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Bibliometric Mapping of Competency-Based Recruitment

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ABSTRACT

This study conducts a comprehensive bibliometric mapping of global research on competency-based recruitment using Scopus-indexed publications. By applying network, co-authorship, country collaboration, density, and overlay visualizations through VOSviewer, the study identifies the structural patterns, thematic evolution, and influential contributors shaping the field. The findings reveal that competency-based recruitment research is predominantly anchored in medical and clinical education, where standardized evaluation, Entrustable Professional Activities (EPAs), and outcome-based frameworks drive evidence-based selection processes. The keyword clusters highlight four major themes: human resource management, competency-based education, curriculum design, and clinical training. The United States and the United Kingdom emerge as the primary global hubs of scholarly collaboration, supported by strong institutional networks involving major medical schools and hospitals. Citation analysis underscores the seminal role of works that link competency models to performance prediction, workforce reliability, and structured assessment. Overall, the study demonstrates that competency-based recruitment has evolved from educational theory into a multidimensional framework that integrates HRM practices, professional competence development, and organizational performance. These insights provide a scientific foundation for strengthening competency-centric recruitment systems in high-risk and knowledge-intensive sectors.

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1. INTRODUCTION

Competency-based recruitment has emerged as a critical strategic approach in modern human resource management, emphasizing the alignment between individual competencies and organizational performance expectations [1]–[3]. As organizations face increasingly dynamic environments marked by technological change, hybrid work arrangements, and global competition for skilled talent, the need for robust, evidence-based recruitment models has intensified. Within this context, competency frameworks have become central to ensuring that employees possess not only technical proficiency but also behavioral attributes necessary for effective job performance. Early foundational works, such as those by [4]–[6], demonstrate the predictive

power of competency models in assessing managerial performance, establishing a strong theoretical foundation for subsequent developments in recruitment science.

Over the past two decades, competency-based recruitment has expanded beyond corporate management roles into sectors such as healthcare, public administration, and education. The integration of outcome-based education, Entrustable Professional Activities (EPA), and structured professional assessment has reshaped how institutions—particularly in health and clinical settings—identify and prepare candidates for complex roles. [7]–[9], for example, highlight the value of competency-driven selection models for general practice registrars, reinforcing the importance of structured, validated tools in reducing subjectivity and improving selection outcomes. Likewise, global initiatives in physician recruitment and midwifery education underscore how competency-based frameworks support skill standardization across diverse cultural and institutional contexts [10], [11].

Technological advancements have also transformed the landscape of competency-based recruitment. Artificial intelligence (AI), machine learning, and digital assessment platforms now play an increasingly significant role in screening, evaluating, and predicting candidate success. These tools provide deeper insights into candidate competencies, reduce human bias, and increase the efficiency of recruitment processes [12]–[14]. AI-driven approaches are particularly valuable in high-stakes professions—such as surgery, nursing, and mental health services—where evidence-based selection methods contribute directly to service quality and patient safety. Studies on compassion fatigue, communication dynamics, and clinical training outcomes demonstrate that competency-based recruitment is deeply interconnected with long-term professional development and workforce retention [15], [16].

Despite its rapid development and widespread application, research on competency-based recruitment remains fragmented across disciplines such as construction management, public health, medical education, nursing, psychology, and human resource management. Each domain contributes unique conceptual and methodological perspectives, enriching the field while simultaneously complicating efforts to delineate its conceptual boundaries and track its evolution. In this context, bibliometric analysis becomes essential for mapping intellectual structures, research productivity, thematic patterns, and collaboration networks across global scholarship. Through techniques such as network visualization, overlay mapping, citation analysis, and density mapping, bibliometrics offers a systematic means of understanding how research themes converge, diverge, and influence emerging priorities across disciplines.

Given the increasing importance of competency-based recruitment in shaping organizational performance and human capital strategies, synthesizing the existing literature is both timely and necessary. Although previous studies have explored specific sectors or methodological approaches, no comprehensive bibliometric examination has assessed the trajectory, influence, and thematic dynamics of competency-based recruitment across major global publications. This gap constrains scholars' ability to identify research frontiers, high-impact contributions, and interdisciplinary opportunities. Therefore, this study conducts a systematic bibliometric mapping using Scopus-indexed publications to analyze publication trends, influential authors, thematic clusters, collaborative relationships, and temporal shifts in research focus. By visualizing these patterns, the study provides an integrated scientific overview of the field's development and highlights future directions for strengthening competency-driven recruitment practices across professional sectors.

