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Assessment of Alumni's Professional Preparedness and Workforce Integration of Mechanical Engineering Departement State University of Surabaya

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ABSTRACT

Objective: Alumni professional readiness and success in the workplace are critical indicators of a university's educational quality and reputation. **Method:** The method used in this research is quantitative, The object of this study was alumni of the Mechanical Engineering Undergraduate Study Program, class of 2023, classes 106, 107, 108, and 109 with a total of 73 respondents, where data information about alumni will be acquired using the study tracer application. **Results:** The research results show that the competencies mastered by alumni are quite good, with the highest competency mastery in teamwork and ethics. In contrast, the competency that alumni need to improve is communication. 66.67% of alumni work in the private sector, 11.76% work in BUMN/BUMD, 5.88% choose to be self-employed/own companies, 9.80% work in government agencies, and 5.88%, with a period of obtaining employment in the first 6 months after graduating reached 90.38%. **Novelty:** This study's strategy, which links the abilities acquired during the study period with alumni's post-graduation job accomplishments and analyzes their preparedness for obstacles in the workplace, is what makes it novel. It will summarize the skills and competencies employers seek in today's workforce and offer fresh perspectives on how higher education courses might be better tailored to industry demands.

INTRODUCTION

As the global labor market undergoes rapid transformation, higher education institutions face increasing pressure to align graduate competencies with industry demands. Tracer studies have emerged as a vital mechanism for evaluating the transition of graduates into the workforce, offering insights into employability, curriculum relevance, and stakeholder engagement. To evaluate and enhance higher education, it is essential to furnish diverse data (Schomburg et al., 2016). The tracer study is presently utilized by BAN-PT as a must for full accreditation in Indonesia (Tracerstudy Kemendikbudristek, n.d.). Enhancing educational program services necessitates the implementation of tracer study activities, namely Graduates Tracer Study (GTS) (Badiru et al., 2016). Consequently, the outcomes of tracer studies might illustrate the presence of higher education institutions, including their respective study programs. (Johnson et al., 2019) assert that the principal objective must be evaluating educational impact to ensure that educational programs provide the appropriate level of added value. Moreover, career counseling is vital in higher education since it aids students in understanding employment opportunities and developing critical skills (Hughes et al., 2016).

Universities must gather data on the employment outcomes of their alumni, encompassing both recent graduates and those who graduated long ago, and develop effective collaboration with stakeholders to improve graduate competency. It is because

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work skills—beyond technical knowledge—are paramount in the twenty-first century for securing and maintaining positions in the global industrial market (Ismail, S., & Mohammed, D. S., 2015). The curriculum developed by universities will undoubtedly exert a positive and substantial influence on students' employment prospects. Communication, interpersonal engagement, and self-confidence are the most pragmatic skills and professional ideals. Additional attributes that may enhance professional performance encompass critical thinking, problem-solving, lifelong learning, and communication skills. Students will significantly benefit from their academic preparation and subsequent jobs (Pontillas, 2018) (Cornillez Jr. et al., 2021).

Educational institutions that produce alumni who are successful in their careers usually have a strong reputation. Universities can foster positive relationships and networks with graduate users to collaborate. The success of alumni in careers recorded through the study tracker will also increase the reputation and attractiveness of the institution in the eyes of prospective students and stakeholders. By observing shifts in market trends and expectations, educational institutions may more effectively adjust and ensure their graduates maintain competitiveness and relevance in the workforce. Higher education and the workforce are inseparable (Saiful et al., 2019). In this context, universities promote the attainment of graduate competencies. Ongoing evaluation of competency and curricular accomplishments and their progression can be examined through tracer studies. Through implementing study tracers, educational institutions can ascertain that their academic programs yield graduates possessing both scholarly aptitude and the capacity to thrive in professional environments. Consequently, academic programs must ensure quality (Fajaryati et al., 2015) and furnish sufficient skills and competencies (Nursubiyantoro & Puryani, 2016).

Tracer studies have gained increasing prominence as a mechanism for evaluating the effectiveness of higher education in preparing graduates for the labor market. Prior research, such as Albina and Sumagaysay (2020), has examined graduate employability in specific disciplines like information technology, revealing that a significant proportion of alumni credited their academic preparation for initial employment success. Similarly, Dzomeku et al. (2024) investigated the contributions of nursing graduates to Universal Health Coverage, underscoring the role of higher education in workforce readiness. These and other studies (e.g., Kahn et al., 2019; Gustafsson et al., 2018; Shrader et al., 2022; Wiranto & Slameto, 2021; Atiyeh et al., 2023) confirm that tracer studies provide valuable insights into how graduates transition into the labor market and how curricula align with professional demands. Despite the rising literature, most tracer studies continue to focus on overall job outcomes or specialized health and information technology-related disciplines, with little attention paid to engineering education in Indonesia. Furthermore, there is a scarcity of empirical research that critically examines how non-technical competencies are possessed and required by industry, such as compensation levels, work positions, and job-search speed.

