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Evaluate the potential of building Thu Dau Mot smart university model by swot

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ABSTRACT

Thu Dau Mot University is one of the main public education institutions in the South-Eastern region of Vietnam. The vision of the university is to adopt innovative teaching methodologies to improve education quality and attract more students. Thu Dau Mot University envisions becoming a smart university as one of its long-term strategies in order to be aligned with the smart city orientation of Binh Duong province. This paper evaluates the potential of building Thu Dau Mot university model by SWOT analysis. The data used in this paper are 18 in-depth interview samples of students, who are studying in different majors at Thu Dau Mot University. It's results will serve as a reference for Thu Dau Mot university's leaders to identifying where are the strengths, the weakenesses, the opportunities and the threats in their process of smart university development. Finally, this paper has provided recommendations to Thu Dau Mot university for becoming a smart university.

Keywords: smart university, Thu Dau Mot university, SWOT

1. Introduction

Binh Duong province has gone through terrific economic development in the last twenty years which has turned a rural area into one of Vietnam's foremost economic districts for domestic and foreign investments in industry and services. Consequently, life standards in the Binh Duong province went through a significant improvement, ensuring better life and environment conditions for its citizens. In order to sustain such growth and maintain the advantage in attracting investments, Binh Duong province is willing to face the challenges imposed by the shift to the 4.0 economy.

After considering economic development models applied in other countries, the leaders of the province have selected the Triple Helix approach adopted by the Brainport Eindhoven region in The Netherlands to be most suitable for advancing the province and placed it as the cornerstone of the Binh Duong Smart City Project. Such an approach requires strong co-operation among government, research and education institutions and businesses as a key factor to unleash the potential for innovation and economic development, where the university plays a prominent role in the production, transfer and application of knowledge and innovation.

Since 2009, Thu Dau Mot university (TDMU) has grown fast and significantly to become one of the main education institutions in the Binh Duong province and the provinces of the South-Eastern region of Vietnam (from Ho Chi Minh City to the Mekong Delta) whose total population amounts to approximately 15 million people. The university has a development strategy to improve the quality of education through the adoption of innovative teaching methodologies by 2020 and have industry-oriented, research-based courses accounting for more than 40% of its total training offer by 2025 in order to position itself as research-oriented university.

Further, the leaders of TDMU envision the adoption of a smart university model as a key factor to effectively pursue the university's objectives by 2030 and actually enhance its operations in all areas that are significant to serve the needs emerging from the shift of the local economy to 4.0 economy, in coherence to the Binh Duong Smart City Project.

2. Literature review

Smart university is a wide concept which relates to the possibility that the use of up-to-date technology in relevant areas of the university's activities and operations may enable new ways of conducting, monitoring, connecting and analyzing them. The smart university concept stems out of the "Smarter Planet" approach, which in the last ten years has highlighted how cutting edge technology is making the world's systems instrumented, interconnected and more intelligent than ever before (IBM, 2008). Academic institutions around the world are considering how the smart approach may be applied to them. In this respect, the adoption of smart technology may be looked at as a trigger that opens to creativity on the many ways that the factors that concur to a successful education system may integrate and interact holistically to uplift the quality of teaching strategies and learning outcomes, the relevance of research, as well as the effectiveness of management and administration of departments and offices of the universities and colleges.

Smart university is a part of smart city. According to Roth-Berghofer (2013), smart university is defined as "a platform that acquires and delivers foundational data to drive the analysis and improvement of the teaching & learning environment. Sensor-data,

linked (open) data, and formalised teaching knowledge are the three sources that we are tapping.". However, this Roth-Berghofer's concept is a merely technological approach. Coccoli et al. (2014) thus introduced the "smarter university" or smart education that "is supported by smart technologies. Nevertheless, smart education is just the upper layer, though the most visible one, and other aspects must be considered as: (1) communication; (2) social interaction; (3) transport; (4) management (administration and courses); (5) wellness (safety and health); (6) governance; (7) energy management; (8) data storage and delivery; (9) knowledge sharing; (10) IT infrasctruture; (11) environment. In this respect, six key are identified for the design of an iCampus such as: learning, management, governance, social, health and green".