2. METHODS

2.1 Design

This study employed a descriptive–quantitative bibliometric design to map the scientific landscape of competency-based recruitment research. Bibliometric analysis was selected because it enables the systematic exploration of publication patterns, intellectual structures, and thematic evolution within a large body of scholarly work. Through visualization techniques—such as network, overlay, density, co-authorship, and country mapping—the method provides an objective overview of how research themes develop and how scholarly collaborations shape the direction of the field.

2.2 Data Source and Search Strategy

The Scopus database served as the primary data source due to its comprehensive coverage of peer-reviewed scholarly publications across disciplines. A structured search query was designed to identify studies related to competency-based recruitment, competency frameworks, competency-based assessment, and professional selection systems, using keyword combinations such as "competency-based recruitment," "competency assessment," "competency model," "professional selection," and "competency-based education," supported by Boolean operators (AND/OR) to refine the scope. Only articles published in peer-reviewed journals, written in English, focused on recruitment or competency-based models, and indexed in Scopus at the time of retrieval were included, while conference papers, editorial notes, and non-research materials were excluded to maintain analytical reliability. The search process, completed in 2025, produced a curated dataset that captures the most current developments in competency-based recruitment research.

2.3 Data Cleaning and Standardization

Before conducting the visualization analysis, the dataset underwent a thorough cleaning process to ensure accuracy and consistency, following standard bibliometric data-preparation procedures. This included the standardization of author names to harmonize variations in initials or spelling and prevent fragmented clusters in co-authorship networks; the unification of synonymous keywords, such as "competency-based education" and "competency-based training," to maintain coherence in thematic mapping; the normalization of institutional affiliations to consolidate multiple naming formats into standardized entries; and the removal of duplicate records to avoid inflation of citation counts and network density. These steps ensured that the resulting network and density visualizations accurately reflected genuine scholarly relationships within the field.

2.4 Bibliometric Tools and Analytical Procedures

The cleaned dataset was then exported into VOSviewer 1.6.x, a widely used tool for constructing and visualizing bibliometric networks. Several analytical techniques were applied to capture different dimensions of the scholarly landscape. Network visualization was used to map relationships among author keywords, revealing dominant research themes and illustrating how topics such as competency models, recruitment strategies, clinical training, outcome-based education, and Entrustable Professional Activities intersect within the literature. Overlay visualization introduced a temporal layer by indicating shifts in research interest across publication periods, enabling identification of emerging and declining topics. Density visualization highlighted the intensity and frequency of keyword co-occurrences, with warm-colored areas indicating the intellectual core of competency-based recruitment research. Citation analysis was employed to identify influential authors and seminal works—such as studies by Dainty et al. (2005), Halaas et al. (2008), Harden (2007), and Gardner et al. (2018)—while co-authorship and country mapping visualized patterns of scholarly collaboration and global scientific interaction,

offering insight into the regions and researcher groups most actively shaping the field.

To guide interpretation of these bibliometric outputs, the study adopted a three-layer analytical framework. The first layer, performance analysis, examined publication volume, citation counts, and author productivity to assess the overall influence of the field. The second layer, science mapping, focused on identifying thematic clusters and intellectual structures using keyword networks to reveal how interdisciplinary contributions coalesce into coherent domains of knowledge. The third layer involved temporal trend analysis, which explored how dominant topics evolved over time using overlay visualization data. Together, these analytical layers enabled a comprehensive understanding of the scientific progression of competency-based recruitment research, clarified underlying conceptual linkages, and uncovered emerging trends that shape future research directions.

2.5 Ethical Considerations

All data analyzed in this study were obtained from publicly accessible academic sources. No personal or confidential information was used, and all analyses adhered to responsible research practices. The visualizations, tables, and interpretations are based solely on aggregated bibliometric data.

