Industrial engineering as a bridge between campus and the world of work: An implementation study on engineering students

ROSNELLI ROSNELLI[1*], YUNIARTO MUDJISUSATYO[2], AND DARWIN DARWIN[3]

Abstract

The ever-evolving paradigm shift in higher education demands that engineering universities be able to integrate the academic world with the real needs of industry. This study aims to analyze the implementation of Industrial Engineering education as a bridging strategy between universities and the workforce in preparing competent, adaptive, and work-ready engineering students. The research employed a qualitative descriptive approach using in-depth interviews, observations, and document analysis involving lecturers, students, and industrial partners at a state university in western Indonesia. The findings reveal that Industrial Engineering-based learning fosters analytical thinking, collaborative skills, and a practical understanding of production systems and industrial management. Collaboration between academia and industry practitioners strengthens the link and match within the engineering curriculum and accelerates students' adaptation to professional work culture. Therefore, the implementation of Industrial Engineering serves as a strategic bridge between academia and industry to produce graduates who are relevant, innovative, and globally competitive.

Keywords
Engineering Education; Industrial Engineering, Link and Match; Work Readiness

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[1*] Universitas Negeri Medan, Indonesia, Corresponding email: rosnelli@unimed.ac.id
[23] Universitas Negeri Medan, Indonesia.

Introduction

Rapid technological developments have brought significant changes to work patterns, production systems, and human resource needs across various sectors, particularly in engineering and technology. This era emphasizes not only automation and digitalization but also places humans at the center of technological innovation. Lal et al., (2020). The concept of human-centered technology is the foundation for the development of modern industry, oriented towards a balance between technological advancement and human values. This paradigm shift requires higher education, particularly in the engineering field, to undertake a fundamental transformation in its learning system to produce graduates who are not only academically intelligent but also resilient, creative, and able to adapt to the complexities of today's workplace.

The modern industrial world now demands college graduates with comprehensive competencies that master scientific theories and concepts, but also the ability to apply them in real-world contexts (Khoo et al., 2020). Engineering graduates must possess analytical thinking skills, cross-disciplinary collaborative skills, and the capacity to adapt to new technological developments such as artificial intelligence, the Internet of Things (IoT), big data analytics, and cyber-physical systems. This challenge is increasingly complex because companies are no longer looking for workers who can simply follow instructions, but individuals who are able to innovate, solve problems, and contribute to the efficiency of production systems and business sustainability. Therefore, the gap between the academic world and the world of work needs to be bridged through learning that is contextual, applicable, and relevant to industry needs.

In this context, engineering higher education has a strategic responsibility to build a learning system aligned with the direction of industrial transformation. Universities can no longer rely solely on conventional learning methods oriented toward theory and memorization of concepts. They need to develop experiential learning, project-based learning, and cross-sector collaboration. This ensures that the learning process takes place not only in the classroom but also in a real-world industrial environment. Synergy between education and industry is key to preparing a future generation of engineers ready to face the challenges of rapidly evolving technology (Pons, 2016).

Industrial Engineering is a field of study that holds significant potential for integrating campus and the workplace. This field is inherently directly related to industrial systems, process management, and resource optimization. Through an interdisciplinary approach, Industrial Engineering teaches students to understand how humans, machines, and systems work harmoniously to create efficiency and productivity. Therefore, the implementation of Industrial Engineering learning is highly relevant for developing engineering students' abilities to not only understand engineering theory but also possess practical skills in designing, analyzing, and managing industrial systems effectively (Al Sheeb et al., 2019).

The application of project-based learning, production system simulations, and collaboration with industrial partners are important tools for strengthening student competencies. Through activities such as industrial case studies, fieldwork, and applied research collaborations, students gain authentic learning experiences (Rohde et al., 2020). They not only learn how industrial systems work but also how to interact with professional teams , understand work culture, and solve real-world problems. This learning process directly strengthens the link and match between academia and industry.

This research focuses on examining how Industrial Engineering learning can act as an effective bridge between campus and the world of work. The focus of the study is directed at the form of curriculum implementation, collaboration strategies with industry, and its impact on the work readiness of engineering students (Mathers et al., 2018). Through this research, it is hoped that a learning model can be found that is able to integrate aspects of theory, practice, and human values as technological demands in the rapidly developing industry. Thus, engineering universities can play a role as a driving force in producing graduates who are not only technically competent but also ethical, adaptive, and ready to become agents of innovation in the new era of global industry.

