

Developing Partnership Program between Polytechnic and Industry in the Remote Area: A Strategy to Improve Graduates Quality

Didik Nurhadi¹, MingChang Wu², and Dwi Agus Sudjimat³

¹PhD Student, Graduate School of Technological and Vocational Education,
National Yunlin University of Science and Technology,
Yunlin, Taiwan

²Professor, Graduate School of Technological and Vocational Education,
National Yunlin University of Science and Technology,
Yunlin, Taiwan

³Associate professor, Department of Mechanical Engineering,
State University of Malang,
Malang, Indonesia

Copyright © 2016 ISSR Journals. This is an open access article distributed under the *Creative Commons Attribution License*, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT: The quality of higher education institutions and students is significantly an impact toward the development of their country. A partnership between an educational institution and industry is a step that is often used by the developed countries in America and Europe. A major success factor in institution-industry partnership is the willingness and ability to collaborate in teaching quality. A unique partnership is implemented in the remote area, Indonesia that is undertaken by Polytechnic, Indonesia through practice teaching in the industry. The basis of this partnership is the lack of the practice facility that owned the educational institution so that the industry provided solutions to use existing industrial facilities to support learning practices for Polytechnic students. A team of Polytechnic partnership should responsible to plan, to implement, and to evaluate through an implementation guideline that approved by industry. Industry requires that polytechnics prepare basic knowledge and competence of their students before they follow activities of teaching and learning in the industry. This paper is to discuss partnership program implementation carried out between polytechnics and industry in the remote area, a model of sustainable partnerships of the teaching program between polytechnics and local industry, and benefits of a partnership program between polytechnics and local industry. These are conducted to create graduates, according to labor market needs. The partnership program is also more optimal if it supported by a good communication between Polytechnic, industry, and government.

KEYWORDS: teaching program, higher education, partnership implementation, program evaluation, sustainable partnership.

1 INTRODUCTION

Currently, the industry support can play a major factor in the overall program success in higher education. It is undertaken through partnerships and collaborations between higher education and industry. Partnering can provide new opportunities for higher education to reconfigure the way instruction gets supports such as funding, teaching and learning, and developing their institution [24]. Meanwhile, collaborative relationships can be both challenging and rewarding for a team of committed partners. These relationships potentially lead to practical solutions, cost savings and process improvements that save time and resources. In addition, such collaborations provide invaluable opportunities for students and faculty to engage in real-world and experiences in the industry [12].

One of the higher educations which has the responsibility to prepare graduates to be ready to work in the industry is polytechnics [13]. This institution is responsible for creating the quality of good graduates' competence and have competed in the labor market in order to support the economic development of the country [14], [15], [16], [17].

In Indonesia, the Polytechnic of Kotabaru is located in the remote area having a problem of learning students' practices on campus. This institution cannot practice teaching for students because the lack of the practice facility owned by the Polytechnic. A partnership with local industry was selected to solve this problem. It is equal with a statement Prigge [1] that stated polytechnic and industry can derive benefits from these partnerships. As local industry partnership is PT. ITP South Kalimantan. Both agree to solve a problem in the Polytechnic through a program of practice teaching in the industry. The industry provided an opportunity toward polytechnic to use existing industrial facilities to support learning practices for students.

Furthermore, polytechnic reforms a team to manage the partnership with industry. This team should responsible planning, implementing, and evaluating with made an implementation guideline that approved by industry and polytechnic. Polytechnics should prepare basic knowledge and competence of their students before they follow activities of teaching and learning in the industry. It is aimed in order to students will have no difficulty in following the practice in the industry.

This paper purposed to describe how the results of implementation partnership Polytechnic in Kotabaru with local industry on the teaching program in the industry, how do sustainability partnership development of the teaching program in the industry based on previous implementation, and what benefits derived from the partnership of the teaching program undertaken between polytechnics and industry. It is carried out to create graduates, according to labor market needs.

2 METHODOLOGY

This study used a quantitative approach to identify about implementation partnership Polytechnic of Kotabaru with local industry on the teaching program in the industry. The populations of this study were polytechnic members from Polytechnic of Kotabaru and managers and department heads from PT. ITP as partner industry. Data collected through three techniques, namely questionnaire, observation, and focused group discussion (FGD). While data analysis of this study used descriptive with mean and percentage that divided the data into several groups. The percentage result was described quantitatively into three qualifications: good, fair, and poor.

