THE IMPACT OF GOVERNMENT FUNDING REFORMS ON THE STRATEGIC PLANNING OF MALAYSIAN PUBLIC UNIVERSITIES

Abd Rahman Ahmad

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DEDICATION

To

Ariah Alias,
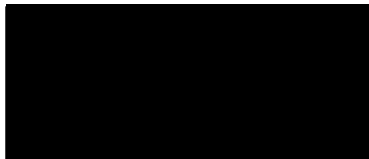
Afiqah Raidah & Afreen Raisha

DECLARATION

'I, Abd Rahman Ahmad, declare that the PhD thesis entitled *The Impact of Government Funding Reforms on the Strategic Planning of Malaysian Public Universities* is no more than 100,000 words in length including quotes and exclusive of tables, figures, appendices, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work'.

Signature   Date

ABD RAHMAN AHMAD   February 2013

PUBLICATIONS

Seminars

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Journals

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Ahmad, AR, Farley, A and Naidoo, M 2012 'The study of government–university relationship in Malaysian higher education system'. *International Education Studies*, vol. 5, no. 5.

Ahmad, AR, Farley, A and Naidoo, M 2012 **'**An examination of the implementation federal government strategic plans in Malaysian public universities' *International Journal of Business and Social Science,* vol. 3 no. 15.

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ABSTRACT

The purpose of this study was to investigate the shift in funding reforms at Malaysian public universities. Previous research has shown that shifts in new funding to public universities are more likely to result in a behavioural change at such institutions. This research used agency theory as a practical theoretical framework to analyse relationships between the principal (government) and the agents (public universities), and to predict the effects a change in government funding would have on teaching and research performance in institutions of higher education. In the context of Malaysia as a developing country, this theory has been used to establish a framework for determining the extent to which such institutions meet the Ministry of Higher Education objectives stated in the National Higher Education Strategic Plan beyond 2020. This research design employed a quantitative survey for major data collection, and subsequent qualitative focus group interviews to enable in-depth analysis of the survey findings.

In the data collection phase, a questionnaire was distributed to the Vice Chancellors/Rectors, Deputy Vice Chancellors/Deputy Rectors, Deans, Directors of Strategic Planning or the equivalent, and Heads of Bursar or equivalent, at all 20 Malaysian public universities. Statistical analysis suggests that the government funding reforms had a positive impact on strategic planning, research and development, teaching and learning, and achievement of government objectives. Findings from the quantitative data were then used to generate questions for the focus group interviews. These interviews were conducted at four Malaysian public universities according to university category, with two from Research/Apex Universities (one which has Apex status), one focused university, and one comprehensive university. Here, results obtained from the Apex University were combined with the research university to be known as Research/Apex Universities, to protect the identity of the Apex University. Data from these interviews were used to support findings from the major data collection.

Overall, this research has identified that agency theory can be applied in the context of government–university relationships. The Ministry of Higher Education approach to monitoring information, auditing and reporting helped to reduce the information asymmetry and goal conflicts. The results from this research have led to the provision of an understanding of the implementation of agency theory in the Malaysian higher education system, especially in the context of Malaysia as a developing country. More importantly, this study had provided further support to previous research studies conducted applying agency theory to explain the government funding reforms in the context of higher education system.

Finally, results from this study have provided theoretical, methodological and practical implications that might be applied in the study of government–university relationships. Based on the conclusion and implications discussed, this study presents several recommendations for future research.

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LIST OF ABBREVIATIONS

ANOVA	analysis of variance
Apex	Accelerated Programme for Excellence
BOD	Board of Directors
CAP	Critical Agenda Project
CU	Comprehensive University
DV	Dependent Variable
EPU	Economic Planning Unit
FU	Focused University
HECS	Higher Education Contribution Scheme
HEI	Higher Education Institution
HELP	Higher Education Loan Program
i-PMO	institutional Programme Management Office
IV	independent variable
KPI	key performance indicator
MBS	modified budgeting system
MoHE	Ministry of Higher Education
MyRA	Malaysian Research Assessment Instrument
NHERI	National Higher Education Research Institute
OBB	Outcome-based budgeting
OECD	Organisation for Economic Co-operation and Development
PASW	Predictive Analytic Software
PAT	principal agent theory
PBF	Performance-based funding
PMO	Programme Management Office
PMS	performance measurement system
PBS	Performance Budgeting System
PTPTN	National Higher Education Fund Corporation
QUAL	Qualitative
QUAN	Quantitative
R&D	research and development

RO	research objective
RQ	research question
RAU	Research/Apex University
RU	Research University
SETARA	System of Rating Malaysian Universities and University Colleges
SPSS	Statistical Package for Social Science
T&L	teaching and learning
UUCA	Universities and University Colleges Act
UIAM	Universiti Islam Antarabangsa Malaysia
UiTM	Universiti Teknologi Mara
UKM	Universiti Kebangsaan Malaysia
UM	Universiti Malaya
UMK	Universiti Malaysia Kelantan
UMP	Universiti Malaysia Pahang
UMS	Universiti Malaysia Sabah
UMT	Universiti Malaysia Terengganu
UniMAP	Universiti Malaysia Perlis
UNIMAS	Universiti Malaysia Sarawak
UniSZA	Universiti Sultan Zainal Abidin
UPM	Universiti Putra Malaysia
UPNM	Universiti Pertahanan Malaysia
UPSI	Universiti Pendidikan Sultan Idris
USM	Universiti Sains Malaysia
UTeM	Universiti Teknikal Malaysia Melaka
UTHM	Universiti Tun Hussein Onn Malaysia
UTM	Universiti Teknologi Malaysia
UUM	Universiti Utara Malaysia

CHAPTER 1

INTRODUCTION

1.1 Introduction

The Malaysian Government has introduced some extensive changes in its strategic planning for public universities in recent years in order to stimulate competition in the higher education sector and ensure that the industry follows the objectives set by the government (MoHE 2007b). Under the aegis of the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010, the government has introduced extensive reforms in its funding mechanisms for Higher Educational Institutions (HEIs). These reforms include a system of categorisation of public universities, encouraging income generation from commercial sources, utilising a method of competitive funding and funding cuts. These reforms seek to amplify the drive towards privatisation, performance and result-oriented funding already introduced by previous reforms like the launch of Outcome Based. In response, universities have been required to transform themselves in order to meet the challenges presented by these policies and align themselves with the objectives set by the government.

However, this process of accommodating and ushering in the funding reforms is complex because universities have to redesign themselves to achieve new goals, redefine staff roles and responsibilities, and reengineer their organisational processes (Rowley, Lujan & Dolence 1997). To optimise the impact of the funding changes, these reforms need to be successfully implemented. In addition, funding changes may also have some unforeseen effects that may have a negative impact on university performance. These policies may reduce access to resources and weaken teaching/learning and research outcomes in the universities.

This research investigates the effects of these funding reforms initiated by the Federal Government on public universities in Malaysia. It intends to determine whether the funding reforms have appeared to be leading to the desired changes in the universities. It examines whether the universities have incorporated the reforms as intended by the government. The study will use agency theory as a conceptual framework to explain the government university relationship. Agency theory elaborates the relationship between the authority that initiates the strategic plan as 'principal' and the institution supposed to incorporate the plan as 'agent'. This theory then interrogates failures in implementing plans from the principal to the agent by locating information asymmetries that occur because of incomplete information and goal conflicts that occur when the agent pursue a different objective than the ones mandated by the principal. It helps explain the dynamics of policy change and the relationship between the government and universities to highlight possible obstacles in the process of translating these reforms from strategy into operation.

This chapter presents the rationale leading to the funding of higher education in Malaysia. Following this, the research approach and outline of the thesis are discussed (see the chapter outline below).

Figure 1.1: Chapter Organisational Flow

1.1. Introduction	→	1.2. Research Background	→	1.3. Research Problem
1.4. The Conceptual Framework	→	1.5. Aims of the Study	→	1.6. Significance of the Study
1.7. Research Approach	→	1.8. Outline of the Thesis	→	1.9. Summary
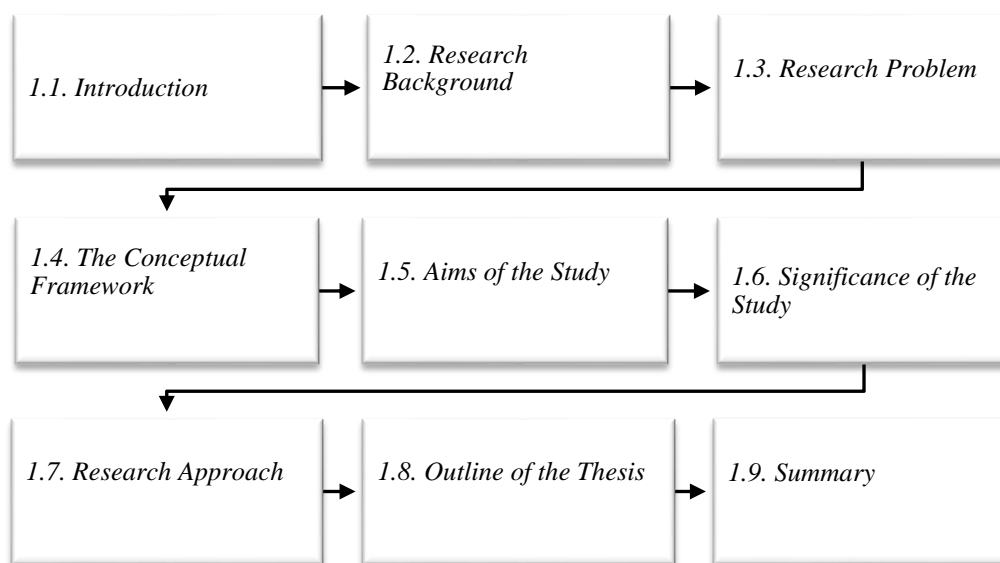
1.2 Research Background

In 2007, the MoHE introduced two policies—the National Higher Education Strategic Plan beyond 2020 and the National Higher Education Action Plan 2007–2010 (Country Report - Malaysia 2008; Sirat 2009a)—with the intention of fostering academic excellence and enhancing the quality of higher education in Malaysia. These policy changes in the national strategic plan can be seen as Malaysia's response to a host of issues relating to the betterment of research and teaching in the nation's HEIs (MoHE 2007a, 2007b). Further, with the intent to enhance the funding cost effectiveness of higher education in Malaysia, the government has also proposed that reform concentrated on: (1) strengthening industry and research collaboration; (2) providing greater autonomy to universities; and (3) strengthening their performance cultures in order to encourage teaching and research activities (EPU 2010a).

An important issue for HEIs in Malaysia is the global challenge posed by the internationalisation of higher education (Sirat 2009a). Changes in educational systems in today's competitive global environment have prompted several countries to restructure their resources for financing higher education to ensure they align with the overall government strategic planning (Johnstone 1998). The MoHE seeks to develop strategies and plans to ensure that HEIs in Malaysia are encouraged to undertake change and achieve excellence to face the competition posed by the global education market. The objective of these plans is to ensure that Malaysian universities achieve world-class status and operate as a hub for higher education in the Southeast Asia region (MoHE 2007a).

These plans also seek to establish HEIs as hubs for strategic development of human resources of the nation through higher education that can aid the growth of the economy by producing people who have advanced knowledge and competence. While tabling the Ninth Malaysian Plan in March 2006, Tun Abdullah Ahmad Badawi, the fifth Prime Minister of Malaysia stressed the importance of 'first-class human capital' in these words:

Development of quality human capital will be intensified. The approach must be holistic and emphasise the development of knowledge, skills, and intellectual capital in fields such as science, technology and entrepreneurship. Simultaneously, we must develop a culture that is progressive, coupled with high moral and ethical values. That is what meant by 'Human Capital with First-Class Mentality'.

