Journal of Education and e-Learning Research
Vol. 7, No. 1, 76-86, 2020
ISSN(E) 2410-9991 / ISSN(P) 2518-0169
DOI: 10.20448/journal.509.2020.71.76.86

The Applicability Factors on the Implementation of Performance Based Funding Mechanism at Malaysian Public Universities

Abd Rahman Ahmad[1]
Kek Siok Yee[2]


(✉ Corresponding Author)

[1,2]*Faculty of Technology Management and Business, Universiti Tun Hussein Onn Malaysia, Batu Pahat, Johor, Malaysia.*
[1]*Email: arahman@uthm.edu.my Tel: +6074533982*
[2]*Email: keksiokyee@gmail.com*

Abstract

The intention of this paper is to examine the applicability factors on the implementation of Performance Based Funding (PBF) mechanism in Malaysian public universities. Three applicability drivers examined in this study are consisting of government objectives, level of understanding and autonomy. Survey questionnaires were distributed to all Dean and Deputy Dean of the faculty of all 20 public universities in Malaysia. This study investigated the drivers of PBF mechanisms for Malaysian public universities. By filling the research gap, this study can serve and provide the Malaysian Government with valuable understanding with regard to the views of public universities on the implementation of PBF. This study also assessed the applicability of the implementation of PBF that may serve as a reference or guideline to the Federal Government in developing PBF and applying higher education funding policies. This study can also function as a reference guide to other nations, especially amongst developing nations considering PBF programs. The findings from the quantitative data showed that government objectives, level of understanding and autonomy have significant and positive relationships with PBF mechanism implementation. Consistent with previous studies, government objective has proven to have a significant relationship with the PBF mechanism implementation where it usually acts as a strategic planning by the government to align the institutional objectives with government objectives.

Keywords: Performance based funding, Applicability, Drivers, Higher education, Public university, Funding.

Citation | Abd Rahman Ahmad; Kek Siok Yee (2020). The Applicability Factors on the Implementation of Performance Based Funding Mechanism at Malaysian Public Universities. Journal of Education and e-Learning Research, 7(1): 76-86.
History:
Received: 6 January 2020
Revised: 10 February 2020
Accepted: 13 March 2020
Published: 9 April 2020

Publisher: Asian Online Journal Publishing Group

Acknowledgement: Both authors contributed to the conception and design of the study.
Funding: Both authors would like to thank you to Research Management Office RMC, Universiti Tun Hussein Onn Malaysia for allowed this paper to be presented by covering fees by using research fund (E15501) UTHM.
Competing Interests: The authors declare that they have no conflict of interests.
Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study was reported; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained.
Ethical: This study follows all ethical practices during writing.

Contents

1. Introduction **77**
2. Literature Review **77**
3. Methodology **78**
4. Demographic Analysis **80**
5. Discussion **85**
6. Conclusion **85**
References **85**

Contribution of this paper to the literature
This study contributes to existing literature by examining the applicability factors on the implementation of Performance Based Funding (PBF) mechanism in Malaysian public universities.

1. Introduction

Funding is the main pillar in managing and supporting the daily operation of higher education. Specifically, it is a financial support that can assist higher education and research systems work according to targets and principles that follow from analysis of what nations, citizens, and business need (Husain, 2017; Sörlin, 2007). At the same time, it can also be defined as a tool that direct the behaviour of universities which to ensure the universities to achieve specific outcomes as set by the government (Jongbloed, 2010).

In both developed and developing countries, government always plays an important role in the funding of universities (Salmi & Hauptman, 2006; Schiller & Liefner, 2007). However, according to Salmi and Hauptman (2006) there are significant differences between each of the funding mechanisms used at every country. For example, some countries have applied traditional method of funding while some countries have practised performance based funding (PBF) mechanisms. Furthermore, there are some countries utilised a variable mix of funding mechanisms (Natow & Dougherty, 2019; Todea & Tilea, 2011).

In Malaysia, the Minister for Higher Education Datuk Seri Idris Jusoh announced the decision to reserve two per cent of the overall funding for public universities as PBF in a recent press statement. The reserve fund will only be given after the respective universities meet the target KPIs and comply with the factors attached such as efficiency, productivity, performance, and success. Moreover, the rate of the reserve fund was told will increase year on year (Berita Harian, 2015). However, most of the PBF studies have only focused on developed countries and limited studies have discussed about the applicability of PBF mechanisms in developing countries. Therefore, a study on the analysis of the applicability drivers to the implementation of PBF mechanism in Malaysian public universities was conducted and is believed could act as a reference for other developing countries.

Higher education is a driver of human development that fosters economic, social as well as political stability of a country (Ahmad, 2013a). Higher education can also be contributed to economic growth and social progress of a nation (Cattaneo, Meoli, & Signori, 2016; Macerinskiene & Vaiksnoraite, 2006). Since higher education is an important driver of stimulating social cohesion, economic activity, and employment, the government cannot retract on its role in funding (Schomburg & Teichler, 2006). Indeed, governments worldwide have allocated substantial amounts of public funds to institutions (Birdsall, 1996; Sanyal & Martin, 2006). The government expenditure on higher education can be seen in Figure 1 below. Malaysian Government commits quite a high proportion of its annual budget, about 7.7 per cent to higher education, followed by other countries like Singapore, Hong Kong, Chile, and Korea, which contribute 6.4 per cent, 6.0 per cent, 4.1 per cent, and 3.9 per cent respectively (Ministry of Education, 2015).