Tikhomirov and Dneprovskaya (2015) advocated a holistic approach to smart university concept. They presented the smart university concept "is a concept that involves a comprehensive modernization of all educational processes". Uskov et al. (2017) considered smart univesity as "a place where knowledge is shared in a seamless way and is a system that is green, robust, personalized, responsible, interactive, and adaptive, as well as accessible anywhere, anytime and from any device." According to Heinemann and Uskov (2018), there are six levels of "smartness" exhibited by smart universities: (1) adaptation, (2) sensing (awareness), (3) inferring (logical reasoning), (4) self-learning, (5) anticipation, and (6) self-organization and restructuring.

Nguyễn Hữu Đức et al. (2020) propose a smart university model V-SMARTH "including six basic components (digital resources, open-access learning materials, virtual teaching-learning environment, individual learning needs, interactive teaching-learning methods and digital infrastructure) are gathered into three pillars: digitization, a teaching-learning model based on digital technology and a comprehensive digital transformation of the system".

SWOT analysis is an analytical model developed by Albert Humphrey in the 1960s – 1970s. SWOT analysis is a simple but powerful tool for sizing up an organization's resource capabilities and deficiencies, its market opportunities, and the external threats to its future (Thompson et al., 2007). It is a tool used for strategic planning and strategic management in organizations. It can be used effectively to build organizational strategy and competitive strategy. It is a strategic planning framework used in evaluation of an organization, a plan, a project or a business activity. SWOT analysis is therefore a significant tool for situation analysis that helps the managers to identify organizational and environmental factors. SWOT analysis has two dimensions: Internal and external. Internal dimension includes organizational factors, also strengths and weaknesses, external dimension includes environmental factors, also opportunities and threats (Gürel & Tat, 2017).

Based on data collected from 18 in-depth interviews with students who are studying in different majors at Thu Dau Mot University, this paper analyzes the potential of

building smart university model of TDMU by SWOT analysis. This model helps to see panorama of the influence factors for building smart university model of TDMU, thereby determining appropriate development direction and measurements. Moreover, this paper provides recommendations for becoming a smart university of TDMU.

3. Finding and discussion

To collect information from research subjects, we conducted purposeful dialogues through in-depth interviews with students at Thu Dau Mot University about experiences related to learning, interactions, and interactions with students at Thu Dau Mot University. Collaborate with faculty, support services, facilities and student expectations. The number of in-depth interviews with students conducted was 18. In-depth interviews are conducted after the interviewer and interviewers have had time to get acquainted and create trust as well as ensure anonymity and comfort during the information collection process. The purpose and meaning of the interview as well as the use of information after collection are informed to the interviewee.

The strenghs, the weaknesses, the opportunities and the threats (SWOT) of the TDMU are summarized in the table below.

	Helpful	Harmful
Internal	**Strengths**	**Weaknesses**
	- Clean campus with the availability of garbage bins - The level of accessibility on campus by introducing ramps and wheel-chair accessible washrooms - Building the strong research groups - Carry out and commercialize the scientific research's results - Students and teachers engage in research - Developed range of majors and area of studies with many development opportunities - Used e-learning in teaching and learning - Image and culture of university	- The quality of classrooms - Lack of lecturers dedicated spaces (for rest/work and collaboration) - Quality of teaching, discipline issues, long classroom time & outdated course materials - Lack of training for lecturers; in-class practical experience; short internships - Inconsistencies in the current policies - Availability of wi-fi, the functioning of the University's website - The university's administrative processes in general
External	**Opportunities**	**Threats**
	- Labor market demand for high quality human resourse - Technology 4.0 development - Bình Dương smart city's project - Digital education trend after Covid – 19 pandemic - International collaboration	- Limited number of students - Student adaptability level is not high - Information security and cyber security - Compete with big university in the region

The strengths

Smart infrastructure (campus facilities; work and study spaces; library; green/trees; planned and ongoing maintenance and improvements) and social responsibility (friendly

and inspiring atmosphere; good relationship among lecturers and students; students' association; sufficient level of enthusiasm and engagement) are the positive in the picture. In the recently, TDMU campus has the major changes and infracstructural improvements. The highlights are the trees, the gardens, and how beautiful and spacious the campus. The university has placed effort on a clean campus with the availability of garbage bins and is increasing the level of accessibility on campus by introducing ramps and wheel-chair accessible washrooms. Besides, the campus sports facilities (availability; diversified sports), the quality of classrooms (high tech appliances), diversified use spaces (study, collaboration, modern computer rooms), and access to the campus (transportation and parking) as improvement areas, including more availability of students' dormitories are development. All of these changes are contributing to a smarter campus and TDMU is on the correct trajectory.

