A Review on Critical Success Factors of Governance towards Sustainable Campus Operations

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Abstract. Campus Sustainability is an effort that integrates environmentally sustainable practices into institutional practices. A successful transition to a sustainable campus requires the involvement of the university community; the administration, academics departments (faculty and students), researchers and the local community. Our research seeks to identify Critical Success Factors (CSFs) of university governance that contribute to the success in implementing Sustainable Campus Operation (SCO) initiatives. The common CSFs have been identified from 22 published and unpublished articles, conference proceedings, university reports, books, and website documents. The CSFs are mapped and ranked based on the frequency of the identified CSFs. 23 CSFs of SCO have been identified through this research. This research revealed that the CSF that contributes the highest frequency as indicated by most researchers is “developing network with external parties for gaining consensus and commitment”. By identifying these CSFs, this research will help assist universities in successfully plan and implement their SCO initiatives.

1. Introduction

Campus Operations are responsible for the provision of all buildings and facilities on universities’ campus for maintaining a safe, comfortable and attractive campus environment that support excellence in teaching, learning and research. There are various areas of concern related to operations on campus. Generally a special committee oversees and manages all aspects of campus sustainability related operations, namely energy, climate, water, food, waste, buildings, people, land, purchasing, and transportation. The committee usually will compromise representatives from faculty, staff, and students. By adopting sustainability in campus operations, it would be able to lower the carbon emission, as well as reduce the consumption of non-renewable sources, and the resources are selected based on life cycle assessment.

Recently there are many Higher Education Institutions (HEI) implementing sustainability initiatives on campus. Likewise, HEI across Malaysia are adopting and are at various stages of integrating sustainability on campus. It can be said that the success of a university to achieve sustainability highly depends on the commitment and involvement from all levels of the organization of the campus community; i.e. students, lecturers, staff, associations, administrations, and also representatives of the local residents [23][24][25]. Moreover, many researches have illustrated that sustainability goals will not be achieved without the cooperation and participation of all stakeholders [26][27]. Weaknesses in the organizational structure of the university as a result of decentralized management or complexity, bureaucratic issue, as well as management that are non-uniformed, would have a negative impact and led to the barriers in achieving successful implementation of designed initiatives, and consequently become challenges in achieving change towards sustainability. In conjunction, there is a need on the part of university’s governance to identify appropriate CSFs to overcome the barrier factors.
CSFs refer to the limited number of areas in which satisfactory results will ensure successful competitive performance for the individual, department, or organization [37]. It can be the indicator on how to achieve certain aims with rational and achievable target. It does not only depend on the process or system used but also reflects the feedback received from the end user. To strengthen the likelihood of a project success, it is vital for the university to comprehend the CSFs and then choose appropriate methods of dealing with them [38]. In other perspective, CSFs are needed for practitioners to improve their organization, which will indicate the progress in particular areas [39], as well as to present or identify a few key factors that the organization should focus on to be successful [40].

In recent years, the studies on CSFs have been conducted in identifying contexts of product service system [15], wastewater management [13], green building [21][17][14], and energy management [3]. However, most of these studies are carried out by international researchers with refer to their local campus environment. Nevertheless, studies on CSFs that cover aspects of campus operations with regard to Malaysian university have not yet been explored. This offers valuable opportunity to further investigate the required CSFs of university’s governance to successfully implement SCO-initiatives. Hopefully, this study can help managers, decision makers, and parties involved in the planning of campus infrastructure and development of universities in ensuring the measures taken in adopting sustainability into campus operations in Malaysian Universities are successful, and effective in achieving sustainable development. A successful implementation of such actions can therefore give HEIs a positive impression of greening, and thereby accelerate the implementations of successful sustainability actions.

