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AI Empowerment and Measurement: Reconstructing the Enterprise Digital Maturity Model and its Implications for Service Ecosystem

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Abstract

In the current context of artificial intelligence driving economic digital transformation, enterprise digital maturity has become a critical foundation for creating shared value and enhancing competitiveness within service ecosystems. Existing maturity models often fail to adequately reflect the fundamental changes brought about by AI technology, necessitating that enterprises continuously adjust their business strategies to align with the requirements of service ecosystem development and value co-creation. Digital maturity measures a company's capabilities in integrating digital technologies, data-driven decision-making, and process optimization, significantly enhancing operational efficiency and market responsiveness while connecting consumers, partners, and the entire ecosystem network. This study constructs an AI-enabled digital maturity model encompassing three dimensions: people enhancement, product-driven innovation, and marketing empowerment. It focuses on analyzing the underlying mechanisms through which value co-creation drives a company's competitive advantage. This direction will approach the topic from a theoretical perspective, focusing on how AI technology reshapes the connotations and measurement standards of AI-driven digital maturity: AI-Enhanced People capability, AI-Driven Product Innovation,and AI-Enabled Marketing Empowerment: AI-Enhanced People capability focuses on leveraging AI technologies such as user profiling, behavioral modelling, and social vitality to achieve deep user insights, ecosystem construction, and intelligent interaction capabilities, while emphasizing the use of privacy computing technologies like federated learning to establish a balance between data development and privacy protection; AI-Driven Product Power emphasizes the intelligence of products and adaptive service capabilities enabled by embedded AI functionalities; AI-Enabled Marketing Empowerment focuses on the effectiveness of ultra-personalised customer insights, precise targeting, and automated interaction based on AI algorithms, and how to upgrade 'AI-Enabled Marketing Empowerment' from traditional broad coverage to 'precise targeting and value prediction capabilities' centred on data intelligence.

Keywords

Artificial Intelligence (AI); Digital Maturity; Value Co-creation; Competitive Advantage; Service Ecosystem.

1. Introduction

In today's world, the global economy is intricately interconnected and technological iteration is rapid, presenting enterprises with increasingly complex and uncertain competitive environments. The integration of international markets has strengthened economic ties between nations while simultaneously introducing multiple challenges, including cultural differences, diverse demands, and rapid technological transformation. To sustain long-term

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competitive advantage, enterprises must not only overcome cultural and institutional barriers in cross-border operations but also continuously monitor technological advancements to drive innovation in products, services, and management. Service ecosystems, as a novel organisational form based on shared rules and multi-party collaboration, provide crucial strategic support for enterprises navigating complex external environments through resource integration and mechanism coordination.

Within this context, service ecosystems have emerged as a novel organizational form grounded in shared institutional arrangements and multi-actor collaboration. By facilitating coordination and resource integration among diverse organizations, they provide a critical strategic framework for companies to operate effectively in complex and uncertain environments.

By fostering close collaboration and resource sharing among diverse stakeholders to build an organisational structure with cross-cultural adaptability, businesses can significantly enhance their ability to adapt to complex and dynamic market environments while effectively improving innovation efficiency and overall performance. [1]point out that in a challenging and changing market environment, a mature enterprise ecosystem must possess sustained autonomous innovation capabilities and flexible adjustment mechanisms. Business digital transformation, as a critical process in transitioning to flexible, integrated dynamic systems and platforms, is redefining new models of organisational value creation. Currently, we are witnessing the vigorous development of a creation ecosystem based on freely integrated modules [2].

However, despite the strong adaptability and immense innovation potential that service ecosystems bring to businesses, companies still face numerous challenges when actually building and utilising such ecosystems, especially in the context of digital transformation. How to effectively enhance digital maturity, strengthen value co-creation, and leverage value co-creation to gain competitive advantages and drive service innovation remains a critical issue requiring further exploration. As industrial and service companies increasingly adopt digital service strategies to achieve service-driven growth and establish competitive advantages, businesses must develop sufficient capabilities to fully leverage the benefits of service-driven growth, an area that remains under-researched in the existing literature [3].

