

The Role of Corporate Strategies in China's Technological Transformation: Towards a sustainable digital future

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Abstract:

The study examines the role of Chinese Companies Strategy in assessing technological transformation and its economic impacts for sustainability. It will expand further to cover strategic measures that could have an impact on economic growth, environmental challenges, and the road to a sustainable future in the digital economy. The study identifies major success factors in a descriptive and analyzing way that would lead through the path of digital transformation while achieving economic growth coupled with the attainment of sustainability goals. Strategies related to corporate, focussing on innovations and sustainable practices with inclusivity in growth, hold the key towards full potential for digital transformation in China. This research, therefore, calls on policymakers to foster a facilitative regulatory environment enabler for digital innovation, while businesses take a holistic approach to digital transformation, placing centres in sustainability and stakeholder engagement.

Keywords: Technological transformation, China, Corporate strategy, sustainability.



1. Introduction:

Digital transformation brings a whole new angle and perspective into the economic outlook of China, hence shaping policies for better growth and innovation. But this shift does not come without its toll. One of the challenges of moving through this technological revolution is how Chinese companies balance economic development with ecological sustainability and Corporate Social Responsibility. While the economic impact of digital transformation has been a widely debated topic, little insight has been drawn with regard to how companies' strategies shape the process, in particular issues of sustainability. This paper debated the pivot of corporate strategies in driving China's Technological Transformation, with special focus on shaping economic impact and addressing arising environmental and social concerns. This makes the rapid pace of digital transformation in China an unparalleled opportunity and challenge for businesses in equal measure. While companies are embracing new technologies at an unprecedented rate, the knowledge gap concerning how corporate strategy can actually balance economic growth with environmental sustainability and social responsibility has not been gauged.. The present research investigation joins this gap by studying in detail the involved relationship of corporate strategies and digital transformation with sustainability in the Chinese context.

This study will contribute valuable insights into the growing knowledge on digital transformation in China. It will be relevant for:

The findings will contribute to the development of policies that will assist the process of digital transformation in ways that consider environmental and social concerns at large, hence fostering sustainable and inclusive growth of China.

This research will have practical insights into the strategic choices that can help improve economic performance and increase sustainability while navigating digital transformation initiatives. This will, therefore, provide a framework for further research on how corporate strategies, digital transformation, and sustainability fit in the context of China.

The approach adopted is descriptive and analyzing; hence, this study would be in-depth analysis for leading and successful Chinese companies in different sectors to explore strategic approaches taken up by them for digital transformation. The economic impact of their business, strategic initiatives taken by these companies to meet the sustainability challenges, and what are the main factors that lead to their success will be explored.

It aims at analyzing the relationship between corporate strategies and the economic impact brought in by digital transformation in China, including how different strategic approaches lead to varying economic outcomes and exploring what the key factors are that contribute to successful digital transformation in the Chinese context. This research paper also attempts to identify and examine the key sustainability challenges associated with digital transformation in China. This will involve an examination of the environmental and social consequences of digital transformation, as well as a review of corporate reactions to these challenges.

The framework development to understand the key success factors of digital transformation coupled with a sustainable attainment of economic growth will be pursued for Chinese companies. This will involve the critical identification of corporate strategy ingredients, organizational practices, and leadership structures that contribute to successful and sustainable journeys of digital transformation.

To pragmatically provide recommendations to policy makers and business leaders on how they can leverage digital transformation toward sustainable development in China. This will help inform policy development, corporate strategy, and stakeholder engagement that fosters a sustainable and inclusive digital future for China.

2. Literature Review

Digital transformation has become one of the most compelling determinants in shaping the business landscapes and economic developments in China. This literature review reveals some of the most recent research in regard to various aspects of digital transformation in Chinese enterprises, given its impacts and implications it puts on them. Also, digital transformation has emerged as one of the major drivers of sustainable development in China, influencing eco-performance across different industries of the economy. Recent research has explored the complex interrelationship between digital technologies and sustainability, showing opportunities and challenges in both directions in the Chinese context.