Utilizing the provided background description, the researcher will examine the career success of alumni from the Mechanical Engineering Study Program at the State University of Surabaya, focusing specifically on those who graduated in 2023 through study tracers. This study aims to assess alumni success in the world of work based on salary assessment, job position, length of time to get a job, and the competency factors that influence it. The findings of this study are expected to provide insight into

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educational assessment, services available in the Mechanical Engineering Undergraduate Study Program, policy formulation and to support continuous quality improvement in engineering education and inform higher education stakeholders in curriculum development ad graduate competency planning.

RESEARCH METHOD

This tracer study encompasses all Bachelor of Mechanical Engineering Study Program graduates from the 2023 cohorts 106, 107, 108, and 109, with a total of 73 respondents. The research employs a questionnaire distributed via applications of tracer study. The questionnaire instrument used in this study was a questionnaire issued by the Ministry of Education and Culture.

Data collection procedure is carried out by contacting alumni and sending information on the complete study tracer data filling procedure along with a username and password. This is done by email and personal contact. The administration of questionnaires to alumni and stakeholders aims to assess the career success of graduates from the Mechanical Engineering Study Program at the State University of Surabaya, and the findings will serve as a basis for curriculum evaluation. This data analysis technique encompasses data reduction, display, and conclusion formulation with descriptive-analytic. The methodological design for the tracer study comprises four stages: preparation, implementation, analysis, and follow-up evaluation, as stated in Table 1.

Table 1. Phases of a Survey and Major Work Tasks

Phases	Major work tasks	Duration
Concept and Instrument preparation	• Data collection from judicial activities from SIAKADU, State University of Surabaya • Updating alumni contact data • Developing a questionnaire that refers to the DIKTI tracer study questionnaire • Preparing a list of emails and passwords to be used in filling in the tracer on the Surabaya State University web tracer • Training of survey team	3 months
Data collection	• Sending invitations via email and WhatsApp • Survey begins • Filling out the questionnaire • Progress monitoring • Sending progress monitoring results to the study program tracer coordinator and surveyor	3 months
Data analysis	• Data cleaning (data cleaning) • Data analysis • Analysis results in the form of numbers, tables, graphs • Preparation of reports • Dissemination	3 months

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Phases	Major work tasks	Duration
Evaluation	• Reporting the results of activity evaluations to University Leadership, Deans, and Heads of Study Programs • Institutional leadership meeting related to tracer study • Improving learning programs such as improving competency and curriculum relevance to the world of work market, improving learning processes and accreditation and certification processes, as well as improving the performance of institutional managers	3 months

The tracer study workflow is organized into four sequential phases that span three months. First, Concept & Instrument Preparation, Data Collection, Data Analysis, and Evaluation, these phases form a rigorous, evidence-based feedback loop that ensures tracer study findings directly inform program improvement and institutional accountability.

RESULTS AND DISCUSSION

Results

Competencies that graduates acquire and require in the professional

Figure 1 depicts an eight-dimensional competency map that represents the difference between competencies required by employers (red line) and competencies attained by alumni (green line). In practically every element, alumni display competence that is close to industry norms, such as work ethic, subject matter expertise, English language abilities, information technology use, communication, teamwork, and self-development. However, there is a little gap in the areas of communication and information technology utilization, where alumni expertise (about a score of 4.0) remains below the needs of businesses (around a score of 4.3). Alumni mastery in cooperation and ethics is only close to or slightly higher than industry standards, reflecting graduates' strength in collaboration and honesty.

The excellent correlation between alumni abilities and industry needs, as evidenced by the near overlap of the green (mastery) and red (needed) sections, suggests that the Mechanical Engineering curriculum has successfully prepared graduates with a relevant foundation. The alignment in aspects such as ethics, teamwork, and self-development builds industry trust in graduates' integrity and collaborative ability. However, minor gaps in communication and information technology use indicate that, while alumni are well equipped, they still need to improve their skills in properly conveying ideas and utilizing the most recent digital technologies. The practical implications include incorporating technical communication modules and advanced digital technology training into courses, as well as working more closely with industry partners on real-world case scenarios. By eliminating these gaps, the study program not only increases alumni employability, but also assists businesses in obtaining a workforce that is immediately productive and adaptable to technological developments.

