

# A Multi-Criteria Approach toward Accelerating for Artificial Intelligence Business Ecosystems: A Perspective of AI Startups

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## Abstract

*AI startups play a crucial role in introducing new ideas and technologies to the market, thereby driving the proliferation of AI. Considering the influence of AI startups within the AI business ecosystem, it is essential to support AI startups as a means of fostering economic growth. While previous studies have predominantly focused on AI adoption by startups (Booyse & Scheepers, 2023; Filieri et al., 2021), there is a gap in understanding the multi-criteria factors that specifically drive the activation of AI startup ecosystems. This necessitates recognizing policies related to AI startups as a critical agenda and formulating appropriate strategies to invigorate the AI business ecosystem. In other words, practical and sophisticated solutions are required to realize the potential of AI startups. This study aims to bridge the gap between rapidly advancing AI technology and the social sciences that need to support technological development. By inviting CEO and managers of major 27 AI startups in Korea, this study proposes a model for evaluating the activation of AI startups business ecosystem. Our findings indicate market demand, training AI professionals, and high-quality data is the most important factors for activation AI startup ecosystem. The implications of our findings underline the importance of strategic policymaking.*

**Keywords:** AI startups, Business Ecosystems, Analytic Hierarchical Process, Multi-Criteria Decision Model, CEOs

## 1. Introduction

The continuous development of artificial intelligence (AI) technology has garnered significant attention due to its potential to enhance efficiency and productivity across various industries. This transformative technology has the capacity to revolutionize operations, streamline processes, and introduce unprecedented levels of innovation. In particular, startups are at the forefront of harnessing AI

as a primary engine for technological innovation, expanding the realms of possibility through AI technology (Bughin et al., 2017). Companies like OpenAI, renowned for their development of innovative AI technologies such as generative AI, have highlighted the critical role AI plays within the business ecosystem. By creating advanced AI systems, these companies not only demonstrate the potential of AI but also set new benchmarks for technological capabilities.

Especially, AI startups are fundamental role in the AI business ecosystem, introducing new ideas and technologies to the market and playing a central role in AI's dissemination (Stahl, 2022). These startups act as the vanguard of AI innovation, constantly pushing the boundaries of what AI can achieve and how it can be applied across different sectors. Their agility and innovative spirit enable them to explore novel applications of AI, thus driving forward the entire ecosystem. Despite the recognized importance of AI startups, prior research has predominantly focused on the factors that influence AI adoption or rejection by startups (Booyse & Scheepers, 2024; Filieri et al., 2021; Gupta & Yang, 2024). Such studies, while valuable, often overlook the broader context in which AI startups operate and the various ecosystem dynamics that affect their growth and sustainability.

Given the significant role of AI startups in the AI business ecosystem, supporting these startups is crucial for driving economic growth. These supports involve recognizing AI startup policies as a critical agenda and developing effective strategies to energize the AI business ecosystem. Government and industry stakeholders must collaborate to create an environment that fosters innovation, provides access to necessary resources, and offers regulatory frameworks that facilitate growth. In other words, practical and sophisticated solutions are needed to harness the potential of AI startups. These solutions must be designed to address specific challenges faced by AI startups, such as AI infrastructure, market, and regulatory environment, thereby enabling them to thrive and contribute to the larger economic landscape.

In this context, the activation of AI startup ecosystems is crucial to ensuring sustained growth. The activation marks the transition from initial formation to continuous growth. However, during this phase, many startups encounter obstacles such as resource leakage, market potential limitations, and the need for a supportive regulatory environment (Stam, 2018). Addressing these challenges is important for enabling startups to fulfill their role in driving AI innovation and contributing to the broader ecosystem. Therefore, prioritizing the challenges that AI startups may face and providing support to overcome them is essential for ensuring their successful activation.

The purpose of this study is to offer a more concrete and holistic sense of the AI startup business ecosystem, supported by data from CEOs and managers of major AI startups in Korea. By delving into the experiences and insights of these industry leaders, the study aims to provide a understanding of the factors that drive the success and growth of AI startups. In other words, this study aims to bridge the gap between the rapid advancement of AI technology and the social sciences that must support its development.

