

Framework for Furniture and Wood Processing Industry Polytechnic in Era Disruption of Covid-19

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ABSTRACT

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In the era of the Covid-19 pandemic, all activities are forced to adapt to the Disruption Era, one of which is the education sector. The era of Disruption Covid-19 changed the learning system from face to face to online and did not change the quality of the learning process. Therefore, the Furniture and Wood Processing Industry Polytechnic must create a new framework in order to survive. This study aims to create a new framework that has the perspectives of various stakeholders such as government, industry, academic institutions, certification institutions, students and technological developments. The making of this framework is based on PEST analysis and a drives competitive for universities according to (Panday, 2014). The result of the framework for the Wood Furniture and Processing Industry Polytechnic are implementation health protocol for Covid-19, improvement of facilities dan infrastructure, creating income from teaching factory, SDM adaptation for improvement facilities and infrastructure, and quality assurance of graduates. The next step is to carry out monitoring and evaluation (MONEV) so that the implementation of framework runs according to the references and targets.

SARI PATI

Pada era pandemi Covid-19 memaksa semua aktivitas beradaptasi dengan Era Disrupsi salah satunya adalah sektor pendidikan. Era Disrupsi Covid-19 merubah sistem pembelajaran yang semula melalui tatap muka menjadi online dan tidak merubah kualitas dari proses pembelajaran tersebut. Oleh karena itu, Politeknik Industri Furnitur dan Pengolahan Kayu harus membuat framework baru agar tetap survive. Penelitian ini bertujuan untuk membuat framework baru yang memiliki prespektif dari berbagai stakeholder seperti pemerintah, industri, lembaga akademis, mahasiswa dan perkembangan teknologi. Pembuatan framework ini berdasarkan analisa PEST dan drive kompetitif proses bisnis untuk universitas menurut (Panday, 2014). Hasil framework untuk Politeknik Industri Furnitur dan Pengolahan Kayu adalah penerapan protocol kesehatan Covid-19, peningkatan sarana dan prasarana, penciptaan income dari Teaching Factory, adaptasi SDM terhadap peningkatan sarana dan prasarana, dan penjaminan mutu lulusan. Langkah selanjutnya adalah melakukan monitoring dan evaluasi (MONEV) agar implementasi framework berjalan sesuai acuan dan target.

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INTRODUCTION

The Covid-19 pandemic has caused a major outbreak around the world. To date, it has caused many deaths worldwide, especially in Europe, United States, China, India and many other countries. Due to the massive spread of the disease, WHO has restricted human mobility and implemented social distancing (Fernando, 2020). Many countries decide to close schools, colleges and universities to reduce mobility and implement social distancing. As a result, many countries are in crisis. In fact, universities and colleges have to organize activities even with the current limitations (Syah, 2020).

With the restriction on human mobility implemented by WHO, colleges and universities have to survive in the midst of the crisis. According to data from the Ministry of Education and Culture in 2020, a total of 74,960 universities in Indonesia were closed and conducted their activities from home.

Politeknik Industri Furnitur dan Pengolahan Kayu (*Polifurneka*) is a State Polytechnic of the Ministry of Industry located in Kendal, Central Java. In 2020, Polifuneka also closed activities on campus. However, the regulation of Ministry of Education and Culture of 2021 allow face-to-face lectures with a capacity of 50% of students per room, Polifurneka begins to adapt to post-Covid19 business conditions. Campus activities such as student service, industrial practice, certification, lectures, practicum, research and community service are still held. However, with a 50% capacity of student, the quality of lecture at Polifurneka is not optimal and the system currently running is still trial and error. Therefore, for adaptation of post-Covid-19 conditions, it is necessary to prepare a framework.

Framework is a frame used to analyze systems and business environments. With the framework, business processes can be faster, more efficient and responsive if there are changes using in-depth analysis (Le and Phi, 2021).

