



USIM's Smart University Blueprint: Advances and Challenges

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Abstract. COVID-19 and the movement control order (MCO) implemented in 2020 and 2021, have had a major impact on Universiti Sains Islam Malaysia (USIM) in all directions. To mitigate these problems, USIM's top management has taken several initiatives to ensure the operation of the University is upheld to its most so that the student continue their study without any delay or obstruction. By incorporating the United Nations' Sustainable Development Goals (SDGs) on Goal 4 (focused on inclusive and equitable quality education) and with the underlying concept of data-driven and student-centric, this paper presents Smart University Blueprint (*Al-Jamiah Al-Mubarakah*). It has 5 clusters and 13 initiatives for digital transformation to support inclusive and equitable quality education. The 5 clusters consist of smart governance, smart lifestyle, smart infrastructure, smart learning, and smart services. This smart blueprint is based on 7 principles from USIM's ICT Strategic Plan (ISP) 2021-2025, which emphasized and are based on the Islamic Laws concept (*Maqasid Syariah*), Industrial Revolution, Student-Centric, Data-Driven, Open Source, Agile and Mobility, and Prosumers. This paper presents how the blueprint has helped to accelerate stakeholders' understanding and cooperation in achieving SDGs in higher education during and beyond the pandemic.

Keyword:

Data-Driven, Student-Centric, Smart University Blueprint, Digital Transformation, Equitable Quality Education, Sustainable Education, Smart Learning.

1. Introduction

Since COVID-19 was discovered for the first time in Wuhan, China, it has had a significant impact on everyone around the world. Since that time, everyone has had to

overcome numerous obstacles to continue living their everyday lives and taking part in societal activities. Nonetheless, two of the key pursuits include Teaching and Learning (T&L). Without consistency and advancements in T&L, the economy and communal life will not advance. While in Malaysia, once the government issued the movement control order (MCO) in March 2020, many things changed and went through a digital transformation drastically. It also has significant impacts on Malaysia's public and private universities. To prevent lecturers and students from being trapped in their T&L challenges, Higher Education Institutions (HEIs) across the world had to drastically restructure the way services were delivered, notably T&L. Nowadays, most the HEIs have their own T&L sustainable education management strategies which include the integration of digital transformation [1-5]. Different organizations have different approaches and strategies to sustain their operations and T&L activities. It is significant to educate future professionals to strategize education approaches and strategies for more sustainable world development [11-14]. As for HEIs, the sustainability role has been widely applied and aligned either in short or long-term strategic plans. Hence, for Universiti Sains Islam Malaysia (USIM), to overcome the T&L challenges and sustain the T&L activities, we developed Smart University Blueprint (*Al-Jamiah Al-Mubarakah*). It incorporates the United Nations' Sustainable Development Goals (SDGs) on Goal 4 (focused on inclusive and equitable quality education. As a result, this paper aims to present USIM Smart University Blueprint (*Al-Jamiah Al-Mubarakah*) with the underlying concept of data-driven and student-centric to support business operations at our university in any situation.

This paper is organised as follows. Section 2 discusses the smart university blueprint and the method used in developing this blueprint. While Section 3 presents the details of the implementation, advances in the technologies used, and challenges faced. Finally, Section 4 concludes this paper.

2. Smart University Blueprint

As for Universiti Sains Islam Malaysia (USIM), Malaysia, ICT Strategic Plan (ISP) 2021-2025 together with Smart University Blueprint has been introduced to support the T&L and other operational matters in the university. This Smart University Blueprint can be downloaded from the CDO's website [6]. These ISP and Blueprint are developed with the collaboration between Chief Digital Officer (CDO) unit, formerly known as Chief Information Officer (CIO) unit and System Development and Engineering Centre (SDEC) and close collaboration and guidance with the Malaysian Administrative Modernisation and Management Planning Unit (MAMPU). Since 2011, USIM has taken a step forward earlier by introducing an online T&L mode using a Learning Management System (LMS) named Global Open Access Learning System (GOALS). The existence of this GOALS system helps lecturers and students manage lecture notes, to submit assignments and to take online exams. Until 2016, blended online learning at USIM has reached almost 97% of users' usage. Hence, when COVID-19 began, USIM's lecturers and students have less trouble with T&L since the culture of online learning has been introduced in earlier years. GOALS system plays a significant role in T&L at USIM, and it is aligned with the 4th Industrial Revolution (4IR) and the coming 5th IR. In the education context, digital tools are used in T&L for smarter, mobile, virtual and comprehensive learning. Lecturers and students must have the digital skills to accept the changes and innovations in the education system today. For operation purposes, a dashboard called Pelangi has been developed at USIM to suit the demand of monitoring the

progress of the strategic plan. This dashboard is a great tool for visualising the data gained from the data owners in USIM. Furthermore, many previous studies integrated dashboards with their T&L as well [7-10]. In the dashboard, the analytic tools are integrated, and these tools are widely used in many aspects of society to evaluate and manage, discover insights from data, and foster innovation. The HEIs are particularly aware of the benefits that data analytics offers, and the use of analytics technologies are becoming more significant since this sector is being affected globally as a result of the COVID-19 pandemic crisis.

