Education Supply Chain Management Model to Achieve Sustainability in Private Universities in Malaysia: A Review

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***Abstract*: This paper addresses an Integrated Tertiary Educational Supply Chain Management Model (ITESCM) to achieve sustainability among the private universities in Malaysia. The application model highlights the role of Supply chain management and sustainable practices in Private Universities (PU). The model provides an overview to equip stakeholders of the educational supply chain with appropriate information to review and appraise the performance of private universities. This is with a view towards the fulfillment of ultimate goals in achieving the potential as providers of educational supply chain services and maintaining sustainability. The paper first provides an overview of recent research conducted in this area, followed by a detailed discussion on research issues that have been developed in ITESCM. It also provides the taxonomy of research and development in the area of integrated SCM and sustainability practices in higher education, particularly in private universities in Malaysia. The concept of integration in tertiary education supply chain and sustainability among the private universities is also discussed.**

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1. Introduction

Recently there has been a wave of interest in the supply chain management in private universities (PU) in order to achieve sustainability. Top managers, leaders, organizational shareholders and stakeholders have focused their attention in various issues heading to sustainability in PU. There is a growing awareness and acceptance in the society and in the business community of the need to create sustainable and sustaining organizations [1]. To achieve these novel objectives, organizations should possess winning strategies, which may accomplish a team spirit for a sustainable supply chain strategy. In order to achieve a sustainable performance, organizations have realized that it is not enough to improve efficiencies within the organization, but the whole supply chain has to be made competitive [2]. Furthermore, organizations need to collaborate and integrate with upstream suppliers and downstream customers in order to be effective. Indeed, it is more important to emphasize the movement of SCM towards sustainability. Hence, the need for firms to tackle the increasing sustainability requirements by stakeholders of the whole supply chain which has led many firms to collaborate more closely with their

suppliers and customers [3]. Ref. [4] emphasizes that, there is a growing realisation by shareholders and managers that the organisation's social and environmental accountabilities do not fall solely under the control of any individual organisation; multiple entities across the supply chain must be involved to fulfil these societal responsibilities effectively. Consequently, organization can no longer move as individuals or isolated units, but rather in teams in order to sustain. As a result, management is looking to identify ways to successfully meet these accountabilities, develop appropriate tools that can be used to assist their efforts and establish the apparatus for pursuing the objectives of sustainability in organisations. This may be achieved in association with their supply chain in an economically feasible mode.

In line with this, the researcher adapted the industrial SCM model incorporated with sustainability practices in the higher education industry especially in Malaysian private universities (PU). The main idea behind this research model is to provide a systematic assessment of the evolution of sustainable performance of PUs through an integrated supply chain management with the goal of identifying issues. This includes potential consensus in findings and approaches across studies and gaps, all of which can help to guide future research and improve the management of sustainable supply chain initiatives. In addition, the researcher will take this opportunity to share his own perspectives regarding the current state of the field (private universities) and where it is believed research should be heading.

Over the past few years, there have been a growing number of studies on how to integrate supply chain management with sustainability in higher education. According to ref. [5] the academic research related to sustainable supply chain management has already emerged over the past two decades. Accordingly, academic enquiry must continue to evolve in ways that help supply chain managers meet these critical challenges. Besides, shareholders, directors and CEO's have given a high priority to sustainable performance in higher education institutions. These factors have encouraged and motivated researcher to develop an integrated education SCM model in order to achieve sustainability.

The current Malaysian private higher education is facing several problem and issues which lead to a lack of sustainability. University performances are weakening with a definite drop in revenue. Student enrolments in the PU's are not stable and the qualities of the programmes are not up to par with public universities. Although Malaysian PU's are growing in number, sustainability issues are also on the rise. Ref. [6] commented on the financial health of 41 private universities, 8 foreign branch campuses and 27 university colleges in Malaysia. Accordingly, some of these private universities are facing serious challenges in terms of financial sustainability. Therefore this study focused on the issues of sustainability faced by PUs in Malaysia.