To bridge the research gap, we raise the following research questions: “**RQ1:** *What are the important characteristics to consider for the activation of the AI startups business ecosystem?*” and “**RQ2:** *Which characteristic is relatively significant over others for activation AI startups business ecosystems?*” These questions aim to identify and prioritize the key elements that contribute to a thriving AI startup ecosystem, providing a foundation for targeted interventions and support measures.

To answer the research questions, this study suggests a criteria model to evaluate the growth for AI startup business ecosystem in Korea by using the analytic hierarchy process (AHP) method. The AHP method, known for its structured and systematic approach to decision-making, is particularly suited for this analysis as it allows for the comparison of multiple criteria based on their relative importance. By engaging with the major 27 AI startup CEOs and managers in Korea, the study seeks to gather expert opinions and insights that can inform the development of effective support strategies. This approach confirms that the proposed model is grounded in real-world experiences and practical considerations, making it highly relevant for policymakers and industry stakeholders.

## 2. Research Background

### 2.1 AI Startup

Artificial Intelligence (AI) can be defined as the simulation of human intelligence processes by machines, particularly computer systems (Stahl, 2022). These processes include learning (the acquisition of information and rules for using the information), reasoning (using rules to reach approximate or definite conclusions), and self-correction. Within the business ecosystem, AI has been recognized for its ability to enhance efficiency, innovate product offerings, and revolutionize operational processes (Burström et al., 2021).

In this situation, major technology companies have increasingly acquired AI startups to strengthen their positions in the AI industry in recent years. For instance, Google has acquired a variety of startups, integrating their capabilities and resources to become a dominant force in AI. Similarly, Apple, IBM, and Microsoft have also been actively acquiring smaller AI firms, highlighting a broader trend of consolidation within the industry (CB Insights, 2023).

AI startups are essential to the growth of the AI business ecosystem, functioning as crucial stakeholders that drive innovation and market expansion. These startups operate across diverse areas, including machine learning applications, machine learning platforms, natural language processing, computer vision applications, virtual personal assistants, and computer vision platforms. Their activities span various industries such as automotive, healthcare, services, consulting, education, finance, and entertainment, reflecting the expansive growth of the AI ecosystem.

The rise of AI startups has been accompanied by significant venture capital investments, which have seen a steady increase. By 2024, the number of AI startups and the funding they attract has grown substantially, with AI-focused venture capital investments playing a crucial role in this expansion. Particularly, in 2023 alone, notable deals included Inflection AI raising \$1.3 billion and Metropolis securing \$1.1 billion, highlighting the robust investment climate for AI innovations (Crunchbase, 2023).

Prominent AI startups like UiPath, Google DeepMind, and SenseTime have achieved unicorn status, experiencing unprecedented growth. The number of AI unicorns increased significantly, reflecting the rapid activation and market potential of these enterprises. For instance, the AI startups have evolved in unicorns, growing from 15 to over 60 between 2020 and 2023 (CB Insights, 2023). These startups often transform powerful machine learning models into diverse business applications, providing services that surpass human capabilities (Schulte-Althoff, 2023).

Globally, the AI ecosystem is primarily led by the United States and China, with significant contributions from the European Union and Japan. The U.S. holds a substantial share of global AI startup deals, followed by China, Japan, and the UK (Statista, 2023). Countries like Canada are also making strides in AI adoption, driven by national strategies and supportive government policies.

AI startups are continually evolving, with increased investments and strategic initiatives fostering a dynamic and competitive market. These startups not only drive technological advancements but also reshape business models and operational efficiencies across various sectors, playing their role as key players in the AI business ecosystem.

## 2.1 AI Business Ecosystems

AI business ecosystem refers to a network of interdependent organizations and individuals that interact within an economic community supported by AI technologies. From an ecological perspective, AI plays a crucial role in configuring advanced products and services to create value within the AI business ecosystem (Burström et al., 2021). Specifically, the AI business ecosystem consists of AI-based business systems or networks, encompassing technology, business applications, and applied business sectors. These ecosystems integrate technological advancements (e.g., machine learning, natural language processing) with applied business sectors (e.g., transportation, healthcare, entertainment) to foster innovation and efficiency (Stahl, 2022).

