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Identifying factors affecting the energy market ecosystem (case study of the Iranian electricity market)

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Abstract

The aim of this research is to identify the factors affecting the energy market ecosystem (Case Study of the Iranian Electricity Market). The research method is applicable-exploratory in terms of its purpose, and qualitative in terms of its implementation method, based on the data-based method. The statistical population of the research includes 22 market management experts, as well as energy industry activists. The sample size was carried out using the purposive sampling method and the snowball method, and the interviews continued until theoretical saturation. Semi-structured interviews were used to collect information. The data-based method and Maxqda software were used to analyze the data. According to the findings, the concepts in the subcategories include: causal conditions (power grid instability, non-integrated governance); background conditions (energy exchange, power plant capacity money (generation) and technology, modularity, shared production and trust, cooperative stability); Intervening conditions (governance organizations/policymakers, production and consumption core, production cycle completers); strategies (decentralization, orchestration, energy pricing, new development investments, diversified financing, foreign energy trade and win-win self-regulation); and consequences (network, ecosystem attractiveness, multi-dimensionality of low-cost and network interactions and multiple satisfaction (governance, business, social) and development synergies and increased regional power).

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Extended Abstract

Introduction

Today, ecosystems are developing and becoming widespread as a new method of value creation with an approach to creating shared and focal value resulting from the performance and cooperation of different institutions (Ghods et al., 2023). Most businesses have paid attention to ecosystems in their macro strategy in two ways: creating their own business ecosystem or connecting to existing ecosystems. In the organizational literature, the term ecosystem was first used in business by James Moore in 1993. He described an ecosystem as “a complex network of interconnected businesses that depend on and feed off each other to deliver value to their customers, end users, and key stakeholders. This concept reflects the emergence of business environments that are characterized by co-evolution and complexity, which is in contrast to the traditional hierarchical organizational forms that have dominated markets and industries for many years. Recently, there have been efforts to systematize the understanding of ecosystems (Jacobides et al., 2018). Jacobides & Lianos (2021) consider ecosystems as communities of cooperating companies that collectively produce a good, service, or solution and co-evolve their products under a common vision that requires the creation of a specific structure of relationships and alignment to create value.” Mitleton-Kelly (2003) considers that an ecosystem consists of organizations and companies that both affect and are affected by it. Due to the breadth of the meaning, multiple interpretations of this concept have been made according to the need and type of its function and application. Platform ecosystems are one of the definitions of the ecosystem in the literature (the definition intended for this study). In this ecosystem, a company uses a platform to utilize the capabilities of other companies as a complement to create a specific value. In this case, the ecosystem is a model and method of organization (Jacobides et al., 2018).

Electricity, as a key infrastructure, plays a prominent role in economic growth and development. Sustainable electricity supply is a prerequisite for growth (KHosravani et al., 2023). This research aims to identify the dimensions and provide a framework for the B2B platform ecosystem in the electricity market, providing a tool for organizations in this industry to become aware of creating or joining an ecosystem. The results of this research can help increase the literature in this field, as well as fill existing gaps and provide practical solutions in this field. Therefore, the main research question: What are the factors affecting the energy market ecosystem?

Theoretical Framework

Ecosystem

The concept of ecosystem emerged from biological sciences and generally means “an interactive system created between living organisms and the environment in which they live” (Jucevičius & Grumadaitė, 2014). In fact, an ecosystem is considered an environment in which different factors exist and interact with each other (Abdi et al., 2023).

Ghavidast Kouhpayeh et al. (2024) examined the role of blockchain technology in creating trust in customers in the marketing ecosystem. The results of the present study showed that trust resulting from transparency arising from blockchain technology is able to have significant effects on various financial and non-financial outcomes for businesses that use this technology in their marketing ecosystem.

Mir et al. (2024) examined the design of an entrepreneurial ecosystem model in a university with a knowledge-based approach. The results in the qualitative section showed that 67 initial codes, 11 basic themes and 5 constructive themes in the main clusters of infrastructure and support (2 themes), technology and knowledge integration (2 themes), education and culture (3 themes), policy and planning (2 themes) and integrated management (2 themes) were

identified and the relationships between them were drawn and presented in the form of a paradigm model. The results of the quantitative section showed that 5 indicators and 11 components with factor loading, average variance extracted and high convergent validity (0.4), Cronbach's alpha coefficient and composite reliability (0.7), and high t-significance coefficients (1.96) were confirmed, and the model has a strong fit.

Research Methodology

The research method is applicable-exploratory in terms of its purpose, and qualitative in terms of its implementation method, based on the data-based method. The statistical population of the research includes 22 market management experts and energy industry activists. The sample size was determined using purposive sampling and snowball method, and the interviews continued until theoretical saturation was achieved. Semi-structured interviews were used to collect information.

Research Findings

The data-driven method and Maxqda software were used to analyze the data. According to the findings, the concepts in the subcategories include: causal conditions (power grid instability, non-integrated governance); contextual conditions (energy exchange, power plant capacity money (generation) and technology, modularity, shared production and trust, participatory stability); intervening conditions (governance organizations/policymakers, production and consumption core, production cycle completers); Strategies (decentralization, orchestration, energy pricing, new development investments, diversified financing, foreign energy trade, and win-win self-regulation) and consequences (network attractiveness, ecosystem attractiveness, multi-dimensionality of low-cost and network interactions, and multiple satisfaction (sovereignty, business, social), and synergistic development flows and increased regional power).

Conclusion

The present study was conducted with the aim of identifying the factors affecting the energy market ecosystem (case study of the Iranian electricity market). The results of this study are in line with the research of Ghavidast Kouhpayeh et al. (2024), Mir et al. (2024), Suuronen et al. (2023), Bonina & Eaton (2023), Wecht et al. (2021), Gawer (2021), Hadad et al. (2021), Hein Andreas et al. (2020), and Aulkemeier et al. (2019). Suuronen et al. (2023) introduced digital business ecosystems as networks of shared value creation and the importance of digitalization in how organizations collaborate and compete in the current era, and identified the opportunities and challenges that these ecosystems create by providing a systematic review of the prerequisites, challenges, and benefits of DBEs.

According to the research results, the following suggestions were made:

Creating ecosystems as new organizational types and alternatives to traditional organizations and management methods requires a change in the thinking, outlook, and performance of influential managers. Based on the research findings, creating ecosystems basically requires creating new paradigms such as decentralization, transferring activities to the private sector, non-interference in buying and selling processes, and eliminating rent and monopoly. At first glance, this seems to be very difficult and complicated, but it is one of the requirements of B2B platform ecosystems and plays an important role in its fundamental formation. The independence of actors must be accepted and the role of guidance should be performed by the government and the government instead of control and policymaking instead of mediation.

Providing new capital attraction platforms as a factor for the continued health of the energy ecosystem should be considered. Investment facilities, the challenge of exchange rate and its

fluctuations and its allocation, lack of incentive for private sector investment due to lack of profitability, return on investment, contractual attractiveness, high investment costs of power plants and facilitating laws including the Electricity Industry Barrier Removal Law, new and attractive investment models and attraction of foreign capital are among the important factors on investment in an electricity energy ecosystem that should be given special attention. Governance and the government will play the most important role in this category.