

Information system for the strategic recruitment and retention of academic talent at the technical university

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Abstract

The world is facing a shortage of personnel in almost all fields. At the same time, training remains crucial, particularly for the new generation of engineers. In addition to modern laboratory equipment and state-of-the-art laboratories, their training requires highly qualified personnel capable of mastering complex engineering processes, conducting world-class scientific research, and simultaneously serving as mentors to students pursuing higher education. However, the current reality is that universities are facing a severe shortage of staff; therefore, it is necessary to develop and implement fundamentally new approaches aimed at identifying, attracting, and motivating new talent that will form the foundation of higher education in the future. Therefore, the goal of this work is to develop a model for attracting top academic staff to academic institutions and, accordingly, to implement this model in the form of an information system that universities can use to attract, motivate, and monitor the effectiveness of research and teaching staff and engineering personnel. To achieve this goal, the issues and existing modern approaches were first analyzed, and their problem areas and limitations were identified. The next step was to develop a new approach and illustrate its possible implementation in the form of an information system.

Keywords

academic talent, information system, technical university, Talent Map, EVP, human resources strategy, faculty recruitment, staff retention, talent management

1. Introduction

Any modern university, both in Ukraine and abroad, operates in an environment of intense competition for applicants, grants, international partnerships, industrial collaboration, and, above all, human capital. Indeed, for universities specializing in engineering, telecommunications, cybersecurity, and defense technology, the quality of the faculty directly determines the ability to create competitive educational programs, conduct cutting-edge applied research, develop laboratory infrastructure, and maintain engagement with the labor market.

It is precisely in these complex, turbulent conditions that academic staff (especially talented ones) can no longer be viewed merely as candidates for a vacant or competitive position. Here, the focus is on individuals who embody knowledge, research connections, reputation, pedagogical expertise, international visibility, and the ability to create new educational and scientific products at the regional or global level. At the same time, in most higher education institutions, the traditional model of recruiting faculty members often remains passive: the university simply posts a vacancy, waits for candidates, and applies standard evaluation procedures. This model works very poorly and, consequently, is ineffective when it comes to highly qualified specialists who already hold a position, have a professional reputation, and are not actively seeking employment.

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Therefore, a pressing task is to develop an innovative model for attracting talented specialists tailored to the profile of higher education institutions. In addition, based on this model, it becomes essential to create an information system that enables the strategic management of academic talent, specifically to gain a comprehensive view of the market of potential candidates, assess their alignment with the university's priorities, personalize the offer, facilitate negotiations, and track outcomes after recruitment.

2. Problem analysis

The level of digital maturity at many universities is quite low, with modern digital tools being used only sporadically. At the same time, HR processes at many higher education institutions often lack sufficient technical support. This results in data on potential candidates being stored in a fragmented manner, communications being conducted in an unsystematic way, evaluation criteria depending on the specific department, and recruitment outcomes not always being linked to the higher education institution's long-term strategic indicators.

In turn, this creates a number of risks for the technical university, including the potential loss of already scarce top candidates due to slow communication; the lack of a comprehensive talent map; a lack of understanding of candidates' true motivations; an inflexible offer system; weak onboarding; and a failure to identify early on the risks of losing recruited specialists.

3. Analysis of studies and publications

Source [1] examines the issue of attracting and retaining academic staff in higher education institutions. The main emphasis is placed on the fact that universities compete not only with one another but also with businesses, international research centers, and the private sector. The paper [2] analyzes the challenges and strategies for attracting and retaining academic research staff in higher education institutions. The authors emphasize the need to examine the strategies, policies, procedures, processes, and systems that universities use for recruiting, developing, and retaining academic staff. Article [3] examines talent retention strategies at Cape Coast Technical University in Ghana. The authors note that higher education institutions face challenges in retaining talented employees; specifically, the study is based on a qualitative approach and interviews with academic and administrative staff. Key retention practices identified include fair career advancement, resolution of legal and labor disputes, training and development, rewards and recognition, as well as improved working conditions.

Article [4] examines the issue of attracting and retaining talent in small and medium-sized cities, as well as the role of universities in this process. The study shows that universities can serve not only as educational institutions but also as institutional centers for the formation, consolidation, and development of human capital in the region. The study [5] examines the role of science parks in attracting talent, particularly university students, as a strategic resource for innovation and entrepreneurship. The authors view university students as a key element of the innovation ecosystem, and science parks as a mechanism for transforming university potential into entrepreneurial and innovative outcomes. This is important for our study because the academic talent management system can be integrated not only with the university's HR processes but also with the science park's infrastructure, technology transfer centers, startup incubators, and partner R&D laboratories.