Due to restriction on human mobility, nowadays, many businesses are transforming to digital systems, thereby accelerating the transition to the disruptive era. This transition exists in all areas of business including education. In the field of education, disruptive change is strongly influenced by technology and the concept of student-centered learning. Therefore, technology must be able to meet the learning needs of students easily and quickly so that learning is not centered on the lecturer (Rahardja *et al.*, 2019). As a result, we need a framework that has competitive values in the Disruptive era

The purpose of this research is to create a framework of Polifurneka that has competitive value in the post-Covid19 disruptive era.

THEORETICAL FRAMEWORK AND HYPOTHESES

Vocational Education in Indonesia

According to Law Number 3 of 2014, RIPIN, and Government Regulation Number 41 of 2015 concerning the development of industrial human resources, development of industrial workers through vocational schools with vocational high schools and vocational colleges. Vocational universities are currently still in the stage of moving towards a dual German model system and development towards industrial HR 4.0. The developments of polytechnics and Akom are also focused on industrial areas so that they will quickly adapt to the development of the industry and facilitate the supply of human resource to industry.

The Ministry of Industry also collaborates with an institution from Switzerland, namely S4C (*Skill for Competitiveness*) for the development of learning in vocational polytechnic. The Ministry of Industry also cooperates with the Ministry of Education and Culture for the learning process. Meanwhile, the collaboration with the Ministry of SOEs and Ministry of Manpower is for the supply of labor produced by the vocational polytechnic (Kemenperin, 2018). Ministry of Industry has 12 vocational polytechnics. One of them is Polifuneka. Polifurneka has three

study programs, namely Furniture Production, Furniture Design, and Furniture Industry Business Management. Assisted by S4C institution in the preparation of strategic plans, DACUM (*Development Curriculum*), PSC (*Private Sector Cooperation*) and preparation of syllabus and lesson plan. The education system used by Polifurneka is a dual system with a lecture model at the end of every year and practice in industry. **Figure 1.** shows the dual system in Polifurneka.

The Ministry of Industry also integrates vocational educations in Industry 4.0. This integration scheme

involves industry, education and other stakeholders. This integration requires collaboration from the government who makes policies, academics for science, training, certification institutions and industries as suppliers of trainers and recipients of industrial human resources. **Figure 2.** Shows the Scheme of Integration of Vocational Education and Industry 4.0.

Post-Covid19 Pandemic Condition

After the Covid-19 pandemic, many countries will raise their economies again by starting to open lock-down and activating industrial activities.

