

THE DECISION-MAKING EMPIRICAL MODEL IN VOCATIONAL HIGH SCHOOL

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Abstract

The objectives of this research is to know the pattern of causal relationships inter-variables on the decision-making empirical model in Vocational High School (SMK). The decision-making empirical model in Vocational High School, consisting of variables: (a) the adequacy of Information and Communication Technology (ICT), (b) the benefits of using information systems, (c) the ethics in decision making, (d) the contribution of school and social environments, (e) the intentions of behaviour, and (f) the patterns of decision-making. Relation between variables was tested statistically using path analysis. The results of the research are as follows. The varian explained by each variable is mathematically formulated in: $Z_Y = 0.134 A + 0.141 B + 0.102 C + 0.486 D + 0.193 E$. The most dominant effect for direct effect is D to E has $\rho_{DE} = 0,47$ and the correlation coefficient = 0,709.

Keywords: *decision-making empirical model in Vocational High School; path analysis.*

INTRODUCTION

SMK, is a vocational secondary education institution in Indonesia. SMK has a strategic role in improving the quality of human resources in Indonesia in entering the world of work. Several important components related to the implementation of the work plan in the implementation of vocational education, as stated in Permendiknas No. 19 year 2007 (Menteri Pendidikan Nasional, 2007) on the basic and secondary education management standards, namely: school guidelines, school organizational structure, school activities, student affairs, curriculum and learning activities, Educators and education personnel, facilities and infrastructure, finance and finance, culture and school environment, community participation and school partnerships. Vision SMK is a shared goal into the future between SMK with the pemangku interests. Vocational vision is expected to provide inspiration, motivation, and strength for the citizens of the school in delivering students to master certain competencies in accordance with interests and talents. SMK is a future vocational education for the people of Indonesia. Products from SMK graduates are expected to become skilled workers in completing a job, in accordance with the level contained in Perpres No. 8 year 2012 (Presiden Republik Indonesia, 2012) on the Indonesian Qualification Framework (IQF).

Vocational education is an education that leads learners to work with various on-the-job training sessions, as Prosser points out in "Prosser's Sixteen Theorems on Vocational Philosophy (Cross, Wyatt, & Groves, 1985, pp. 1–4; Proser & Quigley, 1950, pp. 215–240). The 7th proposition related to decision making, vocational education, will be effective if the teacher has had successful experience in applying the skills and knowledge to the operation and work process that will be done. The focus of attention of this principle lies on the educator as the spearhead in the learning process. Comprehensive competency mastery, between operating knowledge and work processes in industry, is the main capital in the learning process. While the 15th proposition related to decision making is the administration of vocational education will be efficient if flexible. Vocational education should be flexible to the possibility of program improvement in accordance with the dynamics of labor requirements.

There are three basic things in view of the characteristics of vocational education (Bathmaker, 2013, pp. 90–91). First, vocational education focuses on the necessary knowledge and work skills. Secondly, general education conducts vocational skills, but does not facilitate the specific needs of vocational practice required in training the workforce. Third, pre vocational education, which is assumed that learners do not have the necessary job skills for the world of work, this emphasis is on aspects of low-level work skills such as literacy and numeracy. While Billett (2011, pp. 4–5) discusses four matters relating to the purpose of vocational education, namely: (a) the reasons of each individual in the selection of a job, (b) as the individual's initial preparation for working life, (c) individual development to improve the quality of work, (d) transition experience from one job to another.

Characteristics of vocational education include aspects (a) preparing human resources with intelligence, knowledge, personality, noble character, and skills, as well as the ability to enter the world (eg, Djojonegoro, 1998, p. 37) work; (b) a demand-driven and market-driven oriented education paradigm and no longer relying on supply-driven; (c) the required competence demands that meet the labor requirements required by the labor market with an emphasis on the mastery of knowledge, skills, attitudes, and values required by the world of work, this is necessary to generate professional workforce; (d) the true assessment of student success lies in hands-on or labor performance; (e) close relationship with the world of work is the key to successful vocational education; (f) good vocational education is responsive and anticipatory to technological progress; (g) vocational education is more emphasized on learning by doing and hands on experience; (h) require up-to-date facilities for practical activities; (i) require greater investment and operational costs than general education.

