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THE LINK AND MATCH OF THE DEMAND AND SUPPLY FOR PRODUCTIVE VOCATIONAL SCHOOL TEACHERS WITH REGARD TO SPECTRUM OF VOCATIONAL SKILLS IN THE PERSPECTIVE OF EDUCATION DECENTRALIZATION

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Abstract

The purpose of this study was to describe the pattern of link and match of the demand and supply for productive vocational school teachers which should be carried out in the future. This study is descriptive qualitative with the grounded theory approach. The unit of analysis consisted of: policy makers at central level; policy makers at local level; productive vocational school teachers; Teacher Education Institutes (LPTK), and Non-Teacher Education Institutes (Non-LPTK). The data were analyzed using the three phases: open coding, axial coding, and selective coding. The research results are as follows. (1) The pattern of the demand for productive vocational school teachers has been fulfilled through such programs as Three Year Diploma for Vocational Teacher of Engineering, Bond-based Remuneration for Bachelor's Level, Civil Servant Recruitment, Regional Civil Servant Recruitment, and Non-permanent Teachers. (2) Productive vocational school teachers supplied included LPTK graduates majoring in 22 vocational skills training programs and Non-LPTK graduates majoring in 45 vocational skills training programs out of 48 programs. (3) Productive vocational school teachers were distributed in three types of programs. (4) A system of vocational teacher education was conducted by increasing and refining. (5) Link and Match pattern of demand and supply for productive vocational school teachers involved integration of supply for LPTK graduates and that of Non-LPTK graduates, the distribution of such supply, and the pattern of implementation of vocational teacher education.

Keywords: *link and match, demand, supply.*

INTRODUCTION

National development wil achieve its great success if qualified human resources are available in optimizing and maximizing the improvement of all development dimensions. Qualified resources can be attempted through education, either formal or nonformal. One of educational units in formal sector which is intended to prepare the graduates particularly to achieve excellence in the world of work is vocational high school (*Sekolah Menengah Kejuruan*/SMK).

Article 13 and 15 of Law on the National Education System *(Undang-Undang Sistem Pendidikan Nasional)* No. 20 of 2003 define the SMK as "a vocational educational unit which serves as the continuation of primary level education and is intended to prepare learners for certain fields of work." Meanwhile, Djojonegoro (1998, p. 34). Suggested SMK graduates to be closer to a world of work In short, SMK was designed to prepare learners or graduates to enter the world of work ,and to be able to improve professional attitudes in certain fields of work. For SMK graduates, the top priority is the world of work.

The current improvement is marked by several achievements in advances in science and technology. All countries will directly get involved in an era of global competition. The increasing global competition will occur in the 21st century, a century of rapid advances in science (Tilaar, 2004, p. 39). The presence of the era of global competition requires the SMK to develop and keep pace with development in the world of work. Therefore, it is important for SMK to competencies held to remain relevant with demands of the world of business and industry in the era of global competition. One of attempts made by Directorate of Guidance of SMK as a work unit of Ministry of National Education responsible for the existence of SMK was shown with the issuance of vocational skills training programs. The development of SMK as the main institution aiming at the improvement of human resources is of importance since it is related to two concomitant, or complementary things: (1) policies regarding local autonomy and central-local balance financial relationship which require supports of qualified technical/ production skills and reliable managerial skills to revive national economy, and (2) more strict and sharper demands and problems of globalization era, particularly in the field of industrialization and information technology, which lead to rapid change in science and technology. Such condition, on the one hand, provides opportunities to accelerate development rate, and on the other hand, brings about challenges on the improvement of human resource quality (Team of YPPTI, 2010).

The spectrum of vocational skills was first stipulated in Decision of the General Directorate of the Ministry of Primary and Secondary Education No. 251/C/MN/2008 dated August 27, 2008 and enacted in early Academic Year 2008/ 2009 to grade X students. Meanwhile, the implementation to grade XI and XII students remained to refer to Letter of the General Directorate of the Minister of Primary and Secondary Education No. 925/C.C5./KP/07 dated February 28, 2007 concerning the Adjustment of Vocational Programs based on SMK curriculum on 1999 and 2004 editions. Then, the Decision on Spectrum of Vocational Skills was updated to the Letter of General Directorate of Secondary Education Decision No. 7013/D/KP/2013 dated December 4, 2013 regarding Spectrum of Vocational Skills. Then, it was updated to the Letter of General Directorate of Primary and Secondary Education No. 4678/D/KEP/ MK/2016 dated September 2, 2016 on Spectrum of Vocational Skills. In reference to the updated decision regarding spectrum of vocational skills, the education program of SMK was divided into 9 fields of skills, 48 vocational skills training programs, and 142 vocational competencies. The names of skills training program and vocational competencies held by SMK were adjusted to the latest spectrum of vocational skills.

Beside structuring vocational competencies, the Ministry of National Education also made a change in ratio of Senior High School (*Sekolah Menengah Atas*/SMA) and SMK to be 30:70, in accordance with government's intention to increase the number of SMK and achieve ratio of SMK:SM 70%:30%. The number of SMK will increase. Up to 2008, 100 SMA and 341 SMK under local excellence basis had been developed. The ratio of the number of SMK students: SMA students were increasing from 30:70 in

2004 to 49:51 according to tentative count in the end of September 2009 (Ministry of National Education, 2010, p. 23). In term of the ratio of the number of government SMK and government SMA, the latest data indicates 67:33 (Bona, 2016).