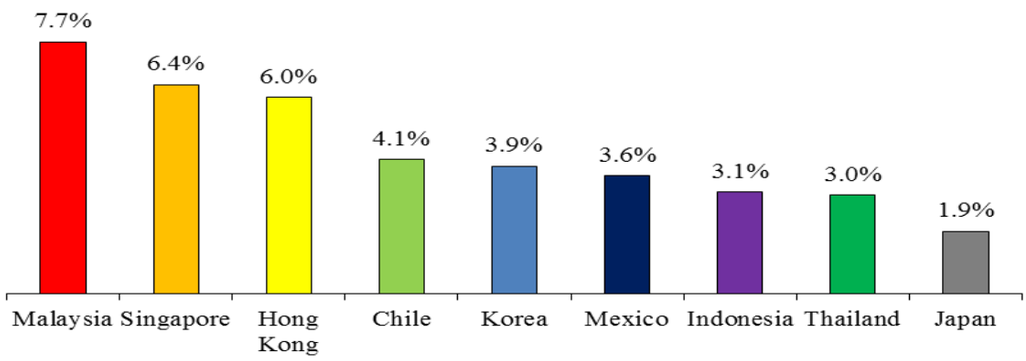

Figure-1. Higher education expenditure as a percentage of annual national budgets.
Source: (Ministry of Education, 2015).

Funding for higher education can be seen as a social investment which yields returns to people. Ahmad (2013a) pointed out that the funding for operational costs or development projects in HEIs is normally come in the form of grants and loans. Hence, all nations should have a comprehensive education system to enhance learning outcomes, access to facilities, as well as optimum use of resources (Newman, Couturier, & Scurry, 2004). Given the government provides HEIs with funding from the taxpayers' money, the HEIs should produce a significant level of output beneficial to the public and make the information accessible to the public (Leruth & Paul, 2006). Additionally, HEIs should also utilise their information, skills, qualifications, abilities, and experience to deliver educational services to the public in compliance with the government's objectives (Ahmad, 2013a; Ahmad, Soon, & Yee, 2016).

2. Literature Review

Kaullychurn (2009) has outlined two applicability variables which are suitable for studies on the applicability of PBF mechanisms in developing countries, which are government objectives and level of understanding in PBF. On the other hand, Ahmad, Farley, and Naidoo (2012a) pointed out that autonomy should be given to universities prior to the implementation of PBF mechanism.

Government objectives: The main concerns of implementing PBF mechanism are definitely the appropriated designs which involved the selection of good indicators and measures to evaluate institutions in accordance with the development of appropriate rewards programs (Salmi & Hauptman, 2006). Generally, PBF is introduced to control the higher education institutions to focus on the particular outcomes and those institutions with the performance that is in compliance with the government priorities are financially rewarded (Boer et al., 2015). However, the choice of performance indicators is always the main controversial issues when implementing the PBF

mechanisms (Jongbloed, 2001). Furthermore, Ahmad, Farley, and Naidoo (2012b) pointed out that it is difficult to justify the criteria of priorities in determining the funding weights for each of the indicators.

Therefore, in order to ensure the success and the effectiveness of implementing PBF mechanisms, several matters which refer to performance indicators that should be noted are summarised by Layzell (1998) from the previous experiences containing: (1) the number of performance indicators selected should be kept to a minimum as below 20; (2) the performance indicators should be avoided in a top-down manner; (3) the development of the indicators should be involved the faculty and the state legislature for long term success; (4) one type of indicator model cannot be applied to all type of institutions; (5) qualitative measurement is preferable to be used rather than the quantitative measurement by the policymakers; (6) appropriate financial incentive should be allocated in every indicator and given to the qualified institutions; and (7) the results of the performance should be reported to the policymakers and the general public in a timely and understandable fashion. Besides, Kivistö (2005) stated that the indicators chosen by the government not only have to be relevant for measuring the institutional performance but also have to be responsible to a broader social and economic environment.

Following this, the implementation of PBF mechanisms has shown a high potential and advantage in improving the performance of higher education (Layzell, 1999). The implementation of PBF has been pointed out could improve the efficiency and value for money, promote the quality, and enhance the accountability of higher education institutions (Kaullychurn, 2009). Furthermore, the competitiveness of PBF could also act as a market instrument which allows the universities to compete among each other in order to obtain the high levels of funding, whilst the universities have to offer a high-quality of teaching and research as well as foster educational and organisational innovation (Liefner, 2003).

In order to enhance the universities' performance, the funding relationship between the government and the funded universities had been redefined by using PBF (Ferris, 1992). Previous research has also shown that one of the main factors which attribute to the reformation of government funding is the implementation of PBF (Ahmad & Farley, 2013; Ahmad, Farley, & Naidoo, 2012c; Schiller & Liefner, 2007). Nevertheless, Schiller and Liefner (2007) stated that shifting a new funding mechanism for public universities is expected to change the behaviour of the universities. Besides, the getting rise of the concern with using taxpayers' money has resulted in the government is now urged the universities to be more economically productive and must fulfil the goals that outlined in the government strategic plan (Lane & Kivistö, 2008).

