



Development of K-Workers Employability Skills Measurements Indicators in Agricultural Sector in Malaysia

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Abstract: Issue of skilled and knowledge worker is an issue that frequently discussed among agricultural training institutions and employers in the sector. It is viewed seriously by Malaysian government through Agrofood Policy 2011-2015 by emphasising agricultural workers that are highly skilled and knowledgeable to assist Malaysia achieves high-income developed nation status. However, what are the characteristics of those high skilled and knowledge workers? This question is the base of this research. By using qualitative approach, modified Delphi technique / method is chosen as the research framework. Eleven experts from various stakeholders such as agriculture lecturer, leaders of agricultural training institutions, agricultural instructor and agricultural industry employer in Malaysia. Finding reveals ten characteristics of k-workers that are needed to enable them to have high employability skill in order to satisfy / fulfil national requirement of skilled workforce. This finding can be used as a measurement basis for employability skill level of labour market in agricultural sector in Malaysia.

Keywords: TVET, agricultural education, agricultural institute, UPSI

1. Introduction

World's food supply crisis in 2008 caused a rise in production cost and world's food prices. Consequently, Malaysia had to afford a massive cost to import food from abroad, such as rice from Thailand. The lesson from that setback, National Agro Food Policy 2011-2020 was introduced to ensure national food supply assurance policy achieved its goal. If this problem is not resolved, national food security's issue is compromised and Malaysia intention to become a high-income developed nation by 2020 is hindered. Human resource development will continue to be a priority to ensure the availability of dynamic labour market that is capable to compete at international level. Economic development based on knowledge and innovation coupled / combined with technological emergence and globalisation will influence the direction of supply growth flow on skill and expertise in the future as well as creating new economic opportunity that can elevate the income of Malaysian.

Eleventh Malaysian Plan (RMK-11), 2016-2020, will continue the agenda to produce knowledgeable and skilled human resource that possesses a positive attitude to advance further in global economy. Government will focus on four areas: improving labour market efficiency to increase economic growth, transforming TVET to fulfil / satisfy industry demand, enhancing / strengthening lifelong learning to upgrade skill and improving educational system quality to increase student outcome and institutional excellence. Economic agenda outlined in RMK-11 is expected to create 1.5 million jobs by 2020 by focusing on improvement of labour productivity and reduction of low-skilled foreign labour dependency, both caused by the shift from labour intensive economy to knowledge- and innovation-based economy. About 60% of jobs that will be created are expected to require skill related to Technical and Vocational Education Training (TVET) (Razali, 2012).

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1.1 Employability of K-workers in Malaysia

Abdul Rahim Anuar & Mohammad Haji Alias (2000) have stressed that education development level and training will influence the quality of labour market. In the labour market, knowledge workforce is vital to assist k-economy development. Therefore, the success in developing economy depends on the quality of education and training systems.

According to Simon (2013), three important skills that need to be mastered / learnt by students to become effective, efficient and productive individuals in the 21st century are: 1) information management, 2) knowledge management, and 3) publication management. Jeoung & Nora (2014) further added three elements in skill process in the 21st century: 1) creative thinking and problem solving, 2) communication and information literacy, 3) leadership and cooperation / collaboration. This is strengthened by Future Farmers of America (FFA) (2014) that enlisted skills required in the 21st century.

1.2 Skilled K-Workers

Bennet et al. (2000) have stated that skills are practical ability, encompassing all matters related to individuals' behaviours that enable them to perform work quickly, carefully / prudently and efficiently. Skills are dynamic by focusing on knowledge acquirement and process modification that are suitable / appropriate with the skills development. Meanwhile, ACCI (2002) defines that skills refer to the ability to perform / execute certain tasks. However, Bailey et al. (2004) opined that skills are the ability of individuals to perform several types of tasks:

“Skills are seen as discrete capacities, acquired and possessed by individuals, enabling them to perform various manual, intellectual, or social tasks.” (p.118)

According to McLaughlin (1995), skills represent all characteristics that make an individual employable, including having knowledge, expertise, attitude and behaviour to work. While Attewell (1990) in Brennan et al. (2003) stated:

“Skills are the ability to do something, but the word also connotes a dimension of increasing ability. Thus, while skill is synonymous with competence, it also evokes images of expertise, mastery and excellence.”