Methodology

Research design, site, and participants

This study uses a qualitative descriptive approach with the aim of in-depth describing the implementation process of Industrial Engineering learning and its relationship to student work readiness (Creswell and Poth, 2016). The research subjects included three lecturers from the departments of Electrical Engineering, Mechanical Engineering, and Civil Engineering, students of the Electrical Engineering, Mechanical Engineering, and Civil Engineering study programs, and industrial partners represented by three industrial managers in the fields of Electrical Engineering, Mechanical Engineering, and Civil Engineering. Data were collected through in-depth interviews, observations, and documentation (Kardanova et al., 2016). Interviews with participants were conducted from 30 to 45 minutes. Data analysis used an interactive model that includes data reduction, presentation, and verification (Mallette and Saldaña, 2019; Matthew B, M., & A Michael, 1994). The interview questions to participants were as follows.

1. How is the current Industrial Engineering study program curriculum designed to adapt to the needs and developments of the modern industrial world?
2. To what extent are project-based learning methods (PBL) and production system simulations applied in the Industrial Engineering lecture process?
3. How do lecturers and students collaborate in practical activities or industrial projects so that learning on campus is relevant to practice in the field?
4. What forms of cooperation or partnership have been established between the Industrial Engineering study program and certain companies or industrial sectors?
5. What are the benefits students get from direct involvement in industrial projects, internships, or practical work facilitated by the campus?
6. How does industry contribute by providing input on curriculum updates or the development of final project topics for Industrial Engineering students?
7. What competencies are considered most important by the industrial world and how does learning on campus help students master these competencies?
8. How do learning experiences in Industrial Engineering help students develop analytical, collaborative, and adaptive skills to new technologies?

9. To what extent do Industrial Engineering graduates feel prepared and able to adapt to the world of work, and how do universities evaluate the effectiveness of learning in bridging industry needs?

Data collection and analysis

Data from the survey were collected through a questionnaire and analysed quantitatively using descriptive statistics following Fowler (2018). The survey questionnaire consisted of two scales. The first scale asking about the democratic attitude of teachers was adapted from Gulec and Balcik (2009); this scale was originally written in English and comprised 24 items. One item was eliminated due to redundancy, and the other 23 questions were translated into Bahasa Indonesia. The second scale rating the effect of teachers' democratic attitudes in teaching on students' learning was added. It consisted of 6 items. Two general questions asking whether or not the participants knew the word "democracy" and how they defined "democracy" were added. The first survey scale used a 5-point scale, ranging from "never" (1) to "always" (5). The second scale used a 5-point scale, ranging from "completely disagree" (1) to "completely agree" (5). Five researchers were involved in designing the survey questionnaire and translating the first scale of the survey questionnaire. They all hold doctorates from reputable universities in Indonesia and overseas universities, majoring in political science (3 researchers) and education (2 researchers). All of them were experts in survey and qualitative studies and fluent in English.

The researchers utilised a Likert scale questionnaire through a face-to-face interview with the research participants to elicit data from the study. The procedure included distributing consent forms and instructions for students from schools in the area with low and high democracy indexes to respond to the survey questionnaire. Trained interviewers interviewed each participant. Survey completion took approximately 30 minutes, and the respondents' responses were anonymous. Two research team members were sent to each location to ensure the quality of the survey data collection. They were responsible for supervising and supporting the interviewers if questions were from related parties, including the schools and students involved in the survey. They were also responsible for solving any issues during the data collection.

All statistical analyses were performed using the Statistical Package for Social Science (SPSS) for the survey data. To verify the reliability of the questionnaire, the Cronbach Alpha coefficient was calculated; the Cronbach Alpha coefficient was 0.831 for the first scale and 0.636 for the second scale. So, it was concluded that the questionnaire was reliable. Basic descriptive statistics were used to determine the levels of the students' perceptions of the teachers' democratic attitudes. The validity of the survey was limited by its face-to-face interview format. The study's rigour and internal validity were increased by carefully selecting an established survey questionnaire from the literature, implementing uniform procedures for data collection across participants/cohorts, and integrating input on the survey from experts on the topic and experts in educational research and measurement.

Results

Research findings indicate that Industrial Engineering learning has been implemented through a project-based learning approach and an industry-based curriculum. Students are involved in solving real-world industrial cases, such as production line efficiency and quality management. Collaboration with industry is carried out through internships, guest lectures, and applied research. The impact is seen in the improvement of engineering students' technical, social, and adaptive competencies, as follows.