Therefore, funding can be used as a strategic planning to align the universities' behaviour with the government objectives (Frølich, Schmidt, & Rosa, 2010). In addition, Ahmad et al. (2012a) has proposed three control methods that are applicable for the government to control the agents by creating efficient monitoring systems, instituting bonds and promissory arrangements and the last one is establish adequate effective systems of financial incentives that link the rewards toward the agents' performances.

Level of understanding in PBF: Level of understanding in PBF is one of the important elements that cannot be avoided. There are three issues that needed to be clarified before implementing the PBF mechanism. First, it is essential to have a clearer notion of what is the concept of PBF stands for. Second, it is necessary to distinguish the levels of resources allocation and the forms of funding. Third, illustrative examples have to be presented by referring to the PBF implementation in other countries (Herbst, 2007). However, due to the different education system within each of the country and also the mix of indicators are being considered, the PBF mechanisms should be study, develop and applicable to its own higher education system (Ahmad & Farley, 2013; Schiller & Liefner, 2007; Teixeira, Biscaia, & Rocha, 2014).

Besides, the implementation of the PBF mechanisms in a country is also affected by other reasons. In order to ensure the successfulness of a PBF mechanism, it is necessary to keep the PBF simple, interact with stakeholders to develop understanding, leave space for error, learn from those who have already implemented the system, and construct specify own methods (Ahmad et al., 2012b). Dougherty et al. (2014) emphasised that the involvement of HEIs leaders, faculty and staff are more important and essential during the process of designing the funding mechanism so the unexpected obstacles and negative effects could be reduced. On the other hand, Kaullychurn (2009) stated that appropriate training and comprehensive guidelines should be provided in order to enhance the human resource capacity prior to the implementation of PBF mechanisms. Furthermore, the combination of universities' responses and national funding mechanism has been proven to direct universities towards more sustainable success (Frølich & Klitkou, 2006).

Autonomy: Autonomy is another applicability driver to implement PBF mechanism. Adequate autonomy and financial freedom should be given to universities before the implementation of PBF mechanisms (Ahmad et al., 2012a). According to Olayiwola (2012) the objective of PBF mechanism is to encourage institutions to have own autonomy and the ability to function under full management control of the available meagre funds rather than to be the constraints under the government bureaucracy.

Moreover, Dominicis, Pérez, and Fernández-Zubieta (2011) stated that financial autonomy should be given for the diversification of public universities budget. It is very important especially when the changes of funding allocation mechanism. It showed that there would have a significant relationship between autonomy and PBF mechanism when the universities have been given financial autonomy. This has been supported by the Association (2009) which stated that autonomy given will make the universities more flexibility to act quickly and effectively in a changing environment.

Hypothesis development: Therefore, three hypotheses which designed for this study are as below:

H1: There is a relationship between government objectives and PBF implementation in Malaysian public universities.

H2: There is a relationship between level of understanding and PBF implementation in Malaysian public universities.

H3: There is a relationship between autonomy and PBF implementation in Malaysian public universities.

3. Methodology

In this study, survey questionnaire was employed for data collection. The questions in the survey were divided into two major sections where Section A focused on respondents' background while Section B consists of questions regarding government objectives, level of understanding, autonomy and PBF mechanism implementation. The

population of this study included all 20 public universities in Malaysia consisting of five Research/Apex Universities, four Comprehensive Universities and 11 Focused Universities. Furthermore, the respondents of the survey questionnaires were the Dean and Deputy Dean of the faculty of all Malaysian public universities.

Analysis of the data collected from survey questionnaires was conducted by using SPSS (Version 20, SPSS Inc., Chicago, USA). Before importing the collected data into the system, the collected data was inserted into Microsoft Excel as an early preparation. However, due to the ethical consideration and to enclose the identity of Apex University, any results from Research Universities and Apex University were merged as RAUs. Out of 245 questionnaires distributed, a total of 155 were returned. Data gathered from the respondents were then put through step one which is the data cleaning process. The missing values in questionnaires collected were detected by using descriptive statistical analysis of SPSS. The results of the analysis showed that around nine sets of questionnaires were found to have missing values and thus taken out from the analysis. Finally, a total of 146 questionnaires were continued through for data analysis.

Table-1. Normality test.

No	Variables	Skewness Statistic	Kurtosis Statistic
1	Government objectives	-0.334	-0.198
2	Level of understanding	-0.454	-0.419
3	Autonomy	-0.659	0.173
4	PBF mechanism implementation	-0.280	-0.195

Following this, a normality test was conducted in step two in order to examine whether the distribution of scores on the variables is normal (Pallant, 2011). During the process, a total of 12 sets of questionnaires were deleted due to the outlier issues and 134 questionnaires were continued forward for data analysis. The result is shown in Table 1.

As indicated, the variables are skewed between -1 and +1 meanwhile the kurtosis of all the variables are within -3 and +3. Therefore, according to Leech, Barrett, and Morgan (2005) all the variables are reasonably close to normal when skewness is in the ranges of -1 and +1 while kurtosis is between -3 and +3. Here, the results revealed that parametric tests are qualified to be carried out. Descriptive statistics were then applied to describe the respondents' background and also to measure the extent of agreements of respondents on government objectives, level of understanding, autonomy, and PBF mechanism implementation. In this part, both frequency and percentage tests were used to explore the frequencies of respondents based on university category, designated position, number of years in current designated position, and number of years worked in the higher education sector. On the other hand, the extents of agreements of respondents on government objectives, level of understanding, autonomy, and PBF mechanism implementation were measured by using frequency, percentage, mean, and standard deviation. Mean values calculated were used to define the respondent' extents of agreement on the variables. Here, the mean values obtained were interpreted by using the mean score indicator as showed in Table 2.

