Effective Mechanisms of State-Legal Regulation in Higher Education: Analysis and Implementation Framework

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Abstract

This study analyzes how state-legal control has fostered higher education in Kazakhstan using the best legal techniques from the US, UK, Germany, and France. Kazakhstan needs strong legislative power, economic accountability, institutional independence, and academic freedom to develop its university system and compete globally. The study aims to establish a state-legal regulating structure for Kazakhstan's universities using global best practices. The study used panel data from 2000 to 2023 using the ARDL approach to assess the long-term and short-term effects of legislative and policy issues on higher education quality. The Pedroni residual cointegration test confirms long-run equilibrium relationships between variables, and robust least squares regression analyzes country-specific effects. The panel ARDL found that firm legal control, public education spending, research and development, and student mobility improve higher education quality. However, university autonomy has varied effects in the long run. Short-term academic independence hurts education quality, but student mobility is desirable. Results show that public education investment and student mobility increase higher education in Kazakhstan, but academic freedom diminishes it. US education quality is improved by strict legislative oversight but lowered by public education funding and university autonomy. This study developed the LEGAF-EDU (Legal, Governance, Autonomy, and Funding for Higher Education Development) Framework, a transformative model for Kazakhstan's regulatory concerns. This strategy combines legislative monitoring with institutional autonomy to create a stable, flexible government that assures high-quality education and holds the state accountable. The study advances legislation and policy by proposing an evidence-based higher education reform for Kazakhstan.

1- Introduction

Higher education drives innovation, human capital, and economic competitiveness, thus affecting the socioeconomic progress of nations [1]. In this era of globalization and knowledge-based economies, the state-legal control of higher education is crucial for maintaining the accessibility, quality, and competitiveness of national education systems. According to Baker, some industrialized countries have strict regulations to govern their higher education sectors while protecting academic freedom and institutional autonomy [2]. These nations are the USA, United Kingdom, Germany,

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and France. Kazakhstan may use these effective state-legal governance models in complex social, political, and economic contexts. Jonbekova [3] observed that Kazakhstan's higher education system changed significantly since its independence in 1991. Transitioning from a centrally planned economy to a market-oriented economy requires higher education initiative (HEI) reforms to meet global norms. The Bologna Process, Nazarbayev University model, and institutional autonomy have helped modernize higher education [4]. However, inadequate laws, academic freedom constraints, quality control issues, and a lack of governance remain issues. Given these challenges, Kazakhstan's higher education system requires a new state-legal governance model that matches international norms. The Kazakh government aims to transform education from 2025 to 2030 [5]. The country's long-term higher education aspirations require a robust legal framework that balances government monitoring and institutional autonomy to ensure quality, academic integrity, and sustainable expansion. Studying the successes and shortcomings of top higher education models in the US, the UK, Germany, and France helps Kazakhstan establish a regulatory framework that works for its needs.

1-1- The Necessity for Reform in Kazakhstan's Higher Education Regulation

Strict certification requirements, centralized decision making, and governmental supervision characterize Kazakhstan's higher education regulatory framework. Despite their noble intentions, these policies have hampered academic freedom and innovation in certain universities [6]. Red tape, opaque leadership, and a lack of curricular and resource management autonomy for institutions contribute to system inefficiency. Varying laws and frequent policy changes have hindered the strategic planning [7]. Globally, higher education governance takes several forms: Germany and France value state control, whereas the US and UK value institutional autonomy under state supervision [8, 9]. Accrediting agencies, rather than the government, supervise US universities. This decentralized strategy has allowed American institutions to innovate, preserve academic freedom, and attract talent from across the globe [10]. However, the French state-regulated system ensured strong public finance and long-standing academic traditions [11]. German higher education has a balanced and efficient model owing to its dual governance structure, which combines firm government control with significant institutional autonomy [12]. By studying these strategies, Kazakhstan can establish a hybrid regulatory structure that balances international and local challenges. Kazakhstan's Higher Education Development Strategy till 2030 emphasizes institution independence, administrative improvements, and quality assurance. Reforming state-legal regulation is the only way to provide higher education institutions, accreditation bodies, and government organizations with a clear legal foundation. A comprehensive legislative framework should ensure academic freedom, international collaboration, and universities' capacity to address social and economic needs.

1-2- Comparative Analysis of State-Legal Regulation in Leading Higher Education Systems

Due to federal and state inaction, Buckner et al. [13] argue that US institutions are unregulated. However, US Department of Education-accredited companies ensure quality. With this strategy, organizations have complete control over expenditures, syllabi, and hiring. Competition from the state-legal system boosts R&D and innovation while maintaining academic standards. This strategy might aid Kazakhstan by improving accrediting agencies and reducing government meddling in administrative and academic matters. Independence under government supervision is important to Britain's university system. Deem & Magalhães [14] state that the Office for Students (OfS) was created as an independent regulator under the 2017 Higher Education and Research Act. This measure provided institutions with tremendous autonomy while ensuring financial accountability and excellence. The Research Excellence Framework helps institutions evaluate performance and provide funds based on research impact. Kazakhstan might adopt a similar path by creating a regulatory entity to supervise universities and colleges and promote institutional accountability and high-quality research. German universities are regulated by the federal government and the states [15]. Accreditation helps university-specialized programs fulfill corporate needs by ensuring quality. This paradigm excels at balancing regulatory control with institutional flexibility. State-controlled higher education in France ensures academic integrity and substantial public funding. Although the state monitors universities and Grandes Écoles, recent revisions have allowed them greater flexibility [16]. France maintains strong academic standards with its well-organized higher education system and strict quality control [17]. Kazakhstan's regulatory system incorporates the state like the French model, although it might be more efficient and inventive if it had greater institutional autonomy and flexible governance. Table 1 compares higher education state legislation in selected countries.

1-3- Developing an Effective Mechanism for Kazakhstan's Higher Education Regulation

Kazakhstan's higher education needs a new state-legal control paradigm that offers institutions greater independence, while assuring quality. Summarizing the existing research background, we propose the following suggestions.

- Setting an independent higher education regulatory authority. Establish a distinct regulatory entity for accreditation, institutional governance, financial accountability, and the Ministry of Education. This reduces bureaucratic interference, increases transparency, and builds confidence in the institution.

- Enhancing institutional autonomy. Institutional discretion should be given to university fund management, course design, and the employment of academic staff. This will equip universities to adjust to worldwide academic development and job-market needs.

- Improve accreditation processes. Accreditation organizations such as the US and the UK should adopt a performance-based assessment approach. This will increase creativity, innovation, and international collaboration, thereby boosting academic performance.

- Industry collaboration. Universities should work with industries to teach students marketable skills. Kazakhstan's universities may explore Germany's dual education system, which combines academic and practical instruction.

- Fostering innovation and research. Kazakhstan universities should develop a national framework for research excellence, like the UK's REF, to evaluate and reward educational institutions based on their research and social impact.

Kazakhstan needs a state-legal higher education regulator to meet its 2030 educational goals. Kazakhstan may use the best practices of major higher education systems to create a well-rounded system that ensures quality, improves institutional autonomy, and promotes academic brilliance. Kazakhstan's educational institutions may benefit from a more organized regulatory framework for global competitiveness and socioeconomic growth. To implement these reforms in Kazakhstan, a comprehensive legislative framework should consider the country's educational and economic atmospheres and international standards.

Table 1. Comparative analysis of state-legal regulation of higher education in selected countries

Aspect \ Country	USA	UK	Germany	France	Implications for Kazakhstan
Regulatory Model	Decentralized, accreditation-based	Independent regulatory body (Office for Students)	Dual governance (Federal & State)	State-controlled, increasing institutional autonomy	Move towards independent regulatory oversight while maintaining state guidance
Institutional Autonomy	High institutional autonomy	Significant autonomy with regulatory oversight	Balanced autonomy within state framework	Limited but increasing autonomy	Increase autonomy for HEIs to enhance academic freedom and governance
Quality Assurance	Accreditation agencies set quality standards	Research Excellence Framework (REF)	State-supervised accreditation	State-supervised accreditation	Strengthen accreditation mechanisms with independent oversight
Funding Structure	Mixed (public, private, research grants)	Public funding with tuition fees	Publicly funded with industry collaboration	Predominantly public funding	Diversify funding sources, including public-private partnerships
Governance & Oversight	Limited state intervention, governance by boards	Office for Students ensures accountability	State and institutional governance mix	Ministry-driven governance	Establish an independent Higher Education Regulatory Authority
Research & Innovation	Strong research culture, industry collaboration	REF rewards impactful research	Research-oriented, industry collaboration	Strong state-funded research	Introduce performance-based research funding and innovation incentives
Graduate Employability	Market-driven education programs	Emphasis on employability and skills development	Dual education system with vocational training	State-driven employment policies	Strengthen university-industry linkages to align education with labor market demands
Legal Framework	Higher Education Act, Accreditation Laws	Higher Education and Research Act 2017	Federal and state education laws	Code de l'Éducation	Develop a Higher Education Law to define the legal framework for regulation

1-4- Unresolved Jurisprudential, Scientific, and Practical Challenges in the State-Legal Regulation of Higher Education: Implications for Kazakhstan's Regulatory Framework

The state's permitted management of universities is an important legal issue that raises numerous theoretical, scientific, and practical concerns. These challenges make it more challenging for governments to create regulatory frameworks that balance institutional independence, state power, and state quality. Many features of US, UK, German, and French university legal systems remain controversial. This is particularly true for digital transformation, socioeconomic growth, and regulatory adaptation of education policies. Kazakhstan's economy addresses these challenges by reforming its higher education regulatory system for the period 2025–2030. To develop a state-legal framework that works in Kazakhstan, it is necessary to consider its educational and socioeconomic conditions and adopt global best practices.

The state-legal management of higher education lacks theoretical basis. Hence, governance approaches vary according to jurisdiction [18]. Legislators and legal experts continue to debate whether universities and colleges should be largely state operated or privately owned. There are several jurisprudential viewpoints on university regulation, including heavy-handed government control to ensure quality, justice, university autonomy, and self-regulation. However, a compromised legal framework that balances government monitoring and institutional autonomy remains elusive. This theoretical ambiguity makes it difficult for regulators to balance their academic freedom and accountability. Kazakhstan must determine how to develop a legal framework that enhances governance and allows universities to innovate and compete globally. The lack of case law makes it harder to bring Kazakhstan's regulatory system to international standards.

Wu & Liu [19] and El Said [20] found empirical evidence on how regulatory strategies affect higher education performance over time. Comparative studies on education governance focus on faculty governance, financial systems, and accreditation approaches. Legislative frameworks and educational outcomes, including research output, graduate employability, and institutional sustainability, are not well measured. Data-driven analysis of the best legal framework should lead to successful developing Kazakhstan's regulatory policy.

Many nations have outdated or insufficient legislative frameworks that hinder globalization, technological advancement, and higher education commercialization. Laws and regulations have not kept up with the rapid digitalization of education in student records. To address issues concerning digital course materials' intellectual property rights, online learning certification, and international education, Carvalho et al. [21] immediately recommend laws. Kazakhstan's legal structure primarily supports face-to-face education. Hence, virtual education governance is still under development. Online program certification is affected by the absence of digital learning regulations, which limits international collaboration and information exchange. Kazakhstan will struggle to modernize its higher education business by integrating digital education laws that fit national policy aims and global norms.

Another issue is the relationship between higher-education regulations and social and economic goals. State laws typically neglect labor market needs, industry plans, and national innovation objectives [22]. Kazakhstan requires legal measures to align university curricula with labor demands. Current regulations prioritize quantitative growth, such as increasing university enrollment rates, but neglect educational quality, including skill development, employability, and industry engagement. Kazakhstan's university graduates do not have the ability to prosper in today's dynamic labor market unless the government strengthens university-business links. Therefore, the government should consider altering its policies to foster economic-priority-based academic programs, including public-private partnerships, industry-sponsored research, and skill-based education.

Finally, university laws were inadequately enforced. Laws and their implementation and oversight weak regulatory structures, political interventions, and insufficient monitoring hinder higher education governance in many countries [23, 24]. To address these issues, Kazakhstan's regulatory system requires strong and independent protection. Without effective enforcement, well-thought out legislative frameworks may be meaningless.

1-5- Research Gaps and Research Questions in the State-Legal Regulation of Higher Education

Academic advances in legal regulation and higher education governance have been significant, but remain incomplete in Kazakhstan's context. Ramanujam & Wijenayake [25] examined the relationship between academic freedom and the rule of law but did not address post-Soviet systems, while Davidenko et al. [26] and Grech et al. [27] explored digital transformation challenges without providing regulatory solutions for Kazakhstan's unique situation. De Wit and Altbach [28] detail internationalization trends in higher education but offer limited guidance on establishing appropriate regulatory frameworks for transitional economies. Cerna-Aragon & García [29] investigated algorithmic governance in public administration, and Knox & Orazgaliyev [30] examined sustainable development goals in Central Asia; however, both neglected higher education regulatory bodies and the mechanisms needed for effective oversight while maintaining institutional independence.