How is the current Industrial Engineering study program curriculum designed to adapt to the needs and developments of the modern industrial world?

Participant #1's explanation is as follows.

> The Industrial Engineering study program curriculum is designed based on competencies and workplace needs, taking into account input from industry and the latest technological developments. The curriculum structure includes a combination of theory, practice, and projects based on real-world problems in the industry (Participant #1).

Discussions with participants revealed that the Industrial Engineering curriculum is designed with a focus on mastering competencies that meet the needs of the modern workplace. In its design, the academic team not only adheres to national higher education standards but also involves input from industry to ensure alignment between the theory taught and the practices required in the field. This competency-based approach emphasizes students' ability to apply engineering concepts, production systems management, and efficiency and productivity analysis in real-world industrial contexts.

Furthermore, the curriculum structure is dynamically developed to remain relevant to the latest technological developments, such as automation, the Internet of Things (IoT), and industrial data analytics. Learning focuses not only on classroom theory but also integrates laboratory practice, case studies, and real-world problem-based projects (project-based learning). Through this approach, students are encouraged to think critically, work collaboratively, and develop adaptive skills to address ever-changing industry challenges. Thus, the Industrial Engineering curriculum serves as a strategic tool for producing competent, innovative graduates who are ready to face the rapidly evolving world of work.

To what extent are project-based learning methods (PBL) and production system simulations applied in the Industrial Engineering lecture process?

The results of the interview with participant #4 are as follows.

> Project-based learning methods and production system simulations have been systematically implemented in various courses. Students are assigned projects that simulate production processes, system planning, and resource optimization, enabling them to gain a firsthand understanding of industrial dynamics (Participant #4).

Discussions with participants revealed that Project-Based Learning (PBL) and production system simulations have become an integral part of the learning process in the Industrial Engineering study program. This approach is systematically applied across various courses so that students not only understand theory but also are able to apply concepts in real-world situations that mimic industrial conditions. In each project, students are challenged to design, manage, and evaluate a production process, from the planning stage to optimizing human, material, and machine resources.

This learning activity also requires students to work in teams , conduct data analysis, and make decisions based on efficiency and productivity. Through these simulations, they can understand the complexity of industrial systems, including the interactions between technical, economic, and managerial factors that influence production performance. Furthermore, lecturers act as facilitators, guiding students in designing innovative and rational solutions to industrial problems. Thus, the application of PBL methods and production system simulations not only improves students' technical skills but also strengthens their communication, leadership, and cross-disciplinary collaboration skills, which are highly needed in a workplace that must continually respond to technological developments.

How do lecturers and students collaborate in practical activities or industrial projects so that learning on campus is relevant to practice in the field?

The results of the interview with participant #5 are as follows.

> Collaboration is carried out through practicum activities, applied research, and joint projects with industry. Lecturers act as academic advisors and mentors, ensuring students are able to apply theory to practical contexts professionally (Participant #5).

The results of discussions with participant #5 indicate that collaboration between universities and the industrial world in Industrial Engineering learning is realized through various planned and sustainable activities. This collaboration includes real-life case-based practicum activities, joint applied research, and collaborative projects with industrial partners. Through these activities, students have the opportunity to learn directly from industrial problems, understand production processes, quality management, and the efficiency of work systems as a whole. These activities also provide contextual experiences that not only strengthen theoretical understanding but also foster critical, analytical, and creative thinking skills.

In this collaborative process, lecturers play a dual role as academic advisors and professional mentors. Lecturers not only guide students in scientific and methodological aspects but also ensure they are able to apply theory to industrial practice with a systematic and ethical approach. Through this guidance, students are shaped to possess professional responsibility, effective communication skills, and a strong work ethic. This kind of collaboration makes the learning process more relevant to the needs of the workplace and strengthens the position of higher education as a strategic partner for industry in preparing superior human resources for an industry that is constantly adapting to new technological advances.

What forms of cooperation or partnership have been established between the Industrial Engineering study program and certain companies or industrial sectors?

The results of the interview with participant #9 are as follows.

> Partnerships with industry are realized through internship programs, guest lectures, research collaborations, and joint projects in production system design.

> Several companies also become permanent partners in providing guidance and evaluation of students' final assignments (Participant #9).

