

# Employment Absorption of Vocational High School Graduates in Shipbuilding Expertise Programs in the Oil, Gas, and Shipyard

Irawati<sup>1\*</sup>

<sup>1</sup>Universitas Negeri Yogyakarta, Indonesia.

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Corresponding Author:

Irawati

[irakavizana@gmail.com](mailto:irakavizana@gmail.com)

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**Abstract:** This study aims to employment absorption of vocational high school graduates in shipbuilding expertise programs in the oil, gas and shipyards industries. A quantitative descriptive research method was employed. The study was conducted within the shipbuilding expertise program at SMKN 5 Batam and SMKS Teladan Batam. The data sources included graduates of the shipbuilding expertise program from 2020 to 2024, the Career Development Center (CDC) at SMKN 5 Batam, and the public relations office of SMKS Teladan Batam. Data collection techniques involved distributing questionnaires, conducting interviews, and reviewing documentation. Quantitative data analysis was performed using descriptive statistical methods. The research findings indicate that the employment absorption rate of SMK graduates in the shipbuilding expertise program into the oil and gas and shipyard industries in Batam City over the past five years was 6% for the 2020 graduates, 9% for 2021, 16% for 2022, 25% for 2023, and 45% for 2024. Among the various specializations, ship welding was the most highly absorbed into the industries. Most graduates secured employment in the oil and gas and shipyard industries within six months of completing their education. Key sources of job information included the school's CDC, social media, family/relatives, teachers, and acquaintances. Internal factors influencing employment absorption included work experience, soft skills, graduate competencies, and motivation to work in alignment with their expertise. External factors included social networks, the quality of the vocational schools, and the demand for specific job vacancies in the industries. The competencies taught in schools were found to be sufficiently relevant to the current occupations of the graduates.

**Keywords:** Absorption; Relevance; Shipbuilding

## Introduction

Indonesia, as the world's largest archipelagic country, has significant potential in the maritime sector, including the oil, gas, and shipbuilding industries (Azhar et al., 2023; Aziz et al., 2024). These industries are considered strategic due to their critical role in national development, economic growth, and job creation (Hatmoko et al., 2017; Ricardianto et al., 2022). To

support their sustainability and competitiveness, there is a strong need for a competent and skilled workforce, especially those who are technically trained in areas such as shipbuilding (Ariany et al., 2022; Praharsi et al., 2022).

Vocational High Schools (SMKs) are designed to produce graduates who are ready to enter the workforce with practical skills relevant to specific industrial sectors (Lee et al., 2021). The shipbuilding expertise program, in

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particular, aims to equip students with the technical competencies required in ship construction, maintenance, and engineering (Schr et al., 2015). However, despite this alignment in theory, many graduates from shipbuilding programs face difficulties in securing employment within the oil, gas, and shipyard sectors. This raises questions about the effectiveness of vocational education in meeting actual industry needs (Kosteczko et al., 2020).

Several factors may contribute to this mismatch, including outdated curricula, limited access to industrial training, lack of certification, and insufficient collaboration between schools and industry stakeholders (Sukardi et al., 2022). Moreover, the rapid advancement of technology and automation in the oil and gas sector and shipyards demands continuous updates in vocational training. Without proper alignment, vocational graduates risk becoming underemployed or unemployed, despite their specialized education (Dewi et al., 2019).

Therefore, it is essential to assess the extent to which vocational graduates, particularly from shipbuilding expertise programs, are being absorbed into the workforce within these industries. Understanding this issue will help identify gaps between education and employment, inform policy reforms, and enhance the quality and relevance of vocational training in Indonesia’s maritime industrial landscape (Amalia & Sugiharti, 2020; Salam et al., 2023).

Batam City is located in a strategic area, which is located on the international shipping lane in the Strait of Malacca and directly borders Singapore (Rowardi et al., 2024). Batam City is located in a strategic area, which is located on the international shipping lane in the Strait of Malacca and directly borders Singapore (Azzahra et al., 2022). Batam City is located in a strategic area, which is located on the international shipping lane in the Strait of Malacca and directly borders Singapore.

The development of the shipping and oil and gas industry in Batam is also reflected in data published by the Batam City Communication and Information Office, which shows that the export volume of marine ships and

mineral fuel is the highest compared to other commodities (Jasrol et al., 2024). The high contribution of these two commodities certainly increases the need for skilled labor in the fields of shipping, welding and other fields in accordance with the needs of the shipping and oil and gas industries. Based on data from the Indonesian National Shipowners' Association (INSA), in 2023 the labor needs for shipbuilding companies will be 15,000-20,000 workers, because there are around 400 ships that have been ordered (INSA, 2023).