Table-2. Mean score indicator for seven-point likert scale.

Mean Score	Level
1.00 to 2.99	Low
3.00 to 4.99	Moderate
5.00 to 7.00	High

In this study, inferential statistics such as Pearson correlation, multiple regression analysis, and one-way analysis of variance (ANOVA) were applied to analyse the data for answering the research questions, as presented in Table 3.

Table-3. Summaries of the research questions and statistical test used.

Research Questions	Statistical Test Used
1) What are the drivers in the implementation of PBF mechanism in Malaysian public universities? • Are government objectives relevant in the implementation of PBF mechanism in Malaysian public universities? • Is level of understanding relevant in the implementation of PBF mechanism in Malaysian public universities? • Is autonomy relevant in the implementation of PBF mechanism in Malaysian public universities?	Pearson correlation Multiple regression
2) Does the result of drivers in the implementation of PBF mechanism vary across the Malaysian public universities sector (RAUs, CUs and FUs)?	One-way ANOVA

Based on the Table 3 mentioned-above, Pearson correlation and multiple regression analysis were used to answer the research questions one. Both statistical tests were used to determine the relationship between drivers of PBF and PBF mechanism implementation. The Pearson correlation was executed to measure the directions and strengths of the two variables which drivers of PBF as independent variables and PBF mechanism implementation as the dependent variable. Furthermore, the results obtained will decide whether the multiple regression analysis can be preceded. Here, the correlation coefficients obtained were interpreted by using the guidelines as proposed by Cohen (1988) as showed in Table 4.

Table-4. Guidelines for interpreting value of correlation analysis.

Values	Interpretation
r = 0.10 to 0.29 OR r = -0.10 to -0.29	Weak
r = 0.30 to 0.49 OR r = -0.30 to -0.49	Medium
r = 0.50 to 1.0 OR r = -0.50 to -1.0	Strong

Subsequently, multiple regression analysis was used to test the hypotheses formulated as proposed in chapter one. The details of the variables used are shown in Table 5. The analysis of this test starts with the test of multicollinearity. Both Tolerance and Variance Inflation Factor (VIF) values which are greater than 0.1 and less than 10 respectively were considered to have not violated the multicollinearity assumption. Following this, outliers, normality, linearity, homoscedasticity, and independence of residuals assumptions were checked. After checking all the assumptions, R Square provides information about the value of variance in the dependent variable is explained by the model (Pallant, 2011). Next, beta under standardised coefficient was used to compare the contribution of each independent variable to the dependent variable. Here, a significant value of 0.05 indicated that there is a statistically significant contribution (Pallant, 2011).

Table-5. Variables details.

Variables	
Dependent Variable	**Independent Variables**
PBF mechanism implementation	Government objectives
	Level of understanding
	Autonomy

Besides, one-way ANOVA was employed to answer the research question two. One-way ANOVA is very suitable to this study as it will help the researcher to assess the significant mean differences among more than two groups on a dependent variable (Sekaran & Bougie, 2013) where those groups in this study are RAUs, CUs, and FUs. The purpose of one-way ANOVA used in this study is to assess whether the means of the three groups are statistically different from each other. First, Levene's test was conducted to test the homogeneity assumption. If the significant value is greater than 0.05, then it was considered to have not violated the homogeneity assumption. Next, it was followed by the test of between-subjects effects. Here, variables with significance levels of less than 0.05 indicated that there is a statistically significant difference. In contrast, if the significant value is more than 0.05, then no significant difference was found. Lastly, a *post hoc* test was performed in order to determine where the differences among the groups exist (Pallant, 2011). The results derived from one-way ANOVA will thus reject or support the alternative hypotheses in chapter one.

4. Demographic Analysis

This section provides information about the respondents' background. Of 245 questionnaires distributed to respondents from the 20 Malaysian public universities, a total of 134 questionnaires were fully responded to, indicating an overall response rate of 54.69 per cent. The demographic profiles of the respondents which include university category, designated position, number of years in current designated position, and number of years worked in the higher education sector were extracted and summarised as showed in Table 6.

Table-6. Demographic analysis.

Demographic Characteristics	**Frequency (n=134)**	**Percentage (%)**
University category		
RAUs	48	35.8
CUs	32	23.9
FUs	54	40.3
Designated position		
Deans	40	29.9
Deputy Deans	94	70.1
Number of years in your current designated position		
Less than 2 years	64	47.8
2 to 4 years	62	46.3
5 to 7 years	5	3.7
More than 7 years	3	2.2
Number of years worked in the higher education sector		
Less than 5 years	-	-
5 to 10 years	17	12.7
11 to 15 years	41	30.6
More than 15 years	76	56.7

Note: RAUs, Research/Apex Universities; CUs, Comprehensive Universities; FUs, Focused.