Source [6] proposes an approach to the strategic integration of knowledge management and talent management in higher education through the implementation of Enterprise Architecture. The authors use the Zachman Framework to align data, applications, IT infrastructure, and the business objectives of the higher education institution. Of particular importance is the provision regarding the need for a centralized and automated system for recruiting and retaining staff, integrating a collaboration platform, and automating administrative processes through an HRM system. Source [7] examines talent management issues in higher education institutions or related organizational structures. In the context of our article, this source is useful for emphasizing that traditional HR procedures do not provide sufficient flexibility in the face of competition for academic and technical specialists.

Study [8] investigates talent retention strategies and the effect on competitiveness of public universities in the western region of Kenya. The authors identify the top causes of employee turnover: job dissatisfaction, poor compensation systems, poor organizational policies, lack of professional growth opportunities, work-life balance problems, and poor working conditions. The competitiveness of the university was evaluated using student enrollment and webometrics rankings. The results indicated that work-life balance, training and development and compensation systems are important for staff retention. The study [9] looked into the effect of talent acquisition on organizational effectiveness on public university campuses in Nakuru County, Kenya. The authors note that public universities operate in a competitive environment with talent shortages, and that talent is regarded as a strategic asset for gaining competitive advantages. Organizational effectiveness was found to be strongly positively related to talent attraction.

Article [10] studies the role of talent management in developing technological competencies, where information technology plays the role of a mediator, based on the case study of private universities in Jordan. “Administrators’ talent management strategies as predictors of faculty retention at federal universities in north-eastern Nigeria,” Source [11]. The study employs a predictive correlational design, a sample of 604 respondents, and assessment instruments with high Cronbach’s Alpha reliability coefficients. The results showed that strategies for staff recruitment, motivation, and professional development statistically significantly predict faculty retention. Source [12] examines recruitment strategies for talent management in the IT sector. Although the study is not limited to the university environment, it is relevant to our article because technical universities compete for talent with IT companies, R&D centers, and technology businesses [13, 14, 15, 16]. In this context, it is advisable to consider IT recruitment approaches: rapid identification of competencies, role fit analysis, experience assessment, talent pool management, and the development of a value proposition for the candidate.

Thus, the analysis conducted shows that the challenge of attracting and retaining academic talent is interdisciplinary and combines issues of strategic HR management, digital transformation of universities, knowledge management, development of technological competencies, and institutional competitiveness. Most studies focus on factors such as working conditions, fair compensation, professional development, career growth, motivation, organizational culture, work-life balance, recognition of achievements, and the opportunity to participate in innovative projects. At the same time, the analysis shows that a significant portion of existing research focuses on a qualitative description of engagement and retention factors, while issues related to formalizing these factors in the form of digital models, scoring metrics, integrated profiles of academic staff, predictive analytics, and information system architecture remain underdeveloped. It is precisely this gap that constitutes the scientific novelty of this study.

4. Purpose, objectives, and scope of the study

Therefore, the aim of this work is to develop a conceptual model of an information system for the strategic recruitment and retention of academic talent at a technical university.

The object of the study is the processes of academic talent management at a technical higher education institution.

The subject of the study is information models, functional modules, evaluation criteria, and KPIs that ensure the strategic recruitment and retention of faculty, researchers, and practitioners.

To achieve this goal, the following interrelated tasks must be addressed: define the lifecycle of academic talent management; establish a talent map structure; develop a model for evaluating individual candidates; detail the architecture of the information system; define user roles; and establish KPIs and implementation phases for the system.

5. Development of an information system for the strategic recruitment and retention of academic talent

5.1. Conceptual model of the information system

As noted above, in today's rapidly changing world, it is essential to develop new approaches to recruitment that can ensure the sustainable development of the university. This section explores the essence of this updated model. Thus, the information system for the strategic recruitment and retention of academic talent is viewed as a comprehensive digital environment that integrates data on the staffing needs of academic and research units and educational programs, profiles of potential candidates, evaluation criteria, communication history, personalized offers, onboarding processes, performance metrics, and retention risks.

The new system should support not only traditional recruitment but also strategic planning for the development of the institution of higher education. In other words, staffing needs should arise not only from the existence of a vacant position but also from specific goals: launching a new educational program, strengthening a research group, developing English-language courses, establishing a laboratory, joining an international consortium, developing industrial partnerships, and more.

Thus, the following conceptual model of an information system for the strategic recruitment and retention of academic talent is proposed (Fig. 1).