Several studies have explored how digital transformation influences corporate performance and risk management. (Xie & Xu, 2024) investigated how population aging affected the digital transformation of SMEs in China. In this paper, they observed that population aging positively affects the digital transformation of SMEs, especially those which are private-owned enterprises located in eastern regions. Their research also discovered that such an influence is mediated through means including the rise of labor costs, human capital accumulation, and savings rates.

In the financial sector, the consequences of digital transformation for bank efficiency and risk management are steadily improving. (Ren, Song, Zhu, & Yang, 2024) found that in Chinese commercial banks, there is a positive relationship between digital transformation and profit efficiency since it can enhance revenue generation and cut costs. The authors, (Zhao, Zhai, & Yuan, 2024), also prove the inverse U-shaped effect of digital transformation on systemic risks of banks, which is moderated by regional digitalization and market concentration.

The impact of digital transformation extends beyond financial performance to corporate behavior and strategic decisions. (Wu & Wang, 2024) demonstrated that digital transformation significantly improves enterprises' risk performance, mediated by optimized corporate governance processes and increased investment in research and innovation. (Chen, Zhao, & Jin, 2024) found that higher levels of corporate digital transformation are associated with lower levels of tax avoidance, particularly in firms with high equity incentives for management and strong political backgrounds.

Digital transformation also plays a crucial role in enhancing firms' competitiveness and market position. (Zhu & Yu, 2024) showed a positive association between digital

transformation and firms' bargaining power when dealing with suppliers and customers, mediated by higher innovation capabilities, optimized human capital structures, and lower transaction costs.

In the context of sustainability and green innovation, (Wang, Liu, & Li, 2024) explored the dynamic capability drivers of green innovation at different digital transformation stages in Chinese manufacturing companies. They found that digital transformation significantly enhances both the quantity and quality of green innovation, with varying impacts across different transformation stages.

The impact of digital transformation on export performance and resilience has also been a focus of recent research. (Zhang, Wang, Chen, & Zhou, 2024) examined the effect of firms' digital transformation on the "cleanliness" of export products, finding that digital transformation significantly contributes to improvement in export product cleanliness. (Li, Zeren, & Haoran, 2024) investigated the impact of digital transformation on enterprise export resilience after the 2008 financial crisis, revealing that digital transformation significantly enhances export resilience, particularly for private and high-tech enterprises.

(Zhang, Ye, Meng, Ma, & Wu, 2024) investigated the relationship between enterprise digital transformation and ESG performance in Chinese listed companies. Their study, which analyzed data from 4,054 companies, found that DT significantly improves operational efficiency and perceptual capabilities, laying the foundation for better ESG performance. The authors identified three key dynamic capabilities that mediate this relationship: innovation changeability (IT), coordination integration capability (CI), and learning absorption capability (LA). This research highlights the potential for Chinese companies to leverage digital technologies to enhance both their digital competitiveness and ESG performance simultaneously.

The impact of DT on supply chain performance has also been a focus of recent research. (Yang, Liu, & Liu, 2024) conducted an empirical study using questionnaire data to examine the relationships among enterprise digital transformation, supply chain performance, and precision management in Chinese companies. Their findings revealed statistically significant correlations between various dimensions of digital transformation and both supply chain performance and precision management. The authors emphasize the importance of continuous improvement and innovation in the DT process, suggesting that Chinese enterprises should regularly assess and adjust their digital transformation strategies based on feedback and results.

(Feng & Wang, 2024) explored the role of supply chain diversification (SCD) in enhancing digital transformation among Chinese companies. Using panel data from Chinese A-share listed companies from 2015 to 2022, they found that SCD positively influences enterprise DT. This relationship is mediated by the strengthening of absorption, innovation, and adaptive capabilities. Additionally, the study identified executive risk preferences and Pilot Policies as positive moderators of the effect of SCD on enterprise DT. These findings provide valuable insights for Chinese companies seeking to optimize their supply chain management and accelerate their digital transformation efforts.

