

# REDESIGN “UNIVERSITY OF THE FUTURE” CONCEPTUAL BUSINESS MODEL: SUSTAINABILITY AND STAYING RELEVANT IN THE DIGITAL AGE

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**ABSTRACT:** Several key studies have shown that the higher education sector is in need of new business models in order to stay relevant and sustainable in the New Digital Age. Pressures and drivers of change – funding, changes in the technology and Fourth Industrial Revolution (4IR), digital socio-economy, and business model, to name a few – that demand institutional change by re-examine its current business model and value proposition, if success is to be sustained over the long term. The digital changes are dynamic and complex. This paper adopted the design thinking approach, where business modeling tools namely the Environmental Map (EM), Business Model Canvas (BMC) and Value Proposition Design Canvas (VPC) are used to formulate, design, and evaluate alternative business models for the higher education institutions (HEI). The tools allow HEI to design conceptual business models - creating value for their business, and delivering value propositions and benefits for their customers. Thus, enabling the creation of sustainable businesses. Depending on the value proposition to be offered to targeted customer segments, this paper has offered generic conceptual business model in preparing for UotF to be always relevant and sustainable in the New Digital Era. In our opinion these generic conceptual business models will help UotF decision makers, planners and relevant stakeholders to continuously review, enhance and customise their value offerings so as to remain relevant, sustainable, agile, and competitive.

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**KEY WORDS:** *University-of-the-Future, Fourth Industrial Revolution (4IR), Business Model, Business Model Canvas, Value Proposition Design Canvas*

## 1. INTRODUCTION

The Higher Education Institutions (HEI) and Industry are undergoing a fundamental transformation, as the forces of globalisation, new business models, and Fourth Industrial Revolution (4IR) have transformed other industries of the economy in the past 20 years. The industry is driven by a number of drivers of change where some of them are disruptive. The role of higher education in society and the economy is changing, and will have to transform the way they deliver their value propositions, operate their organisations, and manage their intellectual assets in creating sustainable high impact values, virtues, and solutions for their students, graduates and other stakeholders. In an increasingly competitive industry, HEI need to differentiate and make themselves relevant to customers and stakeholders. HEI leaders need to rethink their business in creating better values and experiences for their students, graduates, employees,

community, and ecosystem partners, and to optimise costs; especially when the cost of providing higher education continues to rise, while the sources of funding from the governments have eroded (Ernst & Young, 2012, 2018; Barber et al., 2013; MOHE, 2015; Frost & Sullivan, 2016).

Students are paying thousands to enroll for a course and the quality is said to be lower than expected which results in higher unemployment of graduates as compared to school leavers (Barber et al., 2013). The cost of pursuing higher education is regarded as expensive and most graduates are in debt after completing their studies (Ernst & Young, 2012, 2018; Barber et al., 2013; Frost & Sullivan, 2016). From the humanising education perspective, the higher education system has focused on knowledge and skills building of students but pay less attention to good ethics and spiritual aspects. The education system has produced generations of graduates with the knowledge and skills but less value morality and faith in their career and life (Wan, Sirat, & Razak, 2018). This is reflected from the rise in white collar crimes including corruptions and misuse of authority. The HEI must aim to nurture holistic graduates that are intellectually, spiritually, emotionally and physically balanced and harmonious; based on a firm belief in and devotion to God (Wan et al., 2018). These situations have prompted the public to question the value propositions of HEI.

HEI are forced to compete globally for students, academics, and funding. Thus, 4IR technologies create opportunities for universities' leaders to rethink and innovate their business models to stay relevant and operating at an optimum cost in the digital age. Only those that are able to take advantage of these opportunities through building a digital platform and a new operating business model will stay relevant and survive in this new digital age (Peter Bendor-Samuel, 2018).

Many universities are developing specific digital strategies in reaction to the massive shift towards using new technology, yet lack the vision, capability or commitment to implement them effectively. As a result, many institutions then invest heavily in technologies that do not deliver the anticipated benefits, outcomes, and impacts. These universities need innovative business models and strategies that are fit and continuously relevant to stakeholders. Staying relevant in the digital age requires a strategic vision for the whole institution, a vision that is led by the senior leadership team, fully supported by all faculties and departments with competent staff, not just the IT department. A lack of digital transformation competency and culture amongst the HEI community means that early engagement and interaction to build the right support networks is essential in achieving sustainable change across the entire institution.