The structuring of vocational competencies and the issuance of spectrum of skills and the development of ratio of the number of SMA:SMK (30:70) result in the fulfillment of productive vocational school teachers. The change in composition is predicted to exert an influence on the increase in demand for productive vocational school teachers which is limited in number (Jenner, 2010).

Teacher Education Institutes (LPTK) have provided the supply for vocational school teachers. However, vocational LPTK could only supply some based on spectrum of vocational skills. In fact, LPTK have not been able to fulfill the demand for productive teachers for all vocational skills programs and unable to follow a rapid change in differentiated advances in science (Tilaar, 2004, p. 42). After a pilot study conducted in several vocational LPTK and Directorate of Guidance of SMK, demand for productive vocational school teachers based on spectrum of vocational skills were compared to the availability of study programs held by vocational LPTK. The findings revealed that out of 9 fields of skills, LPTK were only able to provide productive voca-tional school teachers in 2 fields of skills including Business and Management, as well as Tourism. Vocational LPTK have not been able to fulfill the demand for productive vocational school teachers in the other 7 fields, particularly in the field of Energy and Mining, Health and Social Work, and Maritimeness.

Policies of the structuring of spectrum of vocational skills and the limited number of LPTK graduates to fulfill the demand for productive vocational school teachers according to spectrum of skills will influence the shortage of productive vocational school teachers. A presurvey carried out in SMKN2 and SMKN 5 Surakarta revealed that the teacher shortage occurred in all vocational competencies. The shortage was caused by the mismatch in degree certificates and the subjects handled, the absence of new formation in recruitment of productive teachers, and the number of teachers entering retirement or pre-retirement (pilot study conducted in SMKN 1 and SMKN 2, August-September 2011). In addition, Director of Directorate of Guidance of SMK (Dit PSMK) of Ministry of Education and Culture, Mustaghfirin Amin (Bona, 2016) pointed out that the teacher shortage presents as a problem in developing SMK. In reference to data of Ministry of Education and Culture, the number of productive vocational school teachers is 80,000 of total number of government SMK teachers of 278,000. The results of survey and the latest data indicate the lack of a sufficient number of productive vocational school teachers. Furthermore, government's program to enhance the quality of educated workforce through SMK Inpres leads to reduced the shortage or productive vocational school teachers.

Attempts to fulfill the demand for productive vocational school teachers have been made by the Ministry of Education and Culture through Directorate of Guidance of SMK and Directorate of Guidance of secondary education Educators and Education Personnel (P2TK). However they seem to be in short run and add-hock in fulfilling the demand for productive vocational school teachers with regards to spectrum of vocational skills and the supply for teachers in perspective of education decentralization. Such attempts cannot be continuously made in a long run due to their vulnerability to tentative policies without references derived from comprehensive and in-depth scientific studies to be legal product for foundation of the policies.

Clearly, several problems encountered by productive vocational school teachers include: the issuance of the structuring of vocational skills, the limited number of LPTK graduates majoring in spectrum of vocational skills, the teacher shortage, the change in authority of recruitment of productive teachers in perspective of education decentralization, and unclear foundation of attempts to deal with the demand for productive vocational school teachers. Problems encountered by productive vocational school teachers seem to be excessive and complicate the world of Indonesian education. A clear pattern based on comprehensive and in-depth scientific study to present as legal product underlying attempts to fulfill the demand for productive vocational school teachers is required. For that reason, a research on the effective link and match of demand and supply for pro-

ductive vocational school teachers based on the spectrum of vocational skills in perspective of education decentralization is required.

Such problems appear to vary and be complicated. To guarantee in-depth results of research, the research focused on: (1) the overview of the fulfillment of demand for productive vocational school teachers which was carried out by central and local governments; and (2) the overview of the pattern of link and match of the demand and supply for vocational school teachers with regards to the spectrum of vocational skills for vocational skills training programs which have not been held by government vocational LPTK, but rather have held by government non-LPTK.

Based on the focus of problem, the research question is: How is the pattern of link and mach of the demand and supply for productive vocational school teachers which should be carried out in the future?

The purpose of the present research was to answer research question, particularly to describe the link and match pattern of the demand and supply for productive vocational school teachers which should be carried out in the future.

The benefits of the research are: (1) for government, in this case Ministry of Education and Culture, to link and match demand and supply for productive vocational high school teachers, (2) for higher education institutions, either Teacher Education Institutes or Non-Teacher Education Institutes, to work together for the link and match of demand and supply for vocational school teachers; (3) for government at provincial level, to construct policies regarding recruitment of productive vocational school teachers; (4) for SMK, to overcome problem of the lack of productive school teachers; (5) for other researchers, to conduct further study, or to refine the results of the present research.

RESEARCH METHOD

The present research sought to examine and reveal actual phenomenon/symptom occurring in SMK: the shortage and scarcity of productive teachers for certain vocational training skills programs. Furthermore, in reference to the examined and revealed phenomenon, the research provided an overview of the pattern of fulfillment of productive vocational school teachers carried out by center and local governments and found out the overview of link and match pattern of supply and demand for productive vocational school teachers with regards to vocational skills training programs in the perspective of education decentralization.

Therefore, the type of the research is descriptive qualitative with grounded theory approach. Grounded Theory is a research method that prescribes systematic guidelines for data collection and analysis with the purpose of inductively building a framework explaining the collected data (Charmaz, 2006).