3 RESULTS AND DISCUSSIONS

3.1 IMPLEMENTATION PARTNERSHIP OF THE TEACHING PROGRAM BETWEEN POLYTECHNIC OF KOTABARU AND LOCAL INDUSTRY

The data analysis was carried out both in Polytechnic of Kotabaru and local industry showed in Table 1 regarding the qualifications of responses from the partnership implementation in the teaching program between Polytechnic and local industry in the remote area. While the evaluation of the partnership program between both is described as Table 2.

Table 1. Qualification of Responses from the Partnership Implementation of the Teaching Program

Indicator	Response Qualification					
	Polytechnic			Polytechnic		
	Good	Fair	Poor	Good	Fair	Poor
Teaching strategies	33.33	33.33	33.33	30.77	30.77	38.46
Instructors' ability	0.00	0.00	100.00	38.46	46.15	15.38
Students' readiness	0.00	0.00	100.00	7.69	53.85	38.46
Teaching implementation	0.00	50.00	50.00	15.38	61.54	23.08
The role of parents and stakeholders	66.67	0.00	33.33	15.38	30.77	53.85
Average	20.00	16.67	63.33	21.54	44.62	33.85

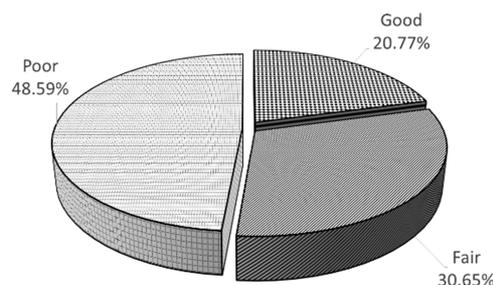


Fig. 1. Qualification of Response from the Partnership Implementation of the Teaching Program

Table 1 showed that the qualifications of polytechnic responses from the partnership implementation of the teaching program were 20% good, 6.67% fair, and 63.33% poor. On the other hand, qualifications of local industry responses from the partnership implementation of the teaching program were 21.54% good, 44.62% fair, and 33.85% poor. While Fig. 1 describe overall of qualification of response from the partnership implementation of the teaching program between the polytechnic and industry that stated 20.77% good, 30.65% fair, and 48.58% poor.

The responses the partnership implementation of the teaching program between Polytechnic of Kotabaru and local industry showed a similarity in all indicators. Generally, most respondents from both sides assumed on the poor level. It was shown by indicators regarding teaching strategy, instructors' ability, students' readiness, teaching implementation, and the role of parents and stakeholders.

The explanation of this data is supported by the results of interviews stating obstacles that arisen in teaching program in industry like program schedule was not fewer clear, several mentors of polytechnics were not ready in terms of material mastery and learning media used in the industry (3) students are less prepared to receive materials in the industry because their basic competences are weak, (4) the learning socialization was not done formally to the parents and other stakeholders, such as foundation, local government, and local labor department.

The FGD result also mentioned that the partnership implementation of teaching program having a complaint for the involved parties because this program was still done partially. The implementation should be done integrated manner and systematically, between polytechnic and industry. Industry manager was willing to help to aim the integrated teaching program with polytechnic. Polytechnic of Kotabaru needs to follow up through improvement on the existing curriculum, increasing mentor ability through internship, training, and further education, preparing of polytechnic students through tight interviews prior to the teaching program, creating of awareness on parents and other parties about their involvement, so they will understand the funding requirements on teaching programs in the industry.

The implementation of teaching program between a polytechnic and local industry needs to be improved. This improvement was aimed to obtain the desired implementation quality that impacted to produce graduates, which could compete in a national labor market. Both sides need to sit together to discuss the implementation of this learning program. Several discussions need to consider of learning strategy, ability of mentors, the readiness of students, teaching implementation, the role of the parents and other stakeholders.

Coe, Aloisi, Higgins, and Major [18] stated that great teaching can be made with defining as that which leads to improved student progress. There are six components for great teaching, i.e. content knowledge, quality of instruction, classroom climate, classroom management, teacher beliefs, and professional behaviors. Teaching program in the industry can use several active learning strategies with the contents covered in the course, motivation and active participation in class and a link between the contents covered in the course and the real in the industry [2].

