses can leverage valuable digital resources to compensate for their shortcomings, respond swiftly to market changes, and achieve transition into new products, services, and business models. This ability enables firms to more effectively identify and exploit market opportunities, thereby enhancing their performance.

Moreover, digital linguistic entrepreneurship is closely linked to an enterprise's social capital. Social capital is a vital source of innovative advantage, enabling businesses to transcend organizational boundaries, seek knowledge and resources, and establish highly trustworthy relationships with partners, fostering free-flowing information and laying the foundation for improved innovation performance^[37]. This trust relationship and information flow assists firms in enhancing innovation performance within the digital ecosystem context.

Simultaneously, digital linguistic entrepreneurship influences an enterprise's strategic decision-making and organizational management. The openness and flexibility of digital technologies allow businesses to sense their environment, recognize opportunities, evaluate, and utilize them^[38]. This flexibility and openness not only enhance adaptability but also strengthen competitive advantages in complex market

environments.

Digital linguistic entrepreneurship significantly affects enterprise performance by enhancing resource acquisition capabilities, strengthening social capital, improving strategic decision-making, and increasing organizational flexibility. This influence is not only reflected in a firm's innovative capability and market responsiveness but also in its overall competitiveness and sustainability. Thus, digital linguistic entrepreneurship is a critical factor for enterprise success in the digital era.

3. Construction of the Digital Linguistic Entrepreneurship Evaluation Index System

This study constructs an evaluation index system for Digital Linguistic Entrepreneurship and attempts to evaluate the digital linguistic entrepreneurship capability of 31 telecommunications, internet, and financial companies in China. The system consists of 3 primary indicators, 7 secondary indicators, and 16 tertiary indicators (see **Table 1**).

3.1. Digital Linguistic Entrepreneurial Philosophy

This indicator has two main aspects: the frequency of digital translation tool usage and the multilingual digital platform support. Digital tools like machine translation and translation memory help companies convert languages efficiently and reflect their digital awareness. A high usage rate indicates strong digital acceptance, while reliance on human translation may suggest a more traditional approach. The multilingual platform support measures how companies provide multilingual versions, particularly timely English updates, showcasing their global vision and digital language service philosophy.

3.2. Digital Linguistic Entrepreneurial Capability

Digital communication capability is measured by the number of languages in annual reports and the activity level on digital media. The multilingual versions of annual reports reflect the scope of the enterprise's language outreach, while the Qingbo index evaluates the enterprise's digital me-

dia communication capability. Furthermore, the number of languages available on the corporate website represents its cross-language communication capability. Digital innovation capability includes investment in research and development and the application of multimodal language service

technologies, reflecting the enterprise’s level of innovation in the digital context. Digital management capability pertains to the effective management of multilingual data and website content, impacting the enterprise’s digital linguistic entrepreneurship capability.

Table 1. Evaluation index system for digital linguistic entrepreneurship of multinational enterprises in China.

Primary Indicator	Code	Secondary Indicator	Code	Tertiary Indicator	Code
Digital Linguistic Entrepreneurial Philosophy	A ₁	Digital Translation Philosophy	B ₁	Use of Digital Translation Tools	C ₁
				Proportion of Human vs. Computer-Assisted Translation	C ₂
		Digital Language Service Demand Philosophy	B ₂	Synchronization Level of Chinese and English Website Content	C ₃
				number of foreign Languages on the Digital platform	C ₄
Digital Linguistic Entrepreneurial Capability	A ₂	Digital Communication Capability	B ₃	Number of languages in Annual Reports Online	C ₅
				Activity level of New Media Big Data Platform	C ₆
				Number of languages on the Company Website	C ₇
		Digital innovation Capability	B ₄	Digital R&D Investment	C ₈
				Types of Multimodal Language Service Technology	C ₉
		Digital Management Capability	B ₅	Multilingual Data Management Capability	C ₁₀
				External Discourse Quality Management Capability	C ₁₁
				Hypertext Knowledge Management Capability	C ₁₂
Digital Linguistic Entrepreneurial Resources	A ₃	Regular Digital Resources	B ₆	Digital Resource Operation Capability	C ₁₃
				Size of Corpus	C ₁₄
		Emergency Response Digital Resources	B ₇	Number of Emergency Language information Communication and Language Monitoring Resources Acquired	C ₁₅
				Number of Resources Provided for Emergency Language Information Communication and Language	C ₁₆

