



Article

Assessing the Effectiveness of Government Support in Venture Capital Ecosystems: Insights from Kazakhstan

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Abstract

This study examines the effectiveness of government support mechanisms in fostering venture capital (VC) ecosystems in emerging economies, with a particular focus on Kazakhstan. While venture capital is widely recognized as a key driver of innovation, entrepreneurship, and economic diversification, many developing countries face persistent structural barriers, including underdeveloped financial markets, limited private investment, and regulatory inefficiencies. To address these challenges, this research adopts a multi-source qualitative design, combining a systematic literature review with semi-structured interviews conducted with venture capital experts and practitioners. The analysis evaluates key policy instruments—such as co-investment schemes, tax incentives, startup accelerators, and regulatory reforms—and assesses their role in shaping VC activity. The findings indicate that although Kazakhstan has made significant progress in establishing institutional support for venture capital, critical constraints remain, including bureaucratic complexity, investor risk aversion, and limited exit opportunities. The study contributes to the literature by integrating global best practices with context-specific evidence, offering policy-relevant insights into how governments can more effectively design and implement interventions to strengthen venture capital ecosystems in developing economies.

Keywords: venture capital; government support; emerging economies; Kazakhstan; innovation policy; entrepreneurial ecosystems; public–private partnerships; co-investment mechanisms; financial market development; institutional frameworks

1. Introduction

Venture capital (VC) has become a central driver of innovation, entrepreneurship, and economic transformation, particularly in knowledge-based and technology-intensive sectors. By providing risk capital, managerial expertise, and strategic guidance, VC plays a critical role in enabling the growth of high-potential startups and fostering broader economic dynamism. While developed economies have successfully cultivated mature venture capital ecosystems, many developing countries continue to face structural barriers that limit the emergence and sustainability of VC activity. These barriers include underdeveloped financial markets, limited private-sector participation, regulatory inefficiencies, and persistent institutional constraints [1–3].

In this context, government intervention has emerged as a key mechanism for addressing market failures and catalyzing venture capital development. Policymakers increasingly deploy a range of instruments—such as co-investment funds, tax incentives, regulatory reforms, and startup support programs—to stimulate early-stage investment and reduce



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perceived risks for private investors. Existing research highlights the importance of these interventions in bridging financing gaps and promoting innovation-led growth, particularly in environments where private capital markets remain nascent [4–6]. However, the effectiveness of such government-led initiatives remains uneven and context-dependent, raising important questions about how policy design and implementation shape venture capital outcomes in emerging economies.

Kazakhstan provides a particularly relevant and underexplored context for examining these dynamics. As one of Central Asia’s largest economies, Kazakhstan has historically relied on natural resource exports, making it vulnerable to external shocks and underscoring the need for economic diversification. In response, the government has introduced a series of initiatives to foster entrepreneurship and strengthen the national innovation ecosystem, including the development of startup accelerators, co-investment mechanisms, and institutional reforms to attract venture capital [4,5]. Despite these efforts, significant challenges persist, including limited access to early-stage financing, a relatively small and risk-averse investor base, and underdeveloped exit markets [4–6]. These constraints raise critical questions regarding the extent to which current policy frameworks effectively support the development of a sustainable VC ecosystem.

Against this backdrop, this study seeks to systematically evaluate the role of governmental support in strengthening venture capital ecosystems in developing economies, using Kazakhstan as a focal case. The research adopts a multi-source qualitative design, combining a systematic literature review with semi-structured interviews conducted with venture capital experts and practitioners. This design integrates global theoretical and empirical insights with context-specific evidence, offering a more comprehensive understanding of policy effectiveness.

The study makes three primary contributions. First, it advances the literature on venture capital in emerging economies by providing a structured assessment of government support mechanisms and their impact on ecosystem development. Second, it offers empirical insights into the Kazakhstani context, an underrepresented region in venture capital research, thereby addressing a significant gap in the existing literature. Third, it provides policy-relevant recommendations by identifying key challenges and best practices associated with government intervention in venture capital markets. Through this analysis, the study contributes to ongoing debates on how governments can more effectively design and implement policies that foster innovation, entrepreneurship, and sustainable economic growth in developing countries.

To guide the investigation and provide a clear analytical focus, the study addresses three interrelated research questions concerning the role of government support in the development of the venture capital ecosystem. Specifically, the research seeks to understand how government-supported mechanisms influence venture capital ecosystem formation in emerging economies, which institutional and ecosystem conditions enhance or constrain the effectiveness of these interventions, and the extent to which Kazakhstan’s current approach aligns with international best practices identified in the venture capital literature. Accordingly, the study is guided by the following research questions:

- RQ1: How do government support mechanisms influence the development of venture capital ecosystems in emerging economies?
- RQ2: Which institutional and ecosystem conditions enhance or constrain the effectiveness of government support mechanisms?
- RQ3: To what extent do Kazakhstan’s venture capital support mechanisms align with international best practices identified in the literature?

The remainder of the paper is structured as follows. The next section reviews the relevant literature on venture capital development and government intervention in emerg-

ing economies. This is followed by a description of the research methodology, including the systematic review process and interview design. The subsequent sections present the empirical findings and discuss their implications for policy and theory. The paper concludes with recommendations, limitations, and directions for future research.

2. Literature Review and Theoretical Background

2.1. *Venture Capital Ecosystems in Emerging Economies*

Venture capital (VC) plays a crucial role in the creation, financing, and scaling of innovative firms, particularly in technology-intensive and high-growth sectors. Beyond providing financial resources, venture capital investors contribute managerial expertise, monitoring capacity, strategic guidance, and access to professional networks, thereby enhancing the survival and growth prospects of entrepreneurial ventures [1,2,7]. In advanced economies, these functions are supported by mature financial systems, strong legal protections, active exit markets, and dense entrepreneurial ecosystems. In contrast, many emerging and developing economies have underdeveloped venture capital markets due to institutional weaknesses, shallow capital markets, and limited private-sector participation [3,7].

The development of venture capital ecosystems in emerging economies depends not only on the availability of capital but also on the broader conditions that enable entrepreneurial activity and investment readiness. Venture capital does not operate in isolation; its effectiveness is shaped by the quality of entrepreneurship, the strength of innovation systems, the availability of commercialization pathways, and the capacity of startups to scale [8,9]. Where these complementary ecosystem components are weak, venture capital supply tends to remain limited, and the market for early-stage investment becomes fragile and highly selective. As a result, developing countries often face a dual challenge: they must stimulate both the supply of risk capital and the demand for investment-ready ventures.

This challenge is especially pronounced in resource-dependent economies seeking diversification into knowledge-based industries. Historically, Kazakhstan's economy has depended heavily on exports of oil, gas, metals, and chemical products, a structure that exposes the country to external shocks and reinforces the strategic urgency of diversifying toward technology-driven growth [8–10]. In such contexts, the emergence of a robust venture capital market is frequently viewed as a necessary condition for promoting innovation, fostering entrepreneurship, and supporting the commercialization of research and technological ideas [4–6]. However, these ambitions require policy frameworks capable of addressing structural bottlenecks that inhibit private investment and ecosystem maturation.

2.2. *Government Intervention and Market Failure in Venture Capital Markets*

A central argument in the literature is that government intervention in venture capital markets is justified primarily by market failures. Early-stage ventures often face acute financing constraints due to information asymmetries, uncertain growth trajectories, limited collateral, and the high perceived risk associated with innovation [11,12]. These factors make young firms particularly unattractive to conventional lenders and can also discourage private investors from entering nascent markets. In developing economies, such financing gaps are often magnified by weak institutions, inadequate investor protections, regulatory inefficiencies, and low levels of market liquidity [13–15].

Governments, therefore, play an important role in shaping the enabling environment for venture capital. At the most basic level, public policy can strengthen macroeconomic stability, improve legal certainty, enhance protection of property rights, and streamline business regulation, thereby reducing uncertainty for investors [7,13,16]. More proac-

tive forms of intervention include direct public investment, public–private co-investment schemes, tax incentives, startup accelerators, innovation grants, and reforms that encourage entrepreneurial experimentation and private-sector participation [4–6,17,18]. These policy tools are intended not only to increase the supply of capital but also to improve the functioning of the wider entrepreneurial ecosystem in which venture capital operates.

At the same time, the literature cautions that government intervention is not automatically effective. Public programs can suffer from bureaucratic inefficiencies, political short-termism, weak governance, and limited familiarity with the operational logic of venture capital markets [14,18,19]. Governments may impose non-commercial constraints on investment decisions, select fund managers without sufficient expertise, or evaluate outcomes within political cycles that do not align with the long time horizons required for venture capital returns [14,20,21]. Consequently, the key issue is not simply whether governments should intervene, but how such interventions are designed, governed, and aligned with market incentives.

2.3. Hybrid Venture Capital Models and Public–Private Co-Investment

One of the most prominent policy responses to early-stage financing gaps has been the development of hybrid venture capital models, in which governments support venture capital markets through co-financed structures involving private-sector fund managers and investors. These models are often inspired by the U.S. Small Business Investment Companies (SBIC) program and have been adapted in countries such as the United Kingdom and Australia through instruments such as Enterprise Capital Funds and Innovation Investment Funds [14]. In these arrangements, the state typically participates as a limited partner, guarantor, or catalytic investor, while delegating investment decisions to professional fund managers in order to preserve commercial discipline. As illustrated in Figure 1, these “equity enhancement” structures are designed to leverage public capital to crowd in private investment, while maintaining market-oriented governance and incentive alignment.

