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DIGITAL HR ECOSYSTEM IN KAZAKHSTAN'S CIVIL SERVICE: INSTITUTIONAL BARRIERS AND PROSPECTS FOR HUMAN-CENTRIC MODERNIZATION

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The article examines the modernization of human resource management in the civil service of the Republic of Kazakhstan through the prism of a digital HR ecosystem. The relevance of the study is determined by the transition from mainly administrative personnel record keeping to strategic, data-driven and human-centric management.

The research is based on a synthesis of regulatory analysis, documentary review, focus-group materials and practical observations related to the integrated information system E-Kyzmet. Attention is paid to the gap between the declared priorities of the Concept for the Development of the Civil Service for 2024-2029 and the actual maturity of digital HR processes in public bodies. The findings show that E-Kyzmet has become an important infrastructure for centralizing personnel data, automating employment procedures and increasing the transparency of recruitment. At the same time, the system still demonstrates technological, methodological and organizational limitations: insufficient HR analytics, uneven integration with external databases, unstable user experience, excessive formalization of processes, weak regulatory support for artificial intelligence, and a shortage of digital competencies among HR specialists.

The article argues that the further development of E-Kyzmet should not be reduced to technical renewal. It requires a coordinated ecosystem approach combining legal regulation, process redesign, cyber security, ethical use of artificial intelligence, user training and a stronger connection between public-sector personnel needs and university training. The proposed recommendations may be used to improve digital HR policy and strengthen the professional capacity of Kazakhstan's civil service.

Keywords: human-centricity, civil service, ecosystem, digitalization, human resource management, Kazakhstan.

ЦИФРОВАЯ HR-ЭКОСИСТЕМА ГОСУДАРСТВЕННОЙ СЛУЖБЫ КАЗАХСТАНА: ИНСТИТУЦИОНАЛЬНЫЕ БАРЬЕРЫ И ПЕРСПЕКТИВЫ ЧЕЛОВЕКОЦЕНТРИЧНОЙ МОДЕРНИЗАЦИИ

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В статье рассматривается модернизация управления человеческими ресурсами в системе государственной службы Республики Казахстан через призму цифровой HR-экосистемы. Актуальность исследования определяется переходом от преимущественно административного кадрового учета к стратегическому, основанному на данных и человекоцентричному управлению.

Исследование основано на синтезе нормативно-правового анализа, обзора документов, материалов фокус-групп и практических наблюдений, связанных с интегрированной информационной системой E-Kyzmet. Особое внимание уделяется разрыву между заявленными приоритетами Концепции развития государственной службы на 2024-2029 годы и фактическим уровнем зрелости цифровых HR-процессов в государственных органах. Результаты исследования показывают, что E-Kyzmet стала важной инфраструктурой для централизации кадровых данных, автоматизации процедур трудоустройства и повышения прозрачности отбора кадров. В то же время система по-прежнему демонстрирует технологические, методологические и организационные ограничения:

недостаточность HR-аналитики, неравномерную интеграцию с внешними базами данных, нестабильный пользовательский опыт, чрезмерную формализацию процессов, слабое нормативное сопровождение применения искусственного интеллекта, а также дефицит цифровых компетенций у HR-специалистов.

В статье обосновывается, что дальнейшее развитие E-Kyzmet не должно сводиться только к техническому обновлению. Оно требует согласованного экосистемного подхода, объединяющего правовое регулирование, пересмотр бизнес-процессов, кибербезопасность, этичное использование искусственного интеллекта, обучение пользователей и усиление связи между кадровыми потребностями государственного сектора и подготовкой специалистов в вузах. Предложенные рекомендации могут быть использованы для совершенствования цифровой HR-политики и укрепления профессионального потенциала государственной службы Казахстана.

Ключевые слова: человекоцентричность, государственная служба, экосистема, цифровизация, управление человеческими ресурсами, Казахстан.