3.3. Digital Linguistic Entrepreneurial Resources

An enterprise’s corpus and data processing capabilities are important resources. The size, quality, and update fre-

quency of the corpus measures the enterprise’s efficacy in language service and data accumulation. Emergency language service capability encompasses the coverage and response speed of multilingual translation, oral, and sign language services, reflecting the enterprise’s ability to manage language

resources during emergencies.

4. Research Questions, Data, and Methods

4.1. Research Questions

This study aims to address the following questions:

1) What is the reliability and validity of the digital linguistic entrepreneurship evaluation index system for Chinese enterprises? What are the appropriate weights for the indicators?

2) How is the digital linguistic entrepreneurship of 31 representative Chinese enterprises assessed? Are there differences among enterprises? How can we effectively enhance the digital capabilities of Chinese enterprises?

4.2. Research Sample and Data

Based on China's digital enterprise rankings over the past five years and data availability, this study selects 31 telecommunications, internet, and financial companies as the research sample, which fall into the internet and telecommunications sectors (see **Table 2**).

The data for this study comes from extensive and objective sources, using publicly released company rankings by official or authoritative institutions domestically and internationally, including the "2022 Forbes China Digital Economy 100". Based on the listed enterprises, internet and telecommunications companies were selected, and data availability determined the final 31 enterprises.

4.3. Research Methodology

This study uses the subjective Delphi method and the objective entropy weight method to test and assign weights to the indicator system's reliability and validity.

(1) Delphi Method

The study invited twelve experts to evaluate the reliability and validity of the evaluation index system, including six academics from the field of language services and six executives from language service companies. Twelve questionnaires were distributed over two survey rounds, achieving a 100% return rate. The evaluated functions included average importance, full mark rate, and variation coefficient. Un-

qualified indicators were removed, and the indicator system was refined based on expert feedback to ensure scientific validity.

Given the central role of expert evaluations in the Delphi method, we recognize the potential for bias, particularly when experts have close ties to industries being assessed. To mitigate this risk, we took the following steps to ensure impartiality and diversity in our expert panel: (1) Expert Selection: Experts were selected from a diverse range of backgrounds and contexts, including both China and the West, as well as academia and the localization industry, to provide a balanced view of the topic. A total of 12 experts were invited, with a focus on those who have extensive experience in digital entrepreneurship, multilingual communication, and digital technologies. (2) Conflict of Interest: All experts were asked to disclose any potential conflicts of interest, including financial or professional ties to the companies being assessed. Any expert with a conflict of interest was excluded from participation to maintain objectivity in the evaluation process. (3) Feedback Handling: Expert feedback was collected anonymously, and responses were carefully analyzed to identify areas of consensus. Dissenting opinions were also recorded and addressed in the final evaluation, ensuring a transparent and comprehensive process. (4) Expert Feedback Process: The expert evaluation process followed an iterative Delphi methodology. After an initial round of feedback, the responses were reviewed and summarized, and a second round of feedback was conducted to refine the evaluation framework. The process involved two rounds of feedback, with experts providing additional insights and suggestions for improving the evaluation criteria. Each round of feedback was designed to achieve a consensus among the experts on the key factors influencing digital linguistic entrepreneurship, while also taking into account the differing perspectives provided by the expert panel. Throughout the process, we maintained expert anonymity and encouraged open, honest dialogue to ensure the final index system reflected the broad range of expert insights.