Based on the result of the university category in Table 6 the majority of the respondents (40.3%) were from FUs. It is also shown that 48 respondents (35.8%) were from RAUs while the remaining 32 respondents (23.9%) were from the category of CUs. It is fair to explain that the low response from RAUs and CUs is due to the fact there are only five RAUs and four CUs respectively. Of the positions held by the respondents, more than half of the respondents (70.1%) were comprised of Deputy Deans, and 40 respondents (29.9%) were reported as Dean. Hence, the respondents in this study were reasonably assumed to have some knowledge about a PBF mechanism. Furthermore, the number of years held in their current position was discussed. Out of the total number of respondents in the survey, only three respondents (2.2%) have more than seven years of work experience in their

current position. It was followed by five respondents (3.7%) with five to seven years of experience, 62 respondents (46.3%) with two to four years of experience, and 64 respondents (47.8%) with less than two years of experience.

In term of the number of years worked in the higher education sector, most of the respondents (56.7%) had served more than 15 years and 41 respondents (30.6%) indicated they had served for 11 to 15 years. Nevertheless, 17 respondents (12.7%) had served five to ten years while none had served for less than five years. In summary, that majority of the respondents (40.3%) are from FUs and most of them (70.1%) are Deputy Deans. In addition, 64 respondents (47.8%) had less than two years of experience and 76 respondents (56.7%) had served more than 15 years in the higher education sector.

4.1. Descriptive Analysis

This section presents the results of a descriptive analysis for government objectives, the level of understanding, autonomy, and PBF mechanism implementation. In this study, descriptive analysis was conducted to examine the mean and standard deviation for each of the variable studied.

4.2. Government Objectives

Table 7 presents the results of the 11 items for government objectives. Statistically, more than 92.0 per cent of respondents agreed that PBF mechanism could monitor institutional performance according to government objectives (1.8) and improve strategic planning that focuses on increasing responsiveness in line with government objectives (1.2). On the other hand, 91.8 per cent of respondents agreed that PBF mechanism could align the strategic planning between the government and the universities (1.4) and increase accountability of the universities to meet government objectives (1.5). In addition, 90.3 per cent of respondents were agreed that a PBF mechanism could align the institutional objectives with government objectives (1.6) and improve the use of performance indicators to align with government objectives (1.7). Nevertheless, only 89.6 per cent and 86.6 per cent of respondents indicated that a PBF mechanism could improve directing universities towards the desired goals of the government (1.1) and improve the operation of the universities in line with government objectives (1.3) respectively.

Table-7. The analysis on the government objectives about PBF.

No	Statement	Disagree (1)+(2)+(3) (%)	Neutral 4 (%)	Agree (5)+(6)+(7) (%)	M	SD
1.1	Improve direction of the universities towards the desired goals of the government.	4 (3.0)	10 (7.5)	120 (89.6)	5.72 (High)	1.02
1.2	Improve strategic planning that focuses on increased responsiveness in line with government objectives.	3 (2.2)	7 (5.2)	124 (92.5)	5.75 (High)	0.94
1.3	Improve the operation of the universities that are in line with government objectives.	6 (4.5)	12 (9.0)	116 (86.6)	5.61 (High)	1.07
1.4	Align the strategic planning between the government and the universities.	3 (2.2)	8 (6.0)	123 (91.8)	5.75 (High)	0.94
1.5	Increase accountability of the universities to meet government objectives.	3 (2.2)	8 (6.0)	123 (91.8)	5.79 (High)	0.98
1.6	Align the institutional objectives with government objectives.	1 (0.7)	12 (9.0)	121 (90.3)	5.74 (High)	0.93
1.7	Improve the use of performance indicators to align with government objectives.	3 (2.2)	10 (7.5)	121 (90.3)	5.74 (High)	0.97
1.8	Monitor institutional performance according to government objectives.	1 (0.7)	8 (6.0)	125 (93.3)	5.81 (High)	0.86
1.9	Provide flexible analysis and reporting of data to assist accurate strategic decisions.	5 (3.7)	16 (11.9)	113 (84.3)	5.47 (High)	1.07
1.10	Produce quality information relevant to government requirements.	5 (3.7)	19 (14.2)	110 (82.1)	5.46 (High)	1.03
1.11	Improve the financial resources' strategy in accordance with government objectives.	4 (3.0)	18 (13.4)	112 (83.6)	5.51 (High)	1.04
1.12	Increase the use of internal resources as part of the strategy to generate funding according to government objectives.	6 (4.5)	21 (15.7)	107 (79.9)	5.39 (High)	1.12
Average mean score					5.65 (High)	0.75

Note: 1, Strongly disagree; 2, Disagree; 3, Somewhat disagree; 4, Neither agree nor disagree; 5.
Note: Somewhat agree; 6, Agree; 7, Strongly agree.

This study also found that 84.3 per cent of respondents agreed that PBF mechanism could provide flexible analysis and reporting of data to assist accurate strategic decisions (1.9). Furthermore, 83.6 per cent of respondents agreed that a PBF mechanism could improve the financial resources' strategy in accordance with government objectives (1.11) and another 82.1 per cent agreed that a PBF mechanism could produce quality information that is relevant to government requirements (1.10). Finally, 79.9 per cent of respondents agreed that a PBF mechanism could increase the use of internal resources as part of the strategy to generate funding according to government

objectives (1.12). The results show that all statements are under a mean score of between 5.39 and 5.81 while the overall average mean score was at 5.65. Overall, the respondents strongly agreed with the importance of government objectives as the driver.