Matsieli & Mutula [31] discuss digital transformation challenges with a focus on inclusive and equitable access to quality education but do not address the specific regulatory adaptations needed in Kazakhstan's legal context. Corradi et al. [32] analyze how regulatory frameworks affect underrepresented groups' access to higher education, focusing on admission policies and student persistence, yet their work primarily examines Western contexts without addressing the unique socioeconomic factors affecting educational access in Kazakhstan. Finally, Singun [33] examined barriers to digital transformation in higher education institutions, identifying organizational and technological factors that impede progress, but did not explore how legal structures can facilitate stronger connections between academic institutions and industry to promote innovation and economic diversification in Kazakhstan's specific context.

Several critical research gaps have emerged from this literature review. There is no comprehensive theoretical framework tailored to Kazakhstan that balances state oversight with institutional autonomy in the post-Soviet context. Research on regulatory approaches to digital education and international academic cooperation lacks practical implementation guidance in Kazakhstan. Empirical studies comparing centralized and decentralized regulatory frameworks are scarce, thus limiting evidence-based policymaking. Practical implementation challenges in higher education governance have been insufficiently analyzed, and research on aligning higher education regulations with national development objectives remains underdeveloped.

This research aims to address these gaps by examining state-legal higher education governance from jurisprudential, regulatory, empirical, and practical perspectives. The primary objective is to investigate effective mechanisms for the state-legal regulation of higher education that could balance government oversight with institutional autonomy in the context of Kazakhstan. The sub-objectives include analyzing regulatory approaches to digital education and international cooperation, empirically comparing different regulatory models to identify their impacts on educational outcomes, examining implementation challenges in higher education governance systems, and exploring how legal frameworks can better align higher education with national development goals. Through a systematic comparative analysis of different legal systems, this study seeks to identify adaptable best practices that respect Kazakhstan's constitutional principles while enhancing its higher education system.

This study's contributions are significant in both theory and practice. Theoretically, it advances understanding of legal-institutional conceptions of higher education management by proposing a "regulated autonomy" model. It enhances the knowledge of how governance structures moderate the relationship between financial resources and academic performance. Practically, it provides Kazakhstan's policymakers with an evidence-based regulatory framework that can transform higher education governance, while maintaining a balance between oversight and autonomy. By systematically comparing different legal systems and adapting best practices to Kazakhstan's context, this study offers a roadmap for legal reform that can enhance the quality, innovation, and global competitiveness of Kazakhstan's higher education system.

This article is organized into several interconnected sections to address the research problem systematically. Following the Introduction, which establishes the significance of state-legal regulation in higher education, this study examines the current regulatory challenges in Kazakhstan's higher education system. It then provides a comprehensive comparative analysis of state-legal regulatory frameworks in the USA, Great Britain, Germany, and France to identify transferable best practices. The Methodology section outlines the mixed-methods approach, which combines panel data analysis and comparative legal techniques. The Results section presents empirical findings on how legal, financial, and institutional factors affect higher education quality across different systems. Based on these findings, Discussion and Conclusion develop a theoretical framework for higher education governance and concludes with policy recommendations for reforming Kazakhstan's regulatory framework to enhance institutional autonomy while maintaining the necessary oversight.

2- Theoretical Framework

2-1- Trends and Problems of Legal Regulation of Higher Education in Kazakhstan

Constitutional principles, legislative frameworks, government initiatives, and international commitments have shaped Kazakhstan's higher education legal system. As Kazakhstan strives to become a knowledge economy, Kim & Comunian [34] reported that its higher education laws are continually changing. Despite several legislative amendments to increase academic quality, institutional autonomy, and regulatory efficiency, significant theoretical and practical hurdles persist. Given these challenges, Kazakhstan requires a solid legal framework that considers its sociopolitical and economic conditions and that meets international norms. One of the most significant changes in Kazakhstan's higher education administration is the shift from centralized to decentralized governance [35]. Kazakhstan's higher education sector has operated under stringent Soviet legislation for a long time. This model emphasizes homogenous curricula, limited institutional autonomy, and stringent governmental oversight. In keeping with Kazakhstan's shift to a market-driven economy and commitment to global educational standards, legislative amendments have given universities greater academic, administrative, and budgetary autonomy [36]. New provisions in the Law on Education of the Republic of Kazakhstan and other presidential decrees and ministerial guidelines provide universities with greater freedom to build courses, employ teachers, and support research. However, regulatory organizations and higher education institutions differ because the statutory framework does not clearly define institutional autonomy. Uneven higher-education policies create legal ambiguities that hinder institutional planning and academic freedom.

Another change in Kazakhstan's higher education law was the emphasis on certification and quality assurance. In recent years, Kazakhstan has built a national quality assurance system based on international standards to align its higher education system with the Bologna Process [37]. Independent accreditation entities were formed along with government regulatory bodies, signifying a more varied legal monitoring structure. However, certification laws are still inconsistent, and the Ministry of Science and Higher Education and independent accrediting bodies have overlapping regulatory duties. Due to regulatory overlap, universities have conflicting accreditation criteria, making quality assurance methods ineffective. The international recognition of Kazakhstan's higher education degrees is problematic because the regulatory structure does not adequately handle international accrediting institutions [38]. Kazakhstan is at risk of having its universities and colleges neglected by the global academic community if its legal framework is unclear.

Kazakhstan's regulatory structure has failed to meet the digital revolution in higher education. The COVID-19 pandemic has revealed legal gaps in cyber-security, intellectual property (IP), and online learning. Kazakhstan's distance learning legal system is still developing despite the country's rising use of digital platforms in education [39]. The legislation does not specify online course accreditation, online degree legality, or institutions' privacy and security responsibilities for students online. The absence of defined intellectual property laws for digital educational content affects institutions' and faculties' rights to commercialize online courses. This lack of clarity in the law threatens Kazakhstan's online education infrastructure and requires prompt action to revise higher education regulations to match the current technology.

Saule & Kurmanov [40] stated that the primary concern of Kazakhstan's higher education policy is governmental interference with university autonomy. Even though universities are becoming increasingly independent, they are heavily regulated and funded by the government. This dependence exposes academic concerns such as recruiting professors, funding research, and creating course materials for political meddling. Political and bureaucratic influences typically influence academic decision-making because the legal structure fails to protect institutions from government overreach [41]. Academic freedom and free expression are unprotected in higher education, which worsens the situation. While some governments such as the US and the UK Kingdom protect academic autonomy, Kazakhstan has no legal or constitutional protection for academic freedom, exposing researchers and lecturers to political and administrative pressure.

According to Mhamed et al. [42], uncontrolled higher education finance is another issue in Kazakhstan's legislative structure. Kazakhstan has worked to diversify higher education finance via partnerships, business contributions, and student fees, despite statutory restrictions on financial autonomy. Universities cannot invest in research, infrastructure, and faculty expansion owing to legislative restrictions on generating their own money, according to Toimbek [43]. The lack of a defined legal framework for public-private partnerships in higher education limits institutions' financial independence. Kazakhstan lacks a legal framework to support university-business relationships, unlike France and Germany, which provide tax incentives and research money [44]. This limitation restricts institutions' competitive R&D, which inhibits innovation. Kazakhstan's higher education policies must be updated to be more market-responsive and flexible to address the financial regulatory issues.

Kazakhstan has a weak legal foundation for internationalizing higher education. The country is increasing student mobility, dual-degree programs, and foreign university partnerships to join the international education system [45]. However, legal standards for international collaboration are often unclear or inconsistent. Kazakhstan's higher education policy still grapples with international credentials, the legal status of foreign academic staff, and collaborative educational program regulation. Without clear laws governing their rights and obligations, international academic institutions in Kazakhstan have risked legal disputes and regulatory differences. This may deter international investment in Kazakhstan's higher education system. A comparative law study shows that countries with clear internationalization legislation, such as the US and UK, attract more international students and professors [46]. Thus, Kazakhstan needs a more structured and open legal framework to foster international academic cooperation and to ensure national educational standards.

Accessibility and fairness are other hurdles to the legislative control of Kazakhstani higher education. Despite legal measures to promote higher education opportunities, rural and impoverished students still face educational disparities [47]. The existing legal framework undervalues financial aid, scholarships, and affirmative action initiatives that encourage higher education. Germany has a regulatory system that encourages student financial aid and tuition-free higher education. Low-income Kazakhstani students face additional financial challenges due to the higher education legislation's lack of affordability protection [48]. A legal analysis of global educational equity best practices and their application in Kazakhstan's higher education system must address this gap.

2-2- Effective Mechanism of State-Legal Regulation of Higher Education: Analysis of Best Practices of the USA, Great Britain, Germany, and France

Building a state-legal framework to govern universities requires studying the best models of other nations. The American, British, German, and French higher education systems have different legislative controls due to historical, political, and social factors. These methods help explain how to ensure quality, while preserving acceptable government monitoring. By examining other legal systems, Kazakhstan may learn how to regulate its universities properly.

2-2-1- United States: A Decentralized Model with Strong Accreditation and Institutional Autonomy

In the US, universities enjoy considerable autonomy under legally decentralized constraints. Aydarova [49] stated that a single education ministry does not supervise all American institutions. Instead, accrediting bodies, institutional boards, and federal and state authorities were regulated. The 1965 Higher Education Act (HEA) governs financial aid, student protection, and equal access. Private and independent certifying agencies ensure their quality. These accrediting

agencies, recognized by the US Department of Education and Council for Higher Education Accreditation (CHEA), hold universities with high academic and administrative standards [50]. This decentralized regulatory approach encourages innovation and adaptability, allowing universities to tailor their academic offerings to a changing job market. The system also fosters healthy competition among universities, thereby improving the quality of higher education. However, state-by-state differences, concerns about for-profit colleges, and rising student loan debt indicate that regulations need revision. The US model shows how a strong accreditation system that balances institutional autonomy and quality monitoring can hold Kazakhstan's institutions accountable, while enabling academic freedom.

2-2-2- Great Britain: A Market-Oriented Model with Legal Protections for Academic Freedom

British higher education law is market-oriented and combines governmental control and institutional autonomy. The Higher Education and Research Act (HERA) of 2017 created the Office for Students (OfS), the major regulator of English universities [51]. OfS ensures that universities meet quality requirements, are financially viable, and protect students. Despite their legal autonomy, UK universities must follow laws to deliver excellent education, manage money properly, and serve the public good. British academic freedom was protected by law. The Education Reform Act of 1988 guarantees academics the freedom to challenge conventional wisdom and conduct research without political or administrative interference, according to Bacevic [52]. A healthy academic environment that fosters critical inquiry and intellectual diversity relies on legal protection. UK public funding is related to performance assessments, such as the Research Excellence Framework (REF), which emphasizes high-quality research [53]. The British model for Kazakhstan emphasizes state control to ensure quality and budgetary responsibility, and explicit legislation to safeguard academic freedom. A systematic strategy that links research funding to institutional achievements may enhance university-level research in Kazakhstan.

2-2-3- Germany: A Federal System with Strong State (Länder) Involvement and Public Funding

Germany's federal system governs higher education, with Länder (state) regulating universities [54]. The Standing Conference of the Ministers of Education and Cultural Affairs (KMK) coordinates nationally, and Grundgesetz provides Länder autonomy in setting higher education policies [55]. Free public financing and the fact that most German and international students are free to define German higher education. German legislation heavily involves state government in university governance. Each country's Higher Education Act governs academic freedom, financing, quality assurance, and institutional governance. The German Accreditation Council ensures that degree programs meet national and international standards [56]. The law also promotes university-company partnerships via controlled apprenticeship programs and applied research. Kazakhstan may learn from the German model how to combine higher education with industry, legally secure autonomy, and support research, and should emulate Germany's coordinated, legally based university-industry relationship to better align higher education with job market needs.

2-2-4- France: A Highly Centralized Model with Strong State Oversight

France's higher education system is highly centralized in Europe because of government control over administration, course design, and funding. Barkaoui et al. [57] stated that the Ministry of Higher Education and Research (MESR) controls universities to maintain French educational policies and standard academic credentials. The Code de l'Éducation governs public and private higher education in France by setting operational criteria and functions [58]. French universities and the Grandes Écoles were dual structured. University is an open-access, government-regulated institution, whereas Grande École is an elite school with selective admissions and significant autonomy. The state heavily subsidizes public university tuition, and the legislature emphasizes equitable education. The unique National Research Strategy of France's higher education law aligns university research with government goals [59, 60]. The legislation linking public research funding to national economic and social objectives ensures that academic research assists policymakers and technology. Kazakhstan may use the French model to learn about the merits and disadvantages of state control. Centralized control guarantees consistency and equity but may reduce institutional flexibility. Kazakhstan's legal framework may benefit from coordinated research coordination with national development objectives to ensure that universities actively contribute to social and economic growth.

