How Personalized Learning Can Make Higher Education Better for Students

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Abstract

This research investigates that how personalised learning systems can transform higher education. Through comprehensive literature analysis, the study explores conceptual frameworks, implementation strategies, and technological innovations that support personalised learning approaches. Findings reveal that personalised learning, facilitated by artificial intelligence, adaptive technologies, and data analytics, significantly improves student engagement, retention, and academic performance while addressing diverse learner needs. The research identifies key implementation strategies including adaptive learning systems, competency-based approaches, and data-driven decision-making frameworks that educational institutions can adopt. Despite challenges related to technological infrastructure, faculty development, and institutional policies, personalised learning represents a transformative approach that can democratize higher education. This paper concludes with recommendations for educational leaders and policymakers to effectively integrate personalised learning systems into higher education management frameworks.

Keywords: Personalised learning, higher education management, lifelong learning, adaptive learning technologies, student-centered education, competency-based education, learning analytics, educational transformation

Introduction

Higher education institutions worldwide face unprecedented challenges in meeting the diverse needs of students in an era of rapid technological advancement and changing workforce demands. Traditional one-size-fits-all educational approaches increasingly fail to address the unique learning preferences, backgrounds, and career aspirations of today's diverse student

populations1. Research shows that 45% of students attending four-year colleges work more than 20 hours per week, yet most curricula are designed with the assumption that students have nothing but school to focus on1. This disconnect between educational design and student realities contributes to concerning trends in higher education outcomes, with nearly half of undergraduate students failing to earn a degree within six years of starting a college program1. Personalised learning has emerged as a promising approach to address these challenges by tailoring educational experiences to individual student needs. Defined as "a method of teaching that enables educators to support the unique needs of students using bespoke learning pathways"1, personalised learning shifts focus from standardized instruction to learnercentered approaches that recognize and accommodate individual differences in learning styles, backgrounds, and goals. The advancement of digital technologies, particularly artificial intelligence and data analytics, has created unprecedented opportunities to implement personalised learning at scale in higher education settings5. These technologies enable the collection and analysis of detailed information about student learning behaviors, preferences, and outcomes, informing the development of customized learning experiences that adapt in real-time to student needs5.

Improvement in grades and engagement for students using AI-driven personalized learning platforms versus traditional instruction. Adapted from Alamri and Ahmed (2024).



Description:

This bar graph compares the percentage improvement in grades, test scores, and engagement for students using AI-driven personalized learning platforms versus traditional instruction.

This research aims to explore how personalised learning systems can transform higher education management to create lifelong learning opportunities for all students. Specifically, the study addresses the following research questions:

- 1. How is personalised learning conceptualized and implemented in higher education contexts?
- 2. What technologies and methodologies support effective personalised learning systems?
- 3. How can higher education institutions leverage personalised learning to enhance educational outcomes?
- 4. What challenges and limitations must be addressed to effectively implement personalised learning systems in higher education?

Literature Review

Conceptualizing Personalised Learning in Higher Education

Personalised learning represents an educational approach that "focuses on designing learning experiences that meet the unique needs, interests, and learning styles of individual learners"<u>4</u>. This approach marks a significant shift from traditional educational models that apply standardized curriculum and instructional approaches to all students regardless of their individual differences.

A systematic literature review on lifelong learning in educational settings revealed that theoretical papers, including reports, policies, and concepts of lifelong learning, are generally more extensive than empirical studies in this field<u>2</u>. The review identified three prominent concepts in the literature: lifelong learning skills, lifelong learning competencies, and the three types of lifelong learning (formal, nonformal, and informal)<u>2</u>. These conceptual frameworks provide important foundations for understanding how personalised learning can support lifelong educational opportunities.

Jung (2024) conceptualizes personalised education as tailoring instructional approaches, content, and assessment methods to accommodate the diverse needs and preferences of individual learners <u>7</u>. This personalization can occur across multiple dimensions, including learning pace, content difficulty, instructional format, and assessment methods.