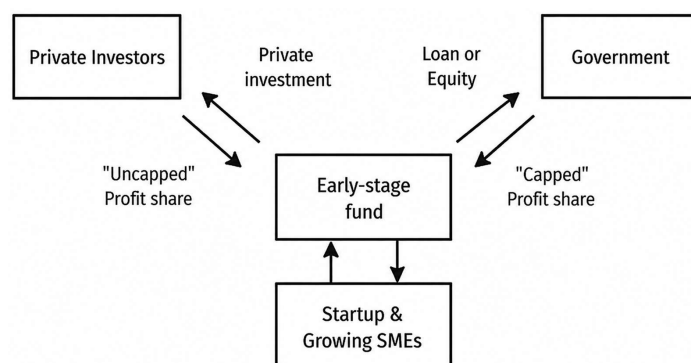


Figure 1. Conceptual model of a government-supported “equity enhancement” venture capital structure. SOURCE: Adapted by the authors based on the UK Small Business Service Enterprise Capital Funds model.

Figure 1 illustrates a hybrid venture capital framework in which public capital is deployed alongside private investment through co-financed funds. Government participation typically occurs as a limited partner or guarantor, enabling risk sharing and incentivizing private-sector involvement, while fund management is delegated to professional investors. Adapted from the UK Small Business Service Enterprise Capital Funds model, the arrows illustrate the direction of financial flows and profit-sharing relationships among government, private investors, the early-stage fund, and startup enterprises. Government capital is provided through loans or equity with capped returns, while private investors contribute investment capital in exchange for uncapped profit participation. The early-stage fund

channels these combined resources to startups and growing SMEs, with investment returns flowing back to the respective funding sources. Source: Adapted by the authors based on the UK Small Business Service Enterprise Capital Funds model.

While hybrid venture capital models offer a promising mechanism for addressing early-stage financing gaps, their effectiveness remains contingent on the quality of their design, governance structures, and alignment with market dynamics. The literature identifies a range of advantages and limitations associated with these models, particularly in emerging economies where institutional capacity may be constrained. As summarized in Table 1, hybrid VC funds can enhance capital availability and incentivize private investment, but they may also introduce inefficiencies related to governance, scale, and policy implementation.

Table 1. Advantages and limitations of hybrid venture capital funds (HVCFs). SOURCE: [9].

Advantages	Limitations
Follows the established VC industry (USA and UK) model of Limited Liability Partnerships (LLPs).	Government involvement may introduce non-commercial constraints on investment decisions.
Professional investment executives (GPs) manage funds exclusively	Government involvement in model design starts from a position of inadequate knowledge of VC industry operations.
Government leverage, combined with asymmetric rewards to LPs, creates incentives for private LPs to invest in early-stage companies.	GP selection can be biased in favor of the public sector, established interests/partners.
Public incentives also increase the size of the fund towards the optimal operating scale.	Public-sector involvement may lead to suboptimal selection of fund managers.
HVCFs allow the government to concentrate efforts/support on the key early-stage focus.	HVCFs are often created at a sub-optimal, small scale.
The greater body of public sector VC fund experience	Supply-side response of HVCFs not matched with demand-side improvements
HVCFs have become a key component of the ‘funding escalator’ concept.	Leveraging the benefits of HVCFs cannot completely correct for ‘adverse selection’ problems.

These trade-offs highlight the importance of carefully designing hybrid VC programs to balance public policy objectives with market efficiency, particularly in emerging ecosystems where institutional constraints may amplify these challenges.

By sharing risk, leveraging public funds, and offering asymmetric reward structures, such programs can attract private limited partners into segments of the market that might otherwise be underserved, particularly seed and early-stage ventures [11,14]. In addition, they may contribute to broader ecosystem development by increasing the size of available funds, building investor confidence, and creating what some scholars describe as a “funding escalator” for entrepreneurial firms [14,18].

However, the evidence on these programs is mixed. While hybrid models can stimulate early-stage financing, they can also reproduce structural weaknesses if not accompanied by complementary demand-side improvements, stronger governance mechanisms, and clear evaluation criteria [14]. The literature identifies several recurring drawbacks, including sub-optimal fund size, adverse selection, public-sector bias in manager selection, and the imposition of non-commercial goals that may reduce fund performance [11,14]. In some cases, government-sponsored VC programs may also produce weaker outcomes than private VC, although they may still generate indirect benefits, such as training and development for local investment professionals [10,11]. These tensions highlight the importance

of viewing hybrid VC programs not as standalone solutions, but as components within a broader institutional and ecosystem strategy.

2.4. Institutional and Ecosystem Conditions for Venture Capital Development

The success of venture capital markets depends not only on financial incentives but also on the institutional environment in which entrepreneurial and investment activity takes place. Institutional structures—including legal systems, regulatory frameworks, investor protections, bankruptcy regimes, and property rights enforcement—shape both the risks perceived by investors and the strategic choices available to entrepreneurs [17,19,22,23]. In weak institutional environments, investors may hesitate to commit capital due to concerns about corruption, uncertain contract enforcement, or inadequate legal recourse [24–26]. These concerns are particularly significant in emerging economies, where formal market-supporting institutions may still be evolving.

In addition to formal institutions, the literature also highlights the importance of entrepreneurial ecosystems and social capital. Successful VC markets are embedded in environments characterized by strong networks among founders, investors, universities, accelerators, corporations, and public agencies [12,13,26,27]. These networks facilitate information exchange, trust-building, and opportunity recognition, all of which are essential in venture financing, where uncertainty is high, and decisions often rely as much on qualitative judgments as on formal metrics. Weak social networks and limited connectivity can, therefore, reduce deal flow, constrain syndication opportunities, and make it more difficult for startups to access strategic support [12,28].

Cultural conditions also matter. In many developing economies, social norms may favor conventional employment over entrepreneurship and reinforce risk aversion among both potential founders and investors [29]. Such orientations may reduce the pipeline of investable ventures and weaken the appetite for early-stage risk capital. For this reason, the venture capital literature increasingly emphasizes the need for governments not only to provide financial support, but also to foster entrepreneurial education, innovation culture, and institutional trust [3,15,30]. Public investment in incubators, accelerators, university-industry linkages, and human capital development can therefore play a catalytic role in strengthening the wider ecosystem in which venture capital functions [16,31].

2.5. Kazakhstan as an Emerging Venture Capital Context

Kazakhstan offers a particularly important setting for examining these issues because it combines strong state involvement, economic transition, and strategic ambition to develop innovation-led growth. In recent years, the government has introduced legislative reforms and institutional mechanisms to strengthen the venture capital ecosystem, including grant financing, innovation support institutions, accelerators, and evolving regulatory provisions for venture investment [4,5,9]. The country's leadership has recognized the need to move beyond a resource-dependent growth model and to create stronger conditions for startup development, technological commercialization, and private investment [8–10].

Despite this progress, Kazakhstan's venture capital ecosystem remains constrained by several structural factors. These include limited market liquidity, relatively few mature exit channels, uneven capital distribution, weak early-stage investment traditions, and a narrow investor base [9,10,28]. The legal framework for venture capital is still developing and intersects with broader corporate, securities, and commercial legislation, creating a complex environment that may not yet be fully conducive to private-sector VC activity [5,9]. In addition, while state institutions such as QazInnovations and the Fund of Science provide support for innovation projects, significant questions remain regarding the coherence, scalability, and long-term effectiveness of these interventions [12].

This makes Kazakhstan a valuable case for examining a broader question in the literature: how can governments in emerging economies design support mechanisms that move beyond symbolic commitment and genuinely contribute to the formation of a functioning venture capital ecosystem? By studying Kazakhstan, this paper addresses an underexplored regional context and contributes to comparative debates on state-led ecosystem building, public–private coordination, and the institutional foundations of venture capital development in developing economies.

2.6. Conceptual Framework

Drawing on the literature reviewed above, this study adopts an institutional and ecosystem perspective to examine the development of venture capital (VC) ecosystems in emerging economies. Rather than viewing venture capital solely as a financial mechanism, this perspective conceptualizes VC markets as institutionally embedded systems shaped by regulatory frameworks, public policy, market incentives, organizational capacity, entrepreneurial infrastructure, and broader ecosystem dynamics [14,18–20]. Consequently, the effectiveness of venture capital development depends not only on the availability of capital but also on the quality of the institutional environment within which investment and entrepreneurial activities occur.

This perspective is particularly relevant in emerging economies, where venture capital ecosystems frequently evolve within institutional environments characterized by incompleteness, fragmentation, or ongoing transition [1,2,4,13]. In such contexts, governments often assume a more active role in fostering market development than would typically be observed in mature market economies. Understanding venture capital development, therefore, requires consideration not only of market mechanisms but also of the broader institutional conditions that shape entrepreneurial activity, investor behavior, and ecosystem formation.