2-2-5- Comparative Insights and Recommendations for Kazakhstan

Comparing the legal systems of the US, the UK, Germany, and France, the authors have yielded some viable ways to improve Kazakhstan's state-legal management of higher education:

- Balancing autonomy and oversight. The US and British models stress monitoring and the need for legislative structures that provide institutional autonomy while adhering to strong accreditation standards. Kazakhstan needs a more independent university certification system so that universities can educate students more freely while satisfying the quality criteria.

- Ensuring academic freedom. Kazakhstan's higher education rules should explicitly incorporate academic freedom clauses like those in Germany and the UK to safeguard academic freedom.

- Government assistance for university funding: Academic degrees in Germany are not cost intensive. Kazakhstan may be unable to afford full tuition subsidies, but a better legal framework for public finance, scholarships, and other student financial aids is needed.

- Academia-industry linkages. Kazakhstan may follow Germany's lead and institute a dual educational system. This strategy funds research, tax rebates, and innovation centers to foster university-business partnerships.

- Prioritization of national objectives. Kazakhstan may benefit from France's coordinated legal approach of integrating research with national development objectives to ensure that universities assist the economy and society.

Kazakhstan might strengthen its state-legal higher education control by adopting and enacting these best practices. This will ensure academic excellence, institutional autonomy, and international educational standards. This study delineates Kazakhstan's statutory criteria for evidence-based higher-education reforms to assist policymakers in improving the system.

2-3- Possibilities of Implementation of the USA and Europe's Best Legal Concepts and Practices in Kazakhstan

Before updating the higher education law, global norms must be assessed for compatibility with Kazakhstan's political, social, and economic settings. Reforms in Kazakhstan may be inspired by US and European higher education laws in Germany, France, and Great Britain. Administrative institutions, economic capacities, and historical trajectories make the direct transfer of legal frameworks impossible or inadvisable. Kazakhstan needs a more selective and adaptive strategy to maximize the benefits of tried-and-true legal systems, while adhering to national interests and legal traditions.

2-3-1- Adapting the U.S. Model: Strengthening Institutional Autonomy and Accreditation

US universities may choose their academic curricula, admission regulations, and funding. Private and nationally respected certifying agencies verify this autonomy through a rigorous process. Samoilov et al. [61] stated that Kazakhstan's Ministry of Science and Higher Education adopted an accreditation-based regulatory model to improve its bureaucratic monitoring and quality control. Kazakhstan's laws must be changed to allow for independent national accreditation organizations. This council should include academics, business executives, and politicians to ensure certification criteria match employer education and experience requirements. Legislation should improve university accountability, research objectives, and financial autonomy.

2-3-2- Incorporating the British Legal Framework: Ensuring Academic Freedom and Research Excellence

British law ensures that academics and intellectuals have a free discourse without governmental discipline. According to Liyanage et al. [62], the Education Reform Act of 1988 and the Higher Education and Research Act of 2017 govern institutions and provide academic freedom via the Office for Students (OfS) and Research Excellence Framework (REF). The Kazakh higher education policy, which preserves academic freedom, demonstrates its commitment to intellectual honesty and innovation. The country should create a National Research Evaluation Framework like REF to ensure that state-funded research has excellent academic and societal impacts. This approach encourages innovation that serves Kazakhstan's long-term development goals by requiring universities to demonstrate how their research benefits society, without sacrificing academic freedom.

2-3-3- Integrating the German Approach: State-Supported Higher Education and University-Industry Collaboration

Kazakhstan may benefit from Germany's federalized higher education governance model to balance national power with regional educational needs. The federal government substantially supports and supervises German universities, despite their independence [63]. The German Accreditation Council must maintain its academic standards and institutional flexibility. Kazakhstan should decentralize higher education management to allow regional governments to customize university policies to unique social and economic realities. Germany's dual education system, combining academics with job training, appeals to Kazakhstan. Legislation should encourage higher education institutions to integrate practical research partnerships and vocational training programs to boost university-industry connections. This may be done through legal mandates for institutions to provide career-oriented academic programs, direct governmental funding for joint research initiatives, and tax benefits for collaborating firms.

2-3-4- Drawing Lessons from France: Centralized Quality Assurance and National Research Strategy

France's well-organized higher education system ensures academic standards and equal access to excellent education. Kazakhstan's higher education system has been centralized, although the French model may increase regulatory efficiency. One possible legal reform is the Higher Education Governance Code, which outlines the roles of governmental, regulatory, and educational institutions [64]. This legally binding charter outlined academic independence, institutional responsibility, and government funding. A National Research Strategy Act that relates research funding to economic and technological objectives may ensure that university research in Kazakhstan directly supports national growth.

2-3-5- Challenges and Legal Adaptation Strategies for Kazakhstan

Significant challenges exist in capitalizing on the enormous benefits of adopting American and European best practices in higher education. First, cultural differences make it unwise to import Western legal and administrative procedures into Kazakhstan. Stringent accountability processes and institutional autonomy should be implemented to prevent mismanagement and to ensure academic integrity. Second, fiscal constraints may make it impossible to replicate Germany's state-funded higher education model. A mixed financing strategy involving public assistance, tuition limitations, and legal scholarship programs may be effective. To achieve this, Kazakhstan's higher education finance law must be amended to incorporate performance-based funding, which rewards institutions for academic and research achievements. Third, Kazakhstan's cumbersome regulatory framework hinders its university operations. Legislative measures that restrict state intrusion and maintain vital surveillance can improve administrative operations. A Higher Education Regulatory Reform Commission involving lawmakers, academic leaders, and legal experts may help to create a more flexible and internationally competitive higher education regulatory framework.

2-4- Hypothesis Development

The legal regulations of higher education are complex and ever-changing. Therefore, nations have used various methods. Implementing American and European best practices in Kazakhstan requires a comprehensive legal framework that protects institutional independence, financial stability, and quality controls. Using theoretical underpinnings and comparative legal analysis, this study establishes several hypotheses to evaluate how legislative changes have systematically influenced higher education governance.

- **H1: Higher education benefits from substantial legal control**: Legal safeguards for academic freedom, institutional autonomy, and academic monitoring are required to sustain higher education. Under a stronger rule of law, university operations are more open, stable, and responsible, thus improving student education [65]. This hypothesis holds that countries with stronger legal systems have higher education enrollment, output, and research.

- **H2: Public education investment increases higher education quality**: Universities and colleges may spend public money on campus amenities, faculty quality, and research initiatives [66]. Public education investment will assist higher education institutions, particularly those in developing countries where capital is a significant barrier. Therefore, more students, better classrooms, and better academic performance are desired.

- **H3: Research and development improve the quality of higher education**: R&D investment affects universities' global status, inventiveness, and academic achievement [67]. Countries with higher R&D investments should have better education. University competitiveness has increased due to increasing research output, global rankings, and new information.

- **H4: University autonomy improves higher education quality**: Universities need liberty to innovate, adjust curricula, and make judgments [68]. This approach suggests allowing universities greater authority in managing resources, hiring academics, and setting academic norms to make higher education more responsive and academic-centered.

- **H5: Academic freedom lowers education equality in the short term but improves it late:** Academic freedom allows universities to conduct breakthrough research and to express themselves. However, academic independence may cause immediate issues regarding institutional stability, curriculum homogeneity, and national education policy. This hypothesis states that academic freedom is crucial for long-term quality advances, but may create short-term performance losses and backlash.

- **H6: Student mobility improved higher education quality in the short- and long run**: Students moving across borders are an indication of the globalization of higher education. Student mobility boosts global academic networks, cultural diversity, and cross-border knowledge exchange [69]. According to this hypothesis, increased student mobility makes higher education institutions more competitive and internationally oriented, thus improving academic and research performance.

These hypotheses help explain how legislative changes affect Kazakhstan's higher-education sector. By adapting international best practices to their legislative and institutional frameworks, Kazakhstan's legislators can strengthen their academic freedom, institutional autonomy, financial sustainability, and research quality. Empirical proof of these notions would help advance legal reform and higher education administration in transitional countries.

3- Theoretical Justification and Framework

Legal regulation of higher education uses jurisprudential theories, policy frameworks, and comparative legal methods to analyze and improve state-legal processes. Government engagement in universities depends on how healthy laws and regulations balance institutional independence, state controls, and market pressure. Legal positivism, public interest theory, and comparative law underpin Kazakhstan's state-legal control of higher education. By examining it through these lenses, it can better comprehend Kazakhstan's higher education industry and develop a more refined legal framework considering its sociopolitical and economic conditions.

3-1- Legal Positivism and State Regulation of Higher Education

Legal positivism holds that everyone must follow sovereign power law, regardless of morality [70]. The state's involvement is in the legal framework governing accrediting agencies, financial methods, quality assurance systems, and institutions. In Kazakhstan, the state has a long-dominated government that includes higher education. According to Shomotova & Karabchuk, the Ministry of Science and Higher Education oversees policies, curricula, and institutional autonomy, according to Shomotova & Karabchuk [71]. However, excessive government control can restrict academic freedom and institutional flexibility. Legislation must balance government monitoring and autonomy. Legal positivism provides a theoretical framework for Kazakhstan's unambiguous, enforceable, and globally compliant higher-education policies.

3-2- Public Interest Theory and Higher Education Governance

Public interest theory supports government actions to improve markets and society [72]. This supports the view that universities should have statutory protection to avoid uneven enrollment, maintain high standards, and integrate degree programs with government objectives to advance national development. German and US laws foster social inclusion, scientific excellence, and industrial collaboration to address the public interest. German public institutions must not charge students [73] to make higher education accessible to everyone, whereas the American government finances national-interest research [74]. Kazakhstan's higher education regulatory structure must be strengthened to address the accessibility, quality assurance, and labor market congruence gaps. Public interest theory justifies state-passing laws that promote social fairness, academic honesty, and transparent institutional accountability. Since excessive legislative restrictions may inhibit innovation, a paradigm that balances the public interest, academic freedom, and institutional autonomy is needed.

3-3- Comparative Law Approach and Legal Transplantation

Comparative legislation may help Kazakhstan learn from other nations' higher education governance success. One important concept in comparative law is "legal transplantation," which requires consideration of cultural, economic, and institutional variances when transferring practical legal norms from one nation to another [75]. Kazakh authorities may learn a great deal from studying the US, UK, German, and French systems that govern universities and colleges. Under America's decentralized legal system, schools and universities enjoy tremendous accreditation autonomy. France and Germany emphasize government-financed education and strong university-business links, whereas the UK and other European legal systems rely on independent regulatory institutions to ensure quality. Legal transplanting may aid Kazakhstan's state-legal university control by adopting the key characteristics of these models; however, straight transplantation without contextual adaption may cause regulatory inefficiencies. Comparative legal techniques should be used to conceptualize Kazakhstan's higher education system reform to ensure that the altered legal procedures match the country's governance structure and socioeconomic conditions.

4- Research Methodology

For empirical and legal analysis, this study compares Kazakhstan's higher education regulatory frameworks to those of developed countries, including the US, the UK, Germany, and France. This study employs panel data analysis for cross-country comparisons and time-series analysis for each nation to analyze the regulatory implications. These two modeling methods comprise one approach. Both modeling methods leverage the studied variables to provide accurate and comparable assessments. Figure 1 shows the study's research design for reference.
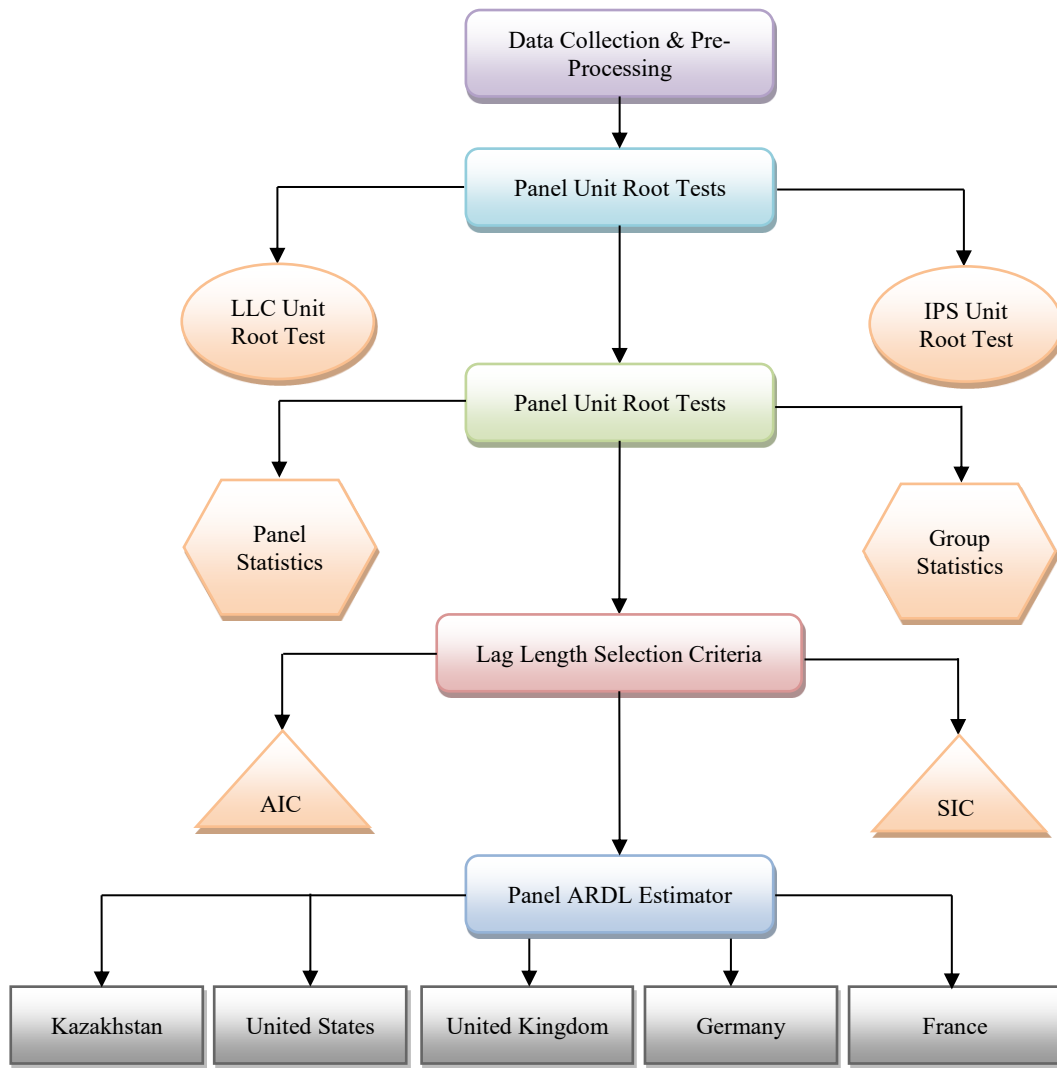
Figure 1. The Flowchart of the Research Process of the Study