Figure 1 depicts the summarisation of the methods used to develop the USIM ISP and USIM Smart Blueprint. There were 5 Phases involved: Mobilization (Phase 1), Analysis (Phase 2), Strategy (Phase 3), Formulation (Phase 4) and Documentation (Phase 5). Each of these phases has its output or known as a deliverable, which includes of project start document, gap analysis report, ICT strategic direction report, action plan interim report and project completion report. USIM took about 2 years to complete all these methods. From time to time, internal Focus Group Discussions (iFGDs) were conducted to gain the right formula for executing this ISP and Smart University Blueprint. USIM also got support from MAMPU and industries that gave their insight and guidance about the technologies that should be implemented and integrated at USIM.

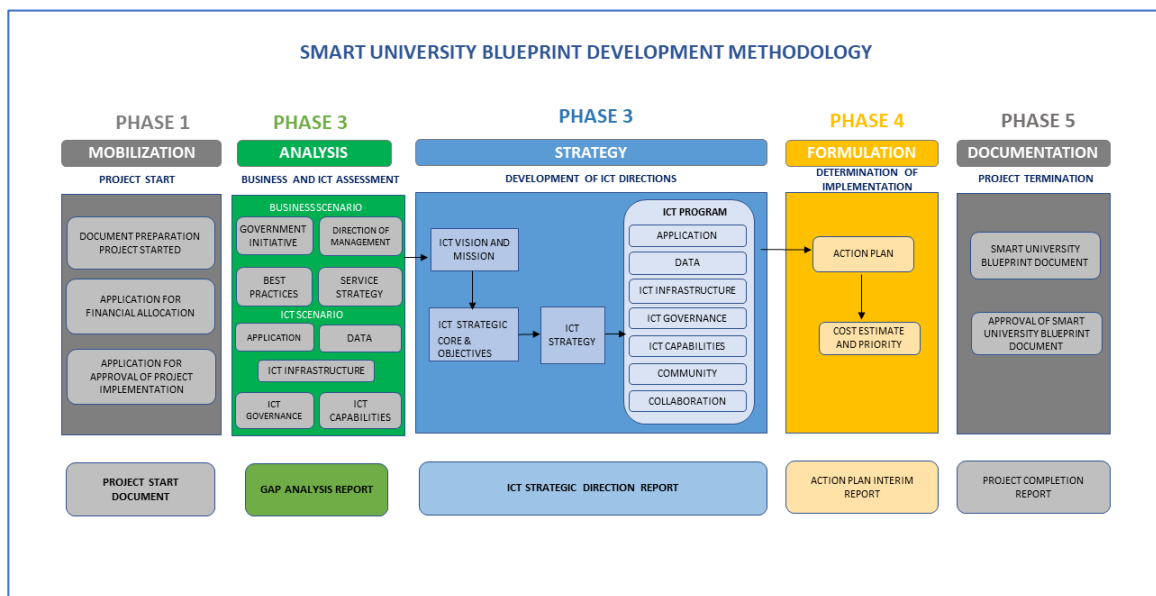


Figure 1. Methods Summarisation for ISP and Smart University Development

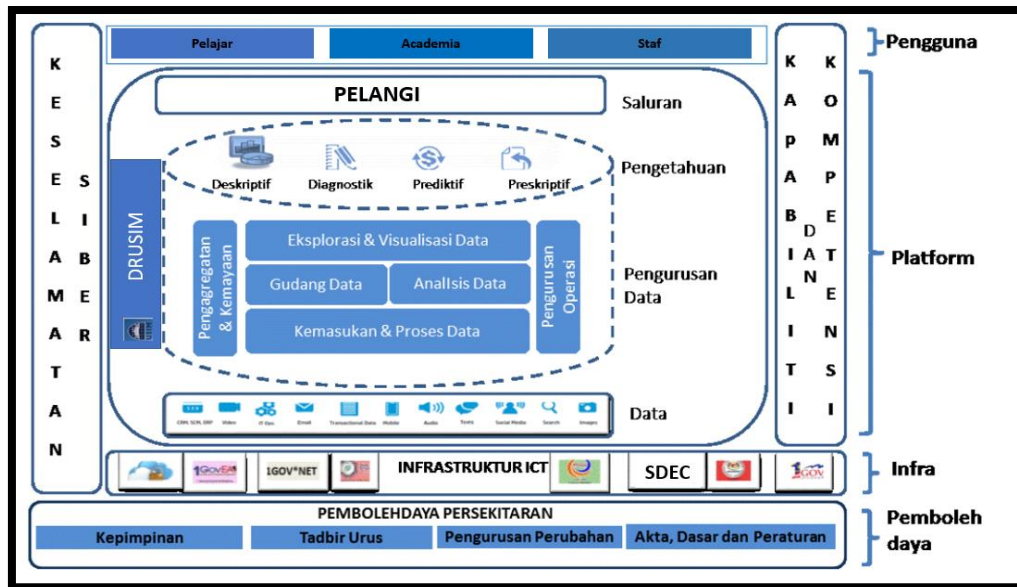


Figure 2. USIM Dashboard Framework

While in Figure 2, is the summarisation of dashboard methods and the dashboard framework. There are 4 main components embedded inside the dashboard framework namely enablers, infrastructure, platforms, and users. There are a few components already completed and the rest are still in progress. In the future, the USIM Dashboard display will reach a smarter level of intelligence in reporting data and be more agile in processing data.