HEI that are not equipping themselves to adapt and harness on these new digital capabilities will be left behind. For examples, Uber and Grab have harnessed these forces of change through building a digital platform and a new operating business model, and have disrupted the taxi industry; and AirBnB has disrupted the hospitality industry. Similarly, Eric Magicovsky could be anywhere raising USD10 million from 69,000 people on Kickstarter (Fisk, 2015); and eSoulKitchen Program in enhancing the well-being of rural communities (Dahlan et al., 2014). Hence, HEI have no choice but to reinvent themselves (Ernst & Young, 2012, 2018; Barber et al., 2013; Frost & Sullivan, 2016). To simply stay relevant and sustainable in the digital age, the time to act is now (Ernst & Young, 2012, 2018; Bain & Company, 2012; Barber et al., 2013).

## **2. OBJECTIVES**

The current dominant university business model - a broad-based teaching and research institution, with a large base of assets and back office - will prove unviable in all but a few cases (Ernst & Young, 2012, 2018; Frost & Sullivan, 2016). There is a need for innovative and dynamic business model designs in meeting the changing requirements of the University of the Future (UotF). The changes are dynamic and complex. It is difficult to analyse complex problem without a proper methodology and business modeling tools. Thus, this paper seeks to: (a) explore the design thinking approach utilising business modeling tools - the Environmental Map (EM), Business Model Canvas (BMC) and Value Proposition Design Canvas (VPC) - in analysing, formulating, designing, and evaluating conceptual business model options for UotF; and (b) offer viable UotF business model options for leaders and planners to consider and adapt for making their universities relevant in the digital era.

## **3. METHODOLOGY**

This paper adopted the design thinking approach (Lewrick et al., 2018). This approach can be viewed simultaneously as a problem-definition/problem-solving methodology and a toolbox for stimulating creativity. Specifically, the empathise and define steps in the process focus on problem definition and the ideate and prototyping steps focus on problem solving. And the test step simply tests and validates to see whether the solution solves the problem. However, this paper does not include the test step. In this last step, you can discover that the solution works but needs changes or it does not. The testing stage may highlight the need to change the solution completely, but oftentimes it leads to rethinking the problem statement. As a toolbox for stimulating creativity, design thinking relies on an approach that considers multiple alternatives in both defining the problem statement and generating solutions. This is known as divergent thinking and is central to the design thinking process. Business modeling tools namely the Environmental Map, Business Model Canvas and Value Proposition Design Canvas (Osterwalder et al., 2010 and 2014) are used in analyzing, formulating and designing conceptual business model options for the University of the Future (UotF). Business modeling tools allow for different approaches of doing business to be modeled and prototyped in sufficient details. Thus enabling HEI to formulate, design and validate the business concept before embarking on the costlier business plan development and implementation. However, in this paper we have restricted the scope to analyzing, designing, and generating conceptual business models without validation by stakeholders. The conceptual business models formulated must be validated by stakeholders and will be reported in another paper. There are many techniques in generating conceptual business models. In this paper, the researchers have chosen to use the "Epicenter of Business Model Innovation" to generate new business models (Osterwalder et al., 2010). By employing a new strategy for each of the nine blocks, a new design of the university conceptual business model is produced. Many different conceptual business models could be generated this way. Some may not be feasible. This paper focuses on business model design space having the characteristics of Value Proposition and Customer Segments; Internal competencies via the Key Resources, Activities and Partners; and Finance driven via the Revenue Stream and Costs.

## 4. LITERATURE REVIEW

### 4.1. University of the Future Business Models

Literature on the University of the Future (UotF), in general, has recommended various strategic business model options for the HEI decision makers and stakeholders to choose (Ernst & Young, 2012, 2018; Barber et al., 2013; Hanover Research, 2013; PWC, 2015; Frost & Sullivan, 2016; Ibrahim & Dahlan, 2016; Hani Salman et al., 2018; Yahaya & Dahlan, 2019). Cost and funding are common major concerns that threaten the sustainability of all the recommended business models. Endowments and gifts from generous donors have always been a major strategy to ensure a university is able to sustain itself in the long run (Mashitoh & Asmak, 2014; MOHE, 2015). The models proposed were largely based on static models which are not immediately amenable to the dynamic scenarios of UotF. These models are unable to fully consider the increasing complexity of university campus environments (Rytkönen & Nenonen, 2013). Ernst & Young's (2012, 2018) static models had captured and described the most thorough UotF business models. According to Ernst & Young (2012, 2018), and Frost & Sullivan (2016), given the trends of customer demands, digital technologies, methods of delivery, democratisation of knowledge and funding, UotF in general has a number of strategic business model options to choose from. Ernst & Young (2012, 2018) saw university business models becoming more diverse, and anticipated three broad lines of evolution for the University of the Future Models.

