Building Innovative Ecosphere in Malaysia Higher Education

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Abstract: To creating an ecosystem of innovation in higher education institutions needs to strategic planning and implementation. Studies of adoption and existing practices for innovation is important in formulating strategies towards the implementation of a holistic innovation in higher education institutions at Malaysia. The study it was conducted at one of the higher education institutions in Malaysia. The study was conducted to determine the acceptability of existing practices and innovation in the educational institutions. The acceptance factors and practice of innovation was identifying based on six main areas such as; (i) Knowledge of innovation model, (ii) Acceptance of the application ecosystem of innovation in higher education institutions, (iii) Implementation challenges of innovation in higher education institutions, (iv) The characteristics of innovative human capital, (v) Teaching and learning approaches to embed innovation and, (vi) The general view of the education system. The results of studies generally indicate that all respondents (100%) acceptance the government's intention to foster a culture of innovation in Malaysia's higher education institution. However, the respondents also consider the adoption of an innovative culture in Malaysian higher education institutions are still relatively low level.

Keywords: innovation; innovation ecosystem; human capital innovative teaching and learning

1   Introduction

Oslo Manual (3rd Ed. 2005) define an innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations. Innovation means renewal or new things that are produced to be used in the future. Innovation results from efforts to improve an existing system or product that results from the past and the problems arising from the present. Innovation is really not a culture, but it is a philosophy in shaping a better future and excel. Innovation can be generated by the diversity of knowledge, ie knowing the need, use, consumption, production processes, exhibition and distribution. According to the Kamus Dewan Fourth Edition, innovation means something new is introduced such a method, system, and other customs. According wangdong E. Miller (1971) innovation is an idea, practice or object that is considered new by someone. Spencer (1994) explains that innovation is considered a new and better than the old one by an individual. Whereas in the Glossary of Educational Technology (1995) refers innovation as an idea, a concept or a new strategy that can improve such practice. Sufean Hussin (2001) in his paper at the Seminar on Education Policy and Management said innovation means renewal, modification, or repair of ideas, things, knowledge and creation of cultural arts of civilization in order to fulfill particular functions or fullfill the specific taste or satisfy specific market.

2   Problem Statement

Malaysia lags behind in terms of investment and productivity growth, as compare to some countries in the region. According to the chart below, it's find out labor productivity growth during the pre-crisis countries is very good. Unfortunately, the productivity growth index has dropped so sharply once during the post-crisis era, from 1998 to 2007. When the global financial crisis ended at the end of 2008, most

countries in the Asian region began to revise their growth strategies and restructure their economies to facing with challenging global economic landscape. In this context, to enable Malaysia to achieve the aspiration of becoming a high-income developed nation by 2020, Malaysia's economy to grow at 6% per annum during 2011-2015 Tenth Malaysia Plan (10MP). The transformation environment for economic growth should be implemented to allow for greater dynamism and productivity. The main challenge is to move from economy base on competed on cost and natural resources to the economy driven by productivity, innovation, and are able to develop, attract and retain talent. To achieve high-income economy, Malaysia needs to shift from a strategy based on economic diversity that made Malaysia a middle-income country to a strategy that focuses on specialization in certain economic sectors and geographies in which the country has a competitive advantage.

Table 1. The Ranking of Green Skills Required From Industries

Labor productivity growth of selected Asian countries, the average annual change				Sources of labor productivity growth for Malaysia, the average annual change		
	Pre-Crisis 1987-1997	Post Crisis 1998-2007			1987-1997	1998-2007
China	4.5	9.2		Productivity	5.5	2.9
India	3.5	4.4				
NIE Asia	4.8	3.4		Contribution		
Malaysia	5.5	2.9		• Capital	3.4	1.0
Thailand	5.2	3.1		• Education	0.3	0.3
Indonesia	3.1	3.0		• Land	0	-0.1
Singapore	4.5	2.4		Sum of factor productivity	1.7	1.6
Philippines	-0.7	2.3				

(Source; World Bank, Economy Planning Unit)

To change the economic landscape of the country, the need for innovative human capital and have the entrepreneurial attribute is very important. Through innovative human capital, is expected to enhance the survival of the country in economic growth and competitiveness among regional countries. To provide human capital with high innovative characteristics, the education system should play a key role in producing high impact in helping Malaysia to realize its goal of becoming a developed and high income nation by 2020.