Regarding mentor skills, Liker and Maier [19] mentioned that they need to have the willingness to learn, adaptability and flexibility, attention and concern, patience, persistence, responsibility, confidence and leadership, and character curiosity. The basic skill and expertise mentor who needed to learn are skill to observe and to analyze a task, effective communication skill, attention to detail, knowledge of a task, and respect to colleagues.

On the other hand, Polytechnic of Kotabaru needs to prepare students, both in their knowledge and attitude. Knowledge preparation was carried out by spoken and written exams. Attitude preparation was carried out by organizing conditioning programs through making rules concerning ethics of discipline and creative and innovative characteristic development.

While the role of parents and other stakeholders needed to be involved at the implementation of teaching program between polytechnic and industry to support its implementation. Polytechnic of Kotabaru would not achieve maximum results from the teaching program in industry if it was not supported by sufficient funding source despite the facilities given by industries. The support from parents, foundation, local government, Education Agency, and Local Labor Agency was needed for the implementation of this partnership program. The support could be in the form of funding, idea, and policy.

Table 2. Qualification of Responses from Evaluation of Partnership Implementation of the Teaching Program

Indicator	Response Qualification					
	Polytechnic			Polytechnic		
	Good	Fair	Poor	Good	Fair	Poor
Teaching guides	0.00	0.00	100.00	0.00	38.46	61.54
Roles and responsibilities	0.00	16.67	83.33	7.69	38.46	53.85
Completeness of data	0.00	33.33	66.67	7.69	46.15	46.15
Empowerment	0.00	33.33	66.67	7.69	46.15	46.15
Commitment	16.67	0.00	83.33	15.38	30.77	53.85
Communication	0.00	0.00	100.00	7.69	30.77	61.54
Teaching packages	0.00	16.67	83.33	7.69	30.77	61.54
Teaching format	0.00	16.67	83.33	0.00	46.15	53.85
Average	2.08	14.58	83.34	6.73	38.46	54.81

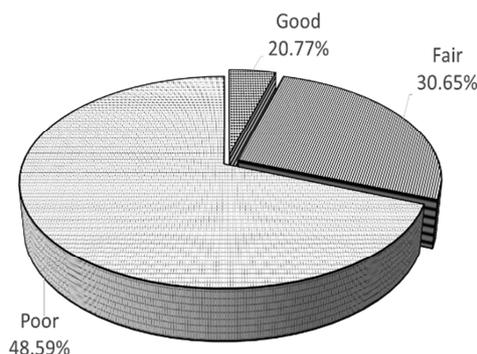


Fig. 2. Qualification of Response on the Evaluation of Partnership Implementation on the Teaching Program

Table 2 showed that the qualifications of polytechnic responses from the partnership evaluation of the teaching program that undertaken were 2.08% good, 14.58% fair, and 83.34% poor. On the other hand, qualifications of local industry responses from the partnership implementation of the teaching program were 2.08% good, 44.62% fair, and 33.85% poor. While Fig. 2 is describe overall of qualification of response from the evaluation of the partnership implementation of the teaching program between the polytechnic and industry that stated 6.73% good, 38.46% fair, and 54.81% poor.

The opinion of respondents from both sides on the evaluation of teaching program implementation between the polytechnic and industry also showed similarity on several indicators. Generally, respondents contend that teaching guides, roles and responsibilities, completeness of data, empowerment, commitment, communication, teaching packages, and teaching format were still poor category. A small part of industry respondents stated that communication and teaching packages were still on poor category.

Meanwhile, the interview result showed that the evaluation of teaching program implementation has not been done by polytechnic and industry. The evaluation has failed to do because they still did not have evaluation manuals, and unclear responsibility division. The partnership team needs to be formed by both sides. They think if the teaching program was not evaluated, industry instructor would be very bored without relevant changes to industrial development. There needs to synchronize perception and to improve the quality of teaching program implementation according to the desired competence standard between industry and polytechnic.

Evaluation results of teaching program implementation have already meet linearity and normality aspects, thus it only needs to follow up. The continuation of program evaluation needs periodically, so a more specific evaluation result on each indicator can be obtained. The valuation conducted by both sides to formulate evaluation on the program implementation in order to define the guidelines on the mechanic system of the program evaluation clearly and documentation carried out better.