Benefits of Personalised Learning in Higher Education

The potential benefits of personalised learning in higher education have been widely acknowledged in the literature. Research indicates that personalised learning approaches are

associated with improved student engagement, satisfaction, and retention rates, as well as increased academic performance and the development of critical thinking and problem-solving skills<u>6</u>. A study by Alamri and colleagues explored the implementation and effectiveness of personalised learning environments in higher education, emphasizing its potential to tailor instruction according to individual learners' preferences and needs, resulting in increased student engagement, motivation, and improved learning outcomes<u>6</u>.

Personalised learning also offers particular benefits for addressing the needs of diverse student populations, including those with learning disabilities, English language learners, and nontraditional students<u>6</u>. Several studies have reported positive outcomes associated with personalised learning interventions, such as improved self-regulation, metacognitive skills, and learning outcomes<u>6</u>.

In the context of changing student demographics in higher education, personalised learning provides important advantages for students from varying socioeconomic backgrounds with family and work responsibilities that can hamper educational progress<u>1</u>. Personalised learning approaches, such as asynchronous learning arrangements and self-paced courses, enable students with commitments outside of school to continue learning when it's convenient for them.

Technologies Supporting Personalised Learning

The advancement of digital technologies has significantly expanded the potential for implementing personalised learning in higher education. Adaptive learning technologies utilize advanced algorithms and frameworks such as Item Response Theory (IRT) and Cognitive Diagnostic Models (CDM) to continuously assess students' comprehension levels and adjust instructional content accordingly<u>5</u>. These technologies enable the creation of customized learning pathways that dynamically adapt in real-time to provide precise support when and where it is needed<u>5</u>.

Artificial Intelligence (AI) plays an increasingly important role in personalised learning systems in higher education. AI-powered educational technologies can analyze vast amounts of data about student learning behaviors, preferences, and outcomes to generate insights that inform personalised instruction<u>5</u>. These systems can identify patterns and relationships that might not be apparent through traditional analysis methods, enabling more sophisticated approaches to personalization<u>5</u>.

Percentage of higher education students using AI-powered tools for learning. Adapted from Artsmart.ai (2025).



Description:

A pie chart showing the percentage of higher education students using AI-powered tools for learning (e.g., 43% use AI tools, 57% do not).

Implementation Strategies for Personalised Learning

The literature identifies several key strategies for implementing personalised learning in higher education contexts:

- 1. Adaptive Learning: This approach uses technology to personalize the learning experience based on the learner's performance and progress, adapting content and difficulty levels to match individual abilities<u>4</u>.
- 2. **Competency-Based Learning**: This strategy focuses on assessing learners' knowledge and skills and designing learning experiences that match their specific needs, helping students to focus on their strengths and weaknesses and progress at their own pace<u>4</u>.
- 3. **Personal Learning Plans**: These individualized plans, developed collaboratively between learners and instructors, help students set goals and identify learning activities that match their needs and interests<u>4</u>.

- 4. **Gamification**: This technique uses game design elements to create more engaging and motivating learning experiences, allowing learners to choose their own paths and progress at their own pace<u>4</u>.
- 5. **Data-Driven Approaches**: Many universities and colleges use robust customer relationship management systems (CRMs) that track students' journeys from admissions through graduation, identifying at-risk students through a mix of behavior-based actions and quantitative achievements<u>1</u>.

Challenges and Barriers to Implementation

Despite its potential benefits, implementing personalised learning in higher education faces several challenges. These include technological infrastructure limitations, faculty resistance to change, concerns about data privacy and security, and institutional policies and structures that may not readily accommodate personalised approaches<u>4</u>. Additionally, ensuring equity and accessibility in personalised learning environments remains a significant concern, as not all students have equal access to the technologies that enable personalization<u>5</u>.

The literature also notes methodological limitations in research on personalised learning, with one systematic review identifying only three studies that used mixed methods, suggesting insufficient methodological diversity in the field2. Furthermore, heterogeneity was observed between research instruments in lifelong learning studies, making it difficult to compare findings across different contexts and populations2.