A useful lens for examining these conditions is the concept of institutional voids, introduced by Khanna and Palepu. Institutional voids refer to the absence, weakness, or inefficiency of market-supporting institutions that facilitate economic exchange, reduce transaction costs, and enable the efficient allocation of resources. Such voids may manifest through limited access to financing, underdeveloped legal and regulatory systems, weak investor protections, insufficient intermediary organizations, and a lack of reliable information channels. In venture capital markets, institutional voids increase uncertainty, discourage private investment, constrain entrepreneurial activity, and inhibit the emergence of efficient capital allocation mechanisms. As a result, governments frequently assume a more prominent role in facilitating market development and addressing ecosystem deficiencies [32].

This interpretation aligns closely with emerging market ecosystem theory, which emphasizes that entrepreneurial and venture capital ecosystems are embedded within broader institutional, social, and economic structures. Successful venture capital markets depend upon the interaction of multiple complementary actors, including governments, universities, investors, entrepreneurs, accelerators, incubators, and regulatory institutions [33,34]. Government intervention, therefore, extends beyond the provision of capital to include the creation of supporting institutions, infrastructure, networks, and policy frameworks that enable entrepreneurial ecosystems to function effectively.

These dynamics are particularly evident in economies characterized by state-led development. Unlike liberal market economies, where private actors dominate resource allocation and innovation activities, state-led systems often rely on governments to coordinate economic development, guide investment priorities, and support strategic industries [35]. While such approaches can accelerate ecosystem formation and reduce market barriers, they may also introduce challenges associated with bureaucratic complexity, institutional

fragmentation, resource misallocation, and dependence on public support. Consequently, the effectiveness of government intervention depends not only on the scale of support provided but also on the degree to which public initiatives align with market incentives and facilitate private-sector participation.

Based on these perspectives, this study conceptualizes venture capital ecosystem development as a process shaped by the interaction between institutional conditions and government support mechanisms. Institutional voids create barriers to entrepreneurial activity and venture capital formation, prompting governments to implement interventions such as regulatory reforms, public financing programs, co-investment schemes, innovation support initiatives, accelerators, and ecosystem-building policies. The effectiveness of these interventions is conditioned by broader ecosystem characteristics, including regulatory quality, investor confidence, entrepreneurial infrastructure, market liquidity, and public–private coordination. Together, these factors influence the overall development and sustainability of the venture capital ecosystem.

Kazakhstan provides a particularly relevant setting for examining these relationships. As a resource-dependent economy pursuing diversification through innovation and entrepreneurship, Kazakhstan has adopted a proactive, state-led approach to developing its venture capital ecosystem. Government agencies, innovation funds, development institutions, and public–private initiatives play central roles in supporting entrepreneurial activity. At the same time, the country continues to face institutional challenges commonly observed in emerging economies, including regulatory complexity, limited market liquidity, a relatively small investor base, and underdeveloped exit markets. These conditions suggest that the effectiveness of government support mechanisms should be evaluated not only in terms of policy design but also in relation to the institutional environment within which they operate.

The conceptual framework presented in Figure 2 illustrates the relationships examined in this study. It proposes that institutional voids create structural constraints that motivate government intervention, while the effectiveness of those interventions depends on ecosystem conditions that ultimately shape venture capital ecosystem development. This framework provides the analytical foundation for the empirical investigation that follows.

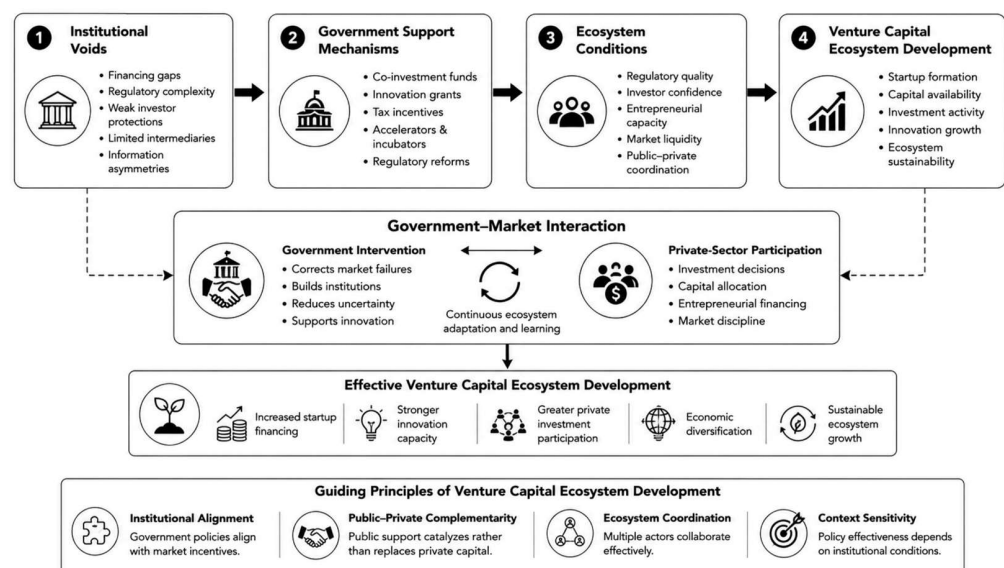


Figure 2. Conceptual framework of government support and venture capital ecosystem development. The framework illustrates the sequential progression from institutional conditions to government support mechanisms, ecosystem conditions, and venture capital ecosystem development. Solid arrows indicate the primary directional flow of influence through the ecosystem development process,

while dashed arrows represent feedback relationships between institutional conditions, government–market interaction, and ecosystem outcomes. The bidirectional arrows within the Government–Market Interaction component denote the reciprocal relationship between government intervention and private-sector participation, highlighting the continuous adaptation and co-evolution of the venture capital ecosystem. The circular arrows represent continuous ecosystem learning and adaptation, whereby government policies and private investment decisions evolve in response to changing institutional and market conditions.

3. Research Methodology

3.1. Research Design

This study integrates two complementary qualitative sources of evidence: a systematic literature review and semi-structured expert interviews to examine the role and effectiveness of government support in venture capital (VC) ecosystems in developing economies, with a particular focus on Kazakhstan. This approach enables the integration of global theoretical and empirical insights with context-specific perspectives, thereby providing a more comprehensive and triangulated understanding of the research problem.

The study follows a sequential exploratory logic, in which the systematic literature review establishes the conceptual and empirical foundation, while the qualitative interviews serve to validate, contextualize, and extend the findings. This design is particularly appropriate given the evolving nature of venture capital ecosystems in emerging economies and the limited availability of comprehensive, context-specific data.

3.2. Systematic Literature Review

The systematic literature review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to ensure transparency, replicability, and methodological rigor. The objective of the review was to identify and synthesize existing research on government support mechanisms for venture capital in developing and emerging economies.

A comprehensive search strategy was developed using combinations of keywords related to venture capital, government support, entrepreneurship, innovation policy, and developing economies. Searches were conducted across major academic databases, including Scopus, Web of Science, Springer, and IEEE Xplore, supplemented by reports from institutional sources such as the Asian Development Bank.

To ensure transparency and replicability, the search strategy employed Boolean keyword combinations related to venture capital, public policy, entrepreneurial ecosystems, and emerging economies. An example of the search string used is

(“venture capital” OR “VC”) AND (“government support” OR “public policy”
 OR “government intervention” OR “co-investment” OR “tax incentives”) AND
 (“emerging economies” OR “developing countries” OR “entrepreneurial ecosystems”
 OR “Kazakhstan”)

Minor modifications were made across databases to accommodate differences in search syntax and indexing structures. Searches were limited to English-language publications from 2010 to 2025. Title, abstract, and keyword fields were searched where database functionality permitted. Given the importance of transparency in systematic literature reviews, Table 2 summarizes the search strategy and screening procedures employed in this study. The table outlines the databases consulted, search parameters, inclusion criteria, and review process used to identify the final body of literature. This information supports the reproducibility of the review and clarifies the methodological decisions underlying the selection of the 34 studies included in the analysis.

Table 2. Search strategy for the systematic literature review.

Component	Description
Databases	Scopus, Web of Science, Springer, IEEE Xplore
Publication Period	2010–2025
Language	English
Search Fields	Title, Abstract, Keywords
Search Terms	Venture capital, government support, public policy, co-investment, entrepreneurial ecosystems, emerging economies
Screening Method	PRISMA
Final Included Studies	34

The study selection process followed a structured screening procedure consistent with PRISMA guidelines. The principal reasons for full-text exclusion included insufficient relevance to government support mechanisms, a lack of a venture-capital ecosystem focus, an exclusive emphasis on developed-market contexts, and inadequate methodological transparency.

The inclusion criteria were as follows:

- Peer-reviewed journal articles and high-quality institutional reports;
- Publications between 2010 and the present;
- Studies focusing on venture capital, government policy, or entrepreneurial ecosystems in developing or emerging economies;
- English-language publications.

Exclusion criteria included:

- Studies without full-text availability;
- Articles not directly related to government support for venture capital;
- Publications lacking sufficient methodological rigor.

A standardized data extraction protocol was applied to capture key information from each study, including research objectives, methodological approaches, geographical focus, and principal findings. This process facilitated systematic comparison and synthesis across studies.

