Factors that Contribute to the Achievement of Sustainability in Private Universities of Malaysia

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Abstract: **Sustainability is today's most important benchmarking criteria to measure performance in organisations. Thus, the measure of critical sustainable practices plays a vital role in determining sustainable performance. This research paper attempts to identify fundamental dimensions of sustainable practices which contribute to sustainable performance in private universities of Malaysia based education supply chain management (SCM) model. In line with this, Exploratory Factor Analysis (EFA) was carried out to identify fundamental constructs that define the sustainable performance of private universities (PUs). A series of pre and post analysis were conducted using survey questionnaire to draw inferences on the topic. The EFA technique was used to regroup the components related to indicators of sustainable practices into a limited set of components based on shared variance. EFA is generally used to sum up data so that relationships and patterns among constructs can be easily understood and interpreted. Eventually, four factor constructs emerged in this study. These offered a meaningful relationship pattern which contributed to the sustainable performance indicators of private universities in Malaysia.**

Keywords: Higher education, SCM, sustainability practices, exploratory factor analysis, sustainable performance.

1. Introduction

Higher education institutions are playing a distinguishable role in supporting national economic objectives of all countries. This includes the direct growth of additional national income [1]. Higher education is a service sector which strives to identify the expectations and needs of its clients, who are students and societies. Education is classified as a service sector with intangible performance, directed towards the minds of people with continuous delivery [2]. It is conducted through a partnership between the service organization and its clients or customers with a high personal contact and low customization.

Higher education is essential for a nation to achieve sustainable growth and for global development. Malaysian private universities (PU), under the jurisdiction of the Ministry of Education (MOE), are entrusted to provide quality education for its people and for others. The vision of MOE is to make Malaysia a centre of educational excellence in the region [3]. Hence the government has developed strategies and plans to ensure that higher education institutes (HEIs) achieve excellence and boldly face the competition posed by the global education market [3]. The objective of this plan is to ensure Malaysian universities to achieve world-class status and operate as a hub for higher education in the Southeast Asian region [4]. In order to be competitive in the global market, Malaysia is aware of the need to collaborate with foreign countries. The restructuring of its

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education policy have given opportunity to the foreign stakeholders to conduct twinning programs with local colleges and universities, as well as open to international branch campuses [3].

In an effort to reposition the Malaysian HEIs, the Ministry of education has introduced two blueprints i.e, National Higher Education Strategic Plan (NHESP) beyond 2020 and National Higher Education Action Plan (NHEAP) 2007–2010. These strategic plans encompass four phases as follows:

a) Laying the foundation (2007–2010)
b) Strengthening and enhancement (2011– 2015)
c) Excellence (2016–2020)
d) Glory and sustainability (beyond 2020).

The blueprints indicate that Malaysian Higher Education Institutions (HEIs) are undergoing substantial changes in terms of the way colleges and universities are functioning due to the globalisation, uncertainty, economic turmoil and advances in information technology [3]. Moreover the increased competition in the education market has a significant impact on the operations of higher education [5].

As the competition among the universities intensifies, HEI increasingly behave as business entity rather than service entity by adopting business strategies [3]. Thus, the importance and necessity of sustainability in this industry has received attention from top managers and stakeholders. Hence higher education has emerged in response to calls for universities to lead society towards a sustainable future [6], [7], [8], [9] and [10]. With regards to the importance, [11] sustainable management is a process of steering the company towards its goal as the primary notion of any organization is to stay in the business for long. Besides that, sustainable performance has become a global trend and insists companies to disclose their performance on economic, environment and social aspects [12].

2. Sustainable Performance through sustainable practices

There is a growing awareness and acceptance in society and the business community of the need to create sustainable organizations [13]. A very systematic education supply chain management (ESCM) will lead organisation sustainability in effective manner [13]. Indeed, sustainable education must address three pillars of sustainability such as social, environmental and economic [14] through SCM network. This is further supported [13], where sustainability in education comprises interactions and equality between four pillars i.e., environmental, social, economic and top management support. In view of transforming these four basic components into university sustainability from an operations point of view, improvement must be done in economic efficiency, protecting and restoring the organisations environment, improving the wellbeing of the society and leader's responsibility to drive the organisation to the right path. In addition to social, economic and environmental factors, universities also need active leadership participation from the administrative, operational and academic divisions [13]. Accordingly, top management's involvement plays an utmost important role in the education industry to achieve sustainability.