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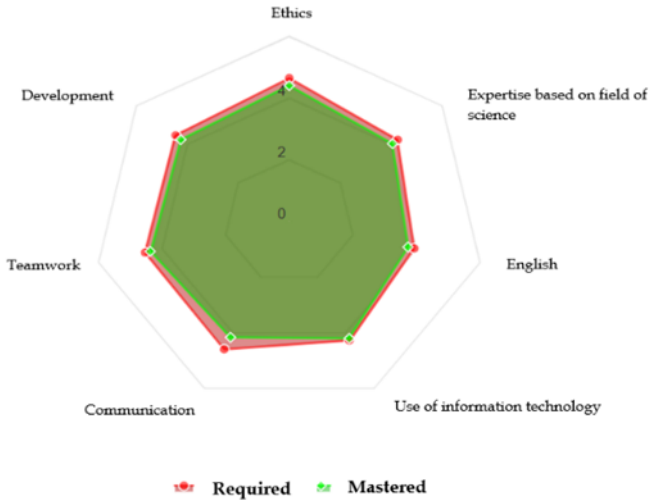

Figure 1. Competencies Acquired by Alumni and Required in the Workforce

Engineering graduates are anticipated to possess skills and competencies that align with the requirements of the workforce and society (Bourn & Sharma, 2008). The competencies of graduates are significantly influenced by universities and their environments, including the quality of the learning atmosphere, curriculum coherence, and the cultivation of skills and competencies (Tomlinson, 2017) (Holmes, 2013). Conversely, challenges such as labor market diversification, heightened skill intensity in employment, and elevated employer expectations for creativity and adaptability often pose substantial obstacles for aspiring professionals (Hensvik & Nordstrom Skans, 2020) (James et al., 2013).

The professional career of an alumni in the workplace

Data was collected from a Google Form survey distributed to graduates of Mechanical Engineering programs during graduation years 106, 107, 108, and 109. The survey has been entirely completed. Tracer study tool maps graduates who have completed their degrees. The study tracer questionnaire consists of seven categories. First, government agencies; second, non-profit organizations and non-governmental organizations; third, private enterprises; fourth, entrepreneurs and their firms; fifth, miscellaneous entities; sixth, state-owned enterprises and regional-owned enterprises; and seventh, institutions and multilateral organizations. Figure 2 illustrates the details of the positions that graduates have secured.

Data from the tracer research, illustrated in Figure 2, reveals that a significant proportion of graduates (66.67%) are employed in private firms, indicating a successful transition into the competitive labor market. Furthermore, 9.80% of grads choose to pursue employment with government entities. Approximately 11.76% of alumnae chose to pursue careers in BUMN/BUMD, while 5.88% opted for entrepreneurship or establishing their own companies. The 5.88% of alumni categorized as 'Other' indicates that many have pursued diverse career trajectories despite the absence of data regarding those employed in non-profit organizations, non-governmental organizations, and multilateral institutions.

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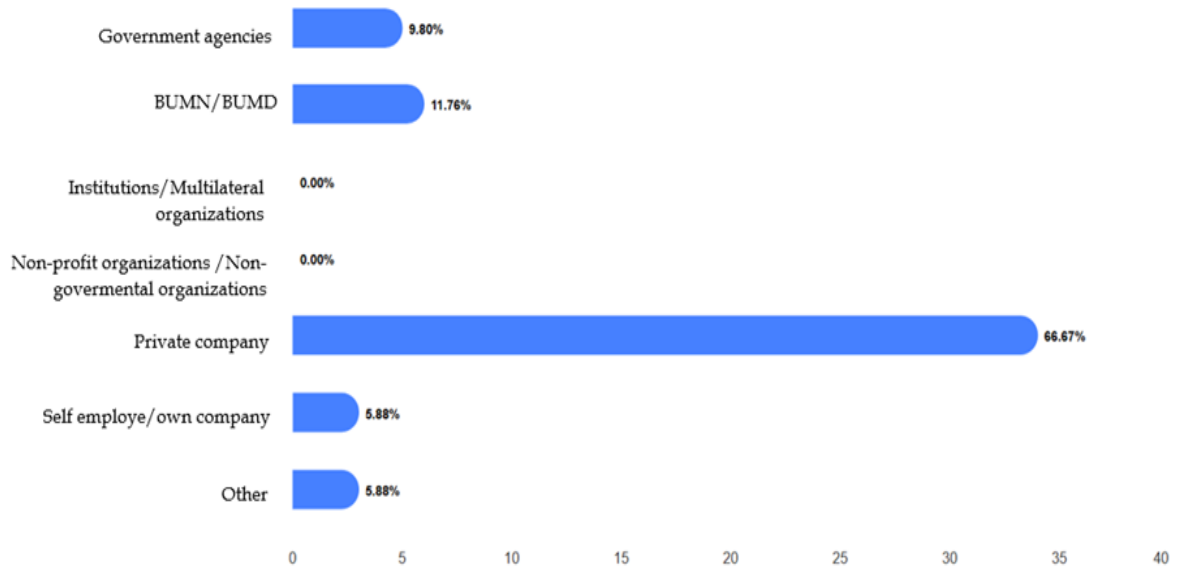

Figure 2. Categories of Institutions Employing Alumni

The majority of alumni (57.69%) decided to work for national companies, followed by multinational corporations (30.77%) and local businesses or entrepreneurs without legal entities (11.54%). These findings indicate that alumni of this university are very competitive at both the national and international levels. Aside from that, interest in entrepreneurial activity is relatively high among alumni, as evidenced by the percentage of alumni who opt to start their businesses.

