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School—University—Industry Partnership Management (SUIPM): A Conceptual Model Of Strengthening Student Employability Skills, Building A Proposed Model

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Abstract

This study examines the implementation of a partnership management model in vocational schools in Central Java, Indonesia and presents a value chain comprising inputs, processes, and outputs in forming skilled workers with technical and non-technical competencies. The formation of skilled labor depends heavily on inputs, including junior high school students and the learning process. Furthermore, the success of partnership management is determined by integration and collaboration between stakeholders, such as vocational schools, industries, and universities. The partnership management model involving universities aims to create more quality output comprising workers with technical and non-technical skills. This is reflected in employability skills essential in achieving the company's goals and improving productivity. Moreover, the skills are crucial in solving problems the government faces in eroding the unemployment rate in the Central Java region.

Keywords: partnership management, vocational schools, value chains, employability skills, conceptual models

Introduction

The Central Java region of Indonesia is highly economically developed with great potential as an industrialization hub in the future (Da Costa & Parmansyah, 2018; Prasetyo, 2016). The area appeals to domestic and foreign industries due to its large population and extensive open land (Destiningsih, Achsa, & Septiani, 2019). To support industrialization and improve welfare, the government must prepare workers with employability skills and non-technical competencies to work effectively and successfully (Nisha & Rajasekaran, 2018). Therefore, vocational schools become a strategic place chosen by the government to prepare skilled personnel. Furthermore, the government faces quite ironic conditions, based on open unemployment rate data released by the Central Bureau of Statistics. The data indicated that Central Java has 1,214,342 jobless people and is the third province with the highest unemployment rate. Additionally, vocational school graduates generate the highest unemployment rate based on education level (Team, 2020), meaning the government is facing two serious problems. First, preparing the workforce to build Central Java as an advanced industrial area. Second, managing vocational school partnerships to prepare inadequately skilled labor candidates.

Partnership management by vocational schools aims to create a productive learning climate that equips graduates with the necessary skills (Rinawati, 2021). This would improve the quality of vocational education output that synergizes with industrialization (Nooruddin, 2017). The great goal of the partnership is to prepare a workforce with technical capabilities and non-technical skills. The basic concept of partnership management is that the input is students, the process is a learning activity, and the output is skilled labor.

In Central Java, Indonesia, partnerships are built only with graduate institutions, resulting in overly pragmatic learning and focusing on technical skills (Lestari, Rusdarti, & Widiyanto, 2020; Puspita, Muchlas, & Kuat, 2020). However, another important aspect of the partnership is non-technical skills or adaptability to the work environment, harmonious social interaction, and cooperation to achieve the company's target (Scott, Connell, Thomson, & Willison, 2019). The inability of universities in the embraced management system makes the quality of pedagogy to develop graduates with non-technical or employability skills unsatisfactory. The conceptual model adopted by partnership management involving universities is becoming increasingly essential in vocational schools. They foster prospective workers with good technical and non-technical skills that support educational goals and industrialization. Furthermore, this model supports the improvement of education quality that synergizes with government interests and industrialization in Central Java.

Prasetiyo (2020) stated that a partnership management model involving only the industry cannot develop graduates' employability skills. Instead, the role of universities may be needed to develop contextual and productive learning. The involvement of universities in managing vocational school partnerships amplifies the improvement of output quality. Good learning creates a workforce that understands the job's technicalities and self-management and achieves the company's vision, supported by social skills. According to Kaysi, Bavli, and Gurol (2017), the cooperation of universities, vocational schools, and industrial sectors sustain education quality to meet various employment needs. Furthermore, Solichin and Yoto (2017) stated that the partnership management model built today should aim to reduce the unemployment rate of vocational school graduates and increase their availability. This could be achieved by improving the learning process by involving universities in preparing the ideal knowledge-based planning, implementation, and evaluation. Subsequently, universities could complement the implementation of unsatisfactory school and industry partnership management.

This study analyzes various variables in the partnership management model in vocational schools. It builds a conceptual partnership management model by involving universities in Central Java, Indonesia, amid industrialization and environmental pressures.