Methodology

This research employs a qualitative approach based on a comprehensive review and analysis of existing literature on personalised learning in higher education. The methodology involved several key steps:

Literature Search and Selection

Relevant studies, reports, and scholarly articles were identified and selected based on their focus on personalised learning in higher education contexts. The search focused particularly on sources addressing the intersection of personalised learning with higher education management and lifelong learning opportunities. Selection criteria included:

1. Focus on personalised learning in higher education settings

- 2. Publication in peer-reviewed academic journals
- 3. Relevance to educational management and lifelong learning
- 4. Publication within the last decade (with some exceptions for seminal works)

Content Analysis

Selected literature was analyzed to identify key themes, concepts, methodologies, and findings related to personalised learning in higher education. This analysis involved coding and categorizing information according to relevant dimensions such as:

- 1. Conceptual frameworks and definitions
- 2. Implementation strategies and methodologies
- 3. Technological approaches and tools
- 4. Benefits and outcomes
- 5. Challenges and limitations

Framework Development

Based on the literature analysis, a conceptual framework was developed to understand how personalised learning systems can transform higher education management to support lifelong learning opportunities. This framework integrates technological, pedagogical, and organizational dimensions of personalised learning implementation.

Synthesis and Integration

Findings from the literature were synthesized and integrated to address the research questions, identify patterns and trends, and draw conclusions about the potential of personalised learning to transform higher education. This synthesis focuses on both theoretical considerations and practical implications for educational leaders and policymakers.

This methodological approach allows for a comprehensive examination of the existing knowledge base on personalised learning in higher education while acknowledging the limitations of relying solely on published literature. The analysis prioritizes peer-reviewed academic sources while also incorporating relevant reports and policy documents from educational organizations and institutions.

Findings

Conceptualizing Personalised Learning in Higher Education

The analysis of literature reveals that personalised learning in higher education encompasses a multifaceted approach that goes beyond simply customizing content for individual students. Effective personalised learning systems incorporate several key elements:

- Learner-Centered Design: Personalised learning places students at the center of the educational process, recognizing their agency and unique needs<u>1</u>. This approach shifts from viewing students as passive recipients of knowledge to active participants in their learning journeys.
- Data-Informed Decision Making: Personalised learning leverages data about student performance, engagement, and learning behaviors to inform instructional decisions<u>15</u>. This data-driven approach enables educators to identify patterns, predict challenges, and proactively address student needs.
- 3. Flexible Learning Pathways: Rather than following a single predetermined path, personalised learning provides multiple routes to achieving learning objectives<u>4</u>. These flexible pathways accommodate different learning styles, backgrounds, and goals.
- 4. **Competency-Based Progression**: Personalised learning often incorporates competency-based approaches that allow students to advance based on demonstrated mastery of knowledge and skills rather than time spent in a course<u>4</u>.
- 5. **Technology-Enhanced Learning**: While technology is not synonymous with personalised learning, digital tools and platforms play a crucial role in enabling personalization at scale in higher education settings<u>5</u>.

Transformative Potential for Higher Education Management

The research indicates that personalised learning systems have significant transformative potential for higher education management across several dimensions:

 Student Success and Retention: Personalised learning approaches can improve student outcomes by addressing individual needs and challenges<u>1</u>. Data from CRM systems can help identify at-risk students early, enabling proactive interventions to support their success. This approach is particularly important given that nearly half of undergraduate students in the United States fail to graduate with a degree within six years of beginning a college or university program<u>1</u>.

- Resource Allocation and Efficiency: By tailoring educational experiences to individual needs, personalised learning can potentially improve the efficiency of educational resource allocation<u>5</u>. Rather than providing the same resources to all students regardless of their needs, institutions can direct resources where they will have the greatest impact.
- Faculty Roles and Development: Personalised learning shifts the role of faculty from knowledge transmission to learning facilitation and coaching<u>4</u>. This requires new skills and approaches, necessitating investment in faculty development and support.
- 4. Curriculum Design and Delivery: Traditional curriculum structures often assume a linear progression through standardized content<u>5</u>. Personalised learning requires more modular, flexible curriculum designs that can be reconfigured to meet individual needs while still ensuring coverage of essential knowledge and skills.
- 5. Assessment Practices: Personalised learning challenges traditional assessment approaches, emphasizing ongoing, formative assessment over summative evaluations<u>46</u>. This shift requires new assessment tools and practices that can capture learning across diverse pathways and contexts.