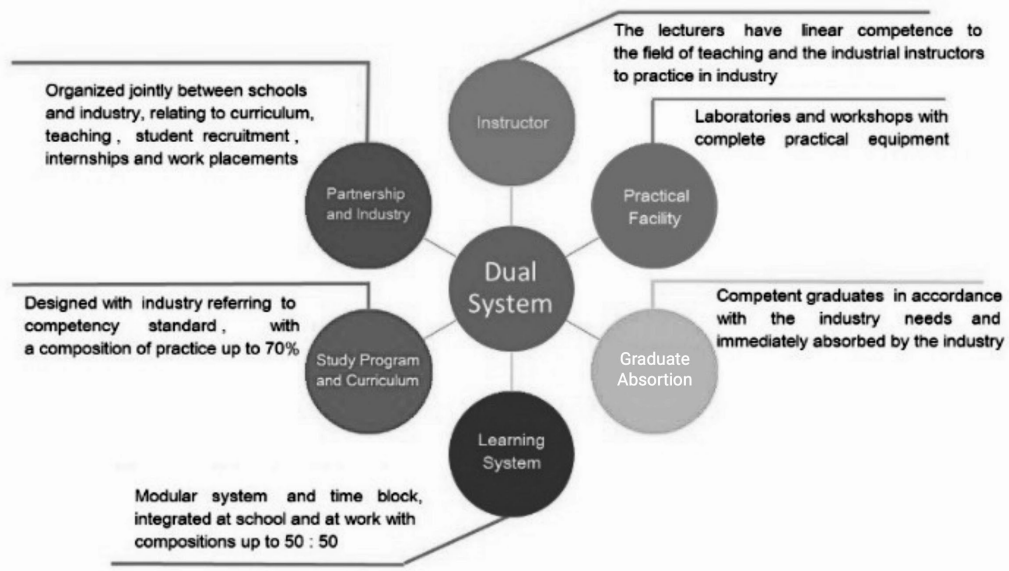


Figure 1. Dual System on Polifurneka

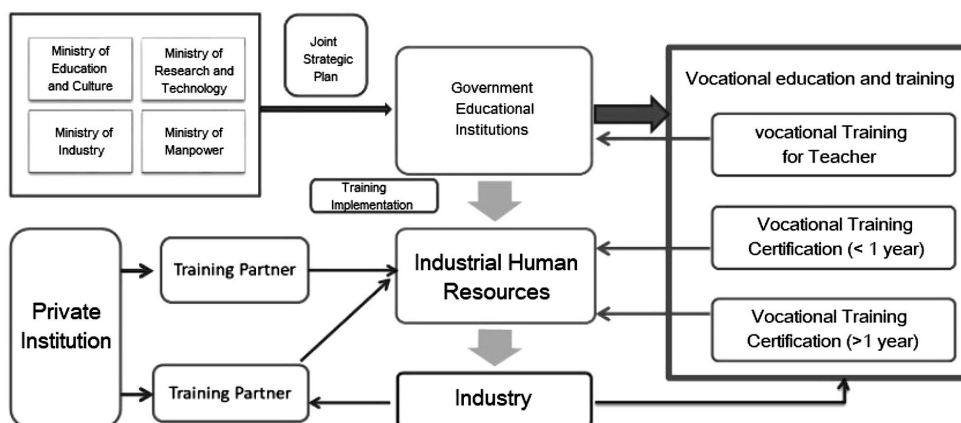


Figure 2. Scheme of Integration of Vocational Education and Industry 4.0 (Vierke, 2019)

The followings are the observations of the post-Covid19 pandemic in Indonesia:

1. Southeast Asian countries will follow China to boost the economy. However, economic improvement is held gradually while still restricting human mobility. In this condition, the demands for products and services are still decreasing.
2. The supply chain is still disrupted and the supply chain performance must be faster and more effective.
3. The need for labor is still low and there are still many workers who are temporarily laid off. This is due to restriction of activity in the industry by 70%-80%.
4. The ability to pay tuition from the student guardian is decreasing.
5. For the education sector, face-to-face learning can be carried out with a class capacity of 50%.
6. The government updates the learning curriculum to maintain the quality of the learning process in the post-Covid19 pandemic situation.
7. The learning and graduation process is carried out online, this has an impact on some students that are not agreeing with the cost of the internet
8. Students have difficulties doing final project research directly in the field (Indrawati, 2020).

Framework Development

The main challenge now is to easily adapt to the post-Covid19 situation. Technology optimization is needed to support this adaptation. The competitiveness of vocational polytechnic is assessed from student graduation which is ready to work and having competency certification.

In order to maintain the quality of graduates, Polifurneka must optimize technology and industrial partnerships to maintain the quality of the learning process in the current condition by developing a Framework with PEST analysis with competitive values in the education sector in the disruptive era (Deshmukh and Haleem, 2020). The frameworks are :

Competitive value of business processes in universities (Panday, 2014).

PEST analysis is used to identify various factors.

Based on the analysis of number 1 and 2, making a framework of Polifurneka to achieve a vocational polytechnic that has high competitiveness.

Competitive Value of College Business Process

To strengthen competitiveness, Polifurneka has to improve the quality continuously. The quality improvement is carried out on the entire business process at the college. The business process on higher education service and the process of improving the quality of education can be seen in **Figure 4** (Panday, 2014).

