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Article

Determining factors for Location of Vocational Schools Based on Regional Characteristics in Pasuruan Regency, Indonesia

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Abstract

Purpose Vocational schools play a very significant role in the growth of a country along with its economy. Developments that occur in Pasuruan require the availability of infrastructure to support people's lives, including educational infrastructure in schools, especially vocational schools. Currently, there are a few vocational schools (SMK) but the problems faced are about how to determine the location for new vocational schools in the Pasuruan Regency. **Method** A qualitative research approach was adopted in this study through indepth interviews with informants. These informants were teachers and students. The data gathered was analyzed through content analysis method to obtain the thematic patterns. **Findings** This study showed the evidence that vocational education played a significant role in the economic development of any country. The findings revealed eight factors affecting the selection of location for the vocational high schools in Pasuruan Regency, Indonesia. Findings also hinted at a few other potential problems related to physical and environmental conditions, such as security, and environmental health, supporting infrastructure, such as electricity, water, and telephone networks, as well as economic factors related to the compatibility between socio- economic factors. **Implications to Research and Practice** Future studies can use the findings of this study to develop plans for vocational schools in other regions. These findings can also be used by the policy makers and academicians of the educational studies as well.

Keywords

Location, Vocational High School, Skills, Regional Characteristics, Indonesia,

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The present education system of Indonesia is facing intense competition which will eventually get tougher with the time. The education industry of Indonesia comprises private as well as public sections. In order to ensure sustainability, schools must have such characteristics that can create the difference in students in terms of their physical, emotional and mental abilities. When special attention is given to students, it would create a lot of difference for schools (Khumaidah, 2018). In this tough situation, vocational schools are also undergoing a rigid competition. The main characteristics of vocational schools include learning along with trade are combined during the process of student education. Students learn several skills regarding vocational schools and different workplaces. Past studies have shown that this kind of educational system played a very important role in minimizing the complaint and appreciating the possibility to bridge the activities of education at vocational schools (Pambudi & Harjanto, 2020).

There is a growth in every field of the world because of globalization. Changes are occurring regularly, and competition is mounting day by day especially in the field of education. Technology in education sector is also evolving along with its management and trained individuals. All these changes are regularly taking place in both developed and underdeveloped countries. The countries that belong to developed countries and ASEAN regions understand the importance of knowledge and technology. With the help of knowledge and technology, these service providers and schools gain a competitive position against competitors. Without innovation, it is not possible for the management of organizations including the school management to survive in the competitive environment and to develop a sustainable competitive advantage (YAHJI et al., 2019).

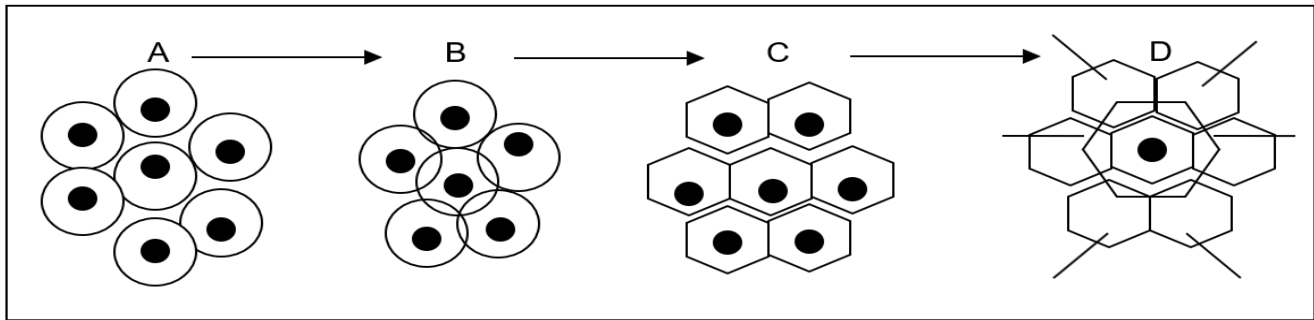
In the present global scenario of competition, it is the responsibility of all stakeholders to develop and provide educational opportunities to the management of educational schools to gain new expertise. For instance, in order to provide resources to universities like trained staff and other systemic resources, and to make these resources useful to both community and industry, initiatives like R&D must be taken (Rawlusyk, 2018). In this situation, it is revealed that there must be solidarity between educational institutions and industries. Industry-institute interaction is the key to strengthening the economic, technological and scientific condition of a nation. The institutions could offer R&D consultancy and testing facilities to industry to develop new products, or train their personnel in accordance with industrial demands (Ahmed et al., 2021).