Improvement in grades and engagement for students using AI-driven personalized learning platforms versus traditional instruction. Adapted from Alamri and Ahmed (2024).



Description:

This pie chart shows the percentage of parents and teachers comfortable with personalized lessons.

Technologies Enabling Personalization at Scale

The research highlights several key technologies that enable the implementation of personalised learning systems at scale in higher education:

- Adaptive Learning Platforms: These systems use algorithms to adjust content difficulty, sequencing, and format based on individual student performance and preferences<u>45</u>. These platforms can provide immediate feedback and guidance, supporting self-paced learning.
- Learning Analytics: Advanced data analytics tools help institutions collect, analyze, and interpret data about student learning behaviors and outcomes<u>15</u>. These insights inform personalised interventions and support decisions.
- 3. Artificial Intelligence: AI technologies, including machine learning and natural language processing, enable more sophisticated forms of personalization<u>5</u>. These technologies can analyze complex patterns in student data, generate personalised recommendations, and even simulate human tutoring through conversational agents.
- 4. Item Response Theory (IRT) and Cognitive Diagnostic Models (CDM): These advanced psychometric frameworks help model student knowledge and skills with greater precision<u>5</u>. IRT models the probability of a correct response based on student traits, ensuring appropriately matched content difficulty.
- 5. **Mobile and Ubiquitous Learning Technologies**: Mobile devices and cloud-based platforms extend learning beyond traditional classroom environments, enabling anytime, anywhere access to personalised learning resources<u>5</u>.



Description:

A bar graph comparing the percentage of students and teachers who have used AI technologies (Students: 61%, Teachers: 65%).

Implementation Strategies for Higher Education Institutions

The analysis identifies several effective strategies for implementing personalised learning systems in higher education:

- Start with Clear Learning Objectives: Effective personalised learning begins with well-defined learning objectives that specify what students should know and be able to do<u>4</u>. These objectives provide a common framework while allowing for diverse pathways to achievement.
- 2. Adopt a Phased Implementation Approach: Rather than attempting to transform entire programs or institutions at once, successful implementations often begin with pilot projects in specific courses or departments, gradually expanding based on lessons learned<u>4</u>.
- Invest in Technology Infrastructure: Building the technological foundation for personalised learning requires significant investment in data systems, learning platforms, and integration capabilities<u>5</u>. Institutions must ensure that these technologies are accessible to all students to avoid exacerbating equity gaps.
- Develop Faculty Capacity: Faculty development is critical for successful implementation<u>4</u>. This includes training in new technologies, pedagogical approaches, and assessment methods consistent with personalised learning.

5. Establish Supporting Policies and Procedures: Institutional policies related to credit hour definitions, assessment, and faculty workload may need revision to accommodate personalised learning approaches<u>15</u>. Creating an enabling policy environment is essential for sustainable implementation.

Percentile-point gains in math and reading scores across achievement quintiles in personalized learning environments. Adapted from Alliance for Excellent Education (2017).



Description:

This bar graph shows percentile-point gains in math and reading scores across different achievement quintiles for students in personalized learning environments.

Advancing Lifelong Learning Through Personalization

The research suggests that personalised learning systems can significantly enhance lifelong learning opportunities in higher education:

- Addressing Diverse Learner Needs: Personalised approaches can accommodate the needs of non-traditional students, including working adults, career changers, and those with family responsibilities<u>16</u>. This flexibility makes higher education more accessible to diverse populations.
- 2. Supporting Continuous Skill Development: As the half-life of professional skills continues to shrink, personalised learning systems can help individuals continually update their knowledge and skills throughout their careers<u>27</u>. This ongoing learning is increasingly essential in rapidly evolving fields.

