

REDEFINING BUSINESS IN THE DIGITAL AGE: AI, OPERATING MODELS, AND ECOSYSTEMS

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Abstract

The research explores the interplay between Artificial Intelligence (AI), digital operating models, and business digital ecosystems. AI is transforming decision-making, automation, and customer interaction, while digital operating models provide the organizational framework. Business digital ecosystems create collaborative synergies for companies to stay competitive. The study examines how these elements influence each other and explores the emergence of a new organizational model driven by AI and digital technologies. It analyzes the impact of AI on business models, shifting them towards a more data-driven and flexible approach. Additionally, it explores how AI reshapes digital ecosystems and how companies can leverage AI to navigate these complex landscapes.

Keywords: artificial intelligence, digital business models, digital business ecosystems, digital transformation, Coase theorem, modularity principle, scalability, value creation

Introduction

The swift progression of technology, particularly artificial intelligence (AI), is significantly altering companies' business models. This transformative power is reshaping the core structure of organizations and encouraging novel forms of business activities. The fusion of advanced technologies and inventive business strategies pushes companies into uncharted territories, surpassing conventional operational paradigms, and reveals new avenues for value generation. This study explores the intricate relationship between artificial intelligence, digital operating models, and business digital ecosystems. As AI is set to redefine decision-making, automation, and customer interaction, digital operating models serve as the organizational framework, and business digital ecosystems create collaborative synergies. It is crucial to comprehend how these elements interrelate and impact each other for businesses aiming to stay competitive in today's dynamic environment.

Literature review

The literature review on our study's topic shows that researchers explore various aspects of integrating AI into business operations. Their studies include examining the mutual relationship between AI and business ecosystems, especially in the context of digital transformation. Scholars such as A. Kindler, J. Moore, A. Fletcher, M. Jacobides, M. van Alstine, M. Koch, D. Kromer, Pidun U., Reeves M., and Schüssler M. J. Coufano, M. Ianciti, K. Lakhani, S. Gupta, among others, have shed light on these aspects. Their research investigates how AI impacts business models, triggering a paradigm shift towards more flexible and data-driven strategies. Furthermore, these studies scrutinize how AI enhances ecosystem design and restructuring and how it repositions businesses within these dynamic landscapes. As AI becomes more prominent, researchers are expanding their focus to explore innovative ways to leverage AI in coordinating services within business ecosystems. Their research examines how AI streamlines processes, improves decision-making and drives innovation in these interconnected networks.

Importantly, researchers analyze the models of digital business ecosystems through the prism of AI's transformative potential and inspect how AI affects market dynamics, enabling ecosystem companies to align their offerings with constantly changing customer preferences. The intersection of

AI and business ecosystems serves as a critical junction for exploring new paths of growth and differentiation. As this field progresses, it underscores businesses' need to adopt AI-driven strategies to navigate the complexities of digital business ecosystems effectively.

Results

Contemporary digital technologies are gradually blurring the traditional boundaries of economic sectors, including industries, agriculture, transport, communications, and finance. The rise of artificial intelligence (AI) is driving significant shifts in both the business model and operational models of organisations. The business model is being reshaped, which defines a company's value proposition to customers, product/service offerings, and revenue generation mechanisms. Simultaneously, the operational model is also transforming, encompassing the processes and methods used to deliver the customer value proposition and monetise revenue. These concurrent changes in the business and operational models are giving rise to a new organisational model.

Comprehending this emerging organisational model's fundamental principles and concepts is vital to understanding its significance and impact. An organisation's fundamental characteristic is facilitating coordination and establishing a hierarchy of motivations among its participants. This coordination and hierarchical structure aim to unify individual motives into a cohesive system that enables rapid decision-making and effective implementation of those decisions.

In essence, the advent of AI catalyses organisations to rethink and restructure their core models – their value propositions to customers, product/service offerings, revenue generation mechanisms, and the operational processes employed to achieve organisational objectives. This transformation is leading to the formation of a new organisational model, which relies on aligning and coordinating the motivations of its participants to drive efficient decision-making and execution. That is, the organization uses the interdependence of the motivations of its members, revealing in this way the interdependence of their functions. A firm represents a specific instance of an organization operating within the economic sphere.

C. Menard [1] posits in the context of organizational theory that a company's economic prosperity is measured by its ability to expand its operations and substitute the market. The ultimate measure of a firm's efficiency is its impact on its surroundings: an efficient organization modifies the external environment to its benefit. The Coase Theorem elucidates the growth boundaries that perplex numerous companies, regardless of size. A company can expand if its internal costs, encompassing all expenses, are less than its external costs. When internal costs match or surpass external costs, the company will hit a point of diminishing returns and halt its expansion. Emerging digital technologies intensify the pressure related to the Coase theorem by decreasing external costs. Some analysts argue that these technologies will lead to the demise of large corporations.

For instance, search engines have significantly simplified and reduced the cost of information acquisition, eliminating the advantage previously enjoyed by large corporations with abundant resources. Nonetheless, digitization also lowers internal costs for companies that effectively utilize technology. It has altered the economics of internal organization. For instance, cloud services offer high-performance levels without needing personnel and significant capital investment when temporary expansion is necessary. Amazon, Microsoft, and Google web services have already leveraged this trend, and such services are expected to multiply. Some companies are already constructing technological platforms that connect all aspects of their business and production chains to achieve lower costs than previous IT initiatives. As digitization progresses, transaction costs will persistently decrease. This process will affect decisions about maintaining activities within the organization and outsourcing others to contractors. Some previously more cost-effective processes within companies will become more costly, like research and development support. Conversely, activities that were previously more cost-effective to outsource, such as HR and training, may become less costly internally because hierarchy simplification allows for less formal (and hence less costly) HR management and recruitment. However, the fundamental equation will remain unchanged: the lower a company's internal costs relative to its external costs, the higher its likelihood of growth [2].