The research had been carried out for 1 year through several stages: (1) pilot study (3 months), (2) data collection (3 months); and (3) data analysis and report making (6 months). It was conducted in 2 locations: (1) main locations: Directorate of Guidance of SMK and Directorate of Guidance of Secondary Education Teachers of Ministry of Education and Culture, the Department of Youth Education and Sports of Surakarta, the Department of Education of Central Java province, Regional Civil Service Bureau of Surakarta, SMK Negeri 2 and SMK Negeri 5 of Surakarta, Faculty of Technology and Vocational Education of Universitas Pendidikan Indonesia, Faculty of Agriculture of Universitas Sebelas Maret Surakarta (UNS), Politeknik Negeri Semarang, and Institut Seni Indonesia of Surakarta; and (2) supporting location: Study Program of Vocational Technical Education of Faculty of Teacher Training and Education of UNS.

Units of analysis involve certain units regarded as research subjects, or anything related to the focus of research/ the examined components. They were determined by the researchers themselves to maintain the validity and reliability of the research.

The units of analysis were divided into 2 parts: (1) components of demand which include: (a) components of demand for which units of analysis cover: (a) policy makers at central level regarding vocational school teachers (Code K1) comprising, Directorate of Guidance of SMK (Code K1A), Directorate of Guidance of Secondary Education Teachers (Code K1B), and documents of Spectrum of Vocational Skills (b) policy makers at local level regarding vocational school teachers (Code K2), consisting of Department of Edu-

cation of Surakarta (K2A), Department of Education of Central Java province (K2B), and Regional Civil Service Bureau of Surakarta (Code K2C); (c) users of productive vocational school teachers (Code K3), including SMKN 2 Surakarta (Code K3A), SMKN 5 Surakarta (Code K3B); and (2) components of supply with such units of analysis as: (a) institutes supplying productive vocational school teachers, Vocational LPTK (Code P1), including Faculty of Technology and Vocational Education of Universitas Pendidikan Indonesia (P1A), Study Program of Vocational Technical Education of Faculty of Teacher Training and Education of UNS (P1B) , and documents of higher education institutions; (b) Non-LPTK supplying graduates relevant to demand for SMK (Code P2), comprising Faculty of Agriculture of UNS (Code P2A), Politeknik Negeri Semarang (Code P2B), Institut Seni Indonesia Surakarta (Kode P2C), and documents of higher education institutions.

The main instruments of data collection are the researchers themselves. Several techniques of data collection were used to support the data collection. They include: (1) structured interview, used to explore data on experiences, thoughts, and perspectives of sources of primary data using interview guidelines related to the pattern of demand for productive teachers which has been fulfilled and the pattern of link and match of demand and supply for productive vocational school teachers; (2) document, used to explore documents derived from secondary data sources through guidelines of document review related to policies and regulations to fulfill the demand for productive subject teachers, both for the pattern of demand for productive teachers which has been fulfilled, and that of link and match of the demand and supply for productive vocational school teachers; (3) member check, used to recheck through discussions with informants to describe the pattern of fulfillment of supply for productive subject teachers which has been conducted, as well as the pattern of the link and match of the demand and supply for productive vocational school teachers based on documents and interview.

In order to maintain data validity, data triangulation technique was applied. It is a technique underlaid by multiperspective thinking patterns, meaning that a number of perspectives are required to draw a conclusion. Data (source) triangulation was used since data sources comprised documents, informants/ respondents with different levels, as well as member check. It leads the researcher to collect data using different data sources to test the data validity.

Data were analyzed using Miles & Hubermen's (1992, pp. 16-20), interactive model in qualitative research consisting of: (1) data reduction; (2) data display; and (3) conclusion drawing and data verification. Data analysis is done when data are being collected, and after data has been collected in certain periods (Sugiyono, 2009, p. 246). Interactive analysis is defined as analysis of which activities can be done through interaction of the components, or with data collection process during activities of data collection.

The collected data included those related to the pattern of demand for productive vocational school teachers which has been fulfilled by central and local governments, as well as those associated with the link and match pattern of demand and supply for productive vocational school teachers with regards to spectrum of vocational skills in perspective of education decentralization. After data collection, the researchers moved along the components of analysis. The process of data analysis was carried out in three consecutive components: data reduction, data display, and conclusion drawing.

Data reduction covered the process of selecting in which attention is centered to simplification and transformation of rough data obtained from interviews and documents, either primary or secondary data. Data display was done when organizing data; it involved systematic construction of information obtained from data reduction. Meanwhile, conclusion drawing was gradually conducted to get high degree of reliability in data/source triangulation and member check on the resulted findings consisting of the pattern of demand for productive vocational school teachers which has been fulfilled, as well as the link and match pattern of demand and supply for productive vocational school teachers with regards to spectrum of vocational skills in perspective of education decentralization. Therefore, data were analyzed since presurvey activities.

The implementation of such interactive analysis was done in two parts: data analysis

of pattern of demand for productive vocational school teachers which has been fulfilled by government, and the link and match pattern of the demand and supply for productive vocational school teachers with regards to spectrum of vocational skills in perspective of education decentralization. Stages in the analysis referred to analysis with grounded theory approach through three phases of coding: open coding, axial coding, and selective coding (Cresswell, 2015, pp. 272-273).