Pasuruan Regency is one of the hinterland areas of Surabaya, which is included in the Surabaya Extended Industrial Area, or Surabaya Amdal, Indonesia. It is an area that has experienced rapid development in recent time including a good social infrastructure, however, not much development has occurred in the educational infrastructure (Panuluh & Fitri, 2016). Regarding the fulfillment of educational facilities, the Strategic Plan of the Ministry of National Education 2020/2024 stated that one of the main policies of National Education Development was increasing the equity and ensuring a wider access to all. It aimed at allowing access to education through vocational school (SMK) based on local needs and advantages (Fatjerin & Budirahayu, 2021). The selection of a vocational school location is often more effective and appropriate if it is based on the choice of a site that is integrated and spatially concentrated with the activities of the surrounding community so that it can create savings due to the proximity of the area (proximity economy). It is not only limited to economics but more to maximize the functions and services of SMK. Despite its benefits, it results in grouping in certain sub-districts (Barrett et al., 2019).

The infrastructural problems and problems related to access are only a small part of the problems faced by vocational secondary education system in the Pasuruan Regency. There are a lot of other potential problems that can arise, particularly related to physical conditions. It includes the suitability of the location of the education unit based on standards of comfort, safety, and environmental health, availability of supporting infrastructures, such as electricity, water, and telephone networks, and economic factors related to the compatibility between economic potential, with majors in each sub-district in Pasuruan Regency (Putrasari, 2020). These problems require a solution in the form of determining the location of the right SMK. This study aimed to identify what factors could be considered to determine the location of SMK in Pasuruan Regency and how to direct the correct place in overcoming the inequality of existing SMK locations.

Literature Review

Tammiksaar et al. (2018) explained the Christaller's theory of city planning based on the size, number, and distribution of cities in a region. Christaller's model is a geometric system in which number three is determined arbitrarily and has a significant role. It is also known as K=3 system from Christaller. Based on K=3 system, Christaller proposed a hexagonal trading area model, as described in Figure 1.



Source: Processed by Tarigan, 2021

Figure 1. *Hexagon Trading Model*

As regards to social infrastructure in the context of educational institutions, Frolova et al. (2016) described the distribution of educational institutions within social infrastructure as presented in Figure 2.