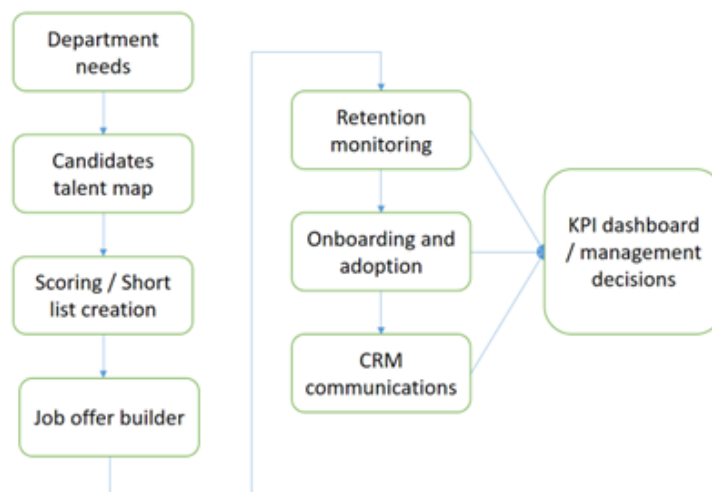


Figure 1: Conceptual model of an information system for the strategic recruitment and retention of academic talent

For this conceptual model, the following stages of the academic talent lifecycle within the proposed system can be identified, as presented in Table 1.

Thus, Table 1 covers all 8 stages of the talent management lifecycle. Accordingly, this table illustrates how each stage can be implemented. Based on the data in this table and for the implementation of the model, an information system architecture is proposed (Fig. 2).

5.2. System functional modules

The system should consist of interconnected modules, each of which supports a specific management task. Some modules should be implemented as interconnected tables, a CRM, or using a low-code

Table 1
Stages of the Lifecycle of Working with Academic Talent

Stage	Content	Digital implementation
1. Identifying the department's needs	Identifying the needs of a department, educational program, or research area, etc.	Strategic Needs Module
2. Profile of the ideal candidate for the position	Description of competencies, experience, research focus, and expected contribution	Profile template / competence model
3. Talent Mapping	Searching for and organizing potential candidates into a list	Talent Map / CRM
4. Scoring	Scoring-based evaluation of candidates using standardized criteria	Candidate scoring engine
5. Communication	Personal contact with the candidate, strategic meeting, discussion of motivation	CRM communications
6. Offer	Creating a personalized offer for the candidate	Offer Builder
7. Onboarding	Integration into the department, team, projects, labs, etc.	Onboarding module
8. Employee retention	Monitoring of results, risks, and resource needs	Retention monitoring



Figure 2: Information system architecture

solution; however, the conceptual architecture must allow for future scalability. The structure of interaction between the system modules is shown in Fig. 3.

Accordingly, Table 2 lists the purpose and main functions of each individual module.

5.3. The talent map structure as the core of the system

The uniqueness of this system is ensured by the use of the Talent Map module. The Talent Map is the system's central information hub. It is not merely a static list of candidates, but a dynamic digital

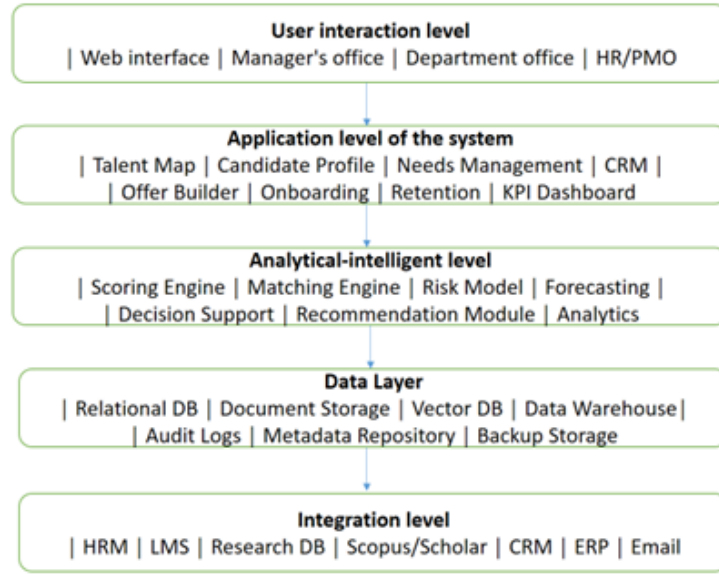


Figure 3: Structure of interaction between information system modules

registry of potential faculty members, researchers, and practitioners that records their academic profiles, motivational profiles, transition complexity, and communication status. Accordingly, this module will contain the following information (Table 3).

6. Academic candidate evaluation model

The ability to evaluate candidates is crucial. To this end, the following integrated model is proposed. Therefore, to support the comparative analysis of candidates, an integrated measure of academic suitability, the ATS (Academic Talent Score), is proposed. It does not replace expert judgment, but it structures the discussion and allows candidates to be compared using a single logic. Candidates can be evaluated using formula (1).

$$ATS = 0.25R + 0.20T + 0.20I + 0.15G + 0.10E + 0.10S, \quad (1)$$

where: R – research relevance (publications, h-index, grants, research school, PhD supervision); T – teaching relevance (disciplines, methodologies, English-language instruction, course development); I – industry relevance (business partnerships, applied projects, defense/aerospace/AI/telecom experience); G – grant potential (experience with international and national grant applications, consortia, research office readiness); E – international readiness (English language proficiency, international mobility, experience in co-teaching); S – strategic fit (alignment with the strategy of the department, faculty, university, and future educational programs).