- a. **Streamlined Status Quo** - Some established HEI will continue to operate as broad-based teaching and research institutions. Concurrently, they will gradually transform the way they deliver their services, administer their institutions, and the way they engage with stakeholders e.g. students, professional and working adults, government, industry, schools, and the community.
- b. **Niche Dominators** - Some established HEI and new entrants will fundamentally reshape and refine the range of services and markets they operate in. These universities with the new entrants will focus on target 'customer' segments with "just-for-you" education, research and related services - with a concurrent shift in the business model, organisation, and operations.
- c. **Transformers** - Private HEI and new entrants will carve out new positions in the 'traditional' sector and create new market spaces that merge parts of the higher education with other sectors such as businesses, technology, innovation, and venture capital. This will create new markets, segments and sources of economic value. Incumbent universities that partner with the right new entrants will create new lines of business that deliver much needed revenue to invest in the core business - globally competitive teaching, research and community engagement.

### 4.2. Drivers of Change in the Higher Education sector

Using the current Australian university model – a broad-based teaching and research institution, with a large base of assets and back-office – will prove unviable in all but a few cases. In higher education sector, there are five mega-trends that will give impacts in the decade ahead (Ernst & Young, 2012, 2018; Barber et al., 2013; Frost & Sullivan, 2016):

- a. **Democratisation of knowledge and access** – The massive increase in the availability of knowledge online and the mass expansion of access to higher education in developed and developing markets means a fundamental change in the role of universities as originators and keepers of knowledge.

- b. Contestability of markets and funding – Competition for students is reaching new levels of intensity, at the same time as governments globally face tight budgetary environments. University will need to compete for students and government funds as never before.
- c. Digital technologies – Such technologies have transformed media, retail, entertainment and many other industries and higher education is next. Campuses will remain, but digital technologies will transform the way education is delivered and accessed, and the way “value” is created by HEI, public and private alike.
- d. Global mobility – This will grow for students, academics, and university brands. This will not only intensify competition, but also create opportunities for much deeper global partnerships and broader access to students and academic talents.
- e. Integration with industry – HEI will need to build significant relationships with industry in the decade ahead in order to differentiate teaching and learning programmes, support the funding and application of research, and reinforce the role of HEI as key drivers of innovation and growth.

There are five other drivers of change presented by the Senior Director of UTM International, during the Seminar on Current Trends and Global Scenario in Higher Education series 2/2014 (Yahaya, 2014):

- a. Access and equity – ICT enhanced higher education sector, for example via open and distance learning, virtual universities, e-learning, and open educational resources. It is likely to become the most significant driver of cross-border provision. Digital technologies will transform the access to education and drive new approaches to teaching and learning as well as the way education is delivered and supported. The new delivery systems being introduced are Massive Open Online Courses (MOOCs), Corporate Open Online Courses (COOCs), Small Private Open or Online Courses (SPOCs), mobile learning, and cloud computing.
- b. Global mobility
- c. University funding – Three common funding sources of HEI are public funding, tuition fees and endowment. Other sources may include institutional investment and resource generation from a myriad of identified sources.
- d. Research and innovation – Many global trends bring impact to the research landscape such as researches are more multidisciplinary, high mobility of researchers, research funding is more competitive and accountability/government policies. Thus, HEI need suitable “model” to adopt these trends by developing an excellence research strategy, producing high impact research solutions and performance.
- e. Global reputation – It is a new force in national and global higher education created by the many rankings and rating of academic institutions. These rankings are criticised but nonetheless, taken seriously by individuals, public, universities and at times governments.

### 4.3. Fourth Industrial Revolution (4IR)

The Fourth Industry Revolution (4IR) is no longer evolving at a linear pace, but it evolves exponentially and disrupts almost every industry in all over the world. This revolution governs the transformation of the whole ecosystems of services, production, management as well as governance (Schwab, 2016). The wave of innovation consists of digital consumer, digital enterprise and digital operations wave. 4IR leads to digitisation and digital transformation, digital disruptions and it has its own consequences too. Education experts have agreed that Education 4.0 will be shaped by innovations and will indeed have to train students to produce innovations (Abdul Hasees, 2018). The 2018 mandate from Minister of Higher Education Malaysia, themed "Higher Education 4.0: Knowledge, Industry and Humanity" is centred on embracing the 4IR as part of the call to revamp the Malaysian higher education system. This is to ensure HEI will be relevant, creating and adding values, and remain competitive in the dawning of 4IR (Ranai, 2018).