ҚАЗАҚСТАННЫҢ МЕМЛЕКЕТТІК ҚЫЗМЕТІНДЕГІ ЦИФРЛЫҚ HR-ЭКОЖҮЙЕ: ИНСТИТУЦИОНАЛДЫҚ КЕДЕРГІЛЕР ЖӘНЕ АДАМҒА БАҒДАРЛАНҒАН ЖАҢҒЫРТУ ПЕРСПЕКТИВАЛАРЫ

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Мақалада Қазақстан Республикасының мемлекеттік қызмет жүйесіндегі адами ресурстарды басқаруды цифрлық HR-экожүйе тұрғысынан жаңғырту мәселелері қарастырылады. Зерттеудің өзектілігі негізінен әкімшілік кадрлық есеп жүргізуден стратегиялық, деректерге негізделген және адамға бағдарланған басқару үлгісіне көшу қажеттілігімен айқындалады.

Зерттеу нормативтік-құқықтық талдауды, құжаттарға шолуды, фокус-топ материалдарын және E-Kyzmet интеграцияланған ақпараттық жүйесіне қатысты практикалық бақылауларды біріктіруге негізделген. Ерекше назар 2024-2029 жылдарға арналған Мемлекеттік қызметті дамыту тұжырымдамасында белгіленген басымдықтар мен мемлекеттік органдардағы цифрлық HR-процестердің нақты жетілу деңгейі арасындағы алшақтыққа аударылады. Зерттеу нәтижелері E-Kyzmet жүйесінің кадрлық деректерді орталықтандыру, жұмысқа қабылдау рәсімдерін автоматтандыру және кадрларды іріктеудің ашықтығын арттыру үшін маңызды инфрақұрылымға айналғанын көрсетеді. Сонымен қатар жүйеде әлі де технологиялық, әдістемелік және ұйымдастырушылық шектеулер байқалады: HR-аналитиканың жеткіліксіздігі, сыртқы дерекқорлармен интеграцияның біркелкі болмауы, пайдаланушы тәжірибесінің тұрақсыздығы, процестердің шамадан тыс формалдануы, жасанды интеллектті қолдануды нормативтік сүйемелдеудің әлсіздігі және HR-мамандардың цифрлық құзыреттерінің жеткіліксіздігі.

Мақалада E-Kyzmet жүйесін одан әрі дамыту тек техникалық жаңартумен шектелмеуі тиіс екені негізделеді. Бұл құқықтық реттеуді, бизнес-процестерді қайта жобалауды, киберқауіпсіздікті, жасанды интеллектті этикалық қолдануды, пайдаланушыларды оқытуды және мемлекеттік сектордың кадрлық қажеттіліктері мен жоғары оқу орындарында мамандар даярлау арасындағы байланысты күшейтуді біріктіретін келісілген экожүйелік тәсілді талап етеді. Ұсынылған ұсынымдар цифрлық HR-саясатты жетілдіру және Қазақстан мемлекеттік қызметінің кәсіби әлеуетін нығайту үшін пайдаланылуы мүмкін.

Түйін сөздер: адамға бағдарлану, мемлекеттік қызмет, экожүйе, цифрландыру, адами ресурстарды басқару, Қазақстан.

Introduction. Human capital has become one of the decisive resources for the effectiveness of the state apparatus. In the case of Kazakhstan, this issue is especially important because public administration is simultaneously undergoing institutional modernization, digital transformation and a shift towards a service-oriented model. The Law of the Republic of Kazakhstan "On Civil Service" consolidated the basic principles of professionalism, meritocracy, transparency and accountability in the public sector [1]. The Concept for the Development of the Civil Service for 2024-2029 further emphasizes the need to modernize personnel management instruments, strengthen the motivation of civil servants, create a comfortable working environment and introduce evidence-based HR planning [2].

The transition to digital HR management is not only a technological task. It changes how personnel decisions are prepared, justified and implemented. When personnel data are fragmented, recruitment procedures remain lengthy and HR units perform mainly clerical functions, digitalization does not automatically lead to better governance. Conversely, when digital tools are supported by clear regulation, reliable data, analytical modules and user trust, they can improve recruitment quality, reduce bureaucratic costs and support fair career development.

Kazakhstan has accumulated considerable experience in electronic government and digital public services. The national civil service increasingly uses digital instruments for vacancy publication, candidate testing, document submission and personnel records. However, the practical experience of E-Kyzmet, the core digital platform for personnel administration in state bodies, shows that the move from automation to a mature HR ecosystem is still incomplete. The National Report on the State of the Civil Service identifies the modernization of HR practices, improvement of professional capacity and development of a more service-oriented state apparatus as key priorities [3]. The Law "On Informatization" also creates the broader legal framework for information systems, electronic interaction and information security [4].