2. Research Framework

The research framework used the approach of CIPP education evaluation / assessment model (Stufflebeam, 2002) that emphasizes relationship between four factors: context, input, process and product formed. In the research, context is seen from the aspect of learning outcome that is set by *Kementerian Pendidikan Malaysia (KPM), Universiti Pendidikan Sultan Idris and Fakulti Teknikal dan Vokasional*. Input is from the result of Malaysian Teacher Standard (SGM) that consists of professional practice, pedagogy skills, and knowledge and skills. Apart from that, input given is the objective of programme offered and the learning outcome of programme.

Meanwhile, the delivery process assessment is done on the teaching and learning processes, the curriculum implemented as well as the assessment method. The final product, the graduate, is viewed from two main aspects: knowledge and skills in various aspects, which are called graduate employability and entrepreneurship Skills. Figure 1 summarises context, input, process and output aspects in the research.

Previous researches showed the existence of a major issue: skills gap between skills obtained during training in skill training institution and skills required by the institution. If this problem is not resolved, it will create competency problem for the trainee of training institution, especially agricultural institution that supplies skilled workforce. Nevertheless, previous researches have shown there is still no competency measurement indicator for trainee in agricultural field. Information from trainer / instructor, trainee of agricultural institution and supervisor as well as employer of agricultural institute can be used to close the gap. This skills gap can be validated / verified by applying competency measurement indicator for agricultural trainee.

This paper was to identify main indicators for the establishment / development of k-workers in agricultural sector in *Institut Pertanian Malaysia*; and to measure reliability the items that are included in each indicators k-worker in Agriculture at the Agricultural Institute of Malaysia. The research questions focuses on:

- a) What are the main indicators for the establishment / development of k-workers in agricultural sector in *Institut Pertanian Malaysia*?
- b) Are the items contained in each of the indicators k-worker in Agriculture at the Agricultural Institute of Malaysia successfully meet the reliability value?