Research Question

Ayonmike and Okeke (2016) stated that vocational education reduces the likelihood of unemployment in a region and supports the possibility of a person entering the labor force. Also, vocational school operations are essential in industrialization by involving many variables in their partnership management model. This dynamic model collaborates all the variables in partnership management, such as SUIPM. In this case, the industry is an employer and technical skills booster, while universities are pedagogical and non-technical skills boosters. Furthermore, vocational schools implement as centers of skilled labor preparation that support industrialization and efforts to reduce the unemployment rate in Central Java. Therefore, this study builds a partnership management model that vocational schools could use to improve the preparation of a workforce with employability skills and suit the needs of the industry. This would reduce unemployment among vocational school graduates because the skills are inconsistent with the needs of the industry.

There is no effort to involve universities as academic institutions that supply the latest knowledge and strengthen teacher competence. This would help prepare, implement, and evaluate learning in vocational schools to strengthen students' employability skills (Qamaruddin, Sapar, Risal, & Hamid, 2019). To realize this goal, two key questions were explored in this study:

1. The conclusion of previous research on the role of partnership management relies solely on schools and industries in Central Java, Indonesia.
2. The partnership management conceptual model improves employability skills relevant to industrial needs in Central Java, Indonesia.

Significance of the Study

This study is about conceptual models applicable in school partnership management to improve the quality of vocational schools in Central Java, Indonesia. The conceptual model is identical to supply chain management in the service sector. In this regard, the main input principle is the customer that utilizes themselves, their mental abilities, and information to the value chain (Badawood, 2021). The process is a learning activity, and the output is the skill to enter the world of work. Previous studies explored areas such as vocational school partnership management and industry. Furthermore, they explored the role of vocational schools in preparing skilled workers and adopting a needs-based curriculum to improve skills. This research reduces the inefficiency gap in the school partnership management system implemented in the region. It identifies and analyzes vocational school partnership management practices in different countries and applies them in producing a concept suitable for Central Java. Moreover, by considering industrialization, this study explores the partnership management implemented by schools to address unemployment and the needs of skilled workers. It also complements the literature around school partnership management, which could be a comparison for subsequent studies.

Limitations

This study used the systematic literature review (SLR) method because it is the most likely option for research in the current situation. Operations heavily depend on secondary sources obtained through digital platforms, such as journal pages or websites, but only print sources. Furthermore, this method emphasizes a rigorous and comprehensive outlining of previous research. However, certain limitations are unavoidable in its implementation, such as the need for primary data that cannot be equipped with this method. Additionally, data collected with SLR is not the latest and irrelevant secondary data from partnership management implementation. Studies on partnership management became popular again in the last five years when discourse about vocational schools and industrialization emerged. Therefore, SLR was only used to guide researchers to analyze the available libraries to formulate the conceptual model. No study has used SLR to create a proven development product through quantitative effectiveness and validity tests.

Operational Definition

This study applies easy-to-understand operational definitions relevant to describe research problems. The results are expected to be a conceptual model of partnership management involving universities in preparing a workforce with strong employability skills. Therefore, data were collected within the conceptual framework of the agreed research and relevant for analysis. Each concept is used to result in interconnected data to build conceptual models. Therefore, the researchers ensured that the concepts used are unchanged and stable to build a new framework in the partnership management model. Stable operational definitions enable researchers to obtain relevant and reliable data (Pacheco & Herrera, 2021). As a result, they explain the concept using an easy-to-understand definition as the basis for analyzing the results and developing a new partnership management model. An operational definition of the concepts used is as follows:

Partnership management: A cooperative model built to advance the quality of vocational school graduates relevant to industrial needs.

Employability skills: The core skill group, including technological, fundamental, personal management, and transferable teamwork skills. They describe the functional nature of knowledge, skills, and attitudes needed in business in the 21st century.

Skilled labor: Community groups with technical and non-technical knowledge and skills relevant to the industrial world.

Teaching Factory: Industry-based learning concepts (products and services) through school-industry cooperation to produce competent graduates relevant to market needs.

Explanations of concepts that protect against data bias and analysis discrepancies should be supported by operational definitions outlining data collection methods. This ensures that data collection is effective by applying a stable approach consistently. To achieve this, researchers define several data collection approaches that support conceptual frames used in protecting data from potential bias and untrustworthiness. The following is a list of operational definitions applied in data collection:

Characteristics of objects: A conceptual model of School—University—Industry Partnership Management (SUIPM).

Data source: Data were collected from online sources through internet facilities. The data in physical libraries were not considered because public service offices are closed and academic facilities are not accessible due to the pandemic.

Verification: Researchers used reference sources from five years old publications, where the oldest source was published in 2016.