At the same time, the empirical data used in this article indicates a number of unresolved problems. E-Kyzmet covers the full life cycle of civil service employment, yet its current functionality is still focused more on formal record keeping than on predictive analytics, skills management and strategic workforce planning. The official e-government portal confirms that access to civil service involves several digitalized stages, including legal knowledge testing, assessment of personal qualities and competition for an administrative position [5]. Nevertheless, the quality of the overall process depends not only on the existence of online services but also on the reliability of data exchange, clarity of business processes, cyber security and the ability of HR specialists to work with analytics.

The purpose of this article is to identify the key institutional, technological and methodological barriers to the development of a digital HR ecosystem in Kazakhstan's civil service and to formulate recommendations for the modernization of E-Kyzmet as a human-centric platform. The article contributes to the discussion on public-sector digital transformation by showing that a digital HR ecosystem should be understood not as a separate software product, but as an integrated environment where regulation, data, users, competencies, security and organizational culture interact.

The research logic therefore moves from the scale of HR digitalization to the maturity of the digital HR ecosystem. Official statistics and Agency reports demonstrate the growing functional scope of E-Kyzmet, while focus-group materials show whether these functions are perceived by users as integrated, reliable and analytically useful. This combination provides opportunity to distinguish between simple automation of personnel procedures and genuine ecosystem modernization.

Materials and Methods. The central *research question* is: what institutional and technological conditions are necessary for transforming E-Kyzmet from a personnel accounting system into a full-fledged digital HR ecosystem for Kazakhstan's

civil service? The question is formulated in relation to the strategic objectives of the Concept for the Development of the Civil Service for 2024-2029 and the practical limitations observed in the functioning of the current platform.

The study advances the following *hypothesis*: the effectiveness of digital HR transformation in the civil service depends not primarily on the number of automated modules, but on the systemic alignment of five components: legal regulation, reliable data integration, HR analytics, digital competencies of users and a human-centric organizational culture. If one of these components remains underdeveloped, digitalization risks reproducing the same bureaucratic practices in electronic form.

Table 1 - Research design and empirical basis of the study

Component	Content of the study	Empirical basis	Expected analytical output
Research question	What institutional and technological conditions are required for E-Kyzmet to evolve from an administrative information system into a human-centric digital HR ecosystem?	Strategic documents, national reports, focus-group materials and internal project data.	Definition of the core transformation problem and analytical boundaries.
Hypothesis	Digital HR transformation will be effective only if technological modernization is combined with regulatory renewal, HR analytics, data integration and user-oriented organizational change.	Analysis of E-Kyzmet practice, civil service reform documents and international digital government literature.	Verification of the link between platform maturity and institutional readiness.
Research stages	Regulatory review; analysis of E-Kyzmet functionality; qualitative analysis of focus groups; synthesis of recommendations.	Five focus groups involving HR staff of central and local public bodies, territorial departments and civil servants enrolled in HRM training.	Integrated map of barriers, risks and modernization priorities.
Methods	Document analysis, comparative institutional analysis, qualitative coding, synthesis and problem-oriented interpretation.	National legislation, concepts of public administration and civil service development, national report data and expert discussions.	Evidence-based recommendations for digital HR ecosystem design.

The study was carried out in *four stages*. The first stage involved the analysis of strategic and regulatory documents governing the civil service, informatization and public-sector HR policy in Kazakhstan. The second stage focused on the functional development of E-Kyzmet, including its modules, integrations and modernization trajectory. The third stage summarized empirical materials obtained through focus-group discussions with representatives of central and local HR units, territorial departments of the Agency for Civil Service Affairs, civil servants enrolled in HR-related educational programmes and employees of the central apparatus. The fourth stage consisted of analytical generalization and the formulation of recommendations for ecosystem modernization.

The methodological design combines document analysis, comparative institutional analysis,

qualitative content analysis of focus-group materials, problem mapping and synthesis of international literature on digital government, HR analytics and artificial intelligence in public administration. The study also uses elements of an applied case-study approach because E-Kyzmet is examined as a concrete institutional and technological mechanism rather than as an abstract digital platform. The structure of the empirical design is summarized in Table 1.