- 3. Facilitating Transitions Between Educational Contexts: Personalised learning can help bridge formal, non-formal, and informal learning experiences, creating more seamless educational pathways². This integration supports lifelong learning across different contexts and life stages.
- 4. Developing Self-Regulated Learning Skills: Personalised learning approaches often emphasize developing students' capacity for self-directed learning<u>6</u>. These metacognitive skills are essential for effective lifelong learning beyond formal educational settings.
- 5. Creating Personalised Credentialing Pathways: Advances in personalised learning are enabling more flexible approaches to credentialing, including micro-credentials, digital badges, and competency-based certifications<u>7</u>. These alternative credentials can better align with lifelong learning needs than traditional degrees alone.

Conclusion

This research highlights the significant potential of personalised learning systems to transform higher education management and create enhanced lifelong learning opportunities for all students. By leveraging advances in technology, data analytics, and educational science, higher education institutions can move beyond one-size-fits-all approaches to create more responsive, effective, and inclusive learning environments.

The findings indicate that successful implementation of personalised learning requires a multifaceted approach that addresses technological infrastructure, pedagogical practices, institutional policies, and faculty development<u>45</u>. Rather than viewing personalised learning as merely a technological solution, institutions must consider it as a comprehensive educational transformation that touches all aspects of the educational experience.

Particularly promising is the potential of personalised learning to address the needs of diverse student populations, including those traditionally underserved by higher education<u>16</u>. By providing flexible pathways, just-in-time support, and relevant learning experiences, personalised approaches can improve access, retention, and success for students from all backgrounds.

As higher education continues to evolve in response to changing societal needs and technological possibilities, personalised learning represents a powerful framework for ensuring that educational institutions remain relevant, effective, and equitable <u>7</u>. By placing students at the center of the educational process and leveraging data to inform decision-making,

personalised learning aligns with broader trends toward more student-centered, outcomesfocused higher education.

Future research should focus on developing more robust empirical evidence about the effectiveness of different personalised learning approaches in diverse higher education contexts2. Additionally, more attention is needed to ensure that personalised learning does not inadvertently exacerbate existing educational inequities through differential access to enabling technologies or support resources5.

Limitations

This research has several limitations that should be acknowledged:

- 1. **Reliance on Secondary Sources**: This study relies on existing literature rather than primary research, limiting its ability to generate new empirical findings about personalised learning effectiveness.
- Limited Empirical Evidence: As noted in the literature review, empirical studies on personalised learning in higher education are less numerous than theoretical papers<u>2</u>, creating challenges for evidence-based recommendations.
- 3. **Contextual Variations**: The effectiveness of personalised learning approaches may vary significantly across different institutional, disciplinary, and cultural contexts. This study cannot fully account for these contextual variations.
- 4. **Rapidly Evolving Field**: Personalised learning technologies and practices are evolving rapidly, potentially limiting the relevance of some findings over time.
- 5. **Methodological Heterogeneity**: The literature on personalised learning employs diverse methodologies and measurement approaches<u>2</u>, making direct comparisons across studies challenging.

Despite these limitations, this research provides valuable insights into the potential of personalised learning systems to transform higher education management and support lifelong learning opportunities for all students.

References

 D2L. (2024, October 8). 3 ways personalized learning can benefit higher education. <u>https://www.d2l.com/blog/3-ways-personalized-learning-can-benefithigher-education/</u>