3   Research Objectives

This study was conducted to:

i. Understanding and identify the current practices in higher education at Malaysia in order to adopt culture of innovation among students.

ii. Identify barriers and challenges to create an ecosystem of innovation in the Malaysia's higher education system.

4   Research Methodology

The study was conducted using qualitative methodology through document analyzes and semi-structured interviews. The respondents were academics and management in higher education institutions Malaysia. Three main documents were selected to be analysis. The three main selected are documents is (i) Document of MOHE Implementation Plan For Development of Innovative Human Capital at Tertiary Level, (ii) Document of MQA 01 for the application to run the new program, (iii) Document of Innovational National Strategy; Innovating Malaysia, Creating Wealth Through Knowledge, Technology and Innovation published by the Malaysian Innovation Agency.

Semi-Structured question have been using for Interview method. The question of interview based on a predetermined theme. The question interview was be divided into five themes, namely (i) Knowledge of innovation model, (ii) Acceptance of the application ecosystem of innovation in higher education institutions, (iii) The chalangging to implement innovation in higher education institutions, (iv) The characteristics of innovative human capital, (v) Teaching and learning approaches to embed innovation and, (vi) General view of the country's education system. Data were collected through interviews will be analyzed based on six themes mentioned above.

4.1 Interview Instruments

Interviews were conducted using focus group methods. Interviews were conducted to obtain student feedback on the acceptance and current practice by higher education institutions to create an ecosystem of innovation in Malaysia's higher education institutions. The result can be obtained by note, record and through brainstorming of respondents. It is done through the construction of semi-structured questions (Lindlof & Taylor, 2002). An interview recorded by a voice recorder to facilitate the making of transcription and analysis. Transcriptions was writing base on Swann (1993) and Fisher (1994) writing transcriptions method. The qualitatve data were analysed by used the interpretation of Cohen's Kappa index (Cohen's Kappa, 1999).

The interview protocol was built in order to get information about adoption and current practice in higher education institution in order to build an ecosystem of innovation. In the interview session, questions were relating with the research objectives. The basic interview questions are designed so that interviews should not deviate from the original objectives of the study. Interviews allow more accurate information available (Cohen & Manion, 1994). There are seven steps proposed to interpret the interviews conducted as recommended by Bogden and Biklen (1992):

Step 1: Transcribe all the answers in interviews.
Step 2: Read the transcript several times to familiarize themselves with the content required to get the whole data as needed.
Step 3: Read the research questions and theoretical framework research repeatedly to ensure the question was designed able to achived the goal of the research.
Step 4: Develop the preliminary categories based on specific keywords and phrases.
Step 5: Determine the categories, themes and patterns shown in the transcript.
Step 6: Develop a sub-category to another.
Step 7: Repair or delete any unnecessary questions.