Official reports and monitoring data of the Agency for Civil Service Affairs (www.gov.kz/memleket/entities/qyzmet) were used to assess the quantitative scale of staffing, vacancies, competition procedures and digital selection, as well as to identify the indicators already collected through E-Kyzmet-related monitoring. The qualitative part consisted of five focus-group discussions conducted on 16 June 2025 via Zoom with 33 participants representing HR units of central and local public bodies, territorial departments of the Agency for Civil Service Affairs, civil servants enrolled in HR-related educational programmes and employees of the central apparatus. The focus-group materials were processed through qualitative content analysis: repeated statements, practical cases and problem situations were grouped into thematic categories such as data integration, manual duplication, user experience, HR analytics, digital recruitment, regulatory support, AI use, digital competencies and cybersecurity.

The research identified a stable set of barriers: insufficient integration between state information systems, lack of predictive HR analytics, excessive complexity of some user scenarios, weak automation of skills-based recruitment, limited readiness for AI use, uneven digital competencies, insufficient methodological support and risks related to cyber security and personal data protection. These findings support the initial hypothesis and show that the development of a digital HR ecosystem requires simultaneous modernization of technology, regulation and organizational practice.

Results and Discussion. *1. Digital HR transformation as an institutional process.* International research on digital government stresses that public-sector digital transformation cannot be reduced to the introduction of electronic services. It involves redesigning organizational routines, decision-making processes and institutional relationships. The OECD Public Governance Scan of Kazakhstan underlines the importance of public administration modernization, human resource management and public-sector innovation for Kazakhstan's reform agenda [6]. This perspective corresponds with broader academic findings: digital transformation in government is a process of reconfiguring structures, services and administrative logic rather than a simple migration from paper to screen [7].

In HR management, this distinction is critical. A platform may formally automate recruitment, leave records, business trips, performance assessment or disciplinary control, while HR specialists still experience manual duplication, unclear role distribution and weak analytical support. Therefore, the quality of a digital HR ecosystem should be evaluated not only by the number of modules, but also by the extent to which the platform reduces routine work, supports evidence-based decisions and strengthens trust in personnel procedures.

2. The current role of E-Kyzmet in Kazakhstan's civil service. E-Kyzmet was introduced as a centralized information system for personnel management in state bodies. It has gradually expanded from basic HR record keeping to a multifunctional platform covering recruitment, personnel files, staffing structures, performance-related processes, training, business trips and control functions. According to the data analysed in this study, the system is used nationally and supports personnel data for more than 80 thousand active users, while the wider database includes information on more than 500 thousand employees and former employees. It has also developed more than 200 integrations with other state information systems.

The introduction of E-Kyzmet has produced clear administrative benefits. It has reduced

the volume of paper documents, standardized personnel procedures and created a common digital environment for state bodies. At the same time, the platform should now be assessed not only by the existence of modules, but also by its ability to transform accumulated HR data into evidence-based workforce planning. Table 2 presents quantitative indicators that show the scale of the HR data environment, while Table 3 summarizes the main barriers and modernization priorities for E-Kyzmet.

To evaluate E-Kyzmet as a digital HR ecosystem, it is necessary to consider both platform-specific indicators and the wider HR environment in which the platform operates. The following indicators link official staffing and competition data with the current modernization trajectory of E-Kyzmet.

Table 2 - Quantitative indicators for assessing E-Kyzmet and civil service HR digitalization

Indicator	Number	Analytical relevance
Staff positions and actual personnel base as of 1 January 2025	91 555 staff positions; 84 482 actual civil servants	Defines the national HR data perimeter and the personnel base for workforce planning.
Vacancies and long-term vacancies	7 073 vacant positions, including 1 599 long-term vacancies	Shows the need for vacancy forecasting, candidate matching and more effective digital recruitment.
Agency survey on staffing needs	33 329 respondents; 64% reported shortage of staff in sectoral units	Confirms that staffing shortages are perceived as a systemic HR problem.
Digital selection through the new system	12 110 competitions; 44 056 participants; 5 056 successful candidates	Shows the scale of digital recruitment and the volume of candidate data available for analytics.
Competition level in the new selection system	From 1.7 to 3.6 candidates per position	Indicates increased openness and attractiveness of digital recruitment procedures.
“Personnel Selection” functionality	Dynamic search based on a digital rating of education, work experience, achievements and risk factors	Moves E-Kyzmet from passive vacancy announcement toward proactive talent search.
New E-Kyzmet modules in 2024	24 new modules	Demonstrates functional expansion of the platform and the need for user-oriented process redesign.
HR indicators collected through E-Kyzmet-related monitoring	Staffing, education, length of service, turnover, appointments, probation, training and competition procedures	Provides a basis for dashboards, predictive analytics and strategic HR planning.