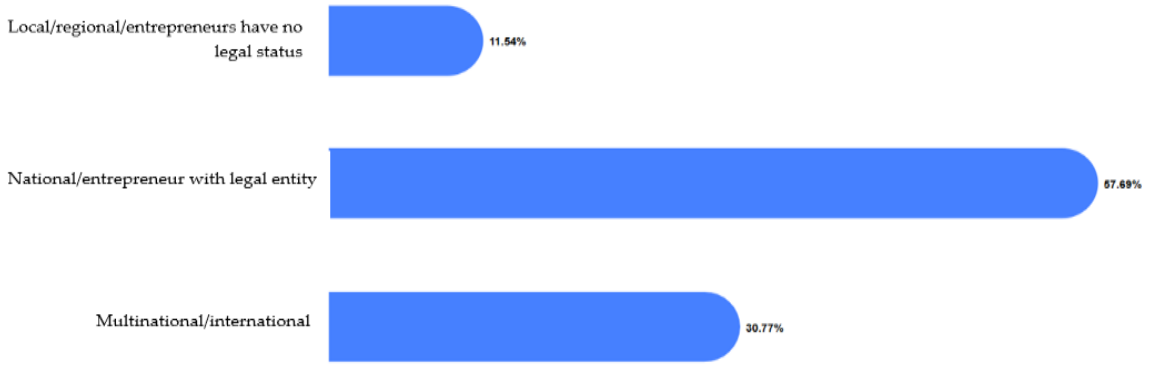

Figure 3. The employment status of alumni

Figure 4 illustrates alumni's many occupations in the industrial sector. The large size of the letters in the image shows the majority of the work of the alumni and it can be seen that most alumni are employed as sales engineer and staff operasional. In addition, alumni also work as production operators, industrial engineers, quality control staff and many other professions that are relevant to their education. It's demonstrating their versatility and capacity to adjust to diverse industrial requirements. It indicates their achievement in navigating a competitive job market. Numerous studies indicate that social networks significantly influence the labor market. Acquaintances or relatives can

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furnish valuable information regarding job opportunities (Calvó-Armengol & Jackson, 2004) (Jackson, 2011) and enhance the establishment of a connection between employers or companies and employees through recommendations (Dustmann et al., 2016) (Hensvik & Skans, 2016). Professional relationships established in the workplace or academia often play a significant role in this context. Additional studies indicate that this form of connectedness yields considerable advantages for employment or remuneration (Hensvik & Skans, 2016), and dan Social networks impact labor markets at various levels (Afridi & Dhillon, 2022)

Figure 4. Alumni Profession

Simultaneously, the distribution of entrepreneurial alumni roles depicted in Figure 5 indicates the position of entrepreneurial alumni, precisely 53.85%, who opted to become founders of their enterprises. It demonstrates the significant enthusiasm of alumni for establishing a firm from inception and attaining leadership positions inside companies. The co-founder role is notably favored by alumni, with a rate of 23.08%, co-founder is Founding partners who collaborate from the early stages of business development. The proportion of alumni employed as staff as operational employees in startup enterprises is 15.38%. Despite being less than founders and co-founders, this figure remains substantial and indicates that specific alumni favor contributing to the expansion of established enterprises. Only 7.69% of grads select freelance work who work on short-term contracts or projects. A minor proportion of alumni opt to pursue independent work as freelancers.

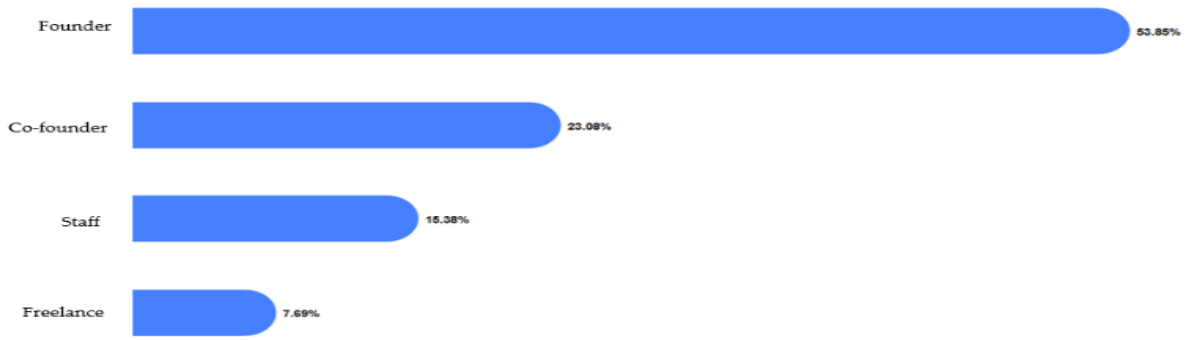

Figure 5. Position of entrepreneurial alumni

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Duration for alumni to secure employment

The initial job search procedure for alumni has differing durations. Data indicates that most alumni, precisely 44.23%, secured employment within 0-3 months post-graduation. A similar amount, precisely 46.15%, secured employment within 3-6 months. It signifies that most graduates can swiftly shift from academia to the professional realm. Approximately 9.61% of alumni required 7 to 12 months to secure employment. This modest percentage indicates the efficacy of the job-seeking procedure for alumni. Figure 6 illustrates the distribution of time required for alumni to secure their first employment.

