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Futures Scenarios for Universiti Teknikal Malaysia Melaka (UTeM)

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Abstract

This article presents the scenarios, visions and strategies that resulted from a three day foresight workshop for Universiti Teknikal Malaysia Melaka (UTeM) in Melaka, Malaysia. The workshop used the 'six pillars' approach to foresight. The methods used included: The futures triangle, emerging issues analysis, the futures wheel, the Sarkar game and macrohistory, causal layered analysis, the integrated scenario method, visioning and backcasting. The workshop concluded with three alternatives: UTeM Everywhere, UTeM – Industry Integrated, and UTeM SOHO. These visions were complementary in the preparation of the UTeM Strategic Plan 2012-2020. The workshop has led to new and executable strategies as the university forges ahead towards 2020.

Keywords: Backcasting, UTeM, Technical and Vocational Education and Training (TVET), Causal Layered Analysis, Scenarios, University Futures

Introduction

To succeed in your mission, you must have a single-minded devotion to your goal (Tunku Abdul Rahman Putra AlHaj, First Prime Minister of Malaysia).

The Technical University of the Future - UTeM 2025: Always A Pioneer, Always Ahead

Technical and Vocational Education Training (TVET) has been identified in the Malaysian Education Blueprint Higher Education 2015-2025 (MEB HE) as one of the key initiatives for the nation's future.

Although the first trade school in Malaya/Malaysia was established as early as 1906, Technical and Vocational Education and Training (TVET) remains as an important pathway for vocational education and skills development, as stipulated in the Malaysian Education Blueprint Higher Education 2015-2025 (MEB HE).

The United Nations Organization for Education, Science and Culture (UNESCO) defines TVET as "those aspects of the educational process involving, in addition to general education, the study of technologies and related sciences as well as the acquisition of practical skills, attitudes, understanding, and knowledge relating to occupations in various sectors of economic and social life".

In the light of the emerging challenges of the 21st century, an era of rapid changes in knowledge, information and communication, science and technology, industrialization and globalization, a new paradigm towards a human-centered development is imperative, if TVET is to play "a crucial role as an effective tool to realize the objectives of a culture of peace, environmentally sound and sustainable development, social cohesion and international citizenship." (Quisumbing, Lourdes R.26th March 2001)

In Malaysia, TVET programs focus more than 50 percent of content on technical and vocational skills encompassing certificate, diploma, and degree level qualifications. MEB HE has outlined 10 shifts which aspire to produce balanced and holistic graduates with entrepreneurial mindsets, nurture 'job creators' rather than just 'job seekers', place TVET programs on par with traditional academic offerings, and make lifelong learning part of the nation's culture. Shift number four of the MEB HE places specific focus on quality TVET graduates which emphasizes on the importance of fulfilling the industries need for highly skilled workers.

Universiti Teknikal Malaysia Melaka was established on 1 December 2000 under the College and University Act 1971, Section 20 (Act 30) with the name Kolej Universiti Teknikal Malaysia Melaka (KUTKM). As the 14th public university established in Malaysia, UTeM was mooted to be a higher technical education powerhouse for Malaysia's development towards a fully industrialized nation in 2020.

In aspiration, where does UTeM position itself in 2025? Will the university be able to keep up as one of the world's leading innovative and creative technical universities? Will the university continue to pioneer in practical-oriented teaching and learning explicating the Fachoshule model?[1] Will the teaching factory model remain a distinguished feature of the technical university of the future? Will UTeM continue to champion the areas of technical and technology or will it modulate towards a comprehensive university offering a diverse range of programmes?

These and other questions were deliberated in Melaka by participants at the Futures Scenario Workshop for UTeM from June 7th to June 9th 2012. Thirty participants from the senior management which included Members of the Board of Directors, Vice-Chancellor, Deputy Vice-Chancellors, Deans, Directors, Student Representative Councils, and Alumni. Participants canvassed several alternative futures scenarios for UTeM in 2025 in the 3-day meeting, facilitated by the renowned futurist Professor Sohail Inayatullah. The output of the discussion became the foundation of the UTeM Strategic Plan 2012-2020.