(Xu, Chen, & Dai, 2023) investigated the impact of corporate digital transformation on environmental performance among Chinese A-share listed companies. Their findings

indicate that digital transformation significantly improves environmental performance, particularly for state-owned, large, and heavily polluting enterprises. The authors identify two primary mechanisms through which digital transformation enhances environmental performance: by fostering green technological innovation and improving corporate governance. Interestingly, they also uncover a nonlinear relationship between digital transformation and environmental performance, suggesting that the benefits may not be uniformly distributed across all levels of digital adoption.

In the context of natural resource exploitation, (Guan, Li, Guo, & Huang, 2023) examined the role of digital transformation in environmental strategies within China's rare earth metals sector. Their research highlights the symbiotic relationship between digital transformation and environmental strategy in driving sustainable development. The study emphasizes the importance of a clear and concise environmental strategy that encompasses environmental compliance, pollution mitigation, and resource conservation. Furthermore, the authors stress the need for measurable environmental targets, including specific objectives to reduce energy usage, greenhouse gas emissions, and water consumption.

(Zhao, Liu, & Dai, 2021) adopted a broader perspective, analyzing the coupling coordination relationship between digital transformation and economic development across 30 Chinese provinces and cities from 2010 to 2019. Their findings reveal a gradual increase in the level of coupling and coordination between digital transformation and economic growth over the years. However, they also note significant regional disparities, with most provinces exhibiting digital lag coordinated development. The study identifies spatial correlations and agglomeration patterns, with high-high agglomeration areas concentrated in the Beijing-Tianjin-Hebei and Yangtze River Delta regions, while low-low agglomeration areas are found in the northeast and western regions.

In conclusion, the literature reveals that digital transformation in China has far-reaching impacts across various sectors and aspects of business operations such as improving their financial performance and risk management, innovation capability, export resilience, and competitive landscapes. The impact on all industries and enterprise types varies greatly, implying that strategies and policies would also have to be differentiated in order to maximize the dividend of digital transformation. These studies give a hint of the promise of digital transformation for the goal of sustainable development in China, while in the same time balanced regional development, strategic environmental policies, and non-linear digital adoption effects would all have to be considered. Tapping into the power of digital technologies, meanwhile attempting to offset regional inequalities and environmental issues, will be several of the important keys toward the sustainability of China's growth.

3. Definition of Digital Economy

The digital economy is defined as an economic environment that employs digital technologies to enhance socio-economic activities, including the production of goods and services, and the improvement of their quality and efficiency. This transformation fosters

the creation of new value, enhancing individual welfare and increasing opportunities for wealth creation (Arab Monetary Fund, 2020, p. 193)

- **Importance of Integration into the Digital Economy**

The importance of integration into the digital economy is underpinned by a set of reasons such as the following (Arab Monetary Fund, 2020, pp. 196-197):

- **Economic Growth and Efficiency:** Digital technologies reduce processes and enhance efficiency in economic activities.

- **Innovation and Competitiveness:** As economies digitize, they foster innovation, enhance competitiveness in the global market, and adapt to rapid technological changes.

- **Job Creation and Skill Development:** The digital economy generates new job opportunities and requires new skills, thus encouraging educational and training programs that align with digital advancements.

- **Market Access:** Digital platforms increase access to markets and reduce entry barriers for businesses, especially small and medium-scale enterprises, minimizing operational costs. Improved Quality of Life: Digital technologies enhance the quality of life by making life-promoting services such as healthcare, education, and government more accessible and efficient.

- **Sustainability:** It enhances sustainable economic practices through optimized resource utilization and waste reduction.

4. Indicators of the Digital Economy of China

Characterized by the following features, according to (UNCTAD, 2024):

- **E-commerce sales:** E-commerce sales of businesses in China increased from \$1.6 trillion in 2016 to \$4.5 trillion in 2022, making it one of the leading players in the international e-commerce market.