The conclusion of the evaluation on teaching program between polytechnic and industry is that the program still needs to do improved. It is done to obtain a better and relevant teaching implementation evaluation form. The evaluation data from both sides showed similarities on perceptions, so both sides need to discuss the evaluation of this partnership teaching program implementation. Several things that need to be followed up are the teaching guide, job and authority division, data completion, empowerment, commitment, communication, teaching packages, and teaching format.

The evaluation of teaching related to four domains of teaching responsibility: planning and preparation, classroom environment, instruction, and professional responsibilities [20]. Headden [21] stated that existing nine good teaching, namely lead well-organized, objective-driven lessons, explain content clearly, engage students at all learning levels in rigorous work, provide students with multiple ways to engage with content, check for student understanding, respond to student misunderstandings, develop higher-level understanding through effective questioning, maximize instructional time, build a supportive, and learning-focused classroom community. These are owned by qualified teachers, and teacher quality will have positively impact toward teaching effectiveness for students [3].

On teaching and learning, four dimensions of teaching practice that should be attentive are institutional climate and systems, diversity, assessment engagement, and learning community [4]. While twelve potential sources of evidence to measure teaching effectiveness are student ratings, peer ratings, self-evaluation, videos, student interviews, alumni ratings, employer ratings, administrator ratings, teaching scholarship, teaching awards, learning outcome measures, and teaching portfolios [5]. Meanwhile, the evaluation can use PDCA (Plan-Do-Check-Action) framework as a tool for continuous improvement in the teaching program in the industry [6].

3.2 MODEL OF SUSTAINABLE PARTNERSHIPS OF THE TEACHING PROGRAM BETWEEN POLYTECHNIC AND LOCAL INDUSTRY

Partnerships can impact enhancement of teaching and learning, develop new funding streams, and rethink the role of the polytechnic development [22]. In order to have a better understanding of the partnership in the teaching program in the industry, and the polytechnic need to develop a model sustainable partnership of the teaching program between the polytechnic and local industry that impacted on the quantity and quality of knowledge, skills, and attitudes for students and polytechnic members [23]. A framework of sustainable partnerships on the teaching program between polytechnic and industry made based on the implementation framework previously illustrated such as Fig. 3.

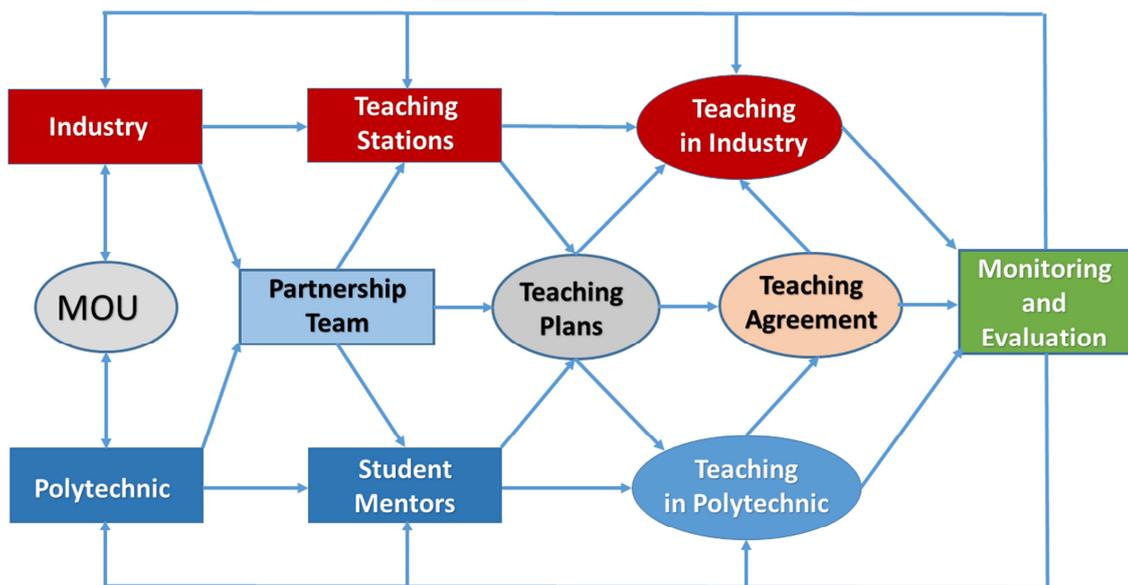


Fig. 3. A Framework of Sustainable Partnerships on Teaching Program between the Polytechnic and Industry

Fig. 3 showed that the partnership management of teaching program is based on a memorandum of understanding (MOU) that made by polytechnic and industry. Then, the two sides agreed to create a partnership team in charge of preparing the learning program. They will follow up through coordination by teaching stations in industry and student mentors and consulted to make a teaching plan. This plan will set implementation of teaching until a plan model agreed by both sides. It regulates the role of teaching that should be done by the Polytechnic before teaching in the industry. All of teaching material should be prepared by partnership team. The result of program implementation is always evaluated and monitored to ensure the next teaching becoming better that impact for improving the management and sustainability of students, the polytechnic and industry [7].

