

IRSTI 14.01.11

<https://doi.org/10.26577/JES88320261>

A. Zhidebekkyzy* , **R. Kudaibergenova** ,
A. Yessengaliyeva 

Almaty Management University, Almaty, Kazakhstan

*e-mail: a.zhidebekkyzy@almau.edu.kz

NATIONAL HIGHER EDUCATION STRATEGIES: CONCEPTUAL FOUNDATIONS, STRATEGIC ARCHITECTURES, AND INTERNATIONAL PRACTICES

National strategies have become important instruments for aligning higher education with long-term economic, technological, and social priorities, yet comparative studies often examine governance, funding, quality assurance, and internationalization separately. This study compares the conceptual and legislative foundations, recurring structural elements, and coordination mechanisms of national higher education strategies and identifies potentially relevant lessons for Kazakhstan. Its scientific contribution lies in treating national strategy as an integrated system of goals, instruments, responsibilities, and feedback mechanisms, while its practical value lies in providing comparative evidence for future strategic planning. The study employs a qualitative comparative design combining benchmarking, document analysis, and cross-case synthesis of more than 50 policy and analytical documents from Austria, Germany, India, China, Norway, Finland, Estonia, and South Korea. The findings show convergence in viewing higher education as an instrument of national development, alongside differences in legal codification, governance, and the balance between state steering and institutional autonomy. Despite the absence of a universal model, the strategies display a recurring three-layer architecture and four coordination configurations. The study concludes that strategic effectiveness depends less on adopting individual instruments than on their coordination, compatibility, and capacity for revision. The findings may be useful in future revisions of Kazakhstan's higher education strategy and its implementation mechanisms.

Keywords: higher education strategy, comparative analysis, benchmarking, higher education governance, strategic planning, Kazakhstan.

А. Жидебекқызы*, Р.Е. Кудайбергенова, А.К. Есенғалиева

Алматы Менеджмент Университеті, Алматы, Қазақстан

*e-mail: a.zhidebekkyzy@almau.edu.kz

**Жоғары білім беруді дамытудың ұлттық стратегиялары:
тұжырымдамалық негіздер, стратегиялық архитектуралар
және халықаралық тәжірибе**

Ұлттық стратегиялар жоғары білім беруді ұзақ мерзімді экономикалық, технологиялық және әлеуметтік басымдықтармен үйлестірудің маңызды құралына айналды, алайда салыстырмалы зерттеулерде басқару, қаржыландыру, сапаны қамтамасыз ету және интернационалдандыру мәселелері көбінесе жеке-жеке қарастырылады. Бұл зерттеуде жоғары білім беруді дамытудың ұлттық стратегияларының тұжырымдамалық және заңнамалық негіздері, қайталанатын құрылымдық элементтері мен үйлестіру тетіктері салыстырылып, Қазақстанның жоғары білім беру саясатын жетілдіруге қатысты ықтимал қорытындылар айқындалады. Жұмыстың ғылыми үлесі ұлттық стратегияны мақсаттардың, құралдардың, жауапкершілік аялары мен кері байланыс тетіктерінің біртұтас жүйесі ретінде қарастыруында; практикалық құндылығы болашақ стратегиялық жоспарлау үшін салыстырмалы талдау нәтижелерін ұсынуында. Зерттеу бенчмаркингті, құжаттарды талдауды және елдер бойынша салыстырмалы синтезді ұштастыратын сапалық салыстырмалы дизайн негізінде жүргізілді. Эмпирикалық база Аустрия, Германия, Үндістан, Қытай, Норвегия, Финляндия, Эстония және Оңтүстік Кореяның 50-ден астам мемлекеттік саясат құжаты мен талдамалық материалын қамтыды. Нәтижелер елдердің жоғары білім беруді ұлттық дамудың құралы ретінде түсінуде жақындасқанын, алайда құқықтық бекіту, басқару және мемлекеттік реттеу мен институционалдық дербестік арасындағы тепе-теңдік бойынша айырмашылықтар сақталғанын көрсетеді. Әмбебап модельдің болмауына қарамастан, стратегияларда ортақ үш деңгейлі құрылым мен үйлестірудің төрт конфигурациясы байқалады. Зерттеу стратегияның тиімділігі жекелеген құралдарды енгізуден гөрі олардың үйлестірілуіне, өзара үйлесімділігіне және қайта қарау мүмкіндігіне тәуелді деген қорытындыға келеді. Алынған нәтижелер

Қазақстанның жоғары білім беруді дамыту стратегиясын және оны іске асыру тетіктерін жетілдіру барысында пайдаланылуы мүмкін.

Түйін сөздер: жоғары білім беруді дамыту стратегиясы, салыстырмалы талдау, бенчмаркинг, жоғары білім беруді басқару, стратегиялық жоспарлау, Қазақстан.

А. Жидебеккызы*, Р.Е. Кудайбергенова, А.К. Есенғалиева

Алматы Менеджмент Университет, Алматы, Қазақстан

*e-mail: a.zhidebekkyzy@almau.edu.kz

**Национальные стратегии развития высшего образования:
концептуальные основы, стратегические архитектуры
и международная практика**