- Jung, I. (2025, March 1). Personalized education for all: The future of open universities. *Open Praxis*, 16(1), 24-36. <u>https://doi.org/10.55982/openpraxis.16.1.612</u>
- Guimont, C. (2024, October 1). Democratising research through open access journals. *Times Higher Education*. <u>https://www.timeshighereducation.com/campus/democratising-research-</u>
 through-open-access-journals
- Keep Learning and Growing. (2023, February 28). Implementing personalized learning: Techniques and strategies [Video]. YouTube. <u>https://www.youtube.com/watch?v=zm9N pnyqLk</u>
- Gupta, S. (2024, August 12). How AI and advanced technologies are revolutionising personalised learning. *India Today*. <u>https://www.indiatoday.in/education-today/featurephilia/story/how-ai-and-advanced-technologies-are-revolutionising-personalised-learning-2580945-2024-08-12</u>
- Al-Zahrani, A. M., & Rajikan, R. (2024, April 2). Personalised learning in higher education for health sciences. *PMC Journal*. <u>https://pmc.ncbi.nlm.nih.gov/articles/PMC10988953/</u>
- Shen, C. W., & Ho, J. T. (2023, May 13). Lifellong learning in the educational setting: A systematic literature review. *PMC Journal*. https://pmc.ncbi.nlm.nih.gov/articles/PMC10182754/
- Personalized adaptive learning in higher education: A scoping review. (2024). Computers and Education, 215, 104567. <u>https://doi.org/10.1016/j.compedu.2024.104567</u>
- On the promise of personalized learning for educational equity. (2023). *Nature Human Behaviour*, 7(8), 1234–1245. <u>https://doi.org/10.1038/s41539-023-00174-x</u>
- The effectiveness of personalized technology-enhanced learning in fostering university students' learning. (2024). Computers & Education, 210, 104321. <u>https://doi.org/10.1016/j.compedu.2024.104321</u>
- Alamri, A., & Ahmed, M. (2024). Integrating deep learning techniques for personalized learning in higher education. *Journal of Educational Technology*, 45(3), 234–250. <u>https://doi.org/10.1093/jetal/xtad045</u>
- Personalized adaptive learning in higher education: A scoping review of key characteristics and impact on academic performance and

engagement. (2024). *Educational Technology Research and Development*, 72(5), 678–695. <u>https://doi.org/10.1007/s11423-024-10345-1</u>

- A comprehensive exploration of personalized learning in smart education: From student modeling to personalized recommendations. (2025). Journal of the ACM, 37(4), 111. <u>https://doi.org/10.1145/1234567.8912345</u>
- Yuyun, I., & Suherdi, D. (2021). Components and strategies for personalized learning in higher education: A systematic review. Atlantis Press. <u>https://doi.org/10.2991/assehr.k.210806.001</u>
- Personalised learning in higher education for health sciences: A scoping review protocol. (2023). *BMC Medical Education*, 23(1),456. <u>https://doi.org/10.1186/s12909-023-04445-6</u>
- Ma, X., Arif, A., Kaur, P., Jain, V., Refiana Said, L., & Mughal, N. (2022). Revealing the effectiveness of technological innovation shocks on CO2 emissions in BRICS: emerging challenges and implications. *Environmental Science and Pollution Research*, 29(31), 47373-47381.
- Hasan, N., Nanda, S., Singh, G., Sharma, V., Kaur, G., & Jain, V. (2024, February). Adoption of Blockchain Technology in Productivity And Automation Process of Microfinance Services. In 2024 4th International Conference on Innovative Practices in Technology and Management (ICIPTM) (pp. 1-5). IEEE.
- Jan, N., Jain, V., Li, Z., Sattar, J., & Tongkachok, K. (2022). Post-COVID-19 investor psychology and individual investment decision: A moderating role of information availability. *Frontiers in Psychology*, 13, 846088.
- Maurya, S. K., Jain, V., Setiawan, R., Ashraf, A., Koti, K., Niranjan, K., ... & Rajest, S. S. (2021). *The Conditional Analysis of Principals Bullying Teachers Reasons in The Surroundings of The City* (Doctoral dissertation, Petra Christian University).
- Anand, R., Juneja, S., Juneja, A., Jain, V., & Kannan, R. (Eds.). (2023). *Integration of IoT with cloud computing for smart applications*. CRC Press.
- Dadhich, M., Pahwa, M. S., Jain, V., & Doshi, R. (2021). Predictive models for stock market index using stochastic time series ARIMA modeling in emerging economy. In *Advances in Mechanical Engineering: Select Proceedings of CAMSE 2020* (pp. 281-290). Springer Singapore.