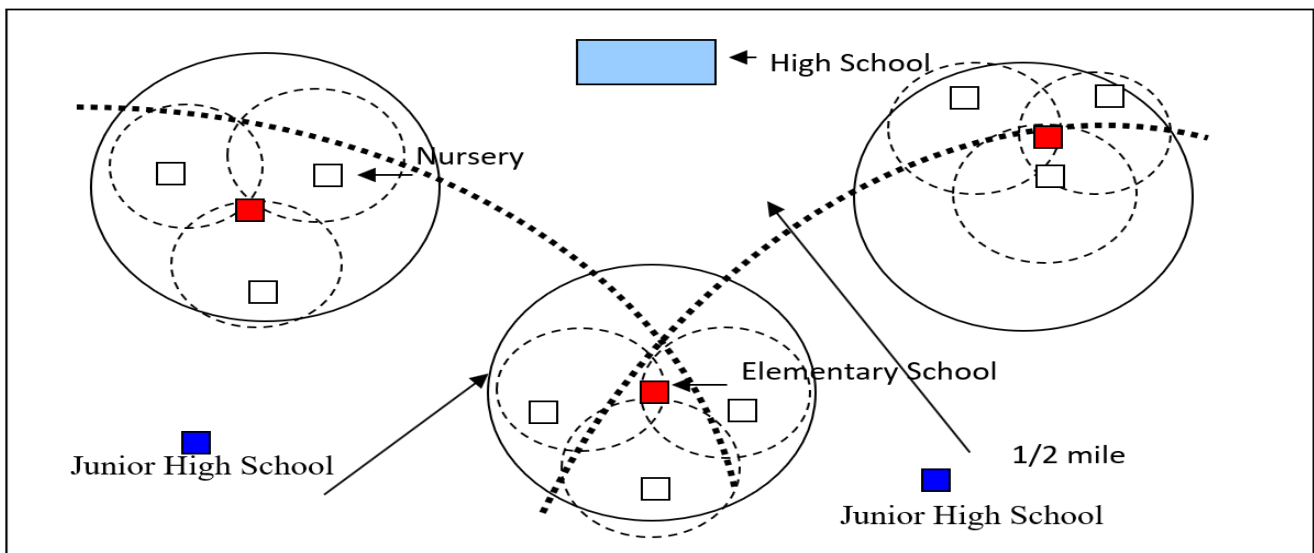


Figure 2. *Typical District Organization*

Figures 1 and 2 are evidence that an environment (a social settlement) is limited by boundaries (large circles), consisting of at least three residential areas, denoted by small circles. Each residential area is served by at least one Kindergarten or a nursery school (TK). The three residential areas are served by one elementary school (SD) located in the village (kelurahan), so that one kelurahan is served by at least one elementary school. The Junior High School (SMP) is outside the ward boundaries serving several adjacent wards, with the maximum distance from the junior high school being 1/2 mile. Likewise, with Senior High Schools (SLTA), at least one high school is available to serve several kelurahan or even one sub-district with a maximum distance of between 3/4 mile to 1 mile, or more than that, transport must be available.

Vocational training and education are considered very important for industrial competitiveness in both developing and developed countries. Vocational education integrates both school systems and work-based practices enhanced through study of a few courses (Lund & Karlsen, 2020). This system integrates both school-based learning and industrial practices in workplaces. In this system, employees play a very important role in the recruitment of students and providing the required education and skills to them (Retnawati et al., 2016). The creation of an upgraded and new system regarding the vocational programs is mostly supervised by governments of the country but they are often driven by organizational employees and trade unions. The vocational school system is developed by countries to improve their economic conditions. However, the vocational school system of every country is very much different from other countries depending upon their institutional and political system that support the vocational school system. Therefore, it is important to understand the working of the vocational school system in terms of a country in context (Lund & Karlsen, 2020).

Indonesia is a market economy that is well-coordinated having characteristics of a good collaboration and coordination among labor, industry and state governments. The key to this collaboration is the model that is based upon labor unions, employer associations and states. Moreover, there is a high level of trust among employees and employers of the organization (Ravn and Øyum 2018). Because of these pre-requisites, the foundation among workplace innovation and industrial education is laid to develop the programs of new educational systems. In this system, ministry of education also plays a very important role in the success of vocational education system. Thus, the vocational schools and industries both play a very important role to provide and fulfilling the needs of industry for skilled workers (Bubou, 2015).

Educational resources are referred to as material and non-material audio-visual environment of school and manpower that are available in the academic environment, to facilitate the administration of the school. They include display boards and chalks, models or specimens, real objects, teachers and staff within the school. They also include the building of the school, its layout, and fundamental materials like books, exercises, pens, pencils etc. which facilitate the process of learning. Moreover, they also include simplifying the process of teaching and learning so that educational process becomes more comprehensive and meaningful for teachers and learners. These educational resources may be built manually or electronically as there could be a variety of needs in both teaching and learning (Usman, 2016). For the purpose of environmental learning, educational resources play a very important role. The utilization of these resources can provide powerful and valuable direction to the faculty members (Getie, 2020).

Any development plan of an educational institution must show the way issues are handled and resolved during the phase of evaluation. It also contains a proper follow-up process. The development plan must be based on several factors. These factors include specific aspects of teaching that must be developed through intended learning outcomes and priorities, various aspect of processes that are to be used in the phase of development, and resources required to achieve any goals and objectives. Last, but not the least, the time required to achieve a specific goal and the division of responsibilities and process of evaluation are also prerequisites (Birenbaum et al., 2015). The main objectives of the development of any vocational, technical and secondary education system include to increase the basic educational process and run the program efficiently, to improve the quality of vocational education, and to strengthen the capacity of the institution that is key to delivering the services of education.