The 4IR is distinguishable from the third because it is where *humans meet the cyber world*; where technology and people are connected. Today, our phones, sensors and Facebook has become an extension of human. Our smart watches are extensions of who we are and what we do. Everything gets connected, integrated, customised and intelligent. The 4IR automates complex tasks; integrating AI, Internet of Things (IOT) and Cloud computing. Graduates must be innovative, entrepreneurial and have cognitive flexibility to deal with complexity. Workers need to collaborate not only with Man, but also with machines and robots. The need for better communication with collaborative skills will be far more important than ever. Graduates must acquire self-learning skills to remain relevant in the era of rapid changes. Education 4.0 is suggested to affect all the domains (Cognitive, Affective and Psychomotor) in the Bloom's model. In the cognitive domain, Application, Analysis, Evaluating and Creating will become more important than the lower level cognitive skills. 4IR will push for students and graduates to have upgraded digital competency - knowledge, skills and culture. Students across disciplines will, therefore, need to develop and acquire digital competency during their studies. The convergence of Man-Machine in the 4IR era demands students and lecturers to have trans-disciplinary knowledge and skill-sets. Universities and industry need to come up with innovative interdisciplinary academic programmes (Abdul Hasees, 2018).

### 4.4. Megatrends

Megatrends as shown in Fig. 1, are transformative, global forces that define the future world with their far-reaching impacts on nations, businesses, and people (Frost & Sullivan, 2016). Megatrends that may impact HEI include: (a) new business model: creating new opportunities of education, employment and value for many, (b) labour market shifts beyond BRIC: increasing automation to affect global workforce, (c) skills mismatch: gap between what employers demand versus what higher education provides, (d) rapid urbanisation: shift toward cities and in search of jobs and career advancement, (e) innovation, connectivity, convergent and mobility: reshaping and transformation of traditional routines and offers new path for learning, (f) economic shifts and she-economy: dependence on emerging markets for economy growth, (g) capacity imbalance: demand in emerging economies versus supply in developed economies, and (h) budget pressures: higher education is facing decline in public funding. These megatrends will compel HEI to offer more relevant, affordable, and flexible academic programmes to catch up the quantitative growth, and qualitative shift (Ernst & Young,

2015). Digital capabilities have reshaped and transformed the way education is delivered, accessed, and the way value is created and enhanced in higher education. It enables real time student's feedback and interaction, and fundamentally, through bringing the HEI to the device. 4IR technologies have benefitted HEI by increasing flexibility and productivity, improving R&D activities, and developing new skills and talent both locally and globally.



Fig. 1: Megatrends (Frost & Sullivan, 2016)

#### 4.5. New Entrants of Higher Education Providers

Higher education sector is evolving. In future, there will be new recruitment of students by big companies like Google and Alibaba's Taobao University. For an example, Google can provide better educational value to students, graduates, educators, communities, and other stakeholders. Google has provided various innovative programs and resources to develop skills for the future (Google, 2018). They engage in research to innovate and create learning opportunities to transform university business model by harnessing digital capabilities. Google has created a new technology that enables people to do things that otherwise they could not do. For instance, Google Glass displays information by working like a smartphone hands-free format.

Alibaba's Taobao University is another new entrant that has the potential of becoming University of the Future. This university is made up of a faculty of senior management from the digital marketplace and offers classes on developing digital businesses. It has been delivering the latest and most valuable industry insights and developments, macro perspectives and expert opinions. This university offers a suite of practical and skill-based programs by the industry experts to address the core competencies of managing e-commerce businesses. Alibaba Business College (ABC), Nanyang International Business College (NIBC), Singapore National Trades Union Congress (NTUC), and LearningHub in collaboration with Employment & Employability Institute (e2i) has launched e-commerce master class to train local talents and help propel Singapore to be a leading global digital e-commerce hub (NTUC, n.b.). ABC and NIBC provide the trainers and curriculum, while e2i and the LearningHub run the programme in Singapore. Students will learn e-commerce business models and platforms, online retailing and digital marketing. ABC plans to roll out a digital e-commerce course in countries under China's Belt and Road Initiative and will launch the course first in Singapore (Charles, 2017).

#### **4.6. Malaysian Education Blueprint 2015 – 2025 (Higher Education)**

This blueprint elaborates the current situation of Malaysian higher education system and highlight where it will go in the future. The Malaysian Education Blueprint, or MEB (HE), outlines 10 Shifts that will spur continued excellence in the higher education system. All 10 Shifts address key performance issues; expected outcomes – including nurturing holistic, entrepreneurial and balanced graduates (MOHE, 2015; Yahaya & Dahlan, 2019); and global trends that are disrupting the higher education landscape (MOHE, 2015). The MEB (HE) also aims to unleash and empower both private and public HLIs to push the boundaries of innovation and strive for institutional excellence in all its forms (Abdul Hasees, 2018).