The table shows that the main challenge is no longer the absence of digital infrastructure. The platform currently supports the implementation of recruitment procedures through electronic verification of certificates and assessment results. The e-government service for searching vacancies and submitting applications allows candidates to find announced vacancies, submit an application and sign it with an electronic digital signature [5]. These elements show that Kazakhstan already possesses the basic infrastructure needed for a more advanced HR ecosystem.

The more important task is to convert accumulated personnel and recruitment data into integrated HR analytics, reliable digital profiles, competency-based planning and user-friendly decision-support tools (Table 3).

Table 3 - Main barriers and modernization priorities for E-Kyzmet

Problem area	Observed limitation	Modernization priority	Expected effect
Integration and data quality	Fragmented exchange with external state databases, repeated manual entry and inconsistent data verification.	Develop a unified digital personnel data contour with automated validation and standard data formats.	More reliable digital profiles and less routine work for HR units.
HR analytics	Limited capacity for workforce forecasting, turnover analysis, workload diagnostics and competency mapping.	Introduce analytical dashboards, skills registers and predictive tools for personnel planning.	Evidence-based staffing, training and promotion decisions.
AI-supported recruitment	Current selection tools rely mainly on formal criteria and do not fully use structured competency data.	Pilot virtual assistants, algorithmic matching and transparent digital scoring with human oversight.	Faster recruitment, broader talent search and lower subjective bias.
Regulation and methodology	Rules for digital profiles, electronic HR processes, AI use and responsibility for data quality remain insufficiently detailed.	Adopt process rules for E-Kyzmet, standards for AI use and clear responsibility for digital HR data.	Legal certainty and more consistent use across public bodies.
User experience and change management	Complex modules, role duplication, insufficient user support and resistance to digital work practices.	Simplify business processes, redesign roles and provide continuous training and methodological support.	Higher adoption, fewer errors and stronger trust in the platform.
Cybersecurity	Sensitive personnel data require strict access control, monitoring and protection against human-factor risks.	Strengthen role-based access, audit logs, incident response and cybersecurity training.	Reduced risk of data leakage and unauthorized actions.

However, the system still functions unevenly. In practice, some modules remain complicated and insufficiently adapted to the daily routines of HR units. Users reported that routine tasks may require unnecessary intermediate operations. For example, the preparation of time sheets for a specific period may require opening and closing several previous periods manually. The logic of rotation, incentives and personnel selection also needs further refinement because the system does not always reflect the real diversity of HR scenarios in public bodies.

The focus group discussions show that the difficulties with E-Kyzmet are not only technical but also connected with everyday administrative practice. Participants noted that the current platforms “do not provide the required level of analytics and predictive models for HR”, especially for such issues as staff turnover, succession planning and the identification of deficit competencies. This confirms that E-Kyzmet already contains important personnel data, but this data are still not sufficiently converted into analytical outputs for HR units and managers.

A separate problem raised during the discussion was the duplication of work. Participants described

“duplication of systems and manual data entry” as one of the practical obstacles to effective digitization. An example of the Ministry of Finance was mentioned in this regard: even where an internal information system exists, employees still must duplicate information in E-Kyzmet, which increases the workload of HR staff instead of reducing it.

The focus groups also showed that digital procedures are not always fully accepted in daily management practice. According to participants, “some managers still require paper copies or signatures” even when the relevant procedure is already available electronically. This means that digitization is slowed down not only by the platform itself but also by established organizational habits and the continuing reliance on paper-based confirmation.

Participants also pay attention to the reliability of data used in personnel decisions. They referred to cases of “unreliable data in eGov and E-Kyzmet”, including incorrect information in education documents or missing attachments and stamps. In such situations, the HR specialist still must recheck documents manually, because automatic verification mechanisms are not yet sufficiently developed.