Национальные стратегии стали важным инструментом согласования высшего образования с долгосрочными экономическими, технологическими и социальными приоритетами, однако в сравнительных исследованиях управление, финансирование, обеспечение качества и интернационализация нередко рассматриваются по отдельности. В настоящем исследовании сопоставляются концептуальные и законодательные основы, повторяющиеся структурные элементы и механизмы координации национальных стратегий развития высшего образования, а также выявляются выводы, потенциально полезные для развития высшего образования в Казахстане. Научный вклад работы состоит в рассмотрении национальной стратегии как целостной системы целей, инструментов, зон ответственности и механизмов обратной связи; практическая ценность заключается в формировании сравнительной основы для дальнейшего стратегического планирования. Исследование выполнено в рамках качественного сравнительного дизайна, сочетающего бенчмаркинг, анализ документов и междустрановой синтез более 50 документов государственной политики и аналитических материалов Австрии, Германии, Индии, Китая, Норвегии, Финляндии, Эстонии и Южной Кореи. Результаты показывают сближение стран в понимании высшего образования как инструмента национального развития при сохранении различий в правовом закреплении, управлении и балансе между государственным управлением и институциональной автономией. Несмотря на отсутствие универсальной модели, стратегии имеют общую трехуровневую структуру и образуют четыре конфигурации координации. Исследование приводит к выводу, что эффективность стратегии определяется не столько внедрением отдельных инструментов, сколько их координацией, взаимной согласованностью и возможностью пересмотра. Полученные результаты могут быть учтены при дальнейшей доработке стратегии развития высшего образования Казахстана и реализации.

Ключевые слова: стратегия развития высшего образования, сравнительный анализ, бенчмаркинг, управление высшим образованием, стратегическое планирование, Казахстан.

Introduction

The transformation of higher education into a key driver of national competitiveness and social development has reshaped the role of strategic planning in university governance. Over the past three decades, governments worldwide have increasingly moved from episodic interventions to comprehensive, multi-year strategies aligning institutional development with broader societal goals. This shift reflects the growing recognition that, in a knowledge-intensive global economy, competitiveness depends increasingly on knowledge production, with universities central to human capital formation and research generation (Altbach et al., 2009). Intensifying competition for talent and research capacity has further strengthened the case for active governmental steering of higher education systems (Salmi, 2009).

The pressures behind this strategic turn are well documented. Global university rankings, introduced in the early-to-mid 2000s, intensified competition and encouraged governments to adopt explicit strategies to improve the international position of their systems (Hazelkorn, 2015). The Bologna Process institutionalized cross-national coordination in quality assurance and accreditation across Europe, serving as both a reference model and a catalyst for national reform agendas (Westerheijden et al., 2007). At the same time, the OECD, World Bank, and UNESCO expanded comparative data collection and assessment, raising the importance of international system comparability on national policy agendas (Altbach et al., 2009). More recently, the shift to remote teaching during the COVID-19 pandemic exposed and deepened existing digital inequalities, including unequal access to devices, connectivity, and institutional response capacity (Czerniewicz et al., 2020),

while the rapid spread of artificial intelligence has introduced new pedagogical, ethical, and governance challenges that policy and research are only beginning to address (Zawacki-Richter et al., 2019).

Comparative research shows that higher education systems often adopt similar governance instruments, yet implementation and outcomes differ because reforms are shaped by national institutional contexts. It also identifies three central dimensions of system development: the balance between excellence and system-wide capacity, resource distribution, and the integration of internationalization into national strategy. Despite this, comparative studies often examine governance, funding, quality assurance, and internationalization separately rather than analyzing how countries combine them into coherent strategic architectures. Recent work on higher education in national AI strategies follows the same pattern, treating AI as a specialized domain instead of an integrated policy component (Pedró & Mendigutxia, 2025). Comparative research also remains regionally selective and rarely covers typologically diverse systems (Kapfudzaruwa, 2025). In practice, coherent strategic management is further complicated by the need to align priorities within higher education, across related policy domains, and between governance levels (OECD, 2025). These gaps support the need for typologically diverse cross-national analysis of higher and postgraduate education strategies as integrated policy systems.

The present study addresses these gaps through a benchmarking-based comparative analysis of national strategies for developing higher and postgraduate education across eight countries. Three research questions guide the inquiry:

RQ1. What conceptual and legislative foundations underpin national higher education strategies, and how do they differ across countries?

RQ2. What structural elements recur across national strategic architectures, and how are these elements configured and coordinated across different higher education systems?

RQ3. What potentially relevant policy lessons can be derived for the further development of Kazakhstan's higher education strategy?

Literature review

The application of strategic planning theory to national higher education systems builds on scholarship originating in organizational and public management. Bryson (2011) defines strategy as a pattern of purposes, policies, programs, decisions, and re-

source allocations that explains what an organization is, what it does, and why. At the national level, this logic applies to higher education systems coordinated through legislation, public funding, regulation, and agreements with institutions. Yet public-sector strategy is not merely a technical planning exercise. Stewart (2004) argues that it combines political, policy, and managerial dimensions and depends on sustained interaction between political and administrative leadership. In higher education, this coordination is especially complex because state priorities must coexist with institutional autonomy, academic freedom, and differentiated university missions.

Comparative research identifies several structural forces shaping national development trajectories. Altbach et al. (2009) highlight massification, quality assurance, privatization, and internationalization as major trends affecting systems across regions. These pressures have expanded participation, intensified demands for accountability, diversified providers and funding sources, and increased cross-border competition. Global rankings have added a further competitive dimension. Hazelkorn (2015) shows that rankings increasingly influence policy priorities, institutional positioning, recruitment, and resource allocation, encouraging governments and universities to orient decisions toward measurable international performance. At the system level, rankings are also used to assess national competitive positioning and inform higher education management, although their methodological limitations require cautious interpretation (Antoniuk et al., 2019). While rankings may support visibility and benchmarking, they can also narrow strategic priorities when their indicators are treated as proxies for broader educational quality or public value.

Common pressures, however, do not produce uniform systems. Formal instruments of higher education governance have converged across countries with different institutional traditions and developmental contexts, yet this convergence coexists with persistent divergence in implementation and outcomes. National systems absorb shared reform pressures unevenly and translate formally similar arrangements into different practices (Dobbins et al., 2011; Dobbins & Knill, 2017). This distinction shifts comparative attention from whether countries adopt similar instruments to how those instruments operate within particular institutional settings.