- **Mobile data traffic:** In 2023, China accounted for more than the combined mobile data traffic of North America and Western Europe, demonstrating its dominance in this area.

- **Industrial robotics:** China accounts for half of global industrial robot installations in 2022, reflecting its leadership in manufacturing automation.

- **Data center capacity:** In 2023, China has 82 per cent of gigafactory capacity for electric vehicle batteries, making it the leading location for global battery production.

5G infrastructure: China is expected to lead the global expansion of 5G networks and will account for half of all worldwide 5G subscriptions by 2029.

- **Environmental Impact:**

- **E-waste:** China is the top contributor to digitalization-related waste globally, accounting for almost half of such waste in 2022.

- **Material Consumption:** It is the leading processor of transition minerals, mainly aluminum, cobalt, lithium, manganese, and rare earth elements, reflecting its central role in the global electronics supply chain.

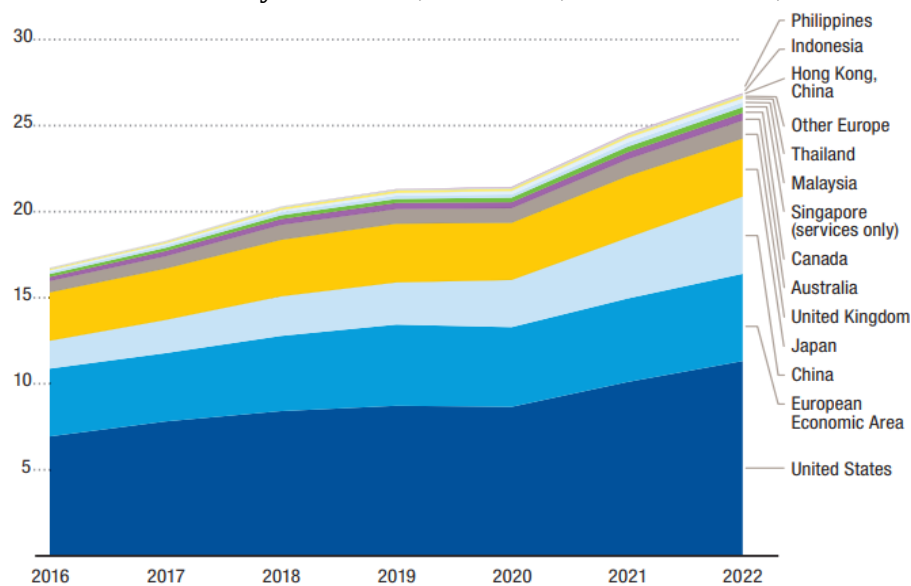
- **Data Centers:** While China's data center capacity is growing, its data centers are less efficient compared to those in developed countries, resulting in higher energy consumption.

- **Dominance:** China is a key player in the global digital economy, holding significant shares in e-commerce sales, mobile data traffic, industrial robot installations, and the production of essential minerals and metals for digitalization.

- **Environmental Challenges:** China faces considerable challenges in managing the environmental impacts of its digital economy, particularly regarding e-waste, water consumption, and emissions from data centers.

- **Policy Focus:** Chinese policy emphasizes the promotion of environmentally sustainable practices in the data center sector and encourages more efficient and sustainable practices in manufacturing and mining operations.

Fig 1. Sales of e-commerce by industries, countries, and economies, 2016–2022



Source:(UNCTAD, 2024, p. 146)

Figure 1, "E-commerce sales by businesses, selected economies and country groupings, 2016-2022," charts the phenomenal growth of e-commerce.

- **Sharp Growth:** Business e-commerce sales in China leaped from an estimated \$1.6 trillion in 2016 to \$4.5 trillion in 2022, recording a remarkable three-fold increase. This growth indicates the rapid move toward e-commerce in China, influenced by a growing middle class, increased internet penetration, and the rise of online platforms such as Alibaba and JD.com.