Opinions collected from in-depth interviews show student satisfaction with the environment of TDMU. When we asked about their feelings about the campus, most students highly appreciated the green, beautiful and comfortable elements of the campus. This is reflected through the words that students use to comment on the school's campus such as: excellent, beautiful, green, airy.

"The school campus must be called excellent. Because there is rarely a university that has a campus where students can study, play and exercise according to everyone's interests." (In-depth interview, T.H.N, Faculty of Foreign Languages)

Smart research is the other strength of TDMU. The university has expressed interest in becoming a prominent applied research institution, and shows great promise in doing so. There is a successful research model currently in place, which demonstrates the ability to carry out and commercialize future research, bringing in revenue to support the university. Such collaborations with business partners contribute to the Triple Helix philosophy, enabling industry to access state-of-the-art research and the university to receive consulting and other fees. Both students and lectures have supported the research currently performed in the university. Students are willing to be more involved in applied research and suggested to increase external research activities such as field trips to industries and to encourage collaboration with other universities. Teachers were more focused on improving internal research activities and proposed to sustain internal research efforts by rewarding them in a timely manner, and to promote collaboration across faculties to pioneer a start-up incubator that allows the students to apply the knowledge they gain through courses.

Since 2020, TDMU has advocated forming strong research groups to serve the goal of promoting scientific research activities in an in-depth direction combining interdisciplinary and transdisciplinary. In TDMU's science and technology development strategy until 2030, strong research programs/groups will be formed.

TABLE 1. Strong research programs/groups of TDMU

South East Region	Migration	New Materials	Nanotechnology
Electronics and Telecommunication	Educational innovation	Social prolems	Vietnamese wild orchids
IT applications	Corporate social responsibility	Big data and data analytics	Half-destruction of polymer structure
The issue of international integration	Cellulose from fruit juice	Algae - medicinal and food	Mushrooms - medicinal and food
Preserve and develop native fruit trees	Cultural issues and human value systems	Smart cities and dynamic urban areas	Socio-economic form in the industrial era 4.0
Modeling and simulation in the digital age			

Source: *Hội đồng Trường Đại học Thủ Dầu Một, 2019*

Along with strengthening international scientific publication activities, TDMU is promoting the commercialization of research products. In 2018 - 2019, TDMU organized training and technology transfer activities for many organizations and localities such as: transferring "Technical process of growing red Ganoderma lucium" and composting process biological organic products with Trichoderma antagonistic mushroom products" for Ca Mau province farmers' association; Transferring the cordyceps extract production process to MHD InnoCare Joint Stock Company; Transferring the cordyceps farming process to Nong Thanh Phat Production, Trading and Services Company Limited, DTN Pharma Pharmaceutical Company; Transferring the process of growing mushrooms and mushroom embryos to Dai Nam Joint Stock Company, Nong Thanh Phat Production Trading and Services Company Limited; Transfer products to the Propaganda Department of Binh Duong Provincial Party Committee; Transferring herbal tea to Khai Anh Pharmaceutical Company... In addition, TDMU has cooperated in research and technology transfer with Ben Tre province for a national technology transfer project on "wood production from coconut tree trunks" according to the State's mountainous rural development program. Currently, products produced from the research results of TDM University have been sold on the market, such as: products from cordyceps, lingzhi mushrooms, San Tuyết tea, cosmetics...

TDMU is oriented toward the multidisciplinary university therefore, it has developed range of majors and area of studies with many development opportunities. Smart education are implemented at all levels such as improvement of the in-campus learning experience (increase quality of teaching, with a more practical twist and a focus on topics relevant to courses; restructuring of time schedules to reduce in-class time; adoption of updated course material); increase of international exposure for both students and lecturers (opportunities for international exchange programs; in-campus international activities; foreign visiting professors); match lecturers' expertise with their teachings; increased adoption of e-learning. Training courses have held often to enhance the use of English language in curricular/non-curricular activities; support specialization of lecturers; train staff to be customer-oriented; promotion of teambuilding activities for lecturers.

The E-learning online training model of TDMU has been deployed since 2016. During the 2021-2022 school year when the whole country of Vietnam is affected by the Covid-19 pandemic, students and lecturers unable to carry out learning activities in class, the E-learning system has become a learning space for lecturers and students of the school.