The objective of the study is to develop an application model from the existing Integrated Tertiary Education Supply Chain Management (ITESCM) model developed by researcher [7]. The model was adopted with amendments to achieve an application model to highlight the factors for efficient and effective university operations in order to achieve sustainability in PU's in Malaysia. In regards to the application model the study will investigate how the SCM and sustainability practices may be integrated to achieve sustainability among Malaysian PUs. Successful organizations with integrated SCM should look beyond the boundaries of their own four partitions to work with their trading partners to achieve optimal performance. SCM principles should not only be used to meet short term goals but to evaluate if these strategies enable a strong leadership, economic, environmental and socially responsible future.

The study shall provide a novel approach to achieve sustainability by developing an integrated

supply chain management model in higher education. This model shall contribute to a useful guide and be a reference for the management of higher education. The review is organized as follows. In the first section, the evolution of SCM and sustainability are discussed. Followed by, systematic review of methodology and specific application of the model and findings are presented in the final section where research opportunities and managerial implications associated with each set are discussed.

2. Literature Review

2.1 Supply Chain Management (SCM)

Supply chain management (SCM) is one of the popular concepts within management in general [8]. Over the last 30 years, supply chain management (SCM) has been increasingly recognized as an important source of competitive advantage [9]. SCM assists the business organization to compete in the dynamic and complex world market. The need to improve operations, increasing levels of outsourcing, rising costs, competitive pressures, globalization, increasing importance of e-commerce and the complexity of the supply chain have emerged as the main reasons for the development of the supply chain management approach [10]. The goal of supply chain management (SCM) is to integrate and optimize activities within and across organizations for stakeholders' satisfaction [7]. Supply chain may consist of manufacturers or service providers receiving inputs from suppliers, processing these inputs, and delivering them to customers [8].

This concept shall be used for both manufacturing and service industries such as education, which represents a type of non-profit organization. The supply chain concept has been widely used among the manufacturing industries in Malaysia and it is proven to be very useful and successful. Although the supply chain management concept was more prevalent in the manufacturing and service industries (other than education) since the concept was first developed, the interest in using supply chain management in education has increased over the last decade [11]. Despite the extensive amount of academic work devoted to supply chain management, which basically focuses on manufacturing supply chains, our knowledge of the structure of supply chains in service businesses is still insufficient [12]. Supply chains are dynamic in nature and require constant revision and fine-tuning at various stages to make sure that any undesired performance is acknowledged, analyzed and enriched [13]. Studies in various industries have shown that supply chain performance could improve if trading partners were able to mutually assess expected consumer demand and plan the supply correspondingly [8].

2.2 Educational Supply Chain Management

Just as the focus on building world class supply chains (SCs) and collaborations in manufacturing began in the latter part of the 20th century, the attention needs to turn now to the supply chain within the service sector [14]. In recent decades, services have become extremely important in world economies. The service company has always been the driving force of economic growth of every developed nation [15]. Researchers do not realize the importance of research on service supply chain management [8].

SCM for the service industry is defined as the ability of the company/firm to get closer to the customer by improving its supply chain channels which includes responsiveness, effectiveness, efficiencies and control [16]. One of the primary suppliers of process input is customers themselves in service organizations. This concept of customers being suppliers is recognized as 'customer-supplier duality' and it implies that service supply chains are bi-directional [17]. The service SCM concept may be applicable to the academia as well.

It is a fact to ponder that, most of the researchers developed SCM models which focused on improving business operations and processes. Just

a few addressed issues in Supply Chain Management (SCM) for the service industry [18], [19], [20], [21] and a very few focused on education [8]. Only few papers [22], [23] [24] and [25] were found to be relevant to the educational supply chain management.

Now is the time for higher education to analyze the service offers and their business model to improve their performance. The higher education business model should be more collaborative and integrated. It is important to have every member of the supply chain involved in the process as well as to develop good communication and information sharing between the upstream, focal firm and downstream [26]. Indeed, it is fundamental for PUs to have a proper educational supply chain network. According to ref. [25] one of the main goals of the educational supply chain is to improve the well-being of the end customer to the society through cutting edge SCM network.