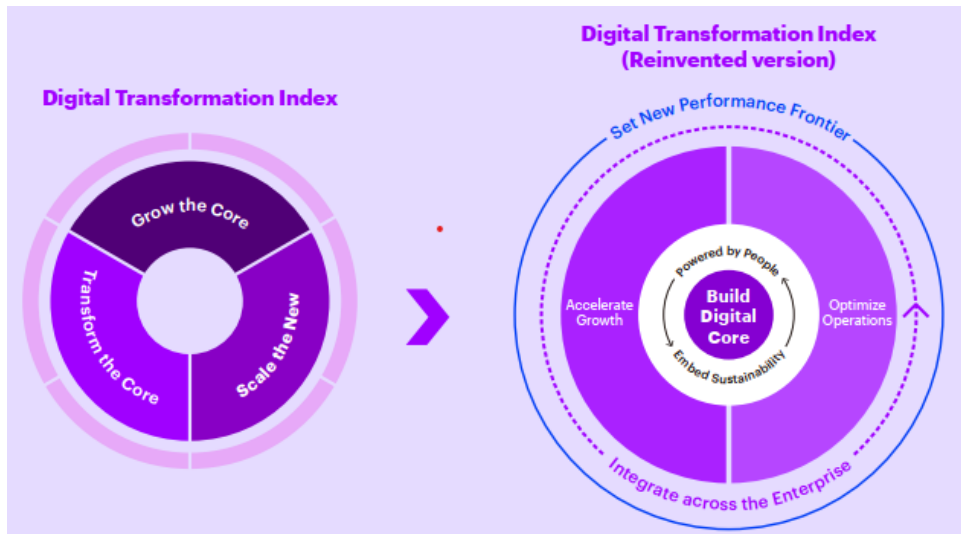
- **Global Dominance:** In 2022, e-commerce sales in China alone surpassed those of the United States and the combined European Economic Area, testifying to its primacy in the global e-commerce market. This is further cemented by the fact that China hosts some of the largest e-commerce platforms in the world, such as Alibaba, JD.com, and Pinduoduo. Given its trajectory, China's e-commerce market is expected to continue growing, driven by increased internet penetration, new online services, and an expanding middle class.⁵

Digital Transformation Index for Chinese Companies

5.1. Continuous iteration of Digital Transformation Index

Figure 2, "China Digital Transformation Index continues to evolve", provides a clear visual comparison between the previous structure of the Digital Transformation Index and its new "Reinvented version". This figure highlights the significant changes made to the framework and demonstrates its evolution to reflect the changing dynamics of digital transformation in China.

Figure 2: China Digital Transformation Index continues to evolve



Source: (Accenture, 2023, p. 17)

Shifting Focus: The previous Index (left side) focused on three core areas: "Transform the Core", "Grow the Core", and "Scale the New." This reflects a focus on building and scaling digital capabilities within the organization. However, the new "Reinvented version" (right side) adopts a more holistic approach, encompassing five key dimensions: "Set New Performance Frontier," "Accelerate Growth," "Build Digital Core," "Embed Sustainability," and "Optimize Operations." This shift reflects the understanding that digital transformation is no longer just about technology but involves a broader, multi-faceted approach that impacts the entire business.

- **Emphasis on Digital Core:** Notably, the new framework elevates "Build Digital Core" to a top-level indicator. This emphasizes the importance of establishing a robust and interoperable digital infrastructure as the foundation for achieving Total Enterprise Reinvention. The previous framework lacked this specific focus on the digital core.