The study selection process followed the PRISMA 2020 guidelines [36] and involved a multi-stage screening procedure. The initial search identified 4084 records from academic databases and supplementary sources, including Springer ($n = 1146$), Scopus ($n = 1642$), Web of Science ($n = 1375$), websites ($n = 21$), organizations ($n = 8$), Google Scholar ($n = 1520$), and conference proceedings ($n = 12$). Following preliminary screening and duplicate removal procedures, 219 records from database searches and 58 records from supplementary sources were retained for further review. During title and abstract screening, 115 records were excluded from the database search stream. Full-text retrieval was attempted for 104 studies from database sources and 58 studies from supplementary sources. However, 27 database-source records and 34 supplementary-source records could not be retrieved. Consequently, 77 studies from database sources and 24 studies from supplementary sources underwent full-text eligibility assessment.

During the eligibility stage, 47 studies from the database search stream were excluded due to publication date restrictions ($n = 19$), inaccessible papers ($n = 15$), or lack of relevance to the geographic focus of the study ($n = 13$). An additional 24 studies from supplementary sources were excluded because they were not directly related to the research topic ($n = 5$), were overly broad in scope ($n = 7$), or lacked methodological transparency ($n = 8$). Following the completion of the screening and eligibility procedures, 34 studies met all inclusion

criteria and were retained for the final systematic literature review. The full selection process is illustrated in Figure 3.

PRISMA 2020 flow diagram for new systematic reviews which included searches of databases, registers and other sources

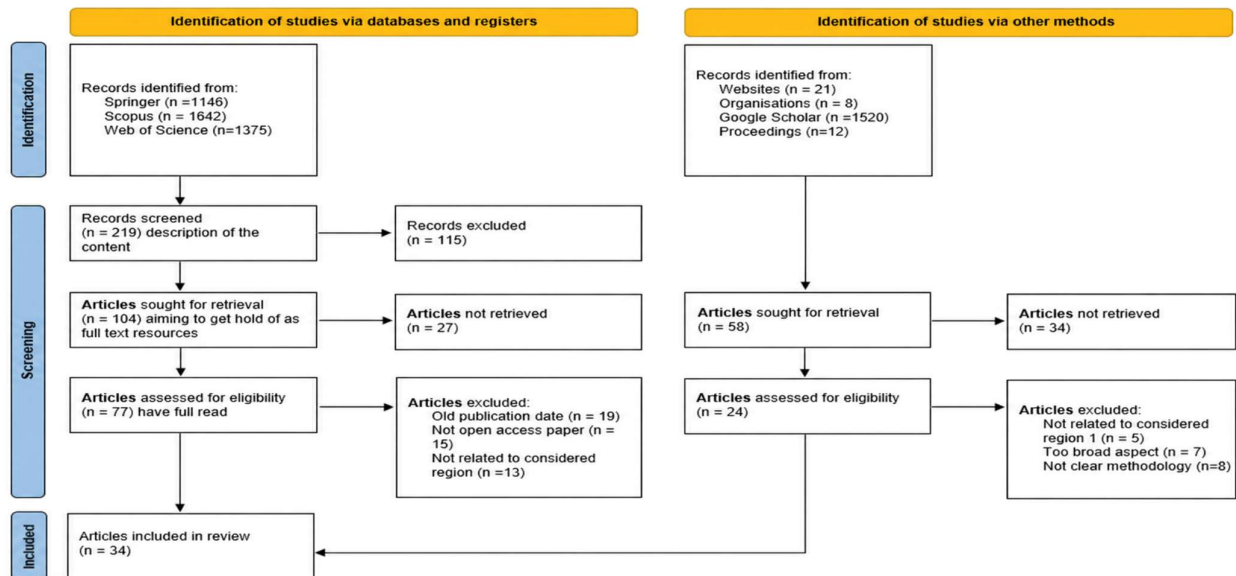


Figure 3. PRISMA flow diagram of the systematic literature review process [36]. SOURCE: The Authors.

Figure 3 presents the study identification, screening, eligibility, and inclusion stages used to select relevant literature on government support for venture capital ecosystems. The process follows PRISMA guidelines to ensure transparency, reproducibility, and methodological rigor. This approach ensures a transparent and replicable selection process, minimizing selection bias.

To enhance transparency and reproducibility, Table 3 summarizes the key stages of the PRISMA screening and selection process. The table provides a concise overview of record identification, screening, eligibility assessment, and final study inclusion, complementing the detailed flow diagram presented in Figure 2 and clarifying the progression from the initial search results to the final sample of studies included in the systematic literature review.

Table 3. Summary of the PRISMA screening and study selection process. The table reports the number of records identified, screened, assessed for eligibility, excluded at each stage, and ultimately included in the final systematic literature review. SOURCE: Developed by the authors based on the PRISMA 2020 [36] screening procedure.

PRISMA Stage	Number of Records
Initial records identified	4084
Records retained for screening	277
Records excluded during title/abstract screening	115
Full-text reports sought	162
Reports not retrieved	61
Full-text reports assessed	101
Full-text reports excluded	67
Final studies included	34

Literature Quality Assessment

In addition to relevance-based screening, studies were assessed for methodological quality to ensure consistency and reliability across the final sample. Given the diversity of research designs included in the review, a pragmatic quality assessment approach was

adopted rather than a design-specific appraisal instrument. Each study was evaluated against five criteria: (1) clarity of research objectives; (2) transparency of data sources; (3) adequacy of methodological description; (4) transparency of analytical procedures; and (5) alignment between evidence and conclusions.

Each criterion was assessed using a three-point scale, where 1 = insufficient, 2 = adequate, and 3 = strong. Studies were required to achieve a minimum average score of 2.0 across the five criteria to remain eligible for inclusion. Studies receiving scores below this threshold were excluded due to insufficient methodological transparency or inadequate evidentiary support.

The quality assessment was conducted independently by two members of the research team. Following the initial evaluation, scores were compared, and any discrepancies were discussed until consensus was reached. This process was implemented to reduce subjective judgment and enhance the reliability and transparency of study selection.

Table 4 summarizes the criteria used in the quality assessment procedure. These criteria provided a consistent framework for evaluating methodological adequacy and determining eligibility for inclusion in the final review sample.

Table 4. Quality assessment criteria and scoring framework applied to studies included in the systematic literature review. Studies were evaluated using a three-point scale (1 = insufficient, 2 = adequate, 3 = strong). SOURCE: Developed by the authors.

Criterion	Description	Scoring Basis
Research Objective Clarity	Clearly stated purpose and questions	1–3
Data Source Transparency	Data sources identified and justified	1–3
Methodological Adequacy	Research design sufficiently described	1–3
Analytical Transparency	Procedures clearly explained	1–3
Evidence–Conclusion Alignment	Findings supported by evidence	1–3

3.3. Qualitative Data Collection: Semi-Structured Interviews

To complement and validate the findings from the literature review, semi-structured interviews were conducted with venture capital experts and practitioners with direct experience in Kazakhstan’s VC ecosystem (see Appendix A for the interview protocol). This qualitative component provides context-specific insights into the implementation and perceived effectiveness of government support mechanisms.

A purposive sampling strategy was used to select participants based on their expertise and involvement in venture capital activities. The final sample consisted of 10 participants, including local and international venture capital investors, industry experts, and ecosystem stakeholders. All participants had at least 3 years of relevant experience in venture capital or related fields in Kazakhstan.

Given the exploratory nature of the study and the specialized expertise required of participants, the sampling strategy was designed to capture perspectives from multiple segments of Kazakhstan’s venture capital ecosystem. The final sample included venture capital investors, industry experts, and ecosystem stakeholders with diverse professional backgrounds and varying levels of exposure to government support initiatives. Table 5 summarizes the characteristics of the interview participants and illustrates the breadth of expertise represented in the study.

Table 5. Profile of interview participants. SOURCE: Developed by the authors.

Participant Code	Role Type	Organization Type	Years of Experience	Involvement with Government Support Programs	International Investment Experience
P1	Venture Capital Investor	Private VC Fund	12	Yes	Yes
P2	Venture Capital Investor	International VC Fund	15	No	Yes
P3	Venture Capital Fund Manager	Hybrid Public–Private Fund	10	Yes	Yes
P4	Startup Ecosystem Expert	Accelerator/Incubator	8	Yes	No
P5	Innovation Policy Specialist	Government-Linked Innovation Agency	11	Yes	No
P6	Entrepreneurial Ecosystem Advisor	Industry Association	9	Yes	Yes
P7	Angel Investor	Private Investment Network	7	No	Yes
P8	Innovation Program Manager	University-Based Innovation Center	6	Yes	No
P9	Venture Capital Consultant	Advisory Firm	14	Yes	Yes
P10	Technology Commercialization Expert	Research and Innovation Organization	8	Yes	No

Total Sample Characteristics

- Venture capital investors/fund managers: 4;
- Ecosystem support organizations (accelerators, incubators, associations): 2;
- Government-linked innovation and policy institutions: 2;
- Advisory and consulting experts: 1;
- Research and commercialization specialists: 1;
- Participants with government program experience: 8 of 10;
- Participants with international investment experience: 6 of 10;
- Average professional experience: 10 years.