PEST Analysis

PEST analysis is used in order to see the external potential factors managed by an organizational unit. The development of PEST analysis predicts the situation and potential strategy, the future of organization, the competitiveness planning or framework. Referring to (Ward and Peppard, 2002) there are several factors that influence PEST analysis model. These factors are political factors, economic factors, social factors and technological factors:

1. Political Factor (P): referring to various forms of government intervention and political activity in economy.



Figure 3. Framework Scheme

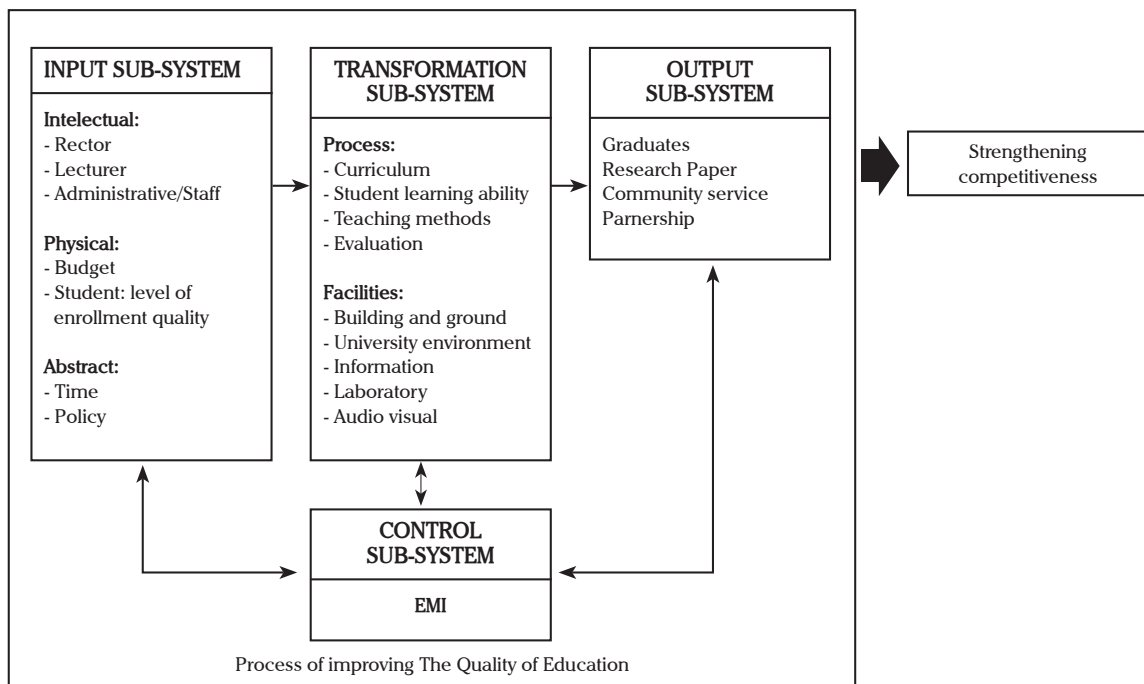


Figure 4. The concept of improving the quality of higher education for strengthening competitiveness

2. Economic Factor (E): referring to macroeconomic policy and external environmental condition.
3. Social Factor (S): referring to the social, cultural and contextual demographic factor of the external environment.
4. Technological Factor (T): referring to activities related to technology, technology infrastructure, technology incentive, and technological paradigm that can affect the external environment (Mahadiansar and Aspariyana, 2020).

METHODS

Population, Sample, and Sampling Technique

The population of the data are 51 people who come from polifurneka stakeholders. The sample data used in this study are 17 people from 17 work units. The sampling adequacy data is calculated based on Slovin’s Formula with an accuracy of 95% (Tejada and Punzalan, 2012) The sampling technique used was carried out by snowball sampling. Snowball sampling is a sampling technique based on interview or correspondence (Farida, 2014).

Data and Data Collection Method

This research is qualitative research. The data collection technique was done by interviewing and observing the sample.

Research Variable

The independent variable of this research is the college business process and the dependent variable is the PEST analysis factor and the drives competitiveness of the college.