In terms of harnessing digital technologies capabilities, MOHE and the Malaysia Digital Economy Corporation (MDEC) have introduced the Premier Digital Tech University (PDTU) initiative. The main purpose of PDTU is the government wants to take a step in order to produce top talents and future leaders in the digital technology industry. PDTU will transform the students to become Digital Makers that will disrupt all sectors and create new job opportunities. PDTU also aims to nurturing and grooming talented students to become future digital innovators and entrepreneurs. Eight universities have been awarded with PDTU status where these universities are expected to deliver first-class theoretical and practical training. This effort will be continuously improved by selecting the HEI, by working with the industry leaders based on demands and requirements, and by benchmarking with other countries to see how they produced digital innovators (HEA, n.d.).

### **5. FORMULATION OF CONCEPTUAL BUSINESS MODEL OPTIONS**

Design thinking approach and the business modeling tools - the Business Model Environment Map (EM), Business Model Canvas (BMC) and Value Proposition Design Canvas (VPC) – were adopted to understand, analyse, formulate, and build alternative business models for the UotF.

#### **5.1. Business Model Environment Map (EM) in the Higher Education context**

The Environment Map (EM) in Fig. 2 shows the external factors such as megatrends that can impact the UotF. For examples, 4IR and digital technologies present both opportunities and threats for universities' leaders to rethink and innovate new business models to stay relevant while operating at a lower cost. And those that are able to take advantage of these opportunities through building a digital platform and a new operating business model will stay relevant and survive. At the same time, the entry of new higher education providers with new business models that harness innovatively on digital capabilities may cause further disruption in the HE industry. Just like Uber and Grab have disrupted the taxi industry, and AirBnB has disrupted the hospitality industry. Contestability of markets for students and availability of funding are common major challenges for UotF to survive in the New Digital Age. And content is virtually free.



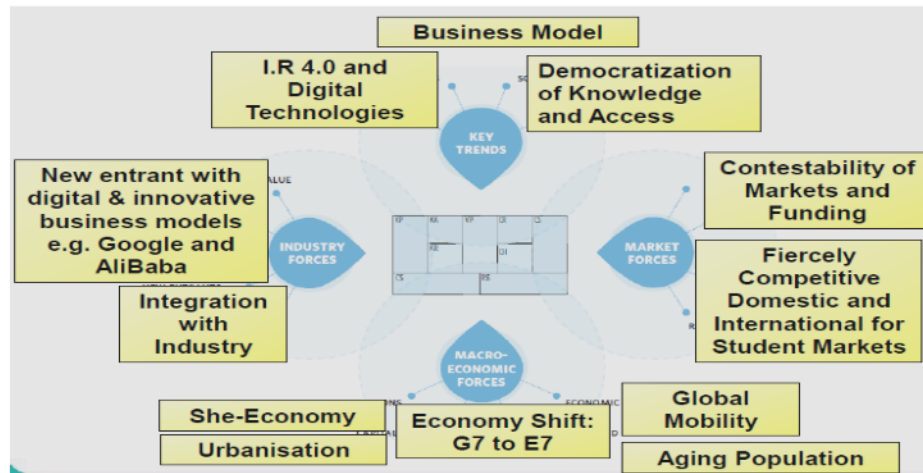


Fig. 2. Environment Map – helps to understand the context in which the UotF create

## 5.2. Business Model Canvas (BMC)

The BMC in the context of future higher education is formulated and shown in Fig. 3. Intuitively, the Value driven and Customer driven strategy focusing on the Value Proposition block and Customer Segment block of BMC respectively, should be one of the primary strategies to be engaged in ensuring the viability of the future business models. Value driven for UotF business model include Nurturing holistic, balanced, and entrepreneurial graduates via Humanizing Education – for Global and local students, fresh and industry professional types of students; Relevant academic programs and Responsible Research & Innovation – in providing high impact solutions to global grand challenges; Continuous Learning and Community Engagement - knowledge transfer, transformation, and wellbeing of community; and co-creation with education providers and industrial partners in providing relevant academic-based solutions.

