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## **ANALYZING EMPLOYABILITY COMPETENCY: IMPACT OF QUADRUPLE HELIX MODEL TO PROSPECTIVE GRADUATES**

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## Abstract

*Although many employability competencies program are conducted by universities and supported by government employability related policies with the community involvement, all the initiatives have yet to fulfill expectation of employers. The objective of this study was to analyze the impact of quadruple helix model to prospective graduates. The employability skills and quadruple helix model were used as research framework. The degree to which prerequisite of foundation knowledge and skill obtainable through higher education institution, industrial training, the government policies and community initiatives might influence prospective graduates' employability competencies. This study utilized a quantitative approach through questionnaires adopted from Engineering Accreditation Council (EAC) consist of 10 item scale of engineering employability skill and 23 item of CAAS measurement scale. Reliability and descriptive analysis were used to verify the factor structures that shaped the graduates employability competencies and career adaptability. The results indicated that respondents were in conformity on how higher education program, industry internship program, government policies and community enhancement program influenced their employability competency. Future study should focus on examining systematic changes in factors affecting employability competency for human capital sustainability.*

### Keywords

Employability, Quadruple Helix Model, Career Adapt ability Scale (CAAS), Technical Graduates

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## 1. Introduction

### 1.1 Background of the Study

The deficiency of knowledge and competencies amongst graduates has been described as one of the causes why alumni struggle to find employment after graduating (Andelt, et.al., 1997). Although some are good in their practical skills, most have been found deficient in their soft skills. Their deficiencies in the soft skills are communication, language, critical and creative thinking skills, leadership, and few others. Several scholars in engineering education have argued the incompetence of the current engineering and ICT educational system in providing the alumni with appropriate employability skills as required by their potential employers (Zaharim et.al., 2009).

Unemployment among youth is on the rise globally. In Malaysia the unemployment rate was 3% with a growth rate of 3.3% per annum for the period covering the 10th Malaysia Plan from 2011. The government has set a target of 7% of graduates finding employment within six months after they graduate. The country is now targeting an unemployment rate of 2.9% for 2016. In short, employability issues among graduates has become not only a national issue but also global.

## **2. Problem Statement**

In developing growth and sustainability of human capital, university is facing issues and challenges through decades, these challenges are the allied closer engagement of the higher education institutions with industry and undeniably other stakeholders (CIHE, 2008; Charles, 2006; Garlic 1998; Owen-Smith et al., 2002; Watson, D., 2010).

The employment, employability and skills development agenda of graduates and their training for an international workforce market are crucial issues faced by many parties. (Artess et al. 2011; European Commission 2005; ESECT 2005; HEFCE 2003; Leitch 2006). The drive towards a 'Triple Helix' model of corporation among government, industry, and higher education (Etzkowitz, 2008; Etzkowitz and Leydesdorff, 2000; Leydesdorff and Etzkowitz 2003; Thorn and Soo, 2006) and the insertion of public society in a 'Quadruple' model (Carayannis and Campbell, 2012) are still questionable on its significance.

The government, industries/employers, university and society are taking action minimizing the skills competency gaps through initiatives and programs in addressing the skill deficiencies among alumni. Without integrated and connected working committee all efforts might be overlap either in objectives, plans and actions. Working in silo are wasting time and money searching for the latest information on the best methods and practices for developing soft skills among undergraduates and alumni (Vatanpoura, H, et.al., 2013). The "silo effect" will pull down the productivity of any organization and this refers to a lack of communication between departments or organizations among quadruple helix (Craft, 2006).

According to statistics from the Ministry of Higher Education in Malaysia, the number of jobless graduates rose from 65,500 in 2010 to 71,600 in the first quarter of 2011 (Hamid et.al., 2014). Salina, et.al., (2012) added, in the year 2005, the Human Resources Minister of Malaysia stressed there are thirty thousand Malaysian graduates qualified for casual and temporary work

lower than their real qualification. In other report by Azian and Mun (2011), a survey conducted by the Malaysian Employers Federation of skills needed by employers are 68% communication skills as being the most needed skill in a job application but there were evidence deficiency in written and oral communication (MOHE, 2006; Salina et.al., 2011; Islam et.al., 2013) . This was followed by work experience (67%), interpersonal skills (56.2%), passion and commitment (55.7%), being a team player (47.8%), having the right degree (46.3%), good academic results (37.9%), a desire to learn (37.9%), can work well under pressure (34.0%), and is able to take the initiative (32.5%) (Murnane, et.al., 1996; McNabb, 1997; Oliver, et.al., 1997; Imel, 1999; Zaharim et.al., 2010).