Operational Definition and Variable Measurement

Higher education business processes are divided into three parts, namely input sub-system, transformation sub-system and output sub-system. Within the sub-system, there are supporting factors:

Input Sub-System

Inputs Sub-System are the resources used in the transformation of the education process.

Intellectual

- A1. Rector
- A2. Lecturer
- A3. Administrative staff

Physical

- B1. Budget
- B2. Student

Transformation Sub-System

Transformation Sub-system refers to the means by which education inputs are transformed into education output.

Process

- C1. Curriculum
- C2. Learning Method
- C3. Evaluation

Facilities

- D1. Lecture Building
- D2. Building Support Facilities
- D3. Polytechnic Location
- D4. IT & Information
- D5. Laboratory
- D6. Audio visual

Output Sub-System

Output Sub-System is the result of a transformation in education process. (Wibowo, 2008)

Support

- E1. Graduation
- E2. Research Journal
- E3. Community
- E4. Service
- E5. Partnership

On the next stage, all Polifurneka business processes are analyzed regarding future strategies to increase competitiveness and adaptation in the post-Covid19 disruptive era.

The next stage is PEST analysis, this analysis is divided into four factors, namely Politic, Economy, Social and Technology. This research discusses the important roles of these four factors in the Polifurneka business process.

Then, the results of the analysis are presented into business framework scheme. Figure 5. Shows the business framework (Jelassi and Martínez-López, 2020).

DATA ANALYSIS AND DISCUSSION

Competitiveness Drives Analysis of Business Process.

Business process of Polifurneka consists of three sub-systems, namely input, transformation and output. In this research, the researcher conducted snowball sampling to 17 people from 17 work units. This sampling technique determine the drives competitiveness of Polifurneka business processes. The followings are the drives competitiveness for each business process sub-system:

A1. Rector (Top Management)

In the post-Covid-19 disruptive era, Top Management must update the ability to adapt to technological

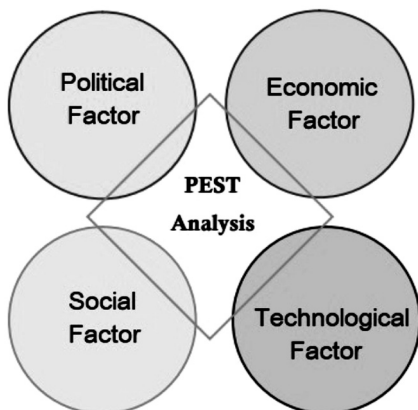


Figure 5. PEST Analysis

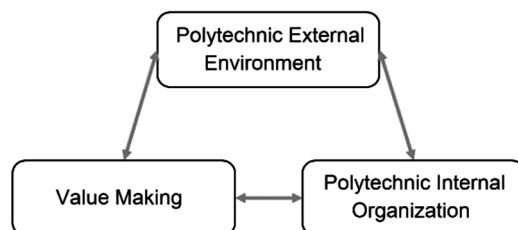


Figure 6. Business Framework

developments in order to make decisions from polytechnic data. There is a system that accommodates data on education, infrastructure, finance, accreditation, policy determination and evaluation monitoring which the performance can be seen in real time for decision making (with a *siakad* cloud system) (Afuan and Permadi, 2013).

A2. Lecturer

Lecturer must also adapt to technological development by updating knowledge in synchronous and asynchronous and student-centered learning, adapting to technological development in online guidance, online data collection, and digital technology application for community service.

A3. Administrative staff

Administrative staff should have digital document management skills, understanding of cloud storage and digital data management.

B1. Budget

The government budget is now sufficient to support research and community service activities, but the research and community service budget for Polytechnics at the Ministry of Industry is still under the Ministry of Education and Culture.

B2. Student

Students are required to be adaptive to current technological developments including technology in online learnings, fast information updates, building relationships, and understanding all social media, especially linked.id for searching job.