2. Governance Support

University governance refers to the structures and processes to make responsible decisions covering issues that prominent to both internal and external stakeholders of the university, as well as concerning the administrative structure and policy directions of Higher Education Institutions (HEIs). Study by Yarime & Tanaka suggest that the administrative structure must consist of an active governing body with sufficient autonomy to fulfil its obligations and ensure the integrity of the university in accordance with the mission and vision of the university [28]. Additionally, Weenen, H. argued that elements of governance also plays an important role in the basic framework to promote sustainability within the institution, through the vision and policies that apply to the whole institution with respect to working conditions, such as employment and payment [29]. The role of university’s governance towards campus sustainability is also expressed in the model of sustainability campus [30][11][31]. In this regard, factors such as strong support, leadership commitment, strategic planning, creating a culture of sustainable, effective communication, and implement feedback mechanisms highly influence the success of governance as well as integrating sustainability in campus planning extensively. Lozano R. [11] has proposed three phases of organizational restructuring elements; which include (i) developing a sustainability mission and vision for the university, (ii) setting up a committee to establish sustainability objectives and policies, and (iii) implementing the strategic plan into education, research, outreach and partnerships, and also into operations on campus. In addition, sustainable policies also need to be developed by incorporating principles and specific objectives of sustainability into the implementation structure and support, and also into scope of work for all staff.

Sustainability efforts are defined broadly as the changes in campus operations, financial, administrative planning and policy, academic curricula, and research that facilitate positive environmental changes. Since the issue of sustainable campus is still relatively new in Malaysia, it is believed that university’s “top-down” support (from uppermost level administrators) is crucial as they play the most important role in the university in making changes. Many studies shows that the support and endorsement of university’s top management is critical to achieve Education for Sustainable Development (ESD), which can be reflected in the sustainability related goals, visions, and statements [32][33][34]. Currently, most of universities in China choose the “top-down” approach to incorporate sustainable development into campus operations. The strategies are developed and determined by the university’s top management, whereas staffs and students do not have many opportunities to contribute [35]. Eimers K. have discussed how upper level administrators can influence the success of sustainability initiatives and policies by ensuring the campus sustainability efforts become standard practices [8]. Even though the “top-down” approach is essential for change, it cannot be denied that the “bottom-up” approach is also important to raise awareness across the
HEIs and encourage interactions between various stakeholders [36]. Traditionally, the approach towards change for campus sustainability consists of "top-down" and "bottom up". It usually reflects either an administrator or root-motivated changes. Generally, the role of students, staff and faculty can be combined in the term "grassroots". However, [4] mentioned that the faculty and staff should be classified as a middle agent, while the bottom agent refers to the students. Faculty and staff have the potential to change the university because they provide an understanding of how the university functions, a variety of technical expertise, and the relationship between the top and bottom agents [4].

3. Previous Study on CSFs Towards SCO
A literature review was conducted on 22 published and unpublished articles, conference proceedings, university reports, books, and website documents. From the literatures reviewed, 23 CSFs have been identified as shown in Table 1. By mapping the success factors with their associated researchers, it can be clearly seen from Table 1 the various factors emphasized by past researchers in ensuring the successful implementation of the SCO-initiatives. This matrix analysis has also highlighted the level of significance of each success factor based on its frequency of appearance as found by the different past researchers around the world.
Table 1. Frequency Analysis of CSFs.