Quality assurance and funding illustrate this pattern. Westerheijden et al. (2007) show that external quality assurance regimes are interpreted and transformed as they move across national systems; similar

agencies, procedures, or standards may therefore perform different functions under different governance traditions. Funding arrangements display comparable variation. Jongbloed and Vossensteyn (2016) identify broad movements toward increased cost sharing and performance-based funding, while showing that systems still differ in output orientation, centralization, and the balance between negotiated and formula-based allocation. These mechanisms are not merely administrative tools: they shape institutional incentives, redistribute authority, and translate national priorities into organizational behavior.

The literature on excellence initiatives further demonstrates the strategic effects of resource allocation. Such initiatives seek to strengthen research capacity and international visibility by concentrating funding and prestige in selected universities, centers, or research groups (Kudaibergenova et al., 2025; Zhidebekkyzy et al., 2026). Langfeldt et al. (2015), examining centers of excellence in four Nordic countries, identified a modified Matthew effect: selected groups gain additional resources, reputation, and visibility, but scheme design can prevent the accumulation of unlimited cumulative advantage. Civera et al. (2020) show that Germany's Excellence Initiative increased research output more clearly than research quality, revealing possible misalignment between quantitative incentives and qualitative goals. Yudkevich et al. (2023), comparing initiatives across nine countries, similarly identify tensions between short-term output indicators, international competitiveness, institutional differentiation, and long-term capacity development. Excellence policies may therefore accelerate performance in selected parts of a system while creating trade-offs between concentration and balanced national development.

Internationalization constitutes another major dimension of national strategy. Knight (2004) defines it as the integration of international, intercultural, or global dimensions into the purposes, functions, and delivery of postsecondary education. This moves internationalization beyond student mobility, treating it as a system-wide process that affects teaching, research, governance, and institutional positioning. It has consequently become a structural rather than optional component of strategy, with institutional plans increasingly expected to align with national priorities (Verbytska & Kholiavko, 2020). Tamtik and Kirss (2016) show how Estonia institutionalized internationalization through successive measurable strategies, illustrating the importance of continuity, coordination, and monitoring. Kapfudzaruwa (2025), analyzing 366 policy documents

from 27 countries, finds that socio-economic rationales dominate across the Global North and South, although they reflect different national priorities; political rationales associated with diplomacy and soft power are also becoming more visible.

Overall, literature identifies governance, funding, quality assurance, excellence policies, rankings, and internationalization as central dimensions of national higher education development. Yet these dimensions are commonly examined separately, whereas national strategies combine them within a single architecture of goals, instruments, responsibilities, resources, and monitoring mechanisms. Less attention has therefore been paid to how these elements are configured and coordinated across systems and to the conditions under which strategic arrangements can be adapted across institutional contexts. This gap requires comparison not only of policy priorities but also of the internal structure and contextual logic of national higher education strategies.

Materials and methods

This study employs a qualitative comparative design combining benchmarking, document analysis, and cross-case synthesis. Benchmarking is used not as a means of ranking countries, but as a structured comparison of policy arrangements, development trajectories, and potentially relevant practices across national higher education systems (Williams, 2018; OECD, 2019; Nugroho & Jaqin, 2021). Document analysis enables the systematic examination of policy texts and the identification of recurring concepts, institutional arrangements, and implementation mechanisms (Bowen, 2009).

The study covers Austria, Germany, India, China, Norway, Finland, Estonia, and South Korea. The cases were purposively selected to represent different regions, governance traditions, system sizes, development trajectories, and approaches to state steering, while also demonstrating sustained policy activity in higher education reform. This variation makes it possible to compare alternative strategic configurations.

Data collection and analysis were conducted between October 2025 and February 2026. The empirical corpus comprised more than 50 documents from three groups of sources:

- (1) national legislation, strategies, policy programs, implementation plans, and materials published by responsible ministries and public agencies;
- (2) analytical reports issued by the OECD, World Bank, European Commission, and UNESCO; and

(3) peer-reviewed studies and academic reviews used to contextualize and verify the interpretation of official documents. Documents were included if they directly addressed the strategic development of higher or postgraduate education and provided information on policy priorities, governance, implementation, or monitoring. Priority was given to authoritative and recent versions available during the data-collection period. The principal documents are listed in Appendix A.

The documents were manually reviewed using a structured analytical framework derived from the research questions. Relevant information was extracted on conceptual and legislative foundations, strategic priorities, governance and coordination mechanisms, funding arrangements, quality assurance, research and innovation, digitalization, internationalization, access and inclusion, implementation instruments, and monitoring practices. The findings were organized in country-level comparison matrices and then compared across cases to identify recurring strategic elements, differences in their configuration, and practices potentially relevant to Kazakhstan. Interpretations of official documents were cross-checked against international reports and peer-reviewed studies.

Results

Conceptual and Legislative Foundations of National Higher Education Strategies

The comparative analysis shows that all eight countries treat higher and postgraduate education as a strategic component of national development. Across the cases, higher education is framed as an integrated system that links teaching, research, innovation, labor market development, international competitiveness, and broader social goals. Nevertheless, the conceptual foundations differ in the relative emphasis placed on public value, institutional autonomy, economic modernization, technological sovereignty, and global positioning.