Foresight Canvassing For the Preferred Technical University of the Future

To provide rigor and relevance in answering these questions, the ''six pillars'' approach to foresight was used (Inayatullah, 2008). The six pillars consist of first mapping the future, through the futures triangle; second, anticipating the future through emerging issues analysis and the futures wheel; third, timing the future through an exploration of macrohistory; fourth, deepening the future by understanding core metaphors that underpin stakeholders' views through the causal layered analysis methodology (Inayatullah, 2004); fifth, creating alternatives through scenarios and finally, sixth, transforming the present and future through visioning and back casting. The foresight process sought to ensure that participants moved out of their current understandings; for example, participants explored emerging issues that could challenge the current map of the future.

In pursuit of global recognition, UTeM sets the target of a globally recognized TVET programme provider that will parlay the university in the international arena. The university has set forth among others, to increase the number of collaborations with top international universities in its desired Key Performance Indicator. This is in support of the aspiration of the Ministry of Higher Education which places specific emphasis on institutional networking and internationalization and has included it as one of the institutional Key Performance Indicators (KPI), in most universities´ blueprint for higher education in Malaysia (Ministry of Higher Education 2013).

"Global Prominence in higher education requires four elements – visibility, recognition, distinction and expansion. To tap these elements, the Ministry will strengthen the promotion, marketing and value proposition of Malaysia's higher education system; identify ways to increase the enrolment of high caliber international students; and establish stronger ties with the global higher education community." (Ministry of Higher Education 2015).

In striving for global presence, UTeM needs to highlight its unique features, its capabilities to excel at what it can do best; developing excellent engineers, technologists and technopreneurs[2] and to build its reputation based on its achievements in integrating available resources with expected performance outcome. Emerging issues such as the relevance of focused technical programmes in the future and financial sustainability in the next 5-10 years were debated. Worst case scenarios such as whether UTeM will cease to operate or be 'out of business in the heat of the rising mobile and apps learning mode by universities globally and if such scenario happens, how then should UTeM rewrite its story in preparation for the best-case scenario or the desired future?

The generally accepted assumption was that the world changes and what we know today may no longer be relevant tomorrow. Thus, preparing for the uncertainties, UTeM needs to learn about learning in order to reflect on new challenges and to know the unknown (Inayatullah, 2012). With the advent of never-thought before technologies bring about new meanings of communication, UTeM has a choice of ignorance, thus missing the invaluable opportunities or it could seize the moment, be the change agent, create new alternatives and assess global trends in higher technical education and adapt accordingly: digitalization, gaming as learning, peer-to-peer student learning and wikis, corporatization and reduction in subsidies from the Ministry of Higher Education (Inayatullah, 2012).

Central to inventing the new future was finding a new narrative. In the ''Six Pillars'' approach, foresight is not just about an evaluation of disruptive trends in digital, brain and genomics technologies or issues of income and demographics, but equally involves transforming the core stories that define the narrative. Organizations have narratives – myths and metaphors – of how they interpret reality. These narratives can sometimes help create the desired future. More often than not, however, they are based on the used future – on what worked in previous eras – and not on what is relevant today or productive for the future. In education, the factory model of learning and teaching is often dominant, making students into products and professors into managers of data (Inayatullah et al., 2006).

Virtualization of a Technical University

Fundamental to achieving the desired future of a globally recognized technical university is the ability to virtualize technical education. That being said, new applications; indeed, ''an app for everything'' is the new analogy for the futures of instruction. New applications are changing the nature of pedagogy and with exponential technological advancement we can see virtual becoming more like face-to-face. Education of the future needs to educate towards a globalization that humanizes, instead of one that marginalizes; an Information and Communication Technology that bridges gaps, and unites instead of divides (Quisumbing, Lourdes R. 26th March 2001). Costs will continue to go down (and climate change/peak oil/security concerns are likely to provide further incentives to virtualize). Innovation will continue to find ways for academics and students to become more comfortable in future virtualized ''classrooms''. Over the long term the current distinctions between virtual and real will likely disappear and we, particularly digital and genomic natives (the double-helix children), will become comfortable with different types of reality (Inayatullah, 2012)

From the discussions in the subsequent sessions, UTeM leaders articulated on a number of preferred futures scenarios after a back casting session reflecting on UTeM's past. How did we get here and where do we see ourselves in the future? The used future may not be applicable anymore. UTeM needs to work on a new future based on current trends and future needs in the industrial sectors. Relying on its strength as a technical education provider, UTeM's sustainability can be rest assured given the foreseen needs for highly technical and skilled workforce in the future.