3. Implementation

In this section, the details of the Smart Campus Blueprint are further explained together with the Executive USIM Dashboard.

3.1. Smart Campus

USIM has developed the Smart University Blueprint (Al-Jamiah Al-Mubarakah) with 13 initiatives to mobilize digital transformation efforts. The focus of the USIM Smart University initiatives is in line with the 7 basic principles of the USIM ICT Framework which emphasize the Shariah Objectives, Industrial Revolution, Student-Centered, Data-Centered, Open-Source Software, Agile & Mobility and Prosumerism. USIM ICT Strategic Plan (ISP) also supports the framework of Al-Jamiah Al-Mubarakah as shown in Figure 3.

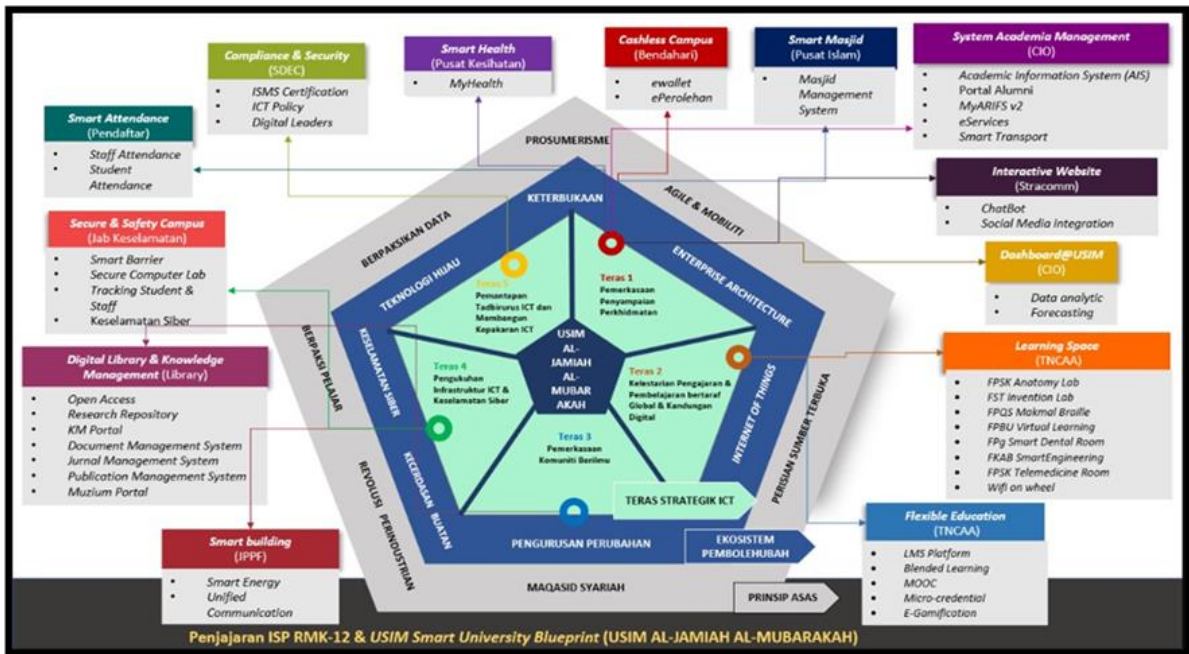


Figure 3. Al-Jamiah Al-Mubarakah Framework

Based on these basic principles that have been identified, 5 clusters have been formed under the Al-Jamiah Al-Mubarakah, namely Smart Governance, Smart Infrastructure, Smart Lifestyle, Smart Services and Smart Learning as displayed in Figure 4. Additionally, Murabbi's touch (Muslim Scholar Touch) is the underpinned concept for this blueprint. While Table 1 summarises the initiatives and programmes in the Smart University to support business operations at the university.



