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QUALITY ASSURANCE OF HIGHER EDUCATION IN THE 5.0 ERA: A SYSTEMATIC LITERATURE REVIEW IDENTIFYING CURRENT TRENDS AND FUTURE PROSPECTS

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Abstract
Quality assurance of higher education (QAHE) is a crucial issue in facing the challenges of the Society 5.0 era, where the integration of advanced technology and humanities is the main focus. This systematic literature review analyzes current trends and prospects of QAHE in the 5.0 era. Using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) method, we identify, filter, and analyze scientific articles from databases such as Scopus, Web of Science, and Google Scholar published between 2020 and 2025. The results show that the QAHE trend in the 5.0 era has shifted from a traditional approach that focuses on administrative compliance to a more holistic and adaptive paradigm. Key findings include: (1) the use of artificial intelligence and big data analytics for data-driven decision-making; (2) a shift in focus from input-output to outcomes-based education that emphasizes the relevance of graduates to industry needs; (3) the adoption of agile approaches and flexible curriculum design; and (4) an emphasis on cross-cultural competencies and non-technical skills such as creativity, collaboration, and ethics. The study concludes that QAHE in the 5.0 era demands fundamental reforms, where collaboration between academia, industry, and government is key to creating a resilient and relevant education ecosystem. Prospects indicate deeper integration between technology and the humanities, shaping a more personalized, adaptive, and sustainability-oriented model of QAHE.

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INTRODUCTION

The rapid development of technology and fundamental social changes have ushered the world into the era of Society 5.0, a concept first introduced by the Japanese government in 2016. This era focuses on integrating technology and solving social problems by converging cyberspace and the physical world (Fukuyama, 2018). In higher education, Society 5.0 demands a comprehensive transformation so that institutions can produce graduates with technical expertise, social intelligence, and adaptability to the ever-changing dynamics of the job market (Lase, 2019). Quality assurance of higher education (QAHE) is a vital instrument to ensure the relevance and accountability of institutions, which must evolve along with the demands of this era.

Traditional QAHE often focuses on compliance with standards set by accreditation bodies. The process tends to be bureaucratic, time-consuming, and usually does not fully capture the essence of the true quality of education (Harvey, 2010). In the 5.0 era, this approach is no longer adequate. The quality of education is measured not only from inputs (curriculum, lecturers) or processes (teaching methods) but also from outcomes (graduate competence) and impact (the impact of graduates on society) (Boholano, 2017). Therefore, a reorientation of the QAHE paradigm is needed to accommodate the characteristics of Society 5.0, such as flexibility, personalization, and technology integration.

Until now, research on QAHE in the 5.0 era is still in its early stages and fragmentary. Several studies have explored the role of technology in QAHE, but few have presented a comprehensive picture of systematically integrated future trends and prospects. This systematic literature review aims to fill this gap by presenting an in-depth analysis of QAHE in the 5.0 era. Its focus is identifying key emerging trends in the literature, delving into the challenges faced, and formulating prospects to ensure higher education remains relevant and excels amid massive change.

METHOD

This study uses a systematic literature review (SLR) approach with reference to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009). This process is carried out in five stages: (1) formulation of research questions, (2) literature search, (3) article screening, (4) data extraction, and (5) synthesis and analysis.

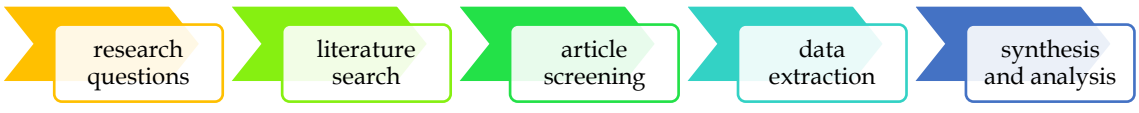

Figure 1. Modified Systematic Literature Review Research Stages

Phase I-Research Questions: This review's main questions are: "What are the current trends and prospects of higher education quality assurance in the era of Society 5.0?"

Stage 2- Literature Search: Searches are conducted on major scientific databases, namely Scopus, Web of Science, and Google Scholar, for articles published between 2020 and 2025. The combination of keywords used includes: ("quality assurance" OR "accreditation") AND ("higher education" OR "university") AND ("Society 5.0" OR "Industry 4.0" OR "digital transformation") AND ("AI" OR "big data" OR "future trends").

Stage 3-Article Screening: The articles are filtered by title and abstract to ensure their relevance after the initial search. The inclusion criteria are: (a) articles in English or Indonesian, (b) articles that focus on quality assurance at the higher education level, (c) articles that discuss the role of technology (especially AI, big data, or the like) and its impact on QAHE, and (d) articles that are the results of primary research or relevant literature reviews. Articles that don't meet those criteria, such as conference reports, book chapters, or opinions, will be excluded.