The Finance driven strategy, focusing on the Revenue Streams block and Cost Structure block of BMC respectively, should also be another primary strategy to be engaged in ensuring the viability of the future business models. Cost is a common major concern affecting all universities into the future – threatening the sustainability of the UotF. Optimising of resources, ROI-driven culture, back office outsourcing, and cost efficiency must be part of UotF business model. Revenue, in traditionally broad-based universities have depended on multiple sources of revenue such as endowment, waqf, gifts, CSR funds, and other donations (Mashitoh & Asmak, 2014; MOHE, 2015). These multiple sources of revenue, apart from fees and grants, must be engaged in ensuring the viability of UotF business model.

The Resource and Activities driven strategy focusing on Key Resources and Key Activities block of the BMC, should also be another primary strategy to be engaged in ensuring the viability of UotF business models. In the New Digital Era, the digital platform, talent, and silo-free ecosystem and lean management must be engaged in ensuring the viability of UotF business model. The Partnership driven strategy focusing on Key Partners and Channel block of the BMC, should also be another primary strategy to be engaged in ensuring the viability of UotF business models. In the New Digital Age, the digital capability in terms of platform for channel partners, physical and

digital resources sharing, silo-free industry value-chain/ecosystem and lean management must be engaged in ensuring the viability of UotF business model.

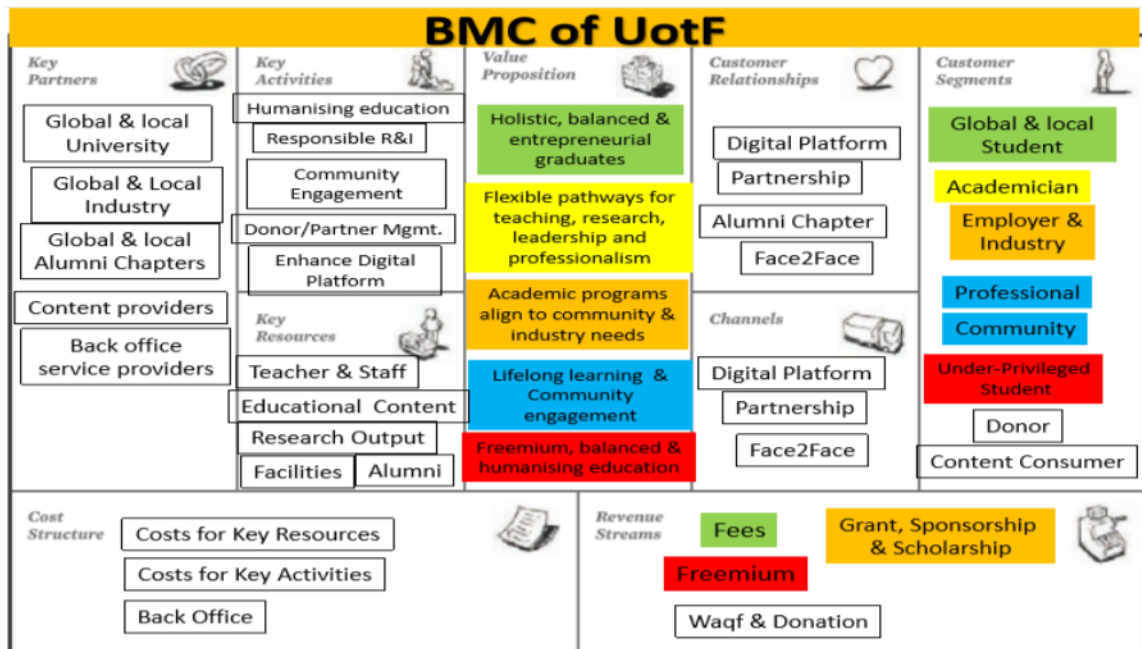


Fig. 3. BMC helps in creating and enhancing value for UotF business

### 5.3. Value Proposition Design Canvas (VPC)

The Value Proposition Design Canvas (VPC) of UotF for Global and Local Students, shown in Fig. 4, is one of its customer segments identified in the BMC. Fig. 4 briefly highlighted the Student’s key Job-to-Do, Pains and Gains, while the UotF is offering values to the Student in terms of Products & Services, Pain Relievers, and Gain Creators. Other customer segments identified in the BMC include employer and industry, donors and sponsors, Public and "Special needs" communities.