4-1- Data Description and Collection

The World Development Indicators (WDI), a World Bank database, provides secondary data for this study. The evaluation of institutional and legal frameworks in higher education governance drives the variable selection. The dataset includes national observations for France, Germany, the UK, Kazakhstan, and the US from 2000 to 2023. The study utilizes the time-series dataset, unique to each prospective country, and the panel dataset, which includes numerous nations throughout time, for nation-level analysis.

4-2- List of Variables

This study used appropriate, governance-based, and educational development indicators from the World Bank database to provide a complete analysis [76]. Table 2 lists the variables studied:

Table 2. Selected variables for panel data analysis [76]

Variables Type	Variables Name	Variable Proxy	Units/Measurement	Symbol	Expected Sign
Dependent Variable	Higher Education Quality	Tertiary School enrolment	% gross	HEQ	
Independent Variable	Legal Regulation Strength	Rule of Law Index	Index Score (Range: -2.5 to 2.5)	LRS	+
	Public Education Expenditure	Government Expenditure on Education (% of GDP)	% of GDP	PEE	+
	Research & Development	R&D Expenditure (% of GDP)	% of GDP	RDE	+
	University Autonomy	Regulatory Quality Index	Index Score (Range: -2.5 to 2.5)	UA	+
	Academic Freedom	Voice and Accountability Index	Index Score (Range: -2.5 to 2.5)	AF	+
	Student Mobility	Tertiary Pupil-teacher ratio	Average number of pupils per teacher in tertiary school	SM	+

The selected variables were based on a comprehensive assessment of the legal, economic, and institutional aspects of higher education quality. Focusing on Kazakhstan's dynamics and country comparisons, each aspect is vital to its educational system's efficiency, accessibility, and global competitiveness. The dependent variable is the Tertiary School Enrollment Rate (% gross), which measures higher education quality. This shows the reach and accessibility of higher education by tracking student engagement trends worldwide. Greater access to higher education and good national education policy raises enrollment rates, which improves educational systems. This essential component provides a context for understanding how institutional, economic, and legal factors affect university education.

Due to the intricate link between higher education governance and performance, the study carefully selected the independent variables. The Rule of Law Index measures how well legal systems protect individual rights, implement government objectives, and hold institutions accountable. Higher education thrives when the rule of law safeguards students' rights, institutional independence, and academic freedom. A sound legislative foundation is essential to a secure and predictable educational environment. It anticipates a positive association between legal rigor and higher education quality with stronger legal frameworks resulting in stronger educational institutions. Government expenditure on education (% GDP) measures government education funding. Public academy financing frequently leads to better facilities, devoted instructors, and more extensive student support services, which makes it important to consider. Higher education is expected to benefit from a higher gross domestic product (GDP) share, which is considered a commitment to improving education. This was selected because socioeconomic models illustrate how money enhances educational quality and accessibility.

Another key aspect affecting higher education quality is R&D investment, as a proportion of GDP. R&D funding is related to greater academic achievement, particularly in institutions that value innovation, technology, and knowledge. R&D funding is expected to boost research-driven teaching, institutional rankings, and a global reputation in higher education. The contributions of higher education systems to national innovation ecosystems and institutional research capabilities may be better recognized by this variable. The Regulatory Quality Index Measures University Autonomy — the extent to which the institution controls its administration, academic freedom, and decision-making. This index shows how private universities are in terms of financial management, faculty nominations, and curriculum formulation.

Academic freedom-representing voice and accountability indexes are important. Universities require an unconstrained academic environment to prosper and contribute to the global knowledge economy. The voice and accountability score reflect the political and legal climate and emphasizes the importance of free intellectual space in higher education. Finally, student migration affects educational quality and global competitiveness, as evidenced by the tertiary pupil-teacher ratio. This statistic depicts the institutional learning environment by indicating the average number of students per higher-education teacher. A lower pupil-teacher ratio indicates more customized education with greater student engagement and teacher-student communication. Mobility trends suggest that internationalizing education boosts institutional reputation. Universities that attract foreign students are perceived as more competitive and culturally accepted. A lower pupil-teacher ratio is thought to improve education quality. A smaller ratio means that students will receive more help and become more engaged in their studies.

4-3- Data Analysis and Econometric Techniques

It is imperative to conduct panel unit root tests to assess the stationarity of variables before conducting econometric modeling. Stationarity is vital in time-series analysis because non stationary data may lead to misleading regression analysis. Since this study employs panel data from multiple countries, it must verify the unit roots in the cross-sectional and temporal dimensions to validate the econometric model. Panel unit root tests such as LLC and IPS determine whether the panel's time series are stationary or need to be different. When analyzing panel data, these tests extend time-series unit root tests to account for cross-sectional dependence across countries. It differentiates variables by using unit roots to generate a stationary series. These tests establish how to handle data before using more complicated econometric methodologies. Thus, panel unit root tests provide a strong foundation for research and provide reliable, non-stationarity-free results. From Equations 1 to 7, the panel unit root test is as follows:

$$\Delta(HEQ)_{i,t} = \alpha + \beta(HEQ)_{i,t-1} + \delta_1\Delta(HEQ)_{i,t-1} + \dots + \delta_{p-1}\Delta(HEQ)_{i,t-p-1} + \varepsilon_{i,t} \tag{1}$$

$$\Delta(LRS)_{i,t} = \alpha + \beta(LRS)_{i,t-1} + \delta_1\Delta(LRS)_{i,t-1} + \dots + \delta_{p-1}\Delta(LRS)_{i,t-p-1} + \varepsilon_{i,t} \tag{2}$$

$$\Delta(PEE)_{i,t} = \alpha + \beta(PEE)_{i,t-1} + \delta_1\Delta(PEE)_{i,t-1} + \dots + \delta_{p-1}\Delta(PEE)_{i,t-p-1} + \varepsilon_{i,t} \tag{3}$$

$$\Delta(RDE)_{i,t} = \alpha + \beta(RDE)_{i,t-1} + \delta_1\Delta(RDE)_{i,t-1} + \dots + \delta_{p-1}\Delta(RDE)_{i,t-p-1} + \varepsilon_{i,t} \tag{4}$$

$$\Delta(UA)_{i,t} = \alpha + \beta(UA)_{i,t-1} + \delta_1\Delta(UA)_{i,t-1} + \dots + \delta_{p-1}\Delta(UA)_{i,t-p-1} + \varepsilon_{i,t} \tag{5}$$

$$\Delta(AF)_{i,t} = \alpha + \beta(AF)_{i,t-1} + \delta_1\Delta(AF)_{i,t-1} + \dots + \delta_{p-1}\Delta(AF)_{i,t-p-1} + \varepsilon_{i,t} \tag{6}$$

$$\Delta(SM)_{i,t} = \alpha + \beta(SM)_{i,t-1} + \delta_1\Delta(SM)_{i,t-1} + \dots + \delta_{p-1}\Delta(SM)_{i,t-p-1} + \varepsilon_{i,t} \tag{7}$$

where: HEQ shows Higher Education Quality; LRS shows Legal Regulation Strength; PEE shows Public Education Expenditures; RDE shows R&D expenditures; UA shows University Autonomy; AF shows Academic Freedom; SM shows Student Mobility; 'i' shows cross-sections; 't' shows time period; and Ɛ shows error term.

After the unit root tests, Pedroni's panel cointegration test was used to assess long-run equilibrium linkages among the panel data variables. Cointegration tests are required for non-stationary time-series data to determine whether the variables move together over time. Pedroni's cointegration test evaluates various cointegrating correlations in a panel setting, while dealing with cross-sectional data from different countries. Pedroni's test considers within-dimension and between-dimension cointegration to capture the long-run connections between variables across countries. This increases the versatility. The test provides panel v-statistics and group rho-statistics to examine variable co-integration. If the variables are cointegrated, indicating a stable long-term relationship, additional econometric models, such as the panel ARDL model, should be included. For policy analysis and recommendations, linkages between variables must reflect long-run dynamics. Pedroni's cointegration test confirmed that short-term oscillations did not drive these interactions. Pedroni's cointegration test calculates within-dimension panel statistics and between-dimension group statistics to examine the long-term relationships between panel data variables. These two statistics accounted for panel data heterogeneity in the test. Panel and group statistics assume the same autoregressive parameters for all cross-sections. The general Equation 8 may also be expressed as follows,

$$HEQ_{i,t} = \alpha_i + \sum_{j=1}^{6} \beta_j X_{j,i,t} + \varepsilon_{i,t} \tag{8}$$

Where, α_i shows country's individual fixed effects, 'X' shows the explanatory variables, β_j shows the slope coefficients of the long-run relationships, and $\varepsilon_{i,t}$ shows disturbance term is level stationary.

After confirming cointegration, the panel Autoregressive Distributed Lag (ARDL) model captures short- and long-term dynamics. The ARDL model is ideal for panel data analysis with cointegrated variables, because it estimates short-run adaptations to long-term equilibrium changes. Lagged values of the dependent and independent variables may be added to the panel ARDL approach to better understand time-dependent interdependencies [77]. The panel ARDL model best accounts for cross-national variations in immediate and distant links compared to the other models. This is crucial because this study included countries with different educational, legal, and economic systems. The panel ARDL model may incorporate country-specific dynamics, allowing research to be tailored to each nation. By incorporating lagged dependent variables and instrumenting the regressors, the model may manage endogeneity concerns, in which explanatory factors are related to the error term. The panel ARDL model shows how legislative restrictions, public expenditure, research funding, academic freedom, and other factors affect the quality of higher education in the short and long run. Thus, this econometric technique strengthens the study's empirical foundation by providing solid estimates to make meaningful policy recommendations to improve Kazakhstan's university system relative to the best practices worldwide. As demonstrated in the ARDL Equation 9,

$$\Delta(HEQ)_{i,t} = \alpha_0 + \sum_{i=1}^{p} \varphi_1 \Delta(HEQ)_{i,t-i} + \sum_{i=0}^{q} \theta_2 \Delta(LRS)_{i,t-i} + \sum_{i=0}^{r} \theta_3 \Delta(PEE)_{i,t-i} + \sum_{i=0}^{t} \phi_4 \Delta(RDE)_{i,t-i}$$
$$+ \sum_{i=0}^{u} \phi_5 \Delta(UA)_{i,t-i} + \sum_{i=0}^{v} \phi_6 \Delta(AF)_{i,t-i} + \sum_{i=0}^{w} \phi_7 \Delta(SM)_{i,t-i} + \delta_1 (LRS)_{i,t} + \delta_2 (PEE)_{i,t}$$
$$+ \delta_3 (RDE)_{i,t} + \delta_4 (UA)_{i,t} + \delta_5 (AF)_{i,t} + \delta_6 (SM)_{i,t} + \varepsilon_{i,t} \tag{9}$$

where Δ shows the first difference operator.