The high need for labor needed in the shipping sector is an opportunity for Vocational High Schools (SMK) that have majors with shipping expertise to work on the project including welders, fitters, scaffolders and their supporting technicians. The large demand for labor needed in the oil and gas industry and shipyards on paper can increase the absorption of vocational school graduates of the shipping skills program in Batam. Vocational High Schools in Batam that have shipping expertise programs are SMKN 5 Batam and SMKS Teladan.

From 2020 to 2024, the number of graduates of SMKN 5 Batam and SMKS Teladan is 1391 graduates. Graduates of the shipping expertise program are expected to be optimally absorbed in the oil and gas industry and shipyards, considering that only SMKN 5 Batam and SMKS Teladan have competence in the shipping sector and are close to the largest shipyard industrial area in the city of Batam. Graduates from the two vocational schools of the shipping expertise program are prepared to meet the demand for labor in the oil and gas industry and shipyards and their supporters in Batam because there are quite a lot of industries.

Although numerically the number of graduates of the two vocational schools is smaller than the number of shipping workforce needs, the absorption rate of graduates of the two vocational schools in the shipping and oil and gas industry tends to be low. The details of the absorption rate of graduates of SMKN 5 Batam and SMKS Teladan in the shipping and oil and gas industry are as follows.

**Table 1.** Absorption of graduates of the shipping expertise program in the oil and gas industry and shipyards in Batam City

Year of Graduation	Graduate Absorption (%)			
	SMKN 5 Batam		SMKS Teladan Batam	
	Work in a variety of industries (%)	Oil & Gas & Shipyard (%)	Work in a variety of industries (%)	Oil & Gas & Shipyard (%)
2020	82	22	20	20
2021	89	9	5	5
2022	76	5	0	0
2023	12	10	9	9

The data shows that in the field of shipping and oil and gas industry, the absorption of graduates of SMKN 5 Batam and SMKS Teladan is in the low category. In 2020, the highest absorption percentage was only in the range of 20%. Meanwhile, in 2021-2023, the absorption is on average below 10%. This condition indicates an anomaly between high labor needs, but the absorption of vocational school graduates majoring in shipping has decreased and the absorption value tends to be low. This low absorption can also be a problem for the shipping industry in Batam, considering that the high labor needs cannot be met by the available school graduates. So that the shipping and oil and gas industry is more difficult to find workers with the required competencies (Sukardi et al., 2022).

The low availability of graduates in the oil and gas industry and shipbuilding is caused by the qualifications of vocational school graduates whose shipping skills program is not in accordance with the company's needs (Cholik et al., 2021). As a result, although there are many vacancies, the available workforce does not match the company's needs, so absorption is low. This low absorption rate is a serious challenge for vocational education institutions (vocational schools) in preparing graduates who are in accordance with the demands of the job market, both in terms of technical competence, industry practice experience, and relevant skill certifications (Choi, 2021).

This condition shows the need for serious attention to factors that can affect the low absorption rate of vocational school graduates of the shipping expertise program in the shipyard and oil and gas industry (Dewi et al., 2019). By understanding these factors, it is hoped that the right strategy can be formulated to increase graduate employment opportunities, as well as encourage the improvement of the quality of vocational education to be more in line with the needs of the industrial world. This research also seeks to identify what competencies are needed by the oil and gas industry and shipbuilding so that efforts can be made to increase employment opportunities, and improve the quality of education (Jung & Go, 2021).

This is important, considering that the low absorption of graduates according to their field of expertise will reduce public trust, especially parents who will send their children to the shipping expertise program. When graduates are not able to be absorbed into the world of work according to their field of expertise, then the public will consider it difficult for graduates of maritime vocational schools to find jobs so that it can have bad consequences for the progress of the vocational school itself. On the other hand, one of the indicators of SMK quality is graduates who are absorbed into the world of work according to their competencies. Therefore, the analysis of the absorption of shipping

graduates in the world of work and the factors that influence it is important. Research results from Aini & Purba (2022) with the title "Analysis of Labor Absorption and Link & Match Programs in Graduates of Vocational High Schools (SMK) Marine & Fisheries Program" shows that more than half of graduates of Marine and Fisheries Vocational Schools (KP Vocational Schools) have successfully entered the world of work, with a percentage that even exceeds the job absorption rate of general vocational school graduates which only reaches 35.11%. However, despite these achievements, the unemployment rate among Fisheries Vocational School graduates is still relatively high, although not as high as the unemployment rate of vocational school graduates in general which reaches 64.89%.