2.3 The need for educational supply chain among Malaysian PUs

- Inadequate mutual communication, collaboration and feedback between educational partners such as universities and colleges / schools on the progress and short comings of students.
- The private higher education system is profit orientated and has financial responsibilities to the shareholders and ethical responsibilities to stakeholders, such as parents, tax payers, alumni, accrediting agencies and national monitoring agencies.
- There is a mismatch in the supply and demand of graduates, with employers reporting that graduates lack the requisite knowledge, skills and attitudes. This mismatch is expected to get tougher due to technological disruptions which reshape industries and alter the types of jobs available.
- Preparing Malaysian youth to navigate this uncertain future not only requires instilling them with transferrable skills and sound ethical foundations, but also the resilience and enterprising spirit to forge new opportunities for themselves and others. It is important to move from a world of job seekers to a world of job creators [27].

As scholars noted, SCM is one of the most effective ways for firms to improve their performance [28] by reducing waste, increasing efficiency, and removing barriers to communication by coordinating processes. According to ref. [29] the objective of every supply chain should be to maximize the overall value generated. To achieve a higher level of performance, higher education institutions such as PUs, should focus on reducing waste, increasing efficiency and engaging in good communication internally and externally. SC integration is a process of interaction and collaboration across firms that incorporate customers and suppliers into a cohesive supply network [30]. A highly integrated supply chain can be a purposive integrated organizational entity that shapes the attraction, the selection, and the retention of the members of the collective. This type of supply chain can be referred to as Meta organization which consists of a closed community supply network [31]. The education supply chain for universities includes service and information sharing up and down the process link. In order to provide a clear and concise picture of the conceptual framework of the paradigm, ref. [7] studied the input and output of the university through the education supply chain management which depicts a holistic view of the educational supply chain model described in Figure 1.

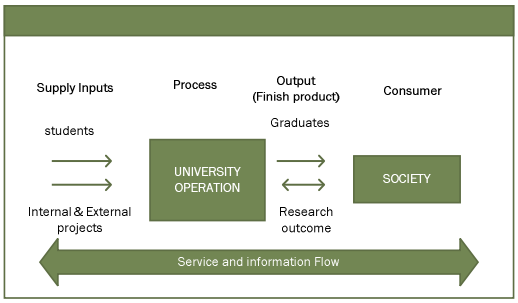

Figure 1: A Holistic View of Educational Supply Chain Model.

2.4 Integrated Tertiary Education Supply Chain Management Model for Sustainability

For an efficient operations and a sustainable performance, education SCM should be integrated and must be able to collaborate with meaningful practices such as SCM and sustainability practices. The supply chain integration (SCI) helps firms to reconfigure their resources and capabilities internally and externally to consolidate their supply chain as a whole in an effort to improve long-term performance [32]. Besides that, the intensification of global competitions and the demand for better customer service have considerably increased the need for integration between organizations [33]. PUs must bear in mind that, moving in a team within network of suppliers, systematic internal operation and knowing customers and consumers could lead to definite success. Integration with schools and colleges as well as employers will contribute to competitive advantage for the universities. Further collaboration with these external partners in internal activities such as curriculum design and programme design could lead to enhanced PU's performance.

To serve such a purpose the researcher has developed an integrated education SCM model for PUs. This is an extended form of the education SCM model [7]. In this study a gap was determined and applied. The integrated model consists of basic educational supply chain components combined with SCM and sustainable practices.

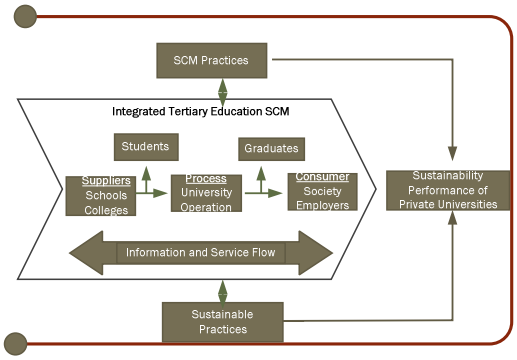

Figure 2: Integrated tertiary education supply chain management model for PUs sustainability