5120

4.2   Innovation Implementation Model

STTAIN Model (AIM, 2009) is the main model of innovation that should be documented in the reference by all higher education institutions in Malaysia to implement and create an ecosystem of innovation. In addition, there are various models that were introduced to create an ecosystem of innovation in the higher education system. Unfortunately, the models introduced quite complex and many thought it might be blocking someone for innovative creativity. This complex model is written nicely on paper, but can not be implemented properly as a result of misunderstanding the staff to implement it. Accordingly, a model of concise, clear and easily understood should be introduced. According to Prof. Dr. Abu Hassan Hasbullah, professor of creative futures stated that innovation can be created by five major phases. The first is through the novelist ideas. The novel idea will be able to embarks improvements to the system or whether an existing product, then the idea was developed to development. The second phase is planning to realize the idea. The third phase is the implementation of a product or system development. The fourth phase is the exhibition of products or spreading systems to be implemented. The fifth phase is the distribution system and, sixth phase is the evaluation of a product or system innovation implemented. Model introduced by prof. Dr. Abu Hassan Hasbullah known as the monsun model and has been implemented in the Faculty of Creative Technology and Heritage, Universiti Malaysia Kelantan.
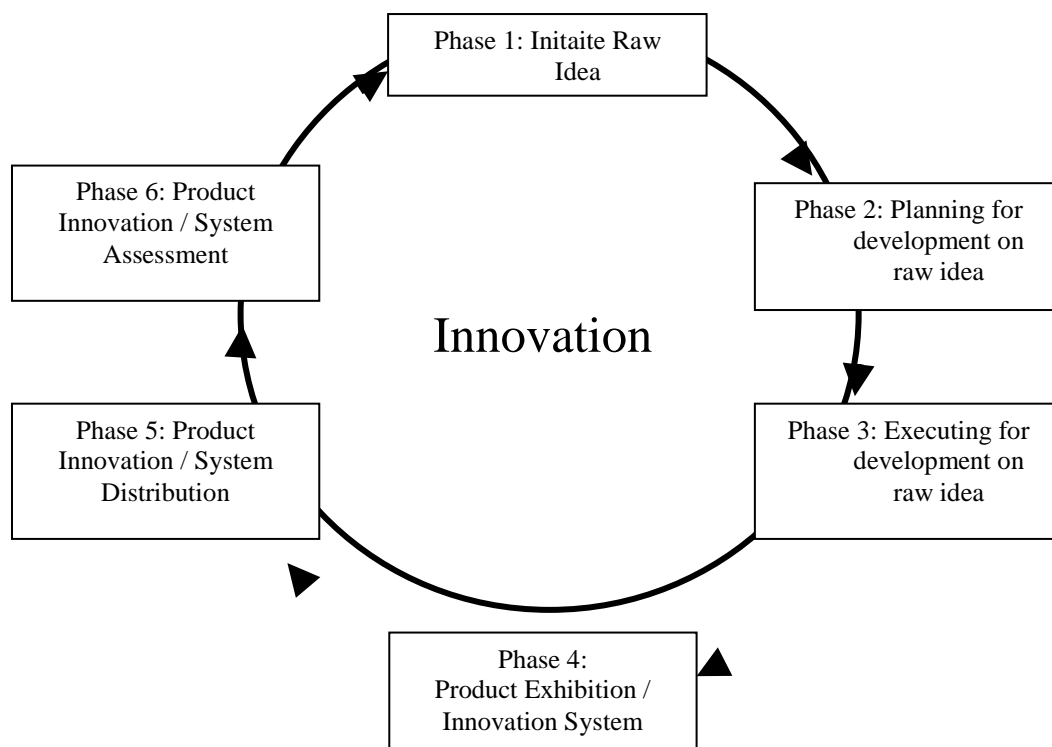
Monsun Model, 2013
(Sources; Prof. Dr. Abu Hassan Hasbullah, Dec)

Figure 1. Monsun model

4.3 Practice Application Ecosystem Innovation in Higher Education Malaysia

Malaysian higher education under the Ministry of Higher Education Malaysia has outlined guidelines for implementing innovation in higher education in Malaysia. These guidelines have been incorporated in the document MOHE Implementation plan for development of an innovative human capital at tertiary level and national documents innovational strategy; Malaysia innovating, creating wealth through knowledge, Technology and Innovation of Malaysia published by innovation agency.

Through this document, STTAIN model (AIM, 2009) has referred to and intended to be implemented in every Malaysian higher education institution. Theoretically, the STTAIN model is very complex and spans the whole aspect that needs to be pressed in raising the level of innovation and creativity. However, the implementation of the model STTAIN is still in argument stage. Not many people know about the STTAIN model even been introduced a long time. The study also found that most of the respondents who were interviewed were not clear and didn't understand the meaning of STTAIN model.