Andi Syarifuddin and friends, with the title "Ideification of Absorption of Graduates of the Business Administration Department of the Samarinda State Polytechnic". Based on the results of the tracer study of alumni majoring in Business Administration in 2019 who have worked in various types of industries in East Kalimantan, the number has shown quite good numbers compared to the previous year where most or around 74% of alumni are absorbed in various industrial sectors and the rest work in government agencies and entrepreneurship reach (10%) of the number that can be observed in the field. The availability of resources that have competencies that are in accordance with the level of need greatly determines the absorption rate of graduates in the industry.

The oil, gas, and shipbuilding industries play a pivotal role in driving national economic growth and strengthening Indonesia's position as a global maritime axis. These sectors demand a highly skilled and technically competent workforce, ideally sourced from vocational education institutions such as Vocational High Schools (SMKs), particularly those with a specialization in shipbuilding. However, there remains a significant gap between the number of vocational graduates and their actual absorption into relevant industries. Many graduates struggle to secure employment in fields that match their expertise due to factors such as insufficient practical skills, misalignment between school curricula and industry needs, and weak collaboration between vocational schools and industry stakeholders. This condition poses a risk of increasing youth unemployment and diminishing the effectiveness of vocational education as a workforce development strategy. Therefore, investigating the employment absorption of SMK graduates from shipbuilding programs in the oil, gas, and shipyard sectors is an urgent step toward aligning vocational education with industrial demand, improving graduate employability, and enhancing national productivity.

This study offers a unique contribution by specifically examining the employment absorption of vocational high school graduates from shipbuilding expertise programs within the oil, gas, and shipyard industries sectors that are vital to Indonesia's maritime economy but have received limited academic attention in terms of vocational alignment. Unlike general studies on vocational employment, this research highlights the intersection between specialized technical education and the real-world demands of high-risk, capital-intensive industries. By integrating perspectives from both the educational sector and industry stakeholders, the study identifies existing skill gaps and evaluates how well current curricula meet the evolving needs of the workforce, especially amidst technological advancements and industrial digitalization. Furthermore, this research provides localized insights that are valuable for shaping region-specific policy and curriculum reforms, particularly in maritime industrial hubs such as Batam and Surabaya. Through this focused approach, the study aims to bridge the disconnect between vocational training and actual job market requirements in one of Indonesia's most strategic sectors.

**Method**

This study uses quantitative descriptive methods that describe the absorption of 2020, 2021, 2022, 2023, and 2024 graduates of the shipping expertise program in the oil and gas industry and shipyards in Batam city, the waiting period for graduates, the sources of information used and the relevance between the competencies taught in school and the needs of the industry. The research was conducted at SMKN 5 Batam and SMKS Teladan Batam

from April 2024 to December 2024 by distributing questionnaires containing closed-ended questions in the form of multiple choices. The sampling technique used purposive sampling with the number of respondents who met the criteria to be a sample was 152 out of a population of 1308 graduates. The data that has been obtained is tabulated and analyzed using descriptive statistical analysis.

**Result and Discussion**

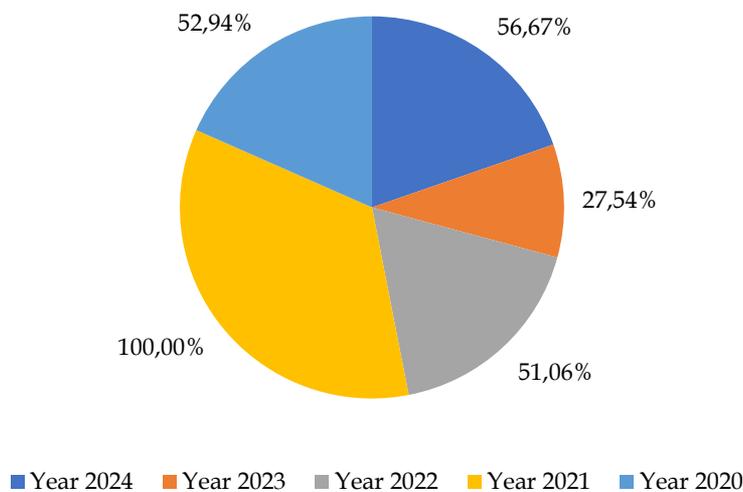
*Absorption of Vocational School Graduates in the Last Five Years*

Data on graduates of the shipping expertise program absorbed in the shipbuilding and oil and gas industry in the last five years as many as 152 people with the following details.

