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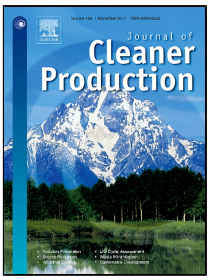

Strategic alignment between sustainability and information systems: A case analysis in Malaysian Public Higher Education Institutions

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Strategic alignment between sustainability and information systems: A case analysis in Malaysian Public Higher Education Institutions

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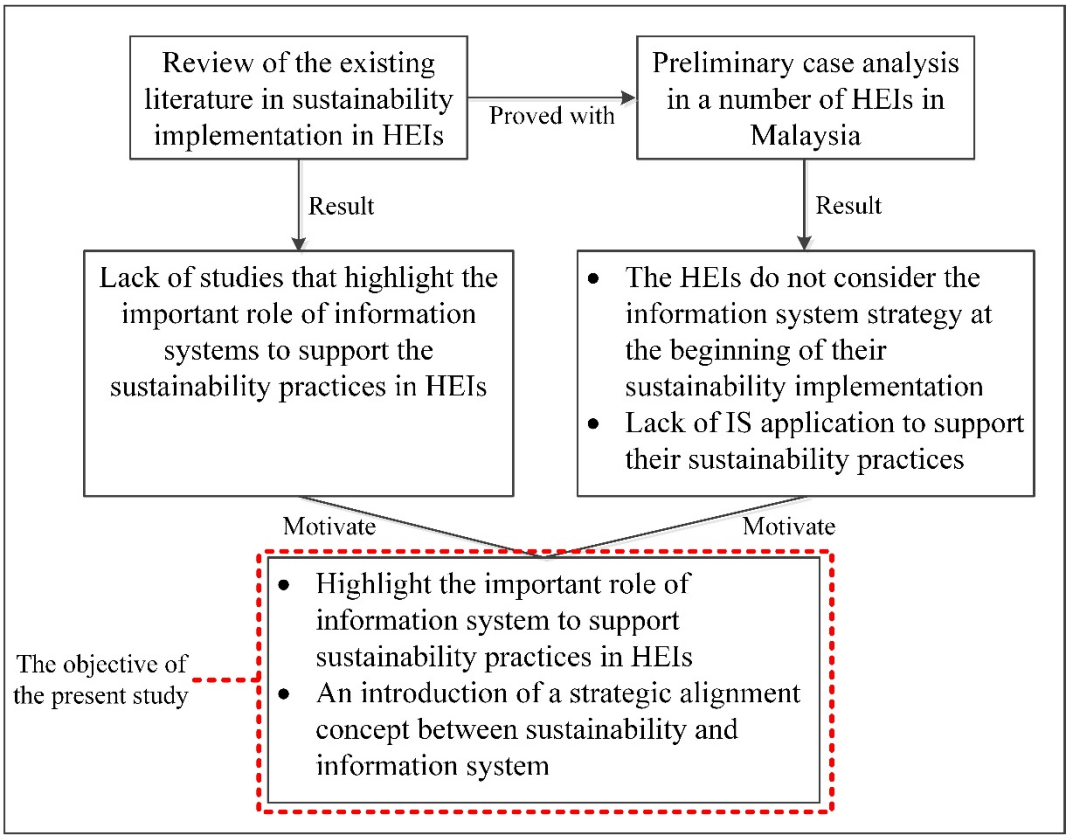
Abstract. Higher Education Institutions have embedded sustainability initiatives into their core activities of curriculum, research, community, and operational to respond the global transformation towards a sustainable future. Numerous studies have been conducted concerning an integrated sustainability into the missions and strategies of the Higher Education Institutions. However, there is a lack of works that highlight the important role of information systems to support the sustainability practices in Higher Education Institutions. This problem motivates the study to underscore the important role of information systems during the sustainability implementation. A preliminary case analysis is performed to observe how the Higher Education Institutions implement the sustainability initiatives and to proof the knowledge gap in real practice. The analysis was conducted during visits via a semi-structured interview with a number of persons from Higher Education Institutions in Malaysia that have been implementing sustainable campus. According to the preliminary case analysis, the Higher Education Institutions do not contemplate the information system strategy at the beginning of their sustainability implementation. There is a lack of information system application to support their sustainability practices. They still use manual methods to collect the sustainability metrics and

assess their sustainability performance. As a result, the sustainability decision-making is isolated and they cannot evaluate their sustainable performance. The problems of managing the sustainability data and processes arise. Therefore, a concept of the strategic alignment between sustainability and information system is underscored in the present study. The introduction of this concept through this study would enhance our understanding in term of the significant role of the information systems to support the sustainability practices and to achieve a successfully sustainable campus.

Keywords: Sustainability implementation; strategic alignment; information system; higher education institutions.