Austria, Finland, and Norway represent autonomy-based and publicly steered models. Their strategies conceptualize universities as self-governing institutions with substantial academic and managerial freedom, while the state retains responsibility for system-wide coordination, quality assurance, and the allocation of public resources. This balance is embedded in framework legislation, including Austria's Universities Act 2002, Finland's Universities Act 2009 and Universities of Applied Sciences Act 2014, and Norway's Universities and University Colleges Act 2024. The Austrian case illustrates

how far this codification extends: the Universities Act 2002 converted public universities from federal agencies into independent legal entities and, at the same time, institutionalized three-year performance agreements between each university and the ministry – embedding the steering mechanism itself, not only institutional autonomy, in framework legislation (Republic of Austria, 2002; Federal Ministry of Education, Science and Research of Austria, 2018). These laws are supplemented by national plans and policy papers that connect institutional autonomy with public accountability, social inclusion, research quality, and long-term national priorities. Estonia follows a related model but adds a stronger digital and evidence-informed orientation. Its Higher Education Act and Education Strategy 2021–2035 combine university autonomy with performance-based accountability, lifelong learning, labor-market relevance, digital transformation, and the protection of national language and culture (Ministry of Education and Research of Estonia, 2021).

Germany differs because its legislative and strategic architecture is shaped by federalism. Responsibility for higher education primarily lies with the *Länder*, each of which has its own legal framework, while nationwide priorities are coordinated through federal-state agreements, joint programs, and the Standing Conference of the Ministers of Education and Cultural Affairs (KMK, n.d.). Consequently, Germany does not rely on a single comprehensive national higher education strategy; instead, its strategic direction emerges from negotiated coordination across levels of government. Federal-state negotiation thus produces a coherent, plural framework centered on academic freedom, quality, access, research excellence, and internationalization (BMBF & KMK, 2024).

India, China, and South Korea exhibit more explicitly developmental approaches. India's National Education Policy 2020 provides a comprehensive reform vision centered on mass access, multidisciplinary learning, digital public infrastructure, research capacity, and "light but tight" regulation (Government of India, 2020). China combines foundational education laws with long-term state plans, including Education Modernization 2035 and the Double First-Class initiative. Its conceptual logic places higher education within national modernization, scientific and technological advancement, and the transition from a large to a globally strong education system (State Council of the People's Republic of China, 2019; Feng et al., 2024). South Korea relies on the Framework Act on Education and the Higher Education Act but operationalizes strategy through successive national programs (KLRI,

2023a; KLRI, 2023b). Its model is built around human-capital development, research competitiveness, regional innovation, and institutionalized university-industry-government cooperation.

Overall, the cases converge on an integrated view of higher education as an instrument of national development but differ along two dimensions: the balance between state direction and institutional self-governance, and the breadth of codification – a single comprehensive strategy versus a coordinated portfolio of sectoral strategies and programs.

Recurring Elements and Configurations of National Strategic Architectures

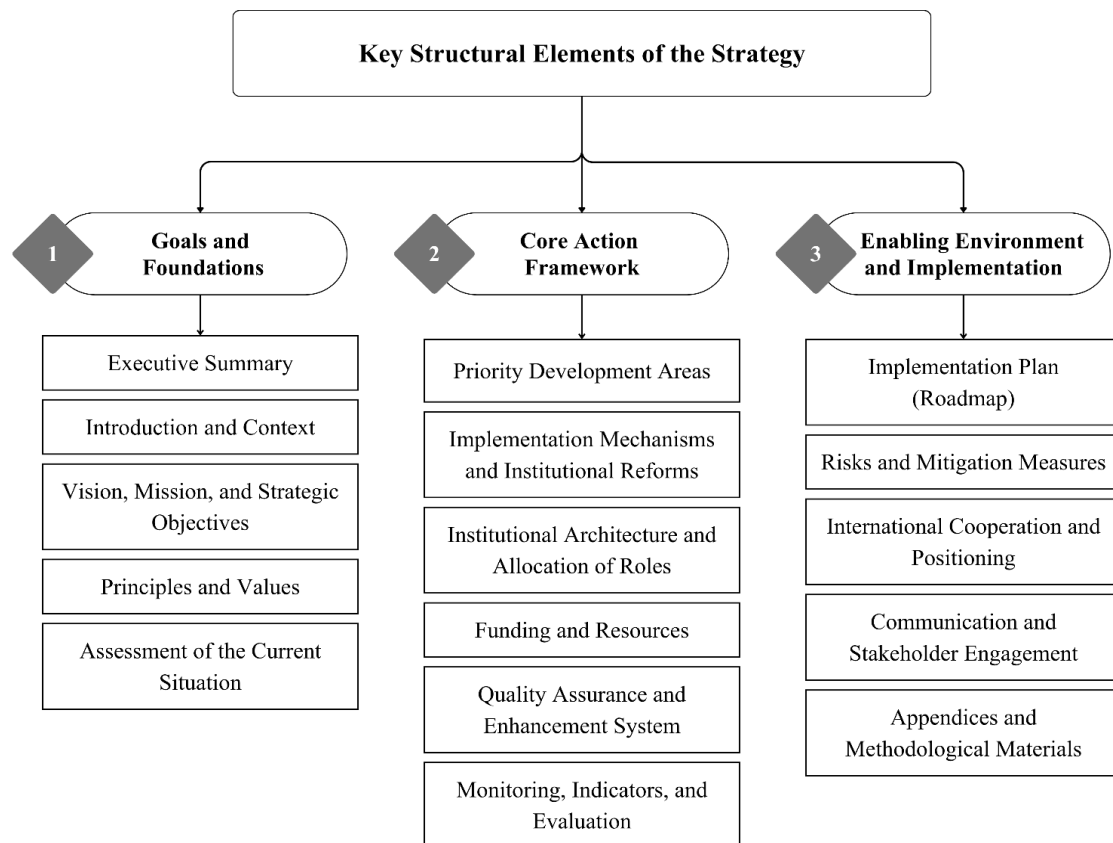
The comparative analysis revealed no single standardized model of national higher education strategy. It nevertheless identified a recurring strategic architecture through which countries connect long-term policy objectives with implementation

instruments, institutional responsibilities, resource allocation, and mechanisms for evaluating progress. Drawing on broader international experience and the country cases reviewed, national higher education strategies typically include three interrelated layers. The first defines the policy context, mission, values, and long-term goals; the second specifies priorities, reforms, institutional responsibilities, funding, quality assurance, and monitoring; and the third supports implementation through roadmaps, stakeholder participation, risk management, international cooperation, and related instruments. Figure 1 summarizes these commonly observed elements.