There are various critical activities required to enhance the efficiency and effectiveness of vocational, technical and secondary education systems. These include delivering the services of education, reviewing the responsibilities and roles of main actors, and functional distribution as per the organizational structure. It is also required to identify the big gaps to initiate any input processes. The prioritizing of plan implementation is also needed to support the development capacity of the organization, professional development of its staff, improving the EMIS systems, developing budgeting resources, renewing the regulations and addressing other requirements (Omosidi et al., 2017).

The integration of education system with sustainable development is a challenge and an opportunity as well. Teachers play a very important role in the transformation of society to ensure this sustainability. Many past studies have provided a framework in the form of a guide for self-assessment, dissemination, evaluation, action and planning of environment, social development) ESD integration efforts. The basic approach is to bring change at the institutional level through its curriculum. It is key because a person expects to contribute towards sustainability through education (Leal Filho et al., 2018). The framework of ESD integration shows that the basic purpose of ESD is the understanding of an integrated and holistic vision of education that draws on the basic concept of development on a sustainable basis. This system also acknowledges the relationship of environmental dimensions, economic dimensions and social dimensions. It also shows that these three dimensions are linked to the culture of any geographical region. These contextual realities are advanced and informed by cross-disciplinary and multidisciplinary (Jetly & Singh, 2019).

Accessibility of education is also a process of developing and designing courses and teaching methodology that are effective to meet needs of people who belong to different backgrounds. Moreover, people also differ in their learning styles and mold themselves according to the different instructional methods which they are taught with. Teachers also have different styles and these styles must meet the needs of different learners (Nail & Ammar, 2017). Besides, there are different characteristics to access education. These characteristics include a variety of characteristics of students including their learning styles, language abilities, gender, age, disabilities, abilities, race and ethnicity. This also includes academic rigor, removing barriers of learning,

reduction in the need of accommodation, identification of important course content, recognizing students' capabilities and ensuring the consistency of material with school goals (Smith et al., 2021).

Another important factor in school education is the location of a school. The local community, size of the city and the city environment also play a critical role. In terms of management, educational institutions play an important role in service sector, where distribution channels are very important for success. Distribution channels are interdependent administrative units which are not involved in making any physical product. They are also known as marketing channels that carry the product from the manufacturing unit to the end consumer (Öztürk & Olgan, 2016). The distribution channel in education sector refers not only to the place where educational services are delivered as a product but also the place of delivery of these educational services. Providing educational services require equipment, classrooms, land and buildings (Grajcevci & Shala, 2016).

On the other hand, the location of the educational institution should also be strategic to include other services like transportation, good communication, and any other product or service that a learner (customer) wants to buy. In business management, location is the place where a business is conducted, and which affects the consumer's decision to buy a service. Hence, the location of a school plays a very important role to persuade the student to join any school (Barrett et al., 2019). In the decision-making process of selecting a school, the price of that specific service provider also plays a very important role. It is the factor through which any organization generates the revenue to cover its cost. In order to determine the price of education, the tuition fee paid by students is considered as the educational cost. Price is a key component upon which every decision is based regarding the services of school (Andreti et al., 2013).

In a school system, a wide range of services attract students and other stakeholders. Among these services, the school health system is very vital to fulfilling the students' daily needs. Health and other aspects of the students may vary, for instance, medical care to students must be provided based upon their medical needs on a routine basis, or the requirement of assistive devices, drugs and testing facilities. The health system of the school should be responsible for conducting and coordinating health assessment including implementation and planning the healthcare plans for effective and safe management of students (Estai et al., 2017). These health services are important to link healthcare providers, community, families, students and staff of the school together with the purpose to promote students' health care in a safe and healthy safe school environment. The health system of schools also provides comprehensive mental and physical health care to students. It provides services that include acute care services, dental and reproductive care services. These services may also be provided to external community providers (Bohnenkamp et al., 2015).