Graphical abstract:



Research highlights:

- Highlight the knowledge gap in sustainable campus implementation.
- A preliminary case analysis is conducted to prove the existing knowledge gap in real practice.
- The important role of information systems is underscored.
- A strategic alignment concept between sustainability and information system is introduced.
- Future research recommendations in the area of sustainability implementation in HEIs are proposed.

1. Introduction

The sustainable development notion globally permeates the governments' programmes and businesses as well as the strategy and research programme of the Higher Education Institutions - HEIs (Bettencourt and Kaur, 2011). Although there have been various prior policy documents, the sustainability idea had its formal commencement in the 1980s (Chofreh et al., 2014). The Brundtland Commission Report (1987) underlined the significance of collaboration between stakeholders in all levels including regional, national, and international, as a requirement to move towards sustainability. The Rio Declaration on Environment and Development established new levels of collaboration between states and societies to create a modern international business (Wheeler and Beatley, 2014). In responding to the transformation towards sustainable future, the National Research Council's Our Common Journey Report initiated a new scientific discipline (Bettencourt and Kaur, 2011).

The HEIs all over the world have begun to address the sustainability issues by integrating sustainability concept into their missions and practices (Stephens and Graham, 2010). HEIs have been commonly considered as an important contributor in promoting sustainability

initiatives (Karatzoglou, 2013). Numerous researches have been conducted concerning the introduction of sustainability in the academic program of HEIs (Juárez-Nájera et al., 2006), a study on sustainability transformation through case studies (Ferrer-Balas et al., 2008), and the analysis of the roles and contributions of the HEIs to education for sustainability (Karatzoglou, 2013). Consequently, it has been obvious that sustainability strategies currently have been incorporated into daily practices of HEIs including curriculum, research, operation, and community. In this approach, HEIs that have the clear vision, strategy, and the implementation capabilities to integrate the sustainability initiatives will come out ahead (Sherman, 2008).

As complex organisations, HEIs can be a model for the community in demonstrating how an organisation could be committed to sustainability. HEIs can provide the communities with graduates, who have knowledge of sustainability, for assisting the transformation towards a sustainable future. HEIs around the world are starting to engage in activities related to sustainability, such as improvement of special courses on sustainability and research collaboration on sustainability (Hancock and Nuttman, 2014). However, what is required for HEIs is an information system (IS) to integrate the sustainability initiatives into all HEIs components, including curriculum, research, operation, and community, both in their internal and external organisations.

HEIs have a significant role in the business transformation towards sustainable future and it has emerged as a significant subject in academic (Rappaport and Creighton, 2007). The literature on sustainability in HEIs is various; however, the majority of that study has been concerned with the empirical and explanatory studies that investigate the strategies and approaches at specific institutions (Jorge et al., 2015), studies that observe the significant role of HEIs in implementing sustainability (Stephens et al., 2008), sustainability assessment (Gómez et al., 2015), and sustainability integration into education/curriculum (Wals, 2014).

Fewer researchers have examined the important role of IS in the context of HEIs to collect, integrate, and report the sustainability data and information (Goni et al., 2013).

To proof the existence of the knowledge gap in a real practice, a preliminary case analysis is performed in a number of Malaysian public HEIs. According to its results, the HEIs do not consider the IS strategy and application at the early stage of the sustainability implementation. They do not implement sustainability and IS simultaneously and harmoniously. There is a misalignment between sustainability and IS strategies in current sustainability implementation in HEIs. However, Chofreh et al. (2016b) argued that the IS strategy and application is a key facilitator to improve a business process in an institution.

Strategic misalignment between sustainability and IS would affect the progress of the sustainability practices in HEIs. They cannot evaluate their performance and the problems of managing the sustainability data, information and activities arise. These sustainability implementation issues might increase the implementation costs and time and lead to ineffective and inefficient sustainability practices. Consequently, this study aims to underscore the important role of IS to support the sustainability implementation and to propose a strategic alignment concept between sustainability and IS to improve the sustainability practices in HEIs. This study would give an overview of the importance of IS role and strategic alignment to the practitioners in HEIs. The proposed concept hopefully would advance the sustainability practices in HEIs, so that they would attain their sustainability goals and objectives. Section 2 provides an explanation regarding the general sustainability emerges and evolves. Section 3 presents the specific sustainability implementation in HEIs. Section 4 presents a review of literature in the area of sustainability implementation frameworks. Section 5 provides a methodological process of the study. Section 6 elaborates the preliminary case analysis results. Section 7 gives an explanation regarding the role of IS and the importance of strategic

alignment between sustainability and IS in sustainability implementation. Section 8 concludes the study by providing significant results and recommendation of future studies.

2. Literature Review

This section discusses the evolution of the sustainability concept, HEIs transition towards sustainability, and numerous studies on sustainability implementation frameworks. Figure 1 provides an overview of this section.