In relation to the evidence stated above, it generates question such as what are the initiatives conducted by the government, university, industry and society as called the quadruple helix model to prospective graduates? Hence, this study was to analyze the impact of quadruple helix model to prospective graduates.

### **3. Literature Review**

#### **3.1 Employability Definition/Terminology**

Several definitions of employability among researcher as shown in Table 1 are similar such as communication skill, team work, problem solving and life-long learning (Bilsland, 2014; DEST, 2002), elementary skills (Robinson, 2000); set of skill, knowledge and personal attributes (Kinash, et.al., 2015; Lowden, et.al., 2011; York, 2006). Nevertheless, there are other definitions ranges from flexibility working for international market in different countries and in multi-cultural groups, creative, strong linguistic skills to flexibility in adapting to changing working environment.

**Table 1:** *Employability definition from 2000-2015*

<b>Researcher</b>	<b>Robinson</b>	<b>DEST (2002)</b>	<b>York (2006)</b>	<b>Lowden, K., et.al</b>	<b>Bilsland, (2014)</b>	<b>Kinash, et.al.</b>
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	(2000)			(2011)		(2015)
Attributes	elementary skills essential for attainment, sustain, and successful on a job	communication, teamwork, problem solving, self-management, planning and organizing, technology, life-long learning, and enterprise skills	is a set of skills, knowledge and personal attributes that could secure applicants and be successful in their chosen occupation(s) to the benefit of themselves, workforce, community and the economy	competencies to work in a global environment, in different countries, in multi-cultural teams, be innovative and enterprising and have strong language skills	communication, interpersonal, teamwork, problem solving, research and analytical, planning and organizing, technology, and lifelong learning skills	Institutions and employers have supported the student knowledge, skills, attributes, reflective disposition and identity that graduates need to succeed in the workforce.

In terms of the terminology of employability, phrases like key skills, core skills, life skills, essential skills, key competencies, generic skills, 21st century skills, necessary skills, and transferable skills are common. Most employers favor employability skills as the terminology in this study (The Allen Consulting Group, 2006). McArdle, Waters, Briscoe, and Hall (2007) assert that graduates must actively engage with employers in the labor market. Stagnant in job market is not good for career development (Morrison and Hall, 2002). Failure to venture into new opportunities in job market prevent graduates to learn new competency skills and put them into a comfort zone making life-long learning exists only in a dream. As we know the working environment are always changing in terms of market, consumer needs, technology and others (Kazilan, et.al., 2009).

### 3.2 Employers Expectation

In addressing employers' perspectives, Li's (2011) study on a tour company's perception on university graduates in terms of employable skills shows that the employers are dissatisfied with the personal characteristics of graduates in terms of work initiative, loyalty, responsibility, visionary skills and ability to work independently.

In relation to the enhancement of graduates' employability skills, Ramli et al. (2010) analyzed the perception of employers on the generic skills of physiotherapy graduates in Malaysia and suggested the importance of thinking and research skills, discipline-based problem-solving skills, as well as information and professional skills which should be embedded in the university curriculum. Othman et. al. (2010) suggested that changes in the method of teaching (i.e. supply side), for example, utilizing problem-based learning (PBL) can enhance the employability of graduates. They found that PBL utilized in applied mathematics can enhance employability skills of engineering graduates.

Similar to Ramli, Zaharim et al. (2009) identified the perception and the expectation of employers on skills owned by the engineering graduates in their work place. The findings indicated that the majority of those companies employing graduates have been satisfied with the knowledge and skills of the graduates they recruit. Another study by Husain et al. (2010) on engineering firms' found that graduates have information skills and technology skills that vary significantly, suggesting the diverse acquisition of skills by students with similar disciplinary background.