Some factors that contribute to the academic quality of vocational school are teachers and principals. Master, as set forth in the Law of the Republic of Indonesia No. 14 Year 2005 (Depdiknas, 2005) on Teachers and Lecturers, Article 1 is a professional educator with the main task of (1) educating, (2) teaching, (3) guiding, (4) directing, (5) training, (6) assessing, and (7) evaluating learners. Teach-

ers with additional duties as principals, as outlined in the Regulation of the Minister of National Education No. 28 year 2010 (Depdiknas, 2010) on the assignment of teachers as principals, are teachers who have met the general requirements and special requirements. General and specific requirements relating to the teaching profession, technical, and administrative. In addition, school education personnel also determine the success associated with the technical aspects of school administrative services.

In conducting school activities in vocational schools, teachers, principals, and educational personnel are faced with the conditions for deciding on a particular situation. Decision making will have an impact on the dynamics that develop in SMK. There is a positive interaction between educational experts and education practitioners in assessing school performance and performance indicators (Nuchron, Soenarto, & Sudarsono, 2013, p. 87). Teachers, principals, and education personnel have a strategic role in managing the managerial functions of the school. The managerial functions are inseparable from the functions contained in the principles of management, among others functions: planning, organizing, activation, and control (Quinn, 2010, pp. 12–13; Negulescu & Doval, 2014, pp. 858–863; Lee, 2013, pp. 1–16). The four functions are synergized when teachers, principals, and education personnel are faced with a decision-making process.

Decision theory focuses on several choices of the best choice, with three main characteristics (Sadovykh, Sundaram, & Piramuthu, 2015, p. 3): (a) cognitive processes, meaning processes of thinking in the decision-making process; (b) an alternative decision, and (c) the outcome of the decision. Thus, the decision is an option, while making a decision means determining the choice of one of several alternative choices (Hatamura, 2005, p. 2). Wang, Liu, & Ruhe (2004, p. 2) state that decision-making is the selection process of the available alternative options against predetermined decision criteria.

Decision-making is one of the key elements of leadership management in schools. In its implementation, there are 3 models of decision making, namely: (a) normative, (b) descriptive, and (c) prescriptive (Athanasou & Van Esbroeck, 2008, p. 164). Although decision-making has been well-planned according

to criteria, there are three important aspects to consider (Pomerol & Adam, 2004, p. 649), namely: (a) identifying all alternative decisions, (b) determining the consequences that occur as a result of the alternatives taken, and (c) evaluate all alternative possibilities of the decision taken.

Appropriate decision-making is a key aspect of successful school management. School dynamics depend on the outcomes of decisions taken by teachers, principals, and education personnel. The decision-making process undertaken by teachers, principals, and education personnel will determine the direction and policy of the school. Decision-making is inseparable from ethical considerations (Yoon, 2011, p. 2403). Factors influencing ethical considerations in decision-making include: (a) the fairness of a decision-making outcome, (b) the order of karma, (c) relativism, in the context of decision-making; (D) selfish, and (e) the merits of a decision. Therefore, decision-making tends to be influenced by individual thought processes and the school environment.

Decision-making is a selection process among several alternative options available in a variety of circumstances. The decision-making process, associated with innovation, is preceded in several ways (Rogers, 1983, pp. 169–186): (a) identification of emerging and developing problems; (b) the scope of the matter, relating to the existing components, eg curriculum, resources and infrastructure, student affairs, or relationships with the world of work and social environment that surrounds the existence of schools; (c) internal factors of the school organization on the involvement of stakeholders on some of the choices of a decision; and (d) the impact on the course of school management as a result of decisions made by the principal. The four ways in making these decisions each school has a different variance. This has an impact on different decision-making results.