Another recurring concern was the stability of the system. The report notes that E-Kyzmet “regularly gives failures”, and that recently entered information may “disappear or be displayed as incomplete”. For HR units, this created a need for additional manual control and reduces confidence in the system as a reliable source of personnel data.

Taken together, these examples show why the expansion of E-Kyzmet modules is not enough by itself. For the platform to become a mature digital HR ecosystem, personnel data should be connected across modules, automatically verified, synchronized with other systems and presented in a form that supports practical decisions on recruitment, training, workforce planning and staff development.

3. Regulatory and methodological gaps. The legal framework provides a general basis for automation and electronic interaction, but it does not yet fully regulate the next generation of HR technologies. The use of artificial intelligence, digital profiles, predictive analytics and automated recommendations in personnel decisions requires clearer rules. The OECD Recommendation on Artificial Intelligence emphasizes that AI systems should be human-centred, transparent, robust, secure and accountable [8]. These principles are directly relevant to civil service recruitment because personnel decisions affect careers, access to public employment and trust in state institutions.

In the Kazakhstani context, the absence of detailed methodological rules for some E-Kyzmet processes creates practical uncertainty. HR specialists may know that certain documents should be kept in electronic personal files, but still lack clear instructions for entering, verifying and updating all relevant information. This gap encourages informal consultations, repeated manual checks and inconsistent practices across state bodies. A mature HR ecosystem therefore requires not only software improvement, but also a detailed regulatory and methodological architecture.

4. Integration and data quality. The focus-group materials show that the integration of E-Kyzmet with other systems is one of the most frequently mentioned barriers. Public bodies use multiple digital resources, including E-Kyzmet, Documentolog, E-Otinish, e-government databases and sectoral information systems. In theory, integration should reduce duplication and improve the reliability of HR data. In practice, data may be incomplete, outdated or transferred in formats that require additional manual verification. This is particularly important for recruitment because civil service legislation sets legal restrictions and qualification requirements that must be verified accurately.

Data quality is also an ethical issue. If a digital rating or candidate profile is formed based on incomplete, wrongly classified or poorly synchronized data, the system may produce an apparently objective but substantively unreliable recommendation. International literature on AI

in the public sector points to similar risks: algorithmic tools can increase efficiency, yet they also create challenges related to transparency, bias, accountability and explainability [9]. For this reason, E-Kyzmet modernization should include a data governance framework: clear data ownership, verification protocols, audit trails, error correction and rules for human review.

5. HR analytics and skills-based management. A major finding of the study is the weak development of HR analytics. Participants of the focus groups repeatedly noted that personnel services often remain concentrated on clerical administration. They lack tools for forecasting staff shortages, analysing turnover risks, identifying overloaded units, mapping competencies and planning individual learning trajectories. This limits the ability of state bodies to move from reactive vacancy filling to strategic workforce planning.

The importance of HR analytics is well established in contemporary human resource management. Evidence-based HR analytics links workforce data with organizational outcomes and helps managers make more informed decisions about recruitment, development and retention [10]. At the same time, scholars warn that technology in HRM produces value only when it is embedded in organizational strategy and supported by appropriate competencies [11]. For Kazakhstan's civil service, this means that E-Kyzmet should include not only standard reports, but also analytical dashboards, early warning indicators and tools for analysing skills gaps.

The development of a skills module is particularly important. Current recruitment and promotion procedures still rely heavily on formal indicators such as education, length of service and previous positions. These indicators are necessary but insufficient. A digital HR ecosystem should allow candidates and civil servants to accumulate verified information about specific hard and soft skills acquired during their career. Such a model would help match job profiles with real competencies, support targeted training and strengthen internal mobility. People analytics literature also emphasizes that the value of personnel data depends on clear conceptual boundaries and responsible use of information [12].

6. Artificial intelligence: opportunities and safeguards. The Concept for the Development of the Civil Service for 2024-2029 envisages the use of artificial intelligence in recruitment, including the analysis of candidate data, new approaches to assessing knowledge and competencies, virtual assistants for interviews and automatic notification of potential candidates [2]. These instruments may accelerate recruitment and reduce the administrative burden on HR units. AI-based tools could also help form talent pools, identify suitable candidates for vacancies and detect mismatches between position requirements and available competencies.