(2) Entropy Weight Method

The entropy weight method was used to calculate the entropy of 16 tertiary indicators, followed by 7 secondary indicators, and finally, 3 primary indicators. The entropy weight method assesses the uncertainty degree of information through data dispersion; higher entropy indicates greater un-

Table 2. Internet and telecommunications companies surveyed in this study.

Enterprise Category	Company Name
Internet	Xiaomi, Huawei, Alibaba Cloud, Hikvision, Lenovo, iFLYTEK, BYD, NetEase, Baidu, Tencent, JD.com, TCL, Kuaishou, skyworth
Telecommunications	China Mobile, Luxshare Precision, China Telecom, ZTE, China Unicom, China Tower
Financial	BOC, CMB, CCB, IB, ICBC, Bank of Communication, ABC, CICC, SPDB, China Everbright Group, CMBC

certainty and richer information content, while lower entropy indicates lesser information uncertainty and less content.

(3) Index Evaluation Method

The study calculates the digital linguistic entrepreneurship index for China’s 20 internet and telecommunications companies. The first step involves creating an original data matrix; the second step involves normalizing and treating anomalies in the data for positive and negative indicators; the third step involves assigning weights to each indicator; the fourth step calculates the digital linguistic entrepreneurship index for each company and converts all index scores into a percentage scale; the fifth step ranks the companies’ indexes from high to low; the sixth step rates each company’s digital linguistic entrepreneurship index based on score intervals with five rating levels: “Very Strong” (80.0–100), “Strong” (60.0–79.0), “Average” (40.0–59.9), “Weak” (20.0–39.9), and “Very Weak” (below 20.0).

5. Results and Discussion

5.1. Validation of the Digital Linguistic Entrepreneurship Index System

Reliability and validity tests (see **Table 3**) show that the average importance score for the 16 indicators in the system reached 4.55, with an average full-score rate of 63% and an average variation coefficient of 0.15. The importance scores ranged from 1.8 to 4.3, all exceeding the threshold of 3.5, indicating relative consensus among experts and meeting the importance requirements for the 16 indicators. The full-score rates of the 16 indicators ranged from 56% to 78%, with indicator 1 reaching 78%. The variation coefficients of the 16 indicators were all below the threshold of 2.5, signaling a scientifically reasonable indicator system.

Table 3. Validation results of the tertiary indicators for digital linguistic entrepreneurship of Chinese multinational enterprises.

No.	Tertiary Indicator	Average Importance	Full-Score Rate	Variation Coefficient
1	C1	4.8	78%	0.09
2	C2	4.6	56%	0.12
3	C3	4.3	56%	0.20
4	C4	4.6	67%	0.16
5	C5	4.3	56%	0.20
6	C6	4.7	67%	0.10
7	C7	4.6	67%	0.16
8	C8	4.6	56%	0.10
9	C9	4.6	67%	0.16
10	C10	4.6	56%	0.12
11	C11	4.4	67%	0.20
12	C12	4.7	67%	0.11
13	C13	4.6	67%	0.16
14	C14	4.6	67%	0.16
15	C15	4.4	56%	0.16
16	C16	4.4	56%	0.16
Avg	/	4.55	63%	0.15

5.2. Weight Assignment Results for the Digital Linguistic Entrepreneurship Evaluation Indicators

The study calculated the entropy values and variation coefficients for each indicator among the 20 representative companies and derived the weights for each indicator (see Table 4).

The weighting for the primary indicators showed that digital linguistic entrepreneurship capability held the highest proportion at 45%, followed by digital linguistic entrepreneurial resources at 30%, and digital linguistic entrepreneurial philosophy at 25%. For the secondary indicators, digital communication capability was highest at 21%;

digital translation philosophy and emergency response digital resources were at 15% and 17%, slightly higher than other indicators. Among the tertiary indicators, “number of corpora,” “number of languages in online annual reports,” and “number of resources provided for emergency language information communication and language monitoring” had the highest proportions at 11%, 11%, and 10%, indicating that digital linguistic entrepreneurship capability has the greatest impact on digital linguistic entrepreneurship. The results show that the weighting in the evaluation index system is reasonable and effective, making it suitable for evaluating the current state of digital linguistic entrepreneurship in Chinese enterprises.