3. RESULTS AND DISCUSSION

3.1 Institutional Collaboration Structure

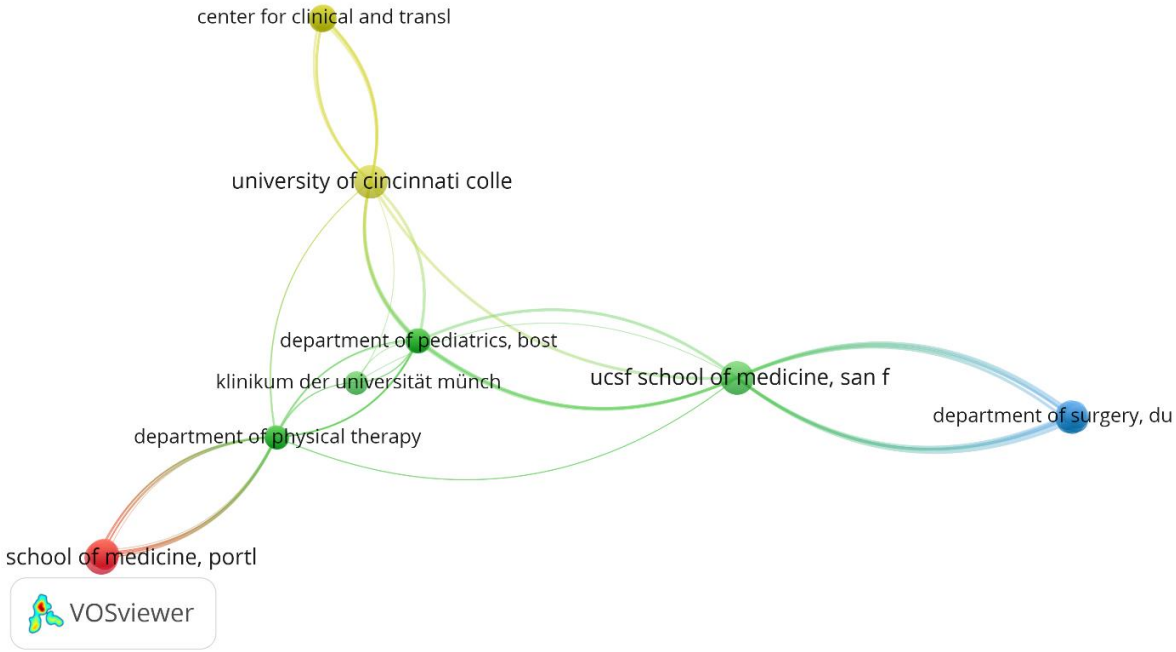

Figure 1. Affiliation
Source: Data Analysis Result, 2025

Figure 1 shows that institutional collaboration in competency-based recruitment research is dominated by medical schools and clinical training centers, with the University of Cincinnati College of Medicine, UCSF School of Medicine, the Department of Pediatrics in Boston, Klinikum der Universität München, and the School of Medicine in Portland forming the densest and most interconnected cluster. These institutions maintain strong co-publication ties, reflecting the close relationship between competency-

based recruitment and the development of clinical education, residency training, and structured competency evaluation frameworks; for instance, the collaboration between Cincinnati and UCSF illustrates shared interests in Entrustable Professional Activities (EPAs), performance assessment, and evidence-based decision-making in medical education. The presence of smaller peripheral nodes—such as the Department of Surgery at Duke—suggests that while surgery-related competency research exists, it tends to be more specialized and limited in collaborative breadth. Overall, the institutional patterns reinforce that competency-based recruitment scholarship is deeply rooted in the health professions, where standardized and reliable selection mechanisms are critical for ensuring quality and patient safety.