Methodology

The primary data of the study was obtained by using interview techniques. The respondents of the study were 30 teachers and students of vocational high schools of Pasuruan Regency. The sample was selected through random sampling selection process. The response guided approach was used for the interview. The researchers designed an interview manual to completely comprehend the concept under study. The content analysis technique was used to analyze the interview data. The data collection involved various steps like the conduct of the interview, recording the interviews, transcribing them, performing the content analysis of the transcribed data in order to detect thematic patterns, and finally coding these patterns as themes and sub themes.

Results

The determination of Vocational High School location was symbolized as a polygon on a map. Before deciding the location of a Vocational High School, it was necessary to determine the number of vocational high school needed in each sub-district. This is determined by the formula in the Indonesian National Standard (INS) Number 03-1733-2004 of 2004, concerning Procedures for Planning for the Urban Housing Environment. This formula can be presented as follows:

$$S_{slta} = \frac{(L_{sltp5} - L_{sltps}) \times a}{E} \%$$

Where,

SLTA = Level of High school study room requirements.

Lsltp5 = Projection of junior high school graduates for five years.

Lsltps = The number of junior high school graduates can be accommodated (capacity of existing high school).

a % = Percentage of junior high school graduates who continue to high school

E = The most effective and efficient study room capacity based on environmental conditions (40 students).

Since this study aimed to find the best SMK locations in the Pasuruan Regency, an analysis of vocational school location determination was required. At this stage of analysis, super impose analysis method was used, which is one of the analytical tools in GIS (Geographic Information System), combined with Qualitative Data Quantification analysis in the form of scoring. The Super Impose analysis works by overlaying or compiling related thematic maps to produce several alternative SMK locations. Along with the Super Impose analysis, a Scoring analysis was also performed. It aimed to equalize the unit value of several aspects (variables) that affected the existing location. The location with the highest total score/weight from various elements (variables) was the best SMK location.

The need of vocational schools was analyzed based on graduate projection data, the number of graduates that could be accommodated, and the percentage of junior high school graduates currently pursuing studies. The data collected is presented in [Table 1](#).

Table 1. *Graduated projection data, number of graduates to be accommodated and continuing.*

<i>Sub-district</i>	<i>Lsltp5</i>	<i>Lsltps</i>	<i>a %*</i>
Purwodadi	1592	680	78.59
Tutur	1519	840	78.59
Puspo	375	320	78.59
Tosari	628	160	78.59
Lumbang	725	0	78.59
Pasrepan	755	0	78.59
Kejayan	635	840	78.59
Wonorejo	1026	800	78.59
Purwosari	3400	4920	78.59
Prigen	2802	1360	78.59
Sukorejo	1768	2120	78.59
Pandaan	5816	5280	78.59
Gempol	5515	4520	78.59
Beji	4233	1960	78.59
Bangil	5880	8280	78.59
Rembang	611	440	78.59
Kraton	1097	680	78.59
Pohjentrek	1040	0	78.59
Gondangwetan	2095	1240	78.59
Rejoso	1082	240	78.59
Winongan	1286	520	78.59
Grati	2437	2320	78.59
Lekok	1013	120	78.59
Nguling	2519	560	78.59

Source: results analysis

Furthermore, by using service standards and formulas in SNI No. 03-1733-2004, researchers combined the existing conditions of the economic sector that had the highest contribution value in each sub-district according to GRDP based on current prices (in 2020). Consequently, the researchers could determine the number of classes, types of services, and vocational majors needed in several sub-districts. These sub-districts were ultimately prioritized to get SMK services. This study was considered several variables or sub-variables that acted as influential factors in determining the location of Vocational Schools in Pasuruan Regency, especially those variables/sub-variables whose data was spatial. By making use of a combined superimpose with the scoring or weight analysis, the existing spatial data was divided into criteria, where each standard had a different value and weight. Each of the current respondents determined the value and importance of each measure.