Eight important points in the decision-making process (Hatamura, 2005, p.17) are: (1) the first point shows the record of how the decision was made; (2) a decision-making process required preliminary information from a problem and motivation on which to base Decision making, (3) functional requirements and constraints when making decisions, (4) one's thinking and possible doubts in making

decisions, (5) realizations and outcomes, (6) discussion and evaluation, (7) From the decision-making process, and (8) the related events and associations relate to the outcome of the decision directly and the circumstances surrounding as a result of decision-making.

The decision-making strategy is a way of constructing a problem to be solved based on the planned completion steps (VanSchaik & Sol, 1990, p. 53), further it is said that there is a positive relationship between decision-making strategies and quality decision-making results. There are three fundamental questions as a driver of quality decision making (Negulescu & Doval, 2014, p. 862), namely: (a) how decisions are made ?, this is related to environmental aspects, strategy, ethics, empowerment, information, and feedback; (b) whether the decision-making is related to the program, the choice, and minimize the risk? And (c) when the decision was taken? It depends on two things: resources and opportunities.

Based on the explanation of the description, this study aims to determine the empirical model of decision making in SMK and the impact of each variable associated with the dynamics that developed in SMK.

RESEARCH METHODE

Empirical model of decision making in SMK developed in this research using quantitative-positivistic approach. The time of the study was conducted in the even semester of the 2015/2016 school year. Place of research in SMK in Special Region of Yogyakarta. The sample of this study amounted to 144 teachers of SMK in the Special Region of Yogyakarta.

The research procedure includes: (a) determining the research variables of the proposed model, (b) formulating the relationships between the variables of the proposed model, (c) preparing the research instruments on each of the variables and indicators, (d) conducting the instrument testing process, (e) conducting the data retrieval process, and (f) performing data analysis.

The research variables developed in this study, to determine the empirical model of decision making in SMK. Each variable consists of one or more indicators, which further compiled the research instrument items. The cornerstone of the determination of variables along with indicators and instrument items is

based on theoretical studies that reinforce the argument for the empirical model of decision making. The results of this activity in the form of instrument grids, indicators, and research instrument items.

The research instrument developed contains six research variables, namely: availability of information and communication technology infrastructure, information system benefit, ethics in decision making, school and social environment that contribute to decision making, intention to behave in decision process, and decision making pattern.

Data analysis technique using path analysis. The use of path analysis aims to display both direct and indirect effect between independent variables and dependent variables. The basic assumptions in using path analysis (Pedhazur, 1997, pp. 804–837), are: (a) relationships between variables in linear, additive, and causal models; (b) each residue is not correlated with any of the variables contained in the model; (c) there is a one-way causal relationship; (d) no multicollinearity may occur.

Data analysis is done to ensure that the data has been obtained is valid and reliable. It aims to find useful data information to know the independence of variables, dependencies of variables, and relationships among variables studied, in order to determine the model tested related to the research variables.

Data analysis has several aspects relating to the reliability and validity of the research variables. Estimation The reliability of the empirical model of decision making is done using an internal consistency approach using the Cronbach Alpha coefficient formula. The instrument reliability criterion when the coefficient of combined grains (alpha reliability) of 0.70 or more then the instrument is declared reliable.

Content validity aims to examine both the poorness of a research instrument based on the content of an instrument considered a conceptual framework.

The empirical model of decision making proposed in this study is shown in Figure 1. The exogenous variables in Figure 1 are shown in the variable labeled A and the endogenous variable shown in the variable labeled B, C, D, E, and F.

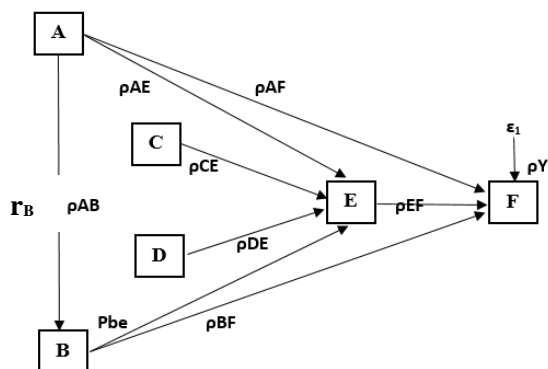


Figure 1. Proposed empirical model of decision-making pattern in SMK.