Nevertheless, AI should be introduced gradually and with safeguards. International studies on AI and advanced technologies in HRM show that such tools may support decision-making but also create risks of opacity, automation bias and excessive dependence on historical data [13]. In the civil service, these risks are even more sensitive because public employment must be based on legality, fairness and equal access. Therefore, AI in E-Kyzmet should not replace human responsibility. It should serve as a decision-support instrument with explainable criteria, auditability and the possibility of appeal or correction.

7. Human factor and organizational culture. The empirical materials demonstrate that the human factor remains a decisive condition for successful digitalization. In several focus groups, participants described resistance to change, distrust of algorithms, continued demand for paper duplicates and the perception that digitalization sometimes increases reporting instead of simplifying work. These reactions should not be interpreted only as conservatism. They also signal that users often experience digital platforms as externally imposed tools rather than as instruments designed around their practical needs.

A human-centric HR ecosystem must therefore be developed together with users. HR specialists, managers and ordinary civil servants should be involved in testing new modules, evaluating

interface logic and identifying unnecessary steps in business processes. The proposed establishment of a coordination council or expert user group under the authorized body would help filter new processes before they are fully deployed. Such a mechanism could reduce design errors, increase trust and make digital modernization more responsive to the realities of public administration.

Table 4 - Analytical framework for assessing digital HR ecosystem maturity

Dimension	Evidence from the study	Maturity gap	Direction of modernization
Data coverage	E-Kyzmet-related monitoring includes staffing, education, length of service, turnover, appointments, probation, training and competition data.	Data exists but are not always transformed into integrated analytics.	Unified HR data model and standardized dashboards.
Recruitment digitalization	Digital selection has scaled to 12 110 competitions and 44 056 participants.	Recruitment is more open, but candidate matching and post-selection analytics remain limited.	Link vacancies, candidate ratings, reserve data and appointment outcomes.
Predictive HR analytics	National data show vacancies, long-term vacancies and staff shortages.	HR units still rely on manual calculations and descriptive reports.	Predictive tools for vacancies, turnover, workload and skills gaps.
Competency management	The “Personnel Selection” function uses digital ratings and candidate profiles.	Competencies are not yet fully connected with training and career paths.	Competency register and individual learning trajectories.
User experience	Focus groups reported synchronization problems, duplication and unstable saving of information.	Users do not fully trust system outputs.	User journey redesign and regular user feedback.
Regulation and methodology	The platform is expanding faster than detailed process regulation.	Rules for AI, digital profiles and data responsibility remain insufficient.	Detailed E-Kyzmet rules and AI/data governance standards.
AI readiness	Project materials propose big-data and AI-supported HR tools.	Users express both interest and concern about algorithmic errors and bias.	Explainable AI with human oversight and appeal mechanisms.
Cybersecurity and trust	E-Kyzmet contains sensitive personal and career data.	Higher integration increases data-protection risks.	Role-based access, audit logs, incident response and cybersecurity training.

8. Cyber security and protection of personal data. E-Kyzmet contains sensitive personal and service-related information. As the number of integrations and analytical functions grows, cyber security becomes more important. The Law “On Informatization” provides the general legal basis for information systems and information security [4]. However, the expansion of digital profiles, AI-based recommendations and data exchange with other systems requires stricter technical and

organizational safeguards. Access rights should be simplified, clearly justified and monitored. Excessive or overlapping roles create risks of unauthorized actions, conflicts of interest and weak accountability.

Global GovTech experience shows that successful digital transformation depends not only on service delivery but also on interoperability, data governance and the institutional capacity to manage digital risks [14]. For E-Kyzmet, this means that cyber security should be integrated into the architecture of modernization rather than treated as a separate technical requirement. Regular audits, role-based access control, logging, backup procedures and incident response mechanisms should become part of the platform's operating model.

9. Connection between civil service and higher education. Another recurring theme in the focus groups was the gap between the needs of public bodies and university training. Participants noted that higher education programmes are often too general and not sufficiently connected to the competencies required in specific public-sector positions. This problem is directly linked to digital HR management. If E-Kyzmet can identify skills shortages and forecast future demand, state bodies will be able to formulate clearer requests to universities and professional development providers. In this sense, the HR ecosystem should extend beyond internal personnel administration and support cooperation between the state, universities and training institutions.