**Table 2.** Absorption of graduates in the last five years

Year of Graduation	Number of Graduates	Number of Absorbed Graduates	Percentage (%)
2024	120	68	56.67
2023	138	38	27.54
2022	47	24	51.06
2021	13	13	100.00
2020	17	9	52.94
Total	335	152	45.37

The 2024 graduates absorbed in the shipbuilding and oil and gas industry are 68 people or 56.67%, 2023 graduates are 38 people or 27.54%, 2022 graduates are 24 respondents or 51.06%, 2021 graduates are 13 people or 100% and in 2020 there are 9 people or 52.94%. The following is a clear picture of graduates based on the year of graduation for the last 5 years.



**Figure 1.** Graphis graduated from the last 5 years of the shipping expertise program

From the results of the recapitulation of graduates over the last 5 years, it shows that 2021 graduates are the most absorbed in the shipbuilding and oil and gas industry by 100%, then graduates in 2024 by 56.67%, graduates in 2020 by 52.94%, and graduates in 2022 and 2023 by 51.06% and 27.54%, respectively.

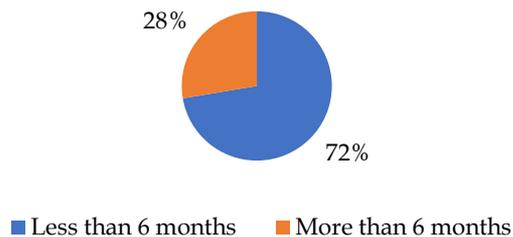
*Waiting Period for Graduates to Get a Job*

The waiting period for graduates after graduating to complete their education and be accepted at oil and gas companies and shipyards in the City of Batam.

**Table 3.** Waiting period for getting a job

Waiting Time	Frequency	Percentage (%)
Less than 6 months	110	72
More than 6 months	42	28
Total	152	100

The waiting period for graduates to get a job in the shipyard and oil and gas industry after completing their education at vocational schools in less than 6 months is 72% or as many as 110 people and more than 6 months is 28% or as many as 42 people or 28%.



**Figure 2.** Waiting period for graduates to get jobs in the shipyard and oil and gas industry

The graph shows that most graduates of vocational schools in the shipping skills program take less than 6 months to get a job in the oil and gas industry and shipyards or around 72%, and it takes more than 6 months at 28%.

*Job Vacancy Information Resources*

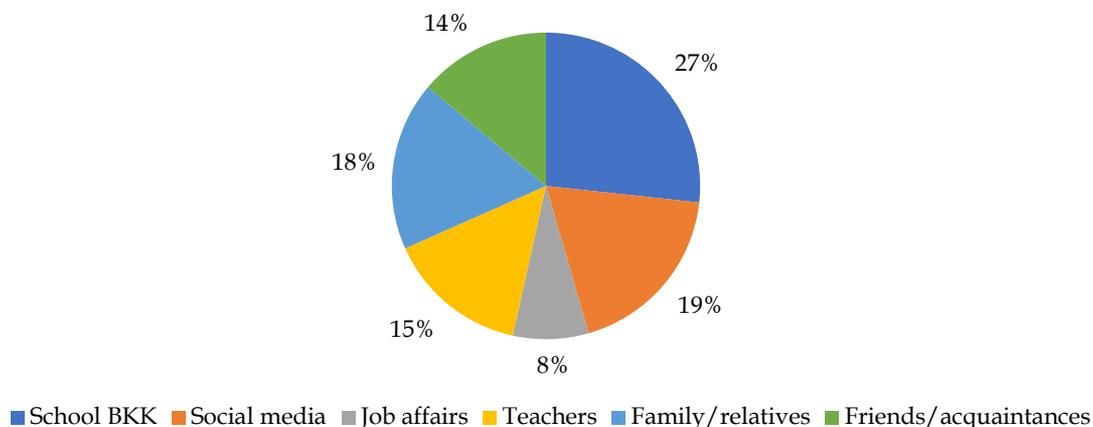
Graduates of vocational schools in the expertise program get information on job vacancies in the oil and gas industry and shipyards through several sources of information as seen in Table 4.