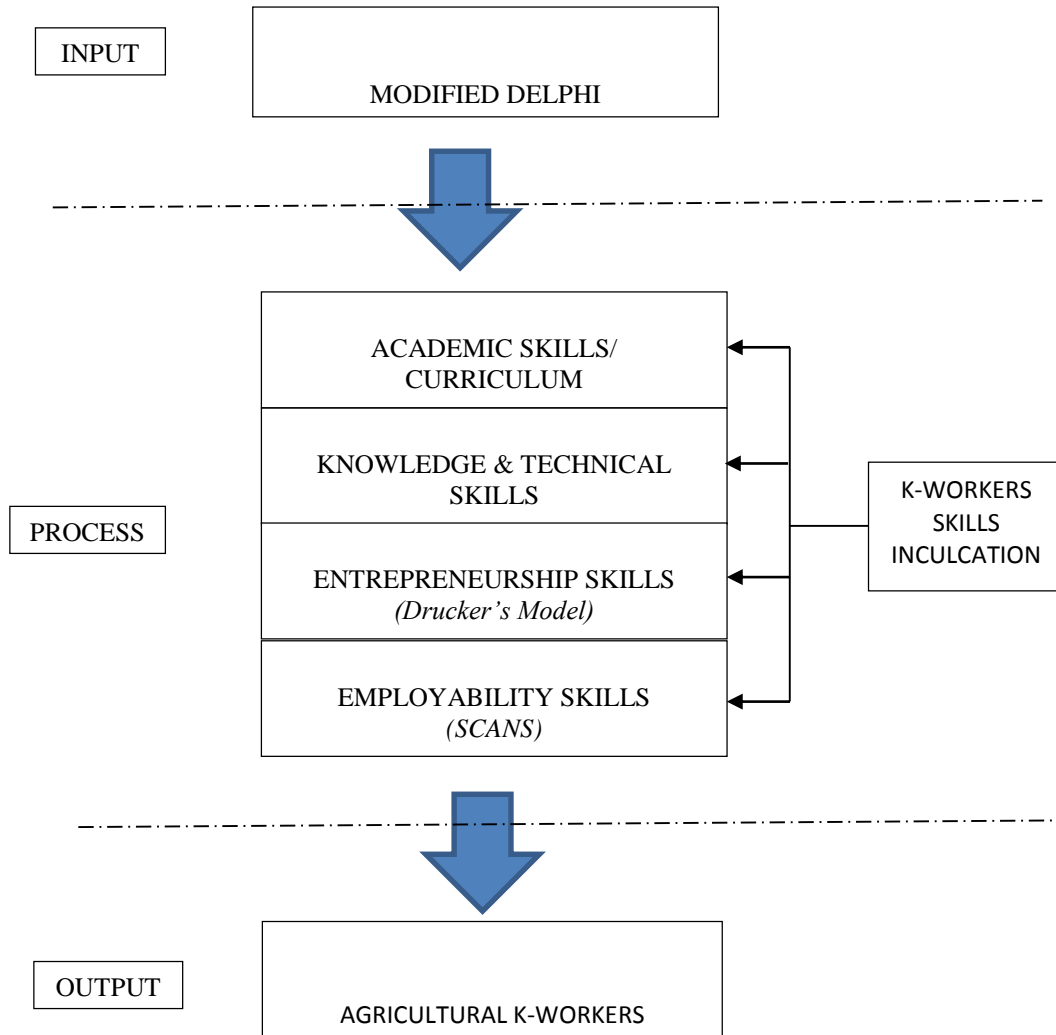


Figure 1: Research Framework

Based on the problems stated above, indicator of k-workers measurement that can measure employability level of k-workers and satisfy / fulfil the needs of education institution and employer need to be established to reduce the problem of employment mismatch. According to Head Assistant Director of Incubator Unit and Malaysian Skills Certificate, *Kementerian Pertanian dan Industri Asas Tani*, Latifah Merais (2013), until today there is no measurement instrument (k-workers) built to assess / measure comprehensively the effectiveness level in fulfilling / satisfying the objective of *Kementerian Pertanian dan Industri Asas Tani* through courses and programmes offered by *Institut Pertanian Semenanjung Malaysia (IPSM)*. Additionally, *Kementerian Pertanian dan Industri Asas Tani* is encouraging / welcoming the establishment of the instrument that can be utilized as a benchmark for the improvement of training programme implemented in *Kolej Pertanian Malaysia, Institut Pertanian Semenanjung Malaysia*.

3. Research Methodology

3.1. Research design

This research is a mixed method (quantitative and qualitative) research that used modified Delphi technique and survey framework (Creswell, 2003). According to Creswell (2003), the mixed method research facilitates researcher to understand and solve a research problem better compared with just using one type of research. The research used two techniques, Delphi technique and survey, which involved two stages:

3.1.2. First stage

This stage involves the researcher to build structured questions for interview instrument of Delphi technique. Interview instrument that was built was based on previous researches, which are related to the creation of knowledge workers in agricultural industry and reports from Department of Agriculture. Subsequently, refinement/standardization of the questionnaire instrument was done by two education experts.

3.1.3. Second stage (Delphi and Survey Instrument)

At this stage, research that used Delphi technique is done in three rounds. Asnul (2012) stated that Delphi technique is one of research method characteristic, which is able to acquire pure agreement / consensus from expert panel because each expert does not know each other and expert panel consensus is achieved without prejudice / bias, influence or pressure from any party. While Saedah (2005) stated that Delphi technique is a research method that encompasses several series of rounds of questionnaires, which requires the expert panel to identify, explain, refine / harmonize / standardize and finally reach consensus on certain issues or researches performed.

On the first round, interview conducted among Delphi expert panel chosen is to identify indicators related to the establishment of knowledge workers in agricultural sector. Through research finding obtained from interviews and documents analyses that include curriculum report in agricultural sector, the researcher will build questionnaire instrument related to the establishment of knowledge workers in agricultural sector.