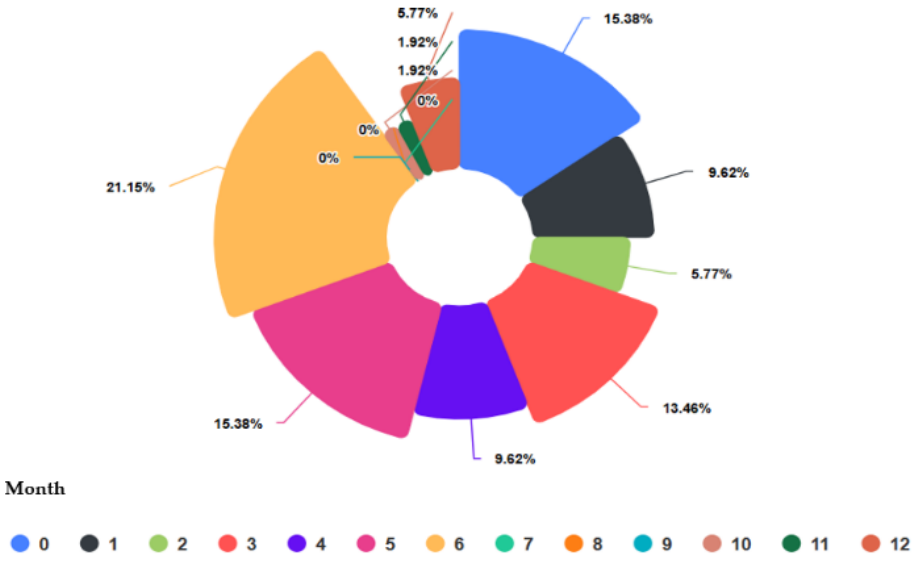

Figure 6. Duration for alumni to secure employment

Alumni income

The distribution of alumni income reveals that the majority (50%) had an average income of more than IDR 5,000,000. This shows that alumni from this college are very competitive in the employment market. However, there is some variance in alumni income levels, with 4.35% having an average take-home pay of less than IDR 2,000,000. This variance may be influenced by various factors, including education, work experience, and the size of the organization where they work. Figure 7 (a) illustrates the previous reasoning in greater detail, as it depicts the income distribution of alumni for the 2023 graduating year.

Meanwhile, Figure 7 (b) depicts the typical distribution of take-home pay among alumni who are entrepreneurs. The analysis found that most self-employed graduates (46.15%) have an average salary of more than IDR 5,000,000. It suggests that graduates who choose the entrepreneurial road have a high earning potential. The income distribution beyond IDR 2,000,000 is very even, indicating variances in the success of alumni-founded firms. Interestingly, no data suggests that self-employed alumni have an average take-home pay of less than IDR 2,000,000, implying that most self-employed alumni have successfully grown their businesses.