4.3. Level of Understanding

In the first statement, 99.3 per cent of respondents agreed that support from the key stakeholders is very important at the early stage (2.1). Meanwhile, 98.5 per cent of respondents indicated that they fully agreed that the universities should have a clearer notion of the concept of PBF (2.3), the policy related to PBF mechanism is necessary to deliver an improvement in the level of understanding for stakeholders (2.6), the human resource development is the important element (2.9), and that they were fully agreed that communication is very important in order to ensure the stakeholders understand the principles of PBF mechanism (2.10). In addition, 97.8 per cent of respondents agreed that training, courses, and seminars should be provided to increase the level of understanding of PBF mechanism among the staff (2.2), the commitments of leaders, faculty, and staff are important during the process of designing the PBF mechanism (2.5), and that PBF understanding is needed to develop an effective resources strategy (2.7). Lastly, 97.0 per cent of respondents agreed that it is necessary to keep the PBF simple, interact with stakeholders to develop understanding (2.4) and 93.3 per cent of respondents agreed that the stakeholders are the most important assets (2.8).

Table-8. The analysis on the level of understanding about PBF.

No	Statement	Disagree (1)+ (2) + (3) (%)	Neutral 4 (%)	Agree (5)+ (6) + (7) (%)	M	SD
2.1	Support from the key stakeholders is very important at an early stage.	-	1 (0.7)	133 (99.3)	6.13 (High)	0.78
2.2	Training/courses/seminars should be provided to increase the level of understanding of PBF mechanism among the staffs.	-	3 (2.2)	131 (97.8)	6.20 (High)	0.77
2.3	The universities should have a clearer notion of the concept of PBF.	1 (0.7)	1 (0.7)	132 (98.5)	6.31 (High)	0.82
2.4	It is necessary to keep the PBF simple, interact with stakeholders to develop understanding.	1 (0.7)	3 (2.2)	130 (97.0)	6.22 (High)	0.85
2.5	The commitments of leaders, faculty, and staff are important during the process of designing the PBF mechanism.	-	3 (2.2)	131 (97.8)	6.29 (High)	0.74
2.6	The policy related to PBF mechanism is necessary for stakeholders in improving the level of understanding.	-	2 (1.5)	132 (98.5)	6.16 (High)	0.74
2.7	PBF understanding is needed to develop an effective resources strategy.	-	3 (2.2)	131 (97.8)	6.10 (High)	0.78
2.8	The stakeholders are the important assets.	3 (2.2)	6 (4.5)	125 (93.3)	5.94 (High)	0.97
2.9	Human resource development is an important element.	-	2 (1.5)	132 (98.5)	6.12 (High)	0.79
2.10	Communication is very important in order to ensure the stakeholders understand the principles of PBF mechanism.	-	2 (1.5)	132 (98.5)	6.30 (High)	0.74
Average mean score					6.18 (High)	0.59

Note: 1, Strongly disagree; 2, Disagree; 3, Somewhat disagree; 4, Neither agree nor disagree; 5, Somewhat agree; 6, Agree; 7, Strongly agree.

All the statements have a mean score of between 5.94 and 6.31, indicating strong agreement with the level of understanding. Finding from the study clearly shown that the respondents were highly agreed with the level of understanding is a key to the implementation of PBF mechanism in Malaysian public universities.

4.4. Autonomy

The result of the nine items for autonomy is presented in Table 9. Results indicated that 96.3 per cent of respondents indicated that they were in full agreement with changes to the rationale and funding allocation mechanisms require greater institutional autonomy (3.3) and that they were fully agreed that more autonomy should be given to the universities in order to make PBF a more significant tool (3.9). As for the second and eighth statements, 94.8 per cent agreed that financial autonomy should be given for the diversification of a public universities budget (3.2) and that autonomy and financial freedom should be given to the universities before the implementation of PBF mechanism (3.8). It was also found that 94.0 per cent of respondents agreed that autonomy

appeared to be essential for the universities in order to act quickly and effectively in a constantly changing environment (3.6).

Table-9. The analysis on autonomy and PBF.

No	Statement	Disagree (1)+(2)+(3) (%)	Neutral (4) (%)	Agree (5)+(6)+(7) (%)	M	SD
3.1	Strengthening the autonomy is the core aim of PBF mechanism implementation.	4 (3.0)	9 (6.7)	121 (90.3)	5.82 (High)	1.13
3.2	Financial autonomy should be given for the diversification of public universities budget.	2 (1.5)	5 (3.7)	127 (94.8)	6.06 (High)	0.92
3.3	Changes to the rationale and funding allocation mechanisms require greater institutional autonomy.	-	5 (3.7)	129 (96.3)	6.02 (High)	0.84
3.4	More autonomy would enable the universities to better compete for research funds and diversify their funding portfolio.	2 (1.5)	8 (6.0)	124 (92.5)	5.98 (High)	0.95
3.5	More autonomy would enable the universities to improve their performance.	2 (1.5)	9 (6.7)	123 (91.8)	5.96 (High)	0.98
3.6	Autonomy appears to be essential for the universities in order to act quickly and effectively in a constantly changing environment.	2 (1.5)	6 (4.5)	126 (94.0)	6.06 (High)	0.96
3.7	Autonomy increases efficiency and effectiveness.	1 (0.7)	9 (6.7)	124 (92.5)	5.93 (High)	0.95
3.8	Autonomy and financial freedom should be given to the universities before the implementation of PBF mechanism.	1 (0.7)	6 (4.5)	127 (94.8)	5.95 (High)	0.90
3.9	More autonomy should be given to universities in order to make PBF more significant.	2 (1.5)	3 (2.2)	129 (96.3)	6.03 (High)	0.88
Average mean score					5.98 (High)	0.77

Note: 1, Strongly disagree; 2, Disagree; 3, Somewhat disagree; 4, Neither agree nor disagree; 5, Somewhat agree; 6, Agree; 7, Strongly agree.