The AI ecosystem comprises various interdependent actors, including startups, large companies, research institutions, and government, which interact to foster AI development and deployment (Burström et al., 2021). Startups are central to this ecosystem, often acting as key innovators that push the boundaries of what AI technologies can achieve (Stahl, 2022). Their agility allows them to explore novel applications, driving both technological advancement and economic growth within the ecosystem. Large companies tend to focus on incremental innovations and improving existing products and processes rather than developing entirely new business models or technologies (Porter & Heppelmann, 2014). This is especially relevant in the AI sector, where large firms often acquire startups to integrate their innovations rather than developing these innovations in-house (CB insight, 2023).

The AI business ecosystem, as a network of interdependent organizations and individuals, thrives on the integration of advanced technologies and their applications across various sectors. To effectively configure and deliver these advanced products and

services, several critical components within the ecosystem must be addressed (Burström et al., 2021; Stahl, 2022). These components include infrastructure, market dynamics, and the regulatory environment. Each of these characteristics plays an essential role in ensuring the ecosystem's sustainability and growth.

In terms of infrastructure, there are three major components: training AI professionals, high-quality data, and computing power. A skilled workforce proficient in data science, machine learning, and AI development is crucial for employing the full potential of AI technologies. Training programs and educational initiatives ensure that professionals are equipped with the latest knowledge and skills in this rapidly evolving field (Wilson & Daugherty, 2018). Continuous learning and upskilling are necessary to keep pace with technological advancements (Dwivedi et al., 2021). High-quality data is another fundamental aspect of the AI infrastructure. The quality, accuracy, and availability of data significantly impact the effectiveness of AI applications. Additionally, access to diverse and extensive datasets allows AI models to learn from a wide range of scenarios, improving their robustness and applicability across different sectors. Computing power is also fundamental infrastructure for advanced AI models, particularly those involving deep learning and large-scale data processing. Adequate computational resources are necessary to train complex models and ensure efficient AI operations. High-performance computing infrastructure supports the computational demands of sophisticated AI models (Dean et al., 2012). Also, scalability in computing resources allows businesses to expand their AI operations effectively, accommodating larger data sets and more complex algorithms without compromising performance.

Market dynamics within the AI business ecosystem are driven by components such as market demand, social acceptance, and business models. Understanding and responding to market demand is crucial for the successful adoption and integration of AI technologies. According to the diffusion of innovation theory, aligning AI solutions with consumer needs and preferences ensures widespread acceptance and usage (Rogers, 2014). Identifying and leveraging market opportunities provide companies with a competitive advantage by offering unique AI-driven products and services that meet emerging trends and demands (Porter & Heppelmann, 2014). Social acceptance is critical for the abundance of AI technologies. Addressing ethical considerations and building trust among users are essential for gaining social acceptance. Transparent AI practices and ethical guidelines help mitigate concerns about privacy, bias,

and accountability (Mittelstadt et al., 2016). Educating the public about the benefits and limitations of AI contributes to informed decision-making and reduces resistance to adoption (West et al., 2019). Developing business models is crucial component for AI market expansion. Companies need to explore various revenue flows and adapt to technological advancements to ensure long-term success (Chesbrough, 2007). Flexible business models that can evolve with technological changes and market shifts enable businesses to capitalize on new opportunities (Teece, 2010), including AI market.

The regulatory environment is another fundamental role in the AI business ecosystem, encompassing government support, self-regulation, and legal framework. Government policies that provide financial support, grants, and incentives for AI research and development can activate innovation and reduce the risk for businesses investing in AI technologies (Mazzucato, 2018). Public investment in digital infrastructure, such as high-speed internet and data centers, creates a conducive environment for the growth of the AI ecosystem (Cohen, 2017). Self-regulation within the industry promotes consistency and interoperability among AI solutions. Establishing industry-wide standards and best practices ensures that companies adhere to ethical guidelines and maintain high-quality standards (Floridi et al., 2018). Encouraging self-regulation advances a culture of accountability and responsibility, where businesses collectively work towards maintaining the integrity and trustworthiness of AI technologies. Legal framework addressing issues such as data privacy, intellectual property, and safety regulations are essential for protecting consumers and businesses. Compliance with these regulations ensures responsible AI development and deployment (Wachter et al., 2017). Regulatory policies should strike a balance between encouraging innovation and ensuring safety. Well-designed regulations can prevent harmful practices without restraining technological progress, enabling a healthy and sustainable AI business ecosystem (Binns, 2018).