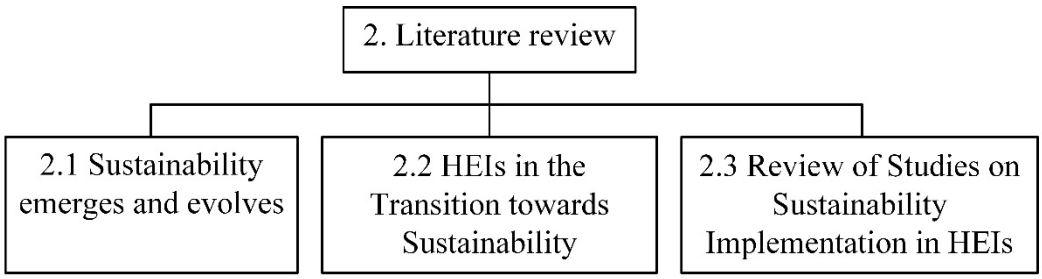


Figure 1. Overview of literature review

2.1 Sustainability Emerges and Evolves

Sustainable development is a massive business transformation that has emerged during the late twentieth century. Waas et al. (2011) presented that this notion is in reality much older. Kidd (1992) reported that since 1950 there were six tensions significantly discussed related to the population growth, a resource used, and environmental pressures. These tensions are the roots of ecological, resources, biosphere, a critique of technology, no growth/slow growth, and eco-development. All these tensions were emerged based on the problems raised and were completely discussed before the term of sustainability was used.

The word of sustainability was initially applied in a United Nations publication in 1978. From that time, the sustainability term started to be applied in the scientific articles, reports, and policy documents, such as in the report of the Group of Seven conference in 1989 (Kidd,

1992). The important characteristics of this evolution can be portrayed in three phases, as shown in Figure 2.

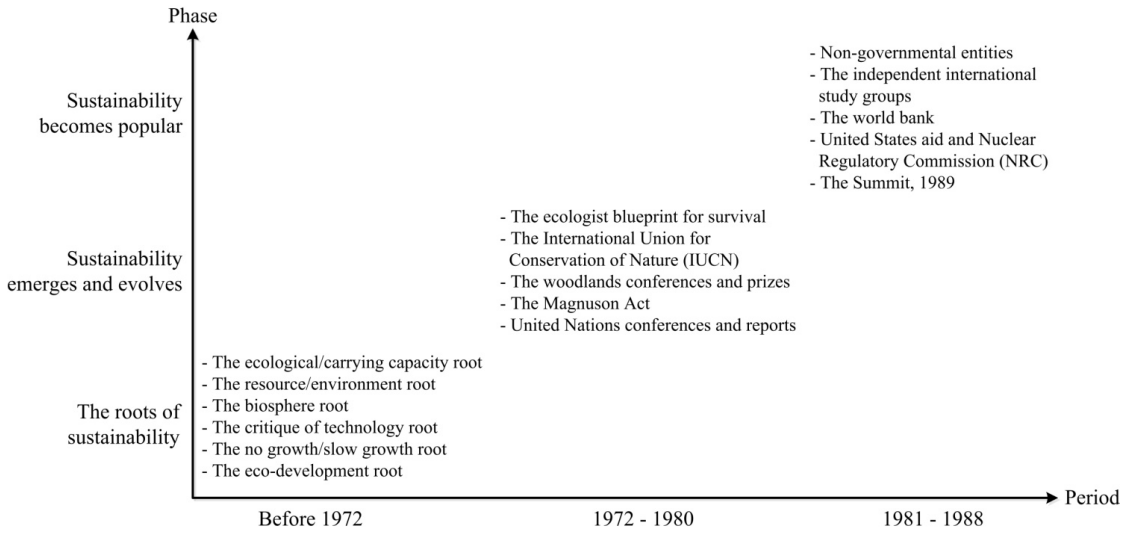


Figure 2: Sustainability evolution (adapted from Kidd, 1992)

Sustainability was defined by the Brundtland Commissions (Brundtland, 1987) as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*". Chofreh et al. (2016a) mentioned that the scholars frequently assign this commission as a significant contribution to the business transformation towards sustainable future. Goni et al. (2015) observed that since that time the sustainability roots have been also profoundly integrated into various concepts and disciplines.

To comprehend the sustainability definition from Brundtland, Elkington (1994) introduced a sustainability perspective, which is recognised as Triple Bottom Line (TBL). This perspective integrates three sustainability dimensions including environment, society, and economy, as shown in Figure 3. Chofreh and Goni (2017) stated that by incorporating these three sustainability dimensions into the business and stakeholders, the organisations will be leading to a more sustainable outcome. Chofreh et al. (2015) argued that ensuring profitability in the business would be best served by considering it with environmental and social goals.