The weighting factors for these parameters may vary depending on the higher education institution's strategic development priorities. However, the most optimal approach to allocating these factors is outlined below:

- **Research relevance** – $R = 0.25$. Research relevance carries the greatest weight in the model, since for a technical university, the research potential of academic staff is one of the key factors in institutional competitiveness. It is the research component that determines a candidate's ability to produce scientific results, publish in professional and international journals, form research groups, supervise graduate students, initiate research directions, and strengthen the university's

Table 2
Information System Modules

Module	Purpose	Key Data / Functions
Strategic Needs Module	Identification of the university's priority staffing needs	Department, educational program, research area, desired profile, urgency
Talent Map	Building a database of potential academic talent	Full name, position, h-index, grants, courses, motivators, status
Candidate Scoring	Assessing a candidate's alignment with strategic needs	Overall score, risks, strengths, fit
EVP Module	Formulating a value proposition for different types of candidates	Autonomy, research budget, lab, status, workload
CRM Communication	Managing contacts, meetings, and negotiation history	Statuses: identified, contacted, meeting, negotiation, offer
Offer Builder	Preparation of a personalized offer	Role, status, resources, KPIs, employment format
Onboarding Module	New hire onboarding plan	Meetings, mentor, resources, media announcement, 30/60/90 days
Retention Monitoring	Identifying retention risks and supporting development	Satisfaction, resources, workload, KPI progress
KPI Dashboard	Program performance analytics	Pipeline, conversion, hires, retention, academic impact

Table 3
Information System Data

Data Group	Parameters
Identification data	Full name, current organization, position, country/city, contact channel
Academic profile	Academic degree, academic title, h-index, publications, Google Scholar / Scopus
Educational profile	Disciplines, English-language teaching, experience in launching courses and programs
Research profile	Grants, laboratories, PhD supervision, research groups, projects
Industry profile	R&D experience with business, defense tech, aerospace, AI, telecom, cybersecurity
International profile	Mobility, consortia, Horizon Europe, international publications
Motivational profile	Career, research, money, status, autonomy, influence, team
Transition difficulty	Low / medium / high; key barriers to transition
Pipeline status	Identified, contacted, meeting, interested, negotiation, offer, accepted, declined

position in the international scientific community. A weight of 0.25 means that research potential is a priority but not an absolute criterion. This prevents a situation where a candidate with high publication metrics automatically receives the highest score without consideration of their pedagogical, industrial, or strategic suitability.

- **Teaching relevance** – $T = 0.20$. Teaching relevance is assigned a weight of 0.20, as the primary function of a university remains the training of students. For a technical university, it is important that academic talent not only have scientific achievements but also be capable of teaching disciplines effectively, developing new courses, modernizing educational programs, working with students, and implementing modern educational technologies. The weight of 0.20

reflects the importance of the educational component, but at the same time leaves room for evaluating other components, in particular research, industry, and grant potential. This approach aligns with the logic of a technical university, where the quality of education must be directly linked to science, engineering practice, and innovation.

- **Industry relevance** – $I = 0.20$. Industry relevance is also weighted at 0.20, underscoring the importance of a technical university's connections to the real economy, technology companies, R&D centers, the defense sector, telecommunications, cybersecurity, robotics, and other applied fields. For a technical university, a candidate with strong industry experience can ensure a practice-oriented approach to education, the integration of real-world case studies into the learning process, the establishment of partner laboratories, the launch of joint educational programs, participation in applied research, and the commercialization of research outcomes. A weight of 0.20 makes the industry component equivalent to the teaching component. This is of fundamental importance for a technical university, which must train specialists not only according to academic standards but also in line with the needs of the labor market and technological development.
- **Grant potential** – $G = 0.15$. Grant potential is weighted at 0.15 because a candidate's ability to participate in grant programs, form consortia, prepare applications, manage projects, and attract external funding is a key requirement for the development of a modern university. At the same time, grant potential partially overlaps with research relevance and international readiness, so its weight is slightly lower than that of the research, teaching, and industry components. This helps avoid double-counting of characteristics that are similar in nature. For example, a candidate with a high publication output and international experience often already possesses the prerequisites for high grant potential. The weight of 0.15 reflects the significance of grant activity as a separate evaluation criterion, but does not make it dominant in the overall assessment of the candidate.
- **International / English readiness** – $E = 0.10$. International / English readiness is assigned a weight of 0.10, as international engagement, English proficiency, and experience participating in international projects, academic mobility, consortia, and joint educational programs are important for the university's internationalization. At the same time, this indicator should not outweigh the candidate's core professional criteria—research, teaching, industry, and grant potential. That is why its weight is set at 0.10. This coefficient allows for international readiness to be considered as a factor enhancing the candidate's profile, but does not make it a sufficient basis for a high overall score.
- **Strategic fit** – $S = 0.10$. Strategic fit is also weighted at 0.10, as candidates should be evaluated not only on their own achievements but also on their alignment with the strategic priorities of a specific university, faculty, department, or academic program. This criterion allows us to consider the extent to which the candidate strengthens the university's priority areas of development, such as cybersecurity, telecommunications, artificial intelligence, aviation systems, robotics, defense tech, 5G/6G, critical infrastructure, and so on. A weight of 0.10 was chosen because strategic fit is a corrective criterion. It is not intended to completely replace the candidate's professional qualifications, but it allows us to prioritize those specialists who best align with the university's long-term development strategy.