Information:

- (A) : availability of information and communication technology infrastructure,
- (B) : the benefits of information systems,
- (C) : ethics in decision making,
- (D) : the school environment and social environment that contribute to decision making,

- (E) : the intention of behaving in the decision-making process,
- (F) : decision-making patterns.

RESULTS AND DISCUSSIONS

Description of the Variable

The pattern of decision making in SMK developed in this research with quantitative-positivistic approach using path analysis. The use of path analysis aims to display a causal relationship pattern among a set of variables. There are 6 research variables, namely: information and communication technology infrastructure, labeled (A); The benefits of information systems, labeled (B), ethics in decision making, labeled (C), school environment and social environment contributing to decision making, dumped (D); Intention to behave in the decision-making process, labeled (E); And decision-making patterns, labeled (F). Description of the variable of each variable is shown in Table 1.

Table 1. Variable description

No	Variables	Operational Definition	Indicator
1.	School Information and Communication Technology Infrastructure (Labeled: A)	Availability of ICT devices in school environments.	Schools facilitate internet connection via wi-fi network (non-wired network) and cable network. Schools facilitate computer devices or laptops or smartphones that are connected to the Internet network All school areas have been connected to the internet network (no blank spot area) Schools provide ICT teams that are ready to assist in ICT-related issues
2.	Benefits of information systems. (Labeled: B)	The direct use that teachers can enjoy, because of the availability of the Information Technology infrastructure.	Decisions to be made by school leaders, teachers, and school administration personnel require data support. The data used as the basis for decision making requires accurate data. Information systems needed to support the smoothness, accuracy, and speed in decision-making relating to schooling tasks.
3.	Ethics/ <i>deontology</i> (Label: C)	The belief that an action in decision-making is administratively correct and does not violate any applicable regulations.	Ethics deals with Responsibility Circumstances must bear all things (If there is a problem related to legislation, it can be blamed) Ethics deals with School Interests (Preferably the interests of the school, as opposed to self-interest) Ethics deals with Integrity (Quality, nature, or circumstances that show unity intact so as to have the potential and ability to emit dignity and honesty) Ethics deals with Objective behavior (A real situation, without being influenced by opinions or views of others and others). Ethics deals with adherence to principles (A habit that does not change from the stipulated provisions)

4. School and social environment. (Labeled: D)	The strength of the school community as well as the various norms that influence the behavior and interaction of teachers, students, school administrators; Along with community involvement in supporting school activities.	<p>Encouragement for students in achieving in school (Results achieved by students in academic and non academic fields related to the learning process and impact of learning).</p> <p>Encouragement for teachers and administrative staff in achieving in school (Results achieved by teachers and administrators of schools in the promotion of paedagogic, professional, social, and personality competencies).</p> <p>Happy to work (All work related to school tasks can be completed with pleasant ambience)</p> <p>The relationship between superiors and subordinates (The working atmosphere in the school reflects the mutual care, nurturing, and upbringing between school leaders, teachers, and school administration personnel)</p> <p>Satisfaction with school leadership (The pleasant psychological conditions felt by teachers and school administration personnel due to the fulfillment of all the learning needs and adequacy requirements)</p> <p>Community participation, including business and industry, in school activities (Community participation in activities organized by schools)</p>
5. Behave intention (Labeled: E)	Intentions to use information systems as decision support	<p>Use of school information systems that are supported by data that is accurate and accountable academically and administratively.</p> <p>Strive to develop school information systems that are backed up with accurate and accountable databases in academic and administrative.</p> <p>School leaders prepare School TIK development teams that are able to accommodate the needs of ICT systems in school activities and administration.</p>
6. Decision making patern (Labeled: F)	Something someone receives and is used as a guide in making decisions.	<p>Schools use school information systems as part of the use of ICTs in schooling activities (such as: learning and school administration tasks).</p> <p>In performing the school administrative function, the school's academic community (school leaders, teachers, school administrators, and students) uses the application software as part of the completion of schooling tasks.</p> <p>To improve the use of ICTs in various school interests (learning and school administration tasks), schools facilitate the increased competence of ICT use through education and training.</p>