On the other hand, 92.5 per cent of respondents indicated that they were agreed that more autonomy would enable the universities to compete better for research funds and diversify their funding portfolio (3.4); they also agreed that autonomy increases the efficiency and effectiveness (3.7). 91.8 per cent of respondents agreed that more autonomy would enable the universities to improve their performance (3.5), and 90.3 per cent of respondents were in agreement that strengthening the autonomy is the core aim of PBF mechanism implementation (3.1). The results showed that the mean score for each of the statements exceeded five and ranged from 5.82 to 6.06 while the overall average mean score for autonomy was at 5.98. Overall, the findings of the study suggested that the respondents were in high agreed with autonomy is one of the critical success factors in implementing the PBF mechanism.

4.5. Performance-Based Funding (PBF) Mechanism Implementation

Table 10 shows the results of the 17 items for PBF mechanism implementation. 92.5 per cent of respondents agreed that PBF mechanism could improve greater transparency and accountability of public universities (4.2). Meanwhile, 91.0 per cent of respondents agreed that a PBF mechanism could align institutional and national priorities (4.8). It is worth noting that 90.3 per cent of respondents agreed that PBF mechanism could accelerate improvements in institutional efficiency (4.4). Furthermore, another 89.6 per cent of respondents were agreed with PBF mechanism could improve the performance of higher education (4.6), increase the efficiency and effectiveness of universities in using public funds (4.12), motivate the universities to achieve the targeted KPIs (4.13), and motivate the universities by providing incentives (4.17). Results show that 88.8 per cent of respondents indicated that a PBF mechanism could increase the monitoring activities of the government to the universities (4.15) while 88.1 per cent of respondents agreed that a PBF mechanism could monitor the real achievement of the universities (4.9) and improve the accuracy of the information from universities to government (4.14). It is also noteworthy that 87.3 per cent of respondents agreed that a PBF mechanism could align the goals of institutions with the government objectives (4.1) and increase awareness of the government preferences (4.11).

Table-10. The analysis on performance-based funding (PBF) mechanism implementation.

No	Statement	Disagree (1)+(2)+(3)(%)	Neutral (4) (%)	Agree (5)+(6)+(7) (%)	M	SD
4.1	Align the goals of institutions with the government objectives.	3 (2.2)	14 (10.4)	117 (87.3)	5.78 (High)	1.00
4.2	Increase greater transparency and accountability of public universities.	1 (0.7)	9 (6.7)	124 (92.5)	5.89 (High)	0.94
4.3	Increase competition between the universities.	6 (4.5)	17 (12.7)	111 (82.8)	5.58 (High)	1.20
4.4	Accelerate improvements in institutional efficiency.	1 (0.7)	12 (9.0)	121 (90.3)	5.78 (High)	0.94
4.5	Improve the quality of educational services.	3 (2.2)	16 (11.9)	115 (85.8)	5.57 (High)	1.13
4.6	Improve the performance of higher education.	3 (2.2)	11 (8.2)	120 (89.6)	5.69 (High)	0.99
4.7	Accelerate improvements in student outcomes.	9 (6.7)	15 (11.2)	110 (82.1)	5.42 (High)	1.15
4.8	Align institutional and national priorities.	1 (0.7)	11 (8.2)	122 (91.0)	5.75 (High)	0.87
4.9	Monitor the real achievement of the universities.	4 (3.0)	12 (9.0)	118 (88.1)	5.65 (High)	1.06
4.10	Increase the internationalisation of universities.	8 (6.0)	21 (15.7)	105 (78.4)	5.31 (High)	1.14
4.11	Increase the awareness of the universities to the government preferences.	3 (2.2)	14 (10.4)	117 (87.3)	5.63 (High)	1.02
4.12	Increase the efficiency and effectiveness of universities in using public funds.	4 (3.0)	10 (7.5)	120 (89.6)	5.72 (High)	0.98
4.13	Motivate the universities to achieve the targeted KPIs.	4 (3.0)	10 (7.5)	120 (89.6)	5.70 (High)	1.00
4.14	Improve the accuracy of the information from universities to government.	3 (2.2)	13 (9.7)	118 (88.1)	5.62 (High)	1.01
4.15	Increase the monitoring activities of the government to the universities.	3 (2.2)	12 (9.0)	119 (88.8)	5.69 (High)	0.98
4.16	Remove the gap between the government and the universities by providing incentives.	3 (2.2)	21 (15.7)	110 (82.1)	5.54 (High)	1.05
4.17	Motivate the universities by providing incentives.	6 (4.5)	8 (6.0)	120 (89.6)	5.78 (High)	1.09
Average mean score					5.65 (High)	0.78

Note: 1, Strongly disagree; 2, Disagree; 3, Somewhat disagree; 4, Neither agree nor disagree; 5, Somewhat agree; 6, Agree; 7, Strongly agree.