Each indicator can be rated on a scale from 0 to 5 or from 0 to 100. For practical application, it is advisable to use not only a numerical score but also a brief expert comment: “strengths,” “risks,” “what is needed for the transition,” “which offer might work” [17, 18, 19].

6.1. Formalization of the system's information objects

To enhance scientific rigor, it is advisable to represent the information system model using sets, feature vectors, and correspondence matrices. Let U be the set of the university's structural units, P the set of strategic needs, C the set of potential academic candidates, V the set of value propositions, and K the set of performance indicators. Then the information system can be represented as a tuple:

$$IS_ATM = \langle U, P, C, M, S, V, K, D \rangle, \quad (2)$$

where M is the mechanism for matching university needs with candidate profiles, S is the scoring model, and D is the data repository and log of management decisions. This formalization allows the system to be viewed not as a personnel registry, but as an information and analytical tool for supporting strategic decisions.

Table 4
Formalization of Information Objects

Object	Designation	Main attributes	Management Purpose
Structural unit	$u_i \in U$	faculty, department, educational program, research area	determination of staffing needs
Strategic need	$p_j \in P$	discipline, laboratory, grant area, partnership	developing the profile of the ideal candidate
Candidate	$c_k \in C$	research, teaching, industry, grant, English, strategic fit	evaluation and shortlist
Value proposition	$v_l \in V$	resources, status, autonomy, laboratory, workload	personalization of the offer
KPI	$k_m \in K$	conversion, retention, publications, grants, new courses	system performance evaluation

6.2. Vector model of the candidate's profile and the university's needs

The academic candidate's profile is represented as a normalized feature vector:

$$C_k = (r_k, t_k, i_k, g_k, e_k, s_k, m_k, q_k), \quad (3)$$

where r_k – research performance, t_k – teaching relevance, i_k – industrial relevance, g_k – grant potential, e_k – international and English-language readiness, s_k – strategic alignment, m_k – motivational compatibility, q_k – quality of the profile's evidence base. Similarly, the strategic need of a department or faculty is described by the vector:

$$P_j = (r_j, t_j, i_j, g_j, e_j, s_j, m_j, q_j). \quad (4)$$

All metrics are normalized to the range $[0, 1]$. This allows for the comparison of candidates from different backgrounds: researchers, practicing instructors, educational program directors, industry experts, and young high-potential professionals.

6.3. “Need–candidate” matching matrix

For a set of needs P and a set of candidates C , a matching matrix A of dimension $n \times m$ is formed:

$$A = [a_{jk}], \quad a_{jk} = Match(P_j, C_k). \quad (5)$$

The element a_{jk} indicates the level of match between candidate c_k and specific strategic need p_j . In practical use, the matrix allows for the creation of a shortlist of candidates not for the university as a whole, but for a specific department, laboratory, educational program, or grant area.

6.4. Multi-criteria scoring model

It is advisable to calculate the overall academic suitability score as the weighted sum of normalized criteria:

Table 5
“Need–Candidate” Matching Matrix

Need / Candidate	Candidate 1	Candidate 2	Candidate 3	Management decision
New English-language course	0.82	0.61	0.74	short-list: 1, 3
Launch of an R&D lab	0.65	0.88	0.71	short-list: 2
Horizon Europe grant group	0.77	0.83	0.58	Negotiations with 1, 2
Industrial track	0.69	0.55	0.91	Priority: 3

$$ATS_k = \sum w_i \cdot x_{ik}, \quad \sum w_i = 1, \quad x_{ik} \in [0; 1], \quad (6)$$

where x_{ik} is the value of the i -th criterion for candidate k , and w_i is the weight of the criterion, determined based on the university’s strategic needs. Unlike the static model, the proposed system allows for adjusting weights for different scenarios: research hiring, teaching hiring, industry hiring, and internationalization hiring.