The number of items in the instrument to determine the decision-making pattern in SMK consists of: (a) Information and communication technology infrastructure (A) variables of 4 items, each consisting of items 1, 2, 3 and 4; (b) Information System Benefit (B) variable of 3 items, each consisting of items 5, 6 and 7; (c) the decision-making Ethics variable (C) of 5 items, each comprising items 8, 9, 10, 11, and 12; (d) the school and social environment variables (D) of 7 items, each of which consists

of 13, 14, 15, 16, 17, 18 and 19; (e) variables of intention to behave in decision-making (E) of 3 items, each consisting of items 23, 24 and 25; And (f) the decision pattern (F) variable of 3 items, each consisting of items 20, 21, and 22.

Correlation between research variables obtained correlation value shown in Table 2. Correlation analysis between variables using software SPSS 6.0.

Table 2. Correlations between variables

Variabel	A	B	C	D	E	F
A	1.000	0.231	0.213	0.196	0.137	0.310
B	0.231	1.000	0.517	0.508	0.590	0.585
C	0.213	0.517	1.000	0.687	0.606	0.654
D	0.196	0.508	0.687	1.000	0.709	0.790
E	0.137	0.590	0.606	0.709	1.000	0.701
F	0.310	0.585	0.654	0.790	0.701	1.000

Coefficient of correlation $R = 0.843$ ($R^2 = 0.710$). This shows the degree of relationship between variables (A, B, C, D, E, and F) at a very strong level (0.843) for the scale (0 to 1). The result of F test shows that the variables (A, B, C, D, and E) are correlated significantly with the variable (F) by using t test at the 0.05 significance level, the variables (A, B, C, D, and E) are partially related to the variable (F). VIF values are between 0.1 and 10, this means there is no multicollinearity between variables (A, B, C, D, and E). Equation estimation between variables, shown equation [1]:

$$Y' = -0.495 + 0.086 A + 0.131 B + 0.067 C + 0.206 D + 0.186 E \dots(1)$$

While "Variant explain by" each variable (A, B, C, D, and E) to variable (F) is shown in equation (2):

$$Z_Y = 0,134 A + 0,141 B + 0,102 C + 0,486 D + 0,193 E \dots\dots\dots (2)$$

The result of equation (2) shows that the coefficient of variable D, the school environment and social environment, has the greatest contribution in the empirical model of decision making in SMK. This means that the school environment and social environment have significant strength to contribute to decision making in SMK. Influence the behavior and interaction between teachers, students, school administration personnel; Along with community involvement in supporting school activities.

The result of path analysis from model usulam, as shown in figure 1, obtained the estimated path value shown in Figure 2.

Path analysis on empirical model of decision making in SMK using software Lisreal 8.1., Got value $\rho_{AB} = 0,24$; $\rho_{AF} = 0.18$; $\rho_{AE} = -0.24$; $\rho_{BE} = 0.29$; $\rho_{BF} = 0.22$; $\rho_{CE} = 0.14$; $\rho_{DE} = 0.47$; $\rho_{EF} = 0.55$. In Figure 2 there is a negative path diagram, ie: $\rho_{AE} = -0,024$. This means that intention to behave in decision making is not

directly related to the availability of ICT infrastructure provided by schools, or teachers have facilitated themselves in the availability of ICT. Therefore, ρ_{AE} is not included in the next path analysis.

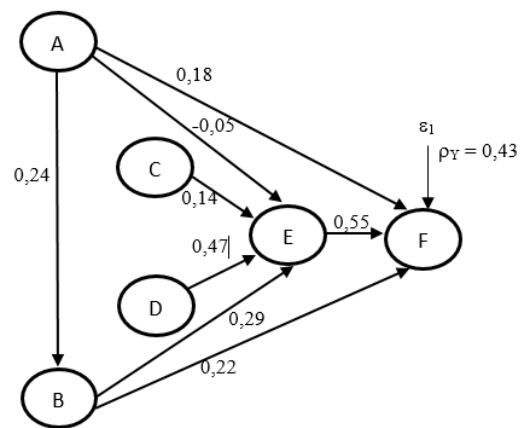


Figure 2. The Result of Model Analysis after Analysis using Path

After ρ_{AE} is not included in the proposed model, a second path analysis is performed. The result of the path analysis without the ρ_{AE} opticality shown in Figure 3.