Enhancing Local Relevance and Strengthening Global Presence

According to the Economic Planning Unit (EPU) Labour Force Survey 2013, the gap in supply and demand of additional TVET workforce from 2014-2020 is rather stark. It is projected that in 2020, 3.3 million new job positions to be created and added into the workforce. However, current highly skilled workers only account for 28 percent of 12 million workers in the country. To become a developed country, Malaysia is required to meet the target of 40 percent skilled workforce and we still have a long way to go in terms of developing the skilled workforce. The local businesses also require 62 percent technical workers and they are having difficulties to source skilled workers. Thus, technical and vocational education in the country is essential in increasing the skill level of the workers and filling the demand gap.

Enhancing UTeM's presence locally and accentuating its presence globally, a number of alternative scenarios were proposed by the participants, among others three groups suggested the acute necessity of UTeM moving towards a virtual university through the idea of "UTeM Everywhere", UTeM SOHO (Small Office Home Office) and UTeM Apps. While the terminology may be different but the context is analogous. These proposals were founded on the basis that with technology and communication getting more sophisticated, the idea of promoting the UTeM brand both locally and globally may become accessible and more plausible. In one group's view, UTeM should remodel into a Wellness University with the co-existence of technology, spirituality and greenness. Another group mooted the alternative future of UTeM as a 'Mecca of higher technical education', with open access facilities for everyone everywhere and recognized worldwide. All these proposals were dwelled onto, debated and rationalized thoroughly with specific emphasis given to the core business and expertise of the university, specifically the curriculum design, student entrepreneurial attributes, university-community network and commercialized-ready products through the fortification of TiCOE[3].

Analysis

UTeM's strategic directions take into account the current trends in globalization, mobility, international collaborations, evolution in learning and teaching, optimum use of technology, global university best practices, student entrepreneurial attributes and community outreach to dramatically redesign its future.

While participants agreed that UTeM will continue to offer market driven technical programmes, concerns of sustainable growth seep in as the concept of a disowned future (Stone and Stone, 1989; Inayatullah, 2007) shadows into UTeM. In search for alternative futures, UTeM may see something new (Inayatullah, 2007). The figure below articulates the preferred visions along with four variables: litany, systemic, worldview and myth/metaphor.

Comparative Analysis of UTeM's Futures				
	UTeM SOHO	UTeM@Apps University	University-Industry Integrated	UTeM Open University
Litany	UTeM staff spends more quality time with their family, resulting in savings of utilities and space.	Academic programmes offered by UTeM becomes available globally, functional and accredited internationally	UTeM leads in industry-driven and advanced technologies in collaboration with strategic industries in Malaysia.	UTeM offers higher education opportunities to all regardless of qualification, financial status, geographic location, age and abilities – indirectly promoting personal and professional growth in the society.
Systemic	Implementation of new policies, enforcing staff monitoring systems and discipline.	Programmes need to comply with needs of industries and duly accredited by international accreditation bodies.	Hosting industries within the university environment also known as the 'Teaching Factory' model. Industries providing factory-scale equipment for teaching and learning.	Advancement of technology & infrastructure. The need to establish a framework to support staff development.
Worldview	Out of sight, out of responsibility.	Globally recognized university and global graduate employability.	University educate; industry trains.	Internationalization of industry-based learning.
Myth/ Metaphor	Fishing from home	UTeM On-Deck	Partners for growth, 'Together as one'.	Mangrove Ecosystem

Strategy	Retain the dedicated staff and provide suitable incentives to encourage performance.	Attract top academics and students globally. Invest in latest technologies and teaching and learning facilities.	Organize structured collaborations with industries. Invite leaders of industries as academic programme advisory panels.	Introduce broad-based academic programmes alongside focused-based existing programmes. Invest in innovative teaching and learning infrastructure.