## **4. The Quadruple Helix Model (QHM) and Employability skill framework**

### **4.1 The Quadruple Helix Model (QHM)**

The concept of the Triple Helix of university-industry-government associations was introduced in the 1990s by Etzkowitz (1993). The concept related to the relationship of university-industry-government for the betterment of knowledge economy society. Later Etzkowitz and Leydesdorff (2002) conveys together knowledge, consensus and innovations of three (or four) major social factors: university - government - industry (and civil society) and provide better framework for social and economic development. The Quadruple Helix encourages the perspective of the knowledge society and of knowledge democracy for knowledge production and innovation. According to Ranga and Etzkowitz (2013) the Triple Helix concept describe as a set of components which are the university – industry – government, relationship between the components and functions.

The Quadruple Helix concept demonstrates the university, industry and industry are attracting innovation in a knowledge based society. The role are suggested equally disseminate

among the components and how this synergy and relationship contribute to the prospective engineering graduates.

#### **4.1.1 The Government Role**

The government has developed a policy (Engineering Technology Accreditation Manual 2015) to ensure that Higher Education Institutions offer programs to equip prospective graduates with certain knowledge, skills and attitude as required by the industries or workplace. In rhyme with the policy, the government has urged initiatives to be planned to for upskill training programmes through the MSC Malaysia MyProCertProgramme (MyProCert) related to international certification standards, the National Talent Enhancement Programme (NTEP) an attachment programme. Moreover, other initiatives include the Industry Academia Collaboration (IAC), which is a global technology alliance with local HEI in curriculum development and TTT programmes and the Technical Education and Vocational Training (TEVT) Curriculum and Trainers' Programme.

The government has initiated other employability initiatives like registering more graduates to the 1Malaysia Training Scheme (SL1M) and Graduate Management Scheme (GEMS) of more than 10,000 to 15,000 from 2015 to 2016. The first nine months of 2015, the number of jobs that appear in JobStreet.com is 1.5 percent higher than last year. However, that number was down one percent in the third quarter this year compared to the same quarter last year.

#### **4.1.2 The University Role**

Universities have been struggling with employability issues for quite some time. Many employability initiatives have been conducted by university to ensure the graduates competency comply with the skills requirements in workplace.

Teaching conventional style such as lecturer centered is a phenomenon of the past. Today's teaching and learning comprise innovative methods designed purposely to prepare student with relevant skills and competencies. Today's teaching and learning are towards student-centered learning such as outcome based-education (OBE), Problem Based Learning (PBL), cooperative learning, learning style and others. Innovation in teaching and learning methods can develop students' engagement in their learning activities. Student are more responsible on their learning. Hence, the capability of universities to generate students; new ideas, skills and entrepreneurial talents is vital in a knowledge-based society.

Technology has been an enhancing and innovative tool in teaching and learning. Gadgets with e-learning applications have been developed to gauge students' interests in learning. Students are not only technology users but technology generators, thus, shifting the part of university – from a traditional source of workforce to a foundation of producing and conveying technology. Thus, students have more options on generating knowledge and skills. They can have the world experts within the technology realms to assist in their learning.

#### **4.1.3. The Community Role**

Everyone should play an important role in generating students' employability competency. Every country is facing economy challenges, dealing with a variety of problems relating to long-term unemployment, particularly among hard-to-reach and low-skilled adults. Surprisingly, several graduates have been unemployed more than 1 year (Hanapi, et.al., 2014). As well as its significant national and local economic cost, long-term unemployment is a major contributor to household poverty and poor physical and mental health (Kuruvilla, et.al., 2007).

Members in the society can play a role by engaging the three components of the government-industry-university in projects that will develop skill, confidence, strong characters and all soft skills needed by the industry among the unemployed alumni. According to Bond (2014), community engagement in developing employability skills are numerous such as social entrepreneur, business elements and assisting unfortunate community sustenance in daily life.