Decision criteria: Data were analyzed from various sources based on theme suitability factors, length of publishing time, and identical writing patterns. Practically, reliable data is a document published in 2016 and subsequent years. Data coming from unknown sources cannot be trusted for validity and are eliminated during analysis.

Previous Studies

Partnership management in academics is usually implemented to maintain or improve the quality of education to support the economic progress and welfare of the people in the region (Okolocha & Baba, 2016). Also, it has downstream in strengthening human resource capacity. This model is identical to supply chain management in the service business proposed by Badawood (2021). However, research on this model is still rarely conducted by academics that focus on educational management. Supply chain management in the field of services is increasingly important to discuss (Tseng, Islam, Karia, Fauzi, & Afrin, 2019). This is because the push to improve education quality is getting stronger, especially to support industrialization. Furthermore, partnership management in vocational education is devoted to preparing skilled graduates ready to work (Lunev et al., 2016). In service companies, the main inputs are students with early skills, while the education rules guide developing skills and knowledge. The final output is employability skills that complement technical skills relevant to industrial needs.

The current partnership management concept developed in vocational schools for Central Java, Indonesia, involves two basic elements. These are the school as an institution that prepares skilled personnel and industry as graduate users (Wahjusaputri, Bunyamin, & Tashia Indah Nastiti, 2020; Yoto & Marsono, 2020). Such partnership management is widely known as Teaching Factory. This model allows schools to utilize industrial sites with technology as a learning arena that prioritizes practicality (Lestari et al., 2020). However, in its implementation, the school focuses more on practice, ignoring classroom knowledge dialogue. The industry feels their involvement in Teaching Factory adds to the company's burden. Additionally, most graduates only master technical skills (industrial technology). They hardly master non-

technical or employability skills that synergize with the company's vision and work environment. As a result, Teaching Factory is labeled as technical job training that makes schools neglectful with pedagogical functions that must be implemented (Prasetiyo, 2020). Subsequently, it fails to satisfy many parties or optimally support regional industrialization. This means that the supply chain management process applied in education services is not maximal in reaching downstream. Therefore, the value chain needs strengthening by other elements that support partnership management to balance the learning process within and outside the classroom (practice). This would produce graduates with technical and non-technical skills. The management of the old partnership described is shown in Fig. 1.

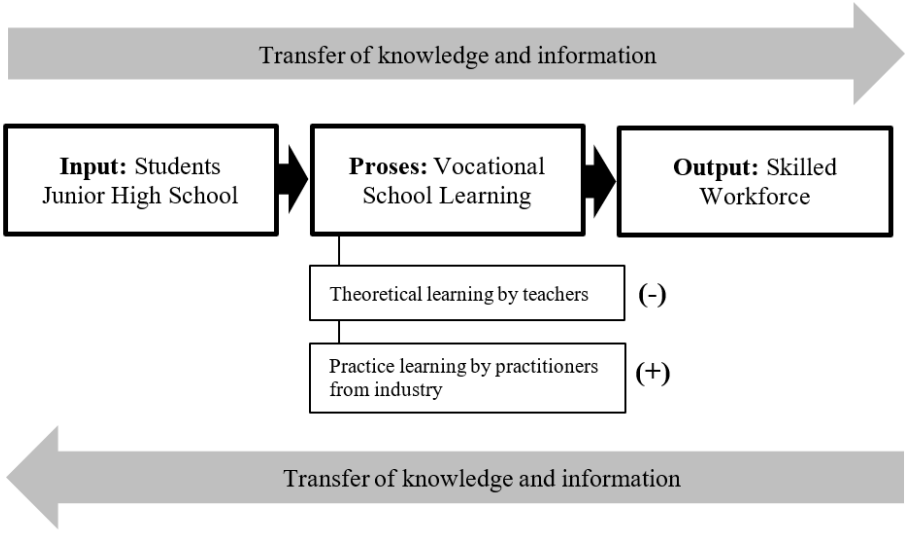

Fig. 1 Simple supply chain in Vocational School-Industry partnership management model

The model in Figure 1 shows that a value chain is built where students and the transfer of knowledge and information move downstream. The vocational education value chain inputs are junior high school students, combining different processes from schools and industries, resulting in the output of skilled labor. The partnership management that focuses on the learning process and preparing graduates should be balanced without compromising the role of each element. It has been an outdated issue where the industry is overly relied upon, and schools ignore pedagogical functions. Furthermore, this problem is based on the pedagogical competence of vocational school teachers that are weak in preparing, implementing, and determining learning assessment tools. This creates a value chain that focuses more on training prospective workers than vocational school learning. Moreover, it conducts a balanced value process based on theoretical and practical learning. This leads to a downstream chain of mastering technical and non-technical skills that meet expectations.