The researcher acknowledges suppliers, customers, service provider and the consumer in this research paper as key players to establish an integrated education supply chain model [7]. Moreover, the fundamental education SCM model [24], named as ITESCM (Integrated Tertiary Education Supply Chain Management Model) served as an essential centric to the researchers model. The ITESCM model in Figure 3 identifies the multi-tier suppliers, multi-tier customers, service provider (university) and the consumers. The ITESCM model integrates the SCM and sustainable practices to form an integrated educational supply chain for sustainability as illustrated in Figure 2. The ultimate goal of this integrated supply chain is to form an interconnected network between the university and its stakeholders to add value to each stage of the university by transferring services and information from upstream to downstream to achieve the ultimate goal of sustainability among PUs. As ref. [24] mentioned supply chain effectiveness depends on the successful integration of both upstream suppliers and downstream customers.

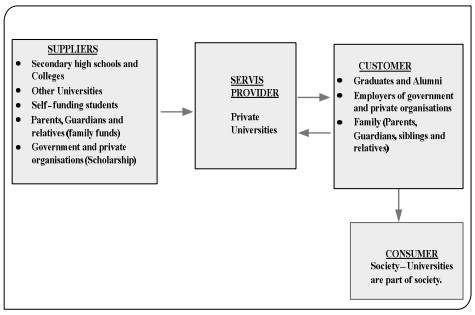

Figure 3: Single -level, Multi-Tier, Bi -directional SCM for Universities

2.5 University Operations

An institution of higher education is reflected as a service provider. Through an appropriate educational administration, the university can produce quality graduates for the society as well as for the rest of the stakeholders [7]. Accordingly, PUs can produce quality outcome for the society at

large through proper educational management. How good the university performs, depends on the quality of the graduates, research outcomes and most importantly how well it executes the respective supply chain management. Further, for a better educational administration and operation, the researcher acknowledges three decision making stages. They are Strategic level, Planning (Tactical) level and Operational level. Each of these levels fragmented in to two implementation levels, namely assessment and development for both education and research supply chain management [7]. Ref. [34] mentioned that the concept of decision levels in Supply Chain Management (SCM) would be adopted in higher education. The three decision stages are defined below:

a) **Strategic level**: Strategic level decision concerns general direction, long term goals, philosophies and values. These decisions are the least structured and most imaginative. They are the most risky and of the most uncertain result, partly because they attain so far into the future and partly because they are of such significance [35].

b) **Planning level**: Planning level tend to be medium range, of medium importance, with moderate outcomes [35]. The planning level supports the strategic decisions in the organization.

c) **Operations level:** Operations level decisions are every day decisions. They are used to support the planning level decisions. The impact of the operations level decisions are immediate, short term, short range, and usually low cost. The outcomes of a bad operating level decision will be minimal, although a series of bad or sloppy decisions can cause harm. These decisions can be pre-programmed, pre-defined, or set out clearly in a policy manual [35].

2.6 Sustainability Performance of Private Universities

Sustainability is becoming an increasingly important issue for universities worldwide [36]. Sustainability is a major issue for all organizations in the twenty first century [37]. Sustainability is a social ideal and business necessity. Being sustainable is currently a source of competitive advantage and a matter of corporate survival. Corporate shareholders and CEOs embrace sustainability as their foremost priority. Ref. [1] mentioned that, lately there has been a wave of interest in sustainability by senior managers and interested organizational stakeholders. There is a growing awareness and acceptance in society and in the business community of the need to create sustainable organizations. Simultaneously, institutions of higher education are also exploring means to integrate sustainability into curricula [4].

Over the past several years, there have been a growing number of studies on how to integrate sustainability in higher education [37]. Some of the most recent studies include ref. [38], ref. [39] which is case-oriented, and/or focused on an individual course, program or institution [40], [38]. According to ref. [40] sustainable education must address all three pillars of sustainability such as social, environmental and economic. This allows everyone to develop the necessary skills, knowledge and perspectives to make decisions to improve the quality of life at all levels. The term sustainability has also led to an acceptance of what must be described as the myths of sustainability [41]. According to ref. [42] sustainability is synonymous with sustainable development. Accordingly a sustainable company will exist merely by recognizing the environmental and social issues by incorporating them into its strategic planning. Besides that, top management's involvement plays an utmost important role for organization such as the education industry to achieve sustainability.