### 3. Method

#### 3.1 AHP

The Analytic Hierarchy Process (AHP) is a widely utilized theoretical modeling technique for complex decision-making processes (Saaty, 1990). Researchers typically establish decision goals and fundamental categories in a hierarchical tree. Numerical data is collected through expert surveys and analyzed via pairwise comparisons to compute AHP

weight scores. While AHP is beneficial for real-world decision-makers, it has also been used by researchers to conceptualize decision models and measure the relative importance of factors affecting decision goals (Saaty, 1990). AHP is particularly effective in situations where decision-makers must evaluate various complex factors simultaneously, as it allows for a structured comparison of the relative importance of these factors (Kim & Kim, 2016; Kim & Kim, 2017; Lim et al., 2024). Additionally, AHP is suitable for small sample sizes, making it ideal for this study, which involves a limited number of AI startup CEOs and managers.

#### 3.2 Criteria Model

The goal of the AHP model is to evaluate the AI business ecosystem, particularly focusing on AI startups. The first layer comprises three primary criteria: infrastructure, market dynamics, and regulatory environment. The second layer includes nine sub-criteria: training AI professionals, high-quality data, computing power, market demand, social acceptance, business model, government support, self-regulation, and legal framework. Table 1 and 2 show the operational definitions of the components used in the AHP model.

| Criteria               | Explanation   |
|------------------------|---|
| Infrastructure         | The foundational environment that drives AI technology          |
| Market dynamics        | The market outlook and consumer attitudes towards AI technology |
| Regulatory environment | Regulations or support policies concerning AI technology        |

Table 1. Explanation of Primary Criteria

| Sub-criteria              | Explanation  |
|---------------------------|--|
| Training AI professionals | The extent to which there is a sufficient number of experts to develop AI technology |
| High-quality data         | The quality and quantity of training data available for developing AI technology     |
| Computing power           | The adequacy of computing power or cloud systems for developing AI technology        |
| Market demand             | The current market demand and size of the market for AI technology                   |
| Social acceptance         | The acceptance of AI technology by users and society at large                        |

|                    |   |
|--------------------|---|
| Business model     | The potential to offer a business model differentiated from other companies |
| Government support | Promotion or support policies for AI by the government                      |
| Self-regulation    | Voluntary regulation by AI companies to protect consumer rights             |
| Legal framework    | Legal regulations related to AI technology to protect consumer rights       |

Table 2. Explanation of Sub-Criteria

This study involves a CEO-level survey, with the layers and subcategories derived from an extensive literature review and interviews with AI startup CEOs. In the expert survey, participants are asked to compare each element within the same hierarchical level, providing importance ratings and pairwise comparison matrices. Priority vectors for each factor are then calculated. Consequently, AHP analysis yields relative weights for each criterion, offering valuable insights into the factors influencing the AI business ecosystem, particularly the growth and development of AI startups.

### 3.3 Data Collection

The survey questionnaire for data collection was designed to perform pairwise comparisons of components related to the AI business ecosystem. It targeted CEOs and key executives from companies within CB Insights' Global Top 100 AI enterprises, including Riiid (AI in education) and Lunit (AI in cancer prevention). Respondents rated the relative importance of these components using a commonly employed 9-point scale (Kim & Kim, 2016; Saaty, 1990, 2008). The questionnaire was distributed in both online and Word document formats, with a sample size of 27 participants. Detailed demographic information is presented in Table 3.

| Measure             |                 | Frequency |
|---------------------|-----------------|-----------|
| Gender              | Male            | 21        |
|                     | Female          | 6         |
| Age                 | 20-29           | 1         |
|                     | 30-39           | 10        |
|                     | 40-49           | 13        |
|                     | 50-59           | 3         |
| AI Startup Industry | Healthcare      | 5         |
|                     | Education       | 2         |
|                     | Logistics       | 2         |
|                     | Entertainment   | 2         |
|                     | AI technologies | 5         |

|                         |                                   |    |
|-------------------------|-----------------------------------|----|
|                         | Other (Beauty, Pets, Foods, etc.) | 11 |
| Roles within AI startup | CEO                               | 14 |
|                         | R&D                               | 4  |
|                         | Planning                          | 9  |