Innovation must be fostered among academician, non-academician and students. Fostering innovation requires holistic planning. It should begin with management's intentions, wishes and very committed to innovation as a key platform in developing quality human capital in Malaysia. Ecosystem of innovation can be nurtured and developed on the flow chart below:
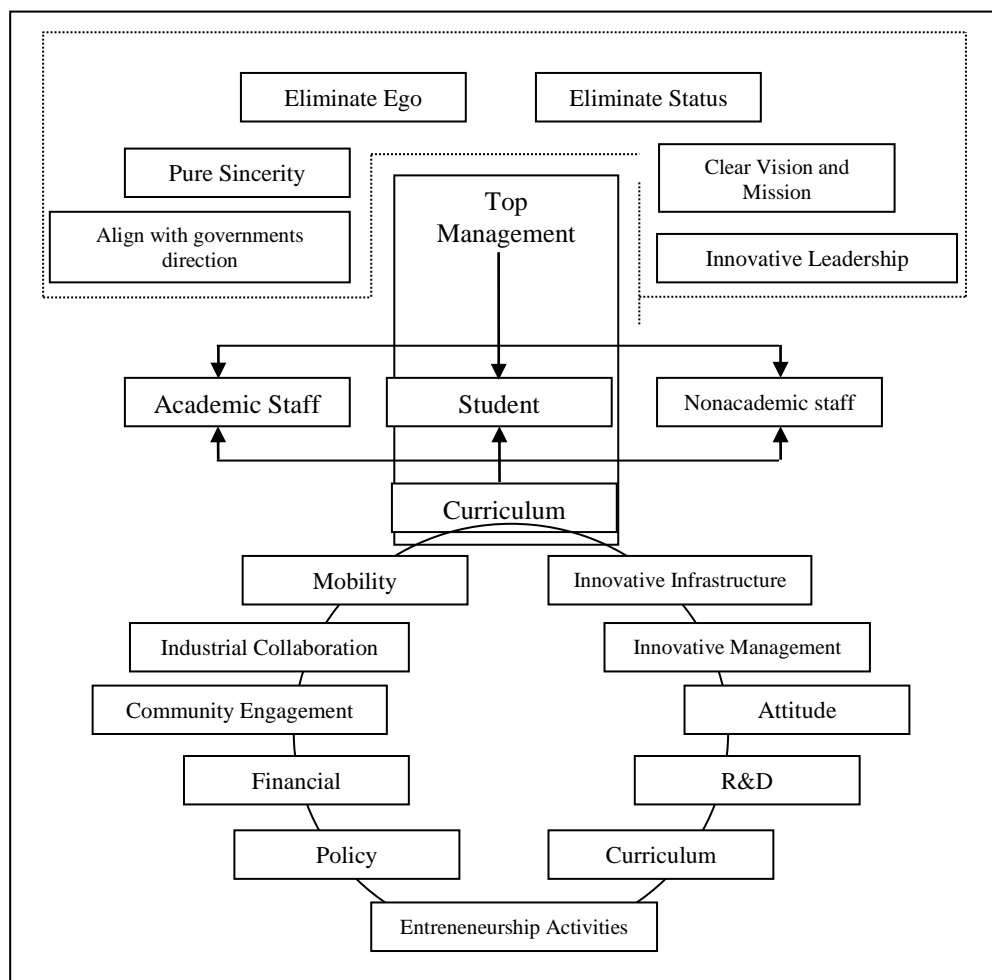

Figure 2. The Flow to Build Innovation Ecosphere

5   Analysis and Findings

Data were collected from the documents and interview analysis

5.1 Document Analysis

   i. Data were derived by analyzing three key documents that support and assist the government to implement innovation in higher education institutions. The three documents are: Documents MOHE Implementation Plan for Development of Innovative Human Capital at Tertiary Level.
   ii. MQA01 documents for the application to run the new program.
   iii. Innovational National Strategy Document; Innovating Malaysia, Creating Wealth Through Knowledge, Technology and Innovation published by the Malaysian Innovation Agency.