Universities are a unique pool of resources which produce graduates who function as agents of change for the growing concerns of environmental transition towards more sustainable society in the future. This research paper will attempt to promote the concept of sustainable performance in the private universities of Malaysia, based on education SCM and specifically focus on the four key components, namely, economic, environment, social, and top management support [13].

The idea behind the study is to create a sense of awareness among the stakeholders about the importance of sustainable performance among PUs. Sustainability is a social ideal and business necessity and it must back by education supply chain management strategy. Thus, 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. Currently, there has been a wave of interest in sustainability among the managers and stakeholders in the private universities. Besides, there is a growing level of awareness and acceptance in the society and business community of the need to create sustainable performance in the universities [13]. A survey by KPMG in 2008 found that 47.7 per cent of companies in their survey sample considered sustainability and corporate responsibility to be important drivers of organizational performance [15]. However, most of these organizations found major

challenges in identifying and prioritizing sustainability issues, developing strategies and policies and measuring performance [16].

Moreover the recent wave of interest in sustainability involves a shift in focus from short-term to long term performance which will support organization's ongoing sustainability. From the entrepreneur's point of view, this means that the focus is not only on economic aspects of business, but also on environmental and social perspectives of organizations for the long term. Thus they can engage on environmental and social activities that not only positively affect the natural environment and society, but also provide long – term economic benefits and a competitive advantage for the company [17].

The task of integrating the environmental and social elements with economic sustainability has received considerable attention among scholars. Some researchers have referred to the triple bottom line of an organization where it is judged on its performance in the three key areas of financial, social and environment [18].
In correspondence with the various approaches of sustainability, a summary of the perceived key benefits are extracted [19]:

a) Improved company and brand image;
b) Cost savings;
c) Competitive advantage; employee
d) Satisfaction, morale or retention;
e) Product, service or market innovation;
f) Business model or process innovation;
g) New sources of revenue or cash flow;
h) Effective risk management; and
i) Enhanced stakeholder relations.

Meanwhile operations management such as supply chain management (SCM) has evolved in recent years due to the changes in market requirements and competitiveness. This includes an increase in environmental awareness, causing industries to rethink their productivity and quality strategies [20]. Therefore, the concept of Sustainable Operations Management (SOM) and SCM has gained prominence in the last decade [21]. Figure 1, will explain concisely how sustainability can be achieved through supply chain management and its practices.

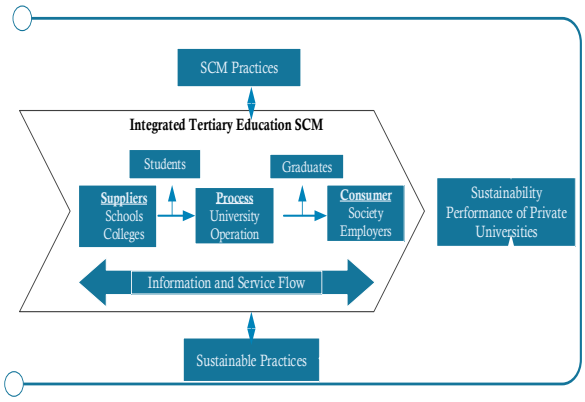

Figure 1: Integrated Education SCM to achieve sustainability

The objectives of this study are twofold. Firstly, to conduct exploratory factor analysis to determine the underlying factors of sustainable practices. Second to identify the factors which university decision makers are keen to consider. Consequently these factors may be employed to influence the decision making process of private universities. Finally, the goal beyond this study is to identify the scale components that need further refinement in order to conduct confirmatory factor analysis in future.

Table 1: Measurements of sustainable practices

Sustainable Practices	
Parameters	**Meaning**
Economic	Finance, cost, sales, revenue
Environment	Competitors, rivals, facilities, campus
Social	Students / and staffs welfare
Top Management Support	Leadership support

Adapted and adopted: Irina Safitri, (2014); Erick, P. Jack, (2015); Basu et al., (2016).

