ENGINEERING AND ENTREPRENEURSHIP – THE WWW.1.MY WAY

1Lee Yee Loon, 2Koh Heng Boon & 3Lee Earn Pin
Universiti Tun Hussein Onn Malaysia
1ahloon@uthm.edu.my, 2koh@uthm.edu.my, 3pin@1.my

ABSTRACT

This paper reveals the secret history of Silicon Valley and selected survey on engineering and entrepreneurship education. It explores myths and realities about research and disruptive innovation. Personal experience on creating value from research is discussed. The www.1.my venture launched by an engineering graduate of UTHM is revealed. Strategies to exploit intellectual property and expedite commercialization for viable research products are discussed. Creating a culture of innovation for universities and SMI is proposed. Graduates are encouraged to startup with academics as advisors. Smart university-industry (UI) link should be the lasting benefit. Way forward for research and innovation is highlighted.

Keywords: Engineering, entrepreneurship, culture, disruptive innovation, smart UI link

Introduction

The secret history of Silicon Valley by Steve Blank has inspired me to share with others my thought on engineering and entrepreneurship. Steve Blank’s presentation has been posted on www.facebook.com/kuikwall. He shared his experience on events which prompted research into advanced electronics for military applications. I focus on the art of peace and prosperity. It comprises two short stories on engineering research and entrepreneurship. It is an attempt to explore beyond the norm with elements of intuition. It is intended to spark renewed interest in disruptive innovation for generation of knowledge and creation of wealth. Emission trading is another potential for developing countries to venture into clean development mechanisms.

Gibb A.A. (1993, 2000) explored the relationship of enterprise education to broader educational goals. He discussed enterprise culture to industry and education management and steps to be taken within the education system. He discussed several issues in another paper on relationship management, assumptions relating to governance and the academic approach to policy research. He stressed the need for more comparative work to ensure a more entrepreneurial future for academics and a higher rate of learning and change in their ways of thinking.

Jack, S (2010) collected data over a six-year period which allowed network to be mapped. Structural characteristics and in-depth detail about network dynamics and change processes over time were studied. Findings show how network structure shifts from calculative to effective ties and demonstrate the importance of social ties for the operation of a network.

www.1.my

Earn Pin (pin@1.my) developed a passion for IT while he was pursuing his first degree in electrical engineering in UTHM (previously KUiTTHO). I was writing up my PhD thesis then and applied for the Intensified Research into Priority Areas (IRPA) research grant. Upon approval of two grants, Earn Pin was engaged to assist me under the working student scheme. We formed the IT-Lodge (www.it-lodge.com) team and explored possibilities. We were striving to turn biomass disposal problems into opportunities for research and innovation. We focused on water treatment and soft soil construction problems. Earn Pin’s final year project was a web-enabled water treatment system. Together with Kok Hou, we developed a microcontroller-based remote monitoring and alert system. A patent was filed in 2006.

Your Website Solution Sdn Bhd (www.1.my) was started with the motto ‘be the first!’. I was the Research Advisor. We applied for Cradle Fund to develop the PPB online, a research management system for KUiTTHO. We also developed several systems for students to retrieve marks online and via SMS. As recipient of Cradle Fund, we had opportunities to meet many entrepreneurs. Some articles were posted
in our blog. I focused on education while Earn Pin strived to create wealth. Our mission was to contribute to children deprived of education in Cambodia.

A novel system was created to match advertisement space owners and businesses looking for creative solutions in marketing. A creative system http://www.kumomo.com was born! The domain name was inspired by the name of a tree that heals. Fund raising was tough. We approached many potential investors to support our system development. We did not succeed after many attempts. I decided to spend some time away from the University to assist Earn Pin in the noble venture. I was on sabbatical leave for 5 months in KL with G&P Geotechnics Sdn Bhd, owned by Ir Dr Gue See Sew, my UTM classmate in the early 70s. While updating myself on geotechnics, I managed to follow up on several matters related to innovations. We managed to raise the fund for two Kumomo schools in Cambodia when we sold the domain name later on.

Earn Pin’s latest work on How to start an online business covers various perspectives of IT entrepreneurship. He covered in a unique manner myths and realities of online business. We hope the readers will be inspired after reading this book and explore with wisdom to create value in sustainable endeavours.