Further, Equation 10 confirms the short-run adjustment through the error correction term (ECT); hence, it has been added to the given formulation:

$$\Delta(HEQ)_{i,t} = \alpha_0 + \sum_{i=1}^{p} \varphi_1 \Delta(HEQ)_{i,t-i} + \sum_{i=0}^{q} \theta_2 \Delta(LRS)_{i,t-i} + \sum_{i=0}^{r} \theta_3 \Delta(PEE)_{i,t-i} + \sum_{i=0}^{t} \phi_4 \Delta(RDE)_{i,t-i}$$
$$+ \sum_{i=0}^{u} \phi_5 \Delta(UA)_{i,t-i} + \sum_{i=0}^{v} \phi_6 \Delta(AF)_{i,t-i} + \sum_{i=0}^{w} \phi_7 \Delta(SM)_{i,t-i} + \delta_1 (LRS)_{i,t} + \delta_2 (PEE)_{i,t}$$
$$+ \delta_3 (RDE)_{i,t} + \delta_4 (UA)_{i,t} + \delta_5 (AF)_{i,t} + \delta_6 (SM)_{i,t} + \lambda ECT_{i,t-1} + \varepsilon_{i,t} \tag{10}$$

where λ shows the adjustment parameter.

4-4- A Comparative Legal Approach

This study uses economic modeling and comparative legal analysis to examine how regulatory frameworks affect higher education administration. This technique allowed us to compare Kazakhstan's legal documents, policy reports,

and legislative activities to those of similar countries. This study analyzes legislation and tribunal judgments that affect academic freedom, university autonomy, finance, and quality assurance. This context-giving analysis helps explain the numerical results of econometric modeling.

4-5- Methodology Justification of the Model of State-Legal Regulation of Kazakhstan Higher Education

This study proposes a unique state-legal regulatory approach to assess higher education governance in Kazakhstan. This method is supported for several reasons, making it empirically sound and legally appropriate. The first argument is empirical validity, that is, econometric analysis quantitatively shows how institutional and legal factors affect higher education quality. Panel data regression and time-series analysis determine how legislative frameworks, financial allocation, and institutional autonomy affect educational outcomes. Second, individual country regression provides benchmarking for comparing the policies of Kazakhstan's top higher education systems, which yield excellent practices for Kazakhstan. This data-driven comparison may help Kazakhstan's policymakers to evaluate higher education governance against worldwide standards. This study examines the feasibility of legislative changes to existing institutions because they must be compatible with current government structures and cultures. This model influences higher education reform policies and legal debates, stressing its importance to policymakers. This study used empirical data with legal expertise to provide legislators, regulatory bodies, and policymakers with practical advice to strengthen state-legal regulation in higher education. The suggested framework addresses Kazakhstan's higher education sector's regulatory inadequacies by actively engaging in policy concerns, not only by analyzing existing texts. As an important resource for legal scholars and education authorities, the study's interdisciplinary approach enhances scholarly literature.

5- Results

Table 3's descriptive statistics indicate the dataset's distributional properties and trends, which help analyze the study's variables. The mean values of the variables show how the selected jurisdictions' higher education systems are performing. The mean value of the higher education quality (HEQ) variable is 63.784, so the panel typically has high tertiary school enrolment. Disparities in institutional competence, budget allocations, and policy effectiveness may explain the 13.375 standard deviations in higher education quality between countries.

Table 3. Descriptive statistics

Methods	HEQ	LRS	PEE	RDE	UA	AF	SM
Mean	63.784	1.084	4.907	1.999	1.136	0.780	14.244
Maximum	88.889	1.874	6.738	3.467	1.868	1.597	22.791
Minimum	32.063	-1.202	2.255	0.116	-0.693	-1.245	7.515
Std. Dev.	13.375	0.944	1.004	1.017	0.724	0.967	4.370
Skewness	-0.059	-1.491	-0.654	-0.840	-1.295	-1.435	-0.049
Kurtosis	2.967	3.439	2.873	2.449	3.208	3.174	2.233

In Table 3, HEQ shows higher education equality, LRS shows legal regulation strength, PEE shows public education expenditure, RDE shows R&D expenditure, UA shows university autonomy, AF shows academic freedom, and SM shows student mobility.

An average legal regulation strength index score of 1.084 indicated a good regulatory atmosphere. However, the large range of values illustrates that university regulatory and legislative institutions vary in their strength. With a negative skewness of -1.491, many countries have weak legal regulatory frameworks, and few have effective legal governance. Public education expenditure (PEE) as a percentage of GDP ranges from 2.255% to 6.738%, averaging 4.907%. Due to fiscal constraints or alternative financing priorities, a few countries have substantially lower public education expenditures, as evidenced by the moderate standard deviation (1.004) and negative skewness (-0.654).

Despite a mean value of 1.999% of GDP, research and development expenditure (RDE) had a large standard deviation of 1.017. This statistic shows the innovation and academic breakthrough investments. Some nations' low R&D investment (at least 0.116 percent) may impair universities' long-term competitiveness and students' learning. The university autonomy (UA) variable ranged from -0.693 to 1.868. The mean score was 1.136 points. This demonstrates how various systems worldwide provide universities with varying degrees of autonomy. Some are more centralized, while others allow greater flexibility to conduct their affairs.

Academic freedom (AF) averages 0.780 and varies from -1.245 to 1.597. Scientific independence and institutional integrity rely on AF. Several nations still struggle with academic speech and institutional autonomy, as evidenced by the negative skewness (-1.435). This supports global concerns regarding academic politicization, overregulation, and political intervention. Finally, the tertiary pupil-teacher ratio shows student mobility (SM), which averages 14.244 and ranges from 7.515–22.791. Internationalization policies, visa constraints, and institutional reputation may explain the high standard deviation (4.370), which reflects student mobility among countries.

Table 4 displays the Levin, Lin, and Chu (LLC) panel unit root test results. These results are significant in assessing the stationarity of this study. Stationarity is critical for effective econometric modeling because unit roots may induce erroneous regression results, which weakens inferential conclusions. The LLC test on all variables shows that integration occurs in mixed order. Some variables attain level stationarity without differencing, whereas others require it to obtain a stable mean-reverting process.

Table 4. LLC panel unit root estimates (Small brackets show probability value)

Variables	Level		First Difference		Decision
	Constant	Constant and trend	Constant	Constant and trend	
HEQ	1.303 (0.903)	0.850 (0.802)	-2.130 (0.016)	-1.435 (0.075)	I(1)
LRS	0.741 (0.770)	0.920 (0.821)	-3.254 (0.000)	-3.859 (0.000)	I(1)
PEE	-1.313 (0.094)	-0.635 (0.262)	-6.032 (0.000)	-5.101 (0.000)	I(1)
RDE	0.842 (0.800)	-0.101 (0.459)	-4.477 (0.000)	-3.349 (0.000)	I(1)
UA	-1.437 (0.075)	-1.076 (0.859)	-2.311 (0.010)	-0.707 (0.239)	I(0)
AF	-1.427 (0.076)	-1.996 (0.023)	-7.237 (0.000)	-6.251 (0.000)	I(0)
SM	-0.126 (0.449)	-0.081 (0.467)	-4.951 (0.000)	-5.350 (0.000)	I(1)

Student mobility, public education expenditure, legal and regulatory strength, and higher education quality are non-stationary when levelled. All reached stationarity after first differencing. This reveals that these variables are integrated of order one, I(1), with a stochastic trend that stabilizes after the first-difference transformation. The institutional and economic implications make these findings significant. According to the requirement for initial differencing in HEQ, long-term structural and policy factors are more likely to induce changes in tertiary enrolment rates than momentary alterations. The LRS and PEE are I(1), indicating modest but steady changes in legal regulatory frameworks and public education finance systems.

Level-stationary variables, such as academic freedom (AF) and university autonomy (UA), offer integration of order zero, I(0). This suggests that governance institutions reverted to their mean values over time. The differences between academic freedom and university autonomy frequently resolve without differences. Once established, higher education governance institutions are famously resilient and do not like to change their courses. The stationarity of UA and AF indicates that long-standing regulatory frameworks and constitutional guarantees often determine institutional autonomy and academic freedom, and not short-term policy adjustments.

Because the variables are integrated in a mixed order, panel autoregressive distributed lag (ARDL) and panel cointegration models are used. Other metrics require differences before reaching stationarity. This empirically supports the use of sophisticated econometric methods. Since panel ARDL estimates may be employed with I(0) and I(1) variables, this study can capture the short- and long-term dynamics of higher education. As AF and UA are level stationary, their long-term effects on higher education are likely to be steady. However, policy changes and exogenous shocks may cause more dynamic interactions in first-differenced variables such as financial and regulatory measures.

Table 5 shows the Pedroni residual-based panel cointegration test, which confirms that the crucial variables have long-run equilibrium linkages. Panel econometrics uses cointegration to ensure that even if the variables are individually unstable, their linear combination indicates a substantial long-run link.

Table 5. Pedroni cointegration test estimates

Within-dimension	Statistic	Prob.	Weighted Statistic	Prob.
Panel v	0.629	0.264	1.361	0.086
Panel rho	1.036	0.850	1.438	0.924
Panel PP	-1.620	0.052	-1.406	0.079
Panel ADF	-1.193	0.116	-1.283	0.099
Between-dimension	**Statistic**	**Prob.**		
Group rho	2.257	0.988		
Group PP	-1.032	0.150		
Group ADF	-1.694	0.045		

The weighted Panel-v, Panel Phillips-Perron (PP), Panel PP, and Group Augmented Dickey-Fuller (ADF) statistics demonstrate high cointegration. These findings suggest that the examined variables follow the same equilibrium course. This shows the interconnection between higher education's institutional, financial, and legal concerns and demonstrates that short-term fluctuations are resolved over time. The long-run cointegration relationship suggests that policy changes, such as public academy financing or legal regulation, will have long-term and predictable effects on higher education quality. This result emphasizes the need for long-term strategic planning over short-term reactive responses by higher education regulators and lawmakers. The significant Panel PP and Group ADF statistics corroborate the stability of these associations. Changes in university autonomy, academic freedom, and student mobility have long-term repercussions for higher education.

The statistical significance of the cointegration tests shows that the ARDL models employed in the following phases were appropriate. Panel ARDL methods help handle mixed orders of integration and capture short- and long-run dynamics; therefore, cointegration ensures that the following econometric estimates yield policy-relevant insights. Any legislative or regulatory endeavor to promote higher education must examine its long-term impacts, since unexpected or arbitrary policy changes might destabilize this long-term balance. Time series and panel econometric modeling require lag length determination, specifically autoregressive distributed lag (ARDL) estimation. The results for these criteria are presented in Table 6. Choosing an adequate lag time ensures that short- and long-run dynamics are captured without overfitting or losing degrees of freedom, which affects model dependability and efficiency.

Table 6. Lag length selection criteria (* indicates lag order selected by the criterion)

| Lag	LogL	LR	FPE	AIC	SC	HQ
0	-599.869	NA	0.009156	15.171	15.380	15.255
1	121.630	1298.700	4.59e-10*	-1.640	0.026*	-0.972*
2	159.352	61.298	6.25e-10	-1.358	1.767	-0.105
3	192.653	48.286	9.94e-10	-0.966	3.619	0.872
4	248.221	70.848*	9.70e-10	-1.130	4.913	1.292
5	297.843	54.584	1.22e-09	-1.146	6.357	1.862
6	358.242	55.869	1.36e-09	-1.431	7.531	2.162
7	443.977	64.301	1.02e-09	-2.349	8.071	1.828
8	557.225	65.117	5.59e-10	-3.955*	7.924	0.807

The different selection criteria suggest different lag times. The Final Prediction Error (FPE), Schwarz Criterion (SC), and Hannan-Quinn Criterion favor a lag duration of 1. The Akaike Information Criterion (AIC) predicts an 8-lag time, whereas the Likelihood Ratio (LR) test suggests a 4. Considering these variations, it is necessary to establish a criterion that fits the study aims and econometric framework, and is supported by theory and evidence. The SC criteria were used to determine the panel ARDL estimate lag time. It is commonly known that SC restricts more parameters than AIC. SC specifies the main dynamics with the fewest required lags, unlike AIC, which overestimates lag lengths and may contain extraneous delays, resulting in inefficiency. In panel econometrics, overfitting due to too many lags may generate model inefficiencies and distorted outcomes. This decision is common, particularly in studies that involve diverse national contexts.

In Table 7, the panel ARDL estimate indicates the long- and short-term relationships between institutional, legal, and economic issues and higher education quality. The panel ARDL model captures the short- and long-term effects of policy interventions and institutional variables on higher education quality, providing a complete picture (Figure 2).