3.2 Author Collaboration Network

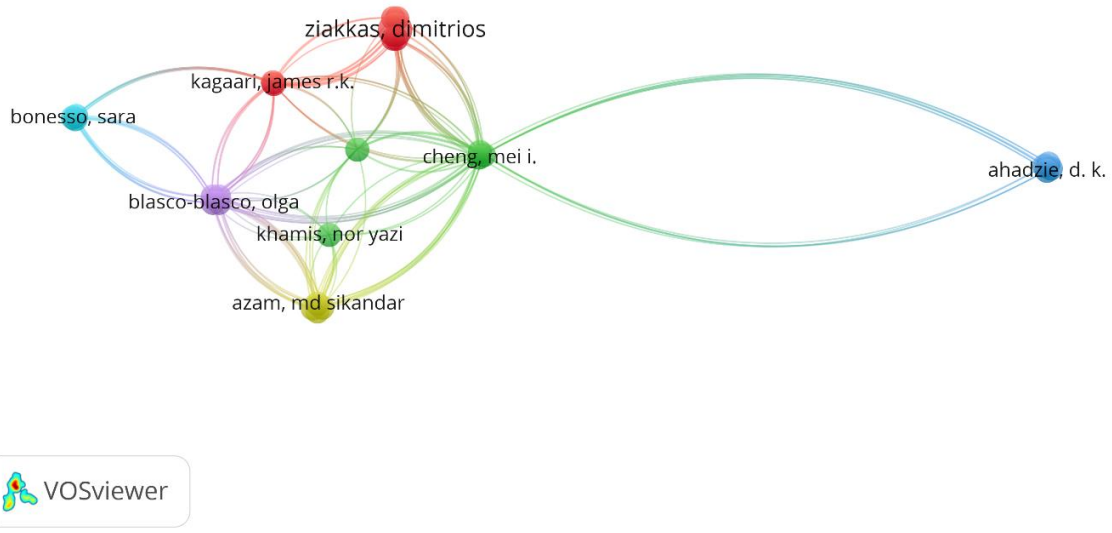

Figure 2. Author Visualization
Source: Data Analysis Result, 2025

Figure 2 illustrates a co-authorship network composed of several highly connected author clusters, with key contributors such as Dimitrios Ziakkas, James R.K. Kagaar, Mei I. Cheng, Olga Blasco-Blasco, Nor Yazi Khamis, Md Sikandar Azam, and Sara Bonesso serving as central nodes within the map. Among them, Cheng emerges as the most prominent bridging author, linking multiple thematic groups through research that integrates competency models, curriculum development, and clinical training. Ziakkas and Kagaar form part of a dense red cluster, indicating strong collaborative patterns focused on recruitment processes, professional competence, and educational evaluation, while authors like Bonesso and Blasco-Blasco contribute interdisciplinary connections extending into leadership development and behavioral competency frameworks. The interconnectedness of these clusters demonstrates that competency-based recruitment research has matured into a multi-disciplinary ecosystem, enriched by contributions from education, human resource management, nursing, public health, and clinical sciences.

3.3 Country Collaboration Patterns

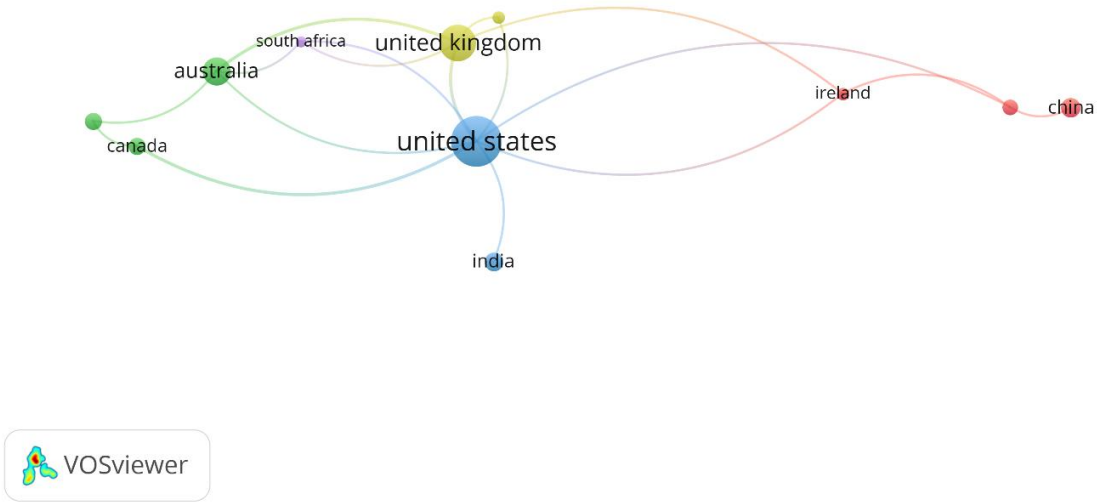

Figure 3. Country Visualization
Source: Data Analysis Result, 2025

Figure 3 illustrates that the United States and the United Kingdom serve as the primary global hubs of competency-based recruitment research, with the U.S. displaying the largest node size and strongest collaborative linkages, reflecting its dominance in publication volume, institutional partnerships, and citation influence. Other notable contributors include Australia, Canada, South Africa, India, Ireland, and China, with strong cross-continental collaborations—particularly among the U.S., U.K., Australia, and Canada—suggesting shared international priorities in enhancing workforce reliability, advancing clinical training pathways, and promoting standardized recruitment systems. Meanwhile, China and Ireland appear as smaller but emerging nodes, indicating increasing yet still modest contributions, while India's collaboration with the United States highlights ongoing reforms toward globally aligned competency-based medical curricula. Overall, the visualization underscores that although competency-based recruitment has developed into an international research agenda, leadership remains concentrated within Western institutions where competency frameworks were first conceptualized and widely implemented