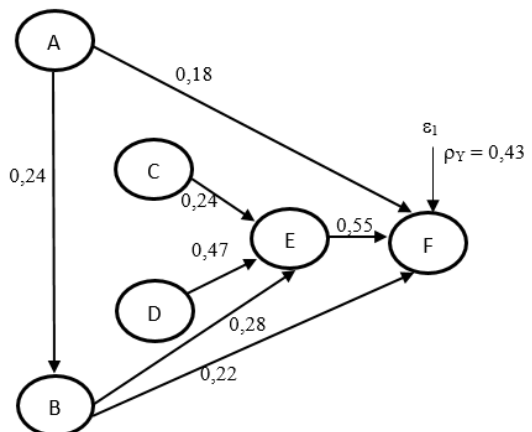


Figure 3. The Result of Model Analysis after Second Stage Path Analysis

The results of the model analysis after the second path analysis using Lisreal 8.1 software. Obtained value $\rho_{AB} = 0.24$; $\rho_{AF} = 0.18$; $\rho_{BE} = 0.28$; $\rho_{BF} = 0.22$; $\rho_{CE} = 0.24$; $\rho_{DE} = 0.47$; $\rho_{EF} = 0.55$.

(1) the availability of ICT devices in the school environment directly effect the decision-making pattern for teachers. This is in line with the role of ICT in management put forward by Spanos, Prastacos, & Poulymenakou (2002, pp. 661–662), inter alia as: (a) strategic planning related activities; (b) simultaneously can help control wheels Organization, (c) assist the management of resources within the organization, in this case the school. ICT can be used to help counseling activities at school (Beidoğlu, Dinçyürek, & Akıntuğ, 2015, p. 466).

(2) the availability of ICT devices in the school environment directly effect the benefits of information systems. The use of information systems in Schools can benefit as Marnewick (2016, p. 1) puts it (2015, p.1). This is closely related to the adaptation of information technology as a result of the use of supply chain management in information systems developed in schools.

(3) ethics in decision-making, administratively correct and not in violation of applicable regulations, directly effect the intention to behave in the decision-making process. This means that Ethics is closely related to the fundamental relationships between individuals and groups that serve to guide moral-based behavior (Stahl, Eden, Jirotko, & Coeckelbergh, 2014, p. 811).

(4) the school environment and social environment directly effect the intention of behaving in the decision-making process. This is in line with that of Soenarto (2014, p. 2) that the school environment as a micro system

related to the dynamics that developed in the school environment, as well as the social environment as a macro system as a school school pemangkukan.

(5) the benefits of information systems directly effect the intention to behave in the decision-making process. In addition, the benefits of information systems have an indirect impact on the availability of ICT infrastructure.

(6) the benefits of information systems directly effect the pattern of decision-making. In addition, the benefits of information systems have an indirect effect on the availability of ICT infrastructure.

(7) the intention to behave in decision-making directly effect the decision-making pattern. In addition, the intention to behave has an indirect impact of ethics in decision making and the school environment and social environment.

In summary, the estimates of coefficient of correlation and direct effect, indirect effect, and overall effect on each variable are shown in Table 3.

Based on the summary of the impact on each variable in Table 3 it is seen that the highest direct impact on the coefficient of path estimation is obtained from the variable D to the variable E with the estimated path value of $\rho_{DE} = 0.47$ and the correlation coefficient of 0.709. It can be interpreted that "the strength of the school community as well as the various norm systems affecting the behavior and interaction between teachers, students, school administration staff and community involvement in supporting school activities" have a direct and highly correlated impact on "the intention to use information systems as Supporters of decision-making".