"*For me, I rate TDMU's E-learning system as good. Firstly, I find accessing teachers' lessons very quick. Secondly, the connection system between teachers and students during the Covid-19 pandemic is very good and when you have any problems, you can go to the E-learning system to look up lessons.*" (In-depth interview, L.L.V, Faculty of Pedagogy)

The image and culture of the university are known more increasingly by collaboration in scientific and teaching with domestic and international university. The Dipterocarpus retusus's fruit is chosen as the representative image of TDMU. It reminds the local image (The Thu Dau Mot's name origin stems from a story about the Dipterocarpus retusus). The university has built many landscapes in the school yard to make a relaxing corner for students. It is a good way of building the university brand and makes the students to feel proud when they study at TDMU university.

The weakenesses

Despite the postive in smart infracstruture, some weaknesses have been highlighted regarding the quality of classrooms (small; crowded; no fans/air conditioning; delays in maintenance) and lack of basic equiment for some strong research group (table, high configuration computer, wifi system).

Regarding classroom equipment, student opinions are not satisfied with the classroom at some points, such as the tables and chairs in some classrooms are not enough for classes with a large number of registered students. However, some tables and chairs are damaged and need to be replaced, projectors, lights, fans or air conditioning systems often have problems.

"*Some of the classrooms that have been rebuilt are beautiful, but the old classrooms are very hot and the fans are very weak. Then the projector in the old H1 row has a yellow cast on the projection screen, making it difficult to read, and it's so small that you can't see it from far away. The tables and chairs are not enough for my class*" (In-depth interview, L.T.M.D, Faculty of Economics)

"*The thing that makes me feel most uncomfortable is the microphone. Accidentally, when I go into a classroom, sometimes there are very good microphones, but some rooms don't have good microphones. This affects the presentation. I think the school should be equipped with better microphones*" (In-depth interview, T.K.V, Faculty of Management Sciences)

Some weaknessess have identified regard to smart education (e.g. disengaged students and lecturers; quality of teaching; discipline issues; long classroom time; outdated course materials) and smart training (e.g. lack of training for lecturers; lack of in-class practical experience; short internships).

"*E-learning sometimes freezes and loses connection, so sometimes I can't take the test on days when E-learning is under maintenance.*" (In-depth interview, B.G.B, Faculty of Foreign Languages)

"*In some majors, there are subjects where teachers speak very quickly and do not stick to the main point of the lesson. When I want to listen again, the speed of the lecture and the lecturer's ideas conveyed the second time are still not the same, which led to me not being able to understand the lesson*" (In-depth interview, L.K.N, Faculty of Management Sciences)

"*There are lecturers who conduct tests very poorly, such as not creating a zalo group to notify all students and then forcing students to go to E-learning to view information. That's why I find there are very uncomfortable and inadequacy problems in studying*" (In-depth interview, D.N.C.T, Institute of Technology)

The current policies sometimes are inconsistence, which need to be standardized and about the fact that amendments to the policy adopted during the school year may trigger disruptions to ongoing activities. Strategies from university council don't effective communicate between faculties, departments and centers. Faculties have not been given the right in the budget spending and human resourcse recruitment.

The availability of wi-fi, the functioning of the university's website (availability; errors; instability) and the university's administrative processes in general (unavailability of forms, documents, certificates and information online; overlap of office procedures; delays and inconveniences in procedure for the payment of tuitions and enrollment process) are the negative of smart technology.

Since 2015, TDMU has invested in installing and regularly upgrading the wifi system according to a centralized management model, making management easy and effective; Serves well the learning, teaching and scientific research of lecturers and students. Currently, TDMU is equipped with more than 170 Access Point devices with wifi coverage in all working, teaching and learning areas at the school with a total internet bandwidth of more than 1.5Gbps.

"*I don't appreciate university's wifi because there have been many times I've been not able to access the university's network. When I log in, the internet is disconnected and I can't access it. Sometimes there is internet but I can't access. So I don't know for what purpose the university creates that wifi, but if it's used for studying, it's not strong at all.*" (In-depth interview, L.L.V, Faculty of Pedagogy)

"*I see that in terms of documents, once I applied for a military service deferment paper, I found it took quite a long time to wait for the paper to be issued*" (In-depth interview, B.G.B, Faculty of Foreign Languages)

"*I find our university's procedures too cumbersome. For example, there is a subsidy for poor students in areas 1, 2, 3, near-poor areas, but the procedure for applying for a*

certificate is very difficult for students in remote areas. Second is the insurance issue, this is almost a common situation for students at school because the system often takes a long time to respond when students have questions related to insurance cards" (In-depth interview, H.D.T, Institute of Technology)

