



## Talent Pool Analysis and Screening for Lecturers Based on Data Management for Business Intelligence at University

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**Abstract.** This study aims to develop a comprehensive understanding of a Talent Pool Analysis and Screening for Lecturers model based on data management and business intelligence (BI) as a strategic approach to improving lecturer recruitment and academic workforce management in universities. The core problems identified include the limited integration of academic and employment data, the predominance of subjective assessments in lecturer selection, and the suboptimal use of predictive analytics to support accurate and forward looking human resource decisions. This research proposes the application of HR analytics, people analytics, and BI as a solution to create a more objective, efficient, and evidence based lecturer screening process. The objects of analysis consist of scholarly literature on HR analytics, BI, and AI/ML for recruitment, as well as institutional documentation related to lecturer management policies. Employing a descriptive qualitative method through literature review and document analysis, the study finds that BI technologies and predictive models significantly enhance candidate identification accuracy, accelerate the selection process, and enable more strategic academic workforce planning. The findings also indicate that the successful implementation of a BI based model requires data readiness, analytical competence, and governance frameworks that ensure ethical algorithmic use. The study concludes that integrating BI into academic talent management not only strengthens recruitment effectiveness but also provides a foundation for developing new theoretical insights, such as an Academic Talent Intelligence framework, to support more adaptive and future oriented lecturer management practices.

**Keywords:** Talent Pool; Lecturer Recruitment; Data Management; Business Intelligence; Higher Education; Human Resource Analytics; Decision Support System.

### INTRODUCTION

The rapid advancement of data technologies and analytics has significantly transformed human resource management practices, particularly in talent identification, assessment, and development within higher education institutions. HR analytics, predictive analytics, and business intelligence (BI) have reshaped organizational decision making by enabling data driven, evidence based strategies for recruitment, retention, and workforce

optimization. As highlighted by (Kurnia Zebua et al., 2024), HR analytics has evolved from descriptive reporting into a strategic instrument capable of enhancing organizational performance and supporting high impact HR functions. This analytical shift is especially relevant for universities seeking to strengthen academic quality and ensure the availability of competent lecturers through systematic talent pool management.

In parallel, the digital transformation of talent acquisition has redefined recruitment dynamics. Artificial intelligence (AI), machine learning (ML), and advanced digital assessment tools now allow institutions to screen thousands of applicants efficiently, identify competency patterns, and predict candidate success with high accuracy. (Tuttle & Critchlow, 2025) emphasize that technology enabled recruitment ecosystems enhance both efficiency and accuracy while supporting personalized candidate experiences in large scale hiring processes. Empirical evidence further demonstrates that AI assisted screening particularly natural language processing (NLP) and predictive scoring can accelerate hiring times and improve the reliability of selection decisions. Moreover, comparative studies of machine learning algorithms in recruitment environments indicate that models such as Random Forests and Neural Networks can achieve accuracy levels exceeding 92% in predicting candidate suitability. (Al-Quhfa et al., 2024) found that these models outperform traditional recruitment approaches, reinforcing the strategic value of integrating BI systems with advanced computational analytics in HR decision making. These developments underscore the potential for higher education institutions to adopt similar data driven frameworks in lecturer selection and talent mapping.

Despite these advancements, significant challenges remain. Several organizations encounter barriers related to data governance, human capital readiness, analytical capability, and resistance to algorithm based decision processes. (AlSuliman & Elrayah Musaddag, 2021) identify issues such as limited analytical skills, technological unfamiliarity, and organizational reluctance as major impediments to HR analytics adoption. Additionally, ethical concerns surrounding algorithmic bias and data privacy demand careful governance structures and responsible analytics practices areas emphasized in people analytics frameworks by (Peeters et al., 2020). Motivated by these shifts and challenges, this study aims to investigate how data management and BI can be utilized to enhance talent pool analysis and screening processes for lecturers at the university level. Although the literature widely recognizes the benefits of HR analytics for organizational effectiveness, there remains a limited body of research focusing specifically on academic institutions' use of BI driven methods for lecturer recruitment, competency mapping, and forecasting academic workforce needs.