Research Method and Procedures

Research Design

This study was conducted by a deep systematic literature review (DSLR) as a secondary research method (Zawacki-Richter, Kerres, Bedenlier, Bond, & Buntins, 2020), with five main stages. They include defining the review question, selecting search sources and databases, and screening and coding studies. Furthermore, the resulting quality is appraised, synthesized, and reported.

The review questions were formulated based on the problems faced by the government in Central Java in preparing the industrial workforce and eroding unemployment through vocational schools. Additionally, with the DSLR method, scientific data were identified and collected from sources that produce articles

relevant to research topics. The association between scientific articles and topics is characterized by the search keywords of research results. These include vocational school partnership management, teaching factory, the importance of universities, and students' employability skills. Alternatively, it could use synonyms such as vocational schools that could be replaced with vocational or technical high schools. Articles were compiled through a database of national and international journals that are guaranteed quality by public institutions. Examples are government representatives in academics or private affairs that focus on disseminating research results globally.

The database is a source of national journals, Science and Technology Index (SINTA), that measures the performance of Science and Technology for academics managed by the Government of the Republic of Indonesia. This database is a collection of international journals with the best rankings to new unrated journals. Only journals rated between 1 to 6 are considered because they have reached the minimum accreditation figure. This means that they have met the standards of scientific publications based on the OJS Editorial and Publishing Process, while unrated journals are ignored because they do not meet the criteria. The database for reliable international journals is the Google Scholar platform, a mainstay by academics worldwide. Both databases are all online and accessible at any time with the support of internet facilities. Online sources increase the breadth of material accessible to researchers, making DSLRs very convenient for this project. The journals in each database are compiled based on content quality, the ranking of the impact factors observable according to the Journal Citation Report, and its publication quality. Based on these aspects, researchers ensure the analysis object characteristics are explained accurately until they reach the synthesis. This study only applied inclusion criteria with verification of data published in 2016.

Examinations and coding of 50 abstracts were conducted to make data elimination and disarmament of findings. Coding was performed by marking the most relevant data (C1), quite relevant (C2), and less relevant (C3). The inclusion requirements guided the data elimination process based on focus proximity and study theme, methods, and conclusions as to the basis for new research. Only 30 sources survived this process, while the filtered sources were studied in-depth related to the findings, conclusions, and recommendations. They are essential in developing novelty study findings that respond to previously identified review questions. Furthermore, researchers appraised their quality in-depth against data that met decision criteria supporting or rejecting the partnership management arguments. The quality of a DSLR article was analyzed based on its relevance to the study theme and purpose. However, the relevant results were not subjectively discarded, though they did not support the expected argument. This is because such data is useful in maintaining objectivity in synthesis withdrawal.

Procedure Followed in Synthesizing and Reporting the Results

The last stage in the DSLR method is synthesizing and reporting the results. The synthesis was withdrawn as an academic effort to propose a conceptual model of vocational school partnership management. This model could strengthen the employability skills of prospective workers needed by the industry. Researchers conducted in-depth examinations, eliminated C3 category data, and codified Data Ready to Analyze (A1). This data is essential in compiling analysis for readers to understand and avoids the biases prevalent in secondary research. Also, A1 data was re-examined regarding its content and relevance to the research theme. Relevant data were then extracted and identified as findings. A1 data is a fact-finding result on the current partnership management, improvement recommendations, and encouragement for the involvement of high education in existing partnerships. Furthermore, a critical analysis was performed on the model's specificity and impactful weaknesses. The primacy of the application process for vocational schools was also analyzed as the dominant factor in preparing the research synthesis. Objectivity was improved using ethics requiring study scriptwriters to remain anonymous and unidentified in secondary

research (Badawood, 2021). After composing the synthesis, the overall results were reported, including a model that integrates the government's interests in education and industrialization and reduces unemployment in Central Java, Indonesia.

Results and Discussion

Finding 1: School-industry partnership management (teaching factory) is developing and facing some challenges in Central Java.