Figure 1. Comparative Analysis of UTeM's Futures

Generally, all visions skewed towards a 'transformed' UTeM as a holistic wellness university where contentedness and satisfaction of its stakeholders becomes primary, but at the same time garnering all its resources towards an acclaimed technical university offering highly crucial industrial-driven and market-relevant programmes, equipping its graduates with the relevant technical skills which are substantial in supporting the nation's aspiration towards a high income nation in 2020.

Aspiring the status-quo as one of the best technical universities in the world is highly realistic and executable for UTeM with due consideration that the programmes offered at UTeM have from the beginning been highly specialized. The curriculum is developed closely with industry experts to ensure its quality and relevance meet the needs of the thriving industrial sectors. As prior interactions and the degree of institutionalization of the interactions (Eliezer Geisler, 2010) are hypothesized to explain survival over time, thus, the aspired university-industry integrated model is unequivocally attainable since the fundamentals have been sturdily set from UTeM's early establishment years.

Alternative Futures of Universiti Teknikal Malaysia Melaka (UTeM)

After three days of using foresight methods to analyze and explore possibilities, the final session of the meeting produced three alternative futures for UTeM 2025.

Scenario 1: UTeM Everywhere (Apps University)

Mapping the future of UTeM as an Apps University, the futures triangle was used. The futures triangle method consists of identifying three distinct factors. The first are the contending pulls of the future. These are current images of the future could be or should be. The second are the critical drivers pushing the future. These are quantifiable. The third factors are the weights of history. These are the barriers preventing the realization of a particular image of the future. A weight for one image of the future, of course, can be a driver for another. Weights are more difficult to quantify.

The first alternative of the future of UTeM Everywhere predominates on UTeM as a globally accessible university. This future puts forth the denotation of a virtual university. To be sustainable, UTeM needs to be accessible 'everywhere'. Emerging technologies are transforming our concept of time and space (Van der Molen, 2001). Academic programmes offered by UTeM must not only be accessible globally but also functional and accredited internationally. Employing the metaphor, "UTeM On-Deck", potential students worldwide will become stakeholders of UTeM, following lectures at the comfort of their home country through innovative and advanced learning technology such as the Massive Open Online Courses or MOOCs. This open learning facility allows learners to flexibly move between different learning scenarios (Jonatan Castaño Muñoz, et.al. 2014). Learning contents are shared through online materials which enable students to be engaged in a more personalised learning setting, at a place of their convenience and around their own schedule. The

open learning environment not only ensures lifelong learning that transcends qualification, financial status, geographical locations, age and abilities but also indirectly promotes personal growth in the society.

In addition, the UTeM Apps University will also result in the increase of high quality graduate students and postdoctoral fellows into research that is deep, broad and challenging given the multitude of academic and physical backgrounds they come from. The most effective impact of the UTeM Apps University is undoubtedly the significant increase of international graduate student enrolment which will definitely promote UTeM in the global arena. The compelling image of the 'university in a gadget' implies on an 'app-based university', similar to a mobile application, UTeM is envisioned to be easily accessible and easy to use. Thus, UTeM must come up with a framework to reinforce the emergence of the nomadic, mobile learner who is dependent not on the teacher or formal educational systems, but on the network of knowledge and skills that can be accessed on an anytime, anywhere, e-learning basis (Roderick Sims, 2008).

Participants further articulated their vision of what the preferred future would look like. Using the Causal Layered Analysis (CLA), they came up with several options within the framework of the UTeM Everywhere futures. These options followed the Integrated approach to creating alternatives (Inayatullah, 2012, 2015). The preferred sets out the desired future. The disowned challenges the desired, asking what is missing, what can go wrong. The integrated intends to as named integrate these two options, creating a far more robust future. The outlier ensures that an alternative - desired or dystopian is explored.