**Table 4.** Sources of information on getting job vacancies

How to get job information	Frequency	Percentage (%)
BKK School	80	27
Social Media	56	19
Job Affair	23	8
Teacher	46	15
Family/Relatives	53	18
Friends/acquaintances	43	14
Total	301	100

The most widely used source of information on job vacancies in the oil and gas industry and shipyards is through school BKK by 27% or as many as 80 people who use it to get job information, using social media as many as 56 people or as much as 19%, through job affairs as many as 23 people or 8%. Information from teachers personally also helped vocational school graduates get jobs as many as 46 people or 15%, through recommendations or information from family/relatives as many as 53 people or 18% and the rest through acquaintances/friends as many as 43 people or 14%.

Comparison of the use of information sources to get information on job vacancies in the oil and gas industry and shipyards. The most widely used source of information by graduates to get information on job vacancies in the oil and gas industry and shipyards was information from school BKK by 27%, using social media by 19%, then information or recommendations from family/relatives by 18%. In addition, recommendations and personal information through teachers are 15% and friends/acquaintances are 14% and the rest are through job affairs by 8%.



**Figure 3.** Source of information to get job vacancy info

*Internal Factors Affecting Absorption*

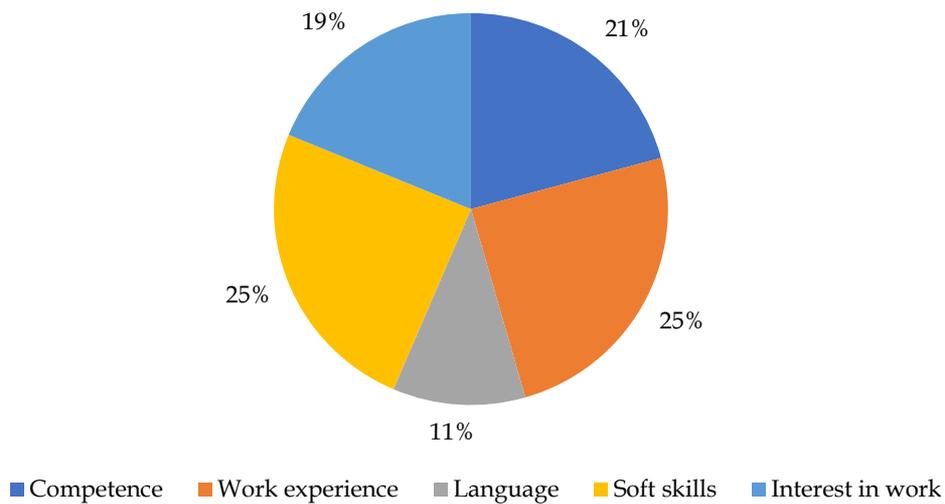
Internal factors that are very influential for graduates in getting jobs in the oil and gas industry and shipyards.

**Table 5.** Internal factors affecting absorption

Internal Factors	Frequency	Percentage (%)
Competence	89	21
Work experience	102	25
Language	44	11
Soft skill	103	25
Work interests	78	19
Total	416	100

Internal factors that affect graduates getting jobs are competence as many as 89 people or 21% stated as one of the influencing factors, work experience was chosen by 102 people or 25% and foreign language skills as many as 44 people or 11%. Meanwhile, soft skills were 103 people or 25% and willingness and interest to work according to competence were 78 people or 19%.

Work experience and soft skills are internal factors that most affect the absorption of graduates in the oil and gas industry and shipyards by 25% each. Graduate competence as an internal factor that also affects getting a job has an impact on the non-absorption of graduates by 21% and interest in work according to competence by 19% and the rest foreign language mastery by 11%.