3.4 Keyword Co-Occurrence Network

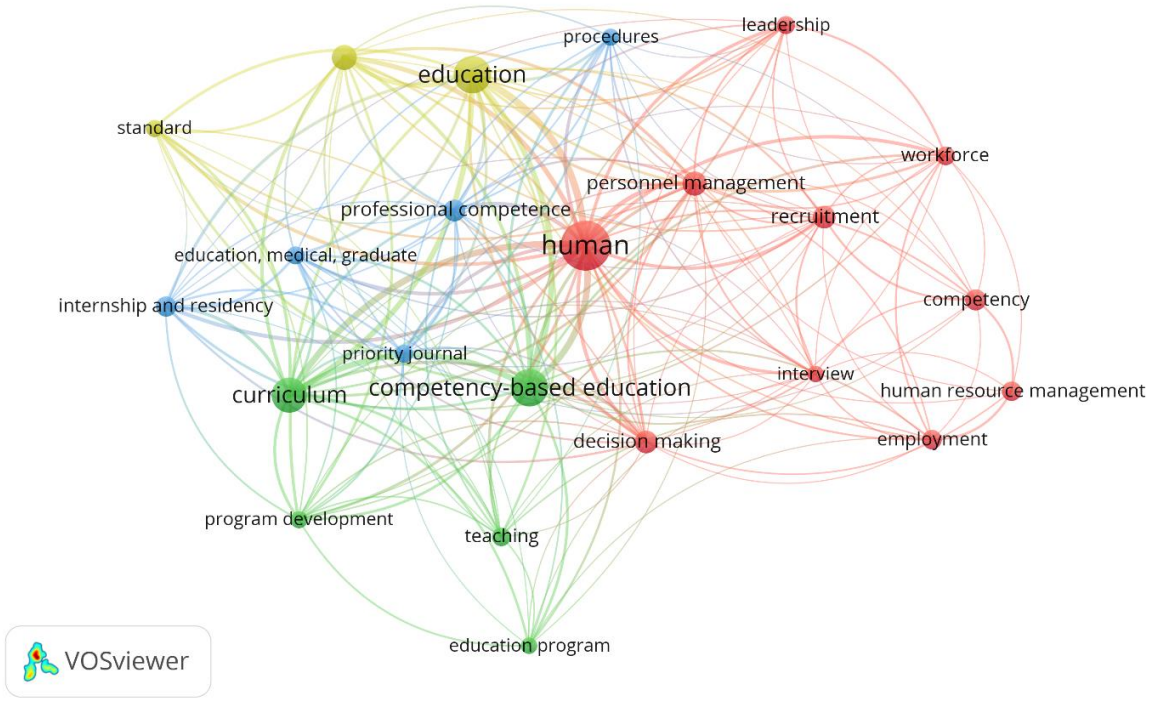

Figure 4. Network Visualization
Source: Data Analysis Result, 2025

Figure 4 demonstrates four major thematic clusters that together map the intellectual structure of competency-based recruitment research. The first cluster, representing Human Resource Management and recruitment, contains keywords such as "human," "personnel management," "recruitment," "workforce," "competency," "employment," and "interview," indicating that the field is firmly rooted in HRM practices, behavioral assessment, and structured workforce selection. The second cluster highlights Medical and Clinical Education, with terms such as "internship and residency," "education medical graduate," and "standard," reinforcing the centrality of clinical training, residency preparation, and standardized assessment models in competency-based research. Meanwhile, the third cluster focuses on Curriculum Development and Competency-Based Education through keywords like "competency-based education," "curriculum," "teaching," "education program," "decision making," and "program development," reflecting the deep integration of competency theories into educational design, especially where high-stakes decision-making is required.