Discussions with participants revealed that partnerships between universities and industry in the field of Industrial Engineering are a crucial strategy for ensuring the relevance and quality of engineering education in the modern era. These partnerships are realized through various concrete activities such as industrial internship programs, guest lectures by professional practitioners, applied research collaborations, and joint projects in production system design and operational efficiency improvement. Through internships, students gain firsthand experience with work culture, safety standards, and decision-making processes in a real-world industrial environment. Meanwhile, guest lectures provide new insights into technological trends, managerial practices, and the latest innovations in the industrial sector.

Furthermore, research collaborations and joint projects provide opportunities for students to apply academic theory to solve practical problems faced by companies. Several partner companies also play an active role as external advisors, guiding and evaluating students' final assignments, ensuring that the research and production system designs they develop are more applicable and industry-oriented. Through this mutually beneficial partnership model, universities and industry can synergize to produce competent, adaptable graduates who are ready to contribute to the rapidly evolving manufacturing and technology sectors.

What are the benefits students get from direct involvement in industrial projects, internships, or practical work facilitated by the campus?

The results of the interview with participant #6 are as follows.

> Through hands-on involvement, students gain practical experience, understand professional work culture, and improve soft skills such as communication, time management, and leadership. This strengthens their readiness to enter the workforce after graduation (Participant 6).

Discussions with participants revealed that through direct involvement in industrial activities, Industrial Engineering students gain valuable opportunities for contextual and applied learning. The practical experience they gain involves not only the application of theory in a real-world work environment but also a deep understanding of professional work culture, safety standards, and the dynamics of interdepartmental coordination within the production system. In the process, students learn to adapt to complex work demands, develop time discipline, and take responsibility for their work.

Beyond technical aspects, industrial experience also strengthens students' soft skills, such as effective communication, teamwork, time management, and leadership skills in situations that require quick and accurate decision-making. Students are encouraged to interact with professionals, understand work ethics, and hone data-driven problem-solving and efficiency skills. All of these experiences provide essential tools that enhance their employability skills after graduation. Thus, direct involvement in the industrial world not only builds technical competence but also fosters professional character, a strong work ethic, and an adaptive mindset aligned with the needs of the industry.

How does industry contribute by providing input on curriculum updates or the development of final project topics for Industrial Engineering students?

The results of the interview with participant #2 are as follows.

> Industry participants provide input through consultative forums, tracer studies, and program advisory boards. Industry feedback is used to update course content, adapt learning technologies, and enhance the relevance of student research topics. (Participant #2)

Discussions with participants revealed that industry plays a strategic role in strengthening the link between academia and the needs of the workplace through various collaborative mechanisms. Input from industry is typically provided through consultative forums, tracer studies, and advisory board programs regularly held by the Industrial Engineering study program. In these forums, company representatives provide insights into technological developments, workforce competency needs, and global trends in manufacturing and production systems management. This information serves as a valuable resource for universities to adjust the direction of curriculum development and learning methods to remain relevant to the dynamics of modern industry.

Furthermore, tracer studies of alumni working in the industrial sector provide a clear picture of the extent to which graduate competencies meet workplace expectations. Based on this feedback, the program updates course content, integrates the latest learning technologies such as digital simulations, data analytics, and the Internet of Things (IoT), and expands student research topics to be more applicable and directly impact industrial performance. With this synergy, higher education serves not only as a center of knowledge but also as a strategic partner in producing superior, adaptive, and innovative human resources in an era of increasingly rapid technological development.

What competencies are considered most important by the industrial world and how does learning on campus help students master these competencies?

The results of the interview with participant #7 are as follows.

> The industry emphasizes competencies in systems analysis, operations management, production process optimization, and adaptability to digital technology and automation. On-campus learning focuses on developing these skills through practical work and real-world case studies (Participant#7).

The discussion with participant #7 revealed that today's industrial world demands graduates with comprehensive competencies, particularly in systems analysis, operations management, production process optimization, and adaptability to digital technology and automation. The challenges of modern industry, which are rife with technological transformation and production efficiency, require workers to possess systematic, critical, and data-driven thinking skills. Therefore, the Industrial Engineering study program is adapting its curriculum to produce graduates who excel in these fields.

On-campus learning is designed in an integrated manner through laboratory practices, real-world case studies, and collaborative projects that mimic industrial working conditions. Students are trained to analyze production flows, identify sources of inefficiency, and design technology-based solutions such as automation, the Internet of Things (IoT), and industrial data analytics. This learning approach not only strengthens students' technical competencies but also fosters their ability to adapt to changing systems and new technologies. Thus, students not only understand the theories of operations management and systems engineering but are also prepared to implement them in a modern industrial context oriented towards efficiency, innovation, and sustainability, in line with the demands of the industrial world.