This research is guided by the following problem statements: (1) What is the relationship between HR analytics utilization and the effectiveness of lecturer screening processes? (2) How does the integration of BI systems influence accuracy in recruitment decision making? (3) To what extent can predictive analytics support lecturer workforce planning and future talent identification? and (4) How do organizational readiness factors moderate the adoption and impact of data driven talent management practices? The objective of this study is to develop a comprehensive analytical perspective on BI based talent pool management for lecturers, identify key variables influencing its effectiveness, and propose a conceptual framework to support strategic academic human resource decisions. Ultimately, this research contributes both theoretically by enriching the discourse on HR analytics within higher education and practically, by offering actionable insights for universities aiming to improve lecturer quality through structured, data oriented talent management systems.

## LITERATURE REVIEW

The development of HR analytics and people analytics has become a foundational pillar for data driven talent pool analysis and lecturer screening systems in higher education institutions. HR analytics is understood as the application of research design and advanced statistical techniques to analyze human resource data for evidence based decision making (Opatha, 2020). This analytical approach enables organizations to address strategic questions

regarding recruitment effectiveness, retention, and long term talent development. In the broader context of organizational performance, HR analytics has been shown to significantly enhance recruitment processes, talent management, and organizational effectiveness, particularly when integrated with predictive analytics and machine learning (Kurnia Zebua et al., 2024). Therefore, HR analytics provides an essential theoretical foundation for building a more systematic and measurable approach to lecturer talent pool analysis in universities.

Complementing this, the concept of people analytics emphasizes that data driven insights in HR are not limited to data processing, but involve generating descriptive, visual, and statistical analyses of workforce information to support evidence based management decisions. (Peeters et al., 2020) developed the People Analytics Effectiveness Wheel, outlining four key ingredients for effective analytics practice: enabling resources (data, infrastructure, analytical skills), analytical products, stakeholder management, and governance structures. For higher education institutions, this framework implies the need to integrate academic performance data, employment records, competency profiles, and lecturer workload metrics into a coherent analytics ecosystem that directly supports talent pool management and lecturer selection.

Despite its strategic potential, the adoption of HR analytics faces several implementation barriers. (Alsaliman & Elrayah Musaddag, 2021) highlight that resistance to data driven HR practices is often rooted in perceived complexity, lack of analytical competencies, insufficient technological support, and organizational resistance to algorithmic decision making. Data quality, ethical considerations, and privacy concerns further complicate implementation, particularly in public sector and academic environments where data governance structures tend to be less mature. These challenges suggest that universities must emphasize capacity building, data standardization, and ethical governance to fully leverage analytics in the lecturer screening process.

The literature on digital transformation in talent acquisition shows a pronounced shift from traditional recruitment toward advanced digital ecosystems that employ artificial intelligence (AI), predictive analytics, and automated assessment tools. (Tuttle & Critchlow, 2025) describe how modern recruitment technologies drastically increase efficiency by screening thousands of candidates within seconds and predicting job success with high accuracy through natural language processing and AI enabled scoring models. These tools also enhance candidate experience and reduce bias, providing a scalable and objective approach to evaluating applicant competencies. For lecturer recruitment, these insights underscore how automated assessment platforms can streamline the evaluation of academic profiles, publication records, and pedagogical competencies. A more technical perspective is offered by (Al-Quhfa et al., 2024), who compare various machine learning models including Random Forest, Neural Networks, and Gradient Boosting to optimize recruitment decisions in BI driven environments. Their findings show that Random Forest achieved the highest accuracy (92.8%), followed closely by Neural Networks (92.6%), demonstrating the effectiveness of ML algorithms in predicting candidate suitability and improving recruitment efficiency. Although the study focuses on BI related hiring, the predictive capabilities explored are highly applicable to academic recruitment, where multi criteria evaluation is essential.