The sample was intentionally constructed to capture perspectives from the principal stakeholder groups involved in Kazakhstan’s venture capital ecosystem, including investors, ecosystem intermediaries, innovation support institutions, and policy-related actors. While not statistically representative, the composition of the sample reflects the diversity of expertise required to assess the effectiveness of government support mechanisms within an emerging venture capital market. Data saturation was reached after the ninth interview, with the tenth interview confirming the consistency of the identified themes.

The sample size was determined using a purposive expert sampling approach commonly employed in exploratory qualitative research involving specialized professional populations. Data collection continued until thematic saturation was reached, meaning that no substantively new themes or insights emerged from subsequent interviews. Saturation was observed after the ninth interview, and an additional interview was conducted to confirm the consistency and stability of the identified themes.

An interview guide was developed to ensure consistency across participants while maintaining sufficient flexibility to enable in-depth exploration of relevant themes. The questions were designed to examine key dimensions of Kazakhstan’s venture capital ecosystem, including existing government support mechanisms and policy instruments, the primary challenges affecting ecosystem development, the perceived effectiveness of current initiatives, and potential recommendations for improvement.

Interviews were conducted via Zoom Workplace 6.1.6 version between August and November 2024, with each session lasting approximately 30 to 45 min. All interviews were audio-recorded with participants’ informed consent and subsequently transcribed

verbatim for analysis. To ensure confidentiality, all identifying information was removed, and participants were anonymized.

3.4. Data Analysis

The qualitative data were analyzed using thematic analysis, supported by Atlas. TI version 24.1.1 software. The analysis followed a structured, multi-stage process:

1. Familiarization: Repeated reading of interview transcripts to gain an overall understanding of the data.
2. Initial coding: Identification of recurring concepts and patterns, generating preliminary codes such as government incentives, co-investment practices, and market constraints.
3. Theme development: Grouping related codes into broader thematic categories, including financial environment, institutional barriers, and ecosystem development.
4. Validation and triangulation: Cross-referencing interview findings with results from the systematic literature review to identify convergences and discrepancies.

To enhance the transparency and credibility of the thematic analysis process, Table 6 illustrates how raw interview data were transformed into analytical themes. The table demonstrates the progression from participant statements to initial codes, subthemes, and higher-order themes, thereby providing an audit trail of the study's interpretive process.

Table 6. Example of theme development process. SOURCE: Developed by the authors.

Interview Excerpt	Initial Code	Subtheme	Theme
"Government programs exist, but entrepreneurs often struggle to understand where to apply for support."	Administrative complexity	Coordination problems	Institutional fragmentation
"Investors remain cautious despite the availability of government incentives."	Risk aversion	Market barriers	Ecosystem constraints
"Several organizations provide support, but their activities are not always aligned."	Institutional overlap	Policy coordination challenges	Institutional fragmentation
"The lack of exit opportunities discourages many investors from participating."	Exit market limitations	Investment disincentives	Ecosystem constraints

Initial coding generated 37 first-order codes, which were subsequently consolidated into 11 subthemes and four overarching themes. The research team reviewed theme development collaboratively to ensure consistency and analytical rigor. Emerging interpretations were continuously compared against findings from the systematic literature review as part of the study's triangulation strategy. This iterative process helped strengthen the credibility of the analysis while reducing the risk of researcher bias.

This process enabled the identification of key themes that reflect both theoretical expectations and practitioner perspectives. Notably, the analysis revealed that certain mechanisms—such as co-investment structures and hybrid VC models—are not yet widely implemented in Kazakhstan, while experts emphasized the importance of improving the overall investment climate and providing targeted tax incentives to stimulate VC activity.

3.5. Data Synthesis and Integration

The final stage of analysis involved integrating insights from the systematic literature review and the qualitative interviews. Rather than conducting a formal meta-analysis, the study employs a qualitative synthesis approach, given the heterogeneity of study designs and data sources in the reviewed literature.

The PRISMA flow diagram (Figure 2) illustrates the systematic review process and selection criteria. The integration of findings follows a convergent triangulation logic,

in which evidence from different sources is compared and synthesized to develop a coherent interpretation of government support mechanisms and their effectiveness in the Kazakhstani context.

3.6. Ethical Considerations

This study adhered to established ethical principles for research involving human participants and was conducted in accordance with the ethical standards outlined in the Declaration of Helsinki. The research involved adult professionals discussing their professional experiences and perspectives regarding venture capital and government support mechanisms in Kazakhstan. No sensitive personal information, biomedical data, or vulnerable populations were involved, and considered minimal-risk research, not requiring formal Institutional Review Board (IRB) review or approval. Participation was entirely voluntary, and informed consent was obtained from all participants prior to the interviews. Participants were informed of the purpose of the study, their right to decline participation, and their right to withdraw from the study at any time without consequence.

To ensure confidentiality, all identifying information was removed during transcription and analysis, and participants were assigned anonymous identifiers. Audio recordings and interview transcripts were stored on password-protected devices accessible only to the research team and were used exclusively for research purposes. These procedures were implemented to protect participant privacy and maintain the integrity of the research process.

4. Findings

4.1. Overview of Kazakhstan's Venture Capital Ecosystem

The findings reveal that Kazakhstan's venture capital (VC) ecosystem remains in a transitional, evolving stage, characterized by growing institutional involvement but limited market maturity. Consistent with insights from the Asian Development Bank and industry reports, investor confidence emerges as a critical determinant of venture capital activity. This confidence is closely linked to perceptions of political and economic stability, as well as as the predictability of the regulatory environment.

Kazakhstan's macroeconomic structure continues to influence venture capital dynamics. The country's reliance on resource-based exports creates cyclical patterns in investment inflows, with periods of high commodity revenues supporting capital availability, while downturns expose vulnerabilities and reduce investor appetite for long-term, high-risk investments. These conditions contribute to a cautious investment climate, particularly for early-stage ventures.

The analysis also highlights structural limitations within the financial system, including limited stock market liquidity and underdeveloped exit mechanisms, which constrain the scalability of venture capital. The uneven distribution of capital, often concentrated among a small number of high-net-worth individuals, further restricts the breadth and depth of the investor base. These factors collectively limit the VC ecosystem's capacity to sustain consistent deal flow and support startup growth at scale.

4.2. Government Support Mechanisms and Institutional Infrastructure

Kazakhstan has established a range of institutional mechanisms to support venture capital development, including state-backed innovation agencies, grant financing programs, and ecosystem-building initiatives. Key actors such as QazInnovations and the Fund of Science provide financial and technical support for early-stage innovation projects, while partnerships among universities, incubators, and private investors contribute to the gradual emergence of venture-financing structures. As illustrated in Figure 4, the institutional architecture of Kazakhstan's venture capital ecosystem is characterized by

multiple public entities operating across different levels of the innovation and financing pipeline. While this multi-layered structure reflects a strong government commitment to ecosystem development, it also raises questions regarding coordination, efficiency, and strategic alignment across institutions.

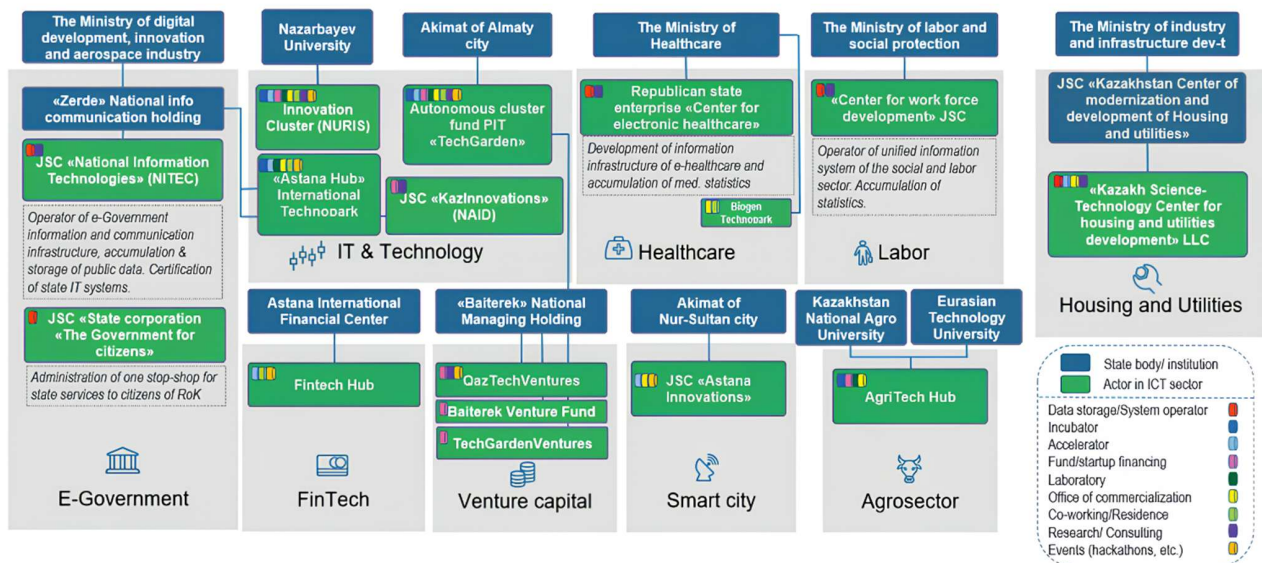


Figure 4. Institutional structure supporting venture capital development in Kazakhstan.