Moreover there is solid evidence that, for achieving sustainable performance, some aspects and practices in the supply chain may have to be changed

and managed in a different way [43]. At the corporate level, sustainability involves the adoption of a holistic and systems based approach that promises the creation of long-term values for the organization within a wider context of corporate social responsibility. This includes the integration of an environmental and social dimension into an organization's day to day operations so as to contribute to a healthy economy, society and environment [44].

Supply chain management (SCM) is therefore highly relevant both to successfully competing in today's market and in addressing responsible behaviour at all stages of the supply chain. It represents a potentially important discipline for establishing the integration of environmental and social considerations and practices to achieve the goal of sustainability.

A recent McKinsey survey also suggests that more and more companies are actively integrating sustainability priorities into their businesses [45]. The quest for sustainability is already beginning to transform the competitive landscape, which may force companies to change how they think about products, technologies, processes and business models [46], [47].

The researcher recommends that to achieve a higher level of sustainable performance in private universities and organizations, upstream and downstream of supply chain of PUs must be incorporated to work efficiently and effectively. University operations network should capitalize the SCM and sustainability practices in order to achieve a dynamic capability and to be resilient in the volatile economic environment. Ref. [48] noted that organizations with dynamic capabilities will perform better than firms with lower active capabilities. Also ref. [49] added that for supply chain systems, resilience is critical as the success of firms is often determined by the ability of the system as a whole to continue to provide flows despite disturbances. According to ref. [40], a sustainable education must address all three parts of sustainability such as social, environmental and economic because this allows all people to develop the necessary skills, knowledge, and perspectives to make decisions to improve the quality of life at all levels. In line with the mandate of higher education institutions being the directions for social, economic and environmental change toward sustainability [50] the private university sustainability movement in Malaysia may be a serious, yet belittled to leverage the development of the country.

2.7 Supply Chain Practices

SCM practices involve a set of activities undertaken by organizations to promote an effective management of the supply chain [51]. Ref. [52] describes the latest evolution of SCM practices, which includes supplier partnership, outsourcing, cycle time compression, continuous process flow, information technology and information sharing. Ref. [2] defines SCM practices as a set of activities undertaken in an organization to promote and effective management of its supply chain. Ref. [51] determined that the underlying dimensions of SCM practices and tested empirically a framework identifying the relationship among SCM practices, operational performance and SCM-related organizational performance for SMEs in Turkey.

Ref. [53] included in their list of SCM practices concentration on core competencies, use of inter-organizational systems such as Electronic Data Interchange (EDI), and elimination of excess inventory levels by postponing customization toward the end of the supply chain. Ref. [54] identified six aspects of SCM practices through factor analysis: supply chain integration, information sharing, supply chain characteristics, customer service management, geographical proximity and JIT capability. Ref. [52] describes the latest evolution of SCM practices, which include supplier partnership, outsourcing, cycle time compression, continuous process flow, information technology and information sharing.

Thus the literature portrays SCM practices from a variety of different perspectives with a common goal of ultimately improving organizational performance. In reviewing and consolidating the literature, five distinct dimensions, which includes strategic supplier partnership, customer relationship, level of information sharing, quality of information sharing and innovation, are selected for measuring SCM practices towards PUs sustainability performance. The five constructs cover upstream (Strategic Supplier Partnership) to downstream (Customer Relationship) sides of education supply chain network. This study will observe how the SCM practices may integrated with the external suppliers and customers with the central university operations. According to ref. [55] SCM requires coordination and configuration of the process that is necessary to make products available in a timely, reproducible and satisfactory manner.

If all these SCM practices were used effectively and efficiently in the education industry, the education SCM management becomes complete. Further, the characteristics of SCM could be achieved by identifying and making use of SCM practices in an organized way. For the purpose of this study the integrated education SCM model incorporates five (5) supply chain practices as shown in figure 4 below.