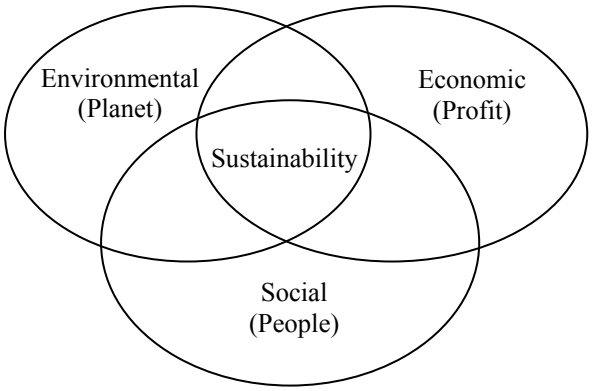


Figure 3: Sustainability TBL (after Elkington, 2004)

2.2 HEIs in the Transition towards Sustainability

HEIs all over the world have begun to integrate the sustainability concept into their missions and practices (Stephens and Graham, 2010). Wright (2004) observed that the sustainability idea in HEIs was initially commenced globally in 1978 by the United Nations Educational, Scientific and Cultural Organization (UNESCO). The notion of integrating sustainability into HEIs has been developed by numerous national and international declarations. These declarations have been acknowledged increasingly in the higher education community and have been authorised by a number of universities (Wright, 2004). For instance, the Talloires Declaration of 1990, which has over 275 signatories and the Copernicus Charter (Cre-Copernicus, 1994) that has been authorised by over 291 HEIs.

Stephens et al. (2008) mentioned that HEIs possess a significant position in society. They are represented as special areas of knowledge creation, diffusion, and continuation. HEIs uniquely can inspire integration of various types of knowledge and consequently leads to the enhancement of the knowledge application for change in the community. Stephens and Graham (2010) stated that all organisations respond to and are involved in social change, the HEIs are considered as the effective learning institutions that uniquely help the community to enhance the perception of the social change and organisational change.

Vorley and Nelles (2008) underlined the important role of HEIs in society can be defined through the discussion among three struggling topics: pressing social issues, knowledge production, and educating leaders and citizens. Waas and Vergruggen (2008) discussed that universities transfer impressive educational messages besides their dedicated research and teaching activities. Through the discussion on the concepts of considering HEIs as change agents (Stephens et al., 2008) and/or as citizens (Boyle, 2007), universities can get the potential role as the active, responsive, contributing and effective entities in society.

DiPadova-Stocks (2005) revealed that HEIs are undergoing a return and swing back to the basic aim of social responsibility by a scholarship of the engagement. As a result of this evolution, Boyle (2007) argued that HEIs are required to get the civic responsibility and be involved in the engagement at the organisational level. It is worth to mention that HEIs can commit more effectively to societal challenges and requirements by expanding and re-orienting their specific functions of teaching and research. According to Freeland (1992), the change in HEIs can be successfully promoted via incentivized and internalised change into the special culture and reward system of HEIs. However, there are various challenging issues along with a transition inside HEIs, such as less support from the top management level and users' resistance to change towards sustainable future. HEIs would face the issues in the way that they interact with their stakeholders and impact remains of the society.

Stephens et al. (2008) stated four common types of awareness regarding the HEIs contributions to the society towards sustainable future. These types of awareness are mentioned as follows.

(i) HEIs can be a model for implementing sustainability for society. This perspective is according to an idea that sustainability actions should begin with individual and continue to promote sustainability practices in the HEIs atmosphere.

(ii) The students in HEIs learn about the integration, production, systems thinking, and solving problems skills in order to manage the sustainability implementation and practices.

(iii) HEIs can perform use-inspired research and project-based learning that are aimed to address the critical sustainability problems in society.

(iv) HEIs can promote sustainability implementation and practices and increase the involvement of individuals and institutions inside and outside HEIs.

Müller-Christ et al. (2014) mentioned that the internal and external drivers of sustainability have been examined through various studies. Holmberg and Samuelsson (2006) observed that the internal drivers include the size of institutions, coordination of sustainability implementation projects, the involvement of experts, and sustainability champions and leadership. The external drivers include the strains from stakeholders, the source of financial support, and employment availability.

Ferrer-Balas et al. (2008) stated that the internal drivers consist of leadership, sustainability idea in the top management level, sustainability champions, and coordination unit. The external drivers consist of financial supports from the government and influence from other HEIs.