Table 6
Multi-Criteria Scoring Model Weights

Criterion	Research hiring	Teaching hiring	Industry hiring	Explanation
Research relevance, R	0.30	0.15	0.10	publications, h-index, research topics
Teaching relevance, T	0.15	0.30	0.15	courses, methodologies, English-language instruction
Industry relevance, I	0.15	0.10	0.30	practical experience, partnerships, R&D
Grant potential, G	0.20	0.10	0.10	Experience with applications and projects
International readiness, E	0.10	0.15	0.10	English, mobility, consortia
Strategic fit, S	0.10	0.20	0.25	Alignment with the faculty’s strategy

6.5. Normalization of indicators and interpretation levels

To ensure the comparability of data of different types, min–max normalization is used:

$$x_{norm} = \frac{x - x_{min}}{x_{max} - x_{min}}. \quad (7)$$

For qualitative indicators, an expert-based scale ranging from 0 to 5 is used, followed by conversion to a $[0; 1]$ scale. For example, the level of international readiness can be assessed on a scale: 0 – absent, 0.25 – basic, 0.50 – sufficient, 0.75 – high, 1.00 – leading.

6.6. Model of the risk of losing and retaining academic talent

Once a candidate has been recruited, the system must support not only onboarding but also the assessment of retention risk. To this end, we propose the Retention Loss Index (RLI):

$$RLI = \alpha_1 L + \alpha_2 B + \alpha_3 W + \alpha_4 A + \alpha_5 C - \alpha_6 M, \quad (8)$$

where L is the level of external competition for the specialist, B is the discrepancy between expected and actual compensation, W is teaching workload overload, A is insufficient academic autonomy, C is

Table 7
Interpretation of ATS Intervals

ATS Interval	Level of compliance	Recommended action
0.85–1.00	Strategic priority	Personal contact from management, quick offer
0.70–0.84	High fit	meeting, clarification of motivation, proposal preparation
0.55–0.69	potential match	keep in the Talent Pool, maintain contact
0.40–0.54	weak match	consider only for related needs
< 0.40	Irrelevant profile	Do not include in the shortlist

low integration into the team and projects, and M is the level of motivational support and access to resources. The higher the RLI, the greater the need for managerial intervention.

Table 8
Retention Loss Index (RLI) and System Actions

RLI Index	Risk Level	System Actions
0.00–0.30	Low	Regular monitoring, annual review
0.31–0.60	moderate	meeting with supervisor, workload adjustment, resource support
0.61–0.80	high	personal retention plan, mentoring, review of terms
0.81–1.00	critical	urgent management decision, individual offer

6.7. Model of engagement effectiveness and economic feasibility

To assess the system's effectiveness, it is advisable to use the Talent Engagement Index (TEI):

$$TEI = \frac{N_{offer} \cdot CR_{accept} \cdot CR_{retention} \cdot Impact}{Cost}, \quad (9)$$

where N_{offer} is the number of offers made, CR_{accept} is the conversion rate of offers into acceptances, $CR_{retention}$ is the percentage of recruited specialists who remained after the control period, $Impact$ is the overall effect for the university, and $Cost$ is the total expenses for recruitment, negotiations, onboarding, and support. The overall effect may include the number of new courses, grant applications, publications, laboratory initiatives, and partnership projects.

Thus, the system's mathematical framework ensures not only candidate selection but also a closed-loop management cycle: strategic need → candidate → offer → onboarding → performance → retention → adjustment of HR strategy [20, 21, 22].

6.8. Typology of academic talent and EVP personalization

A key factor in successful recruitment is personalizing the value proposition. A strong candidate rarely responds to a standard job posting; instead, they respond to the opportunity to pursue their own academic or research agenda.

6.9. User roles in the information system

For the system to function effectively, it is important to define user roles and the scope of their responsibilities. The system must support access restrictions, as some candidate data is confidential.

Table 9

Typology of Academic Talent and EVP Personalization

Candidate Type	Primary Motivation	Recommended Offer
Research-driven	grants, lab, PhD students, publications	Research mini-grant, reduced workload, lab, support from the research office
Status-driven	position, prestige, public visibility, influence	prestigious role, media announcement, participation in strategic decisions, Professor of Transformation
Impact-driven	system change, launching new programs, strategic role	autonomy, independent direction, participation in faculty transformation
Industry-driven	real-world R&D projects, business, defense/aerospace	joint laboratories, industrial projects, applied research
Young high-potential	rapid growth, mentoring, international opportunities	fast-track career, mentor, international mobility, English-language program

Table 10

User Roles and Functions in the System

Role	Functions in the system
Rector's Office / Vice Rectors	Approval of strategic needs, review of the shortlist, decision-making regarding offers
Dean / Institute Director	Identifying faculty needs, contacting strong candidates, participating in negotiations
Department Chair	Candidate profile description, expert assessment of competencies, integration plan
HR / Talent Manager	Maintaining the Talent Map, communications, CRM statuses, scheduling, transition support
Research Office	Grant potential assessment, research proposal support
International Office	evaluation of the international component, mobility, dual appointment
System administrator	access rights, security, reference guides, technical support

6.10. Stages of system implementation

It is advisable to implement the information system in stages, rather than starting immediately with a large digital platform. In the early stages, it is sufficient to create a manageable digital model in the form of a CRM or a structured table, and after validating the processes, transition to a full-fledged web system.

