



## Research and Innovation Impact of Entrepreneurship Management in Electrical Engineering Faculty

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### ABSTRACT

The huge recent changes in the engineering world have created both challenges and opportunities to the engineering literacy. The engineering faculty is changing to meet these challenges. More and more engineering programs endeavour to include entrepreneurship, innovation and moral values in the engineering curriculum. In this paper, we present our view on entrepreneurship management to future engineers and staff and describe our experience in introducing entrepreneurship in Electrical Engineering Faculty (FKE), Universiti Teknologi MARA, Shah Alam, Malaysia. Entrepreneurship management at FKE has the mandate to equip the students and staff with functional knowledge and skills to build their character, attitude and vision. It has a vital role in developing eco-system that promotes innovation and develops entrepreneurial culture, which drives wealth creation and gives further push to innovations. This necessitates pro-active policy interventions in favour of entrepreneurship. Initiating a fruitful discussion on entrepreneurship management, this paper tries to conceptualise the entrepreneurship education, starting from genesis of term 'entrepreneur', its definition, nature and new role of academic staff and non-academic staff in fostering young entrepreneurs.

**Key Words:** Entrepreneurship management, Entrepreneurship, Entrepreneurial Teacher

## 1. INTRODUCTION

In this era of global work practices and technological innovations, there are individuals who always 'think outside the box'. These individuals have a passion for novelty and like to distinguish themselves from others. Legendary world entrepreneurs such as Bill Gates, Steve Jobs, Narayana Murthy and young entrepreneurs like Larry Page, Sergey Brin (co-founders of Google) and Mark Zuckerberg (CEO of Facebook) have set the bar for being the most inspirational and influential entrepreneurs in their respective fields. Balasubramanian (2012) argues that entrepreneurship is the key facet of any nation's economy and is the crucial driver for employment and economic growth. It touches human lives through introduction of new technologies, products and services. Entrepreneurs, through their creativity and ingenious approaches to overcome failure, improve the world by innovation and help build a society that is richer, socially skillful and technically advanced. Entrepreneurship education basically focuses on creation of entrepreneurial culture. It helps potential entrepreneurs to identify and pursue opportunities. It is not limited to boosting start-ups, innovative ventures and new jobs. Entrepreneurship is a competency for all, helping young people to become creative and self-confident in whatever they undertake.

## 2. FKE Institutional Environment

Electrical Engineering Faculty (FKE) supports and promotes entrepreneurial spirit and initiatives throughout the management level, emphasizing on the main core businesses: Management and Administrative, Academic, Publication and Student Affairs. Strong support systems from the staff with good ethical conducts are the major backbone of the creation of "Quality Graduate" from FKE which is in accordance to the motto of "The Best Ever Life @ FKE The BEST" as shown in Figure 1. In order to make sure that staff are fulfilling their responsibility with passion and happiness, various seminars and training modules have been planned to be conducted to ensure quality among the staff.



Figure 1: FKE Institutional Environment

We envision being an entrepreneur-producing faculty of 2.2% of the graduates of Faculty of Electrical Engineering by 2020 and our mission is to develop, nurture and produce graduates with entrepreneurial traits, competencies and skills that enable them to seize and exploit opportunities in business. There are three objectives for the mission:

- to nurture and instill the skills of entrepreneurship among the student of Faculty of Electrical Engineering,
- to assist and facilitate the students in identifying business opportunity and starting up new business, and
- to increase the employability of FKE graduates to 100%.

### 2.1 Entrepreneurial Committee

The entrepreneurial committee in FKE, UiTM was set up in the end of 2011 which consist of six members and led by a coordinator as shown in Figure 2. The committee is responsible of conducting programs and activities that can nurture and instill the skills of entrepreneurship among students. This committee aims in producing future graduate entrepreneurs who are competent, independent, and capable of identifying and creating opportunities, innovative, competitive and willing to undertake calculated risk and ethical.