Through the analysis towards three main documents in the development of curriculum in Malaysian higher education institutions, show that the elements to foster innovation very well. All three documents are reviewed, pointing to the need to foster innovation very well. In addition, all three documents have to be very significantly. Documents MOHE Implementation Plan for Development of Innovative Human Capital at Tertiary Level is foundation to formation the concept of innovation in higher education. The document of MQA 01 is a very complete document in initiating and developing new programs to be conducted in every institution of higher education. This document provides guidelines and a clear space to allow each institution intends to carry out a new program to figure out the basis for developing and implementing innovation in all aspects of support and develop programs of study. Institutions of higher education are planning to organize a new program must provide all equipment based on nine main aspects mentioned in the document MQA 01. Nine aspects are as follows;

   1. The vision, mission and objectives of education
   2. Curriculum Design and delivery
   3. Student's Evaluation
   4. Choice and student support services
   5. Academics staff
   6. Educational resources
   7. Monitoring and program review
   8. Leadership, governance and administration.
   9. Continuous quality improvement

However, all the facts and information regarding the adoption of innovation is only nicely stated on paper. The implementation is still in early stage. There are many staff who are confused and do not understand to foster a culture of innovation towards students. Even more unfortunately, many staff who do not understand the needs and aspirations of the government to adopt and create an ecosystem of innovation.

5.2   Data analysis Interviews

The interview data were analyzed as proposed by Bill Gillham (2005) as follows:
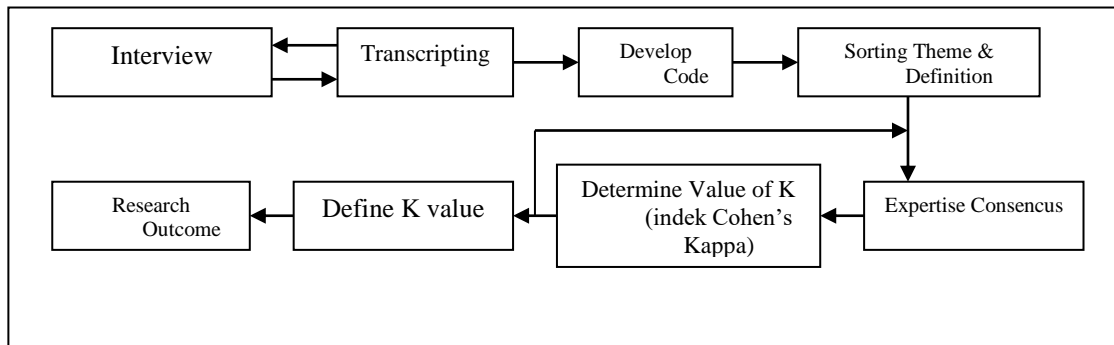

Figure 3. Steps to analyse qualitative data from interview (Bill Gillham, 2005)

The interviews session was conducted by followed the interview's protocol. Once data is collected, it's sorted and transcribed. Furthermore, the transcription been coded to identify the arrise themes. Then, the themes be mapping in order to define the transcription. All definitions which is already compiled will determined their validity and reliability value by the frequency of K based on Cohen's Kappa index. In this regard, there is an opinion in interpreting the index K Cohen's Kappa. Judith and McNary (1999), states that no one particular Kappa coefficient values indicate a very good value and very weak. But Landis and Kosh (1977) suggest that the interpretation of the scale Kappa done at the rate shown in the table 2.

Table 2. Interpretation of Kappa Scale

Value of Kappa	Interpretation
< 0 – 0.00	Very Weak
0.00 – 0.20	Weak
0.21 – 0.40	Moderate Weak
0.41 -0.60	Moderate
0.61 – 0.80	Good
0.81 – 1.00	Very Good

The method used is a semi-structured interview. Individual interviews were conducted on 8 samples which are obtained 4 staff in management and administration sector and 4 academicians who were randomly selected. The interview is conducted regarding to the interview protocol which is prepared in advance.

Interview transcriptions have been analyzed manually. While there are several software that can be used, but it cann't replace the process of interpreting the significance of the data requires the identification of meaningful categories and find the relationship between each of these (Bogdan &

Biklen, 2003). The first step to analyze the interview data is to build an appropriate code and sorted in different categories after reading the interview transcriptions in many times. There are various types of coding such as context categories, perspectives, ways of thinking, the definition of situations, processes, activities, strategies, social relationships and narrative categories (Bogdan & Biklen, 2003).