The opportunities

The concept of knowledge economy, born in the early 90s of the twentieth century, emphasizes the role of knowledge as a new driving force for socio-economic development. The labor market requires highly skilled workers who can understand and operate complex machineries. Workers are trained to adapt to rapid changes of the market. Binh Duong province is an important industrial area in the South of Vietnam with the advantage of manufacturing industry. It is also in the process of transforming its economy from cheap labor economy to a knowledge-based economy, therefore there is a huge demand for high quality human resursce in the coming years. For that reason, TDMU need to take advantage of smart university to training student into human capital.

Technology 4.0 is core element and strong influences the development of smart university. Thanks to technology 4.0, the education system has been changing from traditional (face to face) to digital (online). Technology 4.0 applications have been applied in smart education, such as: teaching and learning by e-learning, digital displays, interactive whiteboards, audio/visual components in smart classroom, big data, cyber security for service student's experience… TDMU is applying a number of smart applications in teaching (smart classroom, e-learning) or research (Big data, AI, IoT) to become a smarter university.

Binh Duong province has implemented the smart city model since 2017 (Triple Helix model) and considers it as a driving force for the province future development. In Triple Helix model, smart education is an important pillar (the other 2 pillars are smart governance and smart business). In 2018, Bình Dương was the first locality in Vietnam to achieve Smart21 and became an official ICF's forum member. For the next two years, Binh Duong continued to be on the Smart21 list of ICF. This result opens up Binh Duong's opportunities for cooperation and exchange of experiences with ICF's network of more than 180 prosperous Smart Cities around the world (People's Committee of Binh Duong Province, 2021). Moreover, it promotes foreign investment attraction and creates a foundation for the development of trade-services, high-tech production in the future.

The Covid-19 pandemic was detected in Wuhan at the end of 2019 and then appeared in all countries around the world. In Vietnam, due to the impact of the COVID-19 epidemic, many educational and training institutions have to close for a long time. More than 20 million pupils, students and nearly 2 million teachers at all levels have not been able to continue teaching and learning by direct teaching method. Ho Chi Minh City was the first locality to announce that it would not hold the opening ceremony but

started the new school year online from the beginning of September with the high school level and mid-September for primary school. At Ha Noi and some cities, the opening of the school year 2021-2022 held online or on television on September 5 due to ensuring the regulations on social distancing according to Directive 16 of the Government. From September 12, southern provinces and cities held a late opening ceremony via online or live broadcast on local television (Central Propaganda & Training Commission, 2021). Even if Vietnam switch to new normal, education by digital will be an inevitable trend.

International cooperation plays an essential and indispensable role in the process of establishing universities that are expected to meet international standards. Briller & Ly (2008) mentioned the internationalization needs and trends of universities on a global scale. This trend is sure to grow stronger in the era of globalization. Internationalization is becoming a matter of survival of universities in the global competition. There is strong evidence that internationalized universities perform much better in both training and scientific research. This is often reflected in the training of students with international knowledge and cross-cultural competence; achieve international standards; maintain competitiveness; promote the development of knowledge on issues of interdependence between nations; study the problems that are posed to the country and the world; work for social progress; appreciate the cultural and ethnic diversity of a country thereby maintaining international security stability and peaceful relations. The need for internationalization makes it impossible today for universities to develop without focusing on international cooperation and operating according to international standards in order to gain recognition and maintain their competitiveness yourself in a global environment (Knight, 1997).

The threats

Tuition fees for the academic year 2020-2021 of TDMU are at the lowest level of 490.500/ theoretical credit (social sciences, economics, law, foreign languages) and the highest is 877.500/ practical credit (natural studies) (TDMU, 2020). In order to switch to a smart university model, TDMU need to invest a lot in the system of facilities and modern equipment such as: smart class, smart library, e-learning system, data system, security… It will increase the cost of a student's college education. High tuition fees will be a huge barrier for most students and limit the number of students.

Smart university uses smart teaching methods through modern ICT technologies. Applying ICT in smart teaching helps to improve teaching effectiveness but also it causes difficulties for teachers and students to adapt to new teaching methods. For students, who are used to traditional way of learning in high school, they need time to get used to the modern way of learning that emphasizes self-learning.