Table 1 translates the comparative findings into an analytical results-chain framework. The model distinguishes policy diagnosis and goal setting from inputs, implementation activities, outputs, wider outcomes, and subsequent policy adjustment.

Figure 1

Recurring elements of national strategic architectures for higher education



Source: Authors' synthesis based on comparative analysis

Table 1*Logical Framework for a National Strategy for the Development of Higher and Postgraduate Education*

Component	Description
Policy review, needs assessment, and problem identification	Identification of socio-economic challenges, labor-market needs, and national priorities. Formulation of strategic objectives, expected results, and target groups.
Inputs and activities	Development of the institutional, human-resource, financial, and regulatory foundations required for implementation. Launch and implementation of reforms related to institutional autonomy, digitalization, internationalization, research development, and other strategic priorities.
Immediate outputs	Delivery of educational programs and services and preparation of qualified graduates. Production of research publications, implementation of innovation projects, and development of cooperation with industry and regional stakeholders.
Outcomes and broader impact	Improvement in educational quality, graduate employment, productivity, and economic innovation. Growth in human capital, social cohesion, sustainable development, and the international competitiveness of the national higher education system.
Monitoring and evaluation mechanisms	Development of key performance indicators at each level of the results chain: inputs → activities → outputs → outcomes and impact. Application of the Plan–Do–Check–Act (PDCA) cycle and Results-Based Management (RBM) principles.
Key areas of strategic focus	Quality of teaching and learning; research and innovation; employability and skills development; internationalization and partnerships; access and inclusion; governance and financing.

Source: Authors' synthesis based on comparative analysis

The comparison further shows that the same elements are combined through different coordination configurations. The first configuration is negotiated contractual steering, most visible in Austria, Finland, and Norway. Ministries establish system-wide objectives but negotiate institution-specific commitments with universities through multi-year performance agreements, funding negotiations, and structured strategic dialogue. These mechanisms support institutional differentiation and, in several cases, connect public funding to agreed objectives. Accountability is therefore relational: universities retain discretion over implementation, while governments monitor whether institutional development remains aligned with national priorities (Federal Ministry of Education, Science and Research of Austria, 2018; OECD, 2023; Ministry of Education and Research of Norway, 2023).

The second is federal–contractual coordination, represented by Germany. Because the *Länder* hold major constitutional responsibilities for higher education, national priorities cannot be implemented solely through a centralized ministerial hierarchy. Coordination instead relies on federal–*Länder* agreements, joint funding programs, standing intergovernmental bodies, and negotiated initiatives such as the Excellence Strategy and programs supporting teaching capacity, internationalization, and research. This architecture is more institutionally dispersed but allows national objectives to be

pursued without displacing regional authority. The transformation of the time-limited Higher Education Pact into the permanent Future Contract further demonstrates that federal–contractual instruments can evolve from temporary co-financing to durable system funding (BMBF & KMK, 2024; DFG, n.d.).

The third configuration is centrally coordinated project-cycle development, especially evident in China and South Korea. China places greater emphasis on long-term central planning, whereas South Korea relies more extensively on successive competitive programs. China's Double First-Class initiative operates through five-year planning and evaluation cycles, in which institutions and disciplines can be added or removed based on evaluation results – a dynamic adjustment feature that distinguishes it from earlier permanent-status excellence schemes (Feng et al., 2024). South Korea's Brain Korea 21 program has used successive seven-year phases, currently BK21 Four (2020–2027), to build postgraduate and research capacity (National Research Foundation of Korea, n.d.; Ministry of Education of the Republic of Korea, 2022). These systems combine broad public investment with selective support for institutions, disciplines, or consortia expected to contribute to technological, industrial, or regional priorities (State Council of the People's Republic of China, 2019).

The fourth is digitally enabled ecosystemic coordination, which is particularly visible in India and

Estonia. India's National Education Policy 2020 combines a broad national policy framework with digital public infrastructure, credit-transfer mechanisms, national platforms, institutional data systems, and regulatory reform; the annual All India Survey on Higher Education and the movement toward integrated "One Nation, One Data" reporting indicate a deliberate effort to make a very large system steerable through unified data flows (Government of India, 2020). Estonia's broader educational trajectory from the Tiger Leap program to AI Leap 2025 illustrates how national digital capacity has been developed cumulatively, with universities increasingly incorporated into the emerging AI and digital-skills ecosystem (Ministry of Education and Research of Estonia, 2021; Education Estonia, 2024; e-Estonia, 2025). In these cases, digital systems do not merely support teaching; they also connect institutions, standardize information flows, increase transparency, and provide data for quality assurance and policy revision.

Consequently, digitalization, artificial intelligence, university–industry cooperation, inclusion, sustainability, and internationalization occupy varying positions within national architectures. They may be formulated as independent strategic priorities, embedded in implementation instruments, or treated as cross-cutting principles affecting all stages of the policy cycle. The central commonality across the cases is therefore not institutional uniformity, but the deliberate integration of objectives, actors, resources, implementation instruments, and feedback mechanisms into a coherent and revisable strategic architecture.