Furthermore, only 85.8 per cent and 82.8 per cent of respondents indicated that a PBF mechanism could improve the quality of educational services (4.5) and increase competition between the universities (4.3) respectively. This study also revealed that 82.1 per cent of respondents agreed that a PBF mechanism could accelerate improvements in student outcomes (4.7) and remove the gap between the government and the universities by providing incentives (4.16). Finally, 78.4 per cent of respondents indicated that a PBF mechanism could increase the internationalisation of universities (4.10). The results revealed that the respondents agreed to all the statements as showed in the table above. All the statements have a mean score of between 5.31 and 5.89. On the other hand, the overall average mean score was at 5.65 which suggested that the respondents highly agreed with the implementation of a PBF mechanism in Malaysian public universities.

Meanwhile, Table 11 reports the overall Pearson correlation matrix among the variables. The Pearson correlation was executed to measure the directions and strengths of the two variables which applicability drivers as independent variables and PBF mechanism implementation as dependent variable. Furthermore, the results obtained will decide whether the multiple regression analysis can be preceded.

Table-11. Overall Pearson correlation results.

Variable	GO	LOU	AUTO	PBF
GO	1.000			
LOU	0.453**	1.000		
AUTO	0.489**	0.508**	1.000	
PBF	0.615**	0.560**	0.575**	1.000

Note: GO, government objectives; LOU, level of understanding; AUTO, autonomy; PBF, performance based funding
** Correlation is significant at the 0.01 level (2-tailed).
$P \leq 0.01$.

As shown in the table above, the correlations between the variables ranged from 0.453 to 0.615. All the variables were positively correlated with PBF mechanism implementation. The correlation between the

government objectives, level of understanding and autonomy (independent variables) with PBF mechanism implementation (dependent variable) was 0.615, 0.560, and 0.575 respectively which exceed 0.3. On the other hand, the correlations between each of the independent variables were less than 0.7. Therefore, the multicollinearity assumption is not violated and multiple regression analysis can be conducted.

In order to confirm the results obtained from the correlation analysis, tolerance and Variance Inflation Factor (VIF) values were used to further assess the multicollinearity assumption. Table 12 presents the result of the test of multicollinearity.

Table-12. Test of Multicollinearity.

Variable	Tolerance	VIF
Government objectives	0.704	1.420
Level of understanding	0.687	1.456
Autonomy	0.658	1.521

As seen in the table above, the tolerance values were greater than 0.1 for all variables. On the other hand, the values of VIF for all variables were less than 10. Therefore, both tolerance and VIF values were in the acceptable range and met the multicollinearity assumption. Subsequently, Table 13 shows the result of the multiple regression analysis.

Table-13. Result of multiple regression analysis.

Model	β coefficient[a]	Sig.
	Standardised	
Government objectives	0.369	0.000
Level of understanding	0.260	0.001
Autonomy	0.262	0.001
R^2	0.523	
Adjusted R^2	0.512	
F-statistic	47.606	
Sig. F	0.000	

Note: [a] Dependent variable: PBF Mechanism Implementation.

As indicated, the value of R^2 is equal to 0.523. It implied that 52.3 per cent of the variance in PBF mechanism implementation is explained by government objectives, level of understanding and autonomy, $F(3,130)=47.606$, $p<0.001$. The result also showed that each of the variables tested was significantly contributed to PBF mechanism implementation. By observing the beta value, government objectives reported the highest beta value ($\beta=0.369$, $p<0.001$), followed by autonomy ($\beta=0.262$, $p<0.05$) and level of understanding ($\beta=0.260$, $p<0.05$). Hence, it can be concluded that the results obtained support the hypothesis one to hypothesis three of the study.

5. Discussion

This study aims to examine the relationship between government objectives, level of understanding, autonomy and PBF mechanism implementation. Consistent with previous studies, government objective has proven to have a significant relationship with the PBF mechanism implementation where it usually acts as a strategic planning by the government to align the institutional objectives with government objectives (Ahmad, 2013a; Boer et al., 2015; Frølich et al., 2010; Hillman, Kelchen, & Goldrick-Rab, 2013). Besides, level of understanding has also proven itself to have a significant relationship with PBF mechanism implementation. As mentioned by Charoenkul and Siribanpitak (2012) human resource development is necessary to be applied to the staff in order to reduce the lack of understanding of staff on the funding system. Similarly, this was also supported by Herbst (2007) where three issues: (1) it is essential to have a clearer notion of what is the concept of PBF stands for; (2) it is necessary to distinguish the levels of resources allocation and the forms of funding; and (3) illustrative examples have to be presented by referring to the PBF implementation in other countries are needed to be clarified before implementing the PBF mechanism. Furthermore, autonomy also exhibited a significant relationship with PBF mechanism implementation. This result is in agreement with the previous finding of Dominicis et al. (2011) in examining the extent of financial autonomy affects the amount of competitive funding. The results showed that the applicability of PBF mechanism implementation will enhance by the autonomy given from the government where it granted the universities to manage the funding which respect to their daily financial operation (Sirat, 2010).

6. Conclusion

In conclusion, the results suggest that PBF mechanism can be implemented if and only if the three applicability drivers are included. There are government objectives, level of understanding and autonomy. However, the results also revealed that government objective is found to be the crucial component that contributes to the implementation of PBF mechanism in Malaysian public universities.

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