Table 7. Panel ARDL estimates with dependent variable HEQ

Variables	Coefficient	Std. Error	t-Statistic	Prob.
Long Run Estimates				
LRS	27.153	15.267	1.802	0.074
PEE	47.889	21.666	2.210	0.029
RDE	77.574	38.197	2.030	0.049
UA	18.760	6.810	2.754	0.007
AF	10.469	1227.498	0.008	0.993
SM	1.692	0.606	2.790	0.006

Short Run Estimates				
ECT	-0.208	0.040	-5.125	0.000
D(LRS)	-6.434	6.108	-1.053	0.295
D(PEE)	1.357	0.791	1.714	0.089
D(RDE)	5.000	1.815	2.754	0.007
D(UA)	4.284	4.311	0.993	0.323
D(AF)	-6.905	2.798	-2.467	0.015
D(SM)	0.813	0.249	3.263	0.001
C	11.984	3.084	3.885	0.000
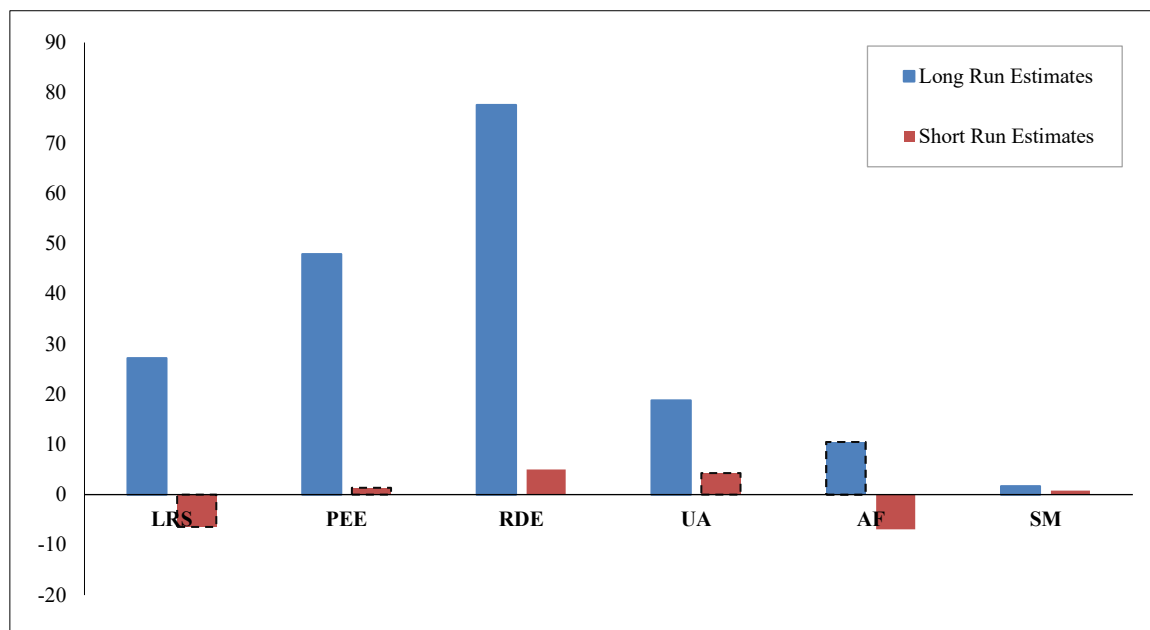
Note: Dashed border indicates coefficient is not statistically significant (p> 0.05).

Figure 2. Panel ARDL Effects on Higher Education Quality

Long-term results show that legislative strength increases higher education quality (HEQ). This suggests that a stronger legal framework with more transparent regulations, accountability, and greater academic freedom protection is needed to foster high-quality higher education. Greater education in countries with stronger legal frameworks is associated with higher-quality services, institutional autonomy, and trustworthy administration. This demonstrates that strong regulatory laws and procedures related to higher education are essential to national growth. Only legislative measures that strengthen the rule of law may boost university performance and global competitiveness [78].

R&D and public education funding have also enhanced higher education over time. Zhang et al. [79] found that public education spending increases HEQ. This implies that government education expenditure is vital because it affects academic infrastructure, teacher development, and student support services. Owing to the strong association between R&D investment and HEQ, sponsoring academic research is essential for an institution's reputation and creativity. Both variables show consistent and purposeful investments in education and research, leading to long-term improvements in higher education quality. These results have evident policy implications for governments that should prioritize education and research budgets to improve innovation, education quality, and institutions' global prestige.

The results showed that institutional independence enhances higher education over time, which affects university autonomy. Previous research confirms the importance of academic freedom and institutional autonomy in fostering innovation, flexibility, and academic excellence [80, 81]. Countries with greater university autonomy in curriculum, faculty recruitment, and research funding have higher education systems. Legislation must be changed to give universities greater autonomy and prevent the government from intervening in academic concerns.

Academic freedom adversely affects higher education quality in the short run. This illustrates that academic independence may not immediately improve the quality of higher education. Academic practice emancipation may be desirable in the long run, but it produces instability or hostility as institutions adjust to new freedoms. It may also delay the institutional and structural reforms required to benefit from academic freedom [82]. Even if academic freedom is essential in a lively academic environment, other factors, including institutions' capacity to manage it, may influence quality in the short term.

However, student mobility improves the quality of higher education in both the short and long run. This study shows how globalization and educational system connections improve higher education. When universities recruit international students, faculty, and research collaborations, global competitiveness and academic stature increase [83]. Student mobility also diversifies the classroom by improving teaching and learning, cross-cultural understanding, and learning time. Policies that promote international cooperation, student exchange, and global academic networks are crucial. These tasks have improved education and institutional rankings globally.

Table 8 shows nationwide robust least squares regression estimates. These estimations show how institutional, economic, and legal issues affect higher education (HEQ) quality in France, Kazakhstan, the US, the UK, and Germany. The estimates show how policy changes in one place may affect performance in other areas and offer a clearer picture of country-by-country higher education system dynamics (see Figure 3).

Table 8. National regression estimates: *, **, and * indicates 10%, 5%, and 1% significance level**

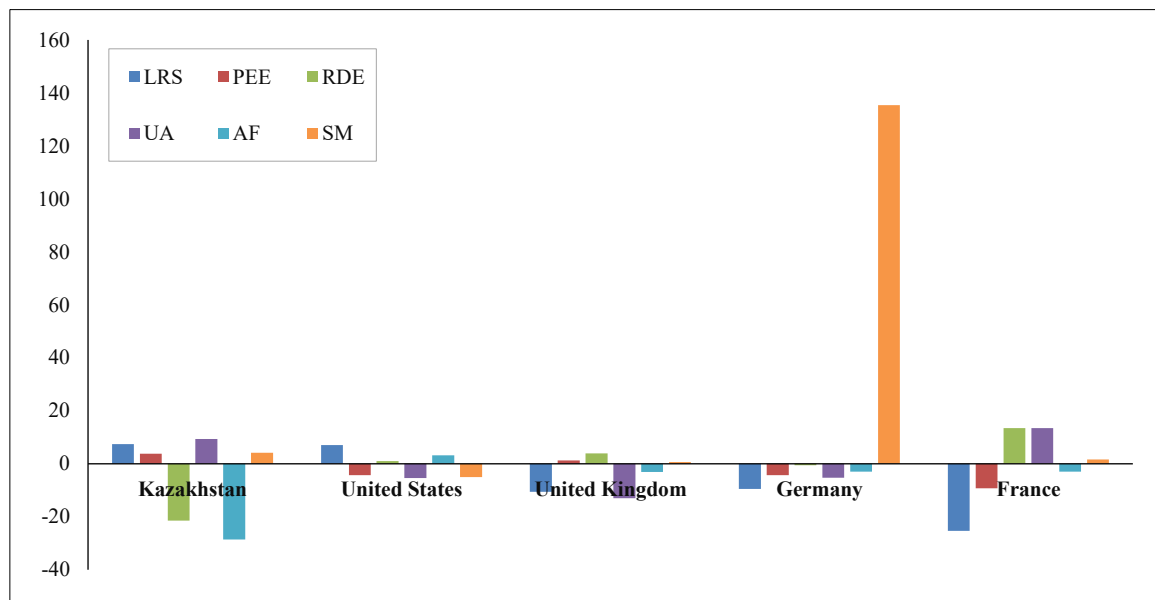| Countries	Constant	LRS	PEE	RDE	UA	AF	SM	Rw^2
Kazakhstan	-45.930**	7.473	3.789*	-21.511	9.318	-28.524**	4.189***	0.973
United States	161.975***	7.059*	-4.319***	1.070	-5.412***	3.162	-5.076	0.971
United Kingdom	78.412***	-10.568	1.315	3.904**	-12.949*	-3.072	0.612	0.830
Germany	-935.201***	-9.483***	-4.257***	-0.498***	-5.203**	-3.000	135.414***	0.989
France	74.597	-25.314***	-9.293	13.407	13.477***	-2.963	1.603***	0.950

Figure 3. Cross-Country Comparison: Panel ARDL Effects on Higher Education Quality

Kazakhstan's quality of higher education is strongly related to public education spending and student mobility. This finding supports the idea that more education funding improves accessibility and quality, and that Kazakhstan's internationalization efforts are attracting international students and encouraging them to collaborate academically. This highlights the importance of higher education financial investment in a booming economy such as Kazakhstan, where public money improves education quality and institutional capacity. Kazakhstan's evolving regulatory environment suggests a short-term trade-off, where increased academic freedom may generate institutional instability or issues that adjust to academic autonomy. This suggests that academic freedom may take time to benefit institutions fully and that its short-term effects, if unchecked, may be harmful. However, long-term academic progress requires intellectual independence.

The regression results show that LRS promotes higher education in the US, supporting the well-known effect of strong legal frameworks on university performance and worldwide reputation. The positive relationship between the LRS and HEQ shows that a robust legal and regulatory framework fosters institutional autonomy, academic freedom, and research. The results show that university autonomy and public education funding lower the quality of higher education in the US. This may be due to the complex interplay between public, private, and state finance in the US; political intervention or bureaucratic limits may diminish institutional flexibility as public money expands. Despite seeming freer, university privatization may restrict institutional autonomy and explain its negative connection with autonomy.

The positive relationship between UK higher education quality and R&D investment shows the importance of investing in research to enhance institutional rankings, boost innovation, and increase academic accomplishment. Higher education in the UK may suffer if institutions are allowed greater autonomy to pursue their own interests rather than the national educational goal, which might lead to uneven academic standards or institutional disintegration. UK universities' financing strategies affect their autonomy and budgetary constraints, which affects the quality of education at these schools.

German higher education has rigorous legislative oversight, public education funding, research and development spending, and institutional autonomy, yet student mobility helps. Excess public education expenditure and severe legislative supervision might hinder academic freedom and waste public cash. In other nations, R&D expenditure boosts academic productivity, but Germany may temporarily lose quality if university autonomy and spending are expanded. Possible factors include unequal research funding and autonomous management. Due to student mobility, Germany's academic reputation has improved by welcoming international students. International student exchanges and collaborations increase teaching, research, and academic status.

Finally, the regression analysis shows that university autonomy and student mobility promote higher education in France, while severe regulatory control decreases it. Legal oversight by the government may hamper university autonomy and capacity to adapt to global academic standards. Autonomous universities and high-quality higher education are linked by academic freedom and institutional self-governance, which foster innovation and flexibility. Student mobility benefits France, proving that globalization and international collaboration improve education quality and competitiveness. Table 9 presents the hypotheses' outcomes for convenience.

Table 9. Hypotheses testing

Hypothesis Number	Hypothesis Description	Testing Outcome
H1	Higher education benefits from substantial legal control	Accepted
H2	Public education investment increases higher education quality	Accepted
H3	Research and development improve the quality of higher education	Accepted
H4	University autonomy improves higher education quality	Accepted
H5	Academic freedom lowers education equality in the short term but improves it later	Partially Accepted
H6	Student mobility improved higher education quality in the short- and long run	Accepted

5-1- LEGAF-EDU Framework (Legal, Governance, Autonomy, and Funding for Higher Education Development): A Transformational Model for Kazakhstan's Higher Education

The empirical findings presented in Tables 3-9 provide robust evidence of how various regulatory, financial, and institutional factors affect the quality of higher education across different national contexts. Building on these quantitative results, we propose the LEGAF-EDU (Legal, Governance, Autonomy, and Funding for Higher Education Development) framework — a comprehensive model designed specifically to address Kazakhstan's higher education challenges through evidence-based policy reform. This framework represents a systematic translation of our panel ARDL estimates and country-specific regression results into actionable policy components, each targeting a key determinant of educational quality as identified in our analysis.

Our panel ARDL estimates in Table 7 reveal that legal regulation strength (coefficient = 27.153), public education expenditure (coefficient = 47.889), R&D investments (coefficient = 77.574), university autonomy (coefficient = 18.760), and student mobility (coefficient = 1.692) have significant positive long-term effects on higher education quality. Simultaneously, our country-specific analysis for Kazakhstan in Table 8 shows that public education expenditure (coefficient = 3.789) and student mobility (coefficient = 4.189) positively affect higher education quality, while academic freedom demonstrates a negative short-term effect (coefficient = -28.524). These empirical findings directly inform the four interconnected components of our LEGAF-EDU framework, creating a model that balances regulatory oversight with institutional flexibility to maximize educational outcomes.

5-1-1- LEGAF-Law: Forging University Regulation Laws

The LEGAF-Law component directly addresses our first hypothesis (H1: "Higher education benefits from substantial legal control"), which was confirmed by our panel ARDL estimates, showing a significant positive coefficient (27.153) for legal regulation strength in the long run. This finding underscores that a robust legal framework serves as a foundation for high-quality higher education by providing predictability, accountability, and protection to academic institutions.