Table 1, shows the potential dimensions of sustainable performance in terms of economic, environment, social and top management support. These could be categorized as one main component known as sustainable practices. Financial, cost, sales,

Table 2: Parameters of Sustainable Practices

CODE	Parameters Items	CODE	Parameters Items
V1	TM gives clear picture of direction the universities heading to	V13	Financial policy consistent and transparent
V2	TM provide sufficient incentives for new programs development	V14	Keeping financial records and documents according to standards
V3	TM willing to invest in staff development	V15	Produce high quality graduates to customers
V4	TM understand staff problem	V16	Programs are competitive in fee structure
V5	Sufficient asset replacement funds are provided	V17	Cost control without compromising to quality
V6	TM considers the relationship between our trading partners to be important	V18	Increase sales by proper promotion activities
V7	Care of staff and students welfare and wellbeing	V19	Provide up to date facilities for staff and students
V8	Provide sufficient training for academic and admin staff to do tasks	V20	Green campus environment
V9	Practice giving rewards and promotion for staff as motivational factors	V21	Provide conducive environment for teaching and learning
V10	Care about staff and students health by providing health care unit	V22	Campus located at strategic and pollution free location
V11	Encourage staff to further their studies to enhance their knowledge and skills	V23	Collaborate with internal and external universities
V12	Involve in CSR through community services	V13	Financial policy consistent and transparent

(TM: Top Management; CSR: Corporate Social Responsibility)

and revenue appeared as significant measures of the economic factor. Competition, rivalries, campus facilities and amenities were in the environmental factor. Social factor highlights students and staff welfare, training and CSR. Eventually managers and leader's involvement, corporate vision and mission were covered in top management support. Generally decision making process in organizations, executed by managers and leaders are often influenced by direct and indirect factors.

Since the majority of these dimensions were within the component of universities sustainable practices, they were considered as imperative criteria of choice among universities for the measurement of sustainable performance.

3. Research Methodology

For determining the dimensions affecting the sustainable performance of academic institutions, the existing empirical and exploratory literature by the researcher [34] in the manufacturing and service industries' model was modified completely, making it suitable for universities/educational institutions.

Integrated education SCM model was used as base to study the sustainability performance of Malaysian private universities, (Figure 1). Accordingly, some of the criteria proposed by these researchers are applicable to sustainability assessment methods in general. In this study, the modified and refined model had 23 items tentatively distributed to cover the four main dimensions of economic, social, environment and top management support. The sustainability aspects perceived by the universities' stakeholders such as staff, managers, heads of departments, and lecturers were measured on a five point Likert-scale ranging from 'Strongly Disagree' to 'Strongly Agree' as response to the statements in the questionnaire. These were analyzed by SPSS Version 22, using the EFA technique specified in the procedure manual.

3.1. Sampling and Data collection

The study engaged in quantitative method with cross-sectional design which involved one time collection of information from the respondents. The target population consisted of Malaysian private universities and its stakeholders.

The sample consisted of selected Malaysian private universities.

In the first stage 15 private universities were chosen and stratified in to three categories i.e, Category A (High Achievers), category B (Medium Achievers) and category C (Low Achievers). The stratification was based on the Malaysian Setara[13] ranking, expert opinions and public's perceptions. In the second stage, three universities from each category were chosen randomly; hence a total of nine universities were chosen. The respondents were selected from senior management personal, managers, department heads, divisional administrative staff and lecturers. These respondents were chosen because they were the ones who were most likely to engage in the day to day operations and administrative activities of the universities' supply chain.

The research was conducted by survey questionnaire. Experts view was taken from ten individuals and changes were done to the draft questionnaires as necessary. Preliminary reliability analysis was conducted after modifying the questionnaires through a pilot study with twenty respondents. Cronbach's Alpha score of 0.70 was achieved, which was sufficient to justify the internal consistency of the questionnaires. The questionnaires for the study consisted of four components or factors with 23 items eligible for the proposed four dimensions of sustainable practices. The particular measurement items of the instruments are illustrated in **Table 2** above.