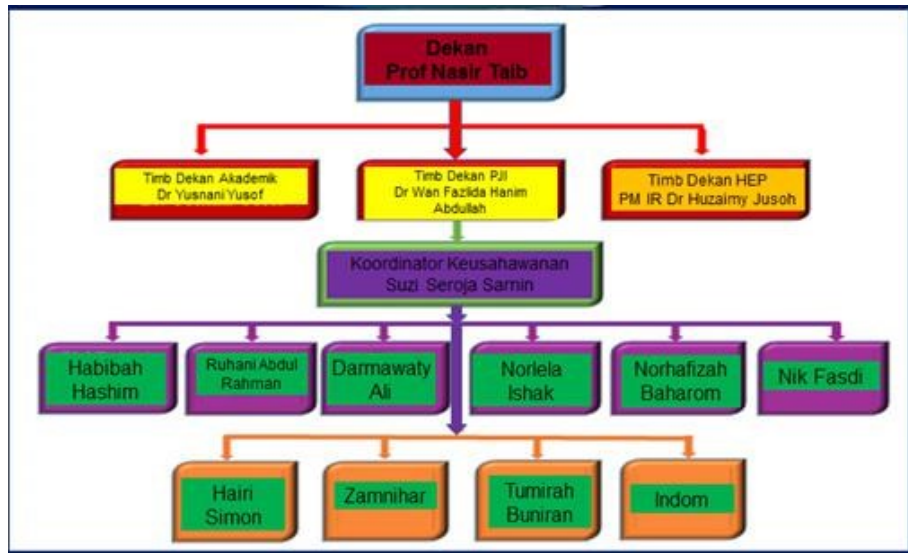


Figure 2: Entrepreneurial Committee of FKE

## 2.2 Entrepreneurship Policy Framework in FKE

FKE has always recognized their staff and students involvement in entrepreneurship. For staff, their contributions are acknowledged and awarded through quality appreciation ceremony such as Quality Day @ FKE and Appreciation Day @FKE which is held once a year. Nevertheless, the students are appreciated through Malam Anugerah Kecemerlangan Akademik (MAKA) and Malam Pra-Graduan. Figure 3 shows the key components of the framework. The related key performance indicators of the framework are shown in figure 4.

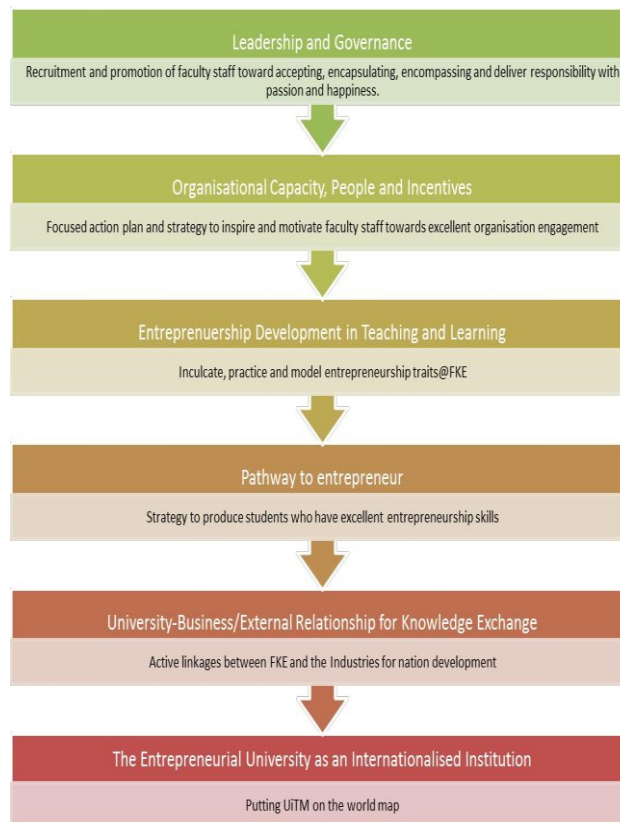


Figure 3: Entrepreneurship framework key components of FKE



Figure 4: Key performance indicators

### 2.3 Entrepreneurship Support

FKE always provides tremendous opportunity and platform for their students towards enterprise and graduate entrepreneurship. This is being done through some of the courses being offered where the main outcome is to instil the skills of entrepreneurship amongst students. FKE anticipates producing 2.2 % of the graduate involvement in entrepreneurship. Students are exposed to real business environments through entrepreneurial activities organized by the students' clubs such as Electrical Engineering Association (ELETA) and Persatuan Pembangunan Fitrah Insan, Keusahawanan, & KerjayaIR (FIKIR) where they are fully funded by FKE. On the other hand, the Invention and Robotic Club (IRC) of FKE is the place for students who are interested to be creative, innovative and expand their ideas in the robotic world. Students and staff are actively encouraged to participate in the innovation competition such as Innovate Malaysia Design Competition, Freescale Cup and to have linkages with the industries. Figure 5 displays the entrepreneurship supports by FKE.