Source: MoHE (2007a)

General academic excellence and human development in the nation constitute the basic orientation of these reforms but these plans are also accompanied by certain practical goals and reforms to revamp the funding mechanisms of HEIs in the country. Previous research has indicated that funding systems are one of the most important tools for policy change and strategic management of HEIs (Kettunen 2008; Rolfe 2003; Strehl, Reisinger & Kalatschan 2007a). According to Johnstone (1998), funding reform can intervene in situations such as: (1) expansion and diversification; (2) fiscal pressure; (3) market orientation; (4) demand for greater accountability; and (5) demand for greater quality and efficiency. Improved funding systems can stimulate strategic activities including staff development and improvements of structures, outcomes, activities and processes.

Given the complexity of the higher education industry and the competitive nature of the global education market, the traditional mode of funding higher education in Malaysia has become inadequate and an improved financing model for Malaysian universities was recommended by the World Bank/EPU (2007). The report identifies three strategies to diversify funding: (1) increased resources diversification and cost sharing; (2) balanced growth in university and non-university sub-sectors; and (3) incentives for private growth.

Prior to the reforms, funding and resource allocation mechanisms in Malaysia still depended on the traditional approach of negotiation between public universities and the MoHE with little monitoring of outcomes. A consulting body published a study in 2004 exploring the feasibility of introducing a transparent funding formula found out that a performance-based model as a funding model could save MoHE 10 to 30

per cent of the operating budget of the public universities resource (World Bank/EPU, 2007). It creates channels of finance flows to HEIs that are transparent, promote accountability in the expenditure of public funds, and ensure that the public receives better value for the money spent. Even though a modified budgeting system (MBS) of accountability and transparency of budget allocation (based on output-oriented mechanisms) was introduced by the Ministry of Finance (MoF) in 1997, in practice, this system was never implemented. The final budget allocation continued to be determined through negotiation without reliance on output measures (World Bank/EPU 2007). Therefore, the MoF has drawn up plans for outcome-based budgeting (OBB), which will be piloted in nominated ministries in 2012 and then implemented in all public sector agencies from 2013 (EPU 2010a; Ministry of Finance 2011). The shift to OBB is seen as a timely and crucial step to ensure optimal use of scarce resources to achieve stipulated goals and deliver better outcomes.

As the Prime Minister announced during tabling the Tenth Malaysian Plan, 2011–2015, the government also plans to implement the performance-based funding (PBF) that linked to SETARA—a system of rating Malaysian universities and university colleges. The system comprises of two components—fixed components (such as salary of faculties members and cost of utilities) and variable components (such as intellectual development in R&D and student co-curricular activities will be based on the SETARA performance rating)—which rewards performance and offers incentive for improvements (EPU 2010a). Further, it has generally been noted that students' enrolments, quality of teaching and learning (T&L), publications, research and development (R&D), patents and licences are some good indicators of performance while deciding funding allocations (Jongbloed & Vossensteyn 2001).

With the National Higher Education Plan beyond 2020, the MoHE has also formulated a policy wherein HEIs will have greater responsibility for sourcing and pursuing alternative funding. Almost all countries today rely on large-scale government funding to improve the quality of higher education (Roger 1995). In Malaysia, for example, funding to education is allocated according to the annual

budget, and an amount of RM50.2 billion was granted to the education sector in 2012 (Malaysian Treasury 2011). Ahmad Nurulazam et al. (2008) studied this change in policy and find that it is expected to generate funds from different sources so that the academic quality in teaching, development and equity of higher education can be developed without relying solely on government funding. This strategy is expected to create strategic linkages that help institutions to diversify their activities and commercialise their research. The Federal Government has allowed Malaysian public universities to form holding companies to carry out business activities and pursue strategies of commercialisation to generate their own income to compensate for the cuts in public funding (MoHE 2007a). Sato (2007) finds that Malaysian public universities are now moving away from government budget to self-funding and this has led to the delivery of better services and ability to generate more income. The Tenth Malaysian Plan document also states that it has seen positive responses to some initial reforms and the government will now reduce the proportion of funding to universities (EPU 2010a).

Employability and commercialisation are significant issues for public universities in Malaysia. Albrecht and Ziderman (1992) point out the need for developing countries to provide effective policies for funding mechanisms in order to stabilise the supply of resources and create links between subsidies and higher education admissions. They stated that funding access could be achieved by establishing funding formulas and linking them to access to the labour market. Therefore, they need to diversify activities of R&D, consultancy, entrepreneurship, patenting, and commercialisation to generate returns for resource funding. In addition, the alternative source of income could be generate from international students since the fees charged to them is higher compared to the local students (Sirat 2009b). For public universities, increasing the tuition fees for local students is beyond their authority since it has been controlled and required approved by the National Council on Higher Education (Lee 1999, 2004). Therefore, strengthening the networks and internationalisation is one of the strategies for the universities to generate additional income.

Further, the MoHE has also introduced a system of categorisation of Malaysian public universities to determine the area and level of fund allocation according to the specialisation of the university and the extent of its operations. Currently, there are about 20 public universities in the country that operate with funding support and subsidies from the Malaysian Government. They have now been categorised into three main groups: Research/Apex University (RAU), Comprehensive University (CU) and Focused University (FU). RAUs have been allocated additional funding of RM50 million every year in order to support their R&D activities while CUs and FUs that offer learning courses for all levels of tertiary education are given funds according to their needs (MoHE 2007a).

It has been suggested that when the funding system changes, there is a need to measure the impact of the new system (Frølich, Schmidt & Rosa 2010). A good monitoring system can help enhance the government's capacity to assess efficient management of resources, assist in eliminating redundancy of programs and projects and ensure that the nation's resources are allocated proportionately to its priorities (EPU 2010a; Noore Alam 2010). In the new policies, public universities in Malaysia have been advised to develop strategies for allocating resources according to teaching and research priorities in accordance with the government objectives and following closely coordinated actions that are oriented towards the delivery of strategic outcomes in T&L and R&D (World Bank/EPU 2007). The Minister of Higher Education Y. Bhg. Datuk Seri Mohamed Khalid Nordin introduced a policy of using key performance indicators (KPIs) as a mechanism to decide the funding level for public universities (Utusan Malaysia 2010c). The monitoring and auditing procedures have become more regular and systematic to ensure that the universities are addressing the government objectives and there is a proper flow of information between the universities and the government. In addition, the private HEIs are non-government aided and recognised under the enactment of the Private Higher Education Institutions Act 1996, Education Act 1961 and UUCA amendment to the 1971. However, even though they comprise the bulk of higher education in Malaysia, the private HEIs rely on individual resources, and funding reforms proposed by the Malaysian Federal Government do not apply to them.

According to these strategic plans, the MoHE is also committed to giving more autonomy to universities. It is hoped that increased autonomy will give Malaysian public universities more competitive advantages, creativity and independence, and decrease their reliance on the government (Berita Harian 2010a). Schiller and Liefner (2006) have argued that although similarities exist in the HEI funding of developed countries, universities in developing countries receive strong funding support but also experience the extreme politicisation of their environments (Jongbloed 2000b). In Malaysia, for example, the results of a 2003 Organisation for Economic Co-operation and Development (OECD) study show that Malaysian public universities have much less management autonomy than other OECD countries (World Bank/EPU 2007).

To conclude, these strategic plans have introduced the most extensive change in the administration of public universities in Malaysia including the funding reforms in order to achieve improved performance, greater autonomy, better accountability and governance, employability, marketability and internationalisation of higher education in Malaysia (MoHE 2007b).

1.3   Research Problem

Previous research has shown that the shifts to new funding mechanisms for public universities are likely to change the universities' behaviour (Kivistö 2008; Schiller & Liefner 2006). Echoing this view, Jongbloed (2008a) added that funding is not only about the mechanism to allocate the resources. It also plays a more holistic role as a tool that enforces common goals set for higher education by the principal in order for the agents to maximise the output with limited resources. In response to these strategies, HEIs are needed to implement funding policies that are in alignment with government objectives. However, these changes require reform before they can be successfully implemented. As Rowley, Lujan and Dolence (1997) suggest, universities need to transform themselves in order to meet the challenges presented by these policies by realigning their organisations with the environment, redesigning

themselves to achieve new goals, redefining staff roles and responsibilities, and reengineering their organisational processes.

Although the push to diversify funding for higher education has proven successful in many developed countries (for example, the United States [US], United Kingdom [UK], Finland, Canada, Australia), Schiller and Liefner (2006) argue that since developing countries such as Malaysia have different political, economic and educational systems, they need to develop models that are appropriate to the country's educational structure. Therefore, the budget allocation and expenses for development and operation should support universities' growth in the future. Further, Strehl, Reisinger and Kalatschan (2007a) point out that implementation of a new system requires support from all university communities and stakeholders to ensure its success. As funding is an essential part of the strategic management process, the government, universities and other stakeholders must be involved in the plan.

The introduction of these funding reforms has also led to some problems. Recently, the development and operational budget expenditure for all public institutions has been affected negatively by the tight budget allocated by the MoHE (Mokhtar Nawawi & Azizan Asmuni 2003). This deficit is due to the increasing number of HEIs and government initiatives upgrading the status of 27 institutes and colleges to university level (Hamzah 2009). In a case of downward trend in funding resources from government and the increasing operating cost per student, it is feared that the quality of teaching and research in HEIs may weaken.

This thesis attempts to measure and explain the impact of changes in government funding on achieving the government objectives in higher education. In light of the objectives set by the government, the funding policy is concerned with better accountability in managing public funds and universities are required to be proactive in adapting to these requirements. This funding change is expected to have an impact on universities' strategic outcomes in T&L as well as in R&D. HEIs are also required to balance their roles and activities in line with government objectives. Thus, this study highlights the issues of goal conflicts and information asymmetries in the

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funding for public HEIs in Malaysia and its impact on the strategic planning, R&D and T&L activities of the Malaysian public universities.

With the purpose of assessing the achievement of these objectives, this study seeks to answer the following research questions (RQs).

Research Question One

Have changes in the Malaysian Federal Government funding altered the approach in strategic planning of public universities in Malaysia through reductions in goal conflict and/or information asymmetry?

Research Question Two

Have changes in the Malaysian Federal Government funding altered the approach to R&D in Malaysian public universities through reductions in goal conflict and/or information asymmetry?

Research Question Three

Have changes in the Federal Government funding altered the approach to T&L in Malaysian public universities through reductions in goal conflict and/or information asymmetry?

Research Question Four

Do the results for RQs (1), (2) and (3) vary across the Malaysian public universities sector (RAUs, FUs and CUs)?

Research Question Five

Has the change in the Federal Government funding contributed to the achievement of the government objectives stated in the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010 through reductions in goal conflict and/or information asymmetry?

1.4   The Conceptual Framework

There are many theories used for analysing issues relating to the subjects of initiating change in strategic policy and the relationship between the government and universities. Recent literature shows that agency theory has emerged as a useful and important theoretical framework in the discipline of strategic management (Kim & Mahoney 2005) and in empirical research on policy change in higher education (Kivistö 2005; Lane, JE & Kivistö 2008; Liefner 2003; Rungfamai 2008; Schiller & Liefner 2006). Focusing on the processes and problems of initiating policy change from the principal to the agent, it examines organisational thinking and behaviour of the agent and the relationship between the agent and principal to highlight goal conflicts and information asymmetries (Rungfamai 2008). According to this theory, information asymmetries occur because information about the activity has not been communicated properly from the agent to the principal and the agent possesses more information about the task assigned. Meanwhile, goal conflicts happen when the agent and principal have different objectives and the agent undertakes a different course of action than the one desired by the principal (Kivistö 2005). Taken together, information asymmetry and goal conflict constitute the *agency problem*—the possibility of opportunistic behaviour on the part of the agent (universities) that works against the welfare of the principal (government). According to Rungfamai (2008), the relationship between government and university is crucial in influencing the outputs of educational policy of the government as well as the university productivity. In such circumstances, it becomes difficult for the principal to monitor the actions taken by agents (Lane, JE & Kivistö 2008; Milgrom & Roberts 1992). As a result, the resources and funds allocated for the activity are not effectively utilised by the agent and the results are inconsistent with the desired outcomes of the principal. Leruth and Paul (2006) added that the important element of any agency theory is to specify any observable that is the main element of the contract.