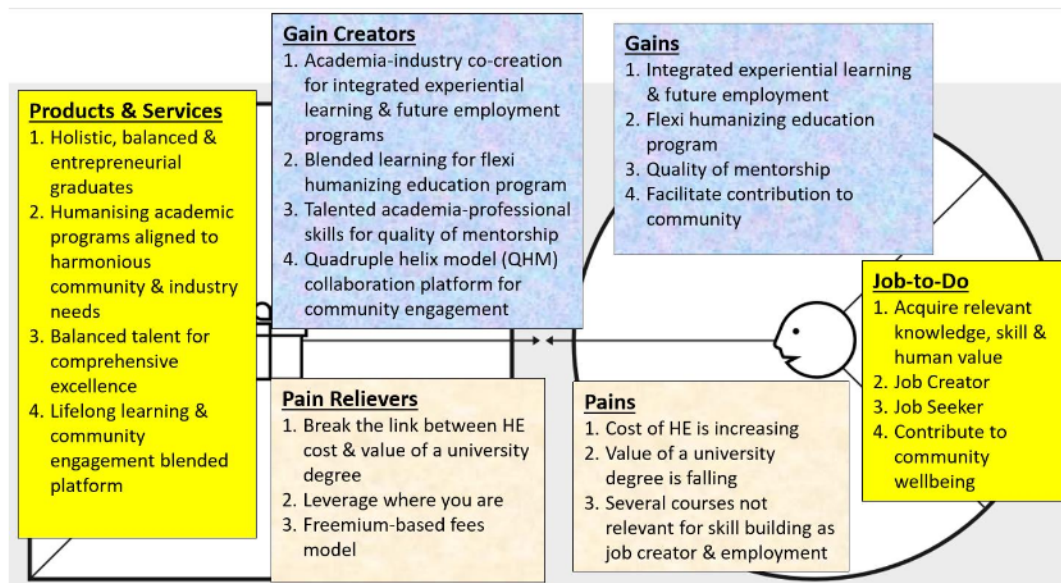


Fig. 4. VPC helps in creating and adding value for Global & Local Students

## 6. CONCLUSION AND FUTURE WORKS

The above modeling exercise, as part of the design thinking approach, showed the creativity and enabling capabilities of business modeling tools in planning, analyzing, designing and building conceptual business model prototypes for the future. The design thinking approach, viewed simultaneously as a problem-definition and problem-solving methodology, facilitates the generation of new conceptual business model options faster, with ease and less cost. Business model prototype options can easily be created, resulted from the different driving strategies, and by starting points in seizing opportunities created and addressing the possible threats posed by the drivers of change. All these business modeling tools reduce risk and uncertainty.

Future works will include gathering evidence, verifying and validating the conceptual business model options, which would progressively achieve problem-solution fit, market-product fit and then Business Model fit (Lewrick et al., 2018). Taking this approach, decision makers and planners for the University-of-the-Future may adopt the above conceptual models, as starting points, in generating innovative and a much wider quality business model options to choose from and work on. Thus, allowing them to test and validate the conceptual business model options before embarking on its costly investment in business and strategic planning, and implementation. This modeling and prototyping approach helps to reduce uncertainty and allows decision makers and planners to make informed decisions on UotF business model options before its full blown implementation.

## REFERENCES

- Abdul Hasees, A. MD (2018). Higher education in the era of IR 4.0. New Straits Times Press (M) Berhad, 10 January 2018. [Online]. Retrieved October 28, 2019, from <https://www.nst.com.my/education/2018/01/323591/higher-education-era-ir-40>
- Azhar Amanullah, A. Ab Aziz, F. N. Abd Hadi & J. Ibrahim (2015). Comparison of Business Model Canvas (BMC) Among the Three Consulting Companies. International Journal of Computer Science and Information Technology Research, Vol. 3, Issue 2, 2015
- Bain & Company (2012). The financially sustainable university. Bain & Company.
- Barber, M., Donnelly, K., and Rizvi S (2013). An avalanche is coming: Higher education and the revolution ahead. Institute for Public Policy Research.
- Carr, N (2012). The Crisis in Higher Education. The MIT Technology Review.
- Charles, R. (2017) "Alibaba college to teach e-commerce here," Singapore Press Holdings Ltd Co., 23 November 2017. [Online]. Retrieved October 28, 2019, from <http://www.straitstimes.com/singapore/education/alibaba-college-to-teach-e-commerce-here>.
- Coes, B. (2014) "Critically assessing the strengths and limitations of the Business Model Canvas", Master, University of Twente.
- Dahlan, A. R. A., Ibrahim, J., Zakaria, N. S. A., Ishak, I., Rahim, N. N., & Malek, N. A. A. (2014). eSoulKitchen Program - Enhancing Societal Wellbeing and Wealth Creation for Orang Asli Community at Pos Selim, Perak. 2014 5th International Conference on Information & Communication Technology for the Muslim World (ICT4M).