Discussion

The findings provide two interconnected insights into the strategic development of national higher education systems. First, in response to RQ1, the eight countries show substantial convergence in their conceptualizations of higher education. Higher and postgraduate education is no longer treated primarily as a sector that delivers degree programs. It is increasingly positioned within a broader national development system linking human capital formation, research, technological innovation, regional development, social inclusion, and international competitiveness. This reflects a strategic planning perspective in which purposes, policies, programs, decisions, and resource allocation are aligned within an overall direction of development (Bryson, 2011).

However, convergence in policy priorities does not produce uniform governance or implementation. Similar instruments, including performance agreements, competitive funding, quality assurance, digital platforms, and evaluation systems, operate differently depending on national institutions and distributions of authority (Dobbins et al., 2011; Dobbins & Knill, 2017). The relevant question is therefore not which country has the most comprehensive strategy, but whether objectives, responsibilities, resources, and accountability mechanisms form a coherent system.

Regarding RQ2, the comparison identified a recurring strategic architecture despite the absence of a universal model. Across the cases, national strategies perform three broad functions: defining the desired direction of system development, translating priorities into responsibilities and implementation instruments, and establishing mechanisms for monitoring, feedback, and policy adjustment. A national strategy should therefore be understood as more than a policy document or a list of priorities. It is a framework for coordinating interdependent decisions. Its effectiveness depends on whether objectives are connected to institutional mandates, financial resources, quality assurance arrangements, implementation schedules, and measurable outcomes.

This interpretation extends literature that often examines funding, governance, quality assurance, internationalization, and research policy separately. In practice, these instruments are interdependent. Funding influences institutional behavior; quality assurance shapes program development; research policy affects postgraduate training; and internationalization priorities guide recruitment, partnerships, and institutional positioning. The central strategic challenge is therefore one of horizontal and vertical alignment. This includes coordination across policy domains, among governance levels, and between national and institutional strategies. Such alignment becomes particularly important where responsibilities are dispersed across multiple organizations and levels of authority (OECD, 2025).

The four configurations identified in the analysis are negotiated contractual steering, federal contractual coordination, centrally coordinated project cycle development, and digitally enabled ecosystemic coordination. They should not be interpreted as stages of development or as a hierarchy of models. They represent different institutional responses to the same coordination problem. Performance agreements, competitive funding, intergovernmental programs, digital platforms, and evaluation systems are

not inherently effective. Their contribution depends on their compatibility with the wider governance architecture and the incentives they create.

The findings also show that the position of a priority within the strategic architecture matters. Digitalization, internationalization, sustainability, inclusion, and artificial intelligence may be presented as stand-alone initiatives, but they have greater systemic significance when embedded across teaching, research, governance, staff development, financing, and evaluation.

A further cross-cutting issue is the relationship between selective excellence and system-wide capacity. Concentrating resources may strengthen internationally competitive research groups and priority disciplines, but it may also reinforce cumulative advantage and institutional inequality. Excellence initiatives do not automatically improve all dimensions of research quality and may generate tensions between measurable outputs, institutional differentiation, and long-term capacity development (Langfeldt et al., 2015; Civera et al., 2020; Yudkevich et al., 2023). Strategic architecture must therefore address not only beneficiary selection but also periodic reassessment, knowledge diffusion, inter-institutional cooperation, and the wider effects of concentrated investment on regional and teaching-oriented institutions.

Policy implications for Kazakhstan

The third research question concerns potentially relevant policy lessons for Kazakhstan. The Concept for the Development of Higher Education and Science 2023–2029 already contains many elements of the recurring architecture identified above, from a diagnostic baseline and quantified targets to excellence instruments and a smart-university digital agenda (Government of the Republic of Kazakhstan, 2023). The comparative findings point to four priorities in their configuration and coordination.

First, Kazakhstan could move from uniform implementation requirements toward multi-year institutional agreements. National priorities would remain common, while commitments, funding, and indicators would be negotiated according to university mission, regional context, and capacity. This approach, used in Austria, Finland, and Norway, would make autonomy more substantive and allow research-intensive, regional, pedagogical, and industry-oriented universities to demonstrate different forms of public value. This becomes critical as the system absorbs a projected doubling of school leavers by 2029.

Second, the centers of academic excellence could operate as dynamic networks instead of a fixed group of beneficiaries. Entry should be competitive, status time-limited, and continuation dependent on independent review. This would connect concentrated investment with system-wide capacity and reduce permanent institutional stratification.

Third, digital transformation should advance from smart-university infrastructure to a national data and AI governance framework. Building on the country's e-government strengths, a single-entry national data architecture that simultaneously supports accreditation, funding allocation, and monitoring would reduce the institutional reporting burden and enable evidence-based steering.

Fourth, monitoring could be strengthened by adding indicators that are not fully captured in the current framework, including completion gaps, regional graduate retention, doctoral career progression, learning outcomes, and universities' contributions to national priorities. These measures would complement existing review procedures by shifting attention from activity and volume toward longer-term system outcomes. Preparation of the successor strategy should begin before 2029 to ensure policy continuity and adaptation to demographic, technological, and economic change.

Conclusion

This study examined how national strategies organize the development of higher and postgraduate education and what potentially relevant lessons can be derived for Kazakhstan. A qualitative comparative design combining benchmarking, document analysis, and cross-case synthesis was applied to more than 50 policy and analytical documents from eight countries.

The analysis produced three main findings. First, the countries share an increasingly integrated understanding of higher education as part of national development, while differing in the location of strategic authority and the balance between governmental steering and institutional autonomy. Second, despite the absence of a universal model, the strategies exhibit a recurring three-layer architecture that connects long-term direction, implementation arrangements, and enabling mechanisms. These elements are combined through four coordination configurations. Third, Kazakhstan's current Concept already includes most major reform areas, but could be strengthened through mission-differentiated institutional agreements, dynamic excellence

instruments, integrated data and AI governance, and broader outcome-oriented monitoring linked to strategic adjustment.