Agency theory focuses on the central question of how the principal can control the agent in a context of information asymmetry and goal conflict. Since universities are complex organisations and their activities are difficult to monitor, Liefner (2003) suggested that the government can link funding to performance and the principal

(government) can allocate funding based on the agent's (university) performance and at the same time reduce unsuccessful activities. As a result, with the implementation of performance-based resource allocation, less motivated agents feel the need to work harder according to the goals set by the principal, while successful agents will be more motivated with incentive for performing the task (Liefner 2003).

Figure 1.2: The Conceptual Framework
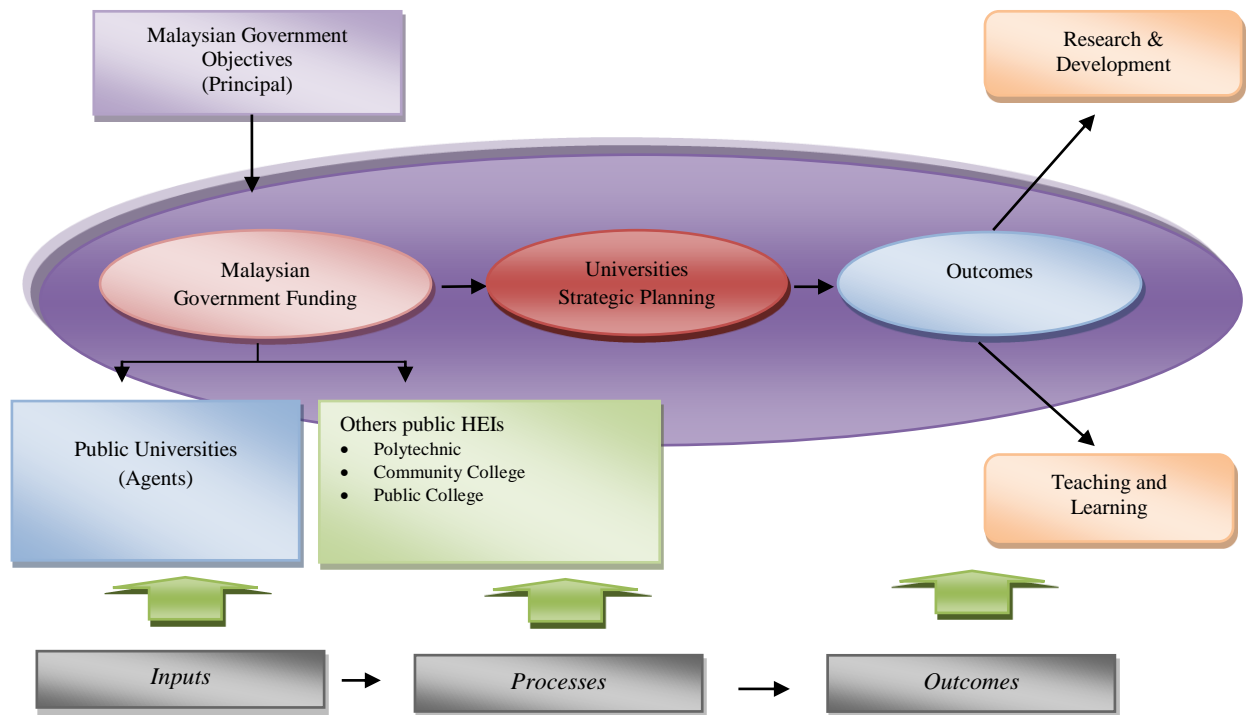
Source: Adapted from Bonaccorsi and Daraio (2007); Caraça, Conceição and Heitor (1998); Layzell (1998); Liefner (2003); Mace (1995); Oyo, Williams and Barendsen (2008); Schiller and Liefner (2006).

This research intends to use agency theory as a framework to study the relationship between government and public universities in Malaysia to identity and alleviate goal conflicts or information symmetries in the implementation of the National Higher Education Strategic Plan beyond 2020 and National Higher Education Plan 2007–2010. Previous research has also used agency theory with success in non-western

countries. Although agency theory has been used in a study on some public companies in Malaysia (Mazlina & Ayoib Che 2011), the research indicates that the theory is compatible with cultural, political and social conditions in Malaysia and can be used for future research. Agency theory needs more empirical research and testing in order to be a more reliable and useful tool in higher education research for analysing and developing an understanding of the relationship between the government and public funded universities (Kivistö 2005). This study develops a conceptual framework (see Figure 1.2) for studying the impact of changes in government funding to Malaysian public universities by drawing on previous research (Bonaccorsi & Daraio 2007; Caraça, Conceição & Heitor 1998; Layzell 1998; Liefner 2003; Mace 1995; Oyo, Williams & Barendsen 2008; Schiller & Liefner 2006).

Agency theory is particularly appropriate for this study because it is a pioneering theory designed specifically to address issues of strategic management relating to funding allocation and monitoring and has made a significant contribution to the literature on this subject. According to Auranen and Nieminen (2010), the major rationale for the shift of public policies towards being increasingly output-oriented and the use of external competitive funding mechanisms is the core theme for the principal agent theory (PAT) dilemma. Agency theory is also useful for examining the relationship between the government and HEIs and the shifts in this relationship when changes are introduced in funding mechanisms (Gomez-Mejia, Tosi & Hinkin 1987; Hill & Snell 1989; Hoskisson, Johnson & Moesel 1994; Kim & Mahoney 2005). Schiller and Liefner (2006) point out that agency theory is particularly useful for the study of the impact of funding reform in developing countries where government is the principal and HEIs the agent. Agency theory is appropriate to study the control relationship between government (the principal) and public universities (the agents) when it contains the following three elements: (1) tasks that government delegates to a university; (2) resources that government allocates to a university for accomplishment of the tasks; and (3) government has an interest in governing the accomplishment of the tasks (Kivistö 2005; Schiller & Liefner 2006; Verhoest 2005).

1.5   Aims of the Study

The main objective of this study is to assess whether the reforms in funding for public universities have facilitated the prioritisation of government objectives within the sector. This question is examined through the lens of agency theory, which examines the relationship between agent and principal to facilitate a reduction in goal conflict and/or information asymmetry. The study seeks to measure:

i.   If changes in government funding for public universities in Malaysia have made an impact on the strategic planning of these universities by assessing if there is a reduction in goal conflict and/or information asymmetry;

ii.   If changes in government funding for public universities in Malaysia have made an impact on their approaches to R&D by assessing if there is a reduction in goal conflict and/or information asymmetry;

iii. If changes in government funding for public universities in Malaysia have made an impact on their approaches to T&L by assessing if there is a reduction in goal conflict and/or information asymmetry;

iv.   The differences in the impact of these changes outline in (i), (ii) and (iii) across the different types of universities across the Malaysian public university sector (FUs, RAUs and CUs); and

v.   The role that the funding reforms have played in achieving the government objectives stated in the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010 by reducing goal conflict and information asymmetry.

1.6   Significance of the Study

This study investigates the applicability of agency theory to the university sector. Kivistö (2007) points out that there is increased scholarly interest in viewing the government–university relationship in the light of agency theory for understanding the dynamic between government control and university accountability. Agency

theory seeks to explain the relationship between a principal (government) and agent (university) for investigating the role of individual and organisational interest, information flows, and incentives in higher education (Kivistö 2005; Liefner 2003; Schiller & Liefner 2007). The findings of this research will contribute to knowledge related to the relationship between a government and publicly funded universities and elucidate the role of funding in that relationship. This research provides an assessment of the effectiveness and efficiency of using a government funding model to facilitate the prioritisation of government objectives in public universities, particularly in developing countries.

Secondly, this research leads to the development of instruments involved in conducting a research study for assessing changes that occur to R&D, T&L and strategic planning in Malaysian public universities through the reduction in goal conflict and information asymmetry. Empirical data will be collected using a questionnaire and focus group interviews to identify information related to the research problem. The mixed-methods triangulation approach will be used to enhance the validity of the research findings (Bazeley 2008; Creswell 2003; Creswell & Plano Clark 2007). Findings from previous research studies show that a combination of qualitative and quantitative methods are useful for investigating issues related to higher education funding (Liefner 2003; Schiller & Liefner 2006; Bonaccorsi & Daraio 2007).

Finally, this research also adds to academic knowledge in relation to the operation of the Malaysian university sector. This is particularly urgent for the overall economic growth and social stability of the nation. As Kretovics and Michaels (2007a) note, higher education is critical to socio-political and economic issues. This study enhances understanding of the different components of the Malaysian public university sector and their response to change in the Malaysian Federal Government funding models.

1.7   Research Approach

In order to achieve the aims of this study, a mixed methodology utilising both questionnaires and focus group interviews has been adopted. The population of this research comprises 20 Malaysian public universities with respondents including Vice Chancellors/Rectors, Deputy Vice Chancellors/Deputy Rectors, Deans, Director of Strategic Planning or equivalent, and Head of Bursar Office or equivalent. The questionnaire design includes closed-ended questions with seven-point Likert scales ranging from 1 = strongly disagree to 7 = strongly agree and 1 = well below 2009 national average to 7 = well above 2009 national average. Following this, questions for focus group interviews were established based on the data from the questionnaire results. Here, the sequential data analysis procedures were adopted where the quantitative and qualitative data analysis were analysed separately (Creswell & Plano Clark 2007). Upon completion of data analysis from both the quantitative and qualitative methods, a matrix method was employed to identify categories or themes to find the differences and similarities. This process helped the researcher develop a better understanding of the variables in the consensus matrix showing the ideas and concepts.

1.8   Outline of the Thesis

The purpose of this section is to briefly outline the organisation of the thesis, as depicted in Figure 1.3.

Chapter 1
Introduction

The first chapter presents the introduction of the research with a clear background addressing the main issues resulting from the impact of changes in government funding on the strategic planning of the Malaysian public universities. Following this, the literature review of Chapters 2, 3 and 4 provides a basis for thesis.

Figure 1.3: Outline of the Thesis

Chapter 1:		Chapter 2:
Introduction	⟷	Agency Theory

Chapter 3:

Strategic Planning and Funding Higher Education

Chapter 4:

Higher Education System in Malaysia

Literature Review

Chapter 5:

Research Design and Methodology

Chapter 6:		Chapter 7:
Results I: Quantitative Analysis	→	Results II: Qualitative Analysis

Chapter 8:

Discussion and Conclusion
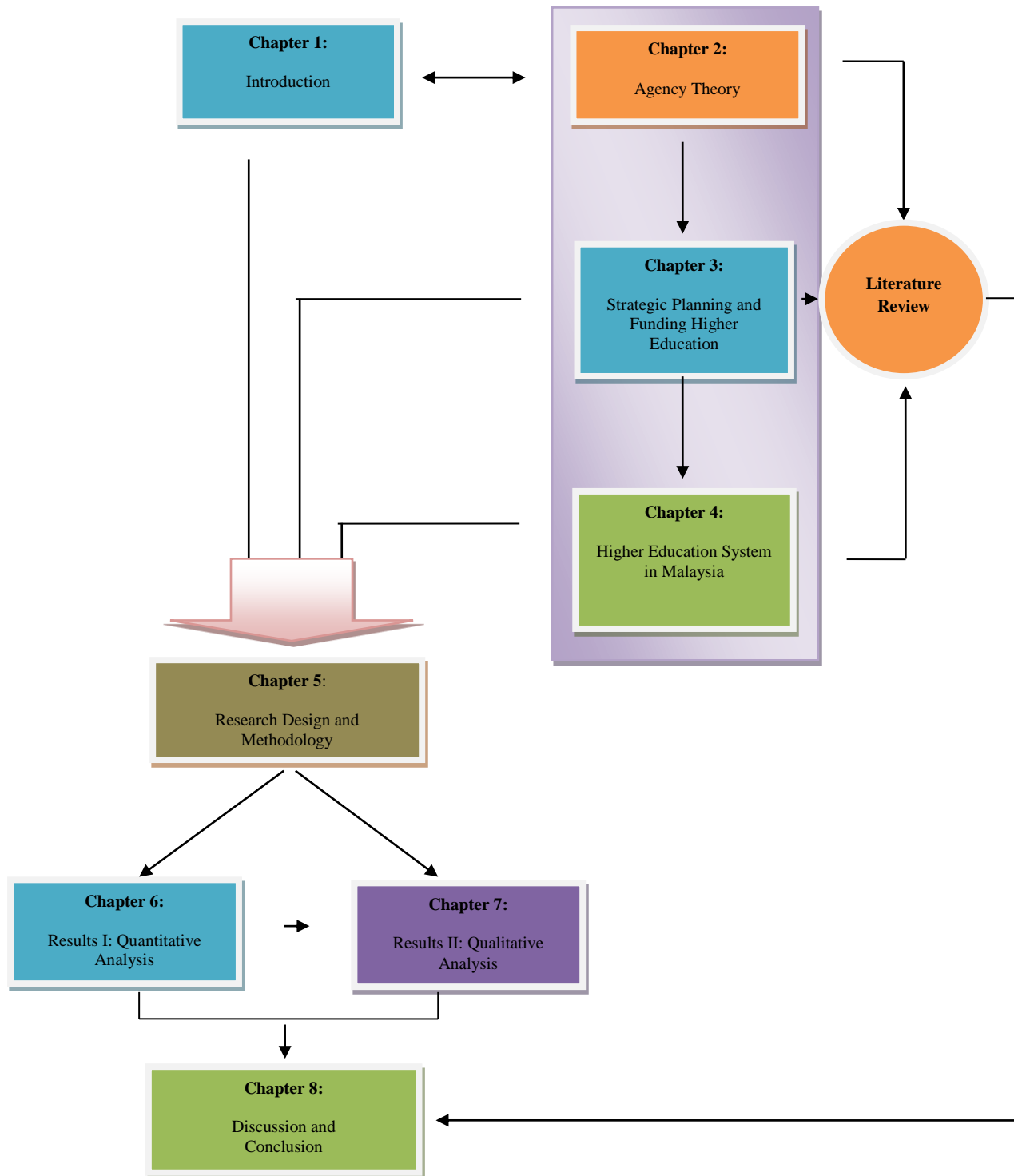
Chapter 2

Agency Theory

The literature review begins with an analysis of PAT or agency theory used in this study. This theory is used to examine the government–university relationship on changes in Malaysian Federal Government funding through reductions in goal conflict and/or information asymmetry in Malaysian public universities.

Chapter 3

Strategic Planning and Funding Higher Education

This chapter analyses the strategic planning and its implementation in the context of HEIs. It also covers the literature on funding methods and their implementation in higher education in developed and developing countries.

Chapter 4

Higher Education System in Malaysia

This fourth chapter reviews literature related to HEIs in Malaysia and discusses the policies and methods used in funding and the Malaysian Federal Government strategic plan intended to assist in transforming higher education in Malaysia to world-class status.

Chapter 5

Research Design and Methodology

This chapter describes the mixed methodology of questionnaire and focus group interviews used to collect data for this research. It also describes the data analysis strategies of statistics and focus group interviews to support data findings from the questionnaire.

Chapter 6

Results I—Quantitative Analysis

Using the methodology outlined in Chapter 5, this chapter presents the findings from the questionnaire. Data are analysed using descriptive and inferential statistic to answer the RQs.

Chapter 7

Results II—Qualitative Analysis

Analysis of focus group results are presented in detail in this chapter. The strategies used to analyse focus group interviews from Miles and Huberman (1994) is adopted in this study. Data are analysed according to coding and themes drawing from the five RQs.

Chapter 8

Discussion and conclusion

This chapter discusses and interprets the data findings in relation to the study with the main aim being to compare and contrast data findings from the questionnaire and focus group interviews. The final section ends with presentation of summary and conclusion of the thesis with a review of overall key findings, limitations of the study, research implications and recommendations of future research.

1.9   Summary

The Malaysian Higher Education Strategic Plan beyond 2020 represents a serious endeavour by the MoHE to transform the higher education system in Malaysia. The blueprint of this plan has been released to ensure that Malaysian public universities become more creative and innovative, and embark on new directions to achieve world-class status as a hub for higher education in a challenging international environment. The government has also directed Malaysian public universities to implement the funding changes in order to ensure that all stakeholders obtain the benefit from the improved performance, accountability and autonomy.

CHAPTER 2

AGENCY THEORY

2.1   Introduction

Under the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010, the MoHE has launched a strategic plan for universities to follow established government objectives and make public universities more dynamic, competitive and productive. Public universities must follow these government strategic plans through closely coordinated actions to achieve strategic outcomes in T&L and R&D. This chapter presents a literature review discussing the general aspects of agency theory, its relevance to the study of the government–university relationship and a survey of previous studies that have utilised this theory. It begins with a review of scholarly literature explaining the concept of agency theory, its theoretical framework and its underlying assumptions. Next, it discusses the applicability of this theory and how it has proved to be an appropriate framework for analysing the relationship between both government and universities and the role of funding mechanisms in that relationship. More specifically, it elaborates the aspects of agency theory that make it suitable for this study. The chapter also reviews previous research that has successfully used this theory (see the chapter outline below).