The following principle that elucidates the nature of the new organizational model is the principle of modularity, formulated by Harvard Business School professors Carlisse Baldwin and Kim Clark in the late 1990s [3]. They identified that modularity, or modular design, was a crucial determinant in the pace of innovation. Corporations employ modularity in software development, automotive design, and other engineering facets. Owing to this, a complex technological design infiltrates numerous

functionally relevant components - standardized where standardization is necessary and individually tailored where differentiation is required. The principle of modularity is also applicable to corporations. Modular organizations can innovate more rapidly than others as their slowest divisions or products do not impede their R&D speed. For example, Amazon has established a structure that enables it to provide a broad spectrum of products at a lower cost than its rivals. This structure empowers the online retailer to penetrate new industries and develop new offerings, including its modular Amazon Cloud infrastructure. An organization can attain modularity by establishing distinct research laboratories without isolating each other. However, it necessitates careful consideration of the structure of the R&D activity: rendering some processes and practices generic (such as procurement of materials and the utilization of cloud-based software platforms) and others wholly isolated (such as unique features of hardware and software that should not be shared with competitors). In the present day, as businesses transition from analogue to digital, modularity is crucial because speed and flexibility are paramount. In general, these theories elucidate the selection of organizational structure, modes of collaboration, and allocation of functions and resources, which are vital components for the successful operation of digital business models and will dictate the internal architecture of corporations. Next, we will examine the alterations in a company's business model and operating model that incorporate artificial intelligence into generating value for its clients. The level and scope of digital technology integration within the firm's business model differentiate between digitally enhanced and digitally enabled business models.

As G. Coufano [4] highlights, a digitally enhanced business model is one where digital technologies are incorporated into pre-existing processes, operations, or products to enhance certain aspects of the business. In this scenario, digital tools augment or refine specific functions without requiring a total overhaul. The focus is on harnessing digital capabilities to boost efficiency, productivity, or customer experience within the existing framework.

Conversely, a digitally-enabled business model transcends mere enhancement by integrating digital technologies as a core and strategic component of the entire business model. It entails a broader transformation of the business's operation, customer service, and value creation. Digital capabilities are deeply embedded across various functions, leading to a comprehensive reimagining of processes, products, and services. This strategy fully exploits digital technologies to uncover new opportunities, investigate novel revenue streams, and disrupt conventional business paradigms.

The main distinction lies in the extent and depth of digital technology integration within the business model. Digitally enhanced models concentrate on refining specific areas, while digitally enabled models entail a more significant shift in the business's operation and interaction with its environment. Both strategies recognize the significance of digital transformation, but the degree of change and impact on the overarching business strategy differentiates them.

As defined by M. Iansiti and K. Lakhany in [5], the role of the operating model is to generate profitable offers at the correct scale (the production volume of goods and services, the number of clients served by the firm), to attain a substantial scale (the range of activities performed by the firm), and to adapt to changes by resorting to suitable training (the firm's operational capacity to improve and innovate). For a considerable period, operational strategy researchers have believed that a firm achieves efficiency in its activities by aligning its strategy and operations for implementation, specifically when the operational and business models are coherent.

Expanding one of the three dimensions of the company's operational activity complicates its operating model, making its management increasingly challenging. Such a limitation restricts the company's activities in terms of its capacity to generate profitable client offers and secure funds. Incorporating digital technologies to create value for the customer enables the company to overcome these limitations, achieve a new level of scaling, have significantly greater scope and learning opportunities, and adapt faster to the turbulent external business environment.

The digitized operating model emerges from the company's transformation of the crucial path for delivering value to customers, employing software or data-based algorithms to replace human labour as the constraining factor in the company's operational growth. The marginal cost of serving an additional user in many digital networks approaches zero, except for certain additional costs of computing power in cloud environments. These aspects make it easier to scale the digital operating model. Limitations to the company's growth are much less dependent on people and organizational obstacles because most operational complications can be solved through software and analytics and the involvement of third-party partners from the company's existing network of partners.

The digital operating model is also changing the firm's architecture thanks to the modularity of digital technologies [2;3], which enables the rapid adjustment of business relationships. The digitized

process can be easily connected to external partner networks and providers to create additional value for the company's client. That is, digital processes are multifaceted. Also, the digitization of the operating model can create opportunities for rapid learning and innovation. The variety of accumulated data and their quality processing allow, for example, the personalization of the application or the introduction of innovations in developing new products. Thanks to the digitized operating model, the need for many employees and bureaucratic procedures is reduced.

As noted [5], employees do not provide a service or product in a digital operating model. However, they design and control software automation, overseeing a digital organization driven by algorithms that deliver the goods. Constraints on growth are transferred to the technology layer or the ecosystem of partners and suppliers.

Ecosystems in the business realm, especially within the digital domain, are gaining increasing significance due to transformative shifts in the economy, propelled by the following factors. First, regulatory changes and the wave of digital transformation have blurred the distinctions between goods and services. Secondly, the abrogation of legal documents has nullified exclusive privileges previously held by specific firms to cater to client needs. Third, modern technologies have revolutionized firms' capacity to serve their clientele. The prevalence of mobile devices and the Internet's pervasive influence on consumer behaviour have expanded the avenues for connecting formerly disparate goods and services, amplifying the impacts of the initial two factors [6].

Considering these transformative developments, individual firms frequently find themselves unable to autonomously create all the components of a comprehensive offering tailored to client needs, let alone experiment with diverse combinations of these elements across various markets. In fact, in numerous sectors, the firm and even the industry no longer serve as distinct units for strategic analysis.

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