Partnership management between vocational schools and industries is intended to build a reciprocal relationship between educational efforts and regional industrialization. Ehlen, van der Klink, and Boshuizen (2016) stated that a skilled workforce could be created through industry involvement in vocational education. In practice, students could be accustomed to recognizing technology and industrial management. Therefore, industrialization needs to be supported by connected vocational education. According to Addy and Adabor (2021), the industry's performance in preparing skilled workers needs support from the university. In this case, the university supplies the latest knowledge and concepts of fostering social skills for students through technology support. Industrialization in the region needs to consider science and social skills as the basis for its development. Therefore, the role of universities in providing such knowledge for skilled labor candidates needs to be considered (Flynn, Pillay, & Watters, 2016). Unfortunately, the university's engagement model in vocational and industrial school partnership practices is not definitive until now. However, the possibility to highlight universities' roles is wide open because they are a source of knowledge development that improves the quality of people (Kashina, Chudnovskiy, Aleksandrova, Shamov, & Borovaya, 2016). In Central Java, partnerships between vocational schools and industry are also known as a teaching factories. However, criticism should be considered regarding partnerships that have not had a significant impact in the region. This is evidenced by high unemployment and low labor availability due to not meeting the criteria (Prasetiyo, 2020). Furthermore, it is signaled by the weak learning activities in schools and teaching factories, creating teacher dependence on the industry (Handayani, Mundilarno, & Mariah, 2018; Perdana, 2018). Consequently, the educational gap makes the industry focus on creating a skilled workforce through practices and experiences shared by tutors (practitioners). In contrast, schools are weak in preparing, implementing, evaluating the learning process, and adopting technology. Therefore, they cannot foster employability skills that impact non-technical knowledge, resulting in undeveloped students.

This study found that involving universities in supply chain management in vocational schools could result in a skilled workforce with strong employability and technical work skills. Universities could supply the latest knowledge and make teachers enrich students' skills useful for strengthening fundamental competencies, self-management, and teamwork (Lim, Lee, Yap, & Ling, 2016). Currently, vocational schools in Central Java are actively adopting technology (Sudiyanto, Sampurno, & Siswanto, 2017). However, it would only be a project without a standard briefing. Therefore, universities should perform their role with technology support, such as eLearning and social media. As a result, they would maintain the quality of teachers in vocational schools to develop learning activities (Dolgova, Belikov, & Kozhevnikov, 2019). This is very useful in preparing workers with competency employability skills and ready to support the achievement of corporate objectives and government programs in the region (Soenarto, Amin, & Kumaidi, 2017).

Finding 2: The involvement of universities in partnership management improves the quality of learning in vocational schools.

Kashina et al. (2016) stated that developing the skills of students that are ready to work with a joint partnership between universities and industry supports government efforts towards industrialization. Furthermore, Husein (Husein, 2019) explained that developing human resources in vocational school education to improve technical and non-technical skills reduces graduate unemployment. One possible strategy is for the government to build school—industry—university-based partnership management. The university's involvement could improve the value in supply chain management in vocational schools (Corrêa, de Mello, Clapis, & Fornazieri, 2017). In line with this, Rinawati (2021) showed that partnership management between the industry and higher education institutions closes gaps related to scientifically oriented learning, social attitudes, and work skills. Furthermore, Scott et al. (2019) examined the development of students' employability skills that depend on learning management by the school. This implies that the process in this value chain requires improvisation from the beginning of planning. Universities could trigger teachers to create productive and social skills-oriented learning conditions through joint activities with academics to make a learning plan (Kashina et al., 2016). These activities could be either a workshop or training. Subsequently, the value chain would be balanced without hanging on to each other, reducing the company's burden in providing learning. Moreover, the school would resort to its main function, to organize quality learning. Therefore, vocational education could optimize the value chain from upstream to downstream to respond to customer needs and become a reliable government instrument in the region.

Bodrunov (2016) found that the business world's need for skilled labor is getting stronger. However, the company is only open to workers with relatively high technical and non-technical skills. Workers with only strong technical skills cannot support the company's productivity because they are individual, neglectful of the company's vision, have weak self-actualization, and stutter in teamwork (Perdana, 2019). Therefore, innovation is needed due to the high unemployment among vocational school graduates and the increasing industrialization (Alam, 2016). Currently, vocational schools only need to improve and strengthen the value in their supply chain management. The balance in the value chain ensures stabilizes the circulation of knowledge and information from upstream to downstream (Badawood, 2021). Therefore, the problems faced could be solved by improving the ongoing system using technology and optimization of processes (Zaudah Cyly Arrum Dalu & Mojibur Rohman, 2019). The supply chain management in vocational schools that rely on teaching factories should be strengthened. Furthermore, the inputs and processes should be integrated to support the quality of output produced in technical and employability skills (Triyono, Trianingsih, & Nurhadi, 2018).