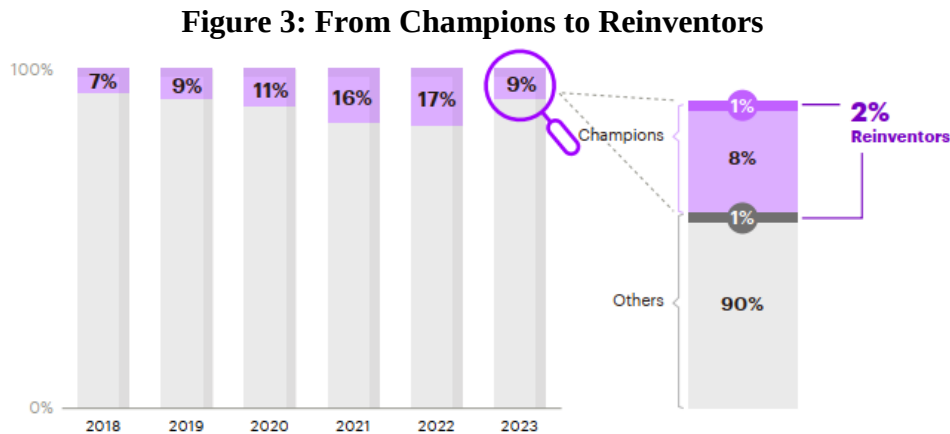
- **Integration of New Elements:** The new framework incorporates "Powered by People" and "Embed Sustainability" as critical dimensions, reflecting their growing importance in the digital transformation landscape. These aspects were not explicitly included in the previous framework, highlighting the changing priorities of Chinese companies.

- **Evolving Framework:** Figure 2 clearly illustrates the evolution of the Digital Transformation Index to reflect the changing landscape of digital transformation in China. The new framework is more comprehensive, taking into account the multi-faceted aspects of reinvention and recognizing the importance of sustainability and talent development. Effectively demonstrates the iterative nature of the Digital Transformation Index and its evolution to adapt to the changing needs and priorities of Chinese companies. The new framework provides a more comprehensive and holistic understanding of digital

transformation, emphasizing the importance of integrating technology, people, sustainability, and operations for achieving sustainable business success in the digital age.

5.2. Chinese Companies Competitive Landscape

Figure 3, titled "From Champions to Reinventors", provides a compelling visual representation of the evolution of Chinese companies' digital transformation journey over the past five years (2018-2023). Here's a breakdown of what the figure reveals:



Source: (Accenture, 2023, p. 15)

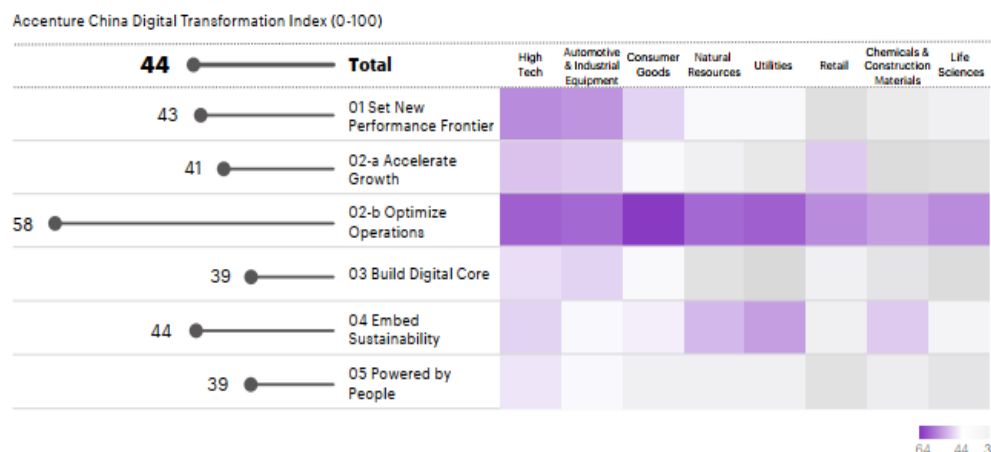
- **The Shift Towards Champions:** The figure shows a steady increase in the percentage of companies categorized as "Champions" from 7% in 2018 to 17% in 2022, indicating a significant progress in digitalization among Chinese enterprises. This reflects the increasing adoption of digital technologies and strategies in businesses.
- **The Emerging "Reinventors":** However, the figure highlights a crucial shift in 2023, with only 9% of companies classified as "Champions." This slight decrease suggests a change in the focus of Chinese companies towards "Total Enterprise Reinvention" rather than simply being "Champions" of digitalization. The emergence of "Reinventors" at a mere 2%, signifies a new paradigm of transformative change.
- **A Critical Gap:** The significant gap between "Champions" and "Reinventors" (9% vs. 2%) signifies that while many companies are digitally transforming, they might be missing out on the opportunity to achieve total enterprise reinvention. This gap is critical to bridge for Chinese companies to truly reap the benefits of digital transformation.
- **The Opportunity to Overtake:** The fact that a significant proportion of "Reinventors" are not even "Champions" implies that Total Enterprise Reinvention can be a game-changer, allowing companies to leapfrog their competitors and achieve a superior level of performance.
- **The Path Forward:** The figure ultimately suggests that Chinese companies need to move beyond being simply "Champions" and embrace the concept of Total Enterprise Reinvention, which involves a more comprehensive and holistic approach to digital transformation. This shift in strategy can unlock significant advantages and propel Chinese companies towards greater success in the global market.

