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The impact of external knowledge on organization performance with indirect effect of instructional agility and process innovation effectiveness

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Abstract. Engaging industry in Vocational High School (VHS) policy outcomes does not only offer awareness of market needs, but also enables industries to influence learning and teaching methods and courses across the overall VHS. This study indicates that external knowledge leads to the feasibility of instructional agility, and process innovation effectiveness, resulting in success of VHS. This study looks at structural equation modeling (SEM) analysis based on empirical data obtained from 129 vocational high schools in Bali Province, Indonesia. The study aimed to concentrate explicitly on how the impact of external knowledge on VHS achievements in Indonesia is mediated by instructional agility, and process innovation effectiveness. The study shows that external knowledge has no influence on VHS performance, while improving VHS performance indirectly through all instructional agility and effectiveness of process innovation.

1. Introduction

In Indonesia, Vocational High School (VHS) addresses the issues and demands of highly complex labor skills which require the workforce to be able to perform effectively and provide job skills in line with today's workforce preferences. To meet these challenges, external relations can guide the design of more relevant educational materials which, in addition to specific knowledge acquisition, enhance the development of skills and competencies. Practice-based learning expands beyond problem solving to the development of new information and observations and the enhancement of critical analytical problem solving and application skills leading to new curriculum [1]. Using complex practices and tasks that has an organizational atmosphere can promote it.

Moreover, there are many barriers to implementing the external knowledge between educational institutions and industries. For instance, the implementation of external knowledge has no effect to improve the institution's performance because there is a failure to achieve closer alignment of the skills and competences graduates exhibit, and to enrich the learning experience through practical insight [2,3,4,5]. Whereas many research studies showed that external knowledge improve organization's performance [6,7,8]. Therefore, this in conclusion effort to fill this research gap by analyzing the impact of external knowledge on vocational high school performance in Bali Province, Indonesia.

Subsequently, this paper draws on the light of these research gaps a complex approach to the potential to provide new insights into the process improvement practices of organizations and the mechanisms through which they influence its results. The dynamic capacity theory approach is defined as an organization's ability to integrate, build and reorganize internal and external capacities to tackle this



issue [9]. With its specific emphasis on how organizations carry out innovation activities and reconfigure their organizational processes in search of improved performance [10], this theoretical framework-work is promising to advance our knowledge of process innovation. The capacity to incorporate developments in the process qualifies as a complex capacity since process advances represent changes in the way things are done within the business [11]. In this regard, the theory of dynamic capabilities view emphasizes the importance of activities aimed at creating, obtaining, integrating and disseminating information for organizational processes of reconfiguration [12,13].

In an atmosphere of uncertainty, which is complex by its nature because it requires choices of activities from a number of creative internal and external possibilities, VHS principals must also undergo considerable amounts of training while undertaking instructional agility, first to stay up to date with evolving trends, and secondly, to be able to deploy any new information that is acquired. Instructional Agility (IA) is an approach for designing learning instructions. It is defined as a systematic application of scientific principles about “how people learn” to develop instruction [14,15]. The term “instructional” means anything that is done purposely to help and facilitate learning [16]. As a concept to systematically developing learning instructions, IA has a long path. “It is the process of deciding what methods of instruction are best for bringing about desired changes in student knowledge and skills for a specific course content and specific student population” [14,15].

To fulfill this gap, this study examines how external knowledge affect the instructional agility, and process innovation effectiveness and the resulting VHS performance. IA develops guidance to fulfill the educational needs of a particular audience and environment, which is continuous and inclusive, taking into account all the teaching stakeholders concerned [13]. In the early stages of the innovation process, such as idea generation or concept creation, activities that promote the acquisition of information from different external sources as well as the production of internal knowledge are especially important. By widening the corporate knowledge base, such practices improve a company's ability to identify the importance of new external information (e.g., to become conscious of potentially useful process innovations), thereby expanding its capacity for process innovation [17,18]. Additional innovation-related practices such as teacher training are especially important in the subsequent implementation period, and the probability of achieving process improvement effectiveness can be expected to increase [19]. Providing teachers with ample knowledge on process technologies and how to use them helps to solve the “not-invented-here syndrome,” whereby workers appear to avoid embracing new ideas from outside sources [20]. Thus, producing the kind of graduate that is versatile and able to meet the requirements of educational institutions would take a more creative and externally focused approach to the design and implementation instructional product, with the industry's varied and rapidly evolving demands.