3.3 BENEFITS OF PARTNERSHIPS PROGRAM BETWEEN POLYTECHNIC AND LOCAL INDUSTRY

The partnership program is undertaking a range of activities in their interaction between the polytechnic and industry. Through this various model of partnership, the polytechnic has the opportunity to build a good relationship with industry that is mutual benefit [25]. For polytechnic, these partnerships will give support for the educational, research, service's missions, broaden the experience of students and faculty, identify significant, interesting, and relevant problems, and increase employment opportunities for students. For industry, such as partnerships provide access for their expertise, improve access to students as potential employees, expand precompetitive research, and leverage internal research capabilities in their industry [11].

Kock, Auspitz, and King [8] also explained that partnership gives benefits for students and industry partners. Benefits for students like putting concepts and theories learned in class in practice, which adds a new and valuable "real world" dimension to the learning process, experiencing first-hand professional issues in their chosen fields, and establishing company contacts who may lead to future employment. While, benefits for industry partners like hiring selected students with top potential, and whose behavior and values match the firm's internal culture, customer orientation and mission, creating the appropriate climate for change due to the infusion of new ideas, and absorbing new concepts and ideas that may be used to boost competitiveness.

The partnership has been of great benefit to the involved parties [9]. The partnership has enabled polytechnic and industry to not only reach the community, but also transform the lives of members in the same community. Therefore, both the polytechnic and industry should seek to enhance graduate skills and ensure a smooth and effective transition between the polytechnic and the industrial environments through collaborations such as joint teaching programs. Through such ventures, students have opportunities to acquire hands own experiences and skills that will come in handy when they finally join the job market. Moreover, the model of partnership management of collaborative relationships must clear and detail to give benefits for both sides [10].

4 CONCLUSIONS

On the one hand, the partnership program that is conducted through the teaching program has provided experiences to students on a theory learned in the polytechnic and application of the theory in the industry. This shows that the material being studied at the polytechnic as required for the industry. Their experience in the industry also gives you the confidence to further the spirit of learning to better prepare the knowledge, skills, and behavior in accordance with standardized the industry.

On the other hand, the implementation of the teaching program in the industry has not been as expected by the industry. It is caused by several indicators both in the process of implementation and program evaluation. Development of a sustainable partnership model in teaching programs between polytechnics and industry is needed to ensure that the preparation and communication have been carried out by both clearly and in detail. This will reduce the problems that will occur and provide benefits in accordance with the planned between both.

Polytechnic needs to prepare human resources related to always follow the development of the existing competence on the industry through training programs and further education. The curriculum and syllabus polytechnics also need to be constantly adjusted to the competencies' needs that exist in the industry so that the basic competencies that are taught always in tune with the basic competencies that exist in the industry. The expectation that link and match between higher education and industry can be realized sustainable manner.