| Code | Critical Success Factors | [1] | [2] | [3] | [4] | [5] | [6] | [7] | [8] | [9] | [10] | [11] | [12] | [13] | [14] | [15] | [16] | [17] | [18] | [19] | [20] | [21] | [22] | Frequency |
|------|--------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| CSF1 | Engaging and obtaining top management support | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 11  |
| CSF2 | Develop policy and guidelines related to campus operations | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 14  |
| CSF3 | Establish top tier teams and commit on management | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 15  |
| CSF4 | Prioritize sustainability experts and working groups | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 8   |
| CSF5 | Create income streams or number campus society involvement in SCO initiatives | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 15  |
| CSF6 | Allocate sufficient resources include people, technology, money and sufficient time to ensure smooth operations and activities of the campus organization | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 12  |
| CSF7 | Ensure proper training to leader and employees to handle specialized equipment and machines related to the campus operation e.g., certified energy manager and etc. | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 5   |
| CSF8 | Prioritize SCO initiatives that are adaptive and flexible to be implemented | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 11  |
| CSF9 | Conduct an audit to measure the performance of SCO initiatives | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 4   |
| CSF10 | Perform maintenance regularly to improve SCO performance of operational | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 13  |
| CSF11 | Prepare and submit a report of SCO performance in annual reviews and verifications | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 4   |
| CSF12 | Integrate Plan-Do-Check-Act (P-D-C-A) cycle to coordinate improvement of list of SCO initiatives | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 10  |
| CSF13 | Understand the current situation and issue of SCO in proper and accurate manner so that the appropriate initiatives can be taken | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 13  |
| CSF14 | Raise awareness among campus community regarding the use of SCO and its functionality through campaigns e.g., poster, brochure, flyers etc, | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 17  |
| CSF15 | Setup working group or research center with the academic research team and postgraduate studies in order to sharing knowledge and solve problems related to directly the SCO | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 18  |
| CSF16 | Develop networks with universities, local community, industry, organizations and government for the purposes of gaining their consensus and commitment to the SCO plan | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 4   |
| CSF17 | Identify the possibility of the risk in SCO initiatives or implementation | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 5   |
| CSF18 | Prioritize strategic plan or preventive measures for any risk of implementation of SCO initiatives | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 7   |
| CSF19 | Update information and latest technology related to SCO systems and management | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 6   |
| CSF20 | Provide and improve facilities to support effort towards SCO | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 15  |
| CSF21 | Set the visions and goals of sustainable development of university level through SCO | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 2   | 15  |
| CSF22 | Smoothly communicate across departments to ensure the success of SCO initiatives implementation | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 7   |
| CSF23 | Knowledgeable and skilled staffs in the field of sustainability for the best practice of SCO initiatives, operational guidance and sharing information | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 1   | 6   |
4. Findings

From the frequency analysis as detailed in Table 1 and illustrated in Figure 1, CSF15 (i.e. develop network with external parties for gaining consensus and commitment) is found to be the most dominant factor of university’s governance towards achieving successful implementation of SCO-initiatives. The factor has the highest frequency, as it has been acknowledged by 18 articles (90%) considered in this study. Apart from having good ties with external parties, 17 articles (85%) emphasized that CSF14 (i.e. setting-up working group with internal campus community to sharing knowledge and solve problems) is also very crucial in achieving sustainability. As such, support from external and internal parties is important for universities to successfully implement SCO-initiatives. It can be clearly seen in Figure 1 that 12 CSFs can be considered as significant ones since they have been highlighted by at least 50% of the articles reviewed in this study. However, 9 of those CSFs have been emphasized by at least 60% of the articles, which can be regarded as most significant factors. These CSFs will be discussed further in order of hierarchy in the following subsections.

![Figure 1: CSFs of University Governance.](image)

1) Develop network with inter-universities, local communities, industry, organization and government

Through developing networks or partnership with businesses, industry associations, governments, non-profit organizations, and outside community colleges and universities, it can indirectly benefit the university. For instances, the university can update and redesign curricula, create new degrees and certifications, gain latest information and technology, and develop new pathways advancement in green industries [40].

2) Setting-up working group with internal campus community

Teamwork is important for improvement by placing accountability for the overall quality of the team, improving information sharing, and collaboration in working groups [41]. Beard, C. & Rees, S. stressed that teamwork is essential to generate ideas, to enhance the learning experience, explore the latest issues, identify conflicts and focus for action to improve understanding of why, what, how, where and when to pursue the best practicable environmental options [42].

3) Identified leader/expert

Leadership in both research areas and practical skills refers to the ability of an individual or organization to lead or guide other individuals, teams, or entire organizations to spearhead the implementation effort [43]. Kasai N. et al. mentioned that by assigning responsibilities for environmental matters to specific individuals, it could help in achieving campus sustainability [16]. Additionally, heading towards SCOs, university leaders should openly promote a sustainability vision through embracing the concept of sustainability as a central value of the administration’s goals and in strategic plan of the university [22]. Rupert J. Baumgartner argued that if the aspect of sustainable development is not part of the mind set of leaders and members of the organization, sustainability initiatives will not bring results and are more likely to fail [44]. Apparently, full support from top management, faculty, staff and students is needed in order to ensure that all efforts made by the leader can be effectively implemented. Furthermore, the leadership should be among the people who have the power to make decisions regarding the development and planning at the university. At the faculty meeting, senior administration, the Senate, and others are necessary to create a special task force, the green goal, guidelines and strategies for the university to move...
forward towards sustainability campus [8].