Table 3. Participants' demographic and background information ( $N = 27$ )

### 3.4 Data Analysis

The data analysis for this study was conducted using MATLAB, a technical computing software, with procedure. The MATLAB code was specifically employed to calculate the Consistency Index (CI), the Consistency Ratio (CR), and ultimately determine the final AHP weight scores. Among the 27 participants, 24 had CR below 0.1, which is considered stringent yet acceptable, while 3 recorded CR below 0.2. Although CR values exceeding 0.1 are not typically preferred, values up to 0.2 can be acceptable in social sciences due to possible ambiguities in the configuration that could affect response consistency (Kim & Kim, 2016; Yang et al., 2007).

## 4. Results

In this study, local weight scores for the first and second layers of the Analytic Hierarchy Process (AHP) model were calculated initially. These scores were then multiplied, combining the first-layer weights with the second-layer weights to produce the overall weight scores. All local and overall weight scores for the evaluation criteria and rankings are presented in Figure 1 and Table 4. The results revealed that AI infrastructure, with a weight of 0.411, was the most critical factor in assessing the AI business ecosystem within the first layer. Following closely, market dynamics had a weight of 0.403, while the regulatory environment was found to have the lowest weight at 0.186. CEOs in AI startups consider that building AI infrastructure is paramount for activating the AI ecosystem, and they rated the potential of the AI market as the next most important component. Meanwhile, the regulatory environment was considered less critical.

Next, we will explain the local score results for the sub-criteria. In the infrastructure criteria, training AI professionals had the highest local score at 0.453. This was followed by high-quality data with a close score of 0.421, while computing power was considered least important, scoring only 0.126. AI startup decision-makers assess securing development personnel as the most important sub-criterion within AI infrastructure, and they rate the construction of

| Criteria               | Weight (W <sub>C</sub> ) | Sub-Criteria              | Local Score (W <sub>L</sub> ) | Global Weight (W <sub>C</sub> * W <sub>L</sub> ) | Rank |
|------------------------|--------------------------|---------------------------|-------------------------------|--|------|
| Infrastructure         | 0.411                    | Training professionals AI | 0.453                         | 0.186  | 2    |
|                        |                          | High-quality data         | 0.421                         | 0.173  | 3    |
|                        |                          | Computing power           | 0.126                         | 0.052  | 8    |
| Market dynamics        | 0.403                    | Market demand             | 0.530                         | 0.214  | 1    |
|                        |                          | Social acceptance         | 0.247                         | 0.099  | 4    |
|                        |                          | Business model            | 0.223                         | 0.090  | 5    |
| Regulatory environment | 0.186                    | Government support        | 0.478                         | 0.089  | 6    |
|                        |                          | Self-regulation           | 0.341                         | 0.063  | 7    |
|                        |                          | Legal framework           | 0.181                         | 0.034  | 9    |

Table 4. AHP Model for AI Business Ecosystem Assessment

high-quality data as the next most important factor. Within the market dynamics criteria, market demand was significantly more crucial, scoring 0.530, compared to social acceptance at 0.247 and business models at 0.223. AI startup decision-makers consider sufficient market demand to be the most important sub-criterion within market potential. They evaluate the acceptance of AI technology by users as the next most significant factor. In the regulatory environment, government support had the highest weight at 0.478, followed by self-regulation at 0.341, and legal regulations showed the lowest weight at 0.181. Thus, AI startup decision-makers consider government-level AI support policies as the most important within the sub-criteria of the policy environment. The relative importance of legal regulations is rated the lowest. This is believed to be because AI startup decision-makers think that for activating the AI ecosystem, policies that rely more on companies' self-regulation rather than strict legal regulations are more necessary.