Table 3. Summary of effect on each variable

No.	Variable	Correlation Coefficient	Effect		
			Direct Effect	Indirect Effect	Total Effect
1	A – F	0,310	0,180	-	0,180
2	A – B	0,231	0,240	-	0,240
3	C – E	0,687	0,140	-	0,140
4	D – E	0,709	0,470	-	0,470
5	B – E	0,590	0,280	$(0,280 * 0,240) = 0,067$	0,347
6	B – F	0,585	0,220	$(0,220 * 0,240) = 0,053$	0,273
7	E – F	0,701	0,550	$(0,550 * 0,470) = 0,259$	0,809
8	E – F	0,701	0,550	$(0,550 * 0,240) = 0,132$	0,682

Koeffisien lowest estimation on direct impact obtained from variable C to variable E equal to $\rho_{CE} = 0,140$ and correlation coefficient equal to 0,687. It can be interpreted that "the belief of an action in decision-making is administratively correct and does not violate the prevailing rules" has the lowest direct impact and has a high correlation in "the pattern of decision making in SMK".

The coefficient value of the path estimation at impact is indirectly obtained from $\rho_{EF} = 0.259$. The indirect effects of the variables E to variable F are influenced from variables C and variable D. It can be interpreted that "the intention to use information systems as decision support supporters" directly impacts the "decision-making pattern" influenced by ethics based on a The belief that the action in the decision-making is administratively correct and does not violate the prevailing rules "and is influenced by" the strength of the school community as well as the various norms that influence the behavior and interaction between teachers, students, school administration personnel and community involvement in supporting school activities".

CONCLUSION

Based on the research result, it may be concluded that:

First, factors contributing to the decision-making pattern in SMK consist of: (a) ICT adequacy, (b) benefits of use of information systems, (c) ethics in decision making, (d) contribution of school environment and social environment, (e) intention Behave in decision making. Significant contribution, statistically, in the pattern of decision making in SMK is contributed from elements related to school environment and social environment.

Second, the highest direct impact on the coefficient of path estimation is obtained from the D variable (school environment and the community environment) to the variable E (behavioral intent) with the estimated path value of $\rho_{DE} = 0.47$ and the correlation coefficient of 0.709.

The suggestions that may be provided for this research is teachers, principals, and educa-

tional personnel, in peroses decision-making required a set of systems that can support decision-making. The system in question is an ICT-supported decision making support system.

REFERENCES

- Athanasou, J. A., & Van Esbroeck, R. (Eds.). (2008). *International Handbook of Career Guidance*. Dordrecht: Springer Netherlands. <https://doi.org/10.1007/978-1-4020-6230-8>
- Bathmaker, A.-M. (2013). Defining 'knowledge' in vocational education qualifications in England: an analysis of key stakeholders and their constructions of knowledge, purposes and content. *Journal of Vocational Education & Training*, 65(1), 87–107. <https://doi.org/10.1080/13636820.2012.755210>
- Beidoğlu, M., Dinçyürek, S., & Akıntuğ, Y. (2015). The opinions of school counselors on the use of information and communication technologies in school counseling practices: North Cyprus schools. *Computers in Human Behavior*, 52, 466–471. <https://doi.org/10.1016/j.chb.2015.06.022>
- Billett, S. (2011). *Vocational Education*. Dordrecht: Springer Netherlands. <https://doi.org/10.1007/978-94-007-1954-5>
- Cross, I. C., Wyatt, W. L., & Groves, R. R. (1985). *Author(s) of interpretive text unknown. This text has been retyped from a class handout from Colorado State University's department of Vocational Agriculture, Source of original statements: Prosser, C. A. & Quigley, T. H. "Vocational Education in a Democr.*
- Depdiknas. Undang-Undang No. 14 Tahun 2005 tentang Guru dan Dosen (2005). Jakarta.
- Depdiknas. Peraturan menteri pendidikan nasional no 28 tahun 2010 tentang penugasan guru sebagai kepala