Table 11

Stages of System Implementation

Stage	Content	Result
Stage 1. Analytics and data model	Description of the candidate profile, Talent Map structure, scoring criteria, and user roles	system methodology and templates
Stage 2. MVP Talent Map	Excel/CRM database, 30–50 candidates, communication statuses, initial scoring	First managed pipeline
Stage 3. Communication Loop	personal outreach, strategic meetings, identifying motivations and barriers	shortlist and negotiations
Stage 4. Offer and onboarding	personalized offers, fast-track procedure, 30/60/90 onboarding plan	Hired candidates and integration
Stage 5. Digital platform	Web interface, dashboard, automated scoring, retention monitoring	Scalable information system

6.11. KPIs and performance evaluation

The system's effectiveness should be evaluated not only by the number of faculty members involved, but also by its impact on educational programs, research, international engagement, and industry partnerships.

Table 12
KPIs and Performance Evaluation

KPI Group	Indicators
Pipeline KPIs	number of profiled candidates; number of contacts; number of meetings; number of active negotiations
Conversion KPI	contacted → meeting; meeting → negotiation; negotiation → offer; offer → accepted
Academic KPI	new disciplines; English-language courses; curriculum updates; participation in accreditation processes
Research KPI	grant applications; publications; research groups; PhD supervision
Industry KPI	Joint R&D projects; laboratories; industrial training courses; partnership programs
Retention KPIs	6-month review; 12-month retention; satisfaction; churn risk
Strategic KPIs	Strengthening the university's priority areas; international visibility; increase in applicants to relevant degree programs

6.12. Data protection and confidentiality

Since the system handles personal data, professional profiles, and confidential information about candidates' potential job moves, it must be designed according to the principle of privacy-by-design. Access to Talent Map must be role-based; sensitive fields should be accessible only to HR, the dean, and authorized members of management. Candidates' communication history, motivators, barriers to transition, and financial expectations must not be accessible to a wide range of users.

Basic security requirements: role-based access control; change logging; backup; export restrictions; labeling of confidential records; deletion or archiving of candidate data upon request; separate rules for working with international candidates; control over the use of information during negotiations.

6.13. Scientific novelty and practical value

The scientific novelty of the proposed approach lies in the fact that the recruitment of academic talent is viewed not as a separate human resources procedure, but as an information and analytical system supporting the strategic development of a technical university. The paper proposes integrating HR analytics, educational strategy, research priorities, partnership collaboration, and retention monitoring into a single model.

The practical value lies in the ability to implement the system gradually: first as a structured Talent Map and CRM process, then as a web-based information system with a dashboard, scoring model, offer builder, and retention modules. Such a model is particularly important for technical universities, where competition for faculty and researchers in the fields of cybersecurity, telecommunications, aviation, artificial intelligence, robotics, and defense technology is high.

7. Conclusions

This article proposes a conceptual model of an information system for the strategic recruitment and retention of academic talent at a technical university. It is argued that for a modern technical higher education institution, the recruitment of strong faculty members, researchers, and practitioners should

Table 13
Implementation Risks and Ways to Mitigate Them

Risk	Manifestation	Mitigation Method
Formal use of the system	Talent Map is not updated; decisions are made outside the system	Assign a responsible HR/Talent Manager, conduct weekly pipeline reviews
Low data quality	Incomplete profiles, varying evaluation criteria	Standardized templates, required fields, regular data audits
Resistance from departments	Departments do not see the value of the system	Link the system to the development of educational programs, laboratories, grants, and department rankings
Lack of budget for offers	Strong candidates do not accept offers	Use flexible formats: part-time, visiting professor, mini-grant, dual appointment
Confidentiality	Risk of information leaks regarding candidates	role-based access, logging, export restrictions, NDAs for users

not be a reactive personnel procedure, but rather a systematic digital process linked to the development of educational programs, research areas, international partnerships, and industrial collaboration.

The proposed system covers the entire cycle of academic talent management: identifying strategic needs, creating a Talent Map, candidate scoring, personalized communication, customized offers, onboarding, KPI monitoring, and retention support. Its implementation can increase the transparency and manageability of academic recruiting, reduce the loss of strong candidates, ensure better integration of new faculty members, and build a talent pool for the university's strategic priorities.