The determination of the value and weight of each respondent's current criteria can be seen in [Figure 3](#) and [Table 2](#):

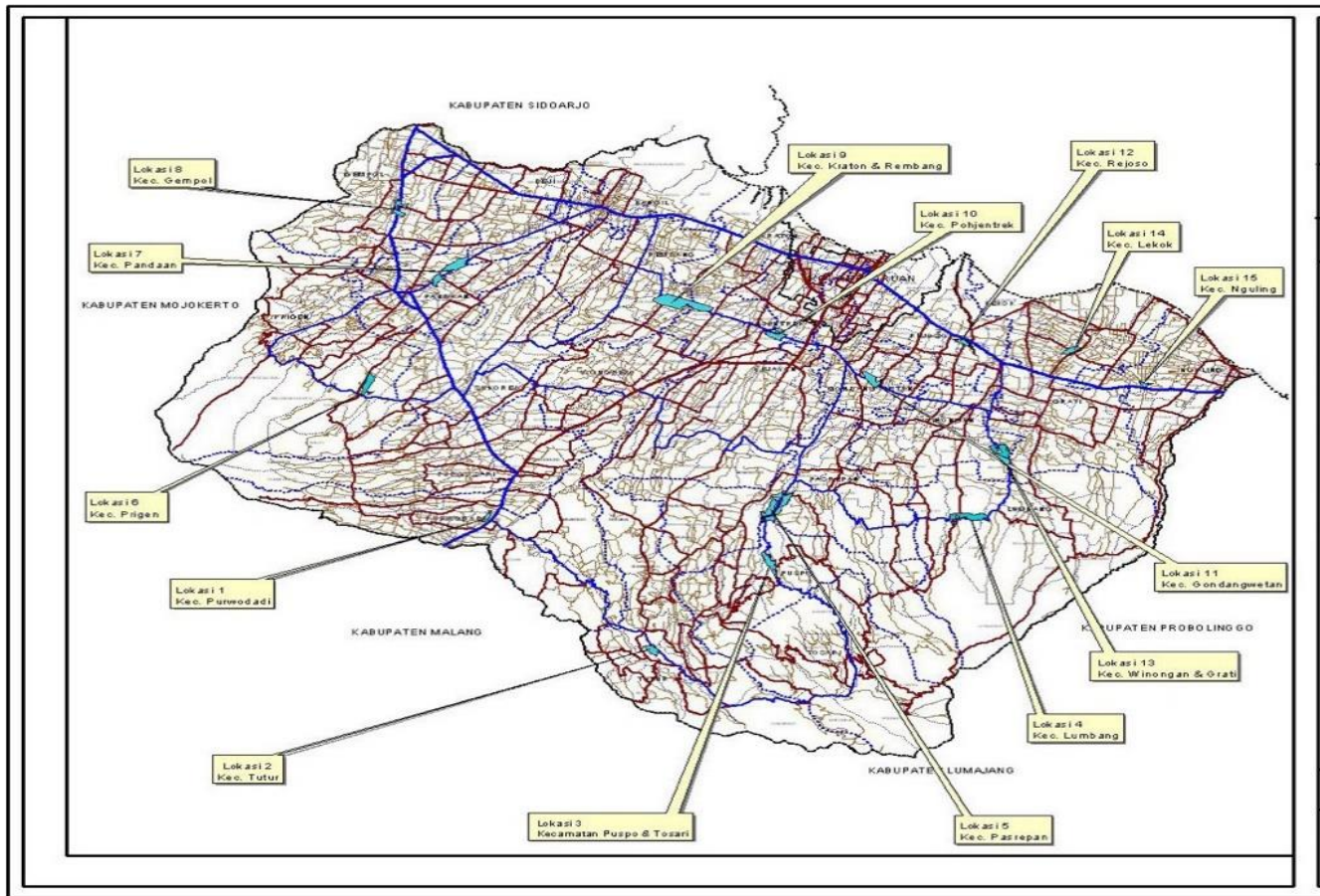


Figure 3. Map of Determining the Location of Vocational Schools in Pasuruan Regency

Table 2. Summary of Land Suitability Weighing Results in Determining the Location of Vocational High Schools in Pasuruan Regency.