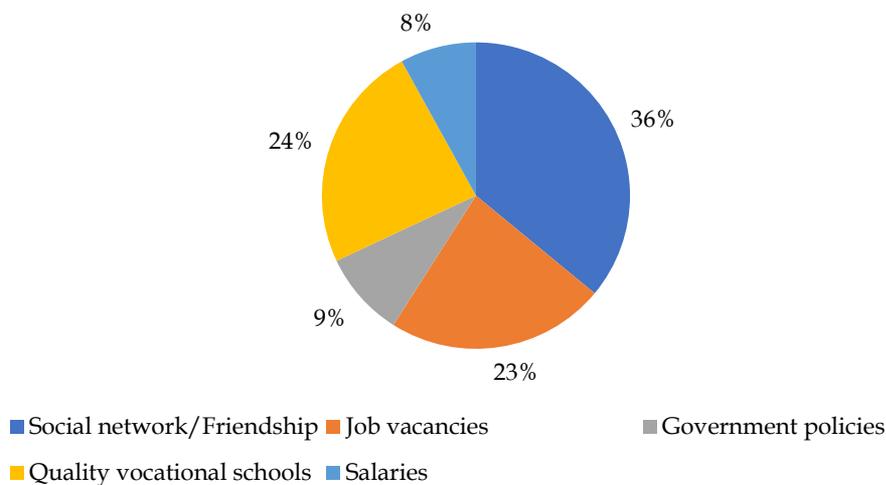


**Figure 4.** Internal factors that influence absorption

*External Factors that Affect Absorption*

External factors that are obstacles for vocational school graduates of the shipping expertise program are absorbed in the oil and gas industry and shipbuilding. Social networks or friends were chosen by 102 people or

36%, job vacancies as many as 71 people or 23%, government policies as many as 26 people or as much as 9%, quality vocational schools as many as 74 people or 24% and salaries as many as 25 people or 8%.



**Figure 5.** External factors that affect absorption

**Table 6.** External factors affecting absorption

External Factors	Frequency	Percentage (%)
Social network/Friendship	109	36
Jobs	71	23
Government policy	26	9
Quality of Vocational Schools	74	24
Salary	25	8
Total	305	100

The factor that greatly affects the absorption of vocational school graduates of the shipping expertise program in the oil and gas industry and shipbuilding is social network/friendship at 36% and the quality of vocational schools also plays an important role in the absorption of 24%.

Job vacancies are also an external factor that affects absorption by 23%. Job vacancies in the oil and gas industry and shipyards depend on the needs of the company to work on a project or order. Other external factors that also have an effect are the government policy of 9% and the remaining salary of 8% which is adjusted to the experience and competencies possessed by graduates.

*Relevance of Competencies*

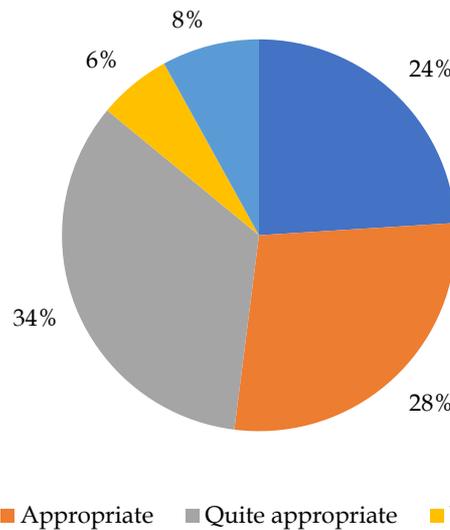
The relevance of competencies between what is required and what is taught in school has a great influence on the absorption of graduates.

**Table 7.** The relevance of graduate competencies to the work undertaken

Relevance of Competencies	Frequency	Percentage (%)
Highly Appropriate	37	24
Appropriate	43	28
Quite Appropriate	51	34
Less suitable	9	6
Inappropriate	12	8
Total	152	100

Graduates who answered were very appropriate as many as 37 people or 24%, as many as 43 people or 28%, as many as 51 people or 34% were appropriate, 9 people or 6% were not suitable and the remaining 12 people answered inappropriate or by 8%.

Graduates who answered were quite appropriate by 34% because the competencies taught were quite in accordance with the needs of the industry, 29% answered in accordance with the competencies taught and the work undertaken, and 24% answered very appropriate because what was taught in school supported or was very suitable for work in the oil and gas industry and shipyards. Graduates who answered were less than 6% and 8% did not match because the work they did was different from the competencies obtained at school so that they needed adjustment and adaptation to the required competencies.



**Figure 6.** Relevance of competencies to the work being undertaken

*Discussion*

Based on the data obtained regarding the absorption of vocational school graduates of the shipping skills program from 2020 to 2024, it can be seen that overall there are 152 graduates absorbed in the shipping and oil and gas industry out of 335 graduates or equivalent to 45.37%. The highest absorption rate is in

2021, which is 100%, but the number of graduates is only 13 people. Meanwhile, when the number of graduates reached the highest point of 138 graduates in 2023, the absorption rate was only 27.54%.