Against this theoretical and practical backdrop, this study focuses on the reconstruction of an enterprise digital maturity model empowered by artificial intelligence (AI) technology, with particular emphasis on its role in reshaping competitive advantages and innovation pathways within service ecosystems through value co-creation mechanisms. The research deconstructs digital maturity into three AI-driven core dimensions: AI-Enhanced People Capability; AI-driven Product Innovation; and AI-Enabled Marketing Effectiveness.

Its goal is to systematically answer the following important question: How can businesses effectively find, assess, and use AI-enabled digital capabilities to help consumers, partners, and other stakeholders work together to create value, which will give them long-term competitive advantages?

2. Theoretical Framework: AI-Enabled Digital Maturity and Value Co-creation Mechanisms

In recent years, the service-dominant logic has progressed to the stage of service ecosystems, which constitute complex networks of dynamic symbiosis and collaborative evolution formed through resource sharing and rule-based coordination among diverse actors including organisations and consumers [4]. Value is co-created through multi-actor interactions, with service innovation grounded in A2A (actor-to-actor) relational structures [5]. Concurrently, the rapid advancement of artificial intelligence technologies is profoundly reshaping the operational mechanisms and value creation methods within service ecosystems.

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This study, grounded in service ecosystem theory and incorporating an AI-enabled perspective, constructs a theoretical framework centred on 'AI-enhanced digital maturity'. It systematically elucidates the mechanism through which this framework drives enterprise service innovation and competitive advantage via co-creation of value. This framework emphasises that corporate digital maturity must transcend traditional technology application and process digitisation, comprehensively encompassing three AI-centric capability dimensions: consumer, product, and marketing. Collectively, these capabilities constitute the critical resources and dynamic capabilities [6] for enterprises within digital ecosystems.

In terms of consumer aspect, AI technologies deploy user profiles, behavioral prediction and privacy-preserving techniques like Federated Learning to gain insight on the needs of consumers, as well as building a trustworthy data-interacting environment, which provides the basis for value co-creation[7]. Furthermore, based on AI-enabled product power, the AI-based agile development, continuous iteration, intelligent service optimization capability greatly increases the dynamical efficiency of companies' response to the changes in the market, so that the co-creation results can be converted into actual service innovations quickly [8]. In terms of AI-Enabled Marketing Empowerment, AI-driven precise targeting, contextualised interaction, and ecosystem-based diffusion have redefined traditional marketing boundaries, driving enterprises to transition from a 'transaction-centric' role to an ecosystem role that balances 'relationships and empowerment'[9].

This study further proposes that AI-enabled digital maturity significantly enhances the breadth and depth of value co-creation by improving resource integration and interaction quality between businesses, consumers, and partners. The knowledge integration effects (e.g., user feedback-driven process optimisation) and relationship embedding effects (e.g., cross-ecosystem collaboration) generated during value co-creation ultimately translate into businesses' difficult-to-imitate differentiated capabilities and sustained competitive advantages [10].

In summary, this theoretical framework not only responds to[11]critique of 'technological determinism' in digital assessment but also expands the new implications of [12]service ecosystem theory in the AI context, providing a new analytical pathway for understanding how enterprises achieve value co-creation and service innovation through AI in the digital age.

3. AI-Empowered Model: The Cornerstone of Competitive Advantage in the Service Ecosystem

3.1. Service Ecosystems and Value Co-creation

In recent years, service-dominant logic has evolved to the stage of service ecosystems, regarded as interacting entities that are co-evolved by organizations and individuals (including customers) to form interdependent relationships for overall effectiveness and survival [13]. Service innovation is based on inter-participant (A2A) networks, and service ecosystems, as proposed by [14], are self-regulating systems in which participants co-create value and form complex, dynamic networks. [15]point out that the service-dominant logic transforms the way customer value is driven and created, and the customer becomes the real creator of value. [16] propose the framework of "indirect transaction", which supports the interactive behavior and the establishment of service platforms. [5] consider "service platforms" as a modular framework where resource interactions enhance the value and depth of the service ecosystem.