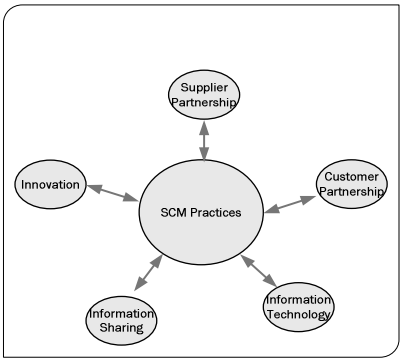

Figure 4: Supply Chain Management Practices

These five SCM practices are perceived as strategy to improve the competitive performance by integrating the internal functions of universities and linking these with the external operations of suppliers, customers and other members of the supply chain. This may lead to changes in the traditional structure of the organization [56]. It is also important for SCM to focus on the coordination and configuration of the processes that are necessary to make products on time, reproducibly and in a satisfactory condition (quality assurance) together with handling procurement of the material/service inputs [57]. Strategically aligned organizations can work closely together and eliminate wasteful time and effort [58]. An effective supplier and customer partnership can be a critical component of a leading edge supply chain [59]. Further, ref. [60] identified the effective use of relevant and timely information by all functional elements within the supply chain as a key competitive and distinguishing factor. Information technology (IT) is not about product or services, but rather about the focus on the effective use of IT resources and effective delivery of IT services and how IT aids and advances the institutional mission [61]. Ref. [62] believed that innovation can take place in an organization when communication of information in terms of technology takes place. Innovative education facilities, programmes and management systems are fundamental for higher education sustainability. Besides that, ref. [63] also noted that innovation will take place when organizations have competences relating to technologies and customers. It is obvious that SCM practices will have a significant impact on university's performance.

2.8 Sustainability Practices

Sustainability practices involve a set of activities undertaken by the organization to promote effective management and sustainability performance. Researchers have indicated that social, economic and environmental practices enhance an organization's strategic results [64], [65]. Global attitudes concerning ethical operations of companies continue to harden in the wake of scandals and

disasters, and pressure continues to mount for companies to take into account not only the simple profit-related bottom line of the business operations, but sustainability perspective as well [66].

Sustainability has become the strategic imperative of the new millennium. Ref. [42]) refers that in reality, it is a broader concept as sustainable development policies encompass three general policy areas: economic, environmental and social. According to ref. [67] the phrase sustainability, define as corporate social responsibility, corporate social performance, going green and the "triple bottom line" in which all refer to organizations enhancement to long-term economic, social and environmental performance. An increasing number of companies are regarding environmental and social sustainability priorities as an opportunity and a source of competitive advantage [45], [68].

Moreover, sustainable development is often misinterpreted as focusing solely on triple bottom line issues only. In reality sustainability also encompasses leadership and top management involvement. Both industry and academic leaders recognize that sustainability is important for the long-term success of both firms and the communities in which they operate. However, the means in which managers can lead and position their firms to be more sustainable remains uncertain [69]. Hindering those sustainable practices only invites negative impacts to the organization.

Moreover, sustainable practices, which produce a win–win outcome for the environment, society and firms, depend upon leaders being purposeful in fostering a "culture of sustainability" within their organizations. So leadership involvement in implementing sustainability is fundamental to any growing organization. Keeping this in mind the researcher incorporate top management factors as one of the fundamental sustainability practices other than economic, environment and social factors. Further research has shown that an organization's culture operates at multiple levels [70] and developing and maintaining a culture of sustainability, requires leaders to address each of these levels. Higher education institutions should incorporate these sustainability practices in their operations strategy to achieve long term sustainability. Figure 5 shows the sustainable practices that are listed in the studies.