10. Towards a mature digital HR ecosystem. The UN E-Government Survey 2024 stresses that digital government should be sustainable, inclusive and oriented towards public value rather than limited to online availability of services [15]. Applying this logic to Kazakhstan's civil service, a mature digital HR ecosystem should combine: a unified digital profile of the civil servant; reliable integration with state databases; skills-based recruitment and development; predictive HR analytics; explainable AI; user-friendly interfaces; clear methodological rules; cyber security; and continuous training of HR specialists. Such an ecosystem would allow the state apparatus to move from formal personnel administration to proactive management of human capital.

Based on data analysis, national monitoring data and focus-group findings, the maturity of E-Kyzmet can be assessed through eight interrelated dimensions. This framework operationalizes the research hypothesis: the platform can become an effective HR ecosystem only when technological modernization is supported by regulation, reliable data, analytics, competencies and organizational trust.

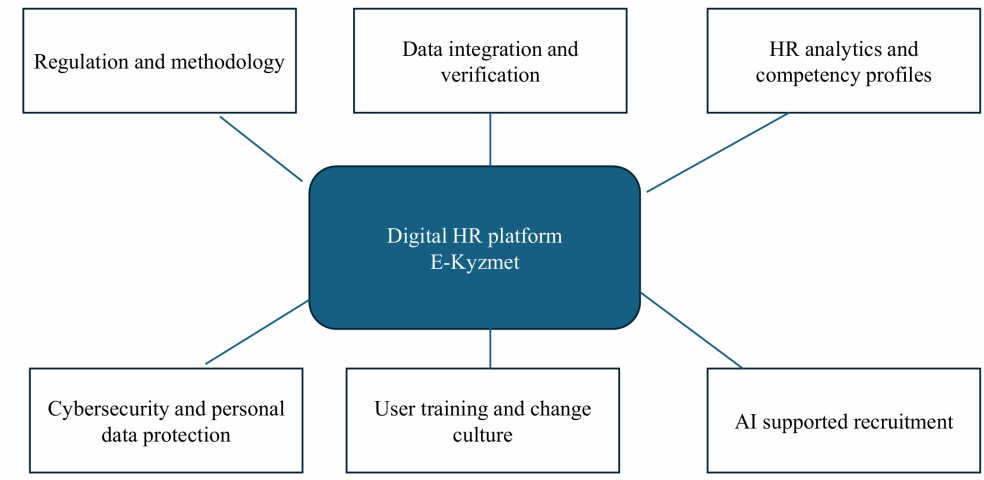


Fig.1 - Conceptual model of a human-centric digital HR ecosystem
Source: developed by the author based on the study results

The analysis confirms the research hypothesis. E-Kyzmet cannot become an effective HR ecosystem through technical modernization alone. Its future effectiveness depends on the alignment of regulation, data, competencies, analytics and organizational culture. The modernization of the platform should be treated as a public-management reform, not only as an IT project. The proposed ecosystem logic is presented in Figure 1.

Conclusions. The study confirms that E-Kyzmet has become a key digital infrastructure for personnel management in Kazakhstan's civil service. The system now supports not only personnel administration, but also digital recruitment, reserve management, HR monitoring and the automation of selected personnel processes. The Agency's National Report confirms the scaling of the new digital selection system, the introduction of dynamic candidate search through the "Personnel Selection" functionality and the implementation of 24 new E-Kyzmet modules in 2024.

At the same time, the findings show that E-Kyzmet is still at a transitional stage between administrative digitalization and a mature HR ecosystem. The main constraint is not the lack of digital tools, but the insufficient integration of data, analytics, regulation and user-oriented processes. Focus-group evidence confirms that HR specialists continue to face fragmented data, manual duplication, incomplete synchronization and technical instability.

The research hypothesis is therefore confirmed: technological modernization alone is not sufficient. E-Kyzmet can become a human-centric digital HR ecosystem only if platform development is aligned with legal regulation, reliable data exchange, predictive HR analytics, digital competencies, cybersecurity and organizational trust. The proposed maturity framework can be used as a practical tool for assessing this transition and identifying priority areas for modernization.

Future research should compare Kazakhstan's experience with international public-sector HR platforms and GovTech practices, especially in the areas of AI-supported recruitment, competency-based workforce planning, digital profiles, data governance and ethical safeguards in HR analytics.

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