REFERENCES

- [1] G. W. Prigge, "University-Industry Partnerships: What do They Mean to Universities? A Review of the Literature," *Industry and Higher Education*, vol. 19, no. 3, pp. 221–29, 2005.
- [2] P. C. Oliveira and C. G. Oliveira, "Integrator Element as a Promoter of Active Learning in Engineering Teaching," *European Journal of Engineering Education*, vol. 39, iss. 2, pp. 201-211, 2014.
- [3] R. Lin, J. Xie, Y. C. Jeng, and S. Huang, "The Relationship between Teacher Quality and Teaching Effectiveness Perceived by Students from Industrial Vocational High Schools," *Asian Journal of Arts and Sciences*, vol. 1, no. 2, pp. 167-187, 2010.
- [4] D. Chalmers, "Teaching and Learning Quality Indicators in Australian Universities," *OECD's Higher Education Management and Policy Journal*, pp. 1-18, 2008.
- [5] R. A. Berk, "Survey of 12 Strategies to Measure Teaching Effectiveness," *International Journal of Teaching and Learning in Higher Education*, vol. 17, no. 1, pp. 48-62, 2005.
- [6] M. Sokovic, D. Pavletic, and K. K. Pipan, "Quality Improvement Methodologies: PDCA Cycle, RADAR Matrix, DMAIC and DFSS," *Journal of Achievements in Materials and Manufacturing Engineering*, vol. 43, iss. 1, pp. 476-483, 2010.
- [7] J. Fleming and C. Hickey, "Exploring cooperative education partnerships: A case study in sport tertiary education," *Asia-Pacific Journal of Cooperative Education*, vol. 14, iss. 3, pp. 209-221, 2013.
- [8] N. Kock, C. Auspitz, and B. King, "Using the Web to Enable Industry-University Collaboration: An Action Research Study of a Course Partnership," *Informing Science*, vol. 3, no. 3, pp. 157-166, 2000.
- [9] D. W. Tumuti, P. M. Wanderi, and C. Lang'at -Thoruwa, "Benefits of University-Industry Partnerships: The Case of Kenyatta University and Equity Bank," *International Journal of Business and Social Science*, vol. 4, no. 7, pp. 26-33, 2013.
- [10] M. Perkmann and K. Walsh, "University-Industry Relationships and Open Innovation: Towards a Research Agenda," *International Journal of Management Reviews*, vol. 9, iss. 4, pp. 259-280, 2007.
- [11] G. W. Prigge and R. J. Torraco, "University-Industry Partnerships: A Study of How Top American Research Universities Establish and Maintain Successful Partnerships," *Journal of Higher Education Outreach and Engagement*, vol. 11, no. 2, pp. 89-100, 2006.
- [12] R. L. Scott, E. K. Schmidt, Y. Zhao, and K. Homan, *Establishing and Managing Business-University Research Partnerships*. Proceedings of the 2015 Conference for Industry and Education Collaboration, 2015
- [13] P. Böckerman, U. Hämäläinen, and R. Uusitalo, *Labour Market Effects of the Polytechnic Education Reform: The Finnish Experience*, Institute for the Study of Labor, 2009.
- [14] J. Middleton, A. Ziderman, and A. A. Adams, *Skills for Productivity: Vocational Education and Training in Developing Countries*. Oxford University Press, 1993.
- [15] CISCO, *Vocational Education and Training Programs (VET): An Asian perspective*. CISCO System, Inc., 2011.
- [16] D. Chen, *Vocational Schooling, Labor Market Outcomes, and College Entry*. World Bank, 2009.
- [17] UNEVOC and BIBB, *Attractiveness of Vocational Education and Training: Permeability, Successful School-to-Work Transitions and International Mobility*. UNEVOC and BIBB, 2014.
- [18] R. Coe, C. Aloisi, S. Higgins, and L. E. Major, *What Makes Great Teaching? Review of the Underpinning Research*. The Sutton Trust, 2014.
- [19] J.K. Liker and D.P. Meier, *Toyota Talent Mengembangkan SDM Anda Ala Toyota [The Toyota Talent Develop your HR with Version Toyota]*. Erlangga, 2008.
- [20] C. Danielson, *Framework for Teaching*. Kentucky Department of Education, 2014.
- [21] S. Headden, *Inside IMPACT: D.C.'s Model Teacher Evaluation System*. Education Sector, 2011.
- [22] Science|Business Innovati on Board AISBL, *Making Industry-University Partnerships Work Lessons from Successful Collaborations*. Science|Business Innovati on Board AISBL, 2012.
- [23] J. Poyago-Theotoky, J. Beath, and D. S. Siegel, *Universities and Fundamental Research: Reflections on the Growth of University-Industry Partnerships*. University of ST. Andrews, 2002.
- [24] Rickard, Wendy, *Come Together: Campuses Find the Road to Success Lined with Partnerships and Collaborations*, 2003. [Online] Available: <http://www.educause.edu/eli/publications?page=28> (May 1, 2016)
- [25] Chou, S. K., *Development of University - Industry Partnerships for the Promotion of Innovation and Transfer of Technology: Singapore*, 2016. [Online] Available: http://www.wipo.int/export/sites/www/uipc/en/partnership/pdf/ui_partnership_sg.pdf (May 1, 2016)