The questionnaires were distributed to the respondents by hand, post, email and whatsapp. A total of 600 questionnaires were sent to the 9 private universities in Malaysia. After several reminders, 140 completed questionnaires had been received by the researcher. This represented 23.33% of the total adequate sample of potential participants. The rate was consistent with the anticipated response from a mail survey and adequate for statistical analysis. Of this, 10 questionnaires were eliminated from the pool because of missing data; the remaining sample size (130) was still large enough to permit appropriate statistical analysis such as Exploratory Factor Analysis (EFA).

3.2 Method of Analysis

With regards to the method of analysis consisted of Exploratory Factor Analysis (EFA). EFA operates on the notion that measurable and observable variables can be reduced to fewer latent variables that will share a common variance which are unobservable and known as reducing dimensionality [22]. Exploratory Factor analysis was performed to recognize factors which play a predominant role in sustainable performance in the study. EFA is used to examine the reliability and inter-correlations among large numbers of items (questionnaire responses) hence doing so reduces the items into smaller groups, known as factors [23]. The dimensions produced by factor analysis may be used as input for further analysis such as multiple regressions and confirmatory factor analysis (CFA).

EFA is also employed to refine the number of items on a scale for the purpose of scale development [24]. It allows the researcher to determine the nature and number of latent variables (dimensions / factors) in the underlying set of items. One of the critical assumptions associated with scale construction is that the scale that measures the particular construct must be relatively homogenous (i.e. load together on one factor). Further, factor analysis can be used to determine whether one or multiple dimensions exist in a set of variables.

EFA is also used as a method with the objective of extracting maximum variance among the variables from the dataset within each factor [25]. In the empirical work [26] on best practices in exploratory factor analysis, it was strongly recommended to use Principal Component Analysis (PCA) due to its influence on factor extraction of the underlying factor structures appropriately.

In rotation methods, it has generally been seen that, ML (Maximum Likelihood) offered the finest results, depending on whether the data were normally distributed or significantly non-normal, respectively [27]. Thus, for the present study ML with varimax Kaiser Normalization rotation method was chosen. This was performed on all the twenty three items (Table 2). On the factor loading criteria, generally factor loading above 0.6 is considered acceptable while factor loading greater than or equal to 0.5 is considered moderately high [27]. Therefore the cut-off for analyzing factor loading was 0.50 and above.

Although EFA is a seemingly complex statistical method, the current study employed the five step exploratory factor analysis procedure **(Refer to figure 1).** The following five steps offered the researcher with clear decision pathways and ease

the overall understanding on EFA

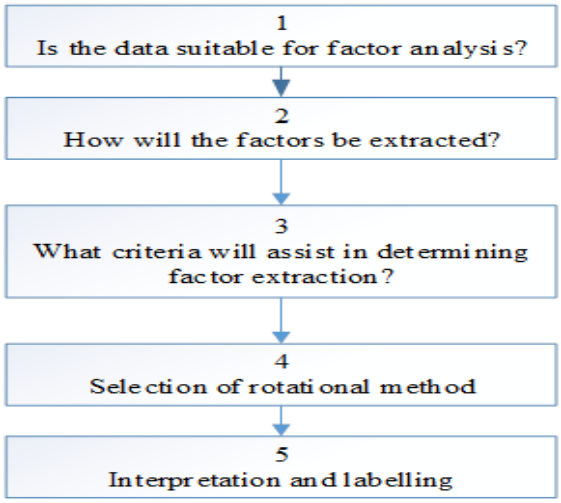

Figure 2: The five step Exploratory Factor Analysis

3.3. Analysis of Data

The primary information of respondents covered of demography, job status and universities' ranking. Around 54% of the respondents were female and the remaining 46% were male. It showed that most of the universities employees were females. In terms of age 90% of the respondents were below 45 years of age and only 10% were above 46. Since the current study included the top three categories of universities hence the data was collected from these on an average percentage of 33% from each category. It implies that the questionnaires and respondents were equally distributed. In terms of job status, most of the respondents, i.e, 68% were staff who were from administration, operations and lecturers. The reason behind selecting these specific respondent groups was because, the day to day operational activities involved them. The remaining 31% comprised managers, HODs and top management personnel (refer to Table 3).

4. Findings and Discussion

Factor analysis produces a considerable amount of output for further discussion and interpretation. This section will explain the results in more detail.