Müller-Christ et al. (2014) argued that a sustainability declaration is the main internal driver for HEIs in implementing sustainability as it allows the staffs and students to commence the internal discussions concerning the sustainability embedment into the missions and strategies of the HEIs. Another main internal driver includes the guidelines of sustainability declarations which were obtained from the discussions' results. The external driver includes the external strain from stakeholders, such as government, non-organisational organisations, and funding agencies. These stakeholders are potential to exert an organisational change in HEIs. Müller-Christ et al. (2014) argued that giving a vote and coordinating the sustainability interests from

different stakeholders can assist the university members to develop pressure within their institution for the sustainability transformation.

Sustainability delivers a host of significant business and financial benefits to HEIs. Johnston (2007) studied on numerous case studies related to the benefit that can be reaped by HEIs in transforming their missions and strategies towards sustainability. These benefits include resource efficiency, contribute to economic development, and conserving and enhancing the natural environment. Other important benefits are preserving high-quality staffs and students, offering the students with a quality sustainability experiences, and responding to the government policy related to sustainability initiatives.

Moore (2005) observed that sustainability implementation in HEIs engages various activities, such as academic learning and teaching, research, operation, and numerous activities in a society. It requires decision-making processes, organisational structures, leadership strategies, and strategic planning. Barlett and Chase (2004) declared that the sustainability implementation is a complex transformation that considered as a long process, challenging, and risky.

2.3 Review of Studies on Sustainability Implementation in HEIs

Sustainability in HEIs has emerged as an important subject in academic (Rappaport and Creighton, 2007). Jorge et al. (2015) mentioned that numerous prior studies have focused on the embedment of sustainability into university operations and curricula, however, fewer works observe sustainability implementation in HEIs, especially in Spanish universities. Therefore, Jorge et al. (2015) focused their study on analysing the aspects that might describe the implementation of sustainability in Spanish universities.

Milutinović and Nikolić (2014) similarly explored current sustainability implementation in Serbia universities. They assessed the current developments in theory and practice, including principles and strategies, and the possible implications on Serbia universities practice. They

argued that the HEIs require pursuing new method for a connection between HEIs and the society, primarily through the renovation of curricula and new research plan.

Stephens et al. (2008) concerned in another study the important role of HEIs in sustainability. The aim of their study is to increase the opportunity for HEIs to be change agents for sustainability. They identified five important points for examining the perspective of HEIs as a change agent in every specific region. These five important points include regional-specific dominant sustainability challenges, financing structure and independence, institutional organisation, the extent of democratic processes, and communication and interaction with society.

Regarding the issue on sustainability assessment, Gómez et al. (2015) introduced an Adaptable Model for evaluating the sustainability implementation within various implementation phases and data accessibility. The model was developed according to the sustainability implementation experiences in HEIs as well as various international declarations. The model consists of four layers' hierarchy with three key criteria include institutional commitment, example setting, and advancing sustainability. Klemeš et al. (2013) observed various important aspects that need to be considered for the multimedia engineering education. This study improves our understanding concerning the urgency of sustainability in engineering education.

The summary of studies that proposed frameworks for the sustainability implementation in HEIs is shown in Table 1. The review of literature in the particular field is aimed to find the knowledge gap in the literature.

Table 1: Review of research in sustainability implementation frameworks for HEIs

Reference	Research Focus	Variables		Sustainability and IS Strategic Alignment
Alshuwaikhat and Abubakar (2008)	This work proposed an integrated approach, in a form of conceptual framework, to achieving campus sustainability. They integrated three strategies, namely university Environmental Management System (EMS), social involvement and responsibility, and sustainability teaching and research.	**University EMS** 1. Environmental management and improvement: - Minimise negative impacts of operations - Pollution prevention - Energy efficiency - Resource conservation - Environmental improvement - Waste reduction - Recycling, etc 2. Green campus - Green buildings - Green transportation - Campus preservation	2. Community services - Public lectures & awareness - Community projects - Other services 3. Social justice - Equity - Care for handicap, etc **Sustainability Teaching and Research** 1. Conferences, seminars, workshops, etc 2. Courses and curriculum - Sustainability - Health and safety - Liveable settlements 3. Research and development	Not available

		Public Participation and Social Responsibility 1. Public participation - Campus community - Alumni - Partnership	- Renewable energy - Environmental protection - Climate change, etc	
Lambrechts et al. (2009)	The authors studied a general sustainability implementation model in HEIs that include the integration process and different types of initiatives, which taken at Leuven University College.	**1. Vision** **-** Horizontal: integration of sustainability in the general vision - Vertical: Defining a specific vision on sustainable development **2. Mission** - Signing a (local, regional, national, or international) sustainability charter **3. Steering committee** - Broad option: central sustainability coordinator - Decentral option: local sustainability coordinators	a. Policy planning b. Communication about efforts in sustainability. c. Networking: local, regional, national, and international corporation - Specific a. Education: Content – education 'about' sustainability, Methodology – education 'for' sustainable development (ESD) b. Research and outreach: Content focus – 'about', Methodological focus – 'for' c. Operations: Social corporate responsibility. Holistic notion of 'triple P'	Not available