Sub-district	Location	Score
Purwodadi	Parerejo Village	147
Tuttur	Wonosari Village	136
Puspo dan Tosari	Puspo Village (Kec. Puspo)	136
Lumbang	Pancur dan Lumbang Village	135
Pasrepan	Manguan Village	143
Prigen	Dayurejo Village	146
Pandaan	Kemirisewu, Kebonwaris, Nogosari dan Kutorejo Village	149
Gempol	Ngerong Village	156
Kraton dan Rembang	Sumberlagah, Krengih, Genengwaru dan Kanigoro (Kec. Rembang), Karanganyar, Sidogiri dan Ngempit (Kec. Kraton) Village	139
Pohjentrek	Susukanrejo Village	149
Gondangwetan	Wonosari dan Gayam Village	149
Rejoso	Rejosolor, Kawisrejo dan Toyaning Village	159
Winongan dan Grati	Jeladri dan Sumberejo Village	145
Lekok	Branang Village	140
Nguling	Sedarum dan Sumberanyar Village	165

Source: Analysis results

A careful analysis of the interview transcripts led to the identification of eight themes. Each theme was given a deep analysis in the context of the research questions of this study.

1. Environmental conditions (present and future).

Environment of the vocational school consisted of political, economic, legal, social, demographic, competitive and technological sectors. For the selection of the place of vocational schools, it is important to understand the environmental changes and impact on the school's selection by the parents. According to most of the respondents, social factors like values, attitudes and lifestyles impacted their decision of how, when and where they should have a vocational school. These social factors varied with the change in time and context.

2. Integration with the development plan.

In this study, development planning was defined as an act of making plans regarding social and economic activities to fulfil specific objectives of a country or region. According to the respondents, a development plan was important for the selection of the location for vocational schools, provided it was consistent with the government's regional development plan, which stated the number of institutions required at each place.

3. Integration with comprehensive education development.

Educational development may be studied horizontally as well as vertically. Respondents opined that expansion of institutional facilities to the general public should be integrated with the development of vocational education. Secondly, it was also suggested that vocational education should be provided to the students by skilled instructors and advanced technology. All respondents agreed that vocational institutions' developmental plans should be aligned with the comprehensive educational development plan of the region. They also said that the educational development plan must include guidelines helping educational institutes how to function effectively and efficiently, as learning and teaching communities, and to enhance the teaching standards and qualities of high schools.

4. Accessibility.

Accessibility was found a variable that helped students to enjoy their studies putting low efforts and cost. Both figuratively and physically, vocational schools are centers of communities. According to the respondents, high schools are locations of community interaction and other events, therefore, they must be accessible and established at central locations. In other words, the integration of accessibility of high schools not only benefited the students but also the whole community.

5. Cost/Price.

For the selection of the high schools, cost was found to be a significant factor. According to the respondents "To choose the high school we focus not only on the quality of education but at the same time on the cost of education". This suggests that authorities must consider the purchasing power of the residents of a particular region while selecting the location of vocational institutions.

6. Range/reach and hierarchy/level of service.

The reach and the approach of the community are also determining factors of the location of a vocational high school. According to a few respondents "for the selection of the high schools, the government should prioritize the service provided by the school and then assign the resources according to the hierarchy level". Therefore, it is the responsibility of the high schools to maintain the standard and define levels in the list of the priorities of the local community.

7. Characteristics of the location/land

For the selection of the site or location, the land characteristics of the location are very important. The locations are to be characterized with human and physical properties. Physical characteristics include climate and landform, while human characteristics include economic systems and distribution of population. According to respondents of the study, the characteristics of land should be given more importance too. Their opinion was that the characteristics of a location played significant role in the success or failure of a vocational high school.

8. Suitability of department with local potential and opportunities.

While selecting the location of the high schools, the potential of the local community must be considered. The resources available locally to the institution and the area of the specialization offered by high schools only can best fulfill the requirements of local community. Moreover, due to the local available resources, the cost of production can also decrease. On the other hand, with high demand market absorption rate of the professional would also be high. According to the respondents “we focus on the suitability of the skill offered by the high schools with our local requirements and its demand in the market”. Increasing and empowering the local community was seen as a critical factor of success. It was also seen as key to sustainable development.