Preferred • Number of preferred programmes relevant to the global industry • Advanced infrastructure with global recognition • World Leading virtual technical university • Metaphor – global brain 	Disowned • identity trade-off • Less hands-on • Lost human touch and soft skills, no physical assessment • Metaphor –Brain drain 
Integrated • Competitive paid salary globally • Sharing resources globally/global franchise • Global Industrial based program with GLOCAL flavour. • Metaphor – networking brain 	Outlier • Limited programmes meeting industry needs • Conventional way of delivery methods • Less presence felt • Metaphor – brain death 

Figure 2. Apps University (Virtual University)

Scenario 2: UTeM- Industry Integrated

From an industrial perspective, relations with universities have traditionally been viewed primarily as a source of human capital, future employees and, secondarily, as a source of knowledge useful to the firm(Etzkowitz, 1998). Fortifying the strategy of boosting potentials in university-industry synergy, participants put forth the significance of 'placing industry in the university'. The current TVET programmes in Malaysia are largely supply-driven. Hence, resulting in a mismatch training to available jobs. There is obviously a need to improve links between institutions and industries so as to minimize this mismatch. This move will not only ensure technology transfer from university to industry and vice versa but also redefine learning by which students are equipped with matching technical skills sought by industries.

The teaching-factory model established in UTeM will be further fortified by the industry within the university concept where structured activities that enhance students' knowledge and skills could be coordinated.[4] Participants also proposed the idea of establishing an industry centre with an advisory role in the enculturation of the research to richness agenda that will result in mutual benefits. For a start, UTeM initiated the CEO Roundtable programme in 2010, inviting and providing a platform for captains of industries locally and regionally in a knowledge and expertise sharing session with the aim of providing advice and feedbacks that would enhance UTeM's academic programmes and elevate graduate employability.

In the field of research and innovation, the integrated concept warrants a sustainable research culture. Knowledge and technology transfer by both university and industry allows for a more expansive ventures. Research products initiated by the university can be further developed by industries with the potential of commercialization. As for industries, products used for manufacturing processes, can be further improved or even improvised with the academic knowledge and expertise available within the university. Although many challenges remain, such as increasing the amount of research grant funding, involving industry partners in R&D activities, commercializing R&D products, and having a direct socio-economic impact via R&D initiatives, but with a committed effort from university researchers, these challenges will soon be overcome.

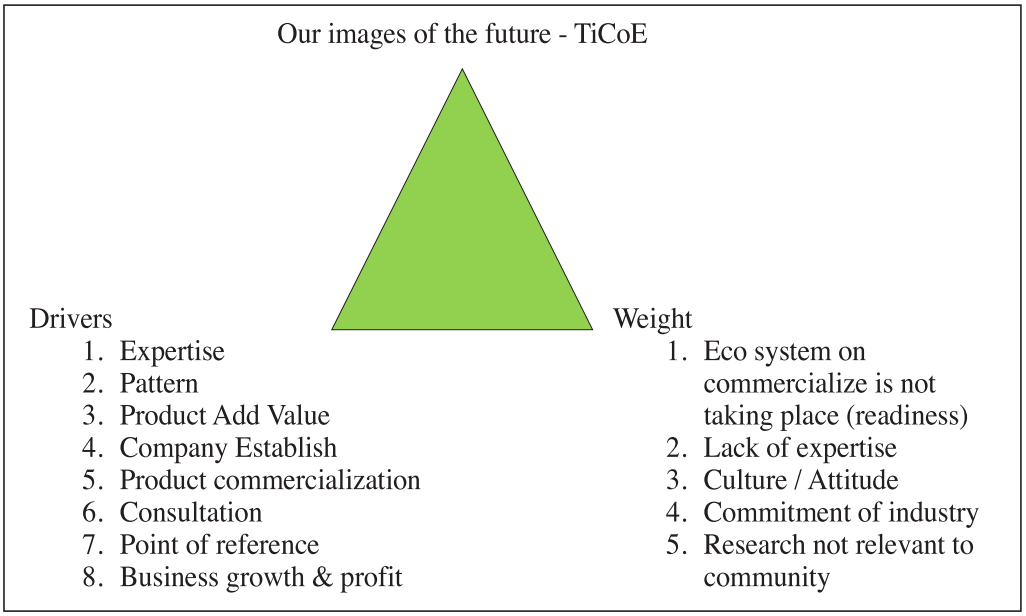

Figure 3. Futures Triangle (Mapping the Future)