However, our country-specific analysis reveals variations in how legal regulations affect different systems. While strengthening legal frameworks positively influences higher education quality in the United States (coefficient = 7.059), excessive regulation can be detrimental, as evidenced by the negative coefficients for France (-25.314) and Germany (-9.483). This nuanced understanding informs our approach to LEGAF-Law, which seeks not simply more regulation but smarter, more balanced oversight.

The proposed National Academic Freedom Charter (NAFC) responds directly to our finding that academic freedom has a negative short-term effect in Kazakhstan (coefficient = -28.524), suggesting the need for clearer legal protections that structure academic freedom within an appropriate regulatory framework. Similarly, the creation of the Higher Education Financial Oversight Commission (HEFOC) addressed the positive impact of public education expenditure (coefficient = 3.789 for Kazakhstan) by ensuring effective financial governance.

The LEGAF-Law component also incorporates provisions for regulating international student mobility, responding to our finding that mobility has a significant positive effect on higher education quality both in the short run (coefficient = 0.813) and the long run (coefficient = 1.692) in our panel ARDL model, and specifically in Kazakhstan (coefficient = 4.189).

5-1-2- LEGAF-Gov: Restructuring Governance Mechanisms for Universities

The LEGAF-Gov component is informed by our fourth hypothesis (H4: "University autonomy improves higher education quality"), which was confirmed by our panel ARDL results showing a significant positive effect of university autonomy in the long run (coefficient = 18.760). However, the country-specific results revealed varying effects of autonomy across different systems, with negative coefficients for the United States (-5.412), the United Kingdom (-12.949), and Germany (-5.203) but a positive effect in France (13.477).

These mixed results suggest that autonomy alone is insufficient, and must be paired with effective governance structures. This insight directly informs the LEGAF-Gov component, which proposes that Academic Governance Boards (AGBs) provide multi-stakeholder oversight that balances institutional autonomy with accountability. The proposed National University Performance Index (NUPI) further addresses this need by creating a transparent mechanism for evaluating institutional performance.

Our finding in Table 8 that Kazakhstan's higher education quality is positively affected by public education expenditure (coefficient = 3.789) but negatively affected by academic freedom (coefficient = -28.524) in the short term suggests a governance gap specifically addressed by LEGAF-Gov by creating structured mechanisms for institutional accountability, while gradually building capacity for greater autonomy.

5-1-3- LEGAF-Autonomy: Enhancing Institutional Independence for Superior Education

The LEGAF-autonomy component directly addresses the complex relationship between autonomy and educational quality, as revealed in our empirical analysis. Our panel ARDL estimates confirmed Hypothesis 4 by showing a significant positive effect of university autonomy in the long run (coefficient = 18.760); however, our analysis also revealed that this relationship varies considerably across national contexts.

This component responds to the empirical finding that autonomy has no significant short-term effect (coefficient = 4.284, p = 0.323) in our panel ARDL model, which suggests that autonomy requires time and supportive structures to yield benefits. The proposed performance-based autonomy contracts represent a direct application of this insight, creating a gradual path toward greater autonomy tied to demonstrated institutional capacity and achievement.

The National Research Freedom Act (NRFA) addresses the negative short-term effect of academic freedom in Kazakhstan (coefficient = -28.524) by creating a structured framework that protects academic inquiry while ensuring alignment with broader educational goals. This approach recognizes that effective autonomy requires both legal protection and appropriate governance, addressing both variables identified as significant in our model.

5-1-4- LEGAF-Funding: Maximizing Public and Private University Investments

The LEGAF-Funding component is empirically grounded in our second and third hypotheses (H2: "Public education investment increases higher education quality" and H3: "Research and development improves the quality of higher education"), both of which were confirmed by our panel ARDL estimates. Public education expenditure showed a significant positive effect in both the long run (coefficient = 47.889) and the short run (coefficient = 1.357), while R&D expenditure demonstrated positive effects in both timeframes (coefficients = 77.574 and 5.000, respectively).

Our country-specific analysis for Kazakhstan confirms the positive effect of public education expenditure (coefficient = 3.789), providing direct empirical support for the LEGAF-funding component's focus on sustainable funding mechanisms. The proposed grant-based research competition directly responds to our finding that R&D investment significantly improves higher education quality, while the scholarship system addresses the broader finding that financial resources must be effectively allocated to maximize their impact.

The emphasis on public-private partnerships reflects our comparative analysis of different national systems, particularly the successful models observed in Germany and the United States, where university-industry collaboration has enhanced research impact and educational relevance.

Thus, the LEGAF-EDU framework represents a comprehensive, evidence-based approach to reforming Kazakhstan's higher education system. By directly translating our empirical findings into policy recommendations, the framework addresses each significant determinant of education quality identified in our analysis, while accounting for the specific contextual factors relevant to Kazakhstan. Through this integrated approach that combines legal protection, effective governance, structured autonomy, and sustainable funding, LEGAF-EDU offers a pathway toward a higher education system that balances regulatory oversight with institutional flexibility to maximize educational outcomes in Kazakhstan's unique context.

Figure 4 illustrates the integration of these four components into a cohesive framework for higher education development in Kazakhstan, demonstrating how each element works together to create a balanced approach to reform, based on our empirical findings.
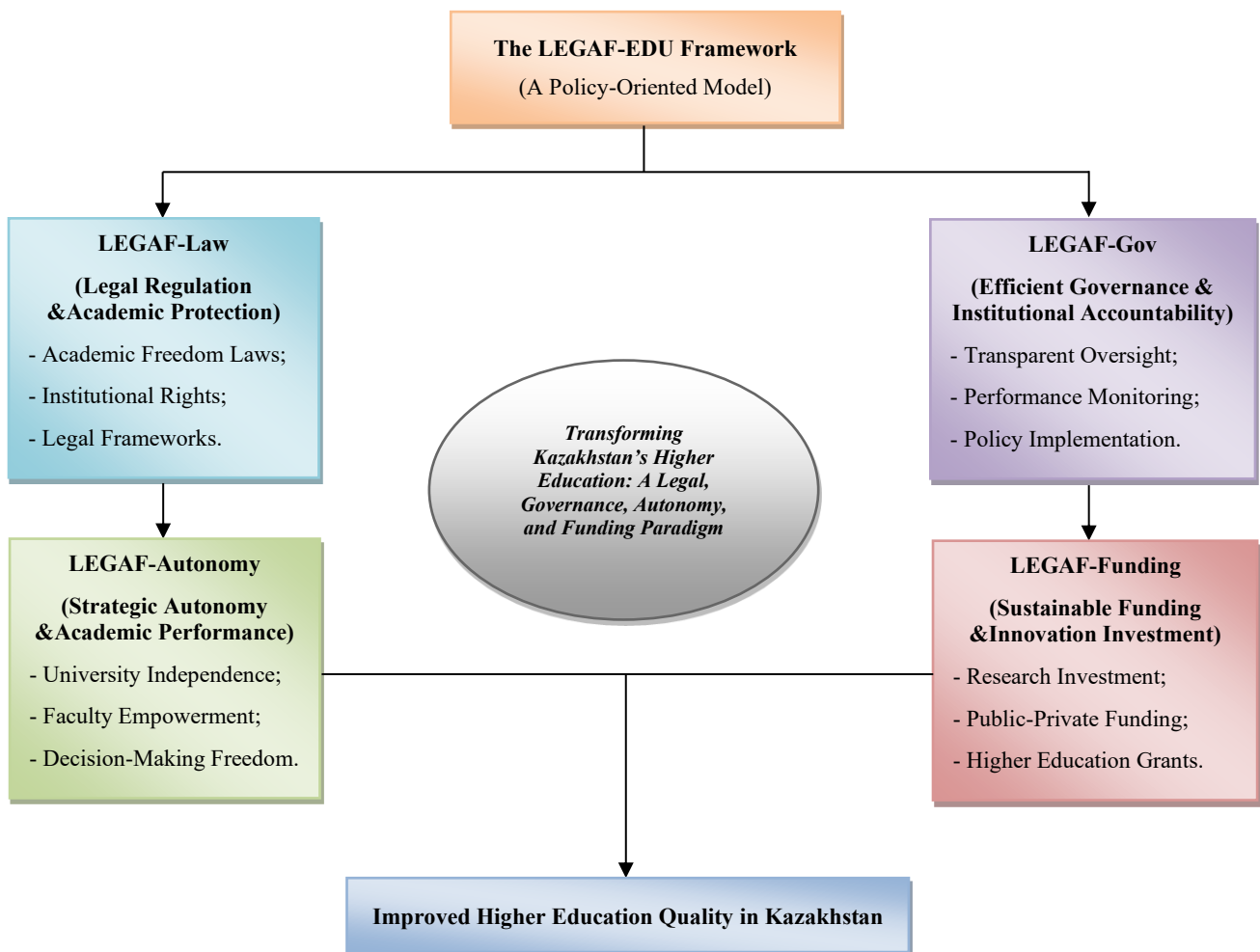

Figure 4. The LEGAF-EDU framework

A progressive policy aligns Kazakhstan's university system with global norms. LEGAF-EDU improves educational institutions' efficiency and national competitiveness. Legislative protection, strategic finance, and organizational autonomy ensure Kazakhstan's universities' academic success, research excellence, and knowledge economy readiness.

6- Discussion

The findings illustrate the complex interaction between regulatory frameworks, funding, governance structures, and higher education quality in Kazakhstan and its comparable systems. The results confirm that strong legal regulations significantly impact higher education quality, aligning with Yadav et al. [84], who demonstrated that robust legal frameworks ensure academic standards and institutional accountability. However, this relationship is nuanced, as shown in country-specific analyses: excessive control can impede innovation, requiring a careful balance between regulation and autonomy [85].

Public education expenditure and R&D investment positively influence higher education quality, confirming our second and third hypotheses. Both contribute to improving academic climate, research productivity, and institutional performance from short- and long-term perspectives, consistent with the findings of Khan et al. [66] and Mao et al. [67]. Importantly, this study reveals that governance systems mediate the relationship between financial investment and educational quality. Without appropriate allocation strategies and performance-based financing, increased expenditure may lead to inefficiencies [86], explaining why public spending shows positive effects in Kazakhstan, but negative relationships in the United States and Germany.

The relationship between university autonomy and higher-education quality is particularly significant. Panel ARDL estimates indicate that institutional autonomy enhances academic performance over the long term, supporting hypothesis four and consistent with Hashim et al. [68]. However, country-specific analyses reveal that variance — autonomy negatively impacts higher education quality in the United States and the United Kingdom, but positively affects it in France. As Ali Mohammed [87] noted, excessive autonomy without adequate oversight may create governance issues and quality disparities, suggesting that a balanced approach that provides decision-making authority within a clear regulatory framework is most effective.

Academic freedom has complex effects on the quality of higher education. Contrary to common assumptions, the study found that, in the short term, academic freedom negatively impacts education quality, particularly in Kazakhstan, partially supporting hypothesis five. This aligns with Audretsch et al. [88], who noted that unrestricted academic freedom could lead to variations in teaching effectiveness and student achievement. The findings suggest that academic freedom requires a clear institutional and legal framework to ensure that it positively contributes to academic excellence, consistent with Alibašić et al. [80].

The empirical finding that academic freedom negatively impacts higher education quality in the short term (coefficient = -6.905, p = 0.015) has important implications for Kazakhstan's education policy approach. This suggests that policymakers should implement a phased introduction of academic freedom, rather than an abrupt deregulation. Short-term education policies should focus on building institutional capacity through targeted faculty development programs, establishing clear governance structures, and creating transitional accountability frameworks, before granting full academic freedom. During this transition period, Kazakhstan could implement guided academic freedom, where institutions receive increasing autonomy in specific domains (curriculum development, research priorities, and faculty hiring) based on demonstrated governance capacity and performance metrics. This scaffolded approach would help mitigate the initial disruption and instability, while institutions develop the necessary systems to effectively manage greater academic independence, eventually realizing the long-term benefits of academic freedom.

Student mobility emerges as a vital factor contributing to higher education quality from both short- and long-term perspectives, fully supporting hypothesis six. International exchange programs and global partnerships foster academic diversity, innovation, and knowledge sharing, which is consistent with Ul Hassan et al. [83]. The positive effect of student mobility is evident across different national contexts, particularly in Kazakhstan, France, and Germany. As Deredzai & Goronga [89] suggested, these findings indicate the need for policies that facilitate student mobility and international institutional collaboration.

Country-specific regression estimates provide valuable comparative insights, demonstrating that, while certain variables consistently affect education quality across nations, their relative importance varies significantly by country. In Kazakhstan, academic freedom tends to have a negative effect, while public education investment and student mobility enhance the quality of higher education. These cross-national comparisons, aligned with findings from Broschek [12] and Baker [2], demonstrate that each jurisdiction requires tailored legal and policy adjustments to reflect its specific environment.

The LEGAF-EDU Framework proposed in this study offers a comprehensive approach to address the identified challenges by integrating legal protections, governance reforms, institutional autonomy, and sustainable funding mechanisms. This framework, responding to Wu & Liu's [19] call for multifaceted approaches to higher education development, provides a structured yet adaptable model for higher education governance that balances regulatory oversight with institutional flexibility, addressing the specific needs of Kazakhstan's higher education sector.