Subsequently, on the second round the researcher faced the Delphi expert panel as well as explained and clarified the format and answering method, and examined the questionnaire instrument. The researcher gave two weeks to Delphi expert panel to give consent, comment and improve the questionnaire instrument. After receiving the feedback from Delphi expert panel in the second round, the result of analysis, questionnaire instrument built will be refined / harmonized / standardized and applied in the third round of Delphi technique. This paper only discusses the preliminary data which is only reliability analysis for the survey item.

3.2. Sampling

There are several views regarding number of samples in Delphi research. According to Wiersma and Jurs (2009), number of samples around 10 to 30 is sufficient for Delphi technique. Delbecq et al. (1975) suggested if the Delphi sample is homogenous, 10 to 15 respondents are sufficient to become a sample. Meanwhile, Witkin and Altschuld (1995) opined that the sample size of Delphi research is generally under 50 respondents and those involved should have experiences and have worked for a long time.

For this research, the researcher selected / chose eleven participants / respondents as Delphi expert panels. Linstone and Turoff (1975) have suggested five to ten experts panel as the suitable / appropriate amount for researches that use Delphi technique. Delphi panel of experts involved in this research consisted of three lecturers from *Institut Pertanian*, one employer from agricultural industry and seven agriculture-related curriculum drafters from *Kolej Vokasional Pertanian* under *Kementerian Pendidikan Malaysia (KPM)*.

The researcher has set several criteria in selecting / choosing Delphi panel of experts, such as having working or teaching experience in agricultural industry for more than ten years and having knowledge concerning the implementation of agricultural-based curriculum. Thangaratinam and Redman (2005) have stressed that the selection of individual as expert panel depends on the research objective that was built to answer research questions specified in the research that uses Delphi technique.

Sample in modified Delphi research involved experts in agricultural education from three institutions as in Table 1.

Table 1: Sample Framework of Modified Delphi Research

Institution	Male
Lecturers of <i>Kolej Vokasional Pertanian</i>	7
Lecturers of <i>Institut Pertanian</i>	3
Industry	1
Total	11

3.3 Instrumentation

Instruments used in this research are divided into two instruments: instrument of modified Delphi research and instrument of k-workers indicators development research. Modified Delphi research uses instrument in the form of questionnaire. According to Wiersma and Jurs (2009), in modified Delphi framework, issues and questions have been defined sufficiently by the researcher. Thus, the first round of Delphi (interview) is not needed / required.

Therefore, at the beginning, the researcher synthesised literature review and curriculum to establish / build the indicator of k-workers. The process involved these aspects:

- (i) The analyses of previous surveys and researches concerning k-workers establishment in agricultural education.
- (ii) Surveys and analyses of models, government policy, such as Malaysia Plan, k-workers and employability in agricultural education.

After the development / establishment of questionnaire items, experts' validations / verifications process by senior lecturer from Universiti Teknologi Malaysia (UTM) and another senior lecturer from Universiti Tun Hussein Onn (UTHM) were conducted before the questionnaires were distributed. This was to validate / verify the content of questionnaire item from the aspects of language and sentence structure. Subsequently, questionnaires were distributed on the first round and the second round to acquire the consensus of experts regarding k-workers in agriculture.

On each round, experts examine the content of questionnaire distributed and add new item if needed / required. The refinement/harmonisation process of the questionnaire was done on each round, based on research finding and experts' view from the previous rounds. To portray / depict their agreement / consent, questionnaire instrument in the form of five-point Likert scale (Likert, 1932) is shown in Table 32

Table 2: Five-point Likert Scale

Group	Interpretation/ Description
5	Strongly Agree
4	Agree
3	Somewhat Agree
2	Disagree
1	Strongly Disagree

4. Research Findings

Participants' data analyses are divided into two categories:

- (i) The participants of modified Delphi research

Questionnaire forms were presented to eleven experts in agricultural education in Malaysia. Participants / Respondents were involved in the establishment / development activity of k-workers measurement indicators in agricultural field in both Delphi rounds. The experts consisted of (i) an employer from the industry, (ii) seven lecturers from vocational college and (iii) three lecturers from *Institut Pertanian Serdang*. The analysis of respondents profile included gender, duration of service in PKM field, highest academic qualification and position held.