The global weight scores represent the ultimate relative importance of nine criteria in the AI business ecosystem. The results indicate that market demand, with a score of 0.214, is the most influential criterion. This result emphasizes the urgency of developing a sufficient market for AI technologies and the need for supportive policies to accelerate the AI business ecosystem. While AI infrastructure is critical, training AI professionals (0.186) and high-quality data (0.173) follow closely in importance, highlighting the necessity of skilled human resources and superior data for ecosystem activation. Social acceptance, ranked fourth with a score of 0.099, suggests that further

education and public outreach are essential to prepare society for AI technology.

The priority of the legal framework is the lowest at 0.034, followed by computing power at 0.126 and self-regulation at 0.063. The lower priority of legal framework and self-regulation suggests that AI startup decision-makers focus on active investment over stringent regulations for the growing AI technology. Furthermore, the relatively low priority of computing power implies that companies consider organizational capabilities to effectively utilize computing resources as more critical than the sheer availability of those resources (Nature, 2023).

## 5. Discussion

### 5.1 Key Findings

The key findings of the study highlight that the primary components for activating the AI ecosystem are securing sufficient market demand and achieving social acceptance. Government-level support policies are crucial to ensure adequate market demand, with proactive measures needed to match AI demand and supply companies. Establishing an open innovation network in the AI sector is significant for creating a collaborative hub where domestic startups and large enterprises can thrive together, encouraging active business partnerships and discovering new business opportunities (Lichtenthaler, 2011). Successful social integration of AI technology requires launching AI campaigns to build societal understanding and public consensus on AI. This can be achieved through the

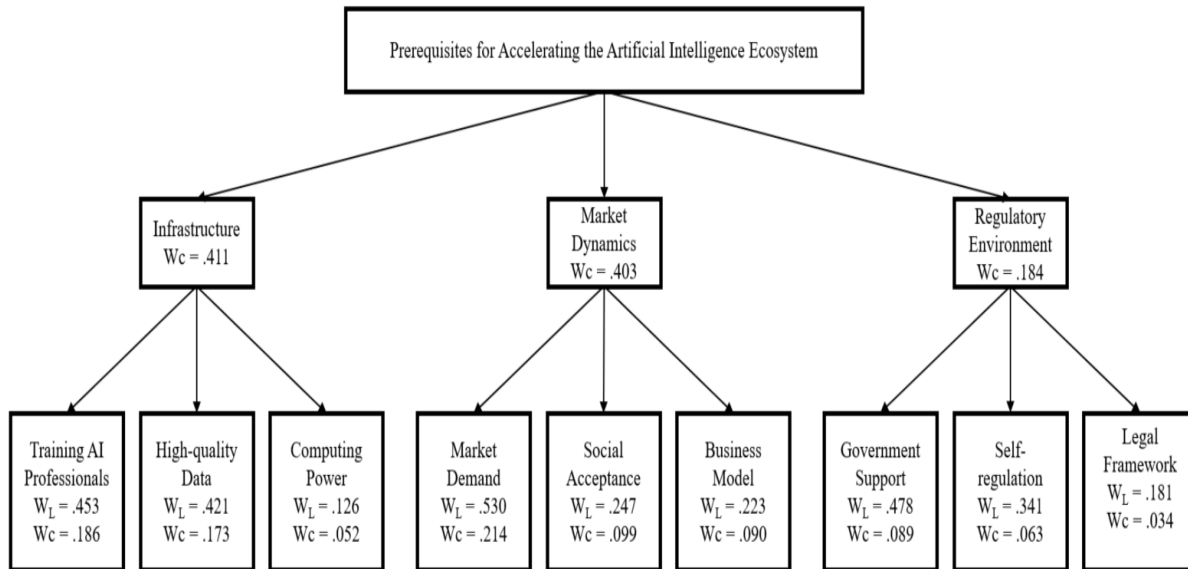


Figure 1. Result of AHP Model for AI Business Ecosystem

development of educational infrastructure and lifelong learning programs to prepare for future job markets (West, 2018). The core infrastructure for AI technology comprises development personnel and data. Like findings in prior chapters, there is a need for support in training specialized human resources for AI technology. To facilitate data sharing between large enterprises and startups, establishing a high-quality data distribution framework with appropriate incentive systems is necessary. Promoting a culture and environment where companies can measure the value of their existing or required data is crucial for encouraging data sharing and transactions. Additionally, lowering the barriers to data access through support for building open-source data platforms is essential to advance AI technology (Bughin et al., 2017).