6-1- Theoretical Contributions

This study advances economic development, legal regulation, and higher education governance by revealing the links between institutional autonomy, academic excellence, legal frameworks, and financial investments. One significant theoretical contribution is the refinement of legal-institutional conceptions of higher education management [90]. According to Bhatt [91], traditional theories of governance frequently perceive state control and institutional autonomy to be diametrically antagonistic. By contrast, this study disproves dualism by demonstrating that the highest achievements in higher education are obtained under a structured regulatory framework, whereby legal limits offer monitoring while also providing operational independence. By advocating for a "regulated autonomy" model, this sophisticated position extends to theories of institutional governance; under this model, universities maintain their autonomy in making choices, but they do so within a legal framework that assures accountability and efficiency.

This study promotes both the public investment and human capital theories. Existing economic theory suggests that public education and R&D expenditures boost GDP and human capital [92]. Although there is much evidence relating

the two, this study contributes to the theoretical body of knowledge by demonstrating that monetary inputs are not enough; institutional processes and legal frameworks also matter and mix legal and financial views to underline the conditional character of financial investments in higher education quality, contributing to educational economics theory. The conclusion is that governance quality moderates the relationship between financial resources, while academic achievement advances the comprehension of education financing.

Institutional autonomy boosts academic performance, creativity, and research [41]. This study reveals that, although university autonomy promotes higher education in the long run, it may produce governance inefficiencies in the short term without regulatory control. This study distinguishes "productive autonomy" from "unregulated autonomy," refining existing views by showing that autonomy is only helpful in effective governance mechanisms. This work is important for legal scholars and politicians in balancing regulatory power with institutional independence.

This study contributes to academic freedom by showing that it may harm the quality of higher education in particular cases. According to this research, excessive or unregulated academic freedom may lower academic quality in environments with inadequate institutional controls. This contradicts the view that increasing academic independence is crucial for intellectual growth and creativity [93]. This finding challenges the idea that academic freedom is naturally desirable by providing a framework in which structured legal protections may ensure that institutional and national educational aims apply to academic freedom. This theoretical enhancement contributes to legal arguments concerning the bounds of university academic freedom. This study focused on student mobility concepts in internationalizing higher education by showing how international student exchanges consistently improve higher education. This legal and institutional analysis suggests that national regulatory frameworks should facilitate student mobility to maximize knowledge transfer and cross-cultural learning [94]. This study shows that student mobility positively affects governance frameworks, supporting the premise that international academic collaboration drives educational excellence and globalization in higher education.

The study shows that governance issues affect countries differently [95], which helps compare education theories. Academic quality depends on legal and regulatory strength, public money, and institutional autonomy, although their effects vary by country [96]. This shows that national regulatory frameworks and governance traditions affect higher education governance in distinct institutional and legal circumstances. Comparative legal analysis enhances higher education governance by supporting country-specific policy frameworks.

6-2- Practical Implications

Government officials, university administrators, and legal scholars who want to improve higher education may find this scholarly discourse helpful in policy formulation. As strict legal rules improve higher education quality, well-organized regulatory frameworks that supervise while allowing operational independence are needed [97]. Regulatory bodies and governments should create balanced laws to support institutional autonomy, transparency, and accountability rather than rigid control tactics. Thus, educational institutions may stimulate innovation while meeting public needs and national development goals, which will help countries enhance their higher education systems and compete globally.

According to this study, public education expenditure and R&D investment aim to improve the quality of higher education. According to Ansari et al. [98], governments should realize that financial resources are crucial, but most effective, when directed by a regulated and strategic framework. Policymakers can ensure that publicly financed universities are appropriately enhanced and used by stressing transparency, performance-based funding, and institutional accountability. By integrating financial spending with governance improvements, nations can boost innovation, research productivity, and academic quality.

University autonomy is also crucial to higher education quality. More autonomy enhances academic creativity and institutional efficiency; however, this study shows that unregulated institutions may have governance concerns and inefficiencies. Therefore, educational authorities must create policies that allow colleges and universities to exercise strategic autonomy while meeting national educational objectives. Quality assurance, performance assessment, and legal protection may help organizations balance their autonomy and responsibility [99].

Academic freedom outcomes also affect university regulation. Academic freedom is important for critical thinking and the growth of knowledge. However, this research shows that unrestricted academic freedom may lower the quality of education. Gibbs et al. [100] stated that institutions and politicians balance academic freedom with a clear legal framework. To ensure that academic freedom improves higher education, policy must foster responsible academic discourse, protect intellectual diversity, and prohibit misuse.

This study also suggests that student mobility may boost higher education. Universities and governments should create regulations that simplify international academic exchange programs for students to promote international collaboration, cultural diversity, and knowledge sharing [101]. This requires improving the credit transfer methods, streamlining immigration, and building relationships with international institutions. Encouraging student mobility may make universities vibrant. Students will learn about varied viewpoints and global best practices to improve their academic achievement and employment.

6-3- Limitations and Recommendations for Future Studies

This study illustrates the link between legislative rules, financial investments, institutional autonomy, and higher education quality, but it has limitations. Although strong in capturing cross-country changes, panel data may not completely account for contextual differences in legal frameworks and governance systems between countries. The qualitative study may reveal more about the historical, political, and cultural circumstances of legal and higher education policies. Qualitative legal analyses, such as case law reviews, policy evaluations, and expert interviews, can augment empirical data to better understand how legal and financial dynamics affect higher education outcomes.

This study focuses on national legal and financial issues, without examining intra-country differences. Higher education governance is decentralized in large federal systems, such as the US or Germany, with state or regional differences. Future research should examine subnational governance models to determine whether different regulatory and financial systems in the same country affect higher education quality differently. A multilevel governance strategy would help to understand how local legal frameworks and national policies affect institutional performance.

The study does not fully examine how Kazakhstan's unique post-Soviet political structures, cultural attitudes toward authority, and institutional readiness would distinctively shape the implementation of university autonomy compared to Western models, which represents an important area for future research.

The study uses robust econometric methods such as panel ARDL and robust least squares regression. However, it does not clearly show how legislative laws and budgetary inputs affect higher-education quality. For more reliable causal linkages, future research should use difference-in-differences (DID) estimations, instrumental variable (IV) methodologies, or structural equation modeling (SEM). Experimental or quasi-experimental research may strengthen the evidence base, particularly in terms of legal and regulatory changes.

Another limitation is the study's focus on legal regulatory strength, academic freedom, public education expenditure, university autonomy, research and development expenditure, and student mobility. These characteristics are crucial for understanding higher education governance; however, additional studies are needed. Faculty governance structures, intellectual property rights in academia, digital transformation, and AI-powered teaching technologies can help explain how higher education quality is affected. The study area should be increased to include these issues in future research.

The study solely examines financial and legal factors, not demographic and social factors that impact higher education quality. Teacher diversity, gender inclusion, and students' socioeconomic background may significantly impact academic performance [102]. Future research should integrate sociocultural issues with financial and legal analyses to better understand the quality of higher education.

The study only examined a few countries; therefore, the results may not be generalizable. This study benefits from covering Kazakhstan, the US, the UK, Germany, and France, but future research should include other countries and emerging economies with different financial and legal systems. Comparing industrialized and developing nations' legal systems may guide us in adapting financial and regulatory rules to different economic scenarios [103].

6-4- Practical Implementation of the LEGAF-EDU Framework in Kazakhstan: Opportunities and Challenges

Kazakhstan's universities are strengthened by the LEGAF-EDU Framework, which simplifies institutional, financial, and legal issues. The framework recognizes that high-quality higher education requires long-term finance, independent institutions, competent governance, and strong laws. This method can assist Kazakhstan in overcoming policy challenges and implementing international university standards. A more competitive and innovative global higher education ecosystem may be accomplished by implementing the multidimensional strategy of the LEGAF-EDU Framework, which assures financial sustainability, academic autonomy, efficient governance, and legal stability.

Strengthening legislative regulations may help establish a more transparent and predictable academic governance framework that eliminates disparities and ensures excellence. Transparent laws protect academic integrity, administrative efficiency, and institutional rights. Better decision-making procedures in academic institutions would reduce bureaucratic inefficiencies and increase accountability and transparency. Giving universities greater independence within the framework encourages them to choose their research goals, strategic objectives, and courses of study without government interference. Owing to autonomy and governance, institutions can quickly adjust to higher education and research development.

Financial sustainability transcends the LEGAF-EDU Framework. Public education, research, and development may improve faculties, research output, and infrastructure. Well-funded universities foster innovation, attract teachers, and retain talented students. This method promotes student mobility, raises Kazakhstan's institutions' worldwide understanding, and simplifies information sharing and collaboration. Kazakhstan may dominate Central Asia intellectually if it has strong ties to top universities.

However, the LEGAF-EDU Framework may face significant challenges. Too many legislative restrictions may limit the institutional flexibility. The legal framework must be strict yet flexible to encourage innovation. Universities that are too restricted and unable to make strategic decisions may innovate less. Budget constraints make public education and R&D financing more difficult. Long-term financing for higher education in a resource-dependent economy may be problematic, particularly during imperfect economic times.

Accountability is required even with great institutional autonomy. Excessive autonomy without control may lower the academic and administrative quality of institutions. Higher educational achievement may vary if certain institutions cannot manage to increase autonomy. Student mobility requires administrative help from overseas students, language training programs, and globally accepted credit transfer systems. Institutional backing is crucial for mobility programs. Politicians' reluctance to reorganize universities and desire a more centralized government may hinder the implementation of LEGAF-EDU. Government agencies, educators, and administrators may require considerable capacity to adapt to this new paradigm.

Despite these challenges, the LEGAF-EDU Framework aims to modernize Kazakhstan's educational institutions. This method can increase educational quality and international competitiveness by combining financial sustainability, institutional autonomy, competent governance, and legal stability. If prepared, Kazakhstan's universities could be the most inventive and successful. To maximize its benefits, the government should take time to adapt its policy depending on the results. Kazakhstan may become a global higher education player due to the LEGAF-EDU Framework, which balances regulatory rigor with institutional flexibility and fosters academic growth.

6-5-Scientific Novelty of Results

Higher education quality is measured by legislative rigor, public education financing, university autonomy, academic freedom, student mobility, and R&D spending. EGAF-EDU, the research model, accommodates the complexity of higher education administration. Panel ARDL estimation and robust least-squares regression on a national scale enhance cross-sectional investigations. This adds richness to short- and long-term processes.

Empirical evidence of governance aspects' long-term cointegration with education excellence advances academic discussion. This emphasizes the importance of legal and financial processes in higher education. The study also shows that legal regulation may benefit higher education, but too much control might hinder autonomy-driven academic accomplishments. The data on student mobility illustrate the role of globalization in educational achievement and demonstrate the global interconnection of educational systems.

This result advances the theory by combining legal studies with educational policy analyses. This adds to institutional governance knowledge by illustrating how financial and legal instruments, mobility, and autonomy affect educational quality. EGAF-EDU offers legislators an evidence-based, governance-oriented approach to higher education reform by presenting a new strategy for academic excellence via a balance of regulation, autonomy, and financing.

7- Conclusion

This study examines the impact of state-legal regulations on Kazakhstan's higher education system. The results show that strong legal frameworks promote institutional performance and that their effectiveness is determined by the balance between state monitoring and institutional autonomy. Panel ARDL analysis confirms that robust legal regulation, public education funding, R&D investments, and student mobility enhance higher education quality in the long term [104], while academic freedom and university autonomy yield varying effects across nations.

In Kazakhstan, academic independence negatively impacts higher education quality, while public education investment and student mobility are beneficial. Country-specific analyses reveal diverse patterns: U.S. universities benefit from strict government control but struggle with excessive flexibility and public funding; UK higher education improves with R&D investment but suffers from too much autonomy; Germany shows complex challenges with legal regulation and funding; and France benefits from university autonomy and student mobility, while excessive legislative control proves detrimental.

The innovative LEGAF-EDU Framework addresses Kazakhstan's higher-education challenges by enhancing financial sustainability, institutional autonomy, legal oversight, and student mobility. This approach creates a balanced regulatory environment that promotes university growth, while maintaining accountability. Kazakhstan's universities require a legal framework that balances structured autonomy with government oversight to improve governance and competitiveness.

By implementing the LEGAF-EDU Framework, Kazakhstan's policymakers could strengthen university governance and enhance the impact of higher education on national and international education. This reform strategy balances regulatory control with institutional freedom, positioning Kazakhstan's universities to improve their performance in the global educational landscape.

8- Declarations

8-1-Author Contributions

8-2- Data Availability Statement

The data presented in this study are available on request from the corresponding author.

8-3- Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

8-4- Institutional Review Board Statement

Not applicable.

8-5- Informed Consent Statement

Not applicable.

8-6- Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript. In addition, the ethical issues, including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancies have been completely observed by the authors.

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