		- Combined option: central + local - Cross-sectoral option: coordinator + existing committees **4. Integration strategies** - General:	**5. Evaluation** - Quantitative indicators - Qualitative indicators **6. Reporting** **7. Certification and Accreditation**	
Stephens and Graham (2010)	This study contributed to the advancement of the sustainability implementation in HEIs by exploring the theoretical framework of Transition Management (TM), a multi-scale, multi-actor, process-oriented approach, and analytical framework.	**Multi-level perspective:** 1. Landscape 2. Regime 3. Niche **Types of activities:** 1. Strategic 2. Tactical	3. Operational 4. Reflexive **Phases of transition:** 1. Pre-development 2. Take-off 3. Breakthrough 4. Stabilization	Not available

Gómez et al. (2015)	The aim of this paper is to propose a new model for assessing sustainability in HEIs. The model was developed according to a review of the existing sustainability assessment models in the literature.	**Sustainability elements:** 1. Inclusion of sustainability throughout the curricula 2. Educating the educators 3. Encouragement of sustainability research 4. Move towards more sustainability-orientated university operations 5. Implementing sustainability through campus experience 6. Stakeholders engagement and outreach	7. Fostering university collaboration 8. Transdisciplinarity 9. Assessing and reporting 10. Including sustainability in the institutional framework **Sustainability dimensions:** 1. Education and research 2. Public engagement 3. Operations 4. Administration	Not available
Verhulst and Lambrechts (2015)	The authors studied sustainability for HEIs from the perspective of organisational change management and defined implementation models and integration guidelines in order to guide sustainability integration in HEIs.	**The implementation process of sustainability criteria to attain the sustainability goals:** - Preparation stage - Interventions - Consolidation of changes	**Four clusters of human factors:** - Organisational culture - Resistance against change - Empowerment and involvement - Internal communication on changes	Not available

Holdsworth and Thomas (2015)	This study developed a sustainable education and academic development (SEAD) framework in order to identify the requirements of academic development programmes in sustainability implementation in HEIs.	**Sustainability education:** - Instrumental knowledge - Practical knowledge - Emancipatory knowledge **Academic development:** - Learning and teaching / instructional knowledge - Pedagogical knowledge - Curricular knowledge	**Organisational change:** - The academic self and identity within existing practice architecture - The support structures within the organisation	Not available

As shown in Table 1, it is obvious that there were various variables considered in the frameworks. However, there is no any general formation that contributes to the development of the frameworks as the researchers have a different view in developing the framework. For instance, Stephens and Graham (2010) used the Transition Management (TM) concept for developing a sustainability implementation framework. This concept provides an understanding of the dynamic of structural change in HEIs. Refocusing the TM concept to the HEIs system supposes a multifaceted co-evolution of economic, cultural, technological, and organisational factors influencing transformation within the system.

Verhulst and Lambrechts (2015) developed in another work an implementation framework based on the organisational change management concept. Particularly, this study concentrated on investigating the human aspects includes resistance, communication, empowerment and involvement, and organisational culture. Their work has been similar to a study conducted by Holdsworth and Thomas (2015), which developed a Sustainability Education Academic Development (SEAD) framework to identify the requirements of academic development programmes in sustainability implementation in HEIs. These proposed frameworks considered the components that need to be considered in sustainability implementation without providing sequential steps to guide practitioners for implementing sustainability in HEIs. A sample work that delineates the general steps is performed by Lambrechts et al. (2009). They studied a general sustainability implementation model in HEIs that consists of vision, mission, steering committee, integration strategies, evaluation, reporting, and certification and accreditation.

According to the literature review, fewer studies proposed a sustainability implementation framework that incorporates the IS strategies. The sustainability and IS visions and strategies are not fully mapped to the implementation activities, so that the sustainability transformation processes are uncoordinated. This issue causes ineffective and inefficient campus practices and it might amplify the implementation costs and period (Chofreh et al., 2016c). To proof the

existence of the knowledge gap in a real practice, this study performs a preliminary case analysis in a number of public HEIs in Malaysia. The methodological process of the preliminary case analysis is provided in the next section.

3. Research Methodology

Transforming the HEIs from unsustainable into sustainable is a complex process that is often distinguished as a long, progressive, and challenging transformation (Barlett and Chase, 2004). During the transformation, the HEIs face various problems that would inhibit the sustainability implementation progress. This study attempts to explore the problems faced by HEIs in implementing sustainability through both theoretical and practical perspectives. Theoretically, numbers of references in the area of sustainability implementation framework are reviewed to find the knowledge gaps and inconsistencies. To proof the existence of the knowledge gap in practice, this study conducts a preliminary case analysis in a number of Malaysian public HEIs.