In the broader field of AI driven talent management, (Faqihi & Miah, 2023) highlight that AI powered HR systems offer unprecedented automation and insight generation, yet introduce ethical risks, algorithmic biases, and concerns of dehumanization that must be addressed through careful system design and oversight. Their proposed framework suggests integrating the Technology Organization Environment (TOE) model with the Diffusion of Innovation (DOI) theory to guide ethical and effective adoption. For universities implementing lecturer analytics, such considerations are critical to maintaining fairness and transparency in recruitment and promotion decisions. Furthermore, literature on predictive analytics in strategic workforce planning demonstrates its importance for long term talent sustainability. (Rahaman & Bari, 2024) argue that predictive analytics enables organizations to anticipate future skill needs, identify workforce gaps, and design targeted interventions that strengthen

long term capability development across industries. Universities similarly require predictive modeling to forecast lecturer needs aligned with student enrollment trends, accreditation demands, and emerging academic disciplines.

The debate between internal development versus external recruitment also contributes valuable insights to talent pool strategies. (Palomäki, 2025) finds that organizations generally adopt a hybrid approach: external recruitment addresses immediate capability gaps, while internal development promotes commitment, cultural alignment, and long term capacity building. In the academic context, this suggests balancing the recruitment of highly qualified external candidates with programs that develop existing lecturers through training, research support, and career progression. Finally, the role of BI tools provides an essential technological backbone for talent analytics. (Maaitah, 2023) notes that BI systems enhance decision making by integrating diverse data sources, enabling rapid reporting, and supporting strategic analyses that improve organizational performance and stakeholder satisfaction. BI capabilities such as dashboards, data warehousing, and predictive modeling are critical for structuring lecturer data into actionable insights for recruitment, promotion, and talent pipeline planning.

Overall, the literature demonstrates that HR analytics, people analytics, BI systems, AI, and machine learning collectively offer a robust theoretical and technological foundation for designing a data driven talent pool analysis and lecturer screening model. However, the limited number of studies focusing specifically on analytics based lecturer talent management indicates a clear research gap. This study addresses that gap by examining how integrated data management and BI systems can enhance the objectivity, accuracy, and strategic value of lecturer screening processes in higher education institutions.

## RESEARCH METHODS

This study employs a qualitative descriptive research approach to examine the mechanisms of Talent Pool Analysis and Screening for Lecturers based on data management and BI within university settings. The qualitative descriptive design was selected because it allows for an in depth exploration of phenomena, the interpretation of conceptual relationships, and the identification of patterns associated with data driven talent management practices. Through this interpretative approach, the study seeks to uncover how HR analytics, people analytics, and BI frameworks are utilized to support evidence based decision making in academic human resources, particularly in the recruitment, evaluation, and development of lecturers. Data collection in this study relies primarily on literature review and document analysis. The literature review synthesizes current scholarly work relevant to analytic driven human resource management, digital transformation in recruitment, predictive analytics, and BI. Key sources include studies demonstrating the strategic contributions of HR analytics to recruitment effectiveness and organizational performance (Kurnia Zebua et al., 2024), conceptual foundations of HR analytics and analytic processes (Opatha, 2020), frameworks of people analytics effectiveness (Peeters et al., 2020), and barriers to the adoption of HR analytics in practice (Alsuliman & Elrayah Musaddag, 2021). Complementary literature also includes works discussing digital transformation in talent acquisition through AI and predictive analytics (Tuttle & Critchlow, 2025), comparative machine learning models for recruitment optimization (Al-Quhfa et al., 2024), and AI driven talent management frameworks addressing associated risks and opportunities (Faqihi & Miah, 2023). These sources were selected for their relevance in providing theoretical grounding and empirical insights into the role of analytics and BI in supporting talent related decisions.

By applying this qualitative methodology, the study aims to produce a detailed and integrative examination of how universities can leverage HR analytics, BI, and predictive technologies to develop a modern, evidence based system for lecturer talent pool analysis and screening. This approach allows the research to contribute theoretical insights while

offering practical recommendations for strengthening analytic capacity and data governance in academic human resource management.