The figure presents the key public-sector institutions and organizational linkages involved in developing Kazakhstan's venture capital ecosystem. It illustrates the multi-level structure of government support, including funding agencies, innovation programs, and intermediary organizations, highlighting both the breadth of institutional involvement and the potential challenges related to coordination and policy coherence. The structure depicted in Figure 3 underscores both the strengths and limitations of Kazakhstan's current approach. On one hand, the presence of multiple institutions enables targeted support across different stages of the innovation lifecycle, from research funding to early-stage venture development. On the other hand, the dispersion of responsibilities across agencies may contribute to fragmentation, duplication of efforts, and reduced policy effectiveness. This institutional complexity can create barriers for entrepreneurs and investors navigating the ecosystem, limiting the overall efficiency of government support mechanisms.

Several institutional actors occupy overlapping positions within the innovation support landscape. For example, QazInnovations, the Fund of Science, university incubators, and various accelerator programs all support early-stage ventures, yet they often operate under distinct administrative structures, funding mechanisms, and performance metrics. Interview participants noted that entrepreneurs frequently encounter duplication of application procedures and uncertainty regarding which institution is responsible for particular forms of support. As one participant observed, "multiple agencies offer similar programs, but coordination between them remains limited" (P4). Such fragmentation can increase transaction costs, slow investment decisions, and reduce the overall effectiveness of government support.

Many interview participants acknowledged the breadth of institutional support available while simultaneously emphasizing coordination challenges among ecosystem actors. As one participant noted

"There are many organizations involved in supporting startups and innovation, but entrepreneurs often struggle to understand which institution is responsible for what. The programs exist, but coordination between them is not always clear." (P4)

Another participant similarly observed

“Several agencies provide support at different stages of the innovation process, yet there is often duplication of effort and limited communication across organizations.” (P8)

These observations suggest that institutional fragmentation may reduce the effectiveness of otherwise well-intentioned support mechanisms by increasing administrative complexity and reducing strategic alignment across agencies.

In addition, the government has promoted initiatives such as startup accelerators, incubators, and public–private partnerships. These efforts have contributed to the gradual emergence of venture financing structures, including corporate venture funds and joint investment initiatives involving universities, private investors, and innovation clusters. Examples include partnerships between incubators and venture funds, as well as collaborations involving research institutions and investment entities.

Despite these developments, the findings indicate that government support remains fragmented and insufficiently coordinated. While multiple programs exist, their integration into a coherent, scalable venture capital strategy appears limited. The legal and regulatory framework governing venture capital is described as complex and layered, intersecting with broader commercial and financial legislation. This complexity may create uncertainty for investors and reduce the effectiveness of policy interventions.

4.3. Gaps Between Policy Design and Market Practice

A key finding emerging from both the literature review and the interviews is the misalignment between formal policy design and practical implementation. While Kazakhstan has adopted policy instruments commonly observed in more mature VC ecosystems, their application in practice remains uneven.

Although Kazakhstan has adopted several policy instruments commonly observed in more mature venture capital ecosystems, participants emphasized that implementation remains uneven. One participant explained

“The concept of co-investment is well understood, but in practice, there are still relatively few examples where public and private investors work together through fully developed venture capital structures.” (P3)

Another interviewee observed

“Government programs provide important support, but private investors are not always integrated into investment decisions in ways that encourage sustained participation.” (P6)

These comments illustrate the gap between policy design and market practice. While hybrid venture capital and co-investment mechanisms are widely recognized as international best practices, their operationalization within Kazakhstan remains constrained by institutional, organizational, and market-level challenges.

Despite their prominence in international best practices, these mechanisms remain only partially implemented within Kazakhstan’s venture capital ecosystem. This suggests that policy adoption at the formal level has not fully translated into functional market instruments. Experts also highlighted administrative inefficiencies and bureaucratic complexity as barriers that reduce the accessibility and effectiveness of government programs. Investor behavior further reflects these structural gaps. The VC market is characterized by high risk aversion, with investors favoring later-stage or lower-risk opportunities over early-stage innovation. This pattern perpetuates financing gaps for startups and limits the transformative potential of venture capital in the ecosystem.

Interview participants frequently linked institutional fragmentation to regulatory complexity. One expert explained

“The regulatory environment has improved over time, but investors still face uncertainty regarding legal procedures, financial instruments, and the practical implementation of regulations.” (P2)

Similarly, another participant emphasized

“The issue is not necessarily the absence of regulation, but rather the complexity of navigating multiple requirements across different institutions and programs.” (P9)

These perspectives suggest that improving coordination and simplifying administrative processes may be as important as introducing new policy instruments.

Interview participants also highlighted a gap between policy design and implementation in relation to public–private investment initiatives. While institutions such as QazInnovations and other government-supported innovation programs have expanded financing opportunities for startups, participants noted that the transition from public support to sustained private investment remains uneven. Several experts indicated that co-investment mechanisms are frequently discussed in policy documents and ecosystem strategies, yet relatively few investment structures have achieved broad participation from both public and private investors. As a result, government support often functions as an initial catalyst rather than a mechanism for mobilizing substantial private capital.

4.4. Role of Institutional and Ecosystem Conditions

The findings underscore the critical importance of broader institutional and ecosystem conditions in shaping venture capital activity. Legal certainty, investor protection, and regulatory clarity are identified as essential prerequisites for attracting both domestic and foreign investment. Weaknesses in these areas contribute to perceived investment risk and discourage long-term capital commitments.

In addition, the development of venture capital in Kazakhstan is constrained by limited entrepreneurial infrastructure and ecosystem connectivity. While incubators and accelerators are present, their scale and integration within the broader innovation system remain limited. The pipeline of investment-ready startups is therefore relatively narrow, further constraining VC activity. Social and cultural factors also play a role. The findings suggest that risk aversion and limited entrepreneurial culture continue to influence both investor and founder behavior. These conditions reduce the supply of high-growth ventures and weaken demand in the venture capital market.

Several participants highlighted the persistence of risk-averse investment behavior despite ongoing government support initiatives. One investor stated

“Many investors remain conservative because the market is still relatively young and exit opportunities are limited. Government incentives help, but they do not eliminate the perceived risks.” (P1)

Another participant noted

“Investors are interested in innovation and technology ventures, but they still seek greater predictability before committing significant capital to early-stage companies.” (P7)

These observations reinforce findings from the literature suggesting that government support alone may be insufficient unless accompanied by broader improvements in institutional quality and market maturity.

4.5. Comparative Insights and Emerging Opportunities

When compared with global best practices, Kazakhstan's approach reflects an early-stage ecosystem-building strategy that emphasizes institutional creation and policy signaling. International models, such as hybrid venture capital funds and structured co-investment programs, demonstrate the importance of aligning public support with private-sector incentives and market dynamics.

The findings indicate that Kazakhstan possesses several structural advantages, including its strategic geographic position, access to regional markets, and increasing policy attention to innovation and entrepreneurship. These factors position the country as a potential hub for venture capital activity in Central Asia. However, realizing this potential requires greater policy coherence, stronger institutional enforcement, and deeper integration into global investment networks.

Overall, the study identifies four central insights. First, while government support has contributed to the development of venture capital infrastructure, the ecosystem remains constrained by structural and institutional limitations. Second, there is a significant gap between the design of policy instruments and their effective implementation in practice. Third, the broader institutional environment, including legal frameworks, market conditions, and cultural factors, plays a decisive role in shaping venture capital outcomes. Finally, although Kazakhstan has made measurable progress, the transition toward a fully functional and sustainable venture capital ecosystem requires more coordinated, market-aligned, and long-term policy interventions.

Despite the challenges identified throughout the interviews, participants generally expressed optimism regarding the long-term development of Kazakhstan's venture capital ecosystem. As one participant stated

"The ecosystem is still developing, but the foundations are much stronger than they were a decade ago. There is growing awareness of venture capital, increasing entrepreneurial activity, and stronger institutional support." (P5)

Another participant emphasized

"The next stage is not necessarily creating more programs, but improving coordination among the institutions that already exist." (P10)

These observations suggest that future policy efforts should focus not only on expanding support mechanisms but also on improving the coherence, coordination, and effectiveness of existing initiatives.

4.6. Integration of Findings

Consistent with the convergent triangulation approach outlined in the methodology, the findings from the systematic literature review and the expert interviews were compared to identify areas of convergence and divergence. Overall, both sources of evidence point toward the central importance of institutional quality, government support mechanisms, ecosystem coordination, and investor confidence in shaping venture capital development in emerging economies.

The literature review emphasized the importance of regulatory frameworks, public-private investment structures, entrepreneurial infrastructure, and institutional stability as key determinants of venture capital ecosystem performance. These themes were strongly reinforced by the interview participants, who highlighted the practical challenges associated with implementing such mechanisms in Kazakhstan. In particular, interviewees emphasized regulatory complexity, fragmented institutional coordination, limited exit opportunities, and investor risk aversion as barriers that continue to constrain ecosystem development.