Figure 2.1: Chapter Organisational Flow


```
┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐
│                  │   │                  │   │ 2.3. Assumptions │
│ 2.1. Introduction│──▶│ 2.2. A Review of │──▶│ Underlying Agency-│
│                  │   │ Agency Theory    │   │ Principal        │
│                  │   │                  │   │ Relationship     │
└──────────────────┘   └──────────────────┘   └──────────────────┘
         │                                              │
         ▼                                              │
┌──────────────────┐   ┌──────────────────┐   ┌──────────────────┐
│                  │   │ 2.5. Suggestions to│ │ 2.6. Applicability of│
│ 2.4. Agency      │──▶│ Rectify Government -│▶│ Agency Theory to │
│ Problem          │   │ HEI Agency Problem │ │ Government - HEI │
│                  │   │                  │   │ Problem and Present│
│                  │   │                  │   │ Study            │
└──────────────────┘   └──────────────────┘   └──────────────────┘
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│ 2.7. Summary     │
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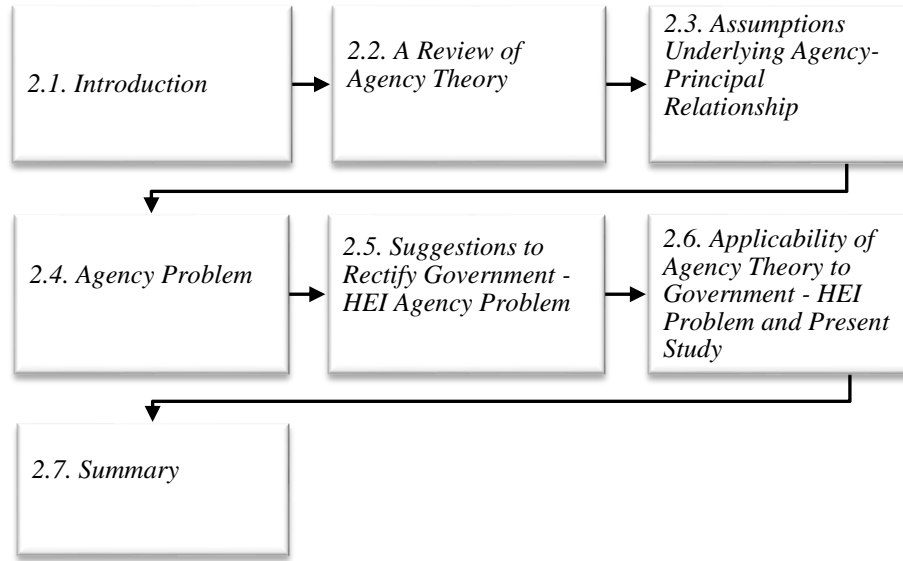
2.2 A Review of Agency Theory

Agency theory was first developed by Jensen and Meckling (1976, p. 308), who defined it in the following words:

> A contract under which one or more persons (the principal) engage another person (agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent.

Eisenhardt (1989) explains that agency theory attempts to describe the relationship between principal and agent using the metaphor of a contract. The theory sets out to examine if the contractual agreement between principal and agent is followed through and the agents take the necessary actions to produce outcomes (see Figure 2.2) expected by the principal (Moe 1984; Waterman & Meier 1998). The contract is based on the premise that the agent possesses the skills, information, qualifications, experience and abilities to perform the outlined tasks and produce good outcomes for the principal (Bendor, Glazer & Hammond 2001; Kivistö 2008).

Figure 2.2: Principal–Agent Relationship

Moral Hazard

Principal

Informational
asymmetries &
goal conflicts

Agent

Adverse Selection

Principals expect good
outcomes from the
relationship

Agents have the advantages
of:
- skill
- information
- qualifications
- experience
- abilities
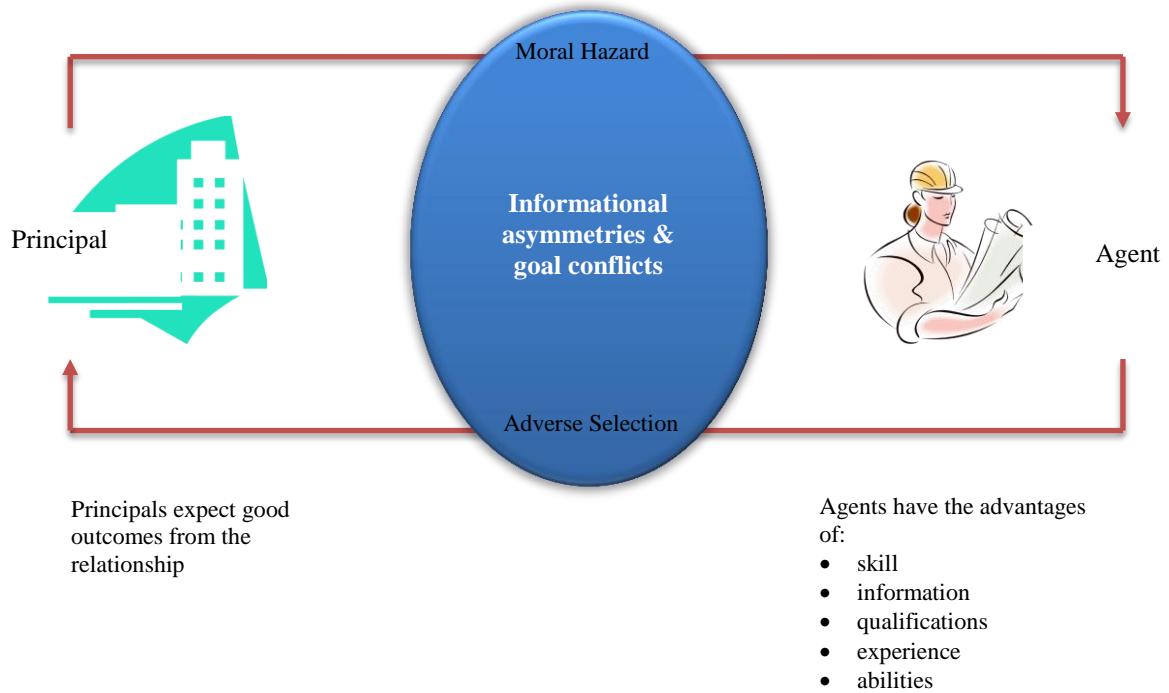
Source: Modified from Bendor, Glazer and Hammond (2001) and Kivistö (2008)

Kivistö (2008) adds that there are different variants of this relationship ranging from *single-principal-single-agent* to *multiple-principal-single-agent* or *single-principal-multiple-agent*. As their respective titles suggest, *single-principal-single-agent* focuses on one principal and one agent, *multiple-principal-single-agent* allows multiple agents to direct a single agent in different areas and *single-principal-multiple-agent* refers to a scenario in which one principal is directing many agents. Of the three situations, the second scenario is most traditionally used in state-run operations in which a single unit is controlled by various actors. For example, the Ministry of Finance and Ministry of Higher Education may jointly control public HEIs, albeit in different aspects of its operation relevant to their specialisation and jurisdiction.

Strehl, Reisinger and Kalatschan (2007a) highlight seven components of the theory that are applicable to studies exploring New Public Management: governance, New Institutional Economics, strategy, marketing, resource allocation mechanisms and

organisation behaviour. New Institutional Economics or Economic Institutional Analysis is of fundamental importance to this study because it attempts to analyse the social, economic and political phenomena occurring within the institution under observation through three main concepts: principal–agent theory (PAT) or agency theory, the theory of property rights and the theory of transaction costs (Furubotn & Richter 2005; Ménard 2008; Menard & Shirley 2005). Although this theory was initially focused on the relationship between individuals, there is evidence that it is equally relevant for the study of groups and organisations (Kivistö 2005).

According to Eisenhardt (1989), agency theory is applicable in a variety of settings ranging from the macro level to the micro level. Kivistö (2005) has also pointed out that this theory is not and has never been exclusively linked with any particular field of research. Agency theory has been applied in a wide variety of fields, for example, in relationships between patient and doctor, defendant and lawyer, landlord and tenant, and employer and employee. According to Klein (1998), this theory is often applied in various academic fields ranging from economics, law, organisation theory, political science, sociology and anthropology. However, the original and most significant contribution of PAT or agency theory was in the field of economics (Coase 1998; Williamson 1985) because it helps to assess the difficulties associated with the interaction between the principal and agent to accomplish a specific task (Rauchhaus 2009).

Over the course of time, this theory has been developed further and eventually split into two main branches: positivist agency theory and principal agency theory. Eisenhardt (1989) explains that while both these streams share the same focus on the agent–principal relationship and share common assumptions about people, organisations, and information, positivist agency theory research is less mathematical than PAT research (Eisenhardt 1989; Rungfamai 2008). Further, Kivistö (2007) explains that the positivist scholars focus their attention on conflict of goals to examine how governance mechanisms can limit the agent's self-serving behaviour.

2.3   Assumptions Underlying Agency-Principal Relationship

Agency theory extrapolates the relationship between the principal and agent and the problems encountered therein in the terminology of goal conflicts and information asymmetries. These two concepts form the crux of agency theory and Kivistö (2007, p. 17) explains the two in the following terms.

Informational asymmetries occur when 'the agent possesses more or better information about the details of the individual task assigned to him, his own action, abilities, and preferences compared to the principal'.

Goal conflicts occur in 'a situation where the principal's and agent's desires and interests concerning certain ends are in conflict with each other and that, they would therefore prefer different courses of action'.

These two concepts are the fundamental assumptions of agency theory and structure the way it perceives and explains the problems in governance and management. The context of informational asymmetries and goal conflicts are discussed in detail in the following section. The purpose of this discussion is to gain further clarification and understanding about the key ideas of the theory so that they may assist in the conceptualising framework for study regarding the objectives between the Federal Government and HEIs in Malaysia as principal and agent.

2.3.1   Informational asymmetries

Informational asymmetries relate to the efficacy of information flow and interaction between the principal and the agent in performing a specific task. The problem of efficiently disseminating or gathering accurate information can hardly be avoided in everyday practice. Normally, such information asymmetries occur because most often agents have access to superior and detailed information about the delegated tasks, operational realities and outcomes in contrast to the principal. As a consequence, the principal not only lacks full access to the information, in case the agents stand to gain from it, they may perpetuate this situation by hiding certain information from the principal (Perrow 1993). Saam (2007) further explains that

informational asymmetries occur because the principal cannot observe the competencies, intentions, knowledge and actions of the agents. Additionally, principals may be required to take expensive and laborious steps to obtain access to the hidden information in a situation. Saam describes various situations of informational asymmetry in which the principal does not have access to accurate information:

Hidden characteristics. This occurs when the information gathered by the principal regarding the agent's qualification is incomplete.

Hidden intentions. This situation occurs when agent secretly act to serve their own intentions without the knowledge of the principal even after signing a contract with the principal.

Hidden knowledge or hidden information. This problem arises before the principal enters into a contract with the agent, and involves situations in which private knowledge is available to the agent and not to the principal (Bergen, Dutta & Walker Jr 1992).

Hidden action. This problem occurs when the agent take a different a course of action than the one stipulated in the original contract even after entering into a signed agreement with the principal.

According to Vetschera (1998), the amount and quality of information given to the principal exerts a significant amount of influence on the way in which it controls the behaviour of its agents. Vetschera shows that with relatively inaccurate or minimal information the principal's capacity to influence agent behaviour is restricted and when the principal has access to more information it can influence the agent's behaviour to suit the set agenda. All this highlights that information asymmetries exist and they are relatively difficult to rectify.

2.3.2   Goal conflicts

Goals conflicts happen when the agent has different goals to the ones set by the principal in the contract. It is assumed that goal conflicts arise in the process of delegating authority from principal to agent (Alvarez & Hall 2006). With the instrument of the contract, the principal restricts the agent's actions to the defined goals and reduces other tasks that run contrary to these goals. However, the agent may engage in hidden actions that hinder the goals outlined in the contract (Eisenhardt 1989). It is generally accepted that goal conflicts constitute the main reason behind problems in the agent–principal relationship (Mahaney & Lederer 1999). Shapiro (2005) also explains that goal conflicts are the main focus of the classic agency paradigm because it seeks to identify when the agent departs from the interests of the principal.

2.3.3   Other assumptions underlying agency relationship

Agency theory is also based on several other behavioural assumptions concerning the principal, the agent and the agency relationship (Kivistö 2007). These are summarised in the table below.

Table 2.1: Summary of Assumptions Underlying Agency Theory

Assumption	Explanation
Self-interested actors	• The individual is a rational, self-interested actor who only wants to maximise their own preferences (Judith 2002).
Utlility maximisers	• Both economics and political science PAT consider the principal and the agent as self-interested utility maximisers (Lane, JE & Kivistö 2008) • This assumption is important for a mathematical approach that oriented the principal–agent researchers that are based on logic and proof (Kivistö 2007; Rungfamai 2008)
Risk preferences	• Degree of an actor's preference for adventure over security (Kivistö 2007) • Risk preferences are part of the self-interest aspect (Fama & Jenson 1983) • Occurs in situations where the principal and agent have different attitudes to the risk associated with the action taken (Wiseman & Gomez-Mejia 1998)
Types	• One of the most important and generally accepted assumption is that the agents differ according to their types (Kivistö 2007) • Kivisto further explain that the types could be refer to whether the agent is 'careful versus careless', 'trustworth versus untrustworth', and 'industrious versus untalented'

Assumption	Explanation
Bounded rationality	• Is an effect of the constraints of incomplete information between the principal and agent to solve the problem (Michael 1994) • Positive agency theory literature shares this assumption with transaction cost theory (Kivistö 2007)
Rational actors	• A rational actor is one who can identify what he or she wants, is capable of ordering those wants from most preferred to least preferred, and acts in ways that he or she believes will maximise satisfaction of preferences (Albanese, Dacin & Harris 1997)

2.4 Agency Problem

Due to informational asymmetries and goal conflicts, the inadequate information and conflict of interests between the agent and the principal can lead to two agency problems known as *moral hazard* and *adverse selection* (Braun & Guston 2003; Kivistö 2008; Waterman & Meier 1998). Adverse selection occurs when the principal is incapable of obtaining sufficient information about the background, motivation and capabilities of the agent prior to entering the contract (Perrow 1993). In circumstances of adverse selection, there is increased chances of goal conflicts because agents whose information is not fully known to the principal may be induced to act in their own private interests while using money from the principal (Harrison & Harrell 1993). *Moral hazard* occurs when both parties enter into a contract to achieve some goals but since it is difficult in reality for the principal to closely monitor the activities of the agents and measure the outcomes, there is a moral hazard of the commitment not being fulfilled (Moe 1984). Moreover, Darrough and Stoughton (1986) describes moral hazard as a situation in which the action undertaken by the agent is not only unobservable it also has a different value for the agent and the principal. These problems, according to Braun and Guston (2003),