Top five public universities in Malaysia, according to QS University Rankings: Asia 2016 (QS Top Universities, 2016) were invited to involve in the preliminary case analysis as they are also recognised as the only research universities in Malaysia. Figure 4 provides a process flow of the preliminary case analysis.

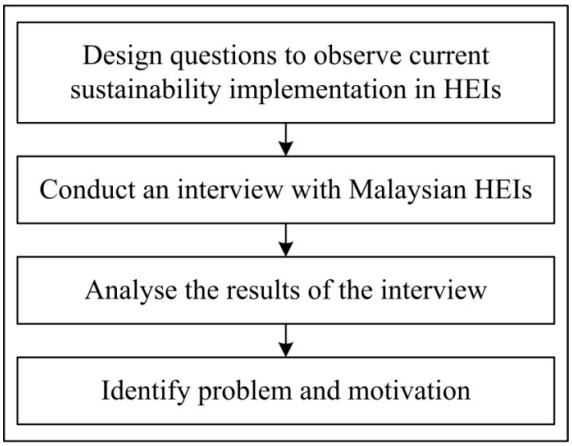


Figure 4: Process of preliminary case analysis

The preliminary analysis was conducted during visits via semi-structured interviews and informal discussions with a number of sustainability experts and key decision-makers of the sustainability implementation in particular HEIs. The questions of interview consist of two parts: general and specific. General questions related to the general perspective of sustainability implementation, whereas specific questions focused on IS utilisation to support the sustainability implementation. The results of the preliminary case analysis are elaborated in the next section.

4. Preliminary Case Analysis Results

According to the results of the preliminary case analysis, the HEIs are generally in the progress of embedding sustainability into their core components including academic, research, operation, and community. During this process, they face various barriers and challenges that are apparently complex as they are related to the strategic component of the institution. For instance, one of the key issues is a lack of green governance committee that is responsible for managing the sustainability implementation in HEIs. This committee consists of numerous people from the top management level in HEIs. They are the key decision makers who should decide and endorse the implementation of every sustainability initiative. Lack of green governance committee in HEIs effects on the emergence of other problems, such as fewer supports from top management level, lack of sustainability policy and enforcement, longer implementation time, and limited financial resources. These problems are currently faced by the universities during the sustainability implementation.

Another main problem that emerged is the lack of IS to support the sustainability practices. The HEIs do not consider the IS strategy at the beginning of the sustainability implementation, which indicates a misalignment between sustainability and IS strategies. The sustainability data and processes are currently managed using tools, processes, and procedures isolated from integrated IS. According to the interview, the HEIs still currently use the spreadsheet to assess

their sustainability performance indicators for monitoring the progress of the sustainability implementation. However, its results may not be reliable. This problem effects on inaccuracy and inaccessibility of data and information. Consequently, the key sustainability experts face a difficulty for making decisions since all sustainability processes and activities are not integrated. Therefore, it is necessary for HEIs to consider IS applications to support the sustainability implementation.

5. Discussions

The importance of IS strategy in business has been studied by numbers of scholars. Olson (2008) underlined the information strategy as one of the components in a strategy pyramid and operations in an organisation. Velte et al. (2008) mentioned that advanced supply chain and business re-engineering needs IS as a key facilitator of sustainability. In another study, Chofreh (2015) studied the vital role of IS to integrate all entities in the extended value chain. Even though fewer studies observed the role of IS in the context of HEIs, this fact does not reduce the important value of the IS strategy for the sustainability implementation.

As mentioned in Section 4, the literature review revealed that there is a lack of IS consideration in the sustainability implementation frameworks. This gap also appears in a real practice of sustainability implementation in Malaysian public HEIs. The problem of lack of IS consideration potentially effects on the emergence of other vital problems including inaccuracy and inaccessibility of sustainability data and information. Therefore, the IS strategy is imperative to be envisaged in the early of the sustainability implementation. Based on this idea, the concept of strategic alignment between sustainability and IS has been proposed in the present study.

There are various studies that underlie the proposed concept. For example, Kearns and Sabherwal (2007) declared that the strategic alignment between IS and the core business enables to increase business performance and competitive advantage. Dao et al. (2011)

observed that IS is important to develop sustainability capabilities in an organisation. They argued that collaborations between internal and external stakeholders as well as information exchange enabled by IS are important aspects of an organisation to achieve sustainable competitive advantage. Therefore, IS plays an important role for a successful sustainability implementation in an organisation. This phenomenon can be reflected in the sustainability implementation in the context of HEIs. The HEIs needs to consider the IS strategy and application in their sustainability implementation to achieve effective sustainability implementation. To comprehend the proposed concept, Figure 5 illustrates a general idea of the strategic alignment between sustainability and IS.