Conclusions and Recommendations

Vocational schools must implement strong and proactive partnership management in Central Java, Indonesia. This would overcome the pressures of labor needs with employability skills that support industrialization and erode unemployment in the region. Therefore, partnership management needs to change and adapt to educational and industrial-technological developments constantly. Furthermore, schools need to ensure the value chain works effectively and efficiently. The existing partnership management should be optimized by stabilizing the collaboration between value chains from upstream to downstream. Therefore, this study proposes the interrelation of each important value chain, especially in the balanced division of tasks and roles. This results in interactions that lead to the achievement of stakeholder objectives in the region. The latter situation shows a stronger urge to involve the university in the interaction. This is because universities complement the existing value chain, especially in optimizing the process. Furthermore, the partnership management model involving universities allows vocational schools to identify stakeholders and their subsequent needs. Consequently, the model built would meet

the prerequisites to be impactful, such as making the processes in the value chain more innovative. Also, this would prioritize quality to meet the diverse learner needs and produce outputs based on industrial and government needs in the region.

The model in Fig. 2 shows various aspects of a partnership management system with inputs, processes, and outputs. This shows that building a value chain with best practices is considered in a system that integrates all values to identify stakeholders and their needs on science and facilitated information. Moreover, the model helps students develop their technical and non-technical skills to enter the industry more easily. Therefore, the science and skills provided should go through a proactive transfer process of all value chains to ensure quality learning. Additionally, the science and information provided should offer insight into employability skills and their usefulness for stakeholders in the value chain. This ensures that the output of the current process fulfills needs that synergistically impact all stakeholders.

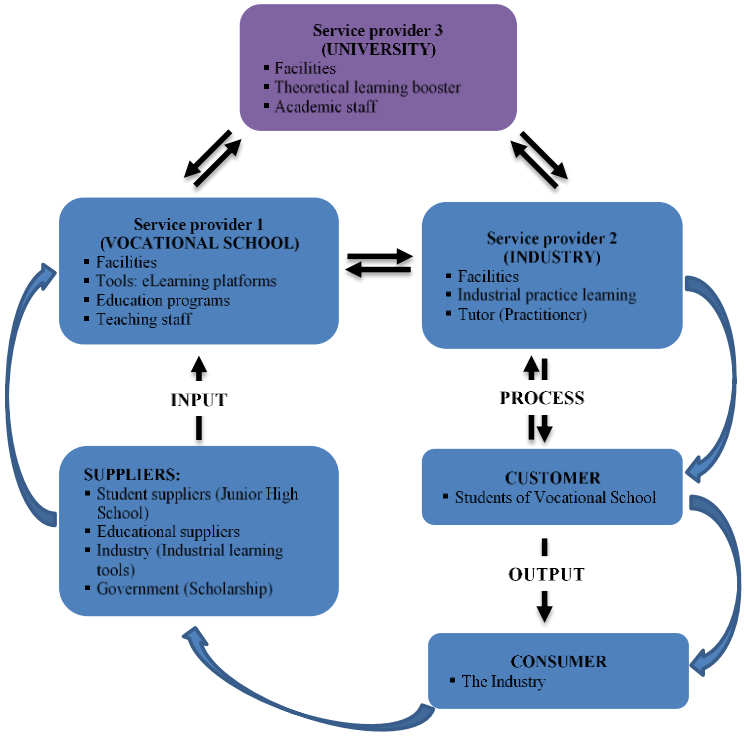

Fig 2. A Conceptual Model of School—University—Industry Partnership Management (SUIPM) to Strengthening Student Employability Skills

The partnership management model must put forward an interactive and dynamic value chain in response to environmental challenges in Central Java. An integrative model allows process activities to run more effectively with support from each value chain. Subsequently, it produces output that suits the needs of stakeholders in the region and addresses changes caused by partnership management innovations. These include changes in employers' labor competency needs. Also, it comprises changes in government policies on skilled labor qualifications produced by vocational schools to support industrialization. Eventually, the partnership management model would improve the region's learning quality. As a result, it would prioritize developing technical and non-technical skills of prospective workers from vocational schools.

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