The central conclusion is that strategic effectiveness depends less on adopting particular instruments than on their configuration, coordination, and capacity for revision. The study contributes to comparative higher education research by providing an integrated analytical basis for assessing strategic coherence. The findings may inform policymakers, higher education authorities, and university leaders seeking to strengthen strategic coherence and align national and institutional priorities. Further research should examine how the identified configurations operate in practice and whether stronger coherence improves implementation and system-level outcomes.

Funding

This research was funded by the Science Committee of the Ministry of Science and Higher Edu-

cation of the Republic of Kazakhstan (Grant No. BR28712521).

Conflict of Interest

The authors declare no conflicts of interest.

Acknowledgements

None

Author contributions

A. Zhidebekkyzy: Conceptualization, Methodology, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review and editing

R. Kudaibergenova: Conceptualization, Validation, Formal analysis, Supervision, Funding acquisition, Writing – original draft, Writing – review and editing

A. Yessengaliyeva: Investigation, Data curation, Visualization, Writing – original draft, Writing – review and editing

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Information about the authors:

Aknur Zhidebekkyzy (corresponding author) – PhD, Associate Professor, Research Professor at the School of Management, Almaty Management University (Almaty, Kazakhstan, e-mail: a.zhidebekkyzy@almai.edu.kz).

Renata Kudaibergenova – Candidate of Historical Sciences, Vice-Rector for Research and Commercialization, Almaty Management University (Almaty, Kazakhstan, e-mail: r.kudaibergenova@almai.edu.kz).

Adina Yessengaliyeva – Senior Lecturer at the School of Management, Almaty Management University (Almaty, Kazakhstan, e-mail: a.yessengaliyeva@almai.edu.kz).

Авторлар туралы мәлімет:

Жидебекқызы Ақнұр (корреспонденттік автор) – PhD, қауымдастырылған профессор, Менеджмент мектебінің зерттеуші-профессоры, Алматы Менеджмент Университеті (Алматы, Қазақстан, e-mail: a.zhidebekkyzy@almai.edu.kz).

Кудайбергенова Рената Еркиновна – тарих ғылымдарының кандидаты, ғылым және коммерцияландыру жөніндегі проректор, Алматы Менеджмент Университеті (Алматы, Қазақстан, e-mail: r.kudaibergenova@almai.edu.kz).

Есенғалиева Адина Қайрлыевна – Менеджмент мектебінің аға оқытушысы, Алматы Менеджмент Университеті (Алматы, Қазақстан, e-mail: a.yessengaliyeva@almai.edu.kz).

Сведения об авторах:

Жидебекқызы Ақнұр (корреспондирующий автор) – PhD, ассоциированный профессор, профессор-исследователь Школы менеджмента, Алматы Менеджмент Университет (Алматы, Казахстан, e-mail: a.zhidebekkyzy@almai.edu.kz).

Кудайбергенова Рената Еркиновна – кандидат исторических наук, проректор по науке и коммерциализации, Алматы Менеджмент Университет (Алматы, Казахстан, e-mail: r.kudaibergenova@almai.edu.kz).

Есенғалиева Адина Қайрлыевна – старший преподаватель Школы менеджмента, Алматы Менеджмент Университет (Алматы, Казахстан, e-mail: a.yessengaliyeva@almai.edu.kz).

Received: 20.07.2026

Accepted: 31.08.2026

APPENDIX A

Comparative overview of key strategic initiatives

Country	Key laws / programs / initiatives	Adoption date / Implementation period	Description and key priorities
Austria	National Development Plan for Public Universities (NDPU)	2019–2024	Development strategy for the public university sector and the basis for performance agreements with universities; sets 8 system goals covering quality of teaching and research, internationalization, digitalization, sustainability and the social mission. Priorities: quality of teaching and science, digital transformation, internationalization, sustainable development, inclusiveness and social responsibility.
	Austrian Action Plan for the European Research Area (ERA-NAP)	2022–2025	National plan implementing ERA policy. Priorities: open science, researcher mobility and careers, digital infrastructures, gender equality, sustainability and digitalization, integration into the ERA, public trust in science and science–society engagement.
	National Mobility & Internationalization Strategy for Higher Education 2020–2030	2020–2030	National mobility and internationalization strategy covering all 4 higher education sectors. Priorities: student and academic mobility (including digital formats), quality, participation in Horizon/ERA, Austria's positioning in the EHEA/ERA and global competitiveness.
	Internationalization of the Higher Education Institutions in Germany: Strategy of the Federal and Länder Ministers of Science (2024–2034)	2024	Joint ten-year strategy of the federal government and the Länder for developing sustainable, digitally enabled international university cooperation and strengthening academic mobility, inclusion and quality of higher education globally. Priorities: international attractiveness, academic mobility, institutional and legal framework conditions, sustainable international cooperation, digitalization and sustainable development.
Germany	Excellence Strategy (ExStra)	2019	Joint federal–Länder program to raise the international competitiveness of German universities by funding selected Clusters of Excellence and Universities of Excellence. Priorities: cutting-edge and interdisciplinary research clusters, stronger university governance and strategic development, sustained advancement of Germany's scientific leadership.
	Future Research and Innovation Strategy	2023	Federal strategy for research and innovation aimed at technological sovereignty, faster knowledge transfer, and a sustainable, digital economy. Priorities: technological and digital sovereignty, transfer and innovation ecosystems, climate and resource sustainability, health and social cohesion, international cooperation.
	National Action Plan for the European Research Area (ERA)	2023	Germany's action plan for developing the European Research Area in 2024–2027, strengthening innovation capacity, scientific excellence and values-based international cooperation within the EU single market for knowledge. Priorities: technological sovereignty and digital transformation, faster knowledge and innovation transfer, open science and researcher mobility, equal opportunities and women's participation, security and freedom of research, international partnerships and the “Team Europe” approach.
India	National Education Policy 2020	29.07.2020	Foundational strategic document setting the course for accessibility, quality, flexible learning pathways, digitalization, AI, a stronger research focus and “light but tight” regulation. Priorities: access and equity, digital transformation, adoption of AI and analytics, flexible pathways and credit transfer, growth of research activity, regulatory reform.
	Anusandhan National Research Foundation Act, 2023 (ANRF)	12.08.2023	Establishes the ANRF as the apex body for strategic governance, funding and coordination of research and innovation, spanning engineering and technology, natural sciences, health, agriculture and other fields. Priorities: strengthening universities' research base, stimulating innovation, coordination and prioritization of research, integration of science and higher education.