Furthermore, in order to initiate such empirical research, this study aims to make the following contributions: First, a VHS acquires business knowledge and experience to enhance the teaching method which meets the needs of the industry. Second, a VHS prepares graduates for potential industrial job challenges by rising practical awareness and industry demand-based experience. Third, a VHS offers an understanding of the needs of industry by teaching the design and implementation of teaching methods focused on real issues. In this paper, the researchers will examine how external knowledge significantly influence the VHS performance, and further examine how instructional agility and process innovation effectiveness mediates the relationship between external knowledge and VHS performance.

2. Literature Review

2.1 Relationship between External Knowledge and Vocational School Performance (VHS)

External knowledge arises as new information emerges from outside the organization and is then communicated inside the organization; this is largely due to the capacity of the organization to obtain, understand, adapt and exploit environmental consciousness [17]. A close relationship with industry associates will provide a basis for the transmission of tacit information with the organization [21]. While the implicit information gained by external practice can be transmitted as the explicit knowledge of the

industry [22]. Implementing this expertise would allow organizations to adjust to changing environments and benefit from new performance process improvements [23,8]. Based on these arguments, the proposed hypothesis is:

H₁: External Knowledge has a positive influence on VHS performance.

2.2 The Mediating Effect of Process Innovation Effectiveness

External knowledge enables the organization to produce innovation-enhancing abilities and innovation that has a positive impact on performance [24]. According to [25], efforts attempt and external knowledge influences higher process innovation and improving operational speed and quality. Learning from partners and the ability to access previous experience are influenced not only by the types of partners but also by the knowledge transferred within an exploratory partnership [26]. Process innovations are intermediary outputs which act as a means of obtaining results success at a higher level, rather than a target in itself [27]. Thus, by leading to cost savings, improved productivity, efficiency increases, or simply by meeting internal and external stakeholders' expectations, process innovation adoption is likely to have a positive effect on the business results of organizations. Studies also offer persuasive proof that process innovations are significantly related to various organization performance measures [28].

Process innovations are certain new combinations of resources, which could theoretically generate value. As indicated by the view point of dynamic capabilities, innovation practices are therefore supposed to be indirectly connected to performance outcomes by allowing firms to reconfigure their operating processes or skills, which in turn generate value [29]. Consequently, the reliability of process innovation may not be a sufficient condition for achieving changes in organizational results. The literature indicates that an organisation's decision to implement such creative processes is often guided by perceptual institutionalism, regulatory constraints, and the encourage to gain attention rather than the goal to obtain tangible results for innovation from key internal and external stakeholders [30]. Regardless of its organizational effectiveness, the simple implementation of creative methods could produce important benefits resulting. Therefore, the following is the proposed hypothesis:

H₂: The process innovation effectiveness mediates the relationship between external knowledge and VHS performance.

2.3 The Mediating Effect of Instructional Agility

The instructional agility idea is identified from and adopted within the wider and multidimensional concept of organizational agility [31]. Hence, the sense of "agility" must be explained before continuing to concentrate on the education context. Agility is seen as the holistic collaboration of all aspects and the competitive foundations of an organization, such as acceleration, flexibility, creativity, efficiency and competitiveness [32]. Agility is an organizational way to generate an efficient, low-cost, high-quality, detailed product range based on individual customer's requirements [33]. From the perspective of school education, this dynamism is important not only through terms of content or information, but also in terms of teaching methods, including all relevant aspects of pedagogy.