4.1. Goodness of fit

The first thing is to witness the correlation matrix to ensure correlation coefficients are not greater than 0.8 in magnitude. If correlations are over 0.8 it might indicates multicollinearity. In this study all correlations were less than 0.8, which tentatively suggested that factor analysis was appropriate.

Table 3: Respondents Characteristics

Prescriptions	Descriptions	Frequency
Job status	Top Managers	41
	Staff and Lecturers	89
Universities	Category A	45
	Category B	44
	Category C	41
Sex	Male	60
	Female	70
Age	26 – 45	117
	above 46	13

Next, the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) was checked. This should have a value of 0.6 or above. KMO for this study was 0.870 which fit within acceptable limits (see Table 4 below). The Bartlett's Test of Sphericity should be significant (less than .05) and in this example the study met this criterion as the test showed significant p value (p = .000). As all the prerequisite values for model fit has been achieved, the factor model was considered reasonably fit.

Table 4: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.870
Bartlett's Test of Sphericity	Approx. Chi-Square	2031.813
	Df	253
	Sig.	.000

4.2. Reliability

A reliability analysis was conducted on the identified factors. Cronbach alpha among the four factors ranged between 0.84 and 0.92 (Table 4) which was considered satisfactory and sufficient [28]. Reliability is a measure of the internal consistency of a set of scale items. The higher the reliability of scale items, the higher the confident score obtained from the administration of the scale that is being tested [29].

4.3. Discussion

After examining the questionnaires via pretesting, there were 130 responses obtained from the three tiers of universities. The obtained data was tested using exploratory factor analysis for inferences. Table 5, shows the matrix that emerged from the factor analysis. As can be observed from the table, a total of four factors or components with 23 items emerged. The above said 23 measurement indicators had factor loadings of 0.6 and above. Further examination of the analyzed data showed most of the items influenced sustainable performance significantly.

With regards to decision on factor extraction and the number of components retained, it was based on a range of criteria and approaches [30]. Accordingly, this stage should take an exploratory approach by testing with the different numbers of factors until a satisfactory level of solution is found. The foremost popular method for deciding on the retaining of factors is Kaiser's eigenvalue which should be greater than 1 [31]. This rule specifies all factors greater than one are kept for interpretation. This is a default method in most of the statistical programs and

Table 5: Pattern Matrix

Item Code	Factor Loadings			
Components	**1**	**2**	**3**	**4**
Cronbach alpha	**.916**	**.916**	**.873**	**.838**
V9	.826			
V11	.825			
V8	.813			
V7	.811			
V10	.754			
V12	.726			
V14		.834		
V13		.829		
V15		.809		
V17		.765		
V16		.646		
V18		.640		
V20			.803	
V23			.802	
V22			.783	
V21			.767	
V19			.720	
V1				.832
V2				.795
V5				.752
V3				.735
V6				.701
V4				.632

Extraction Method: Principal Component Analysis
Rotation Method: Varimax with Kaiser Normalization

Table 6: Total Variance Explained

Factors	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.17	35.52	35.52	8.17	35.52	35.52
2	3.44	14.95	50.46	3.44	14.95	50.46
3	2.47	10.73	61.19	2.47	10.73	61.19
4	1.61	7.00	68.18	1.61	7.00	68.18

it is easy to understand. In fact, this method may lead to subjective decisions, for example it does not make sense to retain a factor with an eigenvalue of 1.01 and drop factors with an eigenvalue of .99 as irrelevant [31], **(Table 6).**

An alternative criterion is to set a predetermined level of cumulative variance and to continue the factorizing process until this minimal value is reached. While no absolute threshold has been adopted, for the social sciences a minimum of 60% cumulative variance is quite commonly accepted [31].

Besides, Cattell's scree test [32], also among other techniques may be used to overcome some of the deficiencies inherent in Kaiser's approach. Scree test graphically presents the eigenvalues in descending order linked by a line. This graph is then scrutinized to determine a noticeable change in its shape which is known as 'the elbow' or point of inflexion. Those factors above this elbow point should be retained by re-running the factor analysis to specify the appropriate number of factors [33].