Figure showcases a crucial turning point in the digital transformation journey of Chinese companies. It emphasizes the need to shift from simply being "Champions" to becoming "Reinventors," embracing a more strategic and all-encompassing approach to digital transformation. This shift holds the potential for Chinese companies to not only keep up with the pace of change but also to lead the way in innovation and achieve lasting success.

5.3. Building the digital core of Chinese companies

Figure 4 gives picture of strengths and weaknesses that Chinese companies have concerning their journey of digital transformation across industries. The figure hints at an imbalance in capabilities and suggests that Chinese companies need to be more comprehensive in their reinvention

Figure 4: Chinese companies have uneven capabilities and divergent industrial trajectories.



Source: (Accenture, 2023, p. 18)

- **Uneven Performance:** While the average overall score of Chinese companies stands at 44, as shown in the figure, there is huge variance between different dimensions of the digital transformation index. Chinese companies achieve an optimum score of 58 in optimizing operations; this suggests a strong focus on streamlining processes and integrating systems. However, they lag in developing capability for digital core building at 39% and people empowerment at 39%, which indicates an imbalance in capability.

- **Industry Divergence:** The above figure brings to light the divergence in the journey of digital transformation across industries. High-Tech, Automotive & Industrial Equipment, and Consumer Goods register high, but the rest of industries in Natural Resources, Utilities, and Chemicals & Construction Materials score considerably lower. That would mean that different industries are at different stages of digital transformation and, hence, need different strategies.

- **The Need for Holistic Reinvention:** The overall message conveyed by Figure 8 is that Chinese companies need to adopt a more holistic approach to digital transformation. While optimizing operations is important, building a strong digital core, empowering people, and

embedding sustainability are equally critical for achieving lasting success. Companies need to address these imbalances to achieve a more comprehensive and balanced digital transformation strategy.

- **Opportunities for Growth:** Despite the imbalances, the figure also highlights potential growth areas for Chinese companies. By strengthening their digital core, developing their talent, and embracing sustainability, companies can unlock significant value and create a competitive advantage.

5.4. Company model China Telecom Corporation Limited

China Telecom Corporation Limited ("China Telecom" or the "Company") is a joint stock company incorporated in the People's Republic of China with limited liability. Along with its subsidiaries, known collectively as the "Group," it stands as one of the world's leading providers of integrated intelligent information services. Its core business encompasses telecommunications services such as wireline, mobile, and satellite communications, along with value-added services like Internet access, information services, and related offerings. The Company's A Shares are traded on the Shanghai Stock Exchange, while its H Shares are listed on the Main Board of the Hong Kong Stock Exchange.

The company's efforts towards sustainability and environmental responsibility in line with ESG (Environmental, Social, and Governance) principles:

- **Digital Empowerment:** China Telecom continues to expand and enhance its digital infrastructure, including the world's largest 4G/5G co-built network, new computing power facilities, and cloud services. The report highlights the company's investments in AI, "Lingze" data elements platform, "Yunxiao" intelligent computing platform, "Huiju" one-stop platform, and the "1+N+M" Xingchen large models series for various industries.