Importantly, no major contradictions emerged between the two evidence streams. Rather, the interview findings provided contextual validation and practical elaboration of themes identified in the literature. The literature offered a broad understanding of successful policy approaches observed internationally, while the interviews revealed how these mechanisms operate in practice within Kazakhstan’s evolving venture capital ecosystem. This convergence strengthens confidence in the study’s conclusions and supports the policy recommendations proposed in the subsequent sections.

As part of the convergent triangulation strategy, the findings from the systematic literature review and the expert interviews were compared across key analytical themes. To strengthen the integration of evidence from the systematic literature review and the expert interviews, Table 7 presents a convergent qualitative synthesis of the principal findings from both sources. The table identifies areas of convergence and divergence between the literature and practitioners’ perspectives, enabling a more comprehensive assessment of the effectiveness of government support mechanisms and the factors influencing the development of the venture capital ecosystem in Kazakhstan. It compares evidence from both data sources, identifies areas of convergence and divergence, and provides interpretive insights into the effectiveness of government support mechanisms and the development of the venture capital ecosystem in Kazakhstan. By explicitly linking the literature review to the qualitative findings, the table provides a transparent demonstration of the study’s integration of multi-source qualitative research designs and reinforces the validity of the resulting policy implications.

Table 7. Integration of findings from the systematic literature review and expert interviews.

Theme	Evidence from SLR	Evidence from Interviews	Integration Assessment	Interpretation
Hybrid Venture Capital Models	Studies identify hybrid VC funds and co-investment structures as effective mechanisms for mobilizing private capital and reducing early-stage financing gaps.	Participants reported that co-investment mechanisms remain relatively limited in practice and have not yet achieved broad market participation.	Partial Convergence	International best practices have been adopted conceptually, but implementation remains uneven.
Institutional Coordination	Literature emphasizes policy coherence and coordination among ecosystem actors as critical for VC development.	Interviewees reported overlapping institutional responsibilities, duplicated programs, and coordination challenges among support agencies.	Strong Convergence	Institutional fragmentation remains a significant barrier to ecosystem effectiveness.
Regulatory Environment	Prior studies identify regulatory clarity and investor protections as important drivers of venture capital activity.	Participants described regulatory complexity and uncertainty as persistent constraints on investment decisions.	Strong Convergence	Regulatory improvements remain necessary to strengthen investor confidence.
Private-Sector Participation	Literature highlights the importance of crowding-in private investors through public-private partnerships.	Participants noted that private investor participation remains limited in several government-supported initiatives.	Partial Convergence	Government support has expanded financing opportunities but has not yet fully mobilized private capital.
Exit Opportunities	Studies consistently identify exit mechanisms as essential for sustainable VC ecosystems.	Participants frequently cited limited exit opportunities as a major deterrent to venture capital investment.	Strong Convergence	Underdeveloped exit markets continue to constrain ecosystem growth.

5. Discussion

5.1. Addressing the Research Questions

The findings allow the study's three research questions to be addressed directly.

RQ1: How do government support mechanisms influence the development of venture capital ecosystems in emerging economies?

The findings indicate that government support mechanisms contribute positively to ecosystem formation through institutional development, startup support programs, innovation funding, and ecosystem coordination. However, their effectiveness depends on the quality of implementation and their integration with market-based investment structures.

RQ2: Which institutional and ecosystem conditions enhance or constrain the effectiveness of government support mechanisms?

The analysis highlights regulatory clarity, institutional coordination, investor confidence, entrepreneurial infrastructure, and exit-market development as critical enabling conditions. Conversely, institutional fragmentation, bureaucratic complexity, and limited private-sector participation constrain policy effectiveness.

RQ3: To what extent do Kazakhstan's venture capital support mechanisms align with international best practices?

Kazakhstan has adopted several internationally recognized mechanisms, including innovation funding, accelerators, and co-investment initiatives. Nevertheless, implementation gaps remain, particularly regarding public–private coordination, private investor mobilization, and operationalization of hybrid venture capital structures.

5.2. Theoretical Implications

The findings of this study provide important insights into the role of government support in shaping venture capital (VC) ecosystems in emerging economies, while also highlighting the limitations of policy-led approaches when not fully aligned with market realities. Drawing on institutional and ecosystem perspectives, the results suggest that government intervention is necessary but not sufficient to develop a functional venture capital market.

First, the findings reinforce the argument that market failures in early-stage financing justify government intervention, particularly in environments characterized by weak financial markets and high uncertainty [19,22,37,38]. In Kazakhstan, government initiatives have helped establish foundational elements of a venture capital ecosystem, including innovation agencies, grant mechanisms, and early-stage support programs. These efforts align with prior research emphasizing the role of public policy in reducing investment barriers and stimulating entrepreneurial activity in developing economies [4–8,23,26,35].

However, the study also reveals that the effectiveness of these interventions is constrained by institutional and implementation gaps. Consistent with the literature on government-sponsored venture capital, the results indicate that policy instruments alone do not guarantee ecosystem development without strong governance, market incentives, and operational coherence [17,20,26,39]. In Kazakhstan, the presence of multiple support mechanisms has not yet translated into a fully functional VC market, largely due to fragmented implementation, bureaucratic inefficiencies, and limited coordination across institutions.

Also, the findings contribute to the literature on hybrid venture capital models and public–private collaboration. While such models are widely recognized as effective tools for bridging financing gaps, the results suggest that their success depends on how well they are operationalized and embedded in local market conditions. In Kazakhstan, hybrid and co-investment structures remain underdeveloped in practice, despite their formal recognition in policy frameworks. This supports existing research indicating that the transfer of policy

models from developed to emerging economies is often incomplete or misaligned with local institutional capacity [13,16].

In addition, the study highlights the critical role of institutional quality and ecosystem conditions in shaping venture capital outcomes. Legal certainty, investor protection, and regulatory clarity emerge as central determinants of investor confidence, confirming prior findings that venture capital markets are highly sensitive to institutional environments [20,23,29]. At the same time, the results extend this perspective by demonstrating that ecosystem-level factors, such as entrepreneurial culture, network development, and the availability of investment-ready ventures, are equally important in enabling venture capital activity. This underscores the need to view VC development not as a purely financial challenge, but as a systemic process involving multiple interdependent components.

The findings suggest that Kazakhstan's experience reflects a broader pattern observed in emerging economies: a transition from state-led ecosystem formation toward market-driven maturation. While government intervention can catalyze initial development, long-term sustainability depends on the gradual emergence of private-sector leadership, deeper capital markets, and stronger integration into global investment networks. This transition remains incomplete in Kazakhstan, highlighting both the progress achieved and the challenges that persist.

6. Conclusions

This study examined the effectiveness of government support mechanisms in fostering venture capital ecosystems in developing economies, with a particular focus on Kazakhstan. By combining a systematic literature review with qualitative insights from industry experts, the research provides a comprehensive assessment of both the design and implementation of policy interventions in an emerging venture capital market.

The findings demonstrate that while Kazakhstan has made significant progress in establishing institutional support for venture capital, important structural constraints remain. Government initiatives have contributed to the development of foundational ecosystem components; however, their impact is limited by gaps in implementation, institutional coordination, and market alignment. The study shows that venture capital development depends not only on the presence of policy instruments but also on the broader institutional and ecosystem conditions that enable their effective operation.

By integrating global best practices with context-specific evidence, this research contributes to the growing literature on venture capital in emerging economies. It highlights the importance of moving beyond policy adoption to effective execution and ecosystem integration, offering insights relevant not only to Kazakhstan but also to other developing countries seeking to build innovation-driven economies.

7. Policy Implications

Policymakers should strengthen coordination among innovation agencies, venture funding programs, and ecosystem intermediaries to reduce duplication of effort and improve strategic alignment across support initiatives. Most notably, they highlight the need for coherent and integrated policy frameworks that align financial incentives, regulatory reforms, and ecosystem-building initiatives. Fragmented interventions are unlikely to generate sustained impact unless they are coordinated within a broader strategic vision that supports both entrepreneurial activity and private investment participation.

The findings also suggest that future policy development should build on Kazakhstan's existing institutional infrastructure rather than rely solely on the introduction of new support programs. In particular, institutions such as the Astana International Financial Centre (AIFC), QazInnovations, the Fund of Science, and university-based innovation

ecosystems provide important foundations for venture capital development. Policymakers should therefore focus on improving coordination among these entities, reducing administrative fragmentation, and creating clearer pathways for public support to mobilize private investment. Strengthening linkages between these institutions may be more effective than establishing additional standalone programs. Efforts to expand exit opportunities through secondary markets, strategic acquisitions, and public market reforms may increase investor participation and improve long-term ecosystem sustainability.

In the Kazakhstani context, regulatory reforms should prioritize clarifying the legal treatment of venture capital funds, strengthening intellectual property protection and commercialization mechanisms, improving bankruptcy procedures for innovative firms, and expanding opportunities for intellectual property assets to be recognized within financing arrangements. Such reforms would help reduce uncertainty for investors while improving the investment readiness of early-stage ventures.

In addition, governments should invest in developing entrepreneurial ecosystems, including support for incubators, accelerators, and university–industry collaboration, as well as initiatives to foster an entrepreneurial culture and reduce risk aversion. Expanding the pipeline of investment-ready ventures is as important as increasing the supply of capital.