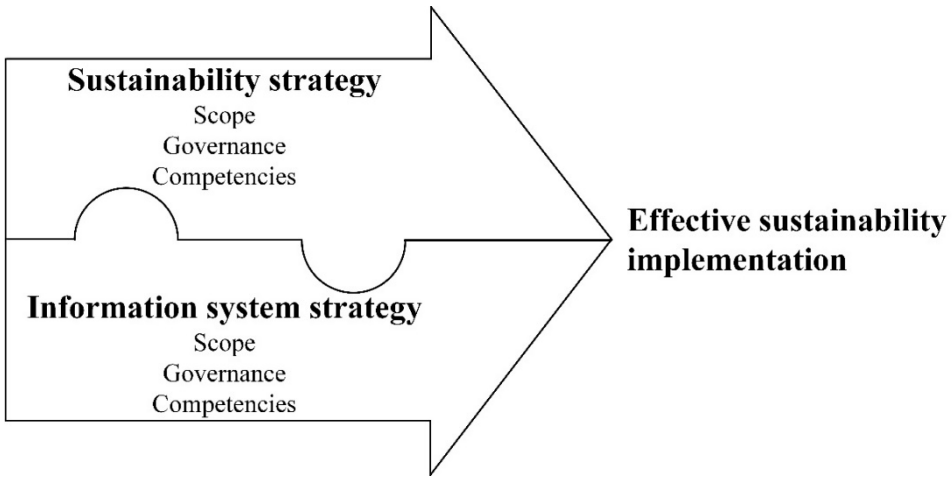


Figure 5. Overview of the strategic alignment concept between sustainability and IS

Strategic alignment is a methodology that considers the business setting through the relationship between business processes and strategies. It allows an organisation to consider its endurance and to discover how to achieve its visions (Morrison et al., 2011). Strategic alignment has various pseudonyms. It is also known as fit (Porter, 1996), integration (Broadbent et al., 1999), bridge (Ciborra, 1997), harmony (Luftman, 1996), fusion (Smaczny, 2001) and linkage (Henderson and Venkatraman, 1989). However, the main focus of the strategic alignment is generally strategic integration between business and IT/IS. According to

Luftman and Ben Zvi (2010), the strategic alignment is a subject that has been argued by the IS community for a long period and it is a challenging task.

According to Figure 5, the sustainability and IS strategies can be interlinked simultaneously. Henderson and Venkatraman (1993) discussed that there are three domains of business and IT strategies that need to be considered in the alignment process. Their domains are scope, competencies, and governance. The strategic alignment concept proposed by Henderson and Venkatraman (1993) can be adopted in the present study since the sustainability implementation can be considered as a business transformation. These three strategic domains are explained as follows.

- Sustainability Strategy
    - Scope: the extent of the sustainability area included in the implementation.
    - Competencies: the capacity of an institution to implement sustainability.
    - Governance: the required rules and actions to implement sustainability.
- IS Strategy
    - Scope: the extent of the IS area included in the implementation.
    - Competencies: the capacity of an institution to implement the system.
    - Governance: the required rules and actions to implement the system.

The strategic alignment between sustainability and IS requires an understanding of its fundamental nature. It needs strategic and managerial skills as well as collaborations between internal and external stakeholders of an institution. Even though the strategic alignment process between sustainability and IS is considered as a multifaceted transformation (Gerow et al., 2015), its successful implementation would help the HEIs to achieve sustainability objectives and outcomes.

6. Conclusions

Sustainability implementation in HEIs has appeared as a principal issue in academic as the HEIs have a vital role in society. It can be seen from various studies focusing on the particular subject. However, the literature review results showed that there is a lack of IS consideration in the existing sustainability implementation frameworks for HEIs. The existence of this issue has been proven through a preliminary case analysis in five Malaysian public universities. According to its results, the HEIs do not consider IS to support their sustainability practices. It indicates a misalignment between sustainability and IS strategies that would inhibit the achievement of sustainability objectives and outcomes. Therefore, this study highlights the importance of the strategic alignment concept between sustainability and IS for HEIs. When sustainability and IS strategies head in the same direction, the HEIs would acquire numerous advantages including improve the effectiveness of the sustainability practices, reduce the cost and time of the sustainability implementation, improve the organisational agility, and improve the risk management.

Further studies need to be carried out concerning the formulation of a sustainability implementation framework that incorporates the alignment between sustainability and IS strategies. This framework should integrate the sequential steps as guidance for practitioners to implement sustainability in HEIs. A study that analyses the strategic domains of the sustainability and IS would be valuable for HEIs to comprehend the strategic alignment concept. Another potential research is a study that observes the required skills and capabilities to align the sustainability and IS strategies. This study would be helpful for the HEIs to strengthen their resources for effective sustainability implementation.

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