result from what New Institutional Economics calls the 'opportunisms' of actors since actors act in self-interest and seek to maximise their personal welfare.

2.4.1 Agency problem in the context of the government–higher education institution relationship

In the context of modern higher education, governments have made dramatic changes to the size, structure, funding arrangements and focus of HEIs so that they can better address public demand and compete as profitable organisations in the global market (Ansell 2008; Jongbloed 2000b; Jongbloed & Vossensteyn 2001). In today's competitive market and its emphasis on productivity, the government now demands that HEIs are economically productive and fulfil the goals outlined in the government's strategic plan (Lane, JE & Kivistö 2008). Since the government provides HEIs with funding from the taxpayer money, it also demands that the HEI agents produce a certain level of output beneficial to the public and make information available to the public (Leruth, L, Paul & Premchand 2006). There are various issues from autonomy, accountability, governance, market pressure to lack of funds that have become central in the discussion of the government–HEI relationship (Kivistö 2005, 2008; Lane, JE & Kivistö 2008).

Kivistö (2005, p. 11) notes that '*the long but still ongoing 'love hate-relationship' bounding governments and HEIs together is complex and it has multiple dimensions'*. Jacobs and Van Der Ploeg (2006) argue that information asymmetries and goal conflicts resulting from agency problems in higher education can be found in funding arrangements, governance structures, students selection, appointment of academic staff, and other regulations. Higher education is currently experiencing demands to synchronise their strategic goals and activities with the government objectives and increase the quality of teaching and research (Kettunen 2006).

Over time, governments all over the world have provided large amounts of public funds to institutions (Birdsall 1996; Sanyal & Martin 2009). While governments form the main source of funding for HEIs, such funding and subsidies from the government can frequently produce unwanted side effects. This unfortunate situation

may occur in several forms such as mismanagement of resources allocation, excessive registration of unmotivated students and perverse redistribution of incomes. Indeed, inefficient government funding methods for higher education may lead to grade inflation, monopolistic practices and the inefficient management of universities (Jacobs & Van Der Ploeg 2006). Gautier and Wauthy (2007) state that it is difficult to evaluate the quality of teaching and research exactly. Kivistö & Hölttä (2008) have also pointed out that in practice it is difficult for stakeholders to recognise the real difference that exists between the funding provided and the actual minimum costs required for the universities to deliver the desired standard of teaching and research output.

Government intervention is warranted whenever there is market failure in the HEI sector and mechanisms controlling finances and allocating funds are the most effective means of doing so (Bebczuk 2002). A system of performance-based mechanisms promotes a better alignment between university actions and government objectives (Anderson, Johnson & Milligan 1996; Kivistö 2008; OECD 2010). In recent decades, public expenditure on education has actually declined and this confronts HEIs with added pressure in achieving institutional goals and government objectives at the same time (UNESCO 2009). Due to financial constraints, institutions need to respond to the changes at a strategic level to garner all the funding opportunities provided by the government.

2.4.2 Factors behind information asymmetries in higher education institutions

Previous research has demonstrated that informational asymmetries are relevant to the study of higher education systems (Liefner 2003; Smart 2001) since they exist on a large scale in the operation of HEIs (Jongbloed 2006; Kivistö & Hölttä 2008). In practice, it is the duty of HEIs to use their skills, information, qualifications, experiences and abilities to provide education services to public according to the government's objectives. However, Liefner (2003) and Kivistö and Hölttä (2008) have argued that in reality, it is difficult for the principal to observe the quality of T&L and R&D outcomes produced by HEIs. This is due to limited government understanding about how organisations operate (Lambert 2001), which then leads to

information asymmetries because the principal finds it difficult to monitor the agents' competencies and actions in the real-time environment (Saam 2007). In addition, monitoring university operations is costly for the principal. Kivistö and Hölttä (2008) conclude that without government intervention, informational asymmetries would lead to degradation of quality of teaching and research in HEIs and eventually to market failure.

Ben-Ner and Hoomissen (1991 cited in Kivistö & Hölttä 2008) indicate that informational asymmetries in HEIs are caused by three factors: a lag of time between purchase and consumption of the educational service; diverse types of consumers with different educational needs; and the nature of each educational service, which is a complex mix of services that cannot be measured in a standard manner.

The time lag between the consumption and purchase of educational services can lead to information asymmetries. Kivistö and Hölttä (2008) explain that the reason for this problem is the significant lag between the time of purchase (enrolment behaviour, resource allocation) and the consumption of the service (learning experiences, rate of return to higher education). Prospective students and parents receive information from market trends to make their decision about an HEI service but the actual delivery of the service and the transaction only occurs when the student enrols in the course and completes his or her education. The outcome may be different from the information given during the purchase. Therefore, the only way to resolve this problem is by forcing institutions to make the most in-depth and up-to-date information available at all times to its stakeholders.

The second cause of information asymmetries arises when it becomes difficult for standardised information to satisfy different types of buyers and consumers with different educational needs and comprehension capabilities. With many goods and services available, consumers have to make decisions to meet their different needs. While human development and enhanced economic opportunities are the general goals for higher education, Kivistö and Hölttä (2008) explain that the customers themselves may have some specific needs and preferences for higher education. In

order to access and choose the service that satisfies their particular needs, consumers need information about the actual strengths and specialisations of an HEI. When there is a lack of information for the customers to answer such specific questions about their needs and preferences, this leads to informational symmetries. Even if the government funds and administers HEIs, the principal may not have access to real-time information about its actual performance. Thus, what is needed is that customers have access to the right information to help them make the right decisions and the agent attempts to understand the marketplace and different customer segments to meet varying expectations.

Finally, higher education produces a complex mix of public goods that might vary in content and nature over time and it may be difficult for the customers to discern or understand these differences. With the rapid increase in the number and variety of institutions today, it is crucial to define the nature and scope of their services to the public. Higher education services constitute a complex array of different and disparate goods and services in academic systems that are now highly differentiated in most countries (Altbach 2007). HEIs produce a complex mix of public goods, encompassing teaching and research, which are unlike other consumer products. In addition, Kivistö and Hölttä (2008) relate that academic work is susceptible to high informational asymmetries because the nature of its core substance—knowledge —is highly changeable and unpredictable.

2.4.3 Factors behind goal conflicts in government–higher education institution relationship

In light of the commercialisation of the HEI industry across the globe, universities are increasingly turning to align education activities to institutional strategy, monitoring productivity and profitability and ensuring that performance is geared towards strategic goals (Tischler, Biberman & Alkhafaji 1993). However, universities are large and complex organisations and there are many aspects of HEIs that contribute to the agency problem of goal conflicts leading to disagreements in vision, mission and goals (Kivistö 2007; Massy 1996). In most situations, there may also be difficulty in following up the initial contract because educational services are

not like any other consumer product and they are difficult to measure and observe (Van Slyke 2007). Thorley (1995) has also argued that a consistent and systematic strategy to direct HEIs' mission is complicated by a tradition of academic freedom in which individual academics develop their practice and expertise autonomously. As large organisations spread over many faculties and departments with a degree of autonomy in their functions, universities also have to jostle with all their individual strategies and objectives while moving towards its overall vision and mission.

The central purpose of establishing goals in a contract is to direct agents towards specific outcomes especially in the face of limited financial resources and demands for accountability (McKelvie 1986). Following this, two types of goals are defined: (1) official; and (2) operative. An official goal refers to the general purpose of organisation outlined in its mission statement and an operative goal refers to objectives set in specific actual day-to-day activities and operations of the organisation. Operative and official goals may go hand in hand at most times, but often, in day-to-day running of the university operative goals may obscure or detract from the broader official goal (Rizzo, House & Lirtzman 1970).

Figure 2.3: Constraints of University Operative Goals
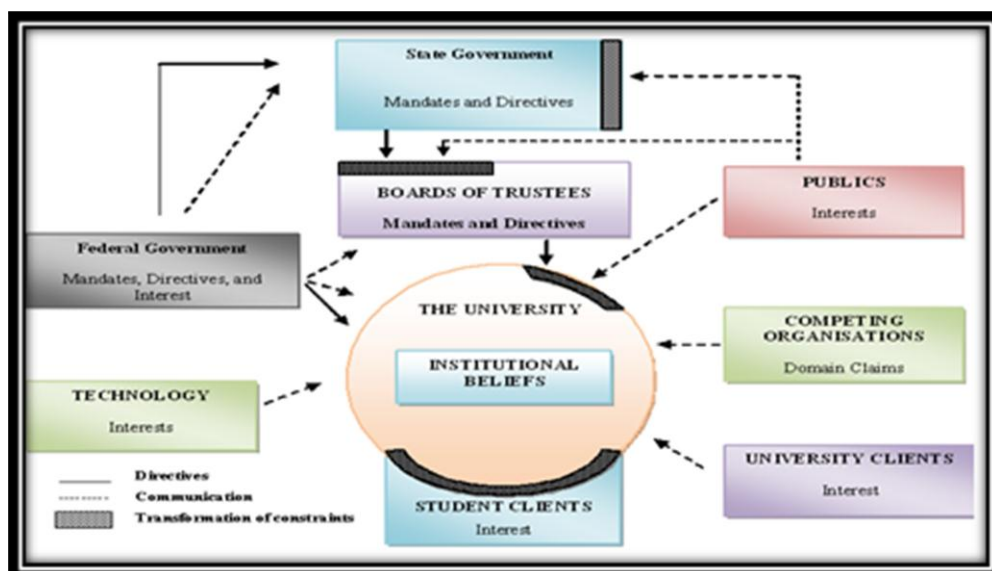
Source: Adopted from Conrad (1974)

Operative goals, in particular, need to be discussed in further detail because they direct and monitor the actual performance and outcome of the agent (see Figure 2.3). Conrad (1974) has characterised operative goals in universities as a matrix of constraints that shape ongoing activities in institutions through: (1) institutional beliefs; (2) state government and boards of trustees; (3) federal government; (4) competing organisations; (5) university clients; (6) the public; (7) student clients; and (8) technology. In general, operative goals can be shaped by forces from the internal and external environment and these factors shape constraints in different ways. Institutional belief refers to the main agenda for which the university was set up and it acts as one of the basic parameters guiding the university's operative goals. Meanwhile, constraints over operative goals refer to the guidelines set by the state government and federal government constraining the HEI's operational activities who while patronising HEIs also act as regulative bodies that mandate its existence and set the rules and guidelines governing its operations. The operative goals are shaped by HEI initiatives to adapt to the needs of its main clientele, that is, the students as well as other clients such as prospective employees of its graduates. The larger public and competing organisations can also directly or indirectly shape the operative goals of the university. Finally, the university may change and adapt its operation policies and goals in day-to-day administration with change in technology.

2.5 Suggestions to Rectify Government–Higher Education Institution Agency Problem

Governments typically increase investment in higher education when there are certain national priorities that need to be fulfilled (Neave 1985). However, due to increasing concern about greater accountability and transparency, the government has to take a strategic approach in managing public funds and tracking the performance of HEIs (Auranen & Nieminen 2010; Bayenet, Feola & Tavemier 2000).

Eisenhardt (1989) further explained that in the situation in which the principal is unable to oberseve the agents activities, two options can be implemented to reduce

the agency problem. The first option is investing in information system (budgeting systems, reporting, boards of directions and additional layers of management). The second option is to enter into a mutually agreed contract that stipulate the outcomes of the agent's behaviour.

In order to reduce agency problem, the principal can use two different approaches to control its agents: (1) behaviour-based contract; and (2) outcome-based contract. Behaviour-based contract is associated with input-based funding methods, where government funding is allocated on the basis of input elements. Meanwhile, in an outcome-based contract funding is determined on the basis of the agent's achievements (Kivistö 2005, 2008). Kivistö suggests that a contract based on outcomes is an efficient mechanism to control agent behaviour and minimise goal conflict. Indeed, the signing of a contract that clearly outlines mutually targeted goals can become an important mechanism to ensure government control of HEIs. However, to benefit from the implementation of such a contract, the HEI must first have autonomy and financial freedom.