Stage 4-Data Extraction: Data extracted from each article that qualifies for inclusion includes: (a) bibliographic information (title, author, year, journal), (b) research objectives, (c) methodology, (d) key findings, € implications, and (f) research gaps.

Stage 5-Synthesis and Analysis: The extracted data is qualitatively analyzed to identify emerging patterns, themes, and trends. The thematic synthesis method groups similar findings and builds a coherent narrative. The results of this analysis are then used to answer research questions and formulate conclusions and recommendations.

RESULTS AND DISCUSSION

Utilization of Advanced Technology for Data-Driven Decision-Making

The integration of artificial intelligence (AI) and big data analytics quality assurance of higher education (QAHE) is one of the most significant transformations in the Society 5.0 era. These technologies enable data processing at scale to support pattern detection, quality problem mapping, and evidence-based decision-making—replacing slow and bias-prone manual processes (Guan et al., 2020). AI also allows institutions to predict student performance, identify underperforming courses, and assess the relevance of the curriculum to the needs of the job market in real-time (Kandemir & Keskinkaya, 2021). In the context of quality analytics, big data from LMSs, academic information systems, and various digital platforms help institutions build a

holistic picture of the quality of learning and services on an ongoing basis (Broussard, 2021).

Cutting-edge research shows that technology-based QA systems are able to improve organizational efficiency, reporting transparency, and quality measurement accuracy. For example, IT-based quality assurance systems have been proven to accelerate internal and external audits, as well as encourage reporting automation (Ansori et al., 2025). In line with that, Mukaffan and Siswanto (2024) show that the use of AI for quality evaluation provides predictive analysis that supports proactive quality improvement. This approach is expected to expand to the higher education level, so that institutions can identify the risk of declining quality before systemic failures occur.

However, the implementation of AI and big data is inseparable from challenges. The issues of data privacy, information security, and ethics in automated decision-making are of great concern. Intelligent systems can potentially be biased if AI models are not carefully designed (Slavina & Kabanov, 2022). Therefore, strengthening the regulatory and ethical framework is an important prerequisite to ensure that digital transformation in QAHE continues to uphold the principles of justice, accountability, and transparency (Pamungkas et al., 2024).

Paradigm Shift from Input–Output to Outcomes-Based Education (OBE)

QAHE's shift from an input-based approach to *outcomes-based education* (OBE) reflects the demands of the 5.0 era on competency-oriented education. In OBE, attention shifts from simply meeting structural standards to achieving real competencies in the world of work and society (Spady, 1994). This requires institutions to formulate learning outcomes that are more explicit, measurable, and relevant to the needs of modern industries (Harden, 2002). The emphasis on learning outcomes also forces a paradigm shift in curriculum design, evaluation methods, and internal quality assurance systems.

Modern OBE research shows that there is a need for consistency between *Course Learning Outcomes* (CLO) and *Program Learning Outcomes* (PLO). In his study, Derouich (2025) developed a CLO–PLO alignment model based on quantitative analysis and continuous feedback, which allows curriculum evaluation to be carried out systematically. This approach becomes particularly relevant when accreditation bodies now shift the focus to evidence of results, such as graduate job uptake, graduate user satisfaction levels, and professional competencies that demonstrate successful curriculum implementation (Kwek et al., 2021).

Although outcomes-based models offer a range of advantages, institutions still face implementation challenges. Designing authentic learning outcomes and validly measuring their achievement requires complex evaluation instruments. In addition, the implementation of OBE requires intensive collaboration between universities, industry, and external stakeholders to ensure that graduate competencies are truly relevant and practically applicable (Duarte et al., 2023). Therefore, QAHE plays a critical role

as a quality keeper that ensures the design, implementation, and evaluation of OBE approaches take place consistently and sustainably.

Flexibility and Customization in Curriculum Design

The increasing need for flexibility and customization in learning is the main trend of QAHE in the 5.0 era. The curriculum is no longer seen as a static structure, but as a dynamic ecosystem that allows students to design personalized learning routes through online, hybrid, modular, or micro-credential-based learning (Barnett, 2017). This flexibility requires a quality assurance system that is able to supervise various forms of learning delivery fairly and proportionately. Therefore, QAHE faces new challenges in developing quality indicators that are tailored to the diversity of learning models (Kopiec, 2021).

To ensure that the quality of learning is maintained in flexible conditions, institutions are beginning to adopt evaluation tools such as digital portfolios, data-based formative assessments, and learning analytics. These instruments help assess student competencies more authentically and sustainably, regardless of the learning format. Research on the implementation of Internal Quality Assurance System (IQAS) shows that institutions that successfully face the 5.0 era are those that are able to integrate digital quality management systems with adaptive internal policies (Suwito, et.al, 2024). This approach ensures that curriculum innovation remains within a strong quality assurance framework.