Data analysis of pattern of demand for productive vocational school teachers which has been fulfilled. Data analysis of fulfillment of productive vocational school teachers was carried out through: (1) data collection using interviews to informants from DITPSMK of Ministry of Education and Culture, DITPGPM of Ministry of Education and Culture, Dikpora of Surakarta and of Central Java province, BKD of Surakarta, SMK Negeri 2 and SMK Negeri 5 of Surakarta, as well as relevant documents; (2) making of inference in the form of abstract conclusion drawing from analysis of interview data and documents. The abstraction of while understanding of data was synchronized with theory as foundation of analysis description; (3) analysis using qualitative study with conceptual scope which is to realize abstraction to become a concept of the pattern of demand for productive vocational school teachers which has been fulfilled. The realization of the abstraction was carried out in a row through three phases of coding in grounded theory: open coding, axial coding, and selective coding (Cresswell, 2015, pp. 272-273). The former involves describing categories and selecting a category as the center of phenomenon, the middle covers reviewing to understand the phenomenon, while the latter includes displaying information obtained from axial coding as the results of interpretation, and determining as research findings in the form of visual model; (4) member check to ensure the validity of the overview of pattern to obtain a pattern which is in accordance with the actual condition; (5) description of pattern of demand for productive vocational school teachers which has been fulfilled by government. Figure 1 describes the conducted analysis process.

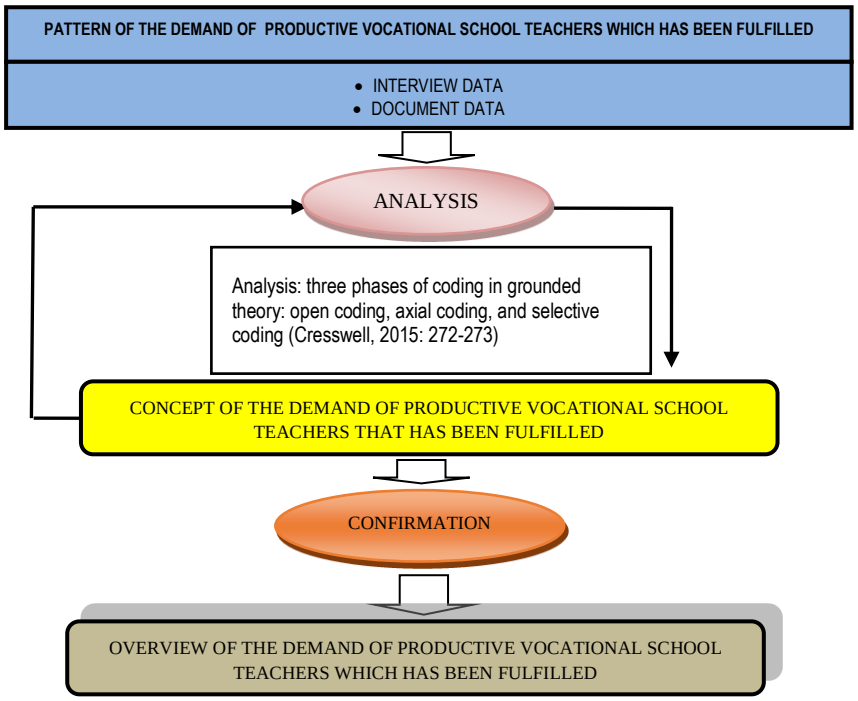

Figure 1. Analysis Process Pattern of Demand for Productive Vocational School Teachers which has been Fulfilled