- (a) Respondents according to gender

Table 3 portrays the detail analysis of respondents based on gender. The respondents of Delphi research are experts in the development / establishment of measurement indicators for agricultural k-workers, where the selection process was based on sampling criteria set.

Table 3: The category of Delphi research respondents based on gender.

Institution	Male	Female	Total
<i>Kolej Vokasional Pertanian (KV)</i>	7	-	7
Experts / Industrial Employer	1	-	1
<i>Institut Pertanian</i>	2	1	3
Total	10	1	11

(b) Respondents according to duration of service, academic qualification and position in PKM field

Duration of service, academic qualification and position in PKM field are important criteria in selecting respondents for Delphi research. Table 4 shows respondents' distribution according to duration of service, academic qualification and position in PKM field. Majority of the respondents have more than ten years of experience in developing / establishing the measurement indicators of k-workers in agricultural field. One respondent has PhD qualification and ten respondents have bachelor's degree. In terms of position, one respondent is a professor from Universiti Malaysia Sabah (UMS), one senior lecturer from *Institut Pertanian Serdang* (IPS), and the rest are vocational training officer and education officer from IPS and *Kolej Vokasional*.

Table 4: Distribution of respondents according to duration of service, academic qualification and position in Kemahiran Malaysia certification field

Profile	Institution			Total
	KV	Industry	IPS	
Duration of Service				
5 to 9	-	-	-	-
10 to 15 years	3	-	1	4
16 to 20 years	4	-	2	6
21 to 25 years	-	-	-	-
26 to 30 years	-	-	-	-
Exceed 31 years	-	1	-	1
Academic Qualification				
PhD	-	1	3	4
Master's Degree	-	-	-	-
Bachelor's Degree	7	-	-	7

(ii) Survey Respondents

Surveys were implemented to determine the reliability of the constructs by involving 42 final year students of *Institut Pertanian Serdang* as discussed in chapter 3. The selection process was based on stratified sampling. The result of analysis is depicted in Table 5, which includes gender and work experience. From the gender aspects, 30 (71.4%) respondents were male, while 12 (28.6%) were female.

Table 5: Distributions of respondents according to gender (2nd phase)

No.	Items	Frequency	Percent (%)
1	Gender	Male	30 71.4
		Female	12 28.6

4.1 Research Question 1: What are the indicators needed / required in the development / establishment of measurement indicators of agricultural k-workers?

Data analysis in the development and establishment of measurement indicators of agricultural k-workers are divided into two:

- (i) First round data analysis
- (ii) Second round data analysis

4.1.1 Analysis of the first round of modified Delphi (Analysis of previous researches)

In the beginning of modified Delphi research, literature review on previous researches and documents related to the development / establishment of measurement indicators of agricultural k-workers have been conducted to develop/ establish questionnaire instrument item, which will be used in the second round of Delphi. The result of literature review revealed four main elements in the development / establishment of agricultural k-workers measurement indicators. There are: (i) employability skills, (ii) entrepreneurship, (iii) professionalism and (iv) value and ethics. Table 6 shows the findings, which are grouped according to their elements.

Table 6: Elements of the development/ establishment of agricultural k-workers measurement indicators