This university-industry integrated future also conjoins the significance of the university in co-creating economic prosperity with the state government of Melaka through the optimization of available resources and expertise. In addition, university-industry alliances have and will continue to contribute significantly to employment growth,as industries will rely on universities to produce competitive and skilful workforce through these alliances. University connections are important for job growth and university research alliances contributed substantially to job creation for those firms that had such alliances (Andrew A. Toole, 2014). The involvement of strategic industries with the university will not only enhance superiority and relevancy of the curriculum, but also assist UTeM in strategizing its research agenda thus further boosting the research to richness initiatives within a flourishing research, development and innovation environment. Options within this framework were not developed largely as participants believed that this scenario would occur.

Scenario 3: UTeM SOHO

Wellness was the keyword in the third future for UTeM as proposed by the participants. With the conviction that UTeM will prosper by keeping people healthy and more productive for longer. The third future was referred to as UTeM SOHO which stands for Small Office, Home Office. This future sees the importance of a balanced between work and personal life as a catalyst to high-impact productivity and accelerated performance.

Four scenarios were drafted using the Six Pillars Approach of Creating Alternatives Scenarios of a SOHO UTeM. These scenarios have multipurpose functions, among others as a contingency planning to assess and prepare for what might go wrong, creating a conceptual distance from the present, so that the present is seen as less real and fixed, and thus changeable, understanding and managing uncertainties, gaining a better understanding of chaos and complexity including the potential levers of influence, understanding the views of different stakeholders and perspectives, finding new areas of growth, products, processes, people, possibilities, clarifying often hidden assumptions about the future, and enhancing organizational learning capacity. Ultimately scenarios planning both reduce risk and enhance reward (Inayatullah, 2012).

All functions of creating alternative scenarios considered, the outcome of which was the importance of elevating the wellbeing trajectory at UTeM. As a relatively young university, UTeM's staff composition consists of 80% young academicians of age less than 40 years old and 20% senior academics of age more than 40 years old. As the shakers and drivers of the university, the young academics are at the onset of starting a family and building a life career, thus a more schedule flexibility and more support from the institutions will result in a better work-life balance (Gail Kinman & Fiona Jones, 2008). A vibrant environment that supports professional and personal growth is paramount in developing passionate and resilient academics, resulting in a high-performance work culture. Studies have shown that highly motivated academics have an acute effect on students' performance. Although money is influential factor at every stage, but at the same time it is not necessary that money alone can increase motivation of every worker there are intangibles (for instance empowerment, recognition and feedback) that are primary motivators for the workers' inspiration to perform effectively (Fuhrmann, 2006). To explore options within the Soho future, the organizational scenario method was used. This comprised of four options: business as usual, worst case, best case, and outlier.

Business as Usual 1. Management Cost 2. Congested 3. Stressful environment 4. Less attractive, less competitive 5. Social issues	Worst Case 1. Funding is withdrawn 2. Productivity 3. University's image tainted 4. Not trustworthy "Fish and go home"
Best Case 1. "Fishing from Home" 2. Balance between work and life 3. Better productivity 4. Happy staff "Happy families produce happy employees"	Outlier 1. High discipline staff 2. Students' creativity 3. Self-funding UTeM as a ROLE MODEL

Figure 4. UTeM SOHO University

Organizations invest in effective strategies to get motivated workforce to compete in the market. Salary alone does not prove to be a vital motivator for everyone in an organization. Various factors motivate people differently depending upon the nature of an organization and its key contributors in developing learning environment. Famous rule of thumb in human resource management is that retaining employees is less costly than hiring new ones. When teachers in universities perform well, students are also high achievers and universities contribute more towards higher education (Muhammad Imran Rasheed, Hassan Danial Aslam, Shakeel Sarwar, 2010)