- Ernst & Young (2012), University of the future. Ernst and Young
- Ernst & Young (2015), Megatrends 2015: Making sense of a world in motion. Ernst and Young
- Ernst & Young (2018). Can the universities of today lead learning for tomorrow? The University of the Future. Ernst and Young
- Fisk, P (2015). Game changers – Are you ready to change the world? Wiley.
- Frost & Sullivan (2016). New Mega Trends - Innovating to the Future. Frost and Sullivan.
- Google. (2018). Computer Science programs to support and encourage students | Google for Education. [online] Retrieved September 28, 2019, from [https://edu.google.com/computer-science/?modal\\_active=none](https://edu.google.com/computer-science/?modal_active=none)
- Grant Thornton (2015). The state of higher education in 2015.
- Hanover Research (2013). Business Models for Online Education. Hanover Research.
- Hani Salman, N. N. F., Norazmi, N. A. S., Zulkifli, N. A., and Dahlan, A. R. A. (2018). An Enhanced Business Model of University Teknologi Malaysia as University of the Future. International Journal of Computer Science and Information Technology Research April – June 2018.
- Hea.uitm.edu.my. (n.d.). Retrieved August 10, 2019, from [https://hea.uitm.edu.my/v1/index.php?option=com\\_content&view=article&id=246&Itemid=242](https://hea.uitm.edu.my/v1/index.php?option=com_content&view=article&id=246&Itemid=242)
- Ibrahim, I., and Dahlan, A. R. A. (2016), Designing Business Models Options for University-of-the-Future. Proceedings of 2016 4th IEEE International Colloquium on Information Science and Technology (CiSt), Tangier, 24-26 October 2016, pp. 600-603.
- Kim, W. C., and Mauborgne, R. (2017). Blue Ocean Shift: Beyond competing. Macmillan.
- Lewrick, M., Link, P., and Leifer., L (2018). The Design Thinking Playbook: Mindful digital transformation of teams, products, services, businesses, and ecosystems. Wiley.
- Mashitoh Mahamood and Asmak Ab Rahman (2014). Waqf Financing for Higher Education: Contemporary funding applications in some selected countries. Prosiding Pelestarian Insititusi Wakaf: Memperkasa Pendidikan Tinggi Negara, UKM.
- MOHE (2015). Malaysia Education Blueprint 2015-2025 (Higher Education): Challenges in implementation. Ministry of Higher Education Malaysia.
- NTUC (n.d.). Alibaba Business College E-Commerce Masterclass launch. NTUC LearningHub, [Online]. Retrieved October 28, 2019, from <https://www.ntuclearninghub.com/alibaba-business-college-e-commerce-masterclasses-launch/>.
- Osterwalder, A., Pigneur, Y., Clark, T. and Smith, A. (2010). Business model generation: A Hanbook for Visionaries, Game Changers, and Challengers. Wiley.
- Osterwalder, A., Pigneur, Y., Bernarda, G.,and Smith, A. (2014). Value proposition design: How to create products and services customers want. Wiley.

- PWC (2015). The Global University: Risks and challenges faced by higher education institutions with an international agenda. Price Waterhouse and Coppers.
- Ranai, M (2018). 2018 Mandate: Embracing Industry 4.0. Ministry of Higher Education Malaysia, 27 January 2018. [Online]. Retrieved October 28, 2019, from <http://news.mohe.gov.my/2018/01/27/2018-mandate-embracing-industry-4-0/>.
- Rytkönen, E., and Nenonen, S (2013). The Business Model Canvas in University Campus Management. Intelligent Buildings International, DOI:10.1080/17508975.2013.807768.
- Samuel, P. B (2018). What is a Digital Platform. Retrieved October 28, 2019, from <https://enterpriseproject.com/article/2018/12/what-digital-platform>
- Schwab (2016). The Fourth Industrial Revolution: What it means, how to respond. World Economic Forum, 14 January 2016. [Online]. Retrieved October 28, 2019, from <https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/>.
- Yahaya, N (2014). Global trends in higher education. Retrieved October 28, 2019, from <https://www.utm.my/perancangankorporat/files/2014/10/2-Prof.-Dr.-Nordin-Yahaya-Global-Trends-in-Higher-Education.-Seminar-on-Trends-in-HE-1.pdf>
- Yahaya, N. Z, and Dahlan, A. R. A. (2019). University of the Future (UotF): redesign business model for local university in Malaysia through humanising education and 4IR. International Journal of Science and Research (IJSR), 8 (1). pp. 64-70. E-ISSN 2319-7064