In the context of absorption per department, it can be known that graduates majoring in steel ship construction have the highest absorption rate of 100%,

even though the number of graduates is only 5 people. On the other hand, the department that has the highest graduates, namely ship design design with 119 graduates, only absorbed 31.93%. This shows that in general, the absorption rate of marine vocational school graduates in the shipbuilding and oil and gas industry is relatively low because it is only 45.37%. This condition can occur because there is a gap between the number of graduates of vocational schools in the shipping skills program and the needs of the industry. On the other hand, the incompatibility of competencies taught in schools with the shipbuilding and oil and gas industry also plays a role in the lack of absorption of maritime vocational school graduates in the shipbuilding and oil and gas industry.

Data on graduates who take less than 6 months after completing their education and getting a job in the oil and gas industry and shipyards is 72% and more than 28% for more than months. The waiting period for graduates to get a job is relatively good, because the waiting period is less than 1 year. This condition shows that although the overall absorption rate of vocational school graduates of the shipping program in the shipyard and oil and gas industry is low, this data shows that for graduates who are successfully absorbed, the waiting time is low.

This is a positive indication of the effectiveness of the educational process carried out at SMKN 5 Batam and SMKS Teladan Batam. Even so, the low absorption of graduates in relevant fields also needs to be the attention of stakeholders in schools to be able to make strategies that can increase the absorption rate of graduates in the fields they master.

The most frequently used sources of information by vocational school graduates of the shipping program to get a job in the shipbuilding and oil and gas industry are information from school BKK by 27%, social media by 19% family/relatives by 18%, teachers by 15%, friends by 14% and job affairs by 8%. The data is consistent with questionnaire data regarding the sources of information that make it most easy for graduates based on pictures are school BKK by 24%, social media by 18%, family/relatives who work in companies by 18%. The next source of information that makes it easier to get information about their respective jobs by 16% is friends/acquaintances, 15% comes from teachers, the remaining 9% comes from job affairs. BKK is a source of information. These results prove the important role of the school BKK as an employment information center and as a bridge between schools and the industrial world. Therefore, schools can provide adequate resource and competency assistance to school BKK to be able to increase student absorption in industries that are in accordance with their fields of expertise. On the other hand, the second main source of information is social

media, and the fourth place is teachers. These two sources of information can be used by BKK to strengthen the database of job vacancy information more widely and effectively. In addition to obtaining a database of job vacancies, BKK can also be more active on social media to be able to reach students and graduates and build a communication network regarding career opportunities in the shipyard and oil and gas industry.

On the other hand, BKK can also collaborate with teachers to be able to motivate students and prepare graduates to face the world of work, so that student competencies are in accordance with industry needs and the level of absorption can be increased. The internal factors that most affect absorption are work experience and soft skills by 25%, graduate competence by 21%, work interest by 19% and language skills by 11%. These results show that work experience and soft skills are two factors that affect the absorption of graduates in the ship and oil and gas industry. In addition, competence, work interests and language skills also have a role in determining the absorption of graduates. On the other hand, according to the theory.

In the context of this research, work experience and soft skills have a role as a reinforcement of the work skills needed such as technical skills and social skills needed in the shipbuilding and oil and gas industry. In addition to soft skills and work experience, students' competence, work interest and language skills also play an important role in increasing the job absorption of maritime vocational school graduates to the shipyard and oil and gas industry. Technical competence is the foundation for graduates to meet the needs of the industry, while work interests can motivate graduates to be able to work in the shipping and oil and gas industry immediately. On the other hand, language skills support also plays an important role, considering that one of the languages that is often used in the work environment in Batam is Chinese, besides that English also plays a role in communicating with clients from abroad.

The dominant external factors affecting the absorption rate of graduates were social networks or friends at 36%, followed by the quality of vocational schools (24%), and the availability of job vacancies (23%). Of these three factors, there are two factors that can be intervened by schools, namely social networks of friends and the quality of vocational schools. Regarding social networks or friendships, schools can collaborate with the school's BKK to help alumni social networks through social media, so that information about work can be conveyed immediately. This step can also be a strategy in expanding access to information, including job opportunities, especially in industrial sectors such as shipyards and oil and gas.

In the context of quality, schools can improve quality by strengthening the existing curriculum and

adapting to the needs of the industry. In addition, improving teachers' competence by participating in trainings that are relevant to the field they are taught so that the knowledge conveyed to students is new knowledge and relevant to the industrial world. This is important to remember, according to the theory of human capital, learning at school is a form of investment by students and parents to improve the knowledge, skills, and work experience that individuals have that can increase productivity and competitiveness in the job market.