Figure 5: Entrepreneurship supports

Social entrepreneurial has become a new interest to FKE. We have always been at the forefront to improve social justice and mobility through continued focus and investment in science and technology (S&T). As part of the government effort, we have conducted the science to action (S2A) program through “My Arduino Science Challenge 2.0” in order to inculcate the awareness and interests towards science and technology amongst the primary and secondary students. We have also invited the Alumni especially those who involved in the entrepreneurship to speak on their achievements and success stories through a program called “Technopreneur Talk”. By doing so we hope students will receive insight as they will be more fully equipped for their futures.



Figure 6: Linkages in FKE

### 3. Entrepreneurial Impact

FKE strategy highlights the need to embed creativity, research, innovation and entrepreneurship into education and proposes a number of actions to FKE staff and students. Staff and students indulged themselves in researches that produce new discoveries, invention and innovations.

### 3.1 Research

Entrepreneurship education produces champions of research. Entrepreneurship graduates are significantly more apt to be involved in developing new products than non-entrepreneurship graduates. Entrepreneurship graduates spend more time in R&D related activities, work with products that had shorter life spans and are more often employed full-time in high-tech industries. Figure 7 shows the total numbers of publications from 2009 to 2016. It shows that the publications are increasing every year and we have targeted to reach 2000 publications by 2016. Entrepreneurial in FKE is designed to empower staff and students to demonstrate enterprise, innovation and creativity in research, teaching and pursuit and use of knowledge across boundaries. We anticipate that by the year of 2016, 100% of our staff will be the principal investigator of research grants as shown in Figure 8.



Figure 7: Total number of publications



Figure 8: Total number of principal investigator

### 3.2 Innovation Competitions

FKE is involved in many innovation competitions in order to expose and incite deliberate application of information, imagination and initiative in deriving greater or different values from resources and includes all processes by which new ideas are generated and converted into useful products. Table 1 shows the awards won by FKE in year 2016.

Table 1: Innovation awards 2016

YEAR	INNOVATION	AWARDS
2016	PERTANDINGAN IIDEX 2016 Date : 7 December 2016 Venue : Dewan Kuliah A, UiTM Shah Alam	<ul style="list-style-type: none"> <li>• 20 gold</li> <li>• 20 silver</li> <li>• 20 bronze</li> <li>• 1 Best Project Award</li> <li>• 1 Industry Choice Award.</li> </ul>
2016	Invention, Innovations and Design (IIDEx 2016) Date: 20-23 September 2017 Venue: Dewan Agung Tuanku Canselor (UiTM)	<ul style="list-style-type: none"> <li>• 9 Golds</li> <li>• 8 Silvers</li> <li>• 8 Bronzes</li> </ul>
2016	27th International Invention, Innovation And Technology Exhibition (ITEX 2016) Date: 12-14 Mei 2016 Venue: Kuala Lumpur City Centre	<ul style="list-style-type: none"> <li>• 3 Golds</li> <li>• 1 Silver</li> </ul>
2016	3rd International Innovation, Design And Articulation (I-IDEATM2016) Venue: 27 - 29 April 2016 Tempat: UiTM Kampus Perlis	<ul style="list-style-type: none"> <li>• 1 Silver</li> </ul>

### 4. Conclusion

Innovative and entrepreneurial initiatives in education show big influence on and shape our graduates' personality. We nurture the innovative characteristics through teaching and learning where we seek to provide students with insights to problems and issues associated with establishing and managing the development of any innovative enterprise or project. Entrepreneurship education has a positive impact on the entrepreneurial mentality of young graduates in such a way that it changes their perspective of intentions towards entrepreneurship, their employability and finally on their role in society and economy.

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