Although my passion was concrete and construction, I realized the relevance of IT for sharing knowledge globally. We developed IT-Lodge modules on R&D, teaching-learning and skill training. We published IT-Lodge Series on HTML and LINUX. We looked at ways to provide shelter for the homeless affected by natural disasters. We developed fast track construction system (branded as the KUiK wall later) incorporating a remote monitoring and alert system. We learnt to file patents and took part in exhibition and competition. We won the first gold medal in 2005!

Engineering and Entrepreneurship

It was a blessing in disguise! Who could imagine that the once deserted Politeknik Batu Pahat (PBP) is now UTHM, the rising star among the 20 public funded universities in Malaysia! I got a transfer to work in PBP which has been closed down for several years for rehabilitation work. All ground floor slab sank due to structural design fault. The place appeared to be a haunted with bushes all over the campus. Some staff were afraid to go to the back of the campus alone. Thought of disruptive innovations with controlled density material derived from biomass and solid wastes was in my mind.

While I served as the Head of Development and Maintenance of the Polytechnic Staff Training Centre (PLSP), I often attended meetings in UTM Skudai. On a special occasion I met Prof. Dato’ Ir. Dr. Zainai Mohamed who encouraged me to do PhD part time. He was the Dean of Graduate School then. I discussed the matter and my proposal with Prof. Ir. Dr. Mohd Warid bin Hj. Hussin who agreed to supervise me. I made a bold decision to register in 1996.

Life was tough! I had to pay fees without scholarship and research grant. I approached many companies for financial support without reply. One day I noticed an advertisement by Blacktop Industries Sdn Bhd about prestressed concrete pile. The factory was located in Semenyih. I called to make an appointment with the managing director, Mr Chu Ah Nge.

The first impression can be deceptive. Mr Chu appeared to be a simple person and dressed up very casually. He was personally cleaning up the factory compound. We had a good chat about concrete and construction. I learnt that he planned to set up a plant to produce cement bricks. I offered my service to test his products as I was the Head of Concrete Laboratory. He agreed and asked me to bill him for services rendered. However, I offered quality prompt services and built up good rapport.

My first research grant

I updated such development to Prof. Warid and he asked me to try to get some financial assistance. I had monthly visit to Blacktop. I usually brought along test reports and relevant information such as standards and competitors in the market.

I asked if Blacktop could support the cost of traveling and development. He agreed without hesitation and wrote a cheque of RM10,000 on the spot. He also agreed to set up pilot plant according to the requirement
of my PhD project. It was my first research grant! It paved way for several patents on sustainable products and processes.

KUiK Wall - CSM’s 1 cent story

“Are you joking? Invest 1 million to make 1 cent profit per piece of brick!” This thought will certainly come across your mind if I tell you “It’s true. You need to invest 1 million in a cement brick plant and the profit for a piece of brick is just 1 cent during recession.”

I like to share the experience of some members of CSM who have survived various challenges and prospered. We are able and willing to share with you the critical success factors in construction material business. We managed to convince several licensee of KUiK wall IBS system because they realise that the return of investment could be 100 times faster as the profit for a piece of ecoCrete block is at least RM1. A cement brick plant typically produces 8000 pieces of bricks per hour. I may take about three years to breakeven.

I quoted facts supported by extensive market survey conducted by consultants appointed by MTDC. I showed my potential licensee the production process and test reports plus numerous awards won since early 2000. I also quoted success stories of CSM members. We are launching concrete entrepreneur development programme and CSM award for enterprise. CSM has to serve and concrete and construction industry in order to survive and prosper. The academics are not left out as we also launch CSM-UTHM’s International Journal on Sustainable Concrete and Construction and aggressively promoting Lean Startup.

BioGen Venture

While I was in Kedah with POLIMAS in the 80s, I noticed the common practice of open burning of rice husk. The effect was smoke and dust and the unsightly residue along the road. I suggested to Kok Kean, the managing director of Ban Heng Bee Rice Mill (1952) Sdn Bhd to exploit renewable energy from rice husk. He owned the largest stockpile of rice husk in Malaysia, probably the oldest in the region. It was there since 1952, two years before I was born.