## RESULTS AND DISCUSSION

### HR Analytics, People Analytics, and Business Intelligence Provide the Methodological and Technological Foundations for More Accurate Talent Pool Analysis

The findings indicate that HR analytics, people analytics, and BI constitute essential methodological and technological foundations for conducting accurate, data-driven talent pool analysis in higher education institutions. HR analytics contributes by employing statistical techniques, workforce data processing, and predictive modeling to evaluate competencies, performance trajectories, and potential development of academic personnel. (Kurnia Zebua et al., 2024) confirm that HR analytics significantly enhances organizational effectiveness by generating relevant insights that support evidence-based decision-making, particularly in recruitment and talent management processes. Similarly, (Opatha, 2020) HR Analytics Model illustrates that systematic data collection, analysis, and insight generation are central to effective talent management. People analytics further expands this methodological base by integrating behavioral, performance, and organizational data to enable holistic workforce analysis. (Peeters et al., 2020), through the *People Analytics Effectiveness Wheel*, emphasize that data quality, analytical capabilities, and governance structures are critical determinants of successful analytics implementation. Meanwhile, BI provides the technological infrastructure required for talent pool analysis, including data integration platforms, dashboards, visualization tools, and automated reporting. (Maaitah, 2023) demonstrates that BI increases decision-making accuracy by offering timely, comprehensive, and structured information an essential capability for mapping academic talent against institutional needs. Together, HR analytics, people analytics, and BI form a robust foundation that allows universities to assess academic talent with greater precision compared with traditional, manually driven approaches.

### AI and Machine Learning Create Opportunities for Predictive and Efficient Screening Models

The study reveals that artificial intelligence (AI) and machine learning (ML) significantly enhance the predictive accuracy and operational efficiency of lecturer screening processes. These technologies enable universities to assess candidate suitability by identifying patterns in historical academic performance, publication records, teaching evaluations, research engagement, and other multidimensional indicators. (Al-Quhfa et al., 2024) found that algorithms such as Random Forest, Neural Networks, and Gradient Boosting achieve prediction accuracies exceeding 92%, positioning them as highly effective tools for automated screening in BI supported recruitment systems. Furthermore, (Tuttle & Critchlow, 2025) highlight that digital transformation in talent acquisition through AI driven document screening, NLP based text analysis, and digital assessments not only accelerates hiring processes but also reduces subjective bias inherent in traditional evaluations. AI driven talent management frameworks, such as that proposed by (Faqihi & Miah, 2023), emphasize the role of predictive analytics in identifying high-potential candidates and forecasting long-term performance contributions. Overall, AI and ML provide transformative capabilities that enable universities to design screening models that are not only faster and more efficient but also empirically grounded and scientifically rigorous.

### The Implementation of Workforce Analytics Faces Adoption, Ethical, and Governance Challenges That Require Appropriate Governance Frameworks

Despite its advantages, the implementation of HR analytics and BI is constrained by multiple challenges related to technology adoption, ethical considerations, and governance. (Alsuliman & Elrayah Musaddag, 2021) found that resistance to analytics technology, limited analytical competency, and insufficient organizational support hinder the adoption of HR

analytics in many institutions. These barriers are similarly observed in higher education, where decision making processes are often dominated by bureaucratic norms and manual evaluation methods. Ethical challenges also emerge, including concerns about algorithmic bias, privacy risks, and the potential dehumanization of academic evaluation. (Faqihi & Miah, 2023) argue that AI based talent management systems must be designed with strong ethical safeguards, transparency mechanisms, and fairness principles to prevent discriminatory outcomes.

Governance challenges further complicate implementation. Inconsistent data quality, poor system integration, and the absence of standards for data management and model auditing weaken the reliability of BI supported decisions. (Peeters et al., 2020) stress that governance including data standardization, access control, and evaluation structures is a core pillar of effective people analytics. Therefore, a comprehensive governance framework is required to ensure that analytics driven talent processes in universities operate ethically, securely, and responsibly.