Table 4. Weight assignment for international language communication power evaluation indicators.

Primary Indicator	Secondary Indicator	Tertiary Indicator	Entropy Value	Variation Coefficient	Tertiary Indicator Weight	Secondary Indicator Weight	Primary Indicator weight		
A1	B1	C1	0.9367	0.0633	7.92%	15.47%	24.59%		
		C2	0.921	0.079	7.55%				
A2	B2	C3	0.8231	0.1769	4.06%	9.12%	45.21%		
		C4	0.916	0.084	5.06%				
		C5	0.931	0.069	11.33%				
	B3	C6	0.8725	0.1275	5.38%	21.13%			
		C7	0.8674	0.1326	4.42%				
		C8	0.9321	0.0679	8.17%				
A3	B4	C9	0.965	0.035	3.48%	11.65%	30.20%		
		C10	0.8709	0.1291	8.50%				
		C11	0.9697	0.0303	1.72%				
		C12	0.8763	0.1237	2.22%				
	B5	C13	0.8821	0.1178	1.63%	13.40%			
		C14	0.9457	0.0543	11.77%				
		B6	C15	0.9732	0.0614			6.59%	16.80%
			C16	0.9745	0.2092			10.21%	

5.3. Measurement and Rating Results for Corporate Digital Linguistic Entrepreneurship Index

The measurement, rating, and ranking of the digital linguistic entrepreneurship index (see Table 5) indicate a range between 25.2 and 76.1, showing clear differences in ratings.

Statistics show that Xiaomi Corporation and Huawei Technologies Co., Ltd. have digital linguistic entrepreneurship indexes of 76.1 and 66.9, respectively, rated as “strong,” illustrating the outstanding performance and competitive strength of these private enterprises in digital linguistic en-

trepreneurship. In the “average” rating, companies such as Alibaba Cloud, Hangzhou Hikvision Digital Technology Co., Ltd., and Lenovo Group Ltd. have indexes ranging from 58.8 to 44.6, indicating a moderate level. These enterprises are primarily in the internet technology sector and mostly private, suggesting an overall average performance in digital linguistic entrepreneurship in this industry. Enterprises rated as “weak,” including China Mobile Communications Group Co., Ltd. (index of 38.2), China Telecommunications Corporation (34.7), ZTE Corporation (33.3), and China United Network Communications Group Co., Ltd. (33.2), are mostly state-owned, indicating a relatively insufficient performance in digital linguistic entrepreneurship among

Table 5. Measurement and rating of corporate digital linguistic entrepreneurship index.