#### **4.2 Employability Skill Framework**

Employability concept in this study was adopted from the definition personal skills consisted communication skills, teamwork, lifelong learning, professionalism, problem solving and decision making skills, competent in application and practice and competency in specific technical discipline were given by scholars (DEST, 2002; York, 2006; Lowden, 2011; and Bilsland, 2014) in Table 1 above. Employability skills were studied from the employer's urges and complaints regarding the lack of employability skills among their employees. The speedy technological changes (DEST,2002; Bilsband, 2014), skill gaps in the workforce will always exist (Shah et.al., 2005) and workers with technical skills only will not effectively function in today's industries(Lowden, et.al., 2011 and Kinash, et.al, 2015). In Malaysia job mismatch are evidence of non-technical skills neglected. Therefore, assessing the career adaptability among prospective technical graduate are crucial and significant for the components of quadruple helix



initiative audit. Hence, this study utilized the quadruple helix model and employability skill as the study framework.

#### **4.2.1 Why Employability is Important?**

Being employed gives the opportunity to employees getting reward in return for the task or work done. The reward is called salary and other benefits provided by the employer. With the salary people have more power in providing health, food, shelter, security and others for themselves and their family. In other situation, people who are exposed to violence are less educated and influenced by the media are amongst the unemployed (Potgieter, 2012). Therefore, a country should assist and develop employability competency program for their young generation for sustenance and growth of the country economy and moral values. In other words, they will have good job, good pay and develop good life and avoid being involved in crime or violence (Lastauskas and Tatsi, 2013; Sieger, 2014). In this context, employment is crucial in maintaining the sustainability of economy and nation.

## **5. Research Methodology**

This study utilized a quantitative method. A survey was conducted among the respondents. Career adaptability used a framework on respondents' judgement concerning their career forecasts and provisions interventions based on their desire (Rottinghaus, Buelow, Matyja, & Schneider, 2012). The objective of this study was to analyze the impact of quadruple helix model to prospective graduates.

### **5.1. Participants**

The sample (N= 292) consisted of engineering final year students of University Technical Malaysia Melaka. The respondents comprised final year students of engineering faculties were selected through stratified random sampling method. The faculties involved were Faculty of Electronic and Electrical Engineering, Faculty of Information and Communications Technology, Faculty of Electrical Engineering, Faculty of Manufacturing Engineering.

### **5.2 Instrument**

This study utilized a quantitative approach through questionnaires adopted from Engineering Accreditation Council (EAC) consist of 10 item scale of engineering employability skill and CAAS. Many studies utilize CAAS (Coetzee, et. al., 2015; De Guzman, et.al.,2013; Duarte, et.al., 2012) to assess career adaptability. Furthermore, CAAS was tested in 13 countries.

The reliability and validity of the CAAS International score was high in extant literature. Thus, these phenomena acted as the motivation to adopt Career Adapt-Abilities Scale (CAAS) as a tool to assess and explore the synergy the components of quadruple helix; universities, industries, government, and community to the career adaptability among prospect technical graduate. Can the synergy among these four helixes enhance the prospective graduates' employability competency and career adaptability?

The instrument were divided into 2 sections; Section 1 consisted of employability skills with Part A; Personal skills (7 items) and Part B; Knowledge (3 items). Section 2; consisted of 4 subscales of CAAS which were concern, control, curiosity and confidence. One item from the concern subscale 'thinking about what my future will be' was omitted. Overall, 33 items were validated. Respondents responded to Likert items in the questions with scale range from 1 (not important) to 5 (very important). Results were analyzed through descriptive statistical analysis.

### **5.3 Procedure**

The respondents were informed of the purpose of the study and asked to specify the impact of the quadruple helix model (university-government-industry-society) toward their employability competency in terms of concern, control, curiosity, and confidence. Data were collected in classroom settings after the end of lesson using a paper-and-pencil format, under the permission of class lecturer and supervision of an assistant researcher. The respondents voluntarily completed the questionnaires.

## **6. Findings**

### **6.1 Reliability and validity**

Items in the questionnaire were adopted from the Career Adapt Ability Scale (CAAS) and were analyzed using software Statistical Package for Social Sciences 22.0 (SPSS 22.0). The Cronbach alpha value of this instrument was .965 as shown in the Table 2.