Referring to our study, if we are to apply Kaiser's eigenvalue greater than 1 criterion we would extract four factors from the dataset. This is examined by the total variance explained (refer to Table 6) where the total eigenvalues for all the four dimensions account for 68.18% of the variance extracted. Scree plot test also used (Figure 2) to find the factor retention through point of inflexion (elbow). In our example the most obvious break (point of inflexion) is at factor 5, suggesting a four-dimensional solution is appropriate.

This result, combined with our eigenvalue analysis and scree plot inspection would lead us to consider a four factor solution. Coupled with these results we must bear in mind our a priori theoretical framework which proposed a four factor solution (Table 1).

From the four factors a total of 23 items were extracted and retained to indicate sustainable practices (Table 2). Through a perfect analysis and examination of the data, it summarized that the underlying items were equally distributed among the four components with factor loadings of 0.6 and above, [27].

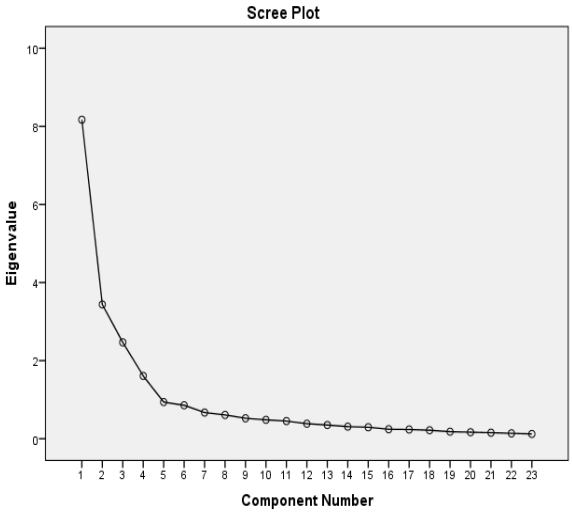

Figure 3: Scree Test Criterion

Table 7: Regrouping and Renaming the New Groups

Emerged Factors	Items Retained	New Dimension
1 - 6 items	V9, V11, V8, V7, V10 and V12	Social factors
2 – 6 items	V14, V13, V15, V17, V16 and V18.	Economic factors
3 – 5 items	V20, V23, V22, V21, and V19	Environment factors
4 – 6 items	V1, V2, V5, V3, V6, and V4.	Top Management Support

4.4. Regrouping and Naming Factors

From Table 7, we have summarized and all the 23 measurement items were grouped into four distinctive components.

Looking at the items that emerged in factor 1 through FA, there were 6 items locked for this component, i.e, V9, V11, V8, V7, V10 and V12. Since almost all the items referred to and explained staff and student welfare, hence we named it as 'Social Factor'.

The factor 2 consisted of 6 items, i.e, V14, V13, V15, V17, V16 and V18. As all the six items primarily explained financial and revenue aspects, we decided to name these components as 'Economic Factor".

The emerged factor 3 retained 5 items i.e, V20, V23, V22, V21, and V19. These five measurement items defined internal and external environment of the universities' campuses, hence we named them as 'Environment Factor'.

Finally the factor 4 comprised 6 items i.e, V1, V2, V5, V3, V6, and V4. Most of these items explained about senior manager's support on the universities' operations. So we named these components as 'Top Management Support".

5. Conclusion

It is acknowledged that sustainable practices were developed and analyzed through exploratory factor analysis. The current study is an endeavor to identify the sustainable dimensions of practices that best contribute to the sustainable performance of private universities of Malaysia

Hence the results of this study contribute to the establishment of key dimensions which are essential for maintaining and sustaining the performance of private universities in Malaysia. The study came out with four meaningful dimensions with twenty three items, represented by Social, Economic, Environment, and Top Management Support. These factors could be used by the private universities as critical success factors in evaluating their sustainability concern. The most important drivers of sustainability performance of PUs of Malaysia were found to be social, economic, and environment, followed by top management support. With these outcomes obtained in the research, the paper suggests and recommends that the practitioners appreciate all the 23 items with the four main groups of sustainable practices as noted above in order to achieve a sustainable performance in private universities in Malaysia. Altogether the study suggests an alternative sustainable model through education SCM as the majority of the respondents agreed and accepted that sustainable practices are a principle component in the vision and mission statement of Malaysian private universities.

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