Educators encourage instructional agility practices, particularly those based on Scrum, and believe that experimenting students with agile methods is an effective solution to qualify them for real job obstacles [34]. Collaborative and organizational processes of learning according to agile principles is known as instructional agility. Instructional agility is the competitive requirement of an organization, relying on various skills to respond quickly, and adapting to industry changes and the needs of customers such as competence of graduates [35]. Based on these arguments, the proposed hypothesis is:

H₃: The instructional agility mediates the relationship between external knowledge and VHS performance.

2.4 Conceptual Design

Based on the literature review, it is found that the external knowledge enhances the performance with instructional agility and process innovation effectiveness as the mediating role. The proposed conceptual model is presented in Figure 1.

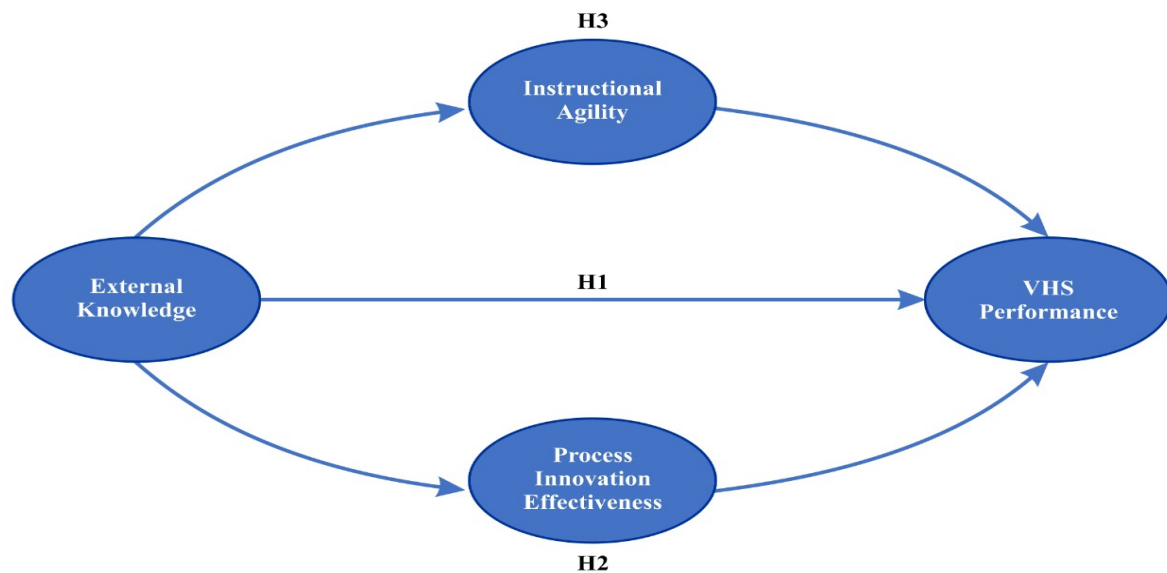


Figure 1. Conceptual Model of the Study.

3. Methodology

3.1 Data Collection and Sample

Data for the main study were received from the Vocational High School (VHS) in Bali Province, Indonesia. The sampling framework consisted vocational high school which are listed on Education Authorities of Bali Province. These schools are spread in 9 different regencies. The participating schools for this study were chosen using a simple random sampling method. A random sample of 9 regencies was chosen, consisting of 175 Vocational High Schools, and this analysis was aimed at principals, and vice of principals who have authority to involve industry in principles of learning design, and the level to which the results learning outcome that meets the industry needs.

In collecting the data, e-mailing questionnaire was distributed to gather the responses from Vocational High Schools (VHS). There are about 175 schools participating in this study. For this report, 129 usable answers were obtained from the VHS. The researchers faced some difficulties in collecting the data including access barriers, principals related to their busy schedules, and incomplete responses, which decreased the response rate. Resulting data were gathered from 129 principals and vice of principals' combinations that represented 129 Vocational High Schools.