3.2. AI -driven Digital Maturity and Competitive Advantage

This study reconstructs the model of digital maturity, rooted in the new retail 'people-goods-place' theoretical framework, and builds upon it to innovate digital theory through AI empowerment. The 'people-goods-place' theory was first proposed by Alibaba, with its core

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focus on the digital reconstruction of commercial elements-shifting from the traditional retail model centred on 'place' ('place-goods-people') to the new paradigm of the digital age centred on "people" ('people-goods-place'). This transformation emphasises consumer-centricity, leveraging data-driven insights to uncover personalised needs and build diverse scenarios. This study further introduces an artificial intelligence technology perspective to deepen and reconstruct the theory across three dimensions:

1) AI-Enhanced People Capability: From 'Consumers' to 'Niche Shapers'.

This dimension transcends traditional customer-centric approaches and digital touchpoint concepts, emphasising deep user understanding, intelligent interaction, and niche construction through privacy-preserving computing technologies such as user profiling, behavioural modelling, social propagation, and federated learning. It balances data utilisation with privacy protection. Building upon Customer Orientation Theory[17]and Digital Touchpoint Theory [12], it integrates AI-enhanced interaction and privacy computing innovations. This encompasses not only enterprises' capacity to identify needs and respond in real-time through digital technologies, but also highlights the ecosystem-building capabilities enabled by AI-driven user insights, behavioural simulation, and social mechanisms. Enterprises may leverage technologies such as federated learning to coordinate the value of multi-source data with privacy protection, avoiding data redundancy and promoting sustainable co-creation of user value [12].

2) AI-Driven Product Innovation: From the 'product dimension' to the 'agile innovation carrier.'

Beyond 'agile development' and 'data-driven innovation,' this dimension focuses on product intelligence embedded with AI functionality (such as predictive maintenance and personalised recommendations), as well as AI-based rapid iteration and adaptive service optimization capabilities. Based on the dynamic capabilities theory [6] and the data-driven innovation framework [8], this dimension highlights the accelerating role of AI technology in product iteration and service optimization. Under AI empowerment, AI-Driven Product Power manifests as highly intelligent capabilities that optimise product design through consumer data analysis, enable end-to-end collaborative development via digital technology, and significantly reduce product time-to-market. Companies can thus quickly respond to market changes, convert data insights into innovative products and services, and form a core competitive advantage in digitalisation [18].

3) AI-Enabled Marketing Empowerment: From the 'marketing dimension' to the 'ecological diffusion engine'.

This goes far beyond the application of digital channels, focusing on the ability to achieve ultra-personalised customer insights, precise targeting, automated interaction processes, and the construction of new business models characterised by ecosystem empowerment, all driven by AI algorithms. Integrating digital transformation theory [19]with the business model innovation framework [9], this dimension assesses the fundamental transformations AI brings to marketing efficacy and business models. Driven by AI technology, enterprises achieve precision marketing and sales through digital channels, formulate intelligent promotion strategies using big data, and establish new business models centred on ecosystem empowerment. This shift not only substantially enhances marketing efficiency but also propels enterprises towards a strategic transformation from ‘transaction-dominant players’ to ‘ecosystem enablers’.

By introducing an artificial intelligence perspective to reconstruct the three-dimensional model, this research expands the measurement framework and theoretical implications of digital maturity. It provides a basis for enterprises to systematically evaluate and enhance their digital capabilities, offering significant insights into value co-creation and innovation pathways within service ecosystems.

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This study further explores the underlying mechanisms of digital maturity from the perspective of value creation. The findings reveal that AI-driven digital maturity significantly reshapes the value creation patterns and sources of competitive advantage within service ecosystems:

First, supporting technology forms the infrastructure for value innovation. Digital technologies such as artificial intelligence, big data, and the Internet of Things not only provide the underlying architectural support for enterprise value creation but also significantly enhance the efficiency and breadth of value creation through data integration and intelligent analysis. The level of digitalisation serves as a key indicator for measuring value innovation, manifested through enterprises' unified management of internal and external information via data centres, the efficient circulation of data, AI technology lowering barriers to user participation in ecosystem collaboration, and standardised API interfaces enhancing interconnectivity and coordination efficiency within systems. For instance, a certain home appliance ecosystem platform has integrated data from over 120,000 enterprises, establishing a shared economy ecosystem spanning the entire industrial chain. By integrating multiple technological elements to form digital infrastructure, it has driven a systemic transformation in value creation models.