The selected coding with each catagories in this interview transcription analysis is from the perspective categories. Bogdan and Biklen (2003) stated that the coding of perspective towards the general views of respondents which is covered overall notion or definition from respondents towards a percular aspect. Looking to the entire of interview protocol, most of the questions give their views on certain issues, especially issues of innovation adoption in Malaysian higher education institutions. The next step is to identify their views on the themes that emerged for each interview question. Recognition is done in accordance with the theme of phrases and sentences that reflect the emergence of a particular theme (Tappan, 2000). There are many clues in the form of sentences and words that are highlighted represent the emergence of a particular theme. The subjects involved in this interview will be coded into two parts;

  i. Management - P1
 ii. Lecturer - P2

From the interview arranged by themes that emerged during the analysis. Analysis of interviews conducted based on six themes which is (i) Knowledge of innovation model, (ii) Acceptance of the application ecosystem of innovation in higher education institutions, (iii) The challenging to implement innovation in higher education institutions, (iv) The characteristics of innovative human capital, (v) Teaching and learning approaches to embed innovation and, (vi) The general view of the current national education system.

i. Knowledge of Innovation Model

Through a review of documents and interviews conducted, it was found that 50% of respondents weren't aware of the existence of STTAIN model. While 25% of respondents are aware of STTAIN model but less clear and didn't understand the concept and content of the model. Only 25% of respondents understand the STTAIN model. When we give some explanation about STTAIN model to the respondents, 100% of respondents stated that the model is quite complex and need to be summarized and come up with other simply model to make all parties easier to understand, especially for whose are need to implement in their teaching and learning process.

ii. The acceptance of the application of the innovation ecosystem in IPT

Through the interview, it was founded that 100% of respondents indicated a very good interest to implement and support the need to produce the innovative human capital. All respondent also agreed the needs to create the holistic innovative ecosystem. Teaching and learning should be supported by a variety of elements and factors that drive toward innovative ecosystem instead of implement in silo method it self. Respondents think there are several factors that need to be streamlined and enhance in order to create an innovative ecosystem specially to support the process of teaching and learning as a core to generate innovative human capital. These factors are:

1. Curriculum
2. Management and administration system
3. The attitude of students and staffs
4. Research and development
5. Facilities
6. Governances
7. Policies
8. Financial
9. Community Relationship
10. Industries Cooperation
11. Mobility of students
12. Entrepreneurial opportunities

iii. The challenge of innovation implementation in HEIs

All respondents (100%) agreed that most of the problems and challenges to instil a culture of innovation among students and staff is attitude. Overall respondents felt that students and staff should have a positive attitude. Students and staff cann't perform the job half-heartedly. They must have a sense of love and passion in any field and task they have it. Passion to learn or perform assigned duties, making them ever thought to make improvements from time to time. Improvements process should be implemented through strategic planning and in proper ways.

Therefore, 100% of respondents felt that the element of research and development is essential in order to develop a culture of innovation. Students and staff are exposed to the research will begin to think creatively and innovate. The way of thinking will be able to mould a good character in order to produce the creative and innovative human capital.

Respondents also felt that the existing education system needs to be strengthened, especially in the aspect of experts and intellectuals who implement the existing system. The employee whose are offered as academician should be taken based on merit. An academic staff shall have a high level of expertise in their respective fields. The composition of the expertise and knowledge which proposed is 60% competent in hands on skills or practical and 40% covered in theoretical skills.

There are 87.5% of respondents felt that a culture of innovation cann't be fully applied in the system of institutions of higher learning in Malaysia if the administrator or the top management still stick with the old approach. Staff and students' creativity should not be blocked. The radical opinion it's come from staff and students always simply ignored by top management. One-way communication style of leadership, from top to bottom will not encourage innovation among staff. The atmosphere here is just eliminating the creativity of staff to innovate in the context of their daily tasks.

iv. Features innovative human capital

100% of respondents expressed the same views and opinions about the need features that should be have toward innovative human capital. All respondents agreed the characteristic of innovative human capital is like to innovate, optimistic, willing to face with challenge, a risk taker and always thinking on every crisis or problem in order to enhance and improving the issue. Such features are usually available on a successful entrepreneur.