C1. Curriculum

The curriculum making with teaching factory (*TEFA*) method with a dual system makes the curriculum from Polifurneka in accordance with current industrial developments and the graduates from Polifurneka will be quickly absorbed by the industry (Diwangkoro and Soenarto, 2020).

C2. Learning method

The learning method currently used is Dual System.

By applying this method, students will learn theory, practice as well as an introduction to work in the industry. With the support of current technology, the teaching and learning process can be online and documented in real time through the *Siakad* cloud application and Learning Management System (*LMS*), making it easier for internal lecturers and lecturers of industry in the learning process (Ho *et al.*, 2019).

C3. Evaluation

Evaluation of the learning process is recorded in real time with *Siakad* cloud and *LMS* applications. Therefore, the evaluation process can be carried out quickly and accurately.

D1. Lecture Building

The Polifurneka lecture building is very complete with classroom, laboratory, library, hall and workshop.

D2. Building Support Facilities

Supporting facilities in the post-Covid-19 disruptive era are the existence of a special room for lecturers for online teaching (such as soundproof room) so that lecturers can teach without being disturbed. Online library facilities are also supporting students to achieve their competencies with the existence of e-books for courses that can be accessed at any time.

D3. Polytechnic Location

The location of Polifurneka is very strategic because it is located in an industrial area. Therefore, the path of information and coordination in the field of learning and recruitment can run quickly (Kosturos, 2012).

D4. IT & Information

In terms of IT & information, the adequacy of supporting hardware such as the adequacy of the Pinpoint Internet, optimization of the LAN network, the adequacy of cloud storage and upgrading of facilities in online *Siakad*. For workshop to support teaching factories, it is necessary to have a software

that integrates all machines so that the production process in the workshop can run continuously from the beginning to the end of the process.

D5. Laboratory

There should be an upgrade of laboratory facilities at Polifurneka, for example, an import-export lab and ERP that are needed by industries today.

D6. Audio Visual

By adapting the notification audio and attendance system in industry, students are expected to study like in the industry

E1. Graduation

Graduation ceremony on Post-Covid19 is not held offline but online. Therefore, the availability of online application and online graduation simulation is very needed.

E2. Research journal

To keep up with the rapid development of publication both in research and community service and there have also been many publications from lecturers, in the future, Polifurneka is expected to have journal publication media for both research and community service.

E3. Community

The role of the community for the employment absorption of graduates in the furniture industry is very important. Currently, Polifurneka maintains good relations with the furniture and wood processing industry communities, namely HIMKI and Asmindo.

E4. Service

In the alumni service, it is hoped that there will be tracer study for graduates that is easy to update such as social media, job vacancies and career development sites for alumni, online job fairs, business incubators, and professional certification services to increase the competitiveness of graduates.

E5. Patnership

It is hoped that after the Covid-19 pandemic, goals and communications with furniture companies will continue well, the implementation of online MOU to accelerate the expansion of industrial partnership and maintenance at the end of the MOU.

PEST Analysis

PEST analysis is used to examine external environmental factors (Syafitri, 2015). External factors that affect Polifurneka in the post-Covid19 disruptive era are:

1. Political Factor (P): The government has played a large role in the post-Covid-19 disruptive era, for instance, the supply of education budget and credit assistance for students. Not only that, the government is also actively changing regulations in the education sector to adjust learning conditions in the post-Covid-19 period.
2. Economic Factor (E): The budget from the Ministry of Industry (DIPA) was cut to solve Covid-19 pandemic, such as vaccines and immune supplements. Other budgets were also diverted for credit assistance to student to support online learning.
3. Social Factor (S): Social change in the post-Covid-19 disruptive era is that socialization between humans is not intensive, causing humans to be more introverted. Students and campus stakeholders are now prioritizing conversations through social media and avoiding face-to-face meetings.
4. Technology Factor (T): Currently, there are many technologies for the online learning process (*e-learning*) such as Edmodo, Zoom and Edlink application.