The fourth cluster, labeled Education and Professional Competence, gathers keywords such as "education," "professional competence," and "procedures," forming a conceptual bridge between human resource practices and competency-based curricular approaches. Together, these four clusters illustrate that competency-based recruitment operates not as an isolated hiring method but as part of a broader competency-driven ecosystem that spans educational development, training processes, performance assessment, and professional practice. This interconnected structure emphasizes that the success of competency-based recruitment depends on alignment across multiple domains, from curricula and learning standards to workplace expectations and behavioral competencies.

3.5 Density Visualization and Research Hotspots

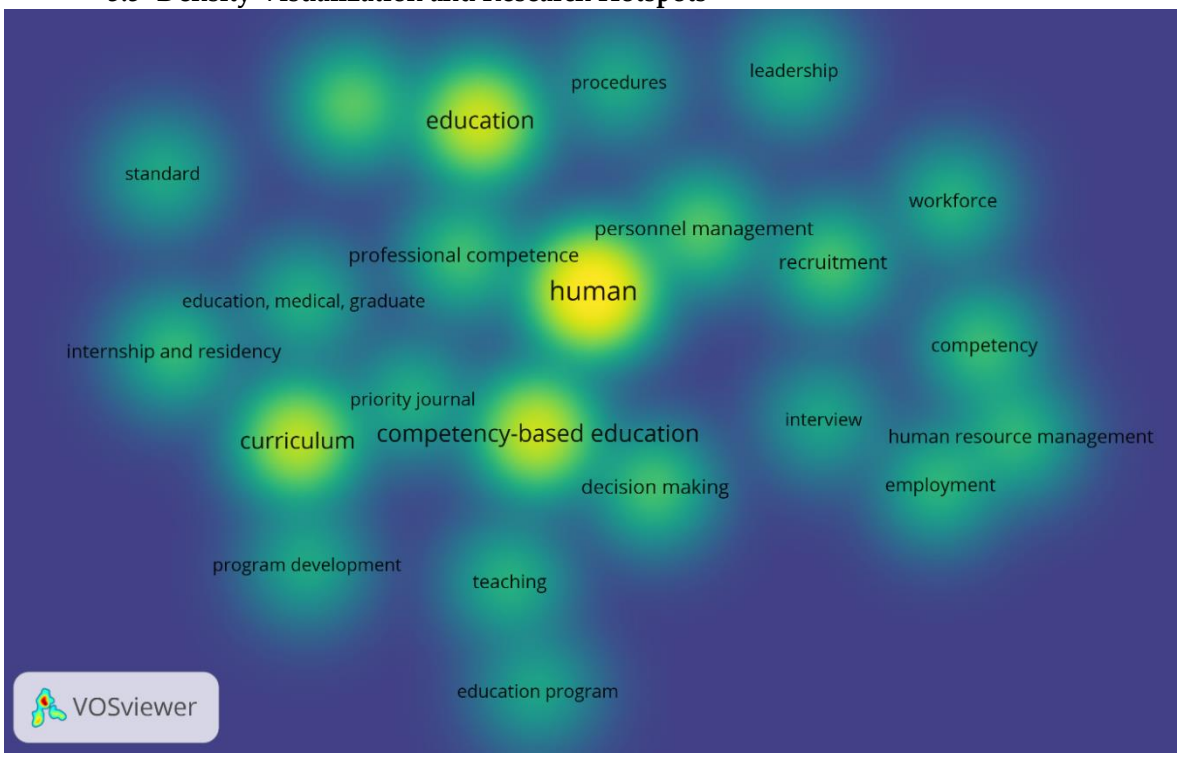

Figure 5. Density Visualization
Source: Data Analysis Result, 2025

Figure 5 presents a density visualization that highlights several high-intensity hotspots, with "human" emerging as the most prominent node, indicating a strong focus on individual performance, behavioral competencies, and personnel management within the literature. Equally significant are the dense areas around "competency-based education" and "curriculum," which demonstrate that research on recruitment is closely interconnected with the design of educational pipelines, particularly in medical and healthcare contexts where competency development is foundational. Additional hotspots such as "recruitment" and "human resource management" further underscore the field's sustained emphasis on organizational needs, structured selection systems, and workforce decision-making. Overall, the density map confirms that competency-based recruitment research is dominated by the intersection of HRM, professional training, and competency-oriented education, offering a holistic view of how competencies evolve from learning environments to recruitment processes and ultimately shape professional performance.