Thus, the best case scenario for UTeM preferred by the participants is the work-life balanced University, SOHO concept with the principle of accelerated productivity through balanced work-personal life. The UTeM SOHO model replicates the comfort of home at the office, though not physically but environmentally. In the context of staff, it is clear that the stability in their personal life becomes the indicator of their performance at work. This feel good at home feeling proliferates to the feel good spirit at the office, especially with the presence of a strong motivating leadership and excellent infrastructure. According to Jeremy R. Hayman (2009),employees operating under flexi -time work schedules displayed significantly higher levels of work/life balance than their counterparts utilizing traditional fixed-hour schedules.Similarly, in the students' context, an exciting campus life, a liberal and multidisciplinary curriculum with integrated extracurricular activities will be effectual in producing healthy, agile, smart, and sharp and forward thinking students. To sum it all, a conducive and supportive environment is substantial in ensuring indisputable productivity for the university.

Conclusion

UTeM Way Forward – Transformation Plan

1. As this workshop was held four years back, we can reasonably ask, while mindsets may have shifted in terms of adopting alternative futures, what practically changed? Three outcomes were significant. First, the expected outcomes of the workshop have been achieved and implemented. UTeM has since produced and adopted the UTeM Strategic Plan 2012-2020, launched on 3 October 2012 – linking foresight of UTeM's long-term strategic plan, providing a stronger footing and strengthening the foundation for the future. Second, UTeM has also established the Samsung IOT Centre in 2015, a university-industry integrated initiative, which is an excellent example of public-private partnership that leverages on the expertise of academia and industry to drive technological development and innovation.The Samsung IOT at UTeM is also the first of such centre located within a public university in Malaysia. And, third, UTeM has also since

the workshop, started and expanded on the CEO Roundtable initiative. A mutually beneficial initiative between university and industries where CEOs of industries meet and discuss emerging issues and opportunities in the industries that could be complemented by UTeM.

2. Thus, there have been immediate benefits from the 3-day futures workshop. However, the deeper shifts suggested by the scenarios such as the apps and the SOHO university are still developing. In this sense, the scenario that gained most traction was the one that fit already into the culture and mindset of the University. One can safely say that the workshop and UTeM foresight efforts did create new efforts to make the university relevant. A notable intervention pursuant to the futures insights would be the massive restructuring exercise that UTeM undertook in 2014 which leads to the introduction of two new offices namely the University Commercialization Centre (UCC) and Centre for Instructional Resources and Technology (CIRT). The UCC, established with a vision to strengthen research, development, innovation and commercialization whilst the latter with a sturdy aim to springboard online and learning through apps which will eventually bring UTeM to the forefront of global higher learning landscape. But deeper change, or what one might say, transformative change has yet to occur. More foresight processes are needed as well as action learning projects in which there is experimentation in the apps and virtual space.

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Notes

1. A Fachhochschule (About this sound Fachhochschule ; FH; plural Fachhochschulen) or University of Applied Sciences (UAS) is a German tertiary education institution, specializing in topical areas (e.g. engineering, technology or business). Fachhochschulen were first founded in Germany, and were later adopted in Austria, Liechtenstein, Switzerland and Greece (where they are called TEI-Technological Educational Institutes).The Fachhochschule represents a close relationship between higher education and the employment system.
2. Technopreneur is a unique term reference used to refer to technology entrepreneurs produced by UTeM from the Faculty of Technology Management & Technopreneuership.
3. TiCOE is a term coined to refer to technically competent and industry driven centre of excellence producing high impact research with close industrial collaboration.
4. UTeM has since collaborated with Samsung in the setting up of the Samsung IOT Centre at UTeM in 2014, the first of its kind in Malaysia.

References

Ahmad Zaidee Laidin (2016). *The Role of Technical and Vocational Education and Training (TVET) towards an Innovation-Based Economy*, The Arshad Ayub Foundation Lecture Series II.