All respondents also noted that the students need to embed with entrepreneurial attributes in order to produce innovative human capital. Critical thinking and criticism must be nurtured at preliminary education. Most respondents also agreed that early education should also be studied in order to apply innovative elements. Students need to learn how to be pro-active. The concept of student-centred need to be implement from kindergarten.

v. Teaching and learning approaches to embed innovation

In overall, the whole respondents (100%) stated that through the studio-based learning, the level of students' innovation and creative will be emphasized. The invention of product or sytem will manage from the novel idea due proper plan to develop the idea into a concrete form. The development processes come up after all the planning and illustrative model set. Through the product development, the process of critical thinking and criticise have organised in order to develop innovative attribute among students. Freedom for student decision making and planning is seen from the point of helping students develop the innovation to a greater good.

Financial factors play a main role in developing student's creativity and innovation. 37.5% of respondents stated that most of the innovation stage of development and implementation need a financial support to realized it's. However, 62.5% of respondents think that someone with a high innovativeness should have been more creative thinking to get the financial resources to realize their creative and novelist ideas.

vi. Publics Opinion against National Education System

Generally, the respondents stated that the education system should be revised which is every component in education system will be able to support the existence innovation ecosystem. Respondents also mentioned the national education system is not in line with the current practiced at schools and universities. The approaches of teacher-oriented learning were implemented at school, while the approaches of student-centered learning were implemented at tertiary level. The learning approaches is very contradicted and not in line and not supported with each other.

Overall, the respondents also felt that the school curriculum does not encourage the development of thinking and culture of innovation among students. The approaches of exam-oriented just blocked students' innovation mindset.

6   Conclusions

This research aims to identify, understand and make recommendations in order to improve and refine the current system of higher education in context of creating an ecospeher of innovation in higher education. In addition, this study was also conducted to identify current practices adopted by higher education institutions in order to produce and develop innovative human capital. To produce human capital with high level of innovative and creative is one of the government requirements in order to realize the government intended to make Malasia as a developed nation by 2020.

Overall, result from interview transcription shown the acceptance and current practice to créate innovation ecosphere at higher education system is still in lower level regarding to implementation aspect. From this interview, the factors (i) Knowledge of innovation model, (ii) Acceptance to embeded innovation ecosystem in higher education institutions, (iii) The challenging to implement innovation in higher education institutions, (iv) The characteristics of innovative human capital, (v) The approaches of teaching and learning in order to embed innovation and, (vi) The general view against national education system was asking. In general, the interview results were found that most respondents gave very positive view of the acceptance and the need to create an ecosystem of innovation in higher education institutions. However, most respondents felt that the implementation to create an ecosystem of innovation in higher education institutions is very slow.

Based on the findings, it was found that teaching and learning can not be implemented without some element of innovation that includes the support of the environment parameters. There are many parameters that affect the teaching and learning process. However, it was found that the overall parameters are described in the document MQA01. MQA01 document is a document that must be completed by each institution to get approval to carry out a program of study at the institution. However, there are still some elements that are not included in the document MQA01 that should be emphasized. Elements of the process of governance or governance runs one way is seen as a factor that is preventing the development of innovation. Factors afraid or hesitant to make a decision among the staff and students as a result of the ego factor, keeping the status quo and so on among administrators and management, students or staff feel they can not or are not allowed to participate in contributing any ideas that may embarrass the supposedly authoritative. In addition, a key factor to the development of students' attitudes also pressed the MQA document. All the great infrastructure could not create innovation ecosystem where students and staff have not changed their paradigm from negative attitudes, rebellious, lazy, lack of confidence and so to a more positive attitude and good. In addition, the administration also should be more open-minded and always ready to listen, discuss and receive ideas and suggestions from students and staff. Openness is addressed in a rational and professional culture of innovation will increase among the organization.

Awareness and acceptance of the need for innovative human capital needs to be applied to in the students and staff. Through awareness, understanding and acceptance high on the changing world of product-based economy to an innovation-based economy, then hopefully staff and students will be better prepared to face the challenging times ahead with making themselves as innovative human capital. With the government's aspiration to turn the country into a developed and high-income countries can be achieved by the year 2020.

7   Acknowledgement

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