3.6 Temporal Evolution of Themes (Overlay Visualization)

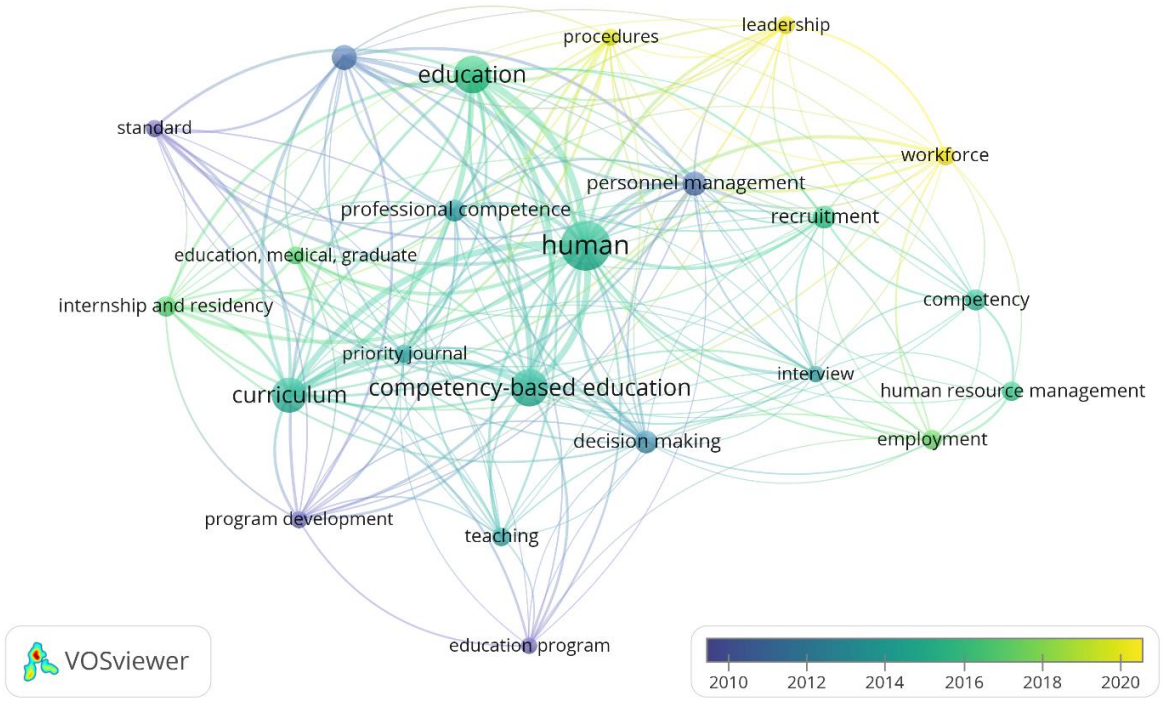

Figure 6. Overlay Visualization
Source: Data Analysis Result, 2025

Figure 6 illustrates a clear temporal shift in thematic priorities, where early research from 2010 to 2014 concentrated on standards, curriculum, and education programs, followed by a mid-period (2015–2017) expansion into competency-based education, teaching, and professional competence, and later transitioning from 2018 onward into themes centered on recruitment, workforce development, leadership, human resource management, and competency demands in clinical and high-risk environments. This progression reflects a broader thematic evolution beginning with the development of competency frameworks, their integration into curricula, and subsequent application within recruitment and workforce systems, ultimately expanding into leadership and organizational performance domains. Overall, the overlay visualization demonstrates that competency-based recruitment has evolved from a primarily educational concept into a practical and strategic organizational tool increasingly embedded in real-world workforce implementation.

3.7 Citation Analysis: Identifying Seminal Works

Table 1. The Most Impactful Literatures

Citations	Authors and year	Title
143	Dainty, A.R.J., Cheng, M.-I., Moore, D.R. (2005)	Competency-based model for predicting construction project managers' performance
82	Halaas, G.W., Zink, T., Finstad, D., Bolin, K., Center, B. (2008)	Recruitment and retention of rural physicians: Outcomes from the rural physician associate program of Minnesota
78	Patterson, F., Ferguson, E., Norfolk, T., Lane, P. (2005)	A new selection system to recruit general practice registrars: Preliminary findings from a validation study
77	Harden, R.M. (2007)	Outcome-based education - The ostrich, the peacock and the beaver