Conversely, Verhoest (2005) outlines three control methods in the way the principal can reduce informational asymmetry and goal conflicts with the agents. The first method is creating efficient monitoring systems for measuring and evaluating the agent's performance, skills and environmental conditions. The second is instituting bonds and promissory arrangements where the agent provides assurance that it will perform actions in the interests of the principal. Thirdly, it is important for principals to establish adequate and effective systems of financial incentives that link rewards to performance. This list outlines a comprehensive set of measures that can be taken to resolve the agency problem. Each of these measures will be explored in greater detail in the following discussion.

According to Saam (2007), the implementation of monitoring systems can result in additional costs to the principal, but this system has been proven to be the best remedy to overcome goal conflicts and hidden actions. Indeed, Billy and To (2011) state that their research findings suggested that a formal control system can affect

work performance and the principal–agent relationship to a great degree. Leruth, Paul and Premchand (2006) suggest that a monitoring system can measure an agent's performance through a mix of indicators (output, outcome and impact). It can measure the output of T&L and R&D in the university in comparison to the input of funds and resources to determine the final value-addition (Kivistö & Hölttä 2008). Here, the government considers output-connected *average cost measure* using performance indicators to measure specific segments of organisational performance in contrast to the funding allocated to each segment (Herbst 2007). Verhoest (2005) finds that such a method of allocating funds to specific activities is a type of performance contracting that can be a key remedy to reduce informational asymmetry and goal conflict in public agencies in contrast to other strategies like autonomy and competition.

A monitoring system may come in the form of reporting, site visit, review and evaluation (Lane, JE & Kivistö 2008). Peer review methods, in which a group of academic peers assess the institutions and produce report based on their evaluation to the public, are also commonly used as a tool to control and assess the quality of teaching and research (Kivistö 2008; Kivistö & Hölttä 2008). McCubbins and Schwartz (1984) have developed a simple oversight model called the *police patrol* and *fire alarm* techniques. They explain that the *police patrol* method is comparatively centralised, active and direct. *Police patrol* techniques include monitoring of information using yearly reports, purchase approvals, performance audits and reporting Lane and Kivistö (2008). In contrast, the *fire alarm* method is not too centralised and active, and merely comprises of the principal issuing instructions, procedures and informal practices to the agent.

The second measure relates to ensuring that there is smooth flow of complete and accurate information from the agent to the principal. Here, the agent is bound to a contractual agreement to release information concerning their performance to principal (Saam 2007). Kivistö and Hölttä (2008) further suggest that there should be a system in which HEIs compile a detailed database with information on all aspects of institution performance that can be accessed by the stakeholders at any time. For

example, the Finnish Ministry of Education has implemented an open web database called *KOTA online* to access figures about university performance. In Malaysia, a study by Ismail and Abu Bakar (2011) found that the information available on Malaysian universities websites was inadequate and they suggested that the Federal Government enforce regulations for HEIs to provide information to the public. Such efforts to invigorate the flow of information from HEIs to the government and the public can aid the creation, acquisition, sharing and transmission of knowledge regarding effective T&L and R&D for the benefit of all stakeholders.

Lastly, the incentive system is an efficient method that can be implemented by the principal as a mechanism to control the agent's activities. An organisation that lacks a formal incentive strategy is like a train without a driver. Management needs to know where the organisation wants to be in order to spend the funds effectively. Evidence from previous findings shows that financial incentives can be a motivating factor to reduce the negative impact of goal conflict (Aulakh & Gencturk 2000; Eisenhardt 1988; Verhoest 2005). The challenge to produce and preserve an effective compensation program is a great one because organisations determine their actions and strategies according to the monetary benefits projected for them. However, Saam (2007) acknowledges that an incentive or compensation system can be expensive to implement. It often creates additional cost for the principal and more risk for the agent. Despite this, giving incentives to promote certain activities is a targeted and focused method to solve the problem of hidden information and conflicting action. Jensen and Meckling (1976) support this statement by saying that a good incentive system implemented by the principal can limit divergent behaviour of its agents. Further, the introduction of performance-based initiatives can be used to align the operative goals of the agents with the strategic goals of the principal, thus ensuring that HEIs are working to fulfil the plans set by the government (Alexander 2000). The principal can give incentives for pursuing activities that are suited to the government objectives over autonomous functions of the university that do not add to or detract from government objectives. In effect, performance-based programs and incentives can determine resource allocation, as shown in Table 2.2.

Table 2.2: Theoretical Effects of Different Forms of Resource Allocation on Behaviour

Form of resource allocation	Effects on level of activity	Effects on type of activity
Non-competitive conditions of allocation:	• Levels of activity depend on motivation of actors	• Types of activity depend on motivation and interest of agents
Fixed budgets or stable allocation are not linked to performance	• Low level of activity and low performance possibility	• Mismatch between interest of university and academic possible
		• High flexibility to carry out projects with high risk of failure
Competitive conditions of allocation: Performance-based allocation or allocation through markets	• Levels of activity depend on incentives connected with resource allocation system	• Types of activity have to be consistent with interests of university or meet market demand
	• High level of activity necessary to maintain level of funding	• Projects that have a higher possibility of failure will not be carried out

Source: Adapted from Liefner (2003)

The theoretical effects of such competitive conditions of resource allocation and incentive-based programs clearly shows that motivated agents are inspired to work harder to achieve the principal's goals (Liefner 2003). Such competitive incentive-based programs have a positive impact on the levels and types of activities in institutions compared to non-competitive conditions in which agents are simply allocated a fixed amount of funds with no incentive for competition. In the scenario of greater privatisation and corporatisation, several public institutions incorporate capitalist element in their day-to-day operation as a means to generate funding (Bleiklie & Kogan 2007). It has also been said that performance-based allocation and

incentive-based competition works the best when it is organically introduced by market conditions rather than being enforced in a top-down fashion by the government.

2.6 Applicability of Agency Theory to the Government–Higher Education Institution Problem and the Present Study

The changed paradigm of funding higher education, particularly in today's competitive environment, has increased the need for accountability in managing public funds. Agency theory has proven to be a fundamental theory for research in the agent–principal dynamic (Hoskisson, Castleton & Withers 2009), and it can also be applied to study the relationship between the principal and HEIs. Lane and Kivistö (2008) indicate that today there is rapid adoption of this theory in research pertaining to higher education because universities are driven by both economic and political motives. From the findings in the literature review, the researcher has identified that Kivistö has contributed the most in examining the applicability and implementation of this theory to the issue of governance and funding in higher education although there is other research that has contributed to the study of agency theory in funding higher education (Jussi 2007; Liefner 2003; Rungfamai 2008; Schiller & Liefner 2007).

Lane and Kivistö (2008) argue that since the government and university operate and exist in public bureaucracies, this type of operation requires a political economy-based theoretical framework, which is provided by agency theory. They point out three reasons for the suitability of agency theory to the government–HEI context. Firstly, universities are provided funds by the government using resources obtained from the tax payer. Secondly, universities produce products that can be considered public goods for social good whose outcomes are difficult to measure; therefore, agency theory is required to ensure that the performance of the agent is continually measured to align with government objectives. Thirdly, the government does not operate as a single principal since universities usually operate under explicit and implicit contracts with many funding bodies and government agencies. Therefore, a

comprehensive framework like agency theory is required to monitor and understand the dynamics of the multiple-principal-single agent relationship.

In spite of the growing popularity of agency theory, as indicated above, studies on the theory in higher education need to be further investigated and widely explored (Kivistö 2005). Indeed, some areas need further explanation and clarification of the theory as a framework for fostering new ideas in examining the government–university relationship. Kettunen (2006) has argued that there has been a clear need to elevate the knowledge of strategic management and methods to clarify strategic plans in HEIs. There is clearly a critical need in HEI studies for an approach that can bring strategic clarity, create a method for communication and alignment, and introduce a process to focus on the strategic and not just operational issues.

Further, most of the empirical results of funding reform in HEIs have focused on developed countries. Schiller and Liefner (2006) outline the important research issues regarding funding reforms implemented in developed countries and pose a question about their applicability in developing countries. They find that changes in the funding system and restructuring of the relationship between government and universities have proven quite difficult to implement in developing countries because agents' plans to improve outcomes have been costly and the principals have not been able to monitor their activities well. Schiller and Liefner urge that agency theory needs to be used to study the reactions and implications of funding reforms in developing countries.

Given the relevance of agency theory to the agent–principal relationship in general and government–HEI relationship in particular, this study uses this framework to explain the effect of the funding reforms initiated by the Federal Government on public universities in Malaysia. In addition, the call for evaluating the situation of HEIs and the relevance of agency theory in developing counties is also of importance to this study. Agency theory requires further empirical research and testing to make it more reliable and valuable for research in the years to come, especially in the context of Malaysian higher education.

2.7   Summary

Agency theory is based on the study of the basic principles of delegating a task to an independent agency to achieve desired objectives. Agency theory provides a useful framework to examine this question by locating goal conflicts and/or information asymmetries in the process of delegating such tasks. Agency theory offers clear and insightful explanations for problems arising from the government–agents' relationship when the principal is unable to monitor the agent's activities adequately and one party lacks information. Agency theory has been widely applied in different disciplines, ranging from economics, finance and strategic management to organisational behaviour. In this study, this theory is used to explain the impact of government funding reforms in Malaysian public universities for achieving the objectives outlined in its strategic plan. The application of this theory in this research contributes to the body of knowledge from the perceptive of Malaysian public universities as well as that of a developing country.

CHAPTER 3

STRATEGIC PLANNING AND FUNDING

HIGHER EDUCATION

3.1   Introduction

The need for reform in funding HEIs has become a topic of heated debate in government policy discussions in developed and developing countries. These debates have identified a crisis in the structure and management of universities with regard to the quality and accountability of their use of public funding (Cleveland-Innes 2010; Jongbloed 2000b; Teixeira & Koryakina 2011; Zhao 2001). Developed countries have shown significant improvement in the execution of their funding system by introducing extensive funding reforms. Developing countries have followed suit and begun to monitor the success and failure of their existing systems of university management and public funding. Indeed, the desire to improve the efficiency and effectiveness of funding HEIs to promote long-term benefit to the economic growth have led to the formulation of many policy reforms in developed and developing countries.