3.2 Instrument Development

Based on the literature review, the researcher has observed three variables (external knowledge, instructional agility, process innovation effectiveness) contributing to performance. For example, respondents were requested to indicate the meaning of external knowledge to achieve their VHS performance, using a five-point scale with endpoints "Strongly disagree" (1) and "strongly agree" (5). External knowledge has been determined by six items that represent acquiring of product development knowledge from industry partners, acquiring the manufacturing process knowledge from industry partners, obtaining the market knowledge from industry partners, maintaining close communication

with industry partners about quality product design changes, as well as giving feedback on quality from industry partner [4].

Process innovation effectiveness was measured by five items including eliminating non-value adding activities in processes related to delivery of teaching; determining non-value adding activities in processes related to delivery of teaching; increasing teaching quality in techniques, machinery and software of delivering processes; determining non-value adding activities; eliminating non-value adding activities [36,37]. Instructional agility was measured by five items representing that are practicing strategy able to enhance the competencies of partners to respond to market demands, teaching strategy to be capable of responding to real market demand, focusing customized learning outcomes rather than standardized, increasing level of customization, joint planning with industry partners in learning process [38,35]. VHS performance was measured by four items. They are graduate competencies, graduate employability, curriculum meets industry requires, learning outcomes [38,39]. To deliver a deeper understanding of principal VHS, each VHS performance indicator listed above was measured on the VHS's major competitors over a span of three years. The questionnaire was based on previous studies with validated measurement scales in the present study which analyzed the constructs in a query.

4. Results

A statistical SmartPLS software package for PLS-SEM (Partial Least Square Structure Equation Modeling) data analysis was used to understand the direct and indirect effect of external knowledge on VHS Performance with mediating influence of instructional agility and product innovation efficacy at VHS in Bali Province, Indonesia.

4.1 Reliability and Discriminant Validity

We performed a series of tests, including composite reliability tests and discriminant validity, to analyze the validity and reliability of the measurement models of the four constructs. We then checked the composite reliability and discriminant validity of the under-examination constructs. The metric of composite reliability can be used to check indicators how well assigned to assess them. Composite reliability typically ranges between 0 and 1, with values larger than 0.6 typically considered acceptable [40]. It is evident from the resulting data in Table 1 that all composite reliability indicators are significantly above 0.6.

Table 1. Reliability and Discriminant Validity.

Constructs	Items	Loadings Factor	Cronbach	Rho_A	Composite Reliability	AVE
External Knowledge (EK)	EK1	0.857	0.934	0.939	0.948	0.751
	EK2	0.821				
	EK3	0.816				
	EK4	0.897				
	EK5	0.901				
	EK6	0.905				
Instructional Agility (IA)	IA1	0.869	0.894	0.894	0.922	0.702
	IA2	0.816				
	IA3	0.850				
	IA4	0.830				
	IA5	0.823				
Process Innovation Effectiveness (PIE)	PIE1	0.865	0.905	0.910	0.929	0.724
	PIE2	0.808				
	PIE3	0.875				
	PIE4	0.829				
	PIE5	0.876				

Constructs	Items	Loadings Factor	Cronbach	Rho_A	Composite Reliability	AVE
VHS	VHS1	0.847				
Performance	VHS2	0.866	0.895	0.895	0.927	0.760
(VHS)	VHS3	0.888				
	VHS4	0.884				

The discriminant validity of a construct can be calculated according to [41] if the average variance extracted (AVE) of this construct is greater than the mutual variances (i.e. square of the correlations) between it and all other constructs in the model. The results in Table 1 show that each construct satisfactorily meets this requirement. All research constructs in this analysis are considered valid and accurate, based on the results of the above analyses.