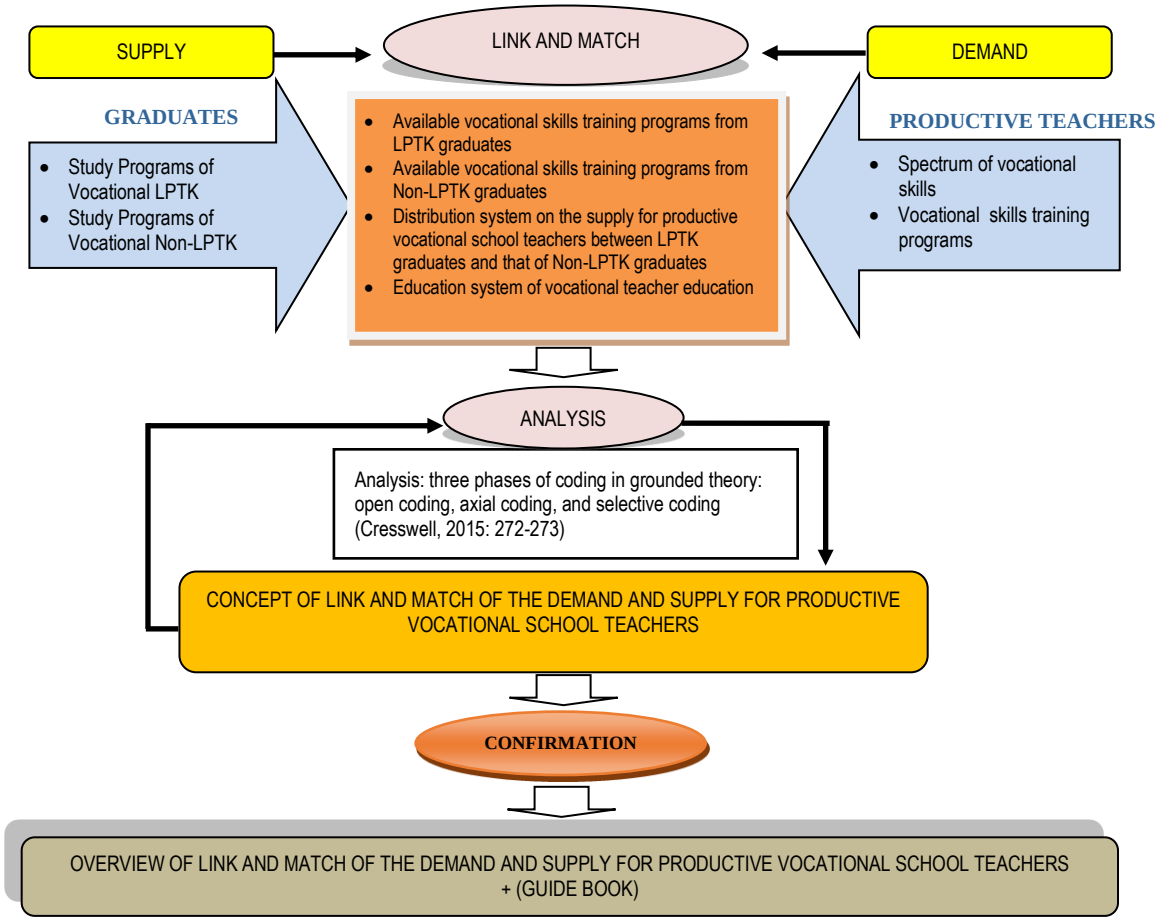

Figure 2. Analysis Process Link and Match of the Demand and Supply for Productive Vocational School Teachers

Data analysis of link and match pattern of the demand and supply for productive vocational school teachers with regard to spectrum of vocational skills in perspective of Education Decentralization

Data analysis of link and match pattern of demand and supply for productive vocational school teachers with regard to the spectrum of vocational skills in the perspective of Education Decentralization was conducted by as follows (1) collecting data through interviews with informants from DITPSMK of Ministry of Education and Culture, DITPGPM of Ministry of Education and Culture, Department of Education of Central Java province, Dikpora of Surakarta, BKD of Surakarta, SMK Negeri 2 and SMK Negeri 5 Surakarta; (2) collecting data through documents of spectrum of vocational skills, documents of the availability of study programs at vocational LPTK, documents of the availability of study programs at Non-LPTK, teacher professional profession documents, Teacher Professional Education documents (PPG), and link and match documents; (3) Comparing documents of spectrum of vocational skills and documents of the availability of study programs at Vocational LPTK and Non-LPTK, and in-depth review of the teacher's professional authority documents, teacher education documents, and link and match documents; (4) Making inference in the form of abstract conclusion drawing from analysis of interview data and documents. Abstraction derived from whole understanding of data was synchronized with theory as the foundation of the analysis description; (5) conducting analysis using qualitative study with the conceptual realm, that embodies the abstraction into concept of link and match pattern of the demand and supply for productive vocational school teachers with regard to spectrum of vocational skills in perspective of education decentralization The realization of abstraction

into concept was done consecutively through three coding phases in grounded theory, i.e. open coding, axial coding, and selective coding (Cresswell, 2015, pp. 272-273). The former involves describing categories and selecting a category as the center of phenomenon, the middle covers reviewing to understand the phenomenon, while the latter includes displaying information obtained from axial coding as the results of interpretation, and determining as research findings in the form of visual model. At these stages, an overview of the supply for teachers from LPTK graduates and non-LPTK graduates based on the demand for vocational skills training programs in vocational school. Distribution system on the supply for productive vocational school teachers between LPTK graduates and that for Non-LPTK graduates, education system of vocational teacher education from LPTK graduates and that for Non-LPTK graduates, and overview of the link and match pattern of the demand and supply for productive vocational school teachers with regard to spectrum of vocational skills in perspective of education decentralization; (6) doing member check/ confirmation to check the validity of the research findings, so that the research findings generated can be in accordance with data analysis of interviews and documents; (7) determining link and match pattern of the demand and supply for productive vocational school teachers with regard to the spectrum of vocational skills in perspective of decentralization as the result of research findings; (8) making summary used as guideline for the link and match pattern of the demand and supply for productive vocational school teachers with regard to spectrum of vocational skills in perspective of education decentralization. The process of conducted analysis can be clarified in Figure 2.

RESEARCH RESULT AND DISCUSSION

Pattern of Demand of Productive Vocational School Teachers which has been Fulfilled

Pattern of demand of productive vocational school teachers which has been fulfilled was divided into two parts, namely the pattern of demand of productive vocational school teachers in the era of centralization and decentralization. The demand of productive vocational school teachers was fulfilled in the era of centralization through such programs as Three Years Diploma for Vocational Teacher of Engineering, Bond-based Remuneration for Bachelor's Level, Civil Servant Recruitment. The fulfillment of productive vocational school teachers in the era of decentralization includes Regional Civil Servant Recruitment, and Non-permanent Teachers.

Illustration of the supply for productive vocational school teachers from LPTK graduates and that Non-LPTK graduates based on the demand for vocational skills training program as can be shown in Table 1.

From the description in the Table 1, based on the 2016 demand for vocational training program on spectrum of vocational skills, productive vocational school teachers supplied included LPTK graduates majoring in 22 vocational skills training programs, while 26 vocational skills training programs were not available. The supply for Non-LPTK graduates was available in 45 vocational skills training programs, meanwhile three programs are not available.

Distribution System on the Supply for Productive Vocational School Teachers from LPTK Graduates and from Non-LPTK Graduates

The availability of Productive vocational school teachers from LPTK graduates and Non-LPTK graduates was distributed in three types of programs, namely: (a) vocational skills training programs provided and fulfilled by LPTK graduates; (b) vocational skills training programs provided and filled by both LPTK and Non-LPTK graduates; and (c) vocational skills training programs pro-vided and fulfilled by Non-LPTK graduates. Table 2 presents such distribution system.