Indicators	Elements
Knowledge and Skills	<ul style="list-style-type: none"> - Have a solid formal education. - Have a habit to obtain lifelong learning. - Have knowledge and skills in the field studied. - Have value, moral and religious knowledge. - Have critical thinking skills: understand basic theory, perform critical judgement, and have the technique to identify and solve problem. - Ability to perform quality work. - Ability to understand system thinking. - Ability to use tools, hardware and technology in task given. - Have skills to manage and implement quality work based on cost and time.
Professionalism	<ul style="list-style-type: none"> - Ability to make a mature decision based on knowledge and good value. - Have basic understanding of the law. - Have the ability to manage not only based on intelligent quotient (IQ), but based on emotion quotient (EQ) as well; thus are able to manage human appropriately / properly.
Entrepreneurship	<ul style="list-style-type: none"> - Have entrepreneurship skills in commercializing products (innovation, discovery and development) in order to be able to create / build wealth for themselves, others and the nation. - Ability to distribute product to wider community groups. - Ability to compete in generating idea and professionalism to achieve success. - Ability to understand philosophy and law regarding copy right and intellectual property right (IPR). - Ability to understand principle and basic philosophy and business model as well as marketing model.
Socialization	<ul style="list-style-type: none"> - Ability to work collaboratively and cooperatively in groups. - Have social interactive skills (discussion, meeting, criticism, making phone call, e-mail etc.). - Ability to understand and respect the importance of culture and good value in organisation and society. - Ability to understand and appreciate moral value, ethics, culture and religion in organisations and societies.
Value and its Appreciation	<ul style="list-style-type: none"> - Have solid principles and life philosophy. - Have honesty. - Have the intention to spread goodness to the universe or extensionalism. - Have solid / sound / strong spiritual ability and ready to face / confront challenges and resistances.

4.1.2 Analysis of the second round of modified Delphi (Analysis of reliability)

Reliability Analysis has shown that the Cronbach’s Alpha value as Table 7.

Table 7: Reliability of the development/ establishment of agricultural k-workers measurement indicators

Construct	Reliability Value (Cronbach’s Alpha)
Knowledge and Skills	0.95
Professionalism	0.89
Entrepreneurship	0.94
Socialization	0.87
Value and its Appreciation	0.81

5. Discussion

The research findings, which are consistent with the findings of Simon (2013), found several important skills, which need to be mastered by students to become effective, efficient and productive individuals in the 21st century: 1) information management, 2) knowledge management and 3) publication management. Apart from that, Jeoung and Nora (2014) also stated three elements in the 21st century skills process: 1) creative thinking and problem solving, 2) information and communication literacy and 3) leadership and cooperation. These are supported by Future Farmers of America (FFA) model (2014), an entity that exists in American schools that enlists 21st century skills that need to be mastered by agricultural students there. Following are the skills (Fig. 2)