Rank	Company Name	Index	Sector	Nature of Enterprise	Rating
1	Xiaomi Corporation	76.1	Internet Tech	Private	Strong
2	Huawei Technologies Co., Ltd.	66.9	Internet Tech	Private	
3	Alibaba Cloud	60.9	Internet Tech	Private	
4	Hangzhou Hikvision Digital Technology	60.2	Internet Tech	Private	
5	BOC	59.6	Financial	State-owned	Average
6	Lenovo Group Ltd.	58.8	Internet Tech	Private	
7	CMB	54.4	Financial	State-owned	
8	iFLYTEK Co., Ltd.	53.1	Internet Tech	Private	
9	BYD Co. Ltd.	52.1	Internet Tech	Private	
10	NetEase, Inc.	51.8	Internet Tech	Private	
11	Baidu, inc.	51.5	Internet Tech	Private	
12	Tencent Holdings Ltd.	50.6	Internet Tech	Private	
13	CCB	50.1	Financial	State-owned	
14	IB	49.7	Financial	State-owned	
15	JD.com, Inc.	49.7	Internet Tech	Private	Weak
16	ICBC	48.0	Financial	State-owned	
17	TCL Corporation	44.6	Internet Tech	Private	
18	Bank of Communication	43.3	Financial	State-owned	
19	ABC	42.0	Financial	State-owned	
20	CICC	42.0	Financial	State-owned	
21	SPDB	40.9	Financial	State-owned	
22	Kuaishou Technology	40.2	Internet Tech	Private	
23	China Mobile Communications Group	38.2	Telecommunications	State-owned	
24	Luxshare Precision Industry Co., Ltd.	38.1	Internet Tech	Private	
25	China Everbright Group	36.2	Financial	State-owned	
26	CMBC	36.2	Financial	State-owned	
27	China Telecommunications Corporation	34.7	Internet Tech	State-owned	
28	ZTE Corporation	33.3	Internet Tech	Private	
29	China United Network Communications Group	33.2	Internet Tech	State-owned	
30	Skyworth Group Co.. Ltd.	29.8	Internet Tech	Private	
31	China Tower Co., ltd.	25.2	Internet Tech	State-owned	

some state-owned enterprises. Those rated “very weak” include Skyworth Group Co., Ltd. (29.8) and China Tower Co., Ltd. (25.2), showing a need for improvement in digital linguistic resource management and emergency language service capability.

Among the 11 financial enterprises, the one with the highest overall score is Bank of China (BOC). Its scores are as follows: 11 points for the concept of digital linguistic entrepreneurship, 30.2 points for digital linguistic entrepreneurship capabilities, and 18.4 points for digital linguistic entrepreneurship resources. These scores are related to the business needs of Bank of China, which is one of the most globalized and diversified banks in China. The bank operates branches not only in mainland China but also in 62 countries and regions. It boasts a well-established global

service network, with its main business covering corporate finance, personal finance, and financial markets. Additionally, it provides a comprehensive service platform that includes investment banking, direct investment, securities, insurance, and other fields.

Overall, private internet technology companies perform better in digital linguistic entrepreneurship, while state-owned enterprises, especially in the telecommunications sector, are relatively weaker. This reflects significant differences in digital linguistic entrepreneurial capability across various types and sectors of enterprises during digital transformation, with private enterprises exhibiting more vitality and competitiveness in digital linguistic innovation, while some state-owned enterprises need to strengthen in this area.

6. Conclusions

This study demonstrates that the evaluation index system for digital linguistic entrepreneurship is both reliable and valid, offering an effective framework for assessing the current state of digital linguistic entrepreneurship across enterprises in China. The system's structured indicators, paired with appropriate weight assignments, enable a nuanced analysis of various dimensions, such as digital capabilities, innovation, resource management, and communication efficiency. These findings suggest that the system provides not only a robust tool for empirical research but also a practical guide for enterprises seeking to enhance their digital linguistic strategies.

However, significant differences in performance were observed across enterprises. Private internet technology firms, notably Xiaomi and Huawei, demonstrated strong digital linguistic entrepreneurship capabilities, showcasing notable advancements in digital linguistic innovation, multilingual communication, and resource utilization. These firms have effectively integrated digital technologies and data-driven language platforms, leveraging them to build competitive advantages both in domestic and international markets. Their success highlights the crucial role of digital linguistic entrepreneurship in driving market leadership and sustainable business growth in the digital era.

In contrast, state-owned enterprises, particularly within the telecommunications sector, were found to have relatively weaker performance in digital linguistic entrepreneurship. These firms often face challenges related to organizational inertia, slower adoption of new technologies, and insufficient digital agility compared to their private-sector counterparts. Although state-owned enterprises possess considerable resources, they tend to lag in integrating digital linguistic capabilities, such as enhancing cross-cultural communication and utilizing multilingual platforms for global business operations.