- sekolah/madrasah (2010).
- Djojonegoro, W. (1998). *Pengembangan sumberdaya manusia melalui sekolah menengah kejuruan (SMK)*. Jakarta: PT Balai Pustaka.
- Hatamura, Y. (2005). *Decision-making in engineering design theory and practice*. (Springer, Ed.). San Jose.
- Lee, S.-T. (2013). *Management decision making support system* (No. 20130024237 Kind Code A1). United States Patent Application.
- Marnewick, C. (2016). Benefits of information system projects: The tale of two countries. *International Journal of Project Management*, 34(4), 748–760. <https://doi.org/10.1016/j.ijproman.2015.03.016>
- Menteri Pendidikan Nasional. Peraturan Menteri Pendidikan Nasional Republik Indonesia Nomor 19 Tahun 2007 tentang Standar Pengelolaan Pendidikan oleh Satuan Pendidikan Dasar dan Menengah (2007).
- Negulescu, O., & Doval, E. (2014). The quality of decision making process related to organizations' effectiveness. *Procedia Economics and Finance*, 15, 858–863. [https://doi.org/10.1016/S2212-5671\(14\)00548-6](https://doi.org/10.1016/S2212-5671(14)00548-6)
- Nuchron, N., Soenarto, S., & Sudarsono, F. (2013). Model evaluasi diri eekolah menengah kejuruan di Daerah Istimewa Yogyakarta. *Jurnal Pendidikan Vokasi*, 3(1), 80–89. Retrieved from <https://journal.uny.ac.id/index.php/jpv/article/view/1583>
- Pedhazur, E. J. (1997). *Multiple regression in behavioral research* (3rd ed.). United State: Thomson Learning, Inc.
- Pomerol, J.-C., & Adam, F. (2004). Practical decision making – from the legacy of Herbert Simon to decision support systems. Decision Support in an Uncertain and Complex World. In *The IFIP TC8/WG8.3 International Conference* (pp. 647 – 657).
- Presiden Republik Indonesia. Peraturan Presiden Republik Indonesia Nomor 8 Tahun 2012 tentang Kerangka Kualifikasi Nasional Indonesia (2012).
- Proser, C. A., & Quigley, T. H. (1950). *Vocational education in democracy* (Revised Ed). Chicago: American Technical Society.
- Quinn, S. (2010). *Management basics*. Retrieved from <https://bookboon.com/en/management-basics-ebook>
- Rogers, E. M. (1983). *Diffusion of Innovations* (3rd ed.). New York: The Free Press A Division of Mac Millan Publishing Co., Inc.
- Sadovykh, V., Sundaram, D., & Piramuthu, S. (2015). Do decision-making structure and sequence exist in health online social networks? *Decision Support Systems*, 74, 102–120. <https://doi.org/10.1016/j.dss.2015.03.007>
- Soenarto, S. (2014). *Course outline: Organisasi dan manajemen pendidikan teknologi dan kejuruan*. Yogyakarta: Pascasarjana Universitas Negeri Yogyakarta (tidak diterbitkan).
- Spanos, Y. E., Prastacos, G. P., & Poulmenakou, A. (2002). The relationship between information and communication technologies adoption and management. *Information & Communication*, 39, 659–675.
- Stahl, B. C., Eden, G., Jirotko, M., & Coeckelbergh, M. (2014). From computer ethics to responsible research and innovation in ICT. *Information & Management*, 51(6), 810–818. <https://doi.org/10.1016/j.im.2014.01.001>
- VanSchaik, F. D., & Sol, H. G. (1990). Effectiveness of decision support systems. In *Twenty-Third Annual Hawaii International Conference on System*

Sciences (Vol. iii, pp. 50–58). IEEE
Comput. Soc. Press.
<https://doi.org/10.1109/HICSS.1990.205327>

Wang, Y., Liu, D., & Ruhe, G. (2004). Formal description of the cognitive process of decision making. In *Third IEEE International Conference on Cognitive Informatics* (pp. 1–7).

<https://doi.org/10.1109/ICCI.2004.16>

Yoon, C. (2011). Ethical decision-making in the Internet context: Development and test of an initial model based on moral philosophy. *Computers in Human Behavior*, 27(6), 2401–2409.
<https://doi.org/10.1016/j.chb.2011.08.007>