Based on the data obtained, it can be seen that as many as 34% of graduates stated that the competencies taught were quite in accordance with the needs of the industry. On the other hand, 29% of graduates answered that the competencies taught were appropriate and 24% answered that they were very appropriate because what was taught in school supported or was very suitable for work in the oil and gas industry and shipyard. These findings indicate that the level of suitability between the competencies studied and the needs of jobs in the shipbuilding and oil and gas industries is optimal. This is because only about half of the total graduates (52%) stated that the skills learned are in accordance with what is needed in the shipyard and oil and gas industry.

This condition proves that it is important to make adjustments to the curriculum of vocational schools for the shipping program with the real needs of the industry. With the adjustment of the existing curriculum to the needs of the shipyard and oil and gas industry, the possibility of the absorption of vocational school graduates in the shipping program will increase. Therefore, the researcher distributed a questionnaire about the competencies that are most relevant to the shipbuilding and oil and gas industry in Batam to find out the competencies that are most relevant to the shipbuilding and oil and gas industry.

The employment absorption of Vocational High School (SMK) graduates in shipbuilding expertise programs is a crucial indicator of how well vocational education aligns with labor market demands, particularly in strategic industries such as oil, gas, and shipbuilding. This study reveals that despite the targeted nature of the shipbuilding curriculum, there remains a notable gap between graduate competencies and industry expectations.

One of the primary factors contributing to the low employment absorption is the mismatch between the skills taught in schools and the skills required by industries. While shipbuilding programs offer technical knowledge in areas such as welding, hull construction, and basic marine engineering, many industries now demand additional competencies related to digital technology, safety standards, environmental compliance, and international certifications. This

suggests that the curriculum has not kept pace with the evolving nature of industrial operations in the oil, gas, and shipyard sectors.

Another key issue is the limited collaboration between SMKs and industry players. Internship opportunities (*Prakerin*) are often not optimally utilized due to the lack of structured industry partnerships. Many students end up working in companies that are not directly related to their field of study, which weakens the practical relevance of their training. Moreover, the absence of industry input in curriculum development further widens the gap between what is taught and what is needed in the field.

From the industry side, there is often a lack of trust in the readiness of SMK graduates, especially in high risk sectors like oil and gas, where safety and precision are paramount. Companies prefer to hire experienced workers or university graduates with higher-level certifications, despite the existence of competent vocational graduates. This reflects a perception issue that vocational education must overcome through quality assurance, continuous teacher training, and certification alignment with national and international standards.

Furthermore, geographical factors also influence employment absorption. Industrial hubs such as Batam, Surabaya, and Balikpapan provide more opportunities for SMK graduates; however, graduates from other regions often face logistical and economic barriers to accessing these job markets. Decentralization of industrial development and regional training centers could be a strategic solution to improve equitable employment outcomes.

In conclusion, improving the employment absorption of SMK shipbuilding graduates requires a multi-stakeholder approach. This includes updating curricula based on industry feedback, strengthening school-industry partnerships, improving student certification and soft skills, and ensuring regional access to relevant job opportunities. Only by bridging the gap between vocational education and industry can Indonesia fully leverage its maritime and energy potential through a skilled and ready workforce.

## Conclusion

Based on the results of the research and discussion, the following conclusions can be drawn: Graduates absorbed in the oil and gas industry and shipyards in the last 5 years for 2024 graduates are 45%, then graduates in 2023 are 25%, graduates in 2022 are 16%, graduates in 2021 are 9%, and in 2020 by 6%. The period of time required for graduates of vocational schools in the shipping expertise program in Batam to get a job in the oil and gas industry and shipyards is in the range of 6

months – 1 year. The most frequently used sources of information by graduates to get a job are information from school BKK, social media, family/relatives, teachers and friends/acquaintances. The internal factors that most affect absorption are work experience, soft skills, competence, work interest and language. Influential external factors are social network/friendships, job vacancies and the quality of vocational schools. In general, the relevance of the competencies taught is not optimal, because only about half of the total graduates (52%) stated that the skills learned are in accordance with what is needed in the shipbuilding and oil and gas industry.

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#### Author Contributions

Conceptualization, methodology, software, validation, formal analysis, investigation, resources, data curation, writing – original draft preparation, writing – review and editing, visualization, supervision, project administration, and funding acquisition, I.

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#### Conflicts of Interest

The authors declare no conflict of interest.

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