**Table 2:** *Reliability and validity*

Cronbach's Alpha	N of Items
.965	33

Cronbach alpha reliability analysis was used to test the reliability of the instrument for each item being tested. In this study, Alpha coefficient method depends on the consistency of individual performance from one item to another (Mohd. Majid, 2005). This method of determining the internal consistency of the items was based on the correlation among items. A value scale for alpha coefficient is between zero to one (0-1). High alpha value indicates a high consistency between items in the set, and vice versa. Cronbach's alpha for section 1 part a (personal skills) was .914. This demonstrates an excellent reliability. Cronbach's alpha for section 1 part b (Knowledge) was .834. This part shows good level of reliability. Thus, section 1 employability has shown a very high consistency between items. Hence, greater the relative number of positive relationships, and stronger inter correlations among the items.

Cronbach's alpha for section 2 part a (Concern) was .871. Cronbach's alpha for section 2 part b (Control) was .863, Cronbach's Alpha for section 2 part c (Curiosity) was .885 and Cronbach's alpha for section 2 section d (Confidence) was .886 as a whole, the Cronbach alpha for this instrument was .965. Cronbach's alpha obtained in this study was greater than .60 as shown in Table 3.

**Table 3: Reliability Value Cronbach's Alpha**

<b>Component</b>	<b>Cronbach's Alpha</b>	<b>N of Items</b>
Section 1a (Personal Skills)	.914	7
Section 1b (Knowledge)	.834	3
Section 2a (Concern)	.871	5
Section 2b (Control)	.863	6
Section 2c (Curiosity)	.885	6
Section 2d (Confidence)	.886	6

The findings using Cronbach's alpha reliability coefficient indicated the instrument has internal consistency between 0.70 to 0.90, Table 4 shows the percentage of goodness of Alpha value.

**Table 4: A rule of thumb Cronbach's Alpha value**

Alpha value	Justification
$\alpha > 0.9$	Excellence
$\alpha > 0.8$	Good
$\alpha > 0.7$	Accept
$\alpha > 0.6$	Questionable
$\alpha > 0.5$	Weak
$\alpha > 0.4$	Reject

Source: Darren and Mallery. (2011)

Referring to the percentage of goodness for interpreting the Alpha value, the higher the value the higher alpha coefficient of reliability and validity of the instrument (Darren & Mallery, 2011). According to Alias Baba (1997), the height of the coefficient indicates the items of the questionnaire are uniform, in which the difference between the scores in individual groups is not so widespread. Hence, the items in the questionnaire can measure the concept well. These findings demonstrate that questionnaire has an acceptable reliability.

## 6.2 Data Reduction Analysis

**Table 5: KMO and Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.951
Bartlett's Test of Sphericity	Approx. Chi-Square	6729.171
	df	528
	Sig.	.000

The analysis result shows the KMO adequacy of the correlation matrix is .951. The score is marvelous (Micheal, 1994). Bartlett's test of sphericity (Table 6) tests the adequacy of the correlation matrix and yielded a value of 6729.171 and an associated level of significance smaller than 0.001. This procedure determines whether the data deviates significantly from a random matrix. Thus, the correlation matrix has significant correlation amongst at least some of the variables.