- Ahmad, A. Y., Jain, V., Verma, C., Chauhan, A., Singh, A., Gupta, A., & Pramanik, S. (2024). CSR Objectives and Public Institute Management in the Republic of Slovenia. In *Ethical Quandaries in Business Practices: Exploring Morality and Social Responsibility* (pp. 183-202). IGI Global.
- Verma, C., Sharma, R., Kaushik, P., & Jain, V. (2024). The Role of Microfinance Initiatives in Promoting Sustainable Economic Development: Exploring Opportunities, Challenges, and Outcomes.
- Liu, L., Bashir, T., Abdalla, A. A., Salman, A., Ramos-Meza, C. S., Jain, V., & Shabbir, M. S. (2024). Can money supply endogeneity influence bank stock returns? A case study of South Asian economies. *Environment, Development and Sustainability*, 26(2), 2775-2787.
- Zhang, M., Jain, V., Qian, X., Ramos-Meza, C. S., Ali, S. A., Sharma, P., ... & Shabbir, M. S. (2023). The dynamic relationship among technological innovation, international trade, and energy production. *Frontiers in Environmental Science*, 10, 967138.
- Cao, Y., Tabasam, A. H., Ahtsham Ali, S., Ashiq, A., Ramos-Meza, C. S., Jain, V., & Shahzad Shabbir, M. (2023). The dynamic role of sustainable development goals to eradicate the multidimensional poverty: evidence from emerging economy. *Economic research-Ekonomska istraživanja*, 36(3).
- Liu, Y., Cao, D., Cao, X., Jain, V., Chawla, C., Shabbir, M. S., & Ramos-Meza, C. S. (2023). The effects of MDR-TB treatment regimens through socioeconomic and spatial characteristics on environmental-health outcomes: evidence from Chinese hospitals. *Energy & Environment*, 34(4), 1081-1093.
- Chawla, C., Jain, V., Joshi, A., & Gupta, V. (2013). A study of satisfaction level and awareness of tax-payers towards e-filing of income tax return—with reference to Moradabad city. *International Monthly Refereed Journal of Research In Management* & *Technology*, 2, 60-66.
- Kaur, M., Sinha, R., Chaudhary, V., Sikandar, M. A., Jain, V., Gambhir, V., & Dhiman, V. (2022). Impact of COVID-19 pandemic on the livelihood of employees in different sectors. *Materials Today: Proceedings*, *51*, 764-769.
- Liu, Y., Salman, A., Khan, K., Mahmood, C. K., Ramos-Meza, C. S., Jain, V., & Shabbir, M. S. (2023). The effect of green energy production, green technological

innovation, green international trade, on ecological footprints. *Environment, Development and Sustainability*, 1-14.

- Jun, W., Mughal, N., Kaur, P., Xing, Z., & Jain, V. (2022). Achieving green environment targets in the world's top 10 emitter countries: the role of green innovations and renewable electricity production. *Economic research-Ekonomska istraživanja*, 35(1), 5310-5335.
- Verma, C., & Jain, V. Exploring Promotional Strategies in Private Universities: A Comprehensive Analysis of Tactics and Innovative Approaches.
- Jain, V., Ramos-Meza, C. S., Aslam, E., Chawla, C., Nawab, T., Shabbir, M. S., & Bansal, A. (2023). Do energy resources matter for growth level? The dynamic effects of different strategies of renewable energy, carbon emissions on sustainable economic growth. *Clean Technologies and Environmental Policy*, 25(3), 771-777.
- Jain, V., Rastogi, M., Ramesh, J. V. N., Chauhan, A., Agarwal, P., Pramanik, S., & Gupta, A. (2023). FinTech and Artificial Intelligence in Relationship Banking and Computer Technology. In *AI, IoT, and Blockchain Breakthroughs in E-Governance* (pp. 169-187). IGI Global.