Table continued

Country	Key laws / programs / initiatives	Adoption date / Implementation period	Description and key priorities
China	China's Education Modernization 2035	23.02.2019	Long-term strategy for modernizing Chinese education to 2035, aimed at making the country a world-class education power. Priorities: a digital lifelong-learning system, universal high-quality education, competitive higher and vocational education, world-class talent development, effective governance and a learning society.
	World-Class Universities and First-Class Disciplines Plan (Double First-Class)	24.10.2015	National program to build world-class universities and “peak” disciplines, implemented in five-year cycles since 2016 with differentiated support across universities and disciplines. Priorities: discipline-based, performance-oriented funding and evaluation; attracting and training research leaders; strengthening basic and applied research for national needs and technology transfer; governance reform and broader public participation; internationalization; dynamic adjustment based on evaluation results.
	Long-term Plan for Research and Higher Education 2023–2032	2023	Long-term strategic framework integrating research, innovation and higher education policy; sets 3 overarching goals (quality and accessibility, competitiveness, sustainable development) and 6 thematic mission priorities. Priorities: quality and accessibility, sustainable development, mission-driven projects (climate, health, technology, security, trust and cohesion).
Norway	Strategy for Digital Transformation in the Higher Education Sector	2023	Sector-wide digital transformation strategy developed by the Ministry together with higher education institutions. Priorities: digitalization of teaching and administration, shared digital services for the sector, ICT infrastructure and data, digital competences of staff and students, open data and EdTech.
	The Research Council of Norway – Strategy 2024	2024	Strategy of the Research Council of Norway built around high-quality and accessible research, sustainability, competitiveness and innovation, an effective research system, and independent expert advice. Priorities: strengthening research ecosystems and infrastructures, international cooperation, knowledge transfer and open science, support for research centers and early-career researchers.
	Vision for Higher Education and Research 2030 & Roadmap (OKM)	2017–2030	Central strategic framework for the development of education and research: a long-term vision of higher attainment, quality and international competitiveness, framing funding reforms and the restructuring of the university network. Priorities: wider access and completion, internationalization, effectiveness and impact of R&D, digitalization of learning, engagement with the economy.
Finland	Strategy for National Research Infrastructures in Finland 2020–2030	2020–2030	Long-term strategy for research infrastructure development, aimed at raising research quality and competitiveness, increasing infrastructures' contribution to society and the economy, and expanding national and international cooperation. Priorities: sustainable infrastructure development, prioritized funding of key areas, open access to data, digitalization, national and international coordination, integration with the European ESFRI framework, support for scientific excellence and innovation.
	Policies to Promote Internationalization in Finnish Higher Education and Research 2017–2025	2017–2025	National strategy of the Finnish Ministry of Education and Culture for internationalizing higher education and research. Priorities: international attractiveness and mobility, development of education export, easier conditions for international students and researchers, diaspora engagement, embedding internationalization in institutional strategies.

Table continued

Country	Key laws / programs / initiatives	Adoption date / Implementation period	Description and key priorities
Estonia	Estonian Education Strategy 2021–2035	2021	National strategy defining goals and priorities for the entire education system, including higher and postgraduate education, based on lifelong learning, sustainability and equal access. Priorities: flexible and inclusive learning pathways, development of staff capacity and leadership, links between education, the labor market and sustainable development.
	Estonian Lifelong Learning Strategy 2020	13.02.2014	Baseline lifelong-learning framework that prepared the transition to the 2035 strategy. Priorities: quality of learning, digitalization, 21st-century competences, coherence across education levels.
	Research, Development, Innovation and Entrepreneurship Strategy 2021–2035 (RDIE)	15.07.2021	Cross-cutting strategy for R&D, innovation and entrepreneurship linking science, higher education and the economy, with targets and indicators to 2035. Priorities: improved research performance, commercialization, science–business–government cooperation, smart specialization priorities.
	Brain Korea 21 (BK21)	1999 – present (Phase IV: 2020–2027)	State program for training research personnel, run in seven-year phases. Priorities: competitive support for research groups, stipends for doctoral students and postdocs, KPIs for publication output and internationalization.
South Korea	New University for Regional Innovation (NURI)	2004–2009	State program for regional specialization and graduate employment. Priorities: competitions for regional consortia, specialization of programs for local labor markets, joint degrees and courses, higher graduate employment.
	World Class University (WCU)	2008–2012	National “World-Class Universities” project. Priorities: recruiting international professors and laboratories, creating world-level research fields, strengthening international networks.
	Leaders in Industry-University Cooperation (LINC; LINC+; LINC 3.0)	2012 – present	Systemic program institutionalizing university–industry cooperation. Priorities: long-term grants with KPIs (field placements, start-ups, technology transfer), institutionalization of university–industry partnerships.
	BRIDGE+ (commercialization of research results)	2015 – present	“Last-mile” commercialization of university research outputs. Priorities: technology packaging, support for contract research, infrastructure, acceleration of academic entrepreneurship.

Source: Authors' synthesis based on comparative analysis