4.2 Hypothesis Testing Results

The fit model was first tested prior to testing the hypothesis using two suitable parameters: Standardized Root Mean Square Residual (SRMR) and the Normed Fit Index (NFI). The SRMR is defined as the difference between the observed correlation and the model-implied association matrix, whereas values below 0.08 are recognized a good fit [42]. [43] implemented the SRMR as a fit test for PLS-SEM which can be used to avoid model inaccuracies. The second fit index is a Normed Fit Index (NFI), an accumulative fit metric that measures the Chi-square value of the proposed model and links that value to a meaningful parameter [44]. NFI values above 0.9 generally contain acceptable fit. The model's data fits are acceptable, since the SRMR value was 0.041 (< 0.08) and the NFI was 0.912 (> 0.90).

The analysis shown in Table 2 describes standardized study model path coefficients (beta coefficients in which the findings are interpreted from a regression analysis). Table 2 and Figure 2 describe that the path coefficients from External Knowledge (EK) to VHS Performance (VHS) was positive but non-significant (Standardized coefficient = 0.097; $p > 0.05$), thus H_1 is rejected.

The indirect effects of External Knowledge (EK) on VHS Performance (VHS) through Process Innovation Effectiveness (PIE) as full mediator was also positive and significant (indirect standardized coefficient = 0.340; $p < 0.01$; *Sobel Test* $Z=3.508$), that H_2 is supported and full mediation. Then, the indirect effects of External Knowledge (EK) on VHS Performance (VHS) through Instructional Agility (IA) as full mediator was also positive and significant (indirect standardized coefficient = 0.363; $p < 0.01$; *Sobel Test* $Z=3.817$), that state H_3 is supported and full mediation. Therefore, the results supported all hypothesis except that H_1 was rejected.

Table 2. Results of the Hypothesis Testing.

Hypothesis	Relationship		Standard Coefficients	Test Result
H_1	External Knowledge	→ VHS Performance	0.097 **	Non-Significant
H_2	External Knowledge Effectiveness	→ Process Innovation → VHS Performance	0.340 *	Significant
H_3	External Knowledge	→ Instructional Agility → VHS Performance	0.363 *	Significant

^aNote: * $p < 0.01$; ** $p > 0.05$

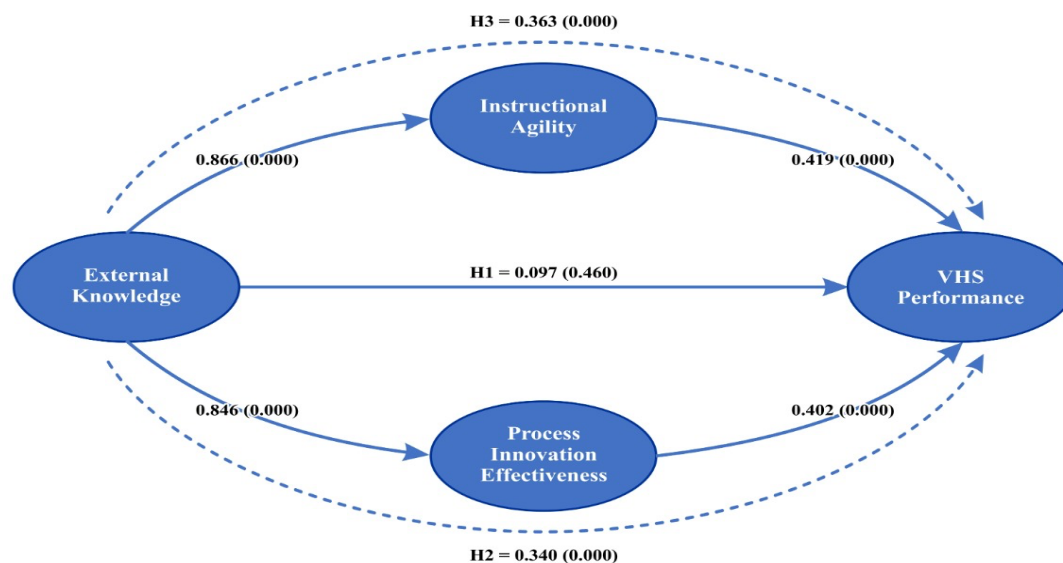


Figure 2. Result of Path Analysis.