Second, enterprises can unlock greater synergistic innovation value through organisational transformation. Digital development requires enterprises to make profound adjustments in structure, processes, and culture, shifting from traditional closed models to open, collaborative value networks. This transformation drives value creation from simple transactions to ecosystem collaboration. For example, an e-commerce platform leveraged data and AI technology to build a content ecosystem, resulting in a 320% increase in advertising return on investment. Sany Heavy Industry extended its product value chain through the industrial internet. These practices demonstrate that organizational transformation is a key enabler of digital value creation.

Third, ecological governance mechanisms have restructured the value distribution system. Digital platforms have spawned new distribution methods, breaking traditional interest chains to form more flexible and sustainable sharing models. Xiaomi's ecosystem chain 'investment + empowerment + revenue sharing' mechanism maintains the core enterprise's leadership while incentivising partner innovation, optimising the value creation environment and enhancing ecosystem stability and competitiveness.

Research indicates that under the support of AI-driven digital maturity, value creation within service ecosystems exhibits new characteristics such as increased density, extended cycles, innovative distribution, and evolving models.Enterprises must synergistically enhance their digital maturity across three dimensions: technological application, organisational transformation, and mechanism design. By fostering co-creation of value, they can build sustainable competitiveness within service ecosystems.

4. Redefining Competitive Advantage in Service Ecosystems: From Enterprise Efficiency to Systemic Innovation

This research transcends the limitations of traditional approaches that define digital maturity solely through a technological lens, establishing an AI-integrated digital maturity model. This framework not only assesses the degree of an enterprise's digital implementation but also provides a progressive capability system spanning data accumulation, value creation, and ecosystem expansion. AI technology profoundly alters the intrinsic nature and operational mechanisms across all dimensions, comprehensively reshaping an enterprise's competitive position and innovation model within the service ecosystem through the core pathway of co-creation of value.

The study argues that AI-driven three-dimensional digital maturity does not directly translate into competitive advantage but rather reshapes service ecosystem competitive advantage

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through the core intermediary mechanism of value co-creation. This addresses the existing research gap in exploring intermediary effects.

From unidirectional transmission to bidirectional interaction: The value co-creation theory emphasises that value is jointly created by enterprises, consumers, and other stakeholders through interaction and cooperation. AI-enhanced People capability reduces interaction barriers, AI-driven product power provides the vehicle for co-creation, and AI-enabled Marketing Empowerment builds the platform for co-creation. The three work in tandem to activate a mechanism where 'enterprises, users, and other ecosystem partners jointly produce value.'

Knowledge integration and relationship embedding effects: Value co-creation helps enterprises build difficult-to-imitate differentiated capabilities through knowledge integration effects (e.g., process optimization driven by user feedback) and relationship embedding effects (e.g., ecosystem partner collaboration). For example, AI-driven customer insights (AI-Enhanced People capability) guide rapid product iteration (AI-Driven Product Innovation) and collect broader feedback through ecosystem-based marketing (AI-Enabled Marketing Empowerment), forming an enhanced closed-loop that continuously nurtures competitive advantages.

Ultimately, through value co-creation, AI-driven digital maturity will transform competitive advantages within service ecosystems across three dimensions:

1) Improving operational efficiency and resilience: AI automates repetitive operations and streamlines procedures, resulting in substantial cost savings and enhanced productivity. Moreover, AI's predictive powers bolster supply chain resilience and business continuity, allowing the entire ecosystem to more effectively endure threats.

2) Propelling service innovation and model transformation: The extensive data and novel concepts produced through value co-creation serve as the foundation for service innovation. AI facilitates the rapid transformation of these into novel services, experiences, or business models (such as C2M or platform-based ecosystems), transitioning from 'value delivery' to 'value creation.'