Curriculum customization also opens up opportunities to introduce alternative modular and credential-based curriculum models. However, QAHE must validate each module to be consistent with national and international competency standards. In addition, the need for a robust credential verification mechanism demands that institutions develop new QA procedures that place more emphasis on authentic assessment, micro-credential validity, and learning process credibility (Varadarajan et al., 2023).

Emphasis on Cross-Cultural Competencies and Non-Technical Skills

Non-technical skills (soft skills) such as communication, ethics, creativity, collaboration, and critical thinking are now an integral part of the quality indicators of higher education in the 5.0 era (Chavhan et al., 2022). QAHE no longer only focuses on traditional academic aspects, but also demands that institutions prove that their graduates have the adaptive abilities, strong character, and cross-cultural competencies required in a globalized world. This emphasizes that the success of education is not only related to the transfer of knowledge, but also the formation of intact and competitive individuals.

Measuring soft skills is a methodological challenge in itself. To answer this challenge, Guerrero-Sosa et al. (2025) developed a fuzzy logic-based multimodal framework to evaluate soft skills in a more objective and explainable manner. This model assesses various aspects such as

communication, nonverbal expression, and collaboration, so that the assessment results can be more comprehensive. Their findings reinforce that quality assurance systems must adopt a multidimensional and evidence-based evaluation approach to assess soft skills proportionately.

In addition, collaborative project-based learning and cross-cultural experiences are increasingly used strategies to develop students' soft skills. His research on multinational collaborative projects confirms that the experience of working in a multidisciplinary team spurs communication, conflict management, and leadership skills (Podlaski et al., 2025). In the context of QAHE, this demands a new quality indicator that not only assesses conventional academic output, but also the social contribution and global civic values of graduates (Lattif et al., 2020).

Future Prospects of QAHE Era 5.0

QAHE's prospects in the 5.0 era are directed towards the integration of predictive technology, the implementation of continuous accreditation, and flexible credential-based personal learning systems. First, QAHE is predicted to utilize AI not only for retrospective analysis but also for academic risk prediction, identification of patterns of quality decline, and automated intervention recommendations to prevent learning failure (Lase, 2019). This kind of predictive system can change the orientation of QAHE from a culture of "control" to a culture of "prevention".

Second, the accreditation process in the future is likely to move towards *continuous accreditation*, where quality assessments are carried out in real-time using data collected automatically from various institutional management systems. This approach is in line with the findings of Duarte et al. (2023), who emphasize the need for faster, responsive, and flexible accreditation mechanisms. The implementation of a continuous accreditation system also has the potential to reduce the gap between formal evaluation and daily factual quality conditions.

Third, personalization of education based on micro-credentials and digital badges is increasingly gaining a place as a model that is able to accommodate the differentiation of student competencies. QAHE plays a role in ensuring the credibility, consistency, and validity of the evaluation of each issued credential. A systematic study by Varadarajan et al. (2023) confirms that the success of micro-credentials depends on a robust QA framework and cross-sector collaboration, especially with industries that are the main users of graduates.

This systematic literature review confirms that higher education quality assurance in the era of Society 5.0 can no longer use traditional approaches. A paradigm shift from bureaucracy and compliance towards flexibility, innovation, and relevance is inevitable. Key findings show QAHE trends driven by AI and big data, a focus on outcomes-based education, curriculum flexibility, and an emphasis on non-technical skills. Institutions must invest in technology, develop a dynamic and results-centric curriculum, and forge close

collaborations with industry to ensure higher education remains relevant and superior. Challenges such as data privacy, AI ethics, and the digital divide must be addressed with mature policies. The future of QAHE will be more personalized, sustainable, and adaptive, where technology and the humanities come together to create a resilient and sustainability-oriented education ecosystem.

This study has several limitations that need to be noted. First, the scope of the literature analyzed is limited to scientific publications available in specific databases (Scopus, Web of Science, and Google Scholar) as well as the 2020–2025 time frame, so it is possible that the results of the review are not fully representative of broader global developments. Second, the literature-based nature of this research causes limitations in providing direct empirical evidence of the implementation of QAHE in various institutional contexts, especially in developing countries with limited digital infrastructure. In addition, this study focuses more on general trends and prospects without delving deeply into the differences in local contexts, cultures, and education policies in each country that can influence the adoption of QAHE in the Society 5.0 era. To enrich the findings, further research is recommended to conduct empirical studies with a mixed methods approach to explore the real practice of implementing QAHE based on AI, big data, and outcomes-based education in various universities. Future research also needs to examine the aspects of ethics, regulation, and data protection in applying AI in the academic environment, especially related to student privacy and digital governance. In addition, comparative studies between countries or between types of universities can provide a more contextual picture of how QAHE in the 5.0 era is adapted to local needs. Longitudinal research exploring the long-term impact of technology in quality assurance is also needed to see the extent to which the proposed reforms contribute to the quality of graduates, global competitiveness, and the sustainability of higher education.

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