Table 1. The Supply for Teachers from LPTK Graduates and from Non-LPTK Graduates

No.	Vocational Skills Training Program	Teacher Availability	
		LPTK	Non-LPTK
Expertise Field of Technology and Engineering			
1.	Construction and Property Technology	Available	Available
2.	Geomatics and Geospatial Techniques	Available	Available
3.	Electricity Engineering	Available	Available
4.	Mechanical Engineering	Available	Available
5.	Aircraft Technology	Not Available	Available
6.	Graphics Engineering	Not Available	Available
7.	Industrial Instrumentation Technique	Not Available	Available
8.	Industrial Engineering	Not Available	Available
9.	Textile Technology	Not Available	Available
10.	Chemical Engineering	Not Available	Available
11.	Automotive Engineering	Available	Available
12.	Shipping Technique	Not Available	Available
13.	Electrical engineering	Available	Available
Expertise Field of Energy and Mining Expertise			
1.	Petroleum Engineering	Not Available	Available
2.	Mining Geology	Not Available	Available
3.	Renewable Energy Engineering	Not Available	Available
Expertise Field of Information and Communication Technology			
1`	Computer and Informatics Engineering	Available	Available
2.	Telecommunications engineering	Not Available	Available
Expertise Field of Health and Social Work			
1.	Nursing	Not Available	Available
2.	Dental health	Not Available	Available
3.	Medical Laboratory Technology	Not Available	Available
4.	Pharmacy	Not Available	Available
5.	Social Work	Not Available	Available
Expertise Field of Agribusiness and Agrotechnology			
1.	Agribusiness Plant	Available	Available
2.	Livestock Agribusiness	Not Available	Available
3.	Animal Health	Not Available	Available
4.	Agribusiness Processing of Agricultural Products	Available	Available
5.	Agricultural Engineering	Available	Available
6.	Forestry	Not Available	Available
Expertise Field of Maritime			
1.	Sailing Fishing Vessel	Not Available	Available
2.	Shipping Commercial Ship	Not Available	Available
3.	Fishery	Not Available	Available
4.	Processing of Fishery Products	Not Available	Available
Expertise Field of Business and Management			
1.	Business and Marketing	Available	Available
2.	Office management	Available	Available
3.	Accounting and Finance	Available	Available
Expertise Field of Tourism			
1.	Hospitality and Tourism Services	Available	Available
2.	Culinary	Available	Not Available
3.	Tata Beauty	Available	Not Available
4.	Fashion	Available	Not Available
Expertise Field of Arts and Creative Industries			
1.	Art	Available	Available
2.	Creative Design and Creative Products	Available	Available
3.	Music Art	Available	Available
4.	Dance Arts	Available	Available
5.	Karawitan Art	Available	Available
6.	The Art of Pedalangan	Not Available	Available
7.	Theater Arts	Not Available	Available
8.	Art Broadcasting and Film	Not Available	Available

Table 2. Distribution System for the Supply for Productive Vocational School Teachers

No.	Vocational Training Program	Availability	
		LPTK	Non-LPTK
Expertise Field of Technology and Engineering			
1.	Construction and Property Technology	√	-
2.	Geomatics and Geospatial Techniques	√	-
3.	Electricity Engineering	√	-
4.	Mechanical Engineering	√	-
5.	Aircraft Technology	-	√
6.	Graphics Engineering	-	√
7.	Industrial Instrumentation Technique	-	√
8.	Industrial Engineering	-	√
9.	Textile Technology	-	√
10.	Chemical Engineering	-	√
11.	Automotive Engineering	√	-
12.	Shipping Technique	-	√
13.	Electrical engineering	√	
Expertise Field of Energy and Mining Expertise			
1.	Petroleum Engineering	-	√
2.	Mining Geology	-	√
3.	Renewable Energy Engineering	-	√
Expertise Field of Information and Communication Technology			
1`	Computer and Informatics Engineering	√	-
2.	Telecommunications engineering	-	√
Expertise Field of Health and Social Work			
1.	Nursing	-	√
2.	Dental health	-	√
3.	Medical Laboratory Technology	-	√
4.	Pharmacy	-	√
5.	Social Work	-	√
Expertise Field of Agribusiness and Agrotechnology			
1.	Agribusiness Plant	√	√
2.	Livestock Agribusiness	-	√
3.	Animal Health	-	√
4.	Agribusiness Processing of Agricultural Products	√	√
5.	Agricultural Engineering	√	√
6.	Forestry	-	√
Expertise Field of Maritime			
1.	Sailing Fishing Vessel	-	√
2.	Shipping Commercial Ship	-	√
3.	Fishery	-	√
4.	Processing of Fishery Products	-	√
Expertise Field of Business and Management			
1.	Business and Marketing	√	-
2.	Office management	√	-
3.	Accounting and Finance	√	-
Expertise Field of Tourism			
1.	Hospitality and Tourism Services	√	-
2.	Culinary	√	-
3.	Tata Beauty	√	-
4.	Fashion	√	-
Expertise Field of Arts and Creative Industries			
1.	Art	√	-
2.	Creative Design and Creative Products	√	-
3.	Music Art	√	-
4.	Dance Arts	√	-
5.	Karawitan Art	√	-
6.	The Art of Puppetry	-	√
7.	Theater Arts	-	√
8.	Art Broadcasting and Film	-	√