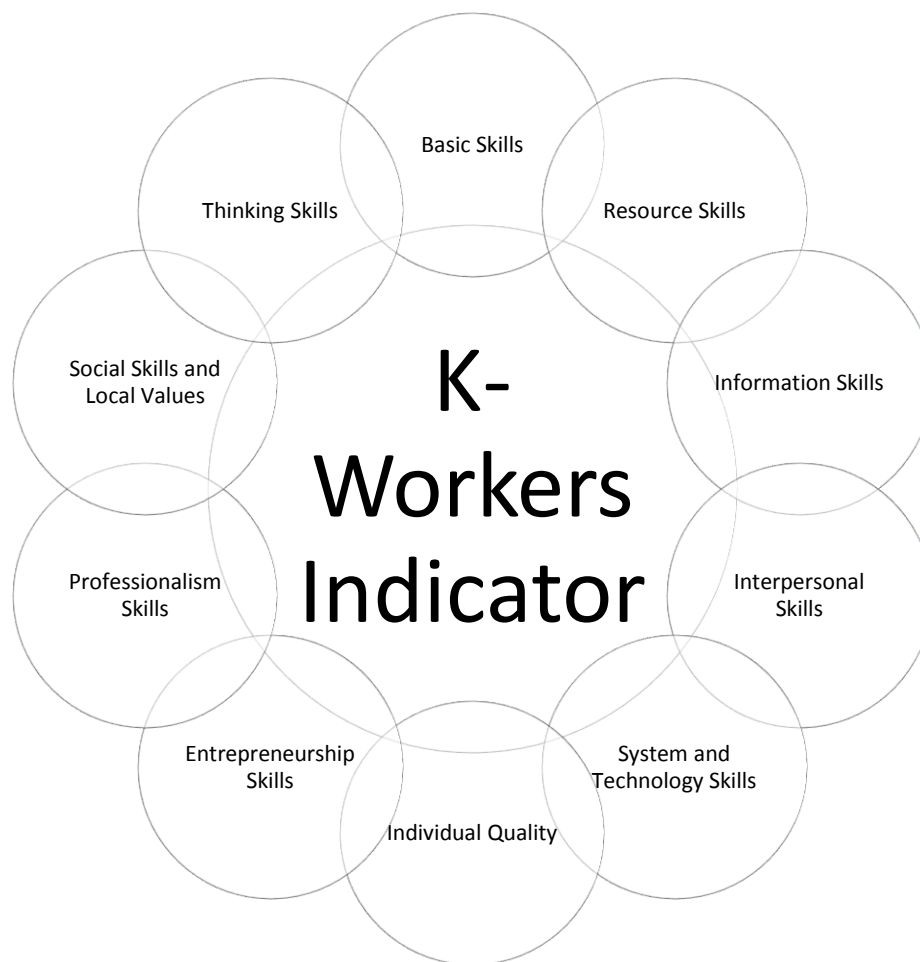


Fig. 2: 21st century skills

All these skills are vital to current marketability skills of students because Ranjit's (2004) findings demonstrated ten main aspects of weaknesses among Malaysian graduates: weakness in management aspect, problem solving, communication, leadership, creativity, critical thinking, proactive, self-confidence, and interaction skills. These cause difficulty to the graduates in acquiring the desired jobs that correspond to their qualification. Abd Hair et al. (2007), stated technical and employability factors as the determining factors for graduates to obtain jobs.

The role of entrepreneurship skill is vital in a competitive world. Entrepreneurship indicators are agreed by all experts. These characteristics are supported by Lekoko, Rankhumise and Ras (2012) that enlisted four main indicators in entrepreneurship: 1) to provide the students on how to start a business, 2) to teach the fundamental business skills, 3) to teach the students the role of entrepreneurship in economic development and creating jobs opportunities, and 4) other factors. In the 21st century, social network usage is seen as playing an important role in the growth / development of entrepreneurship field. According to Greve and Salaff (2003), every entrepreneur needs to build a social network and cultural differences do not play an important role in networking.

Malaysia needs skilled workers to support the country's development to achieve vision 2020 (Ramlee & Rohana, 2013; Yao Sua Tan, 2011). The era of knowledge economy and globalization leads to the necessity of human capital, which comprises of professional and semi-professional as well as knowledgeable and skilled labour (Brockman, Clark & Winch, 2008; Ramlee et al., 2008; Ruhizan et al., 2013; Wan Seman, 2007). Over the years, the country has relied heavily on foreign labour from Indonesia and Bangladesh to fill positions in plantation and construction industries and also as domestic help (Malaysia, 2010). If employees released from Public Training Institutions (PTI) do not have the skills required by the industry, investors would not be interested in investing in Malaysia.

In the article 'Knowledge Workers In Demand Through 2000' (1997), knowledge workers are stated as those who have value to the employers in collecting, analysing, and spreading information in any knowledge. Brinkley et al. (2009) have defined k-work as a broad and expansive step with the position or education level. Meanwhile, according to Drucker (1966), every k-worker in modern organisation is an executive, due to the position or knowledge, he or she is responsible to the contribution that affects organisation material capability to implement and obtain result.

In past researches, knowledge workers factors in an organisation are viewed as contributing significantly towards the development and advancement of the organisation. Many researches were conducted to study the benefits / advantages of knowledge workers, such as knowledge workers factors in organisation leadership, economic development, and others. Knowledge workers are viewed as pioneer in the job sector. According to Barbara et al. (2012), bureaucratic organisation culture has negative influence on the knowledge workers' satisfaction, while innovative or supportive organisation culture has a positive impact.

6. Conclusion

It is hoped this research provide an understanding about curriculum implementation and be used to create an action plan that assist in enhancing and improving further the effective implementation of a technical and vocational programme and consequently assist in achieving the k-worker in agriculture sectors and helping nation's intention to become a high-income nation by 2020. The understanding of the process that exists in skilled workers development system will facilitate the nation to plan the workforce to drive the economy in accordance to Economic Transformation Plan and Agriculture policy implemented by the government to achieve Vision 2020 and Shared Prosperity Vision 2030.

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