Note: —> *direct effect*; -----> *indirect effect*

Figure 2 Displays the coefficient of determination (R^2) (the portion of the variance in the dependent variable which is predictable from the independent variable ranges from 0 to 1 the stronger). Values R^2 which are presented in Figure 2 show that the External Knowledge, Instructional Agility and Process Innovation Effectiveness accounts for 76.4 percent of variance in VHS Performance.

5. Discussion

The findings from this study posit that the External Knowledge (EK) has not a significant influence on the performance of Vocational High School in Bali Province. Knowledge acquired by external practice from industry partners with joint problem-solving does not simply turn directly into organizational performance because of limited human resources and dynamic competencies work. The insignificant result of direct effect of external knowledge on performance, is consistent with the previous studies in the field [2,5]. The results of this study confirm the findings of [45] which reveals that implementing EK improves process innovation effectiveness by acquiring the manufacturing process knowledge from industry partners. Organizations also may gain from concentrating their efforts on a variety of activities that cover the main tasks of implementing new processes. Whereas process innovation effectiveness has leveraged VHS performance that the present study is consistent with the findings of [37]. Process innovation effectiveness such as determining non-value adding activities in processes related to delivery of teaching also acts as a primary catalyst for performance, which also serves as a bridge adding positive impacts to involve of businesses across different programs, courses and classes. A wider range of process innovation and therefore greater commitment of time, energy and money than the mere implementation of process innovations tends to involve the achievement of process innovation effectiveness as demonstrated by cost savings. For example, process of manufacturing flexibility needs information related to production schedule planning and availability supporting materials from bottled water producers to the main suppliers, impact on responsive suppliers to explain if there are delays in production so that the manufacturer can exercise flexibility in the production process such as rescheduling production from glass products to bottled products [46]. Based on these arguments, process innovation effectiveness bridges relationship between the external knowledge and VHS performance that fulfills the research gap.

These results show that the instructional agility is a mediator between the external knowledge and VHS performance. The attempt to achieve the adequate understanding of intellect and wealth capabilities to integrate and address the real problems and knowledge provided to school education by the dynamic and ever-changing business sector [47]. Moreover, we argue that product development knowledge from industry partners and acquiring the manufacturing process knowledge from industry partners, are transferred to capacity (e.g. agility of learning). Thus, instructional agility is a joint planning with industry partners in learning process and teaching strategy to be capable of responding to real market demand, that will rely on specific skills to respond rapidly real market demand and will adjust to market changes and industry needs such as graduated competence [38,5,35]. Giving autonomy in learning will improve teacher performance that is a part of responding market demand through helps the principals for increasing VHS performance [48,49]. For example, VHS may be able to acquire industry partners' expertise to respond to market needs through teachers should be able to build a learning atmosphere to provide students with industrial learning experiences [5], which in turn may contribute to superior organizational performance such as graduates employability. In regarded from these arguments, the instructional agility bridges relationship between the external knowledge and VHS performance that fulfills the research gap. Furthermore, this finding supports to the increasing theory of dynamic capabilities function that considering process renewal or creativity is by definition the core feature of dynamic capabilities [50]. Process innovation can be used as a prism to examine the wider phenomenon of organizational capacity building, according to [51], which is how organizations develop, introduce, and repeat new operating routines.

6. Conclusions and Suggestions

The research findings have provided some significantly beneficial evidence of the importance of the instructional agility and process innovation effectiveness as mediator in enhancing performance in VHS, Bali Province even though there is insignificant result between the external knowledge and performance. Therefore, the study suggests that approaching of instructional agility has greater influence than process innovation effectiveness to leverage the performance. The study also has some important practical consequences for VHS principals as environments become more volatile as levels of complexity and change increase. The VHS will grow students who, not only for today's business problems but also for the business uncertainties of tomorrow, are already prepared with skills and capabilities. This research suggests that principals of VHS should acquire product development of knowledge, and get feedback from industry partners to achieve learning agility and process innovation of teaching.

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