- **Green Development:** The company is committed to the "dual carbon" strategy, focusing on reducing its carbon footprint and promoting a green lifestyle. The company has achievements in green cloud-network, green energy use, green office, and recycling. Notably, China Telecom has built a 100% traceable clean energy zero-carbon data center in Qinghai, established the first "e-Surfing Forest," and constructed over 500 "zero-carbon" base stations.

- **Security Development:** China Telecom prioritizes network and information security, emphasizing the importance of integrating security into every stage of its operations. The company invests in security capabilities, anti-DDoS solutions, the launch of Security Brain, and the development of a managed security service platform. Notably, the company launched the "Forging Shields Action 2.0" initiative, introducing new security products like Quantum Security Cloud, Quantum Security OTN, Quantum-encrypted Messages, and Quantum Cryptographic Solution.

- **Inclusive Development:** China Telecom strives to create a culture of inclusiveness, focusing on employee rights and welfare, building a responsible supply chain, and supporting local communities and those in need. the company's initiatives in building a "home for employees," fostering a sustainable and win-win industrial ecology, and contributing to the development of digital villages and rural revitalization efforts.

- **Modern Governance:** The company continues to optimize its corporate governance structure, focusing on transparency, accountability, and risk management. The company's efforts in refining corporate governance, comprehensively deepening reform, and implementing risk prevention measures in compliance with laws and regulations.
- **The company's axes towards sustainability**
- **Digitalization as a Driving Force:** China Telecom is leveraging digital technologies to drive its business growth, improve service quality, and enhance operational efficiency.
- **Green Transformation:** The company is taking significant steps towards a greener and more sustainable future, embracing renewable energy, reducing emissions, and promoting circular economy initiatives.
- **Security and Resilience:** China Telecom prioritizes security across its operations and is investing in technologies to protect its networks and customer data.
- **Inclusive Growth:** The company recognizes the importance of social responsibility and seeks to ensure equitable access to digital services and opportunities for all stakeholders.
- **Governance and Compliance:** China Telecom is committed to sound governance and adheres to legal and regulatory compliance in all its operations.

6. Conclusion:

Digital transformation in China is complex, requiring a strategic approach that balances economic progress with environmental sustainability and social responsibility. This study explored the intricate relationship between corporate strategies and digital transformation, investigating how different strategies influence economic impact, address sustainability challenges, and ultimately contribute to a more sustainable digital future in China.

6.1. Main Results:

The study revealed the following key results:

- Innovation-oriented corporate strategies, investment in digital infrastructure, and nurturing of talent come out as strong correlates of a greater positive impact of digital transformation on the economy. This would imply that proactive and strategic investment in digital capabilities forms the bedrock of economic success in the Chinese context.
- Digital transformation holds prospects for environmental and social amelioration and poses certain challenges. While that's happening, corporate strategies centered on green innovation, efficient use of resources, sustainable supply chains, and environmental protection can well prove vital to mitigating these challenges and ensuring that digital transformation really takes the road toward sustainability.
- Chinese companies will be better positioned to take on the challenge of digitalization to the extent that they show greater transparency, accountability, and stakeholder engagement, particularly with a view to social responsibility.

6.2. Recommendations:

The study offers the following recommendations:

- Developing policies that enhanced investment in digital infrastructure and innovation, with a special focus on those adding value toward sustainable development.
- Continuation of supportive regulatory environments to encourage responsible and environmentally conscious digital practices.

- Encouraging public-private partnerships for collaboration in the development of sustainable digital solutions.
- Adopting holistic approaches in light of the digital transition, making consideration for the triad of economic growth, environmental, and social responsibility.
- Green innovation, resource efficiency, and development of sustainable value chains will be focused on.
- Ensuring transparency, accountability, and stakeholder engagement in all areas of digital transition.
- Embed a culture of sustainability within their organizations.

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