Furthermore, it is essential to address the low confidence in regulatory policies. To overcome the low trust in regulations, creating a participatory regulatory environment that can support the development of the AI industry is necessary. This involves engaging a diverse range of stakeholders in the regulatory improvement process, including legal and policy experts, AI technology specialists, and social scientists studying the societal impacts of AI. By ensuring sufficient social consensus, rational AI regulatory measures can be developed. Establishing an integrated control tower is crucial for the advancement of the AI industry, facilitating information exchange

between the government, users, and companies. This allows regulatory to continuously update regulations with the latest information, reflecting market demands (Nature, 2023).

## 5.2 Implications

The study provides several theoretical implications for activating AI business ecosystem, especially AI startups. First, this study demonstrates the applicability of AHP in evaluating and prioritizing factors within the AI business ecosystem. By incorporating AHP, researchers can systematically analyze complex decision-making scenarios, enhancing the theoretical understanding of multi-criteria evaluation methods in the context of AI startups. This approach provides a structured framework for assessing diverse elements such as infrastructure, market dynamics, and regulatory environments, thereby contributing to the theoretical development of decision-making models in AI research (Saaty, 1990). Second, the study extends existing theories on AI ecosystems by highlighting the critical role of market demand and social acceptance. Previous research primarily focused on technological advancements and innovation within AI. This study broadens the theoretical scope by emphasizing the necessity of supportive market conditions and societal acceptance for the successful activation and sustainability of AI ecosystems. This theoretical expansion underscores the interconnectedness of

technological, market, and social factors in driving AI innovation and adoption (Stahl, 2022). Third, the study provides empirical evidence supporting the significant impact of government policies on the growth of AI startups. By integrating the perspectives of AI startup CEOs, the research highlights the theoretical importance of policy frameworks that facilitate market development and innovation. This underscores the need for theoretical models to account for the influence of governmental support and regulatory environments on technological ecosystems, offering a comprehensive understanding of policy-driven innovation in AI (Mazzucato, 2018).

The study also presents several practical implications. First, to address the low confidence in regulatory policies, there is a need for a participatory regulatory environment that includes diverse stakeholders such as legal experts, AI specialists, and social scientists. Engaging these stakeholders in the regulatory improvement process can help develop rational and socially accepted AI regulations. Additionally, establishing an integrated control tower for information exchange among government, users, and companies can ensure that regulatory bodies continuously update and reflect market demands in their policies. Second, the study emphasizes the necessity of creating targeted training programs to develop specialized human resources in AI technology. Practical initiatives could include collaboration between educational institutions and industry to design curriculums that address the specific skill gaps identified by AI startups. Implementing certification programs and continuous professional development opportunities can ensure that the workforce remains adept at handling emerging AI technologies. This approach not only enhances the skill set of current professionals but also prepares future generations to contribute effectively to the AI ecosystem (Dwivedi et al., 2021). The findings emphasize the necessity of creating targeted training programs to develop specialized human resources in AI technology. Practical initiatives could include collaboration between educational institutions and industry to design curriculums that address the specific skill gaps identified by AI startups. Implementing certification programs and continuous professional development opportunities can ensure that the workforce remains adept at handling emerging AI technologies. This approach not only enhances the skill set of current professionals but also prepares future generations to contribute effectively to the AI ecosystem (Dwivedi et al., 2021). Third, to support the AI ecosystem, there is a practical need to establish robust data-sharing frameworks that facilitate the exchange of high-quality data between large

enterprises and startups. This could involve developing standardized protocols for data sharing, ensuring data privacy and security, and creating incentive structures that reward data contribution. Such frameworks would enable startups to access valuable datasets that are crucial for training AI models, thus activating innovation and development within the industry. Implementing open-source data platforms can further democratize data access, allowing smaller entities to compete on a more level playing field (Bughin et al., 2017).