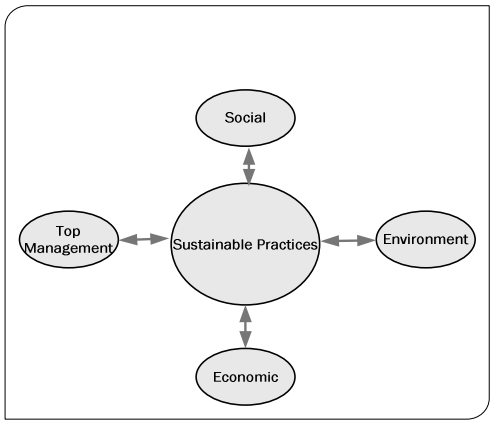

Figure 5: Sustainable Practices

There is a growing demand for sustainable practices on the part of stakeholders, especially consumers who desire sustainable products and services [71]. PUs with green campus and up-to-date facilities, committed to corporate social responsibility, healthy financial conditions, innovative and marketable programmes, visionary and futuristic leaders are influential elements which may strengthen sustainability performance. In addition pressures to maintain legitimacy which is achieved through compliance with an established set of regulations, norms and values, fulfil stakeholders' expectations, improve competitiveness and long-term profitability and promote ecological responsibility, given the organization's concerns with its social obligations and values [72]. Indeed leaders and shareholders have realized the harvesting benefit in their PUs by deploying practices which are enormous. Ref. [74] perceived some key benefits of embracing sustainability practices as follows.

- Improved company and brand image
- Cost savings

- Competitive advantage
- Employee satisfaction, morale retention
- Product, service or market innovation
- Business model or process innovation
- New sources of revenue or cash flow
- Effective risk management
- Enhanced stakeholder's relations.

3. Research Methodology

The research consists of cross section design. A total of eighteen private universities from three categories thus category A- high achievers, Category B-medium achievers and category C-low achievers are chosen. This categorization was based on Malaysian Setara ranking, university performance, expert opinions and public perceptions. Five to eight universities from each category may be selected and stratified and random sampling plan may be used to differentiate and identify the respondents. The sampling procedures will incorporate a complete randomized design to collect the samples from the respondent group which consist of senior management, middle management (Staffs and Executives) and students. This group may form the primary stakeholders in this study. Questionnaires may be issued by random procedures to the three strata.

A survey instrument may develop in order to test the research model. Although the items and questions in the proposed questionnaire were adopted from existing studies, the questionnaire will be pre-tested with several senior executives from PUs to ensure that the phrasing and format of the questions were appropriate. Data for this study were collected using a self-administered questionnaire. Cronbach's alpha is used as a measure of internal consistency or reliability of a psychometric instrument (questionnaire and interview). An alpha of 0.8 or above is stated as highly acceptable for assuming homogeneity of items, while the limit of acceptability is 0.7 [75].

Exploratory factor analysis (EFA) may be used to determine the significant factors that influence the dependent variable. Structural Equation Model (SEM) may be used as a method to verify the goodness of fit of the research framework and to describe the relationships among the construct variables. Structural equation model with the AMOS 20, graphical software program may be used to analyse the relationships among variables in the model and the hypotheses may be tested with goodness of fit data. Figure 6 shows the sampling plan for the study.

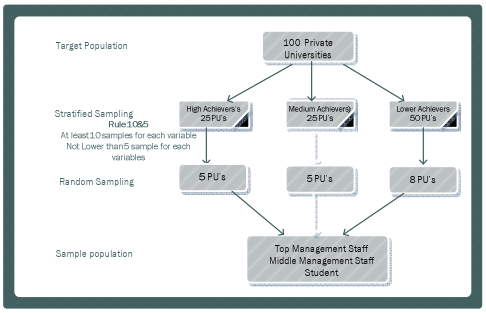

Figure 6: Sampling Plan

2. Conclusion

In-line with the current sustainability risk and opportunities in the education industry, the PUs are required to analyze the services offered and their business model more frequently. Efficiency, consistency and sufficiency of strategies can help to innovative sustainable solutions, redesign the business model and to create innovative-service-systems [76]. This may lead to the redesign of the business model to be more integrated in terms of the supply chains for the focal company sustainability.

This review paper provides insights into the conceptualization of the Integrated Tertiary Education Supply Chain Management (ITESCM) model to achieve sustainability in higher education institutions, specifically in Malaysian PUs. The application model is a structured chain which is needed to be managed with the supply chain and

sustainability practices in order to produce and deliver services at a competitive rate.

Thus, it is proposed that sustainability performance measurement should be adapted and applied to the supply chain model. The suggested application model encompasses the measurement scales for efficiency, and effectiveness of strategies which are available to managers. The strategies are discussed, their interactions are explained and the related measurements are illustrated. It is believed that this study will encourage researchers to make endeavors in less explored areas of SCM and sustainability by incorporating higher education as a contact.

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