Several factors contributed to why state-owned enterprises are underperforming in DLE: (1) State-owned enterprises often maintain traditional, hierarchical organizational structures that can lead to slower decision-making processes and resistance to change. This organizational inertia makes it more difficult for these companies to adopt and implement cutting-edge technologies, including digital linguistic solutions that require quick adaptation and flexibility. (2)

While state-owned enterprises typically have access to significant financial and human resources, these resources may not be allocated efficiently for digital transformation initiatives. Resource allocation often follows established channels that prioritize operational stability over innovation, resulting in slower investments in digital linguistic capabilities. (3) Government policies can play a crucial role in promoting or hindering DLE adoption. State-owned enterprises are more susceptible to regulatory constraints and slower-moving government initiatives, which may not always align with the rapid pace of digital transformation seen in private enterprises. Furthermore, these firms may lack the flexibility to capitalize on international digital language platforms, as they are often more bound by national or domestic regulations.

To address these challenges, it is crucial to offer specific recommendations for state-owned enterprises to improve their digital linguistic entrepreneurship: (1) State-owned enterprises could benefit from adopting more flexible organizational structures that encourage innovation and quicker decision-making processes. Encouraging cross-functional collaboration and reducing bureaucratic obstacles would allow these firms to be more responsive to technological changes. (2) It would be beneficial for state-owned enterprises to allocate more resources specifically to digital transformation initiatives, including the development and integration of multilingual communication platforms. This would involve setting aside dedicated budgets for R&D, AI language technologies, and digital linguistic solutions. (3) To better support DLE adoption, policy frameworks need to be more aligned with the needs of state-owned enterprises. This may include offering incentives for digital innovation, creating regulations that encourage multilingual communication, and promoting cross-border collaboration in the digital economy.

For instance, private enterprises worldwide—regardless of their geographical location—are increasingly recognizing the importance of digital linguistic entrepreneurship to maintain competitive advantages in global markets. The findings related to Xiaomi and Huawei's success, due to their strong integration of digital linguistic capabilities, are relevant for companies operating in Western and developing markets. Enterprises in Europe, North America, and Southeast Asia could adopt similar strategies, investing in AI-driven language technologies, multilingual communication

platforms, and data-driven language solutions to improve operational efficiency and customer engagement.

Furthermore, the broader principles of digital linguistic entrepreneurship, such as leveraging language technologies for global communication, developing multilingual data management systems, and fostering talent development, are universally applicable. The need for fostering interdisciplinary collaboration between language experts and technology professionals is not limited to China but is also a key consideration for enterprises worldwide striving to integrate digital linguistic capabilities into their business strategies.

The role of government policies and external resources—such as collaborations with technology providers, academic institutions, and global partners—cannot be overstated in the context of digital linguistic entrepreneurship. Governments can create a conducive environment for innovation by offering financial incentives, developing digital infrastructure, and facilitating international collaborations. Technology providers and academic institutions offer essential expertise, cutting-edge technologies, and talent, empowering enterprises to enhance their digital linguistic capabilities. These collaborations, coupled with strategic investments in digital technologies and workforce development, will enable enterprises to thrive in the increasingly interconnected and multilingual global market.

By embracing these external resources and policy frameworks, enterprises can accelerate their digital transformation, enhance their multilingual communication capabilities, and secure long-term growth in the competitive global digital economy.

While the study provides valuable insights into the current state of digital linguistic entrepreneurship within Chinese enterprises, it is important to acknowledge the limitations of the index system. Its primary focus on Chinese companies means that its applicability to other countries or industries is not universal. Moreover, the reliance on quantitative metrics may overlook important qualitative aspects that influence the success of digital linguistic entrepreneurship. Future research could benefit from a broader approach, incorporating qualitative insights, sector-specific challenges, and a more global perspective to offer a more comprehensive understanding of digital linguistic entrepreneurship in diverse contexts.

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Conflicts of Interest

The authors declare that there is no conflict of interest.

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