### **Research Specifically Focusing on Talent Pool Analysis and Screening for Lecturers Using Data and BI Remains Limited, Creating a Research Gap**

The findings confirm that, despite the growing body of literature on HR analytics, BI, and AI in talent management, studies specifically addressing *Talent Pool Analysis and Screening for Lecturers* in higher education remain scarce. Most existing research focuses on corporate environments, public-sector organizations, or general workforce management rather than academic personnel. Research on lecturers tends to examine teaching workloads, research productivity, and performance evaluation without explicitly linking these areas to BI-based talent pool methodologies.

In (Rahaman & Bari, 2024), it is provided insights into predictive workforce planning that are highly applicable to lecturer needs forecasting, yet their work does not directly explore data-driven academic talent mapping. Likewise, (Palomäki, 2025) sheds light on the balance between external recruitment and internal development but does not situate this discussion within BI-supported lecturer screening systems. This scarcity of domain-specific studies highlights a clear research gap, particularly in (a) developing data-driven frameworks for academic talent pools; (b) designing predictive models tailored to lecturer performance characteristics; and (c) integrating HR analytics, BI, and academic information systems to strengthen lecturer management strategies. The present study contributes to addressing this gap by conceptualizing a BI enabled talent pool and screening model tailored to the academic context.

### **CONCLUSION AND RECOMMENDATION**

This study concludes that the integration of data management and BI into the Talent Pool Analysis and Screening for Lecturers process represents a strategic advancement capable of significantly enhancing decision making quality within university human resource management. The synthesis of literature and documentation demonstrates that HR analytics, people analytics, and predictive technologies such as machine learning contribute meaningfully to improving the objectivity, efficiency, and accuracy of lecturer evaluation and selection. Standardized data, predictive models, and analytic dashboards enable universities to identify highly qualified candidates based on academic competencies, research performance, and potential contributions to the tridharma of higher education. These findings affirm that BI functions not merely as a reporting tool but as a strategic mechanism that supports long term academic workforce planning. The study also highlights gaps in data readiness, governance practices, and analytical capabilities that significantly influence the success of BI driven talent management initiatives in higher education institutions.

From a theoretical perspective, this study offers the potential formulation of a new conceptual lens referred to as the Academic Talent Intelligence Framework. This framework integrates HR analytics, BI, and predictive algorithms into a unified model for academic talent management. It emphasizes three core components: (1) the integration of academic and

employment data into a cohesive analytic ecosystem; (2) the application of predictive models to assess lecturer suitability and performance potential; and (3) governance and ethical safeguards ensuring transparency, accountability, and fairness throughout the selection process. As such, the study enriches existing literature on people analytics in the higher education sector while providing a conceptual foundation for future theoretical development connecting analytic technologies with academic talent management. Based on the study findings, universities are encouraged to strengthen their data infrastructure and develop integrated BI systems as the foundational requirement for implementing analytically driven talent pool mechanisms. Initial steps include data cleansing, standardization, and consolidation of academic and HR information within a unified platform. Institutions should also invest in enhancing the analytical capabilities of HR personnel through continuous training programs, ensuring that predictive technologies are understood and effectively utilized. Establishing robust data governance policies including those related to privacy, security, and algorithmic fairness will be essential to mitigate risks of bias and uphold ethical standards in the use of technology for lecturer screening.

## ACKNOWLEDGEMENTS

The authors fully express sincere gratitude to the University of Pamulang - UNPAM Tangerang Selatan, Banten, which has given us the opportunity to develop this paper. The authors also are very appreciative to Dr. Taswanda Taryo, M.Sc. who has reviewed and given guidance and hence this paper can finally submitted to and present at the International Conference on Management and Science 2025. The authors finally expected this paper research will be very worthwhile for the related-matter community in Indonesia.

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