3) Building network effects and ecosystem barriers: When businesses successfully establish a platform-based ecosystem model through AI-enabled Marketing Empowerment, they can trigger network effects. The more users and partners they attract, the greater the value of the ecosystem, thereby forming strong ecosystem barriers and sustainable competitive advantages, achieving a leap from 'business competition' to 'ecosystem competition.'

5. Discussion and Implications

5.1. Theoretical Contributions and Research Implications

This study presents a theoretical model of 'AI-driven digital maturity - value co-creation - service ecosystem competitive advantage' to systematically explain how corporate competitive advantage is reshaped in the era of artificial intelligence. The study's main theoretical contributions are reflected in three key aspects:

First,This study advances the theory of digital maturity towards artificial intelligence. Existing models predominantly focus on technological application and process digitization, failing to fully capture the profound transformation brought about by AI. We propose a new three-dimensional framework centred on ‘AI-enhanced people capabilities, AI-driven products, and AI-empowered marketing’. This expands the theoretical scope of digital maturity and highlights AI's pivotal role in reshaping corporate capabilities. This theoretical advancement provides a fresh AI-enabled perspective for subsequent research.

The theoretical contribution of this paper is as follows: Initially, it presents AI technology as a fundamental factor in digital maturity research, so enhancing its theoretical significance.

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Secondly, it elucidates the pivotal mediating function of value co-creation in the transition from 'capacity to advantage', so enhancing our comprehension of the mechanisms that underpin the development of competitive advantages within service ecosystems. Ultimately, it establishes a cohesive theoretical framework that synthesizes technology capabilities, co-creative behavior, and competitive advantage, offering a novel viewpoint on value creation and the attainment of competitive advantage within digital ecosystems.

5.2. Practical Implications and Management Recommendations

According to the research findings of this paper, it makes several recommendations about management practices concerning businesses that are digitizing themselves.

Start by specifying an approach for developing AI capability and creating relevant pathways. Specific 3D capabilities need to be built for each sector according to its particular characteristics and tech stack. Companies and consumers should make efforts to increase AI insights from consumers by using technologies such as user profiling and behavioral prediction. Firms focusing on products should use intelligent, adaptable tech to leverage the improvements in AI-driven products to enhance the pace of new product introductions. Platform companies should build marketing capabilities driven by AI and build network effects driven by diffusion via ecosystem methods.

Secondly, Enterprises should establish organisational mechanisms oriented towards value co-creation, dismantling traditional organisational boundaries to build collaborative platforms integrating consumers and partners. By designing effective incentive and governance frameworks, they can foster knowledge sharing and resource integration, maximising the network effects of value co-creation. Particular emphasis must be placed on applying trusted technologies such as privacy computing to balance data utilisation with privacy protection.

Thirdly, practice ecosystem competition strategies. With the emergence of the digital economy, companies are no longer just competing with each other. Now they are competing within different ecosystems; instead of being a provider of single-direction value companies should become enablers of the ecosystem and lower the barriers of ecosystem participation by sharing open APIs, co-building platforms, actively attracting more partners to join the value co-creation network, collaborating with them to raise the overall value level of the ecosystem.

6. Conclusion

The research helps the business managers get more insights for the practical work. They should first assess the maturity level of each company along the three dimensions of AI-enabled capabilities and then find out the weaker points and implement specific digital transformation strategies. Secondly, they should prioritize the construction of value co-creation platform by creating a better interaction channel and mechanism among all the stakeholders like customers and partners, so as to promote the co-creation value. Finally, current research primarily focuses on the development of enterprises' own capabilities, with insufficient attention paid to macro-level institutional and cultural factors. Future studies may integrate institutional theory to explore how the institutional environment influences corporate digital strategies and value co-creation models.

In conclusion, As artificial intelligence technology matures and becomes increasingly widespread, AI-driven digital transformation has emerged as a crucial pathway for enterprises to gain competitive advantage within service ecosystems. Organisations must fundamentally reshape their value creation logic and organisational structures, transitioning from closed value chains to open value networks. By systematically developing three-dimensional AI-enabled capabilities, enterprises can secure sustained advantages in intense ecosystem competition. This research provides a theoretical framework and practical guidance for such transformation,

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offering fresh perspectives for understanding and advancing corporate innovation and change in the digital era.

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