In addition, the findings of this study offer valuable insights for other key stakeholders within the AI startup ecosystem, including startup accelerators, entrepreneurs, and ecosystem complementors. For startup accelerators, the study's identification of infrastructure and market demand as critical factors for the activation of AI ecosystems provides accelerators or investors with a framework for evaluating potential investments. Startups that have access to high-quality data, a robust talent pool, and scalable computing power are more likely to succeed. Startup accelerators can prioritize companies that demonstrate strength in these areas, as they are better equipped to navigate the challenges of the AI ecosystem (Chesbrough, 2007; Bughin et al., 2017). For entrepreneurs, startup leaders can use the findings to strategically focus their resources. By prioritizing market demand and securing necessary AI infrastructure, such as access to data and skilled professionals, entrepreneurs can align their operations with the most important drivers of growth. Understanding the importance of government support can also help them leverage public resources and programs designed to stimulate innovation (Teece, 2010; Burström et al., 2021). Finally, for ecosystem complementors, larger companies, educational institutions, and industry groups play a key role in supporting AI startups by creating data-sharing frameworks, providing educational resources, and contributing to the development of infrastructure. These entities can help bridge gaps in the ecosystem by offering platforms that facilitate collaboration and innovation. For instance, partnerships between startups and established companies can provide access to large datasets or advanced AI technologies that would otherwise be inaccessible to smaller firms (Porter & Heppelmann, 2014; Mazzucato, 2018).

### **5.3 Limitation and Future Research**

This study has several limitations that should be acknowledged and addressed in future research. Firstly, the sample size is limited to 27 AI startup CEOs and managers from Korea, which may not fully represent the global AI startup ecosystem. Future research could expand the sample size and include

participants from diverse geographical regions to enhance the generalizability of the findings. Additionally, the reliance on self-reported data from CEOs and managers introduces potential biases such as social desirability bias or recall bias. Future studies could incorporate additional data collection methods, such as objective performance metrics or third-party evaluations, to triangulate and validate the findings.

The dynamic nature of the AI business ecosystem poses another limitation. The rapid pace of technological advancements, evolving market conditions, and changing regulatory landscapes may not be fully captured by the static design of this study. Longitudinal studies are recommended to track the evolution of the AI ecosystem over time and assess the impact of new developments and trends. Such studies would provide a more comprehensive understanding of how the AI ecosystem adapts and grows in response to external changes.

Another limitation of this study is its focus on the regulatory environment within the specific context of Korea's AI startup ecosystem. As our results show, regulatory aspects received relatively low weight in the decision-making criteria of Korean AI startup CEOs. However, this finding should be interpreted cautiously, as it reflects the current regulatory landscape in Korea, where AI regulations are still in their early stages. In contrast, in regions such as the European Union, regulations like the AI Act are already affecting how AI technologies are developed and deployed (Wörsdörfer, 2024). This regional difference means that our findings may not be entirely generalizable to other ecosystems, particularly those that operate under more stringent regulatory frameworks. Future research should aim to compare perceptions of AI regulation across different regions to understand how varying regulatory frameworks impact startup decision-making. A cross-regional comparative study would help to uncover how global developments, such as the implementation of the AI Act in the EU or the advancement of AI-specific policies in North America, affect startups' strategic planning and priorities.

In the same vein, future research should also explore the AI business ecosystems in different cultural contexts. Comparing the experiences of AI startups across various countries can provide insights into how cultural factors and local regulations influence the success and challenges of AI startups. This can inform more tailored policy recommendations and support strategies that are sensitive to regional differences. Furthermore, as AI technology continues to advance, future research should investigate the impact of emerging technologies such as quantum computing, edge

computing, and advanced machine learning algorithms on the AI business ecosystem. Understanding how these technologies integrate with and enhance existing AI infrastructure can provide valuable insights for startups and policymakers.

Moreover, the study highlights the importance of social acceptance for the success of AI technologies. Future research should delve deeper into the ethical and social implications of AI, exploring issues such as privacy, bias, and accountability. Engaging with diverse stakeholders, including ethicists, social scientists, and affected communities, can help develop frameworks that ensure the responsible development and deployment of AI technologies. By addressing these limitations and exploring these future research directions, scholars can contribute to a more robust and comprehensive understanding of the AI business ecosystem and its critical success factors.

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