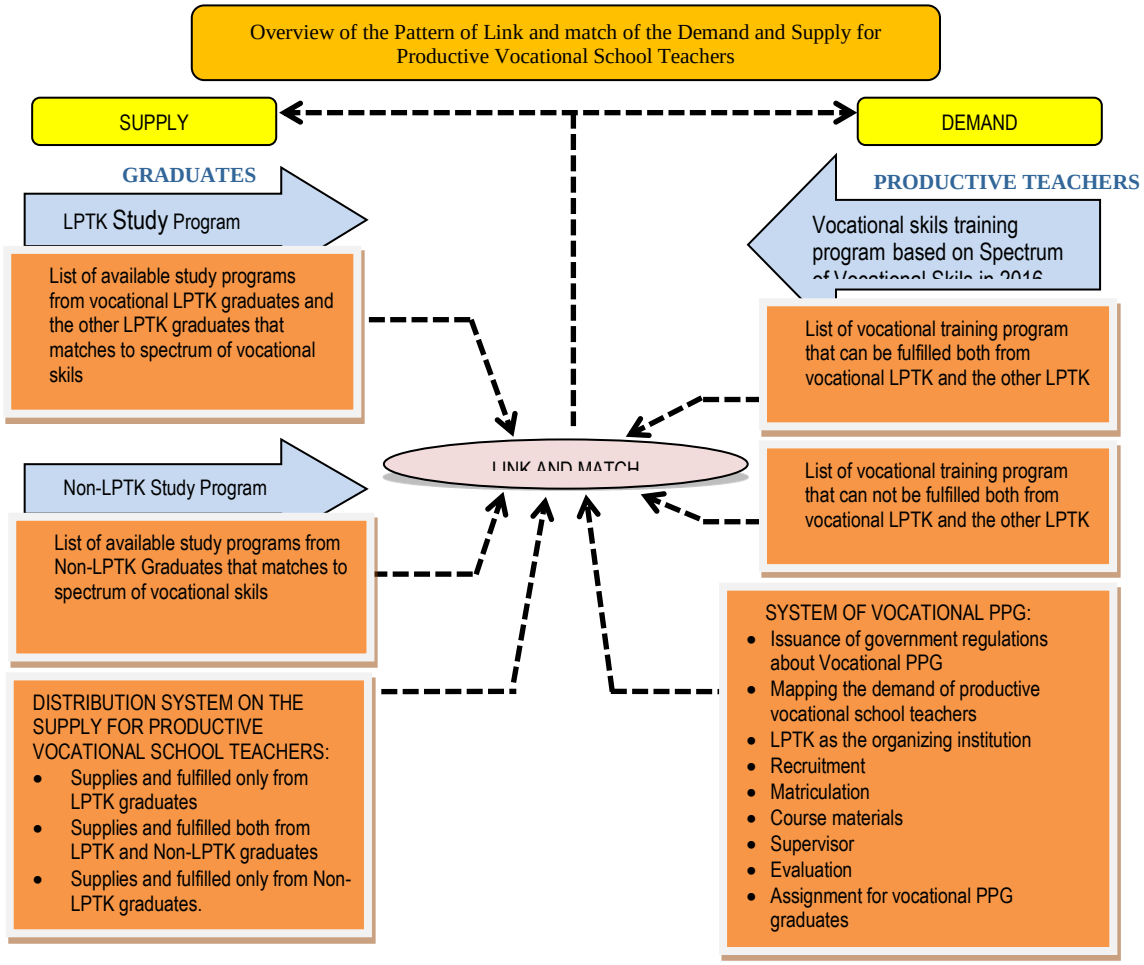

Figure 3. Overview of the Pattern of Link and match of the Demand and Supply for Productive Vocational School Teachers

System of Vocational Teacher Professionalism Training Program (PPG)

The system carried out in the implementation of Vocational Teacher Professionalism Training Program (PPG) remain referred to the stages of PPG that has been implemented by increasing and refining. The added organizational systems are: (1) Issuance of government regulations binding on the provision of Vocational PPG; (2) Mapping the demand for productive vocational school teachers; (3) Assignment for vocational PPG graduates. The enhanced systems are (1) LPTK as the organizing institution; (2) Recruitment; (3) Matriculation; (4) Course materials; (5) Supervisor; and (6) Evaluation. Based on this explanation, the pattern of Vocational PPG consists of the following phases: (1) Issuance of government regulations binding on the provision of Vocational PPG; (2) Mapping the demand for productive vocational school teachers; (3) LPTK as the organizing institution; (4) Recruitment; (5) Matriculation; (6) Course materials; (7) Supervisor; (8) Evaluation; and (9) Assignment for vocational PPG graduates. All activities mentioned above are a series that become one unity.

Overview of the Link and Match Pattern of the Demand and Supply for Productive Vocational School Teachers

The link and match pattern of the demand and supply for productive vocational school teachers is the integration between the demand for LPTK graduates and that for Non-LPTK graduates, its distribution, and the pattern of Vocational PPG which should synergize to each other in fulfilling the demand for vocational productive teachers based on expertise spectrum in vocational high school. The synergy is divided into three parts, namely the demand side, the supply side, and the

link and match. Each side has an important role and must be done together to achieve the same goal.

The integration of these three parts can be described as follows: (a) Demand: the productive vocational school teachers were based on the spectrum of skills by 2016; (b) Supply: vocational training program in vocational high school based on the spectrum of vocational skills can be provided by LPTK graduates and non-LPTK graduates; (c) Link and match side: a pattern for aligning employment with the demand for productive vocational school teachers consisted of the distribution system on the supply for productive vocational school teachers between LPTK Graduates and that of Non-LPTK Graduates; the system of Vocational PPG from LPTK graduates and non-LPTK graduates; consisting of issuance of government regulations about Vocational PPG; mapping the demand for productive vocational school teachers; LPTK as the organizing institution; Recruitment; Matriculation; Course materials; Supervisor; Evaluation; and Assignment for vocational PPG graduates.