Discussion

The analysis to determine the need for the number of SMKs in Pasuruan Regency revealed that currently there existed 15 institutions. On further analysis, it was concluded that the most appropriate SMK locations in Pasuruan Regency consisted of a few areas presented as followed, along with the points scored by each locality in the analysis and given in parentheses. These locations included Purwodadi District, located in Parerejo Village (187 points), Tukur District, located in Wonosari Village (176 points), Districts of Puspo and Tosari located in Puspo Village, Puspo District (166 points), Lumbang District, located in Pancur Village and part of Lumbang Village (165 points), Pasrepan District, located in Mangguan Village (173 points), Prigen District, located in Dayurejo Village (176 points), Pandaan District, located on the border between Kemirisewu, Kebonwaris, Nogosari, and Kutorejo villages (179 points), Gempol District, located in Ngerong Village (186 points), Rembang and Kraton sub-districts are located in Sumberglagah, Krengih, Genengwaru, and Kanigoro villages included in Rembang sub-district Karanganyar, Sidogiri, and Nempit villages are included in Kraton sub-district (169 points), Pohjentrek District, located in Susukanrejo Village (179 points), Gondangwetan sub-district, located in Wonosari and Gayam Village (179 points), Rejosolo Subdistrict, located in Rejosolor Village and a small part of Kawisrejo and Toyaning Villages (189 points), Winongan and Grati sub-districts are located in Jeladri and Sumberejo Villages (175 points), Lekok District, located in Branang Village (160 points); and Nguling District, located in Sedarum and Sumberanyar Villages. (195 points).

For the employability and development of employees, the vocational schools played a very important role. One can easily summarize development of vocational education in two different skill sets. These skill set included practical skills and knowledge/ theoretical skills. Within the discipline that is chosen by vocational students, a lot of time is required to explore procedures, ideas and theory that are used by the professionals of the industry. In terms of non-vocational studies, however, time required depended on different subjects. The class time of the students was only few hours in a single week, the rest of their time was spent on computers to conduct research and in library to find books regarding their topics and develop skills.

Besides, students of the vocational schools have more opportunities as compared to the students who are studying in regular school system. The skill set of the student to do work along with pathways of vocations are limited for these students because the theoretical knowledge is very weak. As a result, a number of challenges are faced by the students of vocational schools. The stage when employees are looking for jobs and to join any organization they must have good skill set. It is because, the skills required by the employers are those that can be used to create sustainable competitive advantage. They are also looking for employees who can adapt according to their organizational culture very quickly after providing significant amount of training.

The students that had very little field experience often found it very difficult to enter in the job field. It is because employers were looking for people who had the training to work in that specific environment and the persons who worked under the supervision of a person who is a good trainer. By this way they created very favorable skill assessment of the employability. On the other hand, employers also looked for good academic record of students to assess their skill set. The employers could take further leverage by taking a recruitment test of students who applied for the job. Through vocation-based education, students get opportunities to assemble a solid organization that would upgrade their learning experience and their professional expertise. They could also work more intimately with their batch mates and their coaches guiding in their coursework.

Conclusion

This study showed the evidence how vocational education played a significant role in the economic development of any country. The current study examined the factors affecting the selection of location for the vocational high schools in Pasuruan Regency, Indonesia. The current study used the qualitative and descriptive techniques to determine the factors influencing the sight selection of the vocational high schools. Based on the results of the data analysis stages carried out in this study, eight variables and their sub-variables were identified, which influenced the determination of the location of SMK in the Pasuruan Regency. These included environmental conditions (present and future), integration with development plans, integration with comprehensive education development, accessibility, characteristics of the location/land (site), cost/price, reach/range and hierarchy/level of service and the suitability of majors with local potentials and advantages.

This study fills a number of theoretical and practical gaps. This study would be a pioneer study in the domain of vocational schools in Indonesia. No study has been carried out in the context of Indonesia to examine the factors that determine the location of a vocational school. Future studies can use the findings of this study to develop plans for vocational schools in other regions. These findings can also be used by the policy makers and academicians of the educational studies as well.

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Conflict Of Interest

There is no conflict of interest among the researchers of this study as they are residents of Surabaya City, not Pasuruan Regency. The results of this research, however, will be helpful for the community, especially in the Pasuruan Regency.

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