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THE ESSENCE AND TYPOLOGY OF ECOSYSTEMS IN BUSINESS

The concept of a business ecosystem as a model of interaction among diverse stakeholders transcending a single industry and the traditional industry value chain has gained widespread acceptance in both business practice and academic research over the past few decades.

In today's globalized and digitized economy, characterized by intensified competition, the boundaries between industries are increasingly blurred. Companies from various sectors collaborate to co-create unique value propositions for end users across multiple domains, engage with competitors, and establish strategic partnerships aimed at joint innovation and sustainable development, thus forming or integrating into diverse business ecosystems.

The adoption of modern technologies, such as digital platforms, big data, and artificial intelligence, within business ecosystems enhances value co-creation and facilitates the coordination of participants, thereby increasing the relevance of business ecosystems as a subject of scholarly inquiry. This growing interest attracts researchers from various scientific disciplines. However, the lack of a unified and widely accepted conceptual framework for ecosystems in the business context has resulted in the emergence and proliferation of numerous analogies and interpretations. This conceptual ambiguity presents significant challenges for further research and theory development.

There is a growing need to differentiate among various interpretations of business ecosystems and to clarify the relationships between related analogies. This requires a comparative analysis of existing literature and the systematization of theoretical approaches to ecosystem definitions to develop a unified conceptual framework.

This research analyzed the works of prominent scholars — including J.F. Moore, M. Iansiti, R. Levien, T. Power, G. Jerjian, S. Gossain, R. Lewin, B. Regine, M. Peltoniemi, E. Vuori, C. Zott, R. Amit, C. Battistella, F. Urmetzer, M. Gomez-Uganda, L. Scaringella, D. Isenberg, J. Korhonen, F. Nachira, R. Adner, M. Cusumano, M. van der Borgh, M. Tsujimoto, A. Hein, among others — to identify the distinguishing features of various ecosystem analogies. This analysis enabled the identification of conceptual correlations and the development of a dependency scheme between ecosystem concepts. As a result, the study proposes definitions of business ecosystems in both broad and narrow senses.

Numerous scholars have attempted to address the terminological diversity surrounding business ecosystems by comparing specific analogies; however, few have provided a comprehensive view of the interdependencies among the most commonly used terms. A comparative analysis of various studies suggests that analogies such as 'economy as an ecosystem,' 'social ecosystem,' and 'business ecosystem' are primarily synonymous and are often employed as overarching terms for 'ecosystems.' In this broader context, the term 'business ecosystem' encompasses these analogies as types or subtypes and is defined by characteristics such as complexity, heterogeneity, and cross-industry composition. It comprises interconnected actors [1] who collaborate to co-create value that no single actor could generate independently [2].

The primary types of business ecosystems can be classified as follows:

1) *Entrepreneurial ecosystems* are characterized by the central role of government in fostering an environment that promotes entrepreneurship within a specific region. These ecosystems typically involve interactions among entrepreneurs, investors, consumers, and, in some cases, universities and established

enterprises. Their collective efforts are aimed at the creation of start-ups and the implementation of innovative business models [2].

2) *Knowledge ecosystems* are defined by the central role of a university, around which a business ecosystem is formed. These ecosystems typically include research institutions, R&D centers of large enterprises, and small and medium-sized enterprises and start-ups. Their primary focus is the generation of new knowledge [2].

3) *Industrial ecosystems* comprise industrial enterprises that collaborate by utilizing each other's by-products as input resources. This form of cooperation aims to conserve resources, reduce emissions, and promote sustainable development [3].

4) *Urban ecosystems* refer to the interaction among various stakeholders within the urban environment. These ecosystems focus on enhancing energy efficiency, minimizing waste and emissions, and improving the overall environmental conditions in specific cities [4].

5) *Innovation ecosystems* are composed of producers, partners, competitors, suppliers, complementors, consumers, and investors who are interconnected and simultaneously engage in cooperation and competition. These actors co-evolve, share the fate of the broader ecosystem, and interact to implement unique value propositions that could not be achieved individually. In cases where such ecosystems also include research institutions and government agencies, they are often referred to as '*business ecosystems*' in the narrow sense [3].

Scholars note that business ecosystems include roles such as customers, organizations, stakeholders, and government [5]. Also, by their definition, these roles are not stable due to the dynamic nature of ecosystems. Participants can take on roles, eliminate non-key participants, or transition to another role. In a type of ecosystem that relies on key players, the participants and roles of the ecosystem can change, but the system as a whole, along with its key players, persists [5].

A distinct subtype of innovation ecosystem is the *platform ecosystem*, characterized by the use of a digital platform that facilitates interaction among participants [4].

Platform ecosystems can be further classified into several subtypes, including *digital business ecosystems*, *software ecosystems*, *modular ecosystems*, *internet and mobile business ecosystems*, and *customer-centric business ecosystems*.

Digital platforms today are effective business models that have enabled large companies such as Apple, Amazon, and Alibaba to become leaders. Moreover, some platform business models are also characterized by going beyond the boundaries of the industry.

Digital platforms and ecosystems facilitate interaction and collaboration, accelerate the development and implementation of new products and technologies, and generally accelerate innovation processes. This is possible due to their network effects.

Further research on platform ecosystems and their subtypes is essential to establish unified terminology within the field of business ecosystems. A comparative analysis is also needed to differentiate ecosystem-based models from network and cluster business models. Future studies should particularly focus on the role of digital platforms in the formation and operation of business ecosystems, the impact of platform ecosystems on the competitiveness of industrial enterprises, and the viability of ecosystem-based business models in the context of digital transformation.

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