He was decisive. The first cogeneration plant which produced 450 kW was up and running on 18 August 1997. I was interested in the ash, which was about 10 tonne/day. It was grey as the incineration temperature was high. The emphasis was on power generation rather than the quality of ash. White ash could fetch a price of RM1000 per tonne whereas grey ash has to be disposed at about RM100 per tonne. The unprocessed grey ash was found to suitable for use in foamed concrete. The density was reduced and the quality was more consistent. Reduction of raw materials means reduced cost. The project won ASEAN Cogen award in 2003!

Social Entrepreneurship

We adopted a volunteerism approach for pre-commercialization. During my term (2008-2010) as the President of the Concrete Society of Malaysia (CSM), I was aggressively driving innovations in concrete and construction. I constructed the KUiK wall (www.1.net.my) funded by the Vice President of the Concrete Society of Malaysia (CSM), Mr. Johnny Cheah based in Sabah with the permission of the University’s top management on a piece of reclaimed land next to Evergreen Fibreboard. I made use of recycled materials such as crushed concrete cubes for the foundation and drain. The areas around the Materials Laboratory was cleaned up. I emulated the Chinese government to put up the fast track quality shelter to serve the homeless. The Chinese government put up a million dwellings in 3 months after the Szechuan earthquake on May 12 2008, just 3 months from the 2008 Olympics. I manage to secure TechnoFund of RM1.46 million for renewable energy and sustainable construction for the BCB group based in Kluang, Johor. However, there were obstacles. The agreement was not signed on time. We did not spend the money. However, I was determined to proceed with other alternative routes. Several new ventures launched on renewable energy and sustainable development. The project was split into two parts; upstream was taken up by a business entity focused on renewable energy while the downstream on sustainable construction was funded by Johnny.

A series of new ventures were launched in conjunction with the global entrepreneurship week every year since 2008 with Smart University-Industry (UI) Link as the theme to create awareness about sustainable ventures (www.lowcarbon.my) and ways to improve the quality of life of all creatures on earth
CSM has launched IBS training programme for the concrete and construction players. The venture is now funded by a SMIDEC grant. University students should benefit from such scheme for lean startup. CSM members are willing to serve as mentors.

**Renewable Energy and Sustainable Ventures**

Sandbag is a UK based campaigning organization dedicated to tackle climate change. Attempt is made to attract investment in renewable and clean technology via [www.1.net.my](http://www.1.net.my) based on the concept shown in Figure 1.

![Biomass Fired Cogeneration Plant](image)

**Figure 1** Renewable Energy and Sustainable Venture Concept

The venture is based on concrete carbonation studies conducted since the mid 90s. It is now viable to mass produce eco-friendly concrete for sustainable development. Strategic alliance with parties in different parts of the world is initiated. With the support of governments and non-profit organizations, the venture is expected to be sustainable. A snapshot of the blog [www.1.net.my](http://www.1.net.my) is shown in Figure 2. An attempt will be made to apply for SWTCH Asia to support SME in clean technology development and deployment.
The production system for KUIK wall as shown in Figure 3 has been designed to produce 20 m³ of G Block/Supra Block (Figure 4) in 8 hours. The amount is equivalent to 200 m² of KUIK wall. The system is mobile and scalable to suit the requirements of the project. It can be deployed quickly to construction sites. A facebook page www.facebook.com/kuikwall has been created for product demonstration and promotion.
RECESS Malaysia @ UTHM

Rehabilitation work in the Batu Pahat Polytechnic campus revealed thickness of concrete slab of up to a metre. As the concrete slab at ground floor sank, it was topped up with normal weight concrete which caused further settlement. I was thinking about alternative materials suitable for use on soft soil. It has to be as durable as concrete yet as light as timber.

It was motivational to gain acceptance of one’s idea. Prof. Dato’ Dr Ismail Bakar offered me the opportunity to present the startup idea of RECESS Malaysia to a group of researchers and practitioners in IOI Putrajaya. The idea was materialized. RECESS is now supporting postgraduate studies and nurturing technopreneurs in soft soil engineering and geotechnics.