Andrew A. Toole (2015). University research alliances, absorptive capacity, and the contribution of startups to employment growth, *Journal Economics of Innovation and New Technology Volume 24*(5), 532-549.

Claudia Unseld; Gaby Reucher (13 September 2010). *University types: Universities of applied science*. Deutsche Welle. Retrieved 17 July 2016, from http://www.dw-world.de/dw/article/0,,5941530,00.html

Economic Planning Unit (2015). *Transforming Technical and Vocational Education and Training to Meet Industry Demand*. Retrieved July 15, 2016, from http://www.epu.gov.my

Eliezer Geisler (2010). Industry–university technology cooperation: A theory of inter-organizational relationships: *Journal Technology Analysis & Strategic Management Volume 7*(2), 217-229.

Etzkowitz, Henry (1998). The norms of entrepreneurial science: Cognitive effects of the new university-industry linkages, *Research Policy, 27*(8), 823-833

Fuhrmann, T. D. (2006). Motivating Employees. Advances in Diary Technology, 18, 93-101.

Gail Kinman & Fiona Jones. (2008). A Life Beyond Work? Job Demands, Work-Life Balance, and Wellbeing in UK Academics. *Journal of Human Behavior in the Social Environment Volume 17*(1-2), 41-60.

Inayatullah, S. (Ed.) (2004c). *The Causal Layered Analysis Reader*, Tamkang University Press, Tamsui.

Inayatullah, S., Bussey, M., & Milojevic, I. (Eds) (2006). *Neohumanistic Educational Futures*, Tamkang University Press, Tamsui, Taiwan.

Inayatullah, S. (2008). "Six pillars: futures thinking for transforming", *Foresight, Volume, 10*(1), 28.

Inayatullah, S. (2012). "University futures: Wikipedia university, core-periphery reversed, incremental managerialism or bliss for all", *On the Horizon, Volume, 20*(1), 84-91.

Inayatullah S. (2015). *What Works: Case studies in the Practice of Foresight*. Tamkang University Press, Tamsui.

Jeremy R. Hayman (2009). Flexible work arrangements: exploring the linkages between perceived usability of flexible work schedules and work/life balance. *Journal Community, Work & Family Volume 12, 2009 - Issue 3*, 327-338.

Jonatan Castaño Muñoz, Christine Redecker, Riina Vuorikari, & Yves Punie (2014). Open Education 2030: planning the future of adult learning in Europe: Open Learning. *The Journal of Open, Distance And E-Learning*, 171-186.

Lourdes R. Quisumbing (2001). *The importance of values education for TVET and its economic and human resource development program*, UNESCO Asia Pacific Conference Adelaide, March 26-28, 2001. Retrieved August 30, 2016 from http://www.yooyahcloud.com/UNESCOAPNIEVE/URmVE/Values_and_TVET.doc

Ministry of Higher Education (2013). *Pelan Strategik Pengajian Tinggi Negara*. Retrieved July 14, 2016, from http://www.moe.gov.my/userfiles/file/PPP/Preliminary-Blueprint-Eng.pdf

Mohd Jailani Mohd Nor. The Malaysian experience: A new approach in managing multi-disciplinary research projects. *The Academic Executive Brief* - Volume 2, Issue 2, 2012.

Muhammad Imran Rasheed et al. Motivational Issues for Teachers in Higher Education: A Critical Case of IUB, *Journal of Management Research*, ISSN 1941-899X 2010, Volume 2, No. 2: E3

Roderick Sims (2008). Rethinking (e) learning: a manifesto for connected generations. *Journal Distance Education Volume, 29*(2), 153-164.

Stone, H., & Stone, S. (1989). *Embracing Our Selves: The Voice Dialogue Manual*. New World Li-

brary, Novato, CA.
Van der Molen, H. J. (2009), *Preface: The virtual university? Educational environments of the future. Virtual university?* Educational environments of the future Proceedings of symposium, Wenner-Gren Centre, Stockholm, London: Portland Press. pp.vii–ix.