Further research should focus on developing a system prototype, validating the scoring model using real-world cases, automating data collection from open academic sources, and creating a dashboard for managerial monitoring of the academic talent pipeline.

Declaration on Generative AI

The authors have not employed any Generative AI tools.

References

- [1] ProQuest Dissertations & Theses, Proquest dissertations & theses, 2026. URL: <https://www.proquest.com/openview/10daff3ec208a60e08f7d51ae40f769c/1?pq-origsite=gscholar&cbl=2026366&diss=y>.
- [2] N. Kunene, Attracting and Retaining Academic Research Staff: A Case Study of an Institution of Higher Learning, Dissertation, University of KwaZulu-Natal, 2019. URL: <https://researchspace.ukzn.ac.za/bitstreams/32b1fdd8-3ad4-45f0-86f6-720a0f3a4fab/download>.
- [3] M. Bartrop-Sackey, A. O. Boakye, P. Muah, N. Y. Oppong, Exploring the talent retention strategies of cape coast technical university in ghana, SA Journal of Human Resource Management 20 (2022) a1865. doi:10.4102/sajhrm.v20i0.1865.
- [4] N. Osutei, J. H. Kim, Examining talent attraction and retention in small and medium-sized cities: Where do universities fit in?, Growth and Change 54 (2023) 736–753. doi:10.1111/grow.12672.
- [5] H. Löfsten, M. Klofsten, E. Cadorin, Science parks and talent attraction management: University students as a strategic resource for innovation and entrepreneurship, European Planning Studies 28 (2020) 2465–2488. doi:10.1080/09654313.2020.1722986.
- [6] A. Kaur, N. L. A. Majid, N. A. A. Bakar, S. S. Hussien, H. Salehuddin, Strategic integration of knowledge and talent management: Enhancing academic operations in higher education through

- enterprise architecture implementation, in: L. Uden, I.-H. Ting (Eds.), *Knowledge Management in Organizations*, volume 2152 of *Communications in Computer and Information Science*, Springer, Cham, 2024, pp. 198–210. doi:10.1007/978-3-031-63269-3_15.
- [7] ProQuest Dissertations & Theses, Proquest dissertations & theses, 2026. URL: <https://www.proquest.com/openview/094fd9ae725e29dca3e92bf0c0384439/1?pq-origsite=gscholar&cbl=2026366&diss=y>.
 - [8] M. L. Chimwene, Talent Retention Strategies and Competitiveness of Public Universities in the Western Region of Kenya, Thesis, Masinde Muliro University of Science and Technology, 2020. URL: <https://ir-library.mmust.ac.ke/xmlui/handle/123456789/1392>.
 - [9] L. J. Rop, J. Kwasira, Influence of talent attraction on organizational performance in public university campuses in nakuru county, kenya, *International Journal of Management and Information Technology* 10 (2015) 2453–2460. URL: <https://www.researchgate.net/publication/326973866>.
 - [10] M. H. M. B. Tareef, A. Al-Hait, The role of talent management in developing technological competencies: The mediating role of information technology: An applied study on jordanian private universities, *International Journal of Health Sciences* 6 (2022) 3189–3221. doi:10.53730/ijhs.v6nS8.12814.
 - [11] P. Hananiya, F. O. Awodoyin, Administrators’ talent management strategies as predictors of lecturers’ retention in federal universities in north-eastern nigeria, *Lagos Education Review* 20 (2025). doi:10.52968/15607928.
 - [12] J. M. Milburn, Recruitment Strategies for Talent Management in Information Technology, Doctoral dissertation, Walden University, 2021. URL: <https://scholarworks.waldenu.edu/cgi/viewcontent.cgi?article=12370&context=dissertations>.
 - [13] Kyiv Aviation Institute State University, Kai faculty excellence program: A project to attract faculty and researchers, 2026. Internal concept document.
 - [14] European University Association, Universities without walls: A vision for 2030, 2021.
 - [15] OECD, Education at a Glance: OECD Indicators, OECD Publishing, Paris, 2022.
 - [16] UNESCO, Reimagining Our Futures Together: A New Social Contract for Education, UNESCO, Paris, 2021.
 - [17] M. Armstrong, Armstrong’s Handbook of Human Resource Management Practice, Kogan Page, 2021.
 - [18] D. G. Collings, K. Mellahi, Strategic talent management: A review and research agenda, *Human Resource Management Review* (2024).
 - [19] P. Sparrow, H. Makram, What is the value of talent management? building value-driven processes within a talent management architecture, *Human Resource Management Review* (2022).
 - [20] Deloitte, Human capital trends, 2021.
 - [21] European Commission, European strategy for universities, 2022.
 - [22] International Organization for Standardization, Iso/iec 27001: Information security, cybersecurity and privacy protection — information security management systems — requirements, 2024.