4) Allocate sufficient resources (e.g. people, technology, money and time)
The availability of sufficient resources has been identified as an important factor in achieving success [39]. Apart from human resources, time and budget are also important sources that need to be addressed to ensure the operation and activities of the organization running smoothly. With good financial standing, it will ensure some income and expense is well worth the money spent [18].

5) Set the visions and goals
To make changes in planning and current operations, goals and objectives of the campus should be aligned with sustainability goals in holistic manner. When enhancing the plans and goals of the campus, it is necessary to align the plan exceeds the existing green voluntary commitment, if possible, at the state or regional level. Consequently, it will enhance important regulatory relationships and may help to accelerate planning approval processes. A framework should be developed to guide all aspects of green campus planning, and to address ways to assess and update sustainability goals over time to ensure continual improvement. Concurrently, universities need to revise its sustainability plan to reflect continuing progress in green campus planning.

6) Smooth communication across departments
University needs to communicate regularly with all stakeholders regarding the implementation of sustainability initiatives. It should also publish regularly sustainability reports to demonstrate its commitment and accountability. Establishing frequent meeting between leaders across departments can help develop comprehensive solutions, avoiding duplication of efforts, accomplishing many tasks simultaneously, and empowering employee [45][46].

7) Develop policy and guidelines
Developing a clear and achievable policy and guidelines is important to ensure the success of SCO implementation [39]. However, the environmental policy can become more meaningful and tailored to the institution when the significant aspects are determined prior to defining an organization’s environmental policy [47]. Environmental Protection Agency (EPA) Guide has outlined three basic elements for creating an environmental policy; which include: (i) incorporate multiple perspectives from all over the institution (e.g. students, staff, faculty, executive management, community members), (ii) develop a marketing plan in order to publicize the policy, and (iii) demonstrate college and university administration commitment by obtaining approval and signatures from key institutional personnel [48].

8) Prepare and submit a report to top management for review and verification of performance
Leader must provide a report on a regular basis either weekly, monthly, or annually, and submitted to top management of university. This report will help top management in monitoring the performance of the efforts taken ensuring sustainability goals are achieved. The results shall be assessed and analysed for any good and bad points (Alia et al., 2014). The lesson shall be utilized as a feedback in the subsequent plan or program. Once approved, this report can be used to spread as information to the university community to expose ongoing efforts achievement.

9) Raise awareness among campus community
Individual attitudes may impact on the culture of a university (Davis, 2009). Therefore, by increasing awareness, it can be an effective way to gain more support from a community. It can be completed by adopting sustainability element into the everyday campus life. Likewise, education and continuing training are essential for the continuation of long-term success and sustainability of an institution's plan. It requires the presence of an individual who can plan, design, construct, operate and maintain access to technical training and those who use the opportunity of the campus (e.g students, faculty, staff and community members) to know about sustainability initiatives on campus, and at the time same time gain self-awareness. These efforts should had a positive effect on increasing the general knowledge on the sustainability of the campus and create a culture that embraced the concept of sustainability. Staff should be made aware of the main concepts with the commitment of the institution, and to understand their role in maximizing element of green campus.
5. Conclusions and Recommendation

Although the factors discussed earlier are of different nature, however, they can be integrated together to study on CSFs of university’s governance in implementing SCO-initiatives. It is crucial that the existing governance of universities and its relationship with sustainability principles should be strengthened with support from all stakeholders, especially top management, as they are the decision makers of university. In other words, the sustainability practices need to be understood and practiced by all members of the organization at various levels to ensure the mission and vision of university can be mobilized successfully. As this study is still ongoing, the CSFs listed in the frequency table will be used as input data to develop a questionnaire survey to determine the CSFs of Malaysian universities’ governance that contribute to successful implementation of SCO initiatives.

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