Smart university operates on the platform of a data system including personal data. These data are often easily stolen by professional hackers. The loss of information greatly affects the reputation and secrery of universities. Therefore information security

or cyber security is one of the important conditions to protect any kind of data and sensitive information against cyber attacks.

From the practice of developing smart universities in the world, it can be said that smart university is the inevitable development trend of universities. However, to become a smart university, universities will need huge investment costs. In Vietnam, universities such as Ha Noi National University, Ho Chi Minh National University, Duy Tan University, Ton Duc Thang University…are considered pioneers in smart university development. These are all big universities with modern facilities and strong financial potential. These are the advantages to develop smart university. Local universities, that do have not the advantages of facilities and finance, will have difficulty in developing smart university. They will be left behind in competition with big universities.

Recommendations for becoming a smart univeristy of TDMU

On SWOT analysis, the paper has considered the challenges in applying a smart university model, proposed the action plan to overcome these challenges, and provided actionable recommendations that progress TDMU towards possible simplification, efficiency, cost reduction and automation:

Providing TDMU with a methodology (PDCA) which will assist the university in:

- Building a well-structured strategic plan will allow the TDMU leaders (i) to clearly convey their vision and objectives to internal relevant stakeholders and thus buy in their adherence and commitment to the plan; (ii) to share their strategy externally with interested counterparties (other academic institution, government bodies, industry representatives) whenever it is so required or beneficial.

- Enhancing its processes in an efficient and cost-effective way, while ensuring engagement of relevant stakeholders within TDMU thus overcoming possible internal aversion to the sharing of data and to change and transformation in general.

- Enhancing the labor force with strong, relevant skills to successfully sustain and contribute to the new phase of economic development necessary for Binh Duong Province to shift from traditional economy to 4.0 economy, by developing effective, high quality curricula with the involvement of prospective employers through the DACUM process.

- Evolving TDMU in an applied research-based university by treasuring talents and setting the conditions for such talents to express their potential in applied research.

- Attracting an increasing number of prospective students by growing TDMU into a students' success oriented academic institution, where success of students is planned for and monitored quantity wise (graduate's employment rates), as well as quality wise (graduates' skills and knowledge are aligned with the needs of the labor market and are suitable for successful transition of graduates into the labor market).

Making available to TDMU meaningful insights to successfully deal with one of the core factors of a smart university, i.e. the adoption of smart technology to simplify and

transform its processes and thus build the prerequisites to new ways of conducting, monitoring, connecting and analyzing the university's activities and operations and thus allow new ways of managing them in order to achieve the desired objectives such as improved quality of education, industry related research, efficiency and costs reduction, effective allocation of resources complexity.

Encouraging TDMU to leverage on the existing initiatives regarding the students' internship to build up a comprehensive co-op program with multiple substantial benefits: (i) enhance the students' learning experience with valuable hands-on experience in the market place in order to build strong human capital for the labor market; (ii) facilitate job placement of students thus increasing graduates' placement rates (iii) foster involvement of local enterprises with the university teaching activities and build up and maintain relationship for potential continuous exchange of ideas, opportunities, research projects and the like between university and business.

4. Conclusion

In the general development trend of modern university, smart university plays an important role in transforming education and training model from traditional to digital. In Việt Nam, smart university model is being viewed as long-term strategies in order to adapt to the economy shift of industry 4.0. As a multidisciplinary university located in a large industrial center in the eastern-south of Vietnam, TDMU has a lot of potential to build a smart university model, such as a green campus, strong research groups with commercialized products, e-learning system, university's culture. However, TDMU also has encounter weakeness such as: lack of smart spaces, the quality of teaching, the limitation of facilities, the inconsistent to policies and administration. Therefore, to address these weakeness, TDMU should employ a continuous improvement model to support systematic assessments across the university. Such a model like PDCA will sustain the university's efforts toward becoming a smart university and support other innovative initiatives across the university. The core of the smart university approach is about leveraging on smart technology to enable new ways of conducting, monitoring, connecting and analyzing the university's activities and operations and thus allow new ways of managing the university in order to achieve the desired objectives such as improved quality of education, industry related research, efficiency and costs reduction, effective allocation of resources complexity. Accordingly, TDMU considers the unification of these processes by generate detailed mapping of various processes and relevant data, build a data repository and create a user portal. And finally, TDMU should structure co-operative education (co-op) program. Incorporating a well-deployed co-op program will offer many benefits to TDMU, industry, and the community.

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