How do learning experiences in Industrial Engineering help students develop analytical, collaborative, and adaptive skills to new technologies?

The results of the interview with participant #8 are as follows.

> Students are trained to think systematically, solve complex problems, and adapt to new technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and intelligent manufacturing systems. This approach helps them prepare for the dynamic demands of the rapidly evolving industrial world (Participant #8).

The results of discussions with participant #8 indicate that students who take Industrial Engineering courses are trained to have systematic and analytical thinking skills in dealing with complex and dynamic industrial problems. Learning does not only focus on theoretical aspects, but is also directed at the practical application of concepts through a problem-based learning approach and industrial system simulations. Students are encouraged to identify the root of problems, design efficient solutions, and evaluate the results using a data-driven approach and digital technology.

In addition, students are also introduced to various cutting-edge technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), and smart manufacturing systems, which are key features of modern industry. Through the use of these technologies, they learn to understand the connectivity between production processes, system automation, and predictive analytics to improve operational efficiency. This approach not only fosters adaptive capabilities to technological developments but also strengthens students' innovative and collaborative skills. With this future-oriented learning, students are prepared to become resilient professionals, able to adapt to change, and ready to face the demands and dynamics of the rapidly evolving industrial world.

To what extent do Industrial Engineering graduates feel ready and able to adapt to the world of work, and how does the campus evaluate the effectiveness of learning in bridging industry needs?

The results of the interview with participant #3 are as follows.

> The campus regularly conducts evaluations through tracer studies, graduate user surveys, and analysis of alumni performance in the workplace. The evaluation results indicate that Industrial Engineering graduates possess relevant, adaptive, and competitive skills in facing professional challenges (Participant #3).

Discussions with participants revealed that the university regularly conducts comprehensive evaluations of the success of the educational process and graduate readiness through various instruments, such as tracer studies, graduate user surveys, and analysis of alumni performance in the workplace. These evaluations aim to assess the extent to which the competencies developed during their studies align with industry needs and current technological developments. Tracer studies provide an overview of graduates' job market absorption rate, job positions obtained, and the suitability of their fields of work to their acquired skills. Meanwhile, graduate user surveys involve partner companies and industry stakeholders to assess graduates' technical abilities, soft skills, and professionalism.

The evaluation results indicate that Industrial Engineering graduates possess relevant, adaptive, and competitive skills to face professional challenges in the digital era. They excel in systems analysis and production management, as well as adapting to new technologies such as automation and the Internet of Things (IoT). Furthermore, graduates demonstrate strong communication, teamwork, and leadership skills. These findings serve as a foundation for the university to continuously improve its curriculum and learning strategies, ensuring that education quality is aligned with the demands of the 5.0 Industrial Revolution and the needs of the global workforce.

Discussion

The results of interviews with various participants, including lecturers, students, and industrial partners, show that Industrial Engineering learning has a strategic role in bridging the gap between the academic world and the world of work. (Mathers *et al*., 2018; Rohde *et al*., 2020). In general, it was found that the applied learning approach was oriented towards mastering competencies that align with the demands of the Industrial Revolution 5.0, namely analytical, collaborative, adaptive, and innovative abilities.

First, from the curriculum aspect, the informant explained that the Industrial Engineering study program has adopted a competency-based curriculum and industry needs. The curriculum is dynamically designed by considering input from industry, technological developments, and labor market trends. This shows the awareness of educational institutions to strengthen academic relevance through the integration of theory and practice (Al Sheeb., 2019). This approach is in line with the concept of Outcome-Based Education which emphasizes the achievement of learning outcomes according to professional needs. Thus, graduates are expected not only to master concepts, but also to be able to implement them in real situations.

Second, the implementation of Project-Based Learning (PBL) and production system simulations provides concrete evidence of the application of contextual learning in a campus environment. Through this method, students learn to manage projects that mimic real-world industrial conditions, including the planning, production, and resource optimization stages. These activities not only improve technical skills but also train critical thinking, communication, and time management skills. These findings align with theories (Desha *et al*., 2019; Kardanova *et al*., 2016) that emphasize that hands-on experience is an effective means of internalizing knowledge.