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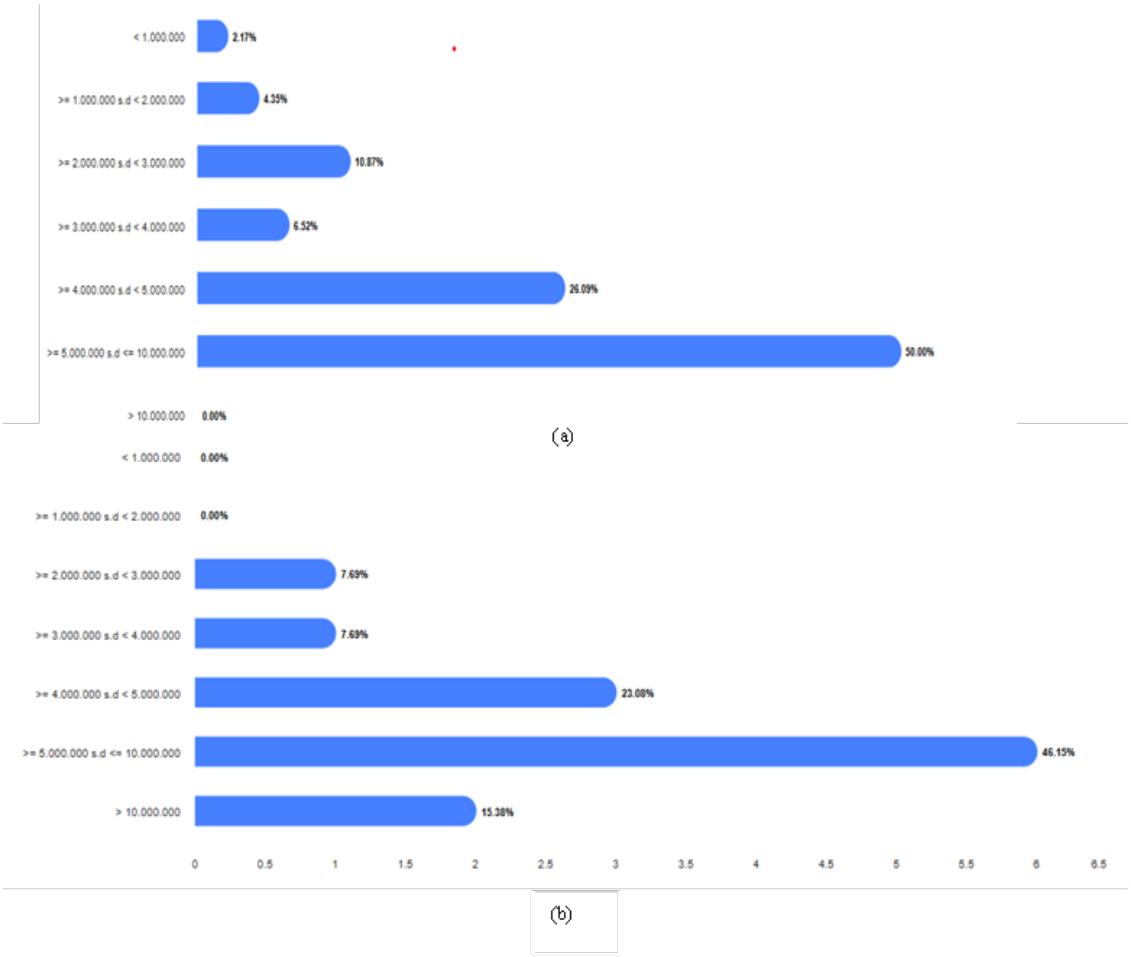

Figure 7. The average take-home pay of alumni works in (a) companies, (b) entrepreneurs

Normality Test

This research used the Kolmogorov-Smirnov (K-S) normality test, a statistical tool for assessing if the data distribution deviates considerably from a normal distribution. This test is conducted to prevent misinterpretation of results from non-normally distributed data. This examination contrasts the distribution of sample data with the theoretical normal distribution. This normalcy test evaluates the competency data acquired by alumni against the skills demanded by the industry. This research utilized 73 samples. Decision-making is predicated on the significance value: if it exceeds 0.05, the research data is considered normally distributed; if it is less than 0.05, it is deemed not normally distributed.

Table 2. One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		73
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	3.76732181
Most Extreme Differences	Absolute	.082
	Positive	.082
	Negative	-.080

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Test Statistic			.082
Asymp. Sig. (2-tailed)[c]			.200[d]
Monte Carlo Sig. (2-tailed)	Sig.		.263
	99% Confidence Interval	Lower Bound	.251
		Upper Bound	.274

a. Test distribution is Normal.

b. Calculated from data.

c. Lilliefors Significance Correction.

d. This is a lower bound of the true significance.

Table 2 indicates that the p-value (Asymp. Sig.) is 0.200, exceeding the conventional significance threshold of 0.05. The data is presumed to conform to a normal distribution. The significance value obtained by the Monte Carlo approach is 0.263. The confidence interval for this number ranges from 0.251 to 0.274, reinforcing the conclusion that the residual data can be deemed normal, so validating the static analysis results and permitting the acceptance of the normality assumption for subsequent analysis.

Homogeneity test

Table 3. Test of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
N	Based on Mean	1,389	11	56	,204
	Based on Median	1,044	11	56	,422
	Based on Median and with adjusted df	1,044	11	36,052	,430
	Based on trimmed mean	1,387	11	56	,205

Table 3 shows the results of the homogeneity of variance test using the Levene test, which has four approaches: mean, median, median with modified degrees of freedom, and trimmed mean. The data in Table 3 show that. Levene Statistics values range between 1.044 and 1.389. The first degree of freedom (df1) is 11, and the second (df2) ranges from 36.052 to 56. The significant value (Sig.) for all approaches above 0.05 ranges from 0.204 to 0.430. Because the significance value for all techniques is more than 0.05, we may conclude that there is no significant variation in variance across groups. In other words, the homogeneity of variance assumption is met. The variation in the data is relatively equal across groups.

Correlation Test

The correlation test is a statistical technique used to determine the degree of association between two variables. In this case, correlation indicates how strongly and in which direction two variables are associated. Table 4 shows the correlation between the skill needs of the industry and the skills acquired by alumni; based on the correlation test results, it was shown that the skills required by the industry and the skills owned by alumni have a significant positive link. It is indicated by the Pearson Correlation Value between Needed and Owned is 0.709, where the magnitude of 0.709 indicates a strong correlation based on the general interpretation of Pearson correlation (0.7–0.9 is considered a strong correlation). The Sig. Value (2-tailed) <0.001 indicates that the results of this correlation are very statistically significant. It means that the

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probability that this correlation occurs by chance is very small (<0.1%), so we can conclude that this relationship is valid in the broader population.