Figure 4. Smart University Blueprint Cluster

Table 1. Smart University 13 Initiatives

Initiatives	Programmes
Cashless Campus	eWallet e-Perolehan system
Smart Attendance	Staff Attendance Student Attendance
Learning Space	FPSK Anatomy Lab FST Invention Lab FPQS Braille Lab FPBU Virtual Learning FPG Smart Dental Room FKAB Smart Engineering FPSK Telemedicine Room Management Trainee Space Wi-fi on wheel
Dashboard @USIM	Data Analytics Forecasting
Academia Management System	<i>Academic Information System (AIS)</i> <i>Alumni Portal</i> <i>My ARIFS V2</i> <i>Smart Transport</i>
Interactive Website	Chatbox Social Media Integration
Smart Masjid	Masjid Management System
Smart Health	MyHealth
Digital Library & Knowledge Management	Research Repository System (Open Access Initiatives) Knowledge Management Portal Document Management System Journal Management System Publication Management System Muzium Portal
Flexible Education	MOOC V2 LMS Platform Blended Learning Micro-credential E-Gamification

Initiatives	Programmes
Secure & Safety	Smart Barrier Secure Computer Lab Student & Staff Tracking
Campus Smart Building	Smart Energy Unified Communication
Compliance & Security	ISMS Certification ICT Policy Digital Leaders

3.2. USIM Dashboard

It has become a duty, especially in the main industries to have a display that shows the activities that take place from the beginning to the end, more understandably and systematically. This informative display system has long been used especially for control systems such as SCADA. Now, many industry experts prefer to call this system a Dashboard. Because of the wider use of Dashboard, this has become one of the main challenges to measure the extent to which an institution meets the requirements of a smart city or smart campus in a more dynamic and agile so that the dashboard could be called a Smart Dashboard. The Malaysian government through its department, MAMPU, has developed the Smart Dashboard framework since 2015 by conducting several pilot studies. This pilot study is the starting point for a more mature Dashboard framework. USIM through the CIO office has held several knowledge-sharing sessions with MAMPU since the beginning of 2020. Through this knowledge sharing, USIM has branded a Dashboard framework that can be adapted by USIM. Several steps and strategies have been compiled to produce USIM Dashboard. Among them is the work of harmonizing the various data definitions required for recognition such as MyRA, MyMOHES, and SETARA data. The second step is to develop a USIM Dashboard for use by top management that involves several key indicators, namely financial sustainability, USIM@MEDIA, Research and Publication, Graduate Employability, and Community Engagement as shown in Figure 5.



Figure 5. USIM Dashboard

Apparently, there are a few challenges identified during the Smart University Blueprint development which include data volume and scope, semi-automatic and decentralization of work processes, difficulty in standardization of data entry and data quality and the demand for real-time data from the stakeholders. All of these challenges lead to inconsistent data and affect the data quality. However, all these challenges are solved through internal Focus Group Discussions (iFGDs) with the university's top management, technical team members and data owner for the relevant systems in several sessions of the town hall.

4. Conclusion

HEIs increasingly acknowledge their role in setting sustainability for education within their strategies, visions, and missions. Though COVID-19 has created a pause in the strategies implementation in certain HEIs, it has taught us to think differently and creatively when facing this situation. As for USIM, by having Smart University Blueprint, inclusive and equitable quality education are in place to ensure the sustainability of good education. Furthermore, based on the Smart University Blueprint developed, it can be concluded that a strategic and comprehensive collaboration and plan, is significant to ensure our T&L runs smoothly. We must always be ready to 'expect unexpected situations' to ensure the sustainability of our T&L activities and business operations. As we adapted and adopted to post-pandemic COVID-19, we have learned and are aware of the challenges raised and we have successfully solved all the challenges that we faced. The new normal also has taught us about applying ethical manners in terms of supporting government strategies when it comes to combating COVID-19. Yet worldwide, we are still learning.

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