Citations	Authors and year	Title
66	Brasel, K.J., Lindeman, B., Jones, A., ... Buyske, J., Mellinger, J.D. (2023)	Implementation of Entrustable Professional Activities in General Surgery: Results of a National Pilot Study
57	Marshman, C., Hansen, A., Munro, I. (2022)	Compassion fatigue in mental health nurses: A systematic review
53	Gardner, A.K., Grantcharov, T., Dunkin, B.J. (2018)	The Science of Selection: Using Best Practices From Industry to Improve Success in Surgery Training
52	Koropchak, C.M., Pollak, K.I., Arnold, R.M., ... Abernethy, A.P., Tulsky, J.A. (2006)	Studying communication in oncologist-patient encounters: The SCOPE Trial
50	O'Neill, F. (2011)	From language classroom to clinical context: The role of language and culture in communication for nurses using English as a second language. A thematic analysis
47	Fullerton, J.T., Johnson, P.G., Thompson, J.B., Vivio, D. (2011)	Quality considerations in midwifery pre-service education: Exemplars from Africa

Source: Scopus, 2025

Table 1 highlights ten of the most influential publications shaping the development of competency-based recruitment, indicating the intellectual foundations and disciplinary breadth of the field. The most cited contribution by Dainty, Cheng, and Moore (2005) established a predictive competency framework for managerial performance, setting a methodological benchmark for subsequent recruitment research. This is followed by Halaas et al. (2008), whose work demonstrates how competency frameworks enhance recruitment and retention of rural physicians through structured selection and community-based training. Additional seminal work includes Patterson et al. (2005), which validated a competency-driven selection system for general practice registrars, and Harden (2007), who articulated the philosophical underpinnings of outcome-based education, providing conceptual clarity for linking training outcomes with recruitment criteria. More recent advancements, such as Brasel et al. (2023), show the evolution of competency assessment through Entrustable Professional Activities (EPAs), offering stronger alignment between observable clinical tasks and recruitment expectations.

Complementing these foundational studies are contributions that broaden the scope of competency-based recruitment into emotional, communicative, and cultural domains. Marshman et al. (2022) underscore the significance of affective competencies through their systematic review of compassion fatigue among mental health nurses, while Gardner, Grantcharov, and Dunkin (2018) highlight the integration of industrial best practices to improve performance-based selection in surgery training. The SCOPE Trial by Koropchak et al. (2006) reinforces the importance of communication competence, influencing structured assessment tools used in modern recruitment frameworks. Meanwhile, O'Neill (2011) and Fullerton et al. (2011) emphasize linguistic, cultural, and contextual dimensions of competence, demonstrating the need for adaptable standards in diverse healthcare settings. Collectively, these ten influential works reveal that competency-based recruitment is shaped by multi-disciplinary and multi-contextual evidence spanning managerial prediction models, clinical workforce planning, emotional resilience, communication skills, and cultural competence. Together, they form the scientific and practical foundation for contemporary competency-driven recruitment systems across sectors.

4. CONCLUSION

The bibliometric analysis reveals that competency-based recruitment has

developed into a robust interdisciplinary field, integrating perspectives from human resource management, medical education, behavioral assessment, and curriculum development. The results show that research productivity and intellectual influence are concentrated primarily in health-related disciplines, where high-stakes professional environments require structured and evidence-based selection systems. Institutional and author collaboration networks—dominated by major US and UK medical schools—demonstrate strong global partnerships that accelerate theoretical advancement and practical innovation. Thematic clusters and density mapping confirm that "competency-based education," "curriculum," "professional competence," and "recruitment" form the conceptual core of the field, while temporal analysis indicates a clear shift from foundational competency frameworks toward applied recruitment strategies.

Citation analysis further highlights the seminal contributions of studies linking competency models to performance prediction, physician recruitment, outcome-based training, and structured assessment systems. Collectively, these findings indicate that competency-based recruitment is no longer an isolated HR technique but part of a comprehensive ecosystem that spans training pipelines, organizational development, and workforce planning. The study provides a scientific overview that can guide policymakers, educators, and HR professionals in designing recruitment frameworks that are more reliable, transparent, and aligned with the evolving demands of knowledge-intensive professions. Future research should expand into emerging contexts such as digital hiring, AI-assisted assessment, and global workforce mobility to further strengthen competency-driven selection practices.

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