Tabel 4. Correlation test

		Needed	Owned
Needed	Pearson Correlation	1	.709**
	Sig. (2-tailed)		<.001
	N	73	73
Owned	Pearson Correlation	.709**	1
	Sig. (2-tailed)	<.001	
	N	73	73

**. Correlation is significant at the 0.01 level (2-tailed)

This relationship is statistically significant, indicating that an increase in industry needs for a skill is related to an increase in the skills possessed by alumni. The curriculum must align with the skills required if a university hopes to increase the graduates' suitability for industry demands.

Discussion

The Mechanical Engineering Study Program Class of 2023 alumni tracking project was a success, with 73 alumni from four classes (106-109) participating at 100%. This full response rate reflects not only high alumni engagement, but also a strong attachment between graduates and the institution, which can be interpreted as concern for the quality of education they receive, as well as an understanding of the value of feedback for institutional improvement. This can be used to design a stakeholder-based curriculum.

Graduates in a professional environment, particularly in the engineering industry, must have solid technical competence, practical communication skills, strong work ethics, English language skills, and teamwork abilities. These characteristics do not exist in isolation, but rather interact with one another to support job success. For example, technical talents without communication skills might impede knowledge transfer within a team, whereas a strong work ethic is the foundation of trust in intercultural teamwork. This is in line with Kalaw that said elucidates that the competencies acquired in college assist graduates in selecting employment that aligns with their capabilities (Kalaw, 2019).

According to the collected data, 66.67% of alumni opted for employment in the private sector. The preeminence of the private sector as the preferred option for graduates signifies the compelling allure of private enterprises, particularly regarding career prospects and a vibrant work atmosphere. It is corroborated by research conducted by (Ghassani et al., 2021) which revealed that 56.2% of alumni are employed in private companies. This shows an increasing tendency for graduates to choose professional paths outside government agencies. 13.04% of alumnae opted for employment in BUMN/BUMD, 6.52% pursued entrepreneurship or established their enterprises, and 4.35% selected alternative occupations. Maydiantoro said that indicates that entrepreneurs and companies strive to generate employment and decrease unemployment rates (Maydiantoro, n.d.). The tendency of alumni to explore entrepreneurship, although not yet dominant, shows that there are strategic

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opportunities that can be maximized by universities through the integration of entrepreneurship education into the curriculum.

The length of the job search time is also a significant factor. Approximately 47.83% of alumni find work within 0-3 months of graduation, which is comparable to the fraction that finds work within 3-6 months. This demonstrates a fairly decent absorption of graduates into the job market and indicates that the existing curriculum is reasonably aligned with industry requirements. The Research conducted (Cornillez Jr. et al., 2021) that said that the majority of graduates, 33.52%, secured their first employment between 1-6 months post-graduation.

The diversity of alumni positions, ranging from Operator to Application Engineer to Project Control Analyst, demonstrates graduates' ability to enter a number of professions. The concentration of graduates in East Java, particularly Sidoarjo, Gresik, and Surabaya, demonstrates the geographic link between educational institutions and regional industrial areas. This shows that schools play a significant role in promoting local economic prosperity by providing skilled labor. However, this creates opportunity for critical debate; although it demonstrates the strength of regional ties between institutions and local industry, it also signals potential restrictions in career mobility. Universities must promote national and international student mobility programs like as cross-regional internships, cross-provincial industrial collaboration, and exchange programs to extend students' horizons and professional networks.

The bulk of alumni are employed by national companies (56.22%), followed by multinational organizations (32.61%), while a smaller percentage (10.87%) work for local enterprises or entrepreneurs lacking formal structures. Research by Sonny (2020) indicates that a more significant proportion of ITB alumni from the class of 2013 are employed in national companies (47% or 973 individuals) compared to multinational and local organizations (Rustiadi, 2020).

The allocation of self-employed alumni roles was as follows: 53.85% became Founders of their own companies, 23% assumed Co-Founder positions, 15.39% were employed as staff in startup companies, and 7.76% opted to become freelancers. These data indicate that the entrepreneurial spirit is starting to grow and needs to be strengthened through project-based education, business incubation, and industry collaboration, universities also endorse this by requiring courses, specifically in entrepreneurship, to cultivate an entrepreneurial mindset among students. (Pittaway et al., 2015) aim to promote technology transfer (Sillitoe, 2013) and entrepreneurship education to create employment opportunities for local communities and facilitate experience sharing among colleagues (Zozimo et al., 2017).