Several interview participants also emphasized the importance of broadening the domestic investor base. In particular, carefully designed reforms that enable greater participation by institutional investors, including pension and long-term investment funds, could significantly increase the availability of venture capital financing while maintaining appropriate risk-management safeguards. Such measures have played an important role in the development of venture capital markets in other jurisdictions and may warrant consideration within Kazakhstan’s evolving financial system.

Efforts to integrate local ecosystems into global venture capital networks can enhance knowledge transfer, increase access to funding, and improve the competitiveness of domestic startups. Building on the findings of this study, a structured set of policy recommendations can be identified across different time horizons. These recommendations reflect both immediate priorities and longer-term strategic interventions required to strengthen venture capital ecosystems in developing economies.

Building on the findings of the literature review and expert interviews, the policy recommendations proposed in this study are organized according to implementation complexity, institutional requirements, and expected time to impact. Short-term recommendations primarily involve administrative coordination and ecosystem support measures that can be implemented within existing institutional frameworks. Medium-term recommendations require regulatory reforms and institutional adjustments, while long-term recommendations involve structural changes to the financial system and investment environment. As shown in Table 8, the recommendations are linked to specific institutions within Kazakhstan’s innovation and venture capital ecosystem to facilitate implementation and accountability.

The recommendations presented in Table 7 suggest that strengthening Kazakhstan’s venture capital ecosystem requires more than additional funding mechanisms. Short-term priorities should focus on improving coordination among existing institutions and expanding opportunities for early-stage investment. Medium-term reforms should address regulatory and legal barriers that influence investor behavior and startup growth, while long-term initiatives should seek to deepen domestic capital markets and broaden participation by institutional investors. Taken together, these measures provide a phased roadmap for strengthening the effectiveness of government support and fostering a more sustainable venture capital ecosystem.

Table 8. Policy recommendations for strengthening venture capital ecosystems in developing economies.

Recommendation	Time Horizon	Lead Institution(s)	Expected Outcome
Expand angel investment facilities through AIFC-supported networks	Short-Term	AIFC, Private Investor Associations	Increased early-stage capital availability
Improve coordination among QazInnovations, Fund of Science, accelerators, and incubators	Short-Term	Ministry of Digital Development; QazInnovations	Reduced fragmentation and duplication
Clarify VC fund regulations and public–private co-investment frameworks	Medium-Term	AIFC; Financial Regulators	Greater investor confidence and participation
Modernize bankruptcy procedures for innovative firms	Medium-Term	Ministry of Justice	Reduced investment risk and improved exits
Strengthen IP commercialization and collateral mechanisms	Medium-Term	Ministry of Science and Higher Education	Improved startup financing opportunities
Facilitate carefully regulated participation of institutional investors	Long-Term	National Bank; Pension Fund Regulators	Expanded domestic venture capital pool

8. Limitations and Future Research

This study is subject to several limitations that should be acknowledged. First, the focus on Kazakhstan as a single case study may limit the generalizability of the findings to other developing economies with different institutional and economic contexts. While the case provides valuable insights, comparative studies across multiple countries would enhance the robustness of the conclusions.

Also, the study relies on a combination of secondary data and a relatively small sample of expert interviews. The qualitative component relied on ten elite interviews with venture capital investors, practitioners, and ecosystem stakeholders. Although modest in size, this sample is consistent with exploratory qualitative research involving highly specialized expert populations where participants possess extensive domain-specific knowledge and direct experience with the phenomenon under investigation. The objective of the interviews was not statistical representation but rather the generation of contextualized expert insights to complement and interpret findings from the systematic literature review. Consequently, the findings should be interpreted as indicative of prevailing perspectives among key ecosystem actors rather than as definitive evidence of consensus across the entire venture capital sector in Kazakhstan. Although this approach enables in-depth analysis, it may not fully capture the dynamic and rapidly evolving nature of venture capital ecosystems. Future research could expand the empirical base by incorporating larger samples and additional stakeholder perspectives, including entrepreneurs and policymakers.

A further limitation relates to the composition of the interview sample. Eight of the ten participants had direct experience with government-supported innovation or venture capital programs. While this characteristic was valuable for obtaining informed perspectives on the design, implementation, and effectiveness of government interventions, it may also have introduced a degree of ecosystem-insider bias. Participants with direct involvement in government-supported initiatives may possess greater familiarity with existing programs and may be more likely to emphasize their strengths, challenges, and operational realities than stakeholders operating entirely outside publicly supported structures. Although the study sought to mitigate this risk by including private investors, independent advisors, and participants with international investment experience, the findings should be interpreted as reflecting the perspectives of experienced ecosystem participants rather than a statistically representative cross-section of all venture capital stakeholders in Kazakhstan. Future research could broaden stakeholder representation by including entrepreneurs who have

not participated in government programs, investors operating outside state-supported initiatives, and additional international market participants.

Furthermore, the study adopts a cross-sectional perspective, focusing on current conditions rather than long-term developments. Longitudinal research would be valuable in assessing how government interventions influence venture capital ecosystems over time and in identifying the conditions under which such interventions are most effective.

Future research could also explore comparative analyses of different policy models, examine the role of cultural and behavioral factors in shaping investment decisions, and investigate the interaction between local ecosystems and global venture capital flows. Such efforts would contribute to a more nuanced and comprehensive understanding of venture capital development in emerging economies. Future research could also examine the perspectives of entrepreneurs and university-based innovators regarding venture capital financing. While this study focuses primarily on ecosystem actors and policy mechanisms, entrepreneurs may differ in their willingness to engage with venture capital investors, their perceptions of investor influence, and their preferences for alternative sources of financing. Investigating these perspectives would provide a more comprehensive understanding of how financing mechanisms align with the needs and expectations of emerging entrepreneurs in Kazakhstan and other developing economies.

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Institutional Review Board Statement: Ethical review and approval were waived for this study due to the following reasons: in the methodology section, there is a paragraph that states the ethical approach adopted, indicating we used informed consent in English and Farsi, and IRB approval was not necessary as the questions asked of participants were exogenous to their personal lives and well-being, only related to their business. The research was conducted in accordance with the principles of the Declaration of Helsinki. All interviews were conducted with participants' explicit consent, and data were anonymized and securely stored to ensure confidentiality.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. Data were anonymized and securely stored to ensure confidentiality.

Conflicts of Interest: The authors declare no conflicts of interest.

Appendix A. Semi-Structured Interview Guide

The interview protocol was designed to explore expert perspectives on the effectiveness of government support mechanisms within Kazakhstan's venture capital (VC) ecosystem. The semi-structured format provided consistency across interviews while allowing participants to elaborate on issues relevant to their professional experience. Follow-up questions were used when appropriate to clarify responses and explore emerging themes.

Appendix A.1. Professional Background

1. Please briefly describe your current role and experience within the venture capital or entrepreneurial ecosystem.
2. How long have you been involved in venture capital, innovation, entrepreneurship, or related activities in Kazakhstan?

3. Have you participated in or interacted with any government-supported venture capital, innovation, or entrepreneurship programs? If so, please describe your experience.

Appendix A.2. Current State of the Venture Capital Ecosystem

4. How would you assess the current state of Kazakhstan's venture capital ecosystem?
5. What do you consider the major strengths of the ecosystem?
6. What are the principal challenges or weaknesses currently limiting venture capital development in Kazakhstan?

Example Follow-Up Probes

- Access to capital;
- Investor participation;
- Regulatory environment;
- Entrepreneurial talent;
- Exit opportunities;
- Institutional coordination.

Appendix A.3. Government Support Mechanisms

7. What forms of government support for venture capital and entrepreneurship currently exist in Kazakhstan?
8. Which government initiatives or policy instruments do you believe have been most effective?
9. Which initiatives have been less effective or have not achieved their intended objectives?

Example Follow-Up Probes

- Public funding programs;
- Co-investment mechanisms;
- Tax incentives;
- Regulatory reforms;
- Innovation grants;
- Incubators and accelerators.

Appendix A.4. Institutional and Regulatory Environment

10. How would you evaluate the legal and regulatory framework supporting venture capital investment in Kazakhstan?
11. Are there specific institutional barriers that discourage venture capital investment or entrepreneurial activity?
12. To what extent do different government agencies and ecosystem organizations coordinate their activities effectively?

Example Follow-Up Probes

- Policy consistency;
- Administrative complexity;
- Bureaucratic procedures;
- Institutional fragmentation;
- Public-private collaboration.

Appendix A.5. International Comparisons and Best Practices

13. How does Kazakhstan's venture capital ecosystem compare with those of other emerging economies?
14. Are there international policies or programs that Kazakhstan should consider adapting or adopting?
15. What lessons can Kazakhstan learn from more mature venture capital ecosystems?

Appendix A.6. Future Development and Policy Recommendations

16. What policy changes would most improve the effectiveness of government support for venture capital development?
17. What role should the government play in supporting venture capital markets in the future?
18. What priorities should policymakers focus on over the next five to ten years to strengthen Kazakhstan's venture capital ecosystem?

Closing Question

19. Is there anything else you believe is important for understanding the development of venture capital and government support mechanisms in Kazakhstan that we have not discussed?

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