Third, the interview results also emphasized the importance of collaboration between lecturers, students, and industry. Collaboration is carried out through practicum activities, applied research, industrial internships, and joint projects (Khoo *et al*., 2020). Lecturers act not only as instructors but also as professional mentors, ensuring students are able to apply theory in an industrial context ethically and effectively. This collaborative model demonstrates a paradigm shift in learning from teacher-centered learning to student-industry-centered learning , where students are positioned as active participants in the competency-building process.

Furthermore, strategic partnerships with industry are a key strength in creating synergy between universities and the workplace. These partnerships are realized through internship programs, guest lectures, joint research, and the involvement of practitioners in evaluating students' final assignments. This form of collaboration offers two main benefits: for students, the partnerships enhance practical experience and job readiness; while for industry, these activities serve as a means to identify and select potential job candidates (Lal *et al*., 2020). This synergy reflects the triple helix model between universities, industry, and the government in supporting innovation and human resource development.

In terms of student competency development , interview results indicate that students benefit significantly from direct involvement in the industrial world. They not only learn technical aspects but also understand professional work culture and develop soft skills such as communication, leadership, and teamwork (Pons, 2016; Zlatkin *et al*., 2019). Improving non-technical competencies is crucial because the modern workplace demands not only academic prowess but also adaptive character and strong interpersonal skills. Furthermore, input from industry is a crucial element in maintaining the quality of learning. Consultative forums, tracer studies, and advisory boards serve as continuous feedback mechanisms to update the curriculum and adapt learning technologies. Rapid response to changing industry needs ensures that study programs remain relevant to digitalization and automation trends. The integration of technologies such as the Internet of Things (IoT) , Artificial Intelligence (AI), and smart manufacturing systems further strengthens students' readiness to face the digital-based work ecosystem. With this approach, students are trained to become resilient problem solvers and adapt to new technologies. These findings reinforce the view that modern engineering education must be flexible and able to keep up with the ever-changing industrial landscape.

Finally, the results of campus evaluations through tracer studies and graduate user surveys indicate that Industrial Engineering graduates are considered relevant, adaptive, and competitive. They are able to adapt to digital-based work environments and demonstrate good performance in systems analysis and production management (Rohde *et al*., 2020). This ongoing evaluation serves as a basis for the campus to continuously improve the quality of the curriculum, learning methods, and industrial partnerships to remain in line with global demands. Through a curriculum based on the Indonesian National Curriculum Framework, contextual learning methods, strategic collaboration, and continuous evaluation, this study program has succeeded in producing graduates who are ready to face the challenges of increasingly rapid technological developments in the industrial world. By strengthening academic and industrial synergy, engineering higher education not only produces skilled workers but also agents of change capable of contributing to innovation and sustainability of the national industry (Khoo *et al*., 2020; Pons, 2016).

Industry actively provides input through consultative forums, tracer studies, and advisory board programs. These mechanisms serve as a crucial bridge to ensure that each curriculum update truly reflects the latest industry dynamics. Feedback from industry partners is used to enrich teaching materials, adapt learning technologies, and enhance the relevance of student research topics to achieve high applicability (Desha *et al*., 2019; Khoo *et al*., 2020). Furthermore, industry emphasizes the importance of mastering analytical competencies, operations management, and production process optimization, combined with the ability to adapt to digital technologies such as automation and industrial information systems. Universities then respond to these demands with a practice-based learning approach and real-life case studies, so students not only understand theory but also are able to implement it in real-world industrial contexts. These findings reinforce the importance of synergy between universities and industry not only impacting curriculum relevance but also enhancing graduates' competitiveness at the national and global levels.

Conclusion and Recommendations

Learning in the Industrial Engineering study program has proven to be a strategic bridge that effectively connects the academic world with the world of work. Through the implementation of a project-based learning approach and active partnerships with various industrial sectors, students not only gain theoretical understanding, but also direct experience in solving real-world problems. Industrial involvement in the learning process provides opportunities for students to understand professional standards, organizational dynamics, and the application of the latest technology in the world of work. Thus, technical competencies and soft skills such as communication, teamwork, and adaptability can develop in a balanced manner. To strengthen this synergy, a higher education policy is needed that is oriented towards sustainable collaboration between campuses and industry, so that Industrial Engineering graduates are not only competent but also able to compete globally in facing the challenges of the rapidly evolving digital era. Thus, the implementation of Industrial Engineering can function as a strategic bridge between campuses and the industrial world to create graduates who are relevant, innovative, and globally competitive.

Disclosure Statement

No potential conflicts of interest were reported by the authors.

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