The proposal to develop an industrialized construction system for road on peat was granted by Cradle Fund under the Ministry of Finance. The venture is supported by Junda Realty Sdn. Bhd., a construction company based in Kuching, Sarawak. Experience of road construction on soft soil in Sekinchan (Figure 5) has created opportunities in East Malaysia especially Sarawak with large deposit of peat.
Patents took about five years to be granted in Malaysia. The first patent filed for UTHM on precast composite wall system (PI 20044277) was granted (MY-139642-A) five years later in 2009. The other patent granted (MY-140472-A) was filed for CIDB on method of producing biomass silica. The idea evolved around renewable energy and sustainable development.

The IP policy is generous! Researchers in Malaysian universities are entitled to more than 50% of income generated from commercial exploitation of IP. With passion, determination and hardwork, several investors are attracted to negotiate on technology licensing and spinoff.

Innovation Culture and Ecosystem

It is common for academic staff in Malaysia to be allocated 20% of the time to conduct research and personal development activities. In an exclusive session with Dr Hii, HH of the Ministry of Science, Technology and Innovation (MOSTI), the way forward to nurture innovation culture and ecosystem was discussed. The following actions are considered appropriate to achieve maximum benefit:

- Formation of one-stop commercialisation agency within MOSTI to facilitate transfer of prototype technologies to the industry
- Expand existing initiatives aimed at industry-academia collaboration
- Conduct annual “Research Assessment Exercise” to monitor and upgrade the quality of R&D
- Attract high-quality S&T manpower regardless of their nationality
- Look into “dual ladder” career for academics showing great research potential
- Harmonise the national guidelines on Intellectual Property
- Enhance efficiency of Patent Office by increasing quality Patent Officers and Examiners
Contribution to Humanity

After the two Kumomo schools in Cambodia, the next target is Vietnam. A meeting was arranged with Dato’ Terry Lee of Fairdeal Corporation in his Kuala Lumpur office in Wisma Cosway. Together with the Technology Transfer Officer of UTHM and Mr Look of Vyncke, we explored possibilities of providing clean renewable energy and producing ecoCrete for sustainable development there. Mekong delta is the rice bowl of Vietnam. It has the good source of biomass for biofuel and clean energy. CSM’s Concrete Entrepreneur Programme also has a possibility of promoting lowcarbon lifestyle.

I was pleased when Prof. Dato’ Dr Mohd Noh Dalimin, the Vice Chancellor of UTHM noticed KUiK wall in the campus and tried to use the material and method for future projects within the campus. I was impressed by his sincere effort to care for the staff and the local community. Terms such as teaching factory were discussed and the places surrounding UTHM were named as the valley of prosperity.

An exciting idea came across my mind. IT-Lodge @ UTHM ! We could provide for the needy families with improved infrastructure such as road and drains. Free training is to increase income and improve the quality of life while serving the community. KUiK wall could be used as incubator and named IT-Lodge (www.it-lodge.com). Another incubator could be set up in the IT-Lodge @ Parit Bengkok, integrated with the 1.my Cafe. The concept could lead to social transformation of Parit Raja into an innovation hub where budding entrepreneurs gather to strive for breakthrough. Some of the award winning products and systems developed by Malaysian inventors could be deployed at Parit Bengkok on the land owned by parties who have confidence in (www.1.my) ’s 1Malaysia Homestay. It will serve as living showcase and evidence of UTHM’s contribution to the community. Such small step could pave way for a giant leap for investors to consider the development of a Technology Park. This concept has prompted developers in East Malaysia to consider joint venture with foreign investors.

Conclusion

Engineering education should lead to ingenuity and innovations. Sustainable social entrepreneurship should create employment which lead to improved quality of life. With increasing awareness of the relationship between peace, prosperity and happiness, engineering education should add value by incorporating elements of entrepreneurship.

With better understanding of social entrepreneurship, business ventures should make commitment for social responsibility. The emerging tide of voluntary services for the benefits of those in need are attracting global attention and contribution. We should explore with wisdom the possibilities of reinforcing ties within established networks of community colleges, polytechnics and the universities in Malaysia to expedite engineering research and entrepreneurial activities for the benefits of mankind and perpetual existence of earth in the universe.

References


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