Figure 3 shows clearly the intent of the conclusions resulting from the description of the pattern of the link and match between demand and supply for productive vocational school teacher that is the integration of demand, supply, and link and match.

CONCLUSIONS

Based on the results of research and discussion, the conclusions resulting from this study are as follows:

The pattern of fulfillment of demand for SMK productive teacher's requests was divided into two eras, namely: (a) Centralization era with the pattern of fulfillment of SMK productive teacher demand through Diploma III of Technical Vocational Teacher (GKT) program, S1 Academic Officer Benefit (TID) program, and selection program of Civil Servants Candidate (CPNS); (b) Decentralization era with the pattern of fulfillment of SMK productive teacher demand through the selection program of Civil Servant Candidate in certain area (CPNSD) and Non-Permanent Teacher (GTT) program.

LPTK graduates for productive teachers' demand on vocational skills training programs in vocational schools fulfilled to 22 programs, while Non-LPTK graduates fulfilled 45 from a total of 48 skill programs.

The distribution system of SMK productive teachers' availability of graduates from the vocational LPTK and non-LPTK graduates consists of three categories. They are vocational skills program provided and fulfilled (a) only from LPTK graduates totaling 19 skill programs; (b) by LPTK and non-LPTK graduates amount to 3 skill programs, and (c) only from Non-LPTK graduates totaling 26 skill programs.

The system of vocational Teacher Professionalism Training Program (PPG) from vocational LPTK graduates and from non-LPTK graduates remain refers to the PPG stage that has been implemented with the addition and refinement.

The link and match pattern of demand and supply for SMK productive teachers is based on the spectrum of vocational skills in the perspective of education decentralization is an integral part of the availability of graduates from LPTK and Non-LPTK, the distribution of graduates from LPTK and Non-LPTK, and the pattern of Vocational PPG provision. All of which must synergize each other in fulfilling the demand for SMK productive teachers based on the spectrum of SMK expertise.

With regard to the conclusions of this study, it is suggested to:

The government, in this case, the Ministry of Education and Culture, to immediately implement a link and match pattern of demand and supply for productive vocational school teachers which has been discussed in this study. The crucial thing to do is to issue a government regulation as a binding regulation for the implementation of Vocational PPG as one of the important elements from the link and match pattern generated in this study.

Higher education institutions, both LPTK and non-LPTK, to establish cooperation and synergize in the availability of graduates to fulfill the demand for productive vocational school teachers and to no longer prioritize the dichotomy between LPTK and non-LPTK to achieve the common goal of balancing the demand and supply for productive vocational school teachers.

Government at provincial level as vocational education manager in the area, to immediately formulate policies related to the

fulfillment of SMK productive teacher demand. The urgent thing that must be done is to map the demand for vocational teachers who are valid and reliable in their respective provinces.

Vocational high schools as direct users of productive teachers, to immediately make an actual mapping about the condition of productive teachers in SMK. That mapping is absolutely necessary for the link and match of demand with productive teachers' supply in SMK.

Other researchers are necessary to be able to conduct further research or research that refines the results of this study. It may be in the form of a research involving universities, Directorate General of Teachers and Education Personnel, and Local Government. It can be used as a material for preparing the road map of SMK productive teachers recruitment.

REFERENCE

Charmaz, K. (2006). *Constructing grounded theory a practical guide through qualitative analysis.* London: SAGE Publications.

Cresswell, J. W. (2015). *Penelitian kualitatif dan desain riset memilih di antara lima pendekatan.* Yogyakarta: Pustaka Pelajar.

Ditjen Mandikdasmen. (2008). *Spektrum keahlian SMK.* Jakarta: Ditjen Mandikdasmen.

Ditjen Pendidikan Menengah. (2013). *Spektrum keahlian SMK.* Jakarta: Ditjen Pendidikan Menengah.

Ditjen Pendidikan Dasar dan Menengah. (2016*). Spektrum keahlian SMK*. Jakarta: Ditjen Mandikdasmen.

Djojonegoro, W. (1998). *Pengembangan sumberdaya manusia melalui sekolah menengah kejuruan (SMK).* Jakarta: PT. Jayakarta Agung Offset.

Jenner, R. G. (2010). Menghadapi melonjaknya kebutuhan guru SMK, P4TK-SB godok SDM siap alih fungsi. Retrieved September 16, 2017, from www.pppgkes.com.

Kementerian Pendidikan Nasional. (2010). *Rencana strategis Kementerian Pendidikan Nasional 2010-2014.* Jakarta: Kemdiknas.

Bona, M. F. (2016). SMK masih kekurangan guru produktif. *Harian Suara Pembaruan*, hlm.1.Retrieved Juni 24, 2016

Miles, M. B., & Huberman, A. M. (1992). *Analisis data kualitatif (terjemahan Tjetjep Rohendi Rohidi).* Jakarta: UI-Press.

Republik Indonesia (2003). Undang-Undang RI Nomor 20, Tahun 2003, tentang Sistem Pendidikan Nasional.

Sugiyono. (2009). *Metode penelitian kuantitatif, kualitatif, dan R & D.* Bandung: CV Alfabeta.

Team of YPPTI. (2010). *Reposisi dan reorientasi pendidikan kejuruan menjelang 2020.* Jakarta: YPPT

Tilaar, H.A.R. (2004). *Pendidikan Indonesia masa depan (universitas dan pendidikan guru).* Jakarta: UNJ Press.