Framework Making

The results of the analysis of drives competitiveness on Polifurneka and PEST business processes, the scenario in the post-Covid-19 disruptive era are:

1. Digitalization is growing rapidly.
2. Business processes are run in accordance with health protocols.
3. Closely related to the virtual world because

- many meetings are held virtually.
4. Acceleration of online learning technology architecture.
 5. Cloud storage technology plays an important role as a provider and data storage in the real time.
 6. The government and industry partners are still supporting.
 7. The learning curriculum is in the process of development.

From this scenario, a business framework is made. The following is a proposed business framework:

1. Implementation of the Covid-19 Health Protocol
In the post-Covid-19 era, the most important thing in carrying out business processes is to maintain health protocol. Based on the Guidelines for the Directorate General of Higher Education of the Ministry of Education and Culture in 2020, the health protocols that must be implemented by state universities are the application of social and physical distancing, washing hand, wearing mask, and hand sanitizer, spraying disinfectant regularly, checking temperature every day and giving vitamin to maintain immunity.
2. Improving the Management of Facilities and Infrastructure while maintaining health protocol, the next step is to update the facilities and infrastructures owned by Polifurneka to adapt to the post-Covid-19 disruption era. Updating Polifurneka facilities and infrastructure focuses on digitizing data storage and documentation. For data storage, optimizing cloud storage and setting the data storage mechanism in cloud storage to make it neatly organized. For data documentation, the use of cloud siakad can fully document the polytechnic business processes, namely the learning process, finance, tracer study, career center, staff management, PDDIKTI integrator, BAN-PT, PMB, data analysis for Top Management, and back up data. With LMS support for the learning process, Polifurneka facilities and infrastructures are ready to

adapt to the post-Covid19 disruption era. Another main supporting facility is an internet connection at Polifurneka which is stable and fast to support the digitization of data storage and documentation.

3. Income from Teaching Factory
The third step is the development of learning method. Currently, Polifurneka uses a dual system with an industrial apprenticeship system and a Teaching Factory Level 3. By raising the Teaching Factory level to level 9, it will optimize the dual system learning method, reduce the need for industrial apprenticeships for students, and not depend on the government funding. Steps to reach Teaching Factory level 9 are the establishment of QC SOPs, the existence of software linking business processes from upstream to downstream (*Market Place*), sales of teaching factory products to external, product development and the establishment of divisions such as R&D, HRD, PPIC, etc. Teaching Factory produces products for external use continuously, SOPs are arranged, and finally there is business development from Teaching Factory (Siregar, Daryanto and Restu, 2020).
4. Adaptation of Human Resources to the Improvement of Facilities and Infrastructure
After all facilities and infrastructures as well as the teaching factory are fulfilled, then further training is carried out for Lecturers and Administrative Staffs to quickly adapt to current facilities and infrastructures, teaching factory level and health protocol habits. For students, the selection process for new students is focused on the ability to adapt to the current learning system so that students can tune in until graduation.
5. Graduate Quality Assurance
The final step is quality assurance and graduate absorption. For quality assurance of graduates, Polifurneka should have a professional certification agency (*LSP*) so that every graduate already has a professional certification. With the professional certification, graduates of Polifurneka will be more ready

to work in the Furniture Industry (Agus M Saragih, 2018). For those who want to become entrepreneur, Polifurneka accommodates students with business incubator. This business incubator focuses on product diversification that will support the teaching factory so that business of student and the teaching factory will be integrated (Fitriani Lubis, 2019).

CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

From the results of the analysis on drives competitiveness of business processes for internal factors and PEST analysis for external factors, the framework for Polifurneka in the post-Covid-19 disruptive era is obtained, namely the application

of health protocol, improving facilities and infrastructures, making income from teaching factories, adapting human resources to improve facilities and infrastructure, and quality assurance of graduates.

The researcher suggests that monitoring and evaluation (*MONEV*) should be implemented on the frame work so that the implementation of the framework is in accordance with the guidelines and targets.

The limitation of this research is to consider the effects of the post-Covid19 disruptive era for university or polytechnic business processes. ■

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