**Table 6: Total Variance Explained**

Factor	Eigenvalue	Percentage of variance	Cumulative percentage
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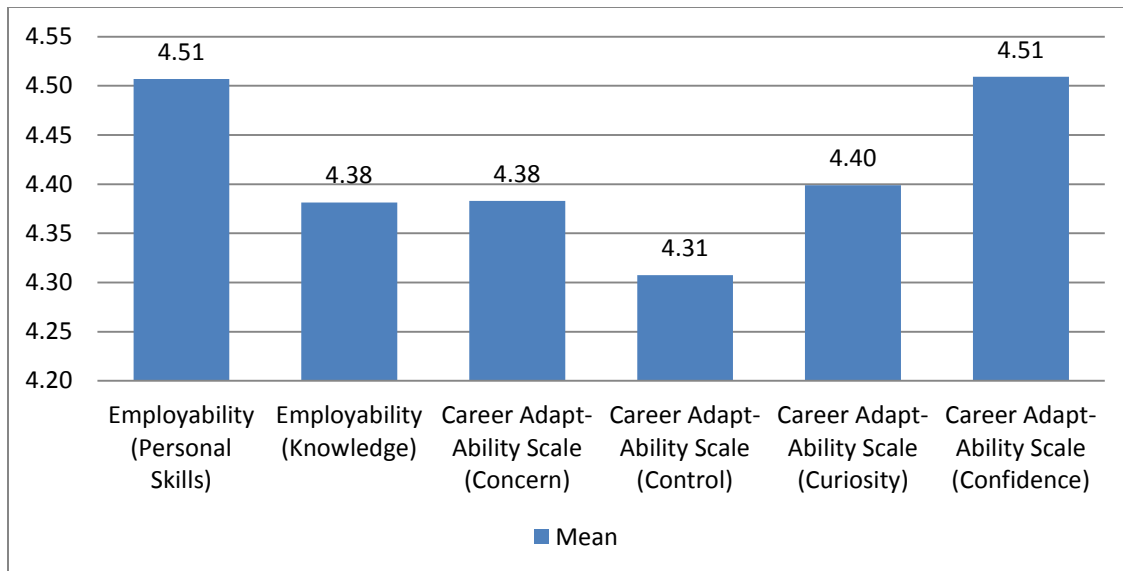
1	15.829	47.968	47.968
2	1.876	5.684	53.651
3	1.559	4.725	58.377
4	1.070	3.243	61.620
5	1.034	3.134	64.754

The result of factor analysis output Table 7 shows the Total Variance Explained using the criterion of retaining only factors with eigenvalues of 1, five factors were retained for rotation. These five factors accounted for 47.968%, 5.684%, 4.725%, 3.243% and 3.134% of the Total Variance, respectively and for a total of 64.754%. According to Lewis (1984), “reasonable comprehensiveness” is maintained when extracted factors explained at least 60% of variance. The factors are reflected on the important for success in the workplace; factor 1-concern, factor 2-control, factor 3-curiosity and factor 4-confidence.

**Table 7: Descriptive Statistics**

	N	Mean	Std. Deviation
Employability (Personal Skills)	292	4.5068	.55083
Employability (Knowledge)	292	4.3813	.62711
Career Adapt-Ability Scale (Concern)	292	4.3829	.59353
Career Adapt-Ability Scale (Control)	292	4.3076	.60607
Career Adapt-Ability Scale (Curiosity)	292	4.3990	.58358
Career Adapt-Ability Scale (Confidence)	292	4.5091	.52805

### 6.3 Descriptive statistics



**Figure 1: Descriptive Statistic**

The descriptive statistics showed that the highest score in employability section was personal skills followed by knowledge whereas the high scores in Section 2 were confidence, curiosity, concern and lastly is control, respectively. Figure 1 above also indicates clearly that personal skills and confidence both have similar score. Matching the personal skills at entry level for employment will also boost the prospective graduates' confidence and self-esteem in the workplace (Pool & Sewell.2007). The low scores were "keeping upbeat", "making decision by myself", "taking responsibilities", "sticking up for my beliefs", "counting on myself and doing what is right". Hence, the prospective graduates have problems and issues in taking self-responsibility. This supports the findings by Hanapi, et.al., (2014), which state that unemployment is caused by the quality of graduates as employers cannot see the prospective graduates take self-responsibility. The prospective graduates should take responsibility on their career development in order to sustain employability (Li, 2011;Potgieter, I., 2012).

## 7. Conclusion

In conclusion, the findings yield that personal skills and confidence have similar score, indicating that the prospective graduates are aware of the employers' requirement in the workplace. They are prepared to join the workplace with the knowledge, skills and employability competency equipped from the impact of quadruple helix model and synergy.

The impact of quadruple helix model-university-the finding shows that learning approaches taken by university such as outcome based education to enhance the employability and e-learning are paralleling with the latest approach in learning and demand from industry.

The impact of quadruple helix model-employer demonstrates that practical exposure on site or workplace has played an important practical learning experience employability competency in real scenario for the prospective graduate.

The impact of quadruple helix model-government illustrates the initiatives on employability programs and policy has developed the prospective graduate a platform for career opportunity.

The impact of quadruple helix model-society shows that participation of society in enhancing added values in psychosocial are significant too in preparing the prospective graduate for workplace. Future study should focus on examining systematic changes in factors affecting employability competency for human capital sustainability.

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