The alumni income distribution indicates that 50% of alumni earn over Rp. 5,000,000, while 26.09% earn between Rp. 4,000,000 and Rp. 5,000,000, and 6.52% earn between Rp. 3,000,000 and Rp. 4,000,000. It contradicts the findings of Dotong et al., which indicated that the cohort of engineering graduates earned at least IDR 5,000,000.00 to less than IDR 10,000,000.00, with 10% and 2% of surveyed graduates earning under IDR 5,000,000.00, respectively (Dotong et al., 2016). The average income of most self-employed alumni (46.15%) exceeds Rp. 5,000,000, indicating that graduates who pursue entrepreneurship possess significant earning potential, often superior to employment in a company or agency. The revenue distribution exceeding IDR 2,000,000 is rather equitable, indicating disparities in the success levels of alumni-established enterprises. The alumni's interests and abilities align with their study area. These

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findings have substantial implications, including the fact that the entrepreneurial pathway offers economic potential that is equivalent to, if not greater than, that of the traditional employment pathway when supported by the correct ecosystem.

The normality and homogeneity tests ensure that questionnaire data may be evaluated with appropriate statistical methods. The normality test determines if the data is regularly distributed, whereas the homogeneity test ensures equal variance between groups. Both are necessary to improve the accuracy and reliability of questionnaire-based research findings. The normality test reveals that the p-value (Asymp. Sig.) is 0.200, which exceeds the conventional significance threshold of 0.05, implying that the remaining data can be considered normal, validating the static analysis results and accepting the normality assumption for further analysis. The significance result for the homogeneity test in all techniques is more than 0.05, implying no significant difference in variance between groups. In other words, the variance-homogeneity assumption is met. However, correlation tests determine the degree of link between two variables. In this case, correlation indicates the strength and direction of the relationship between two variables.

Based on the data collected, it is possible to conclude that the skills required by the sector and those possessed by alumni have a strong positive link. This link is statistically significant, demonstrating that the growth in industry need for talent diminishes as alumni skills increase. Curriculum evaluation and graduate skill improvement are critical for adapting to job market demands. Furthermore, the results of this tracer study contain a number of relevant policy implications for higher education. Among them, an adaptive curriculum design is needed that is regularly evaluated based on the results of the tracer study, strengthening industrial internship programs, project-based learning, and entrepreneurship courses must be institutionalized, cooperation strategies between universities and local and global industry players must be facilitated to support the relevance and competency of graduates so that they are able to produce professional graduates in accordance with the demands of the industrial world, especially the engineering industry.

CONCLUSION

Fundamental Finding: The tracer survey response rate has attained 100%, achieving a gold level of 86.44% based on income requirements of 1.2 times the Provincial Minimum Wage and securing employment within six months, inclusive of alumni who are entrepreneur, This gold standard result exceeds the university's minimal gold standard level of 80%. The most important industry competency is communication, followed by English, ethics, and teamwork. In contrast, among the competencies mastered by alumni, English is ranked the lowest, although communication and ethics are quite strong. In this case, the correlation between the competencies needed by the industry and the competencies possessed by alumni shows the strength and direction of the relationship between the two variables. As a result, the talents needed by the industry and those possessed by alumni have a high positive correlation. **Implication**: The evaluation results highlight that, within the professional domain—particularly in the engineering industry—graduates must have a combination of strong technical competencies, effective communication skills, high ethical standards, English language proficiency, and the ability to work collaboratively in teams. These competences are not distinct characteristics; rather, they are mutually reinforcing and collectively crucial in

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preparing graduates to negotiate the multifarious demands of a globalized and technologically driven job market. Technical expertise, for instance, forms the foundation for executing domain-specific tasks, but without the support of clear communication and ethical responsibility, such expertise may fail to deliver optimal outcomes in team-based projects. Similarly, in a culturally diverse workplace, interpersonal skills and language fluency become essential tools for cross-cultural collaboration and organizational integration. This finding has critical implications for higher education institutions, suggesting that engineering curricula should not only focus on the mastery of technical content, but also systematically integrate soft skills development through interdisciplinary coursework, industry-based internships, and collaborative learning experiences. When equipped with this comprehensive skill set, graduates are more likely to demonstrate adaptability, leadership potential, and resilience—attributes that are highly valued by employers in both domestic and international contexts. Thus, the development of such integrated competencies should be viewed not merely as an educational outcome, but as a strategic imperative in enhancing graduate employability and upward mobility in the labor market.. **Limitation**: One notable limitation of this study pertains to the availability of alumni respondents. Many alumni are actively engaged in professional commitments, often managing demanding schedules that restrict their ability to participate promptly in research activities. This limited availability led to extended response times and delays in data collection, potentially affecting the timeliness and completeness of the dataset. Consequently, the study may have underrepresented the perspectives of alumni with more intensive work obligations, which could influence the generalizability of the findings. **Future Research**: Future research should consider conducting a Return on Investment (ROI) analysis to evaluate the economic value of educational attainment in relation to graduates' occupational outcomes. This approach would allow for a more comprehensive assessment of whether the financial and temporal investments in higher education are justified by the employment benefits obtained, such as income level, job stability, and career advancement opportunities. Such analysis is essential to inform institutional decision-making, improve curriculum relevance, and guide prospective students in making informed educational and career choices.

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