However, most of the empirical research on funding HEIs has been conducted in developed countries and the strategies and insights derived from this existing literature have proven difficult to apply in developing countries. There is a need to examine the political, social and economic conditions in developing countries that may have hindered the implementation of funding reforms (Schiller & Liefner 2006).

This chapter summarises the literature on strategic planning and its role in funding higher education with an emphasis on comparing the methods, policies and trends in implementing strategic planning from a comparative perspective drawn from research on developed and developing countries. The chapter begins with an outline

of the funding situation in HEIs, the current crisis in funding systems and the rationale for funding reforms. The next section surveys the role of strategic planning in HEIs, particularly focusing on how strategic planning can be used to implement funding reforms to solve the current funding crisis as well as align HEIs with the government agenda. After that, the chapter focuses on the various components and techniques of funding reforms, such as traditional funding to performance-based funding (PBF). The last section clarifies the various issues and obstacles in implementing these funding reforms.

Figure 3.1: Chapter Organisational Flow
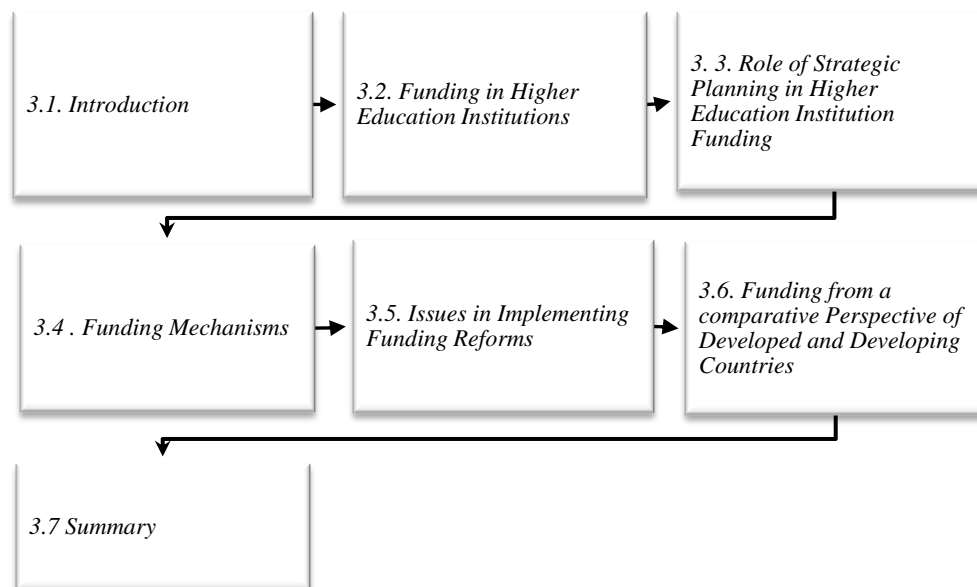
This chapter summarises the literature review on strategic planning and funding higher education with the emphasis on methods, policies and global trends compared from different perspectives to enhance understanding of the study. This thesis outline began with the discussion of strategic planning in higher education, funding in HEIs, and its implementation in perspective of developed and developing countries. Finally, this section ends with the overall summary of this chapter.

3.2 Funding in Higher Education Institutions

3.2.1 Funding crisis in higher education institutions

An important priority of public policy is to ensure that HEIs contribute to economic growth and social progress as a whole, especially in the context of today's globalised markets and knowledge economy (Macerinskiene & Vaiksnoraite 2006). It is crucial for any nation to have a good education system to improve learning outcomes, access to facilities, and efficient use of resources (Newman, Couturier & Scurry 2004a).

Managing the higher education sector has become a complex and challenging matter due to the globalisation of education markets and increasing demand from the public (Choban, Choban & Choban 2008; Moja 2007). HEIs face challenges in expanding and developing their operations because governments across the world are now becoming more strict and parsimonious in investing public funds. There is a greater demand for funding owing to growing costs and global competition. However, the government resources allocated to public universities are currently insufficient (Salmi & Hauptman 2009). Further, Lebeau et al. (2011) add that the world economic crisis has contributed to great pressure on public funded HEIs in most parts of the world. For example, the funding allocation for higher education has declined during the economic downturn in Thailand, Philippines and Malaysia (Postiglione 2011). Meanwhile, Ko and Osamu (2010) explain that the pressures facing the Japanese higher education come from the global market, funding cuts, social demand and shrinking of the number of students currently. As a consequence, institutions have been directed to search for alternative sources of funds to fill the funding gap (Jongbloed 2004; Lepori et al. 2007; Teixeira & Koryakina 2011). At the current levels of low government support, funding gap is estimated to become a key factor to a crisis in HEIs.

In this competitive and commercialised environment, there is a constant need to enhance the systems, policies and strategies of higher education for a more efficient use of resources (Newman, Couturier & Scurry 2004b). With the greater demand for accountability in spending public money, HEIs are required to become more transparent in their dealings (Christensen 2011). Governments across the world have

introduced many barriers to ensure that there is an effective use of public funds (Altbach 2007; Moja 2007; Rolfe 2003). They have also implemented monitoring systems to oversee the administration and operation of universities to ensure that HEIs adhere to the government agenda (Alexander 2000).

Jongbloed (2004) explains that funds for HEIs mainly come from three resources: government, students and other private institutions, as illustrated in Figure 3.2.

Figure 3.2: Resource Flows to and from Tertiary Education Institutions
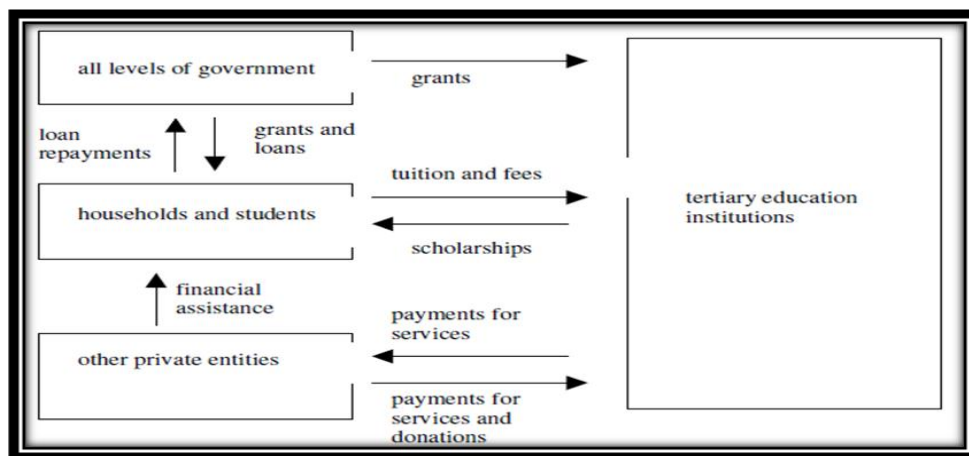
Source: Adapted from Jongbloed (2004)

Government funding may come in different forms either as grants or loans that are normally used for funding operational costs or development projects in HEIs. In England, for example, 60 per cent of funds for higher education comes from the government while the rest is made up of other sources such as tuition fees from students (Prowle & Morgan 2004). Nowadays, tuition fees have become an increasingly popular (Bou Habib 2010) and important source of funds for HEIs (Teixeira & Koryakina 2011). For example, in China, the government has shifted its funding system from a state-supervised model to a diversified funding base using mixed sources from government grants to charging fees (Chow & Shen 2006; Tilak 2003). The introduction of tuition fees and greater commercialisation of university

services have been adopted as strategies for supplementing funding sources in HEIs (Vidovich, Yang & Currie 2007).

3.2.2 Rationale for change

There is a serious debate about whether the services and products generated by HEIs can be considered 'public' or 'private' (Altbach 2007; Kevin 2003; Nixon 2010). If higher education is considered a private good, students need to pay for the services and if it is a public good, it is the responsibility of the society to provide the resources. However, from another point of view, higher education has both the characteristics of a public and private good. Therefore, HEIs may treat students as consumers and clients and charge them requisite fees for their services, but governments must continue to provide a significant source of income for HEIs (Altbach 2007; Marginson 2007; Neart 2004). Since higher education is a major vehicle of promoting social cohesion as well as economic activity and employment, the government cannot completely renege on its role in funding (Schomburg & Teichler 2006). Funding for higher education can be considered a social investment with economic and social returns that benefit the individual and the public. Albatch (2007) states that the decision of categorising HEI services is critical to the overall wellbeing and progress of a society.

Funding HEIs has become a source of great debate from 1976 onwards. HEIs have been asked to justify their activities and improve their efficiency (Casu & Thanassoulis 2006; Metz 2011). Various stakeholders have begun to demand more evidence of the quality of programs in HEIS, their learning outcomes and community impact (Choban, Choban & Choban 2008). LeRoux and Wright (2008) find that management reforms and increased concern about non-profit accountability have been advanced as the rationale for implementing performance measurement. The '*business as usual*' attitude is no longer acceptable for operating higher education (Rowley, Lujan & Dolence 1997).

In the traditional method, the allocation of funding is determined through a process of negotiation between the government and HEIs, based on input criteria and

historical trends (Salmi, Reviewed & MacMillan 2006; Strehl, Reisinger & Kalatschan 2007a). The budget is allocated on the basis of the proposal submitted by the institutions to the government as the starting point of the negotiations (Jongbloed 2000b). However, with the greater demand for more accountability in the use of public resources, there is a need to introduce a more transparent funding model that improves efficiency in the use of public money. Therefore, policymakers began to look for approaches that could promote better performance in funding HEIs (Kretovics & Michaels 2007a).

The current experience in HEI sector shows that the diversification of funding has become a global trend (Teixeira & Koryakina 2011). Kretovics and Michaels (2007a) point out three conditions of the diversification: exploring alternative funding; deregulation of policy and regulation; and encouraging alternative funding.

Figure 3.3: Classification of Public Funding Regimes
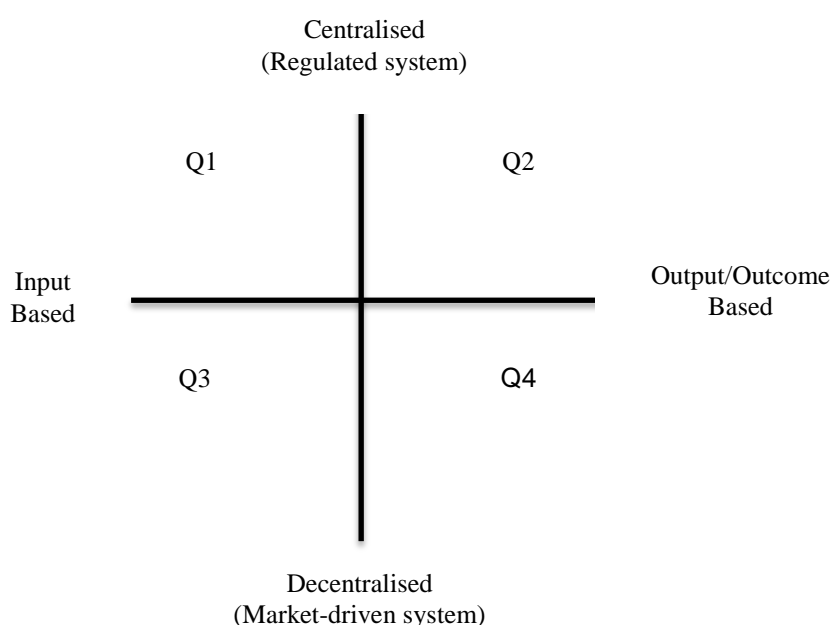
Source: Kelchtermans and Verboven (2008)

Higher education requires a variety of resources (Input) to support programs, activities, and services in teaching and research. HEIs are being called to account for the quality (Outcomes) of education that they provide and they need to have a

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mechanism to measure their achievement (Abdullah, F 2006; Caraça, Conceição & Heitor 1998; Cave 1997). Jongbloed and Vossensteyn (2001) state that successful funding methods currently in use in HEIs have a strong affinity with market-oriented mechanisms with techniques to measure output, productivity and performance indicators (see Figure 3.3).

These market mechanisms are expected to enhance the efficiency and responsiveness of HEIs (Deogratias Bugandwa Mungu 2009; Leslie & Slaughter 1997). Bergan (2009) points out that there are two factors behind the new trend that treats education as a marketable commodity. The first factor is that higher education systems are under financial strain due to increasing numbers of students and lack of public funds; and the second factor is the neo-liberal economic policies that promote privatisation of social and economic sectors including higher education.

As indicated earlier in Figure 3.3, Q3 and Q4 are based on market-driven mechanisms that can also be associated with a movement towards a student-centred system. In fact, the student-centred option is portrayed as the most demand-driven system of financing (European Students' Union 2005). Jongbloed (2004) indicates that the current international trend in funding mechanisms has adapted itself to become more student-centred (see Figure 3.4). This form of demand-driven funding is a key aspect in the future direction of funding models. This alternative will give more freedom for students to choose their programs and ensure that they have greater flexibility in achieving their goals. These systems appear in an increasing number of countries, for example, Cheung (2003) indicates that the voucher system is an increasingly popular funding method.

Figure 3.4: Trends in Funding Mechanisms

Centralised
(Regulated system)

Budget
oriented

Program
oriented

Input
Based

Output/Outcome
Based

Student
oriented

Supply
driven

Decentralised
(market-driven system)
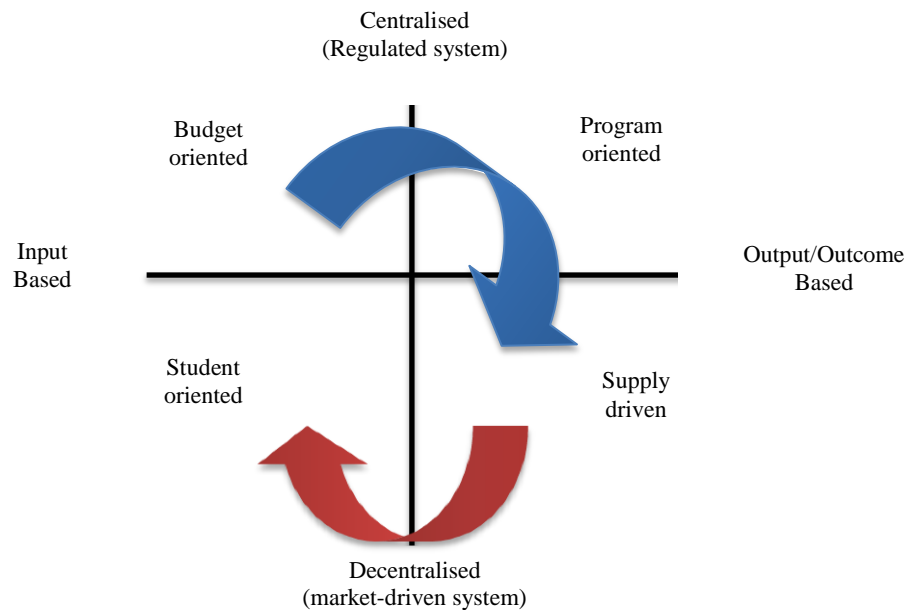
Source: Adapted from Jongbloed (2004)

HEIs in most countries have adapted cost sharing mechanisms to raise the necessary funds in light of the funding cuts (Mohrman, Ma & Baker 2008). For example, in Jordan, the enforcement of cost sharing strategies contributed to freeing up the income needed by HEIs (Kanaan, Al-Salamat & Hanania 2011). Recently, there has also been greater cooperation among universities and the industry because there is greater commercialisation of research that can be used in the business world who then give increased support for R&D (Lundberg & Andersen 2011).

Apart from greater accountability and flexibility, the reform agenda should also include delegating more autonomy to HEIs in running their operations and making decisions. There has been a growing emphasis on performance orientation as well as a decentralisation to balance the diversification of financing, accountability and autonomy in higher education. Consequently, there is a move towards decentralisation of authority since HEIs have entered into a new phase of market-oriented reform (Frølich & Klitkou 2006; Kelchtermans & Verboven 2008). For

example, a 2003 survey study shows that the OECD university countries have autonomy to regulate their own policies and priorities in activities such as: (1) managing own buildings and equipment; (2) borrowing funds; (3) spending money; (4) setting academic structure; (5) employing and dismissing academic staff; (6) setting salaries; (7) managing student enrolment; and (8) determining level of tuition fees (OECD 2003).

Many researchers interpret these funding reforms in a positive light and argue that a relative decrease in public funding can encourage HEIs to raise more private funds, adopt novel ways of cost sharing, and act in a more entrepreneurial way (Vincent-Lancrin 2007). This has been supported by Ogbogu (2011), who suggests that universities should be more open to implementing cost sharing strategies without relying too much on government funding. With government contributions on the decline (Altbach 2007; Liefner 2003; Orr, Jaeger & Schwarzenberger 2007; Roger 1995), demand from stakeholders for more efficiency (Massy 2004), greater accountability to public funds (Alexander 2000; Hines 2000) and increasing costs (Johnstone 2004), a large number of HEIs have introduced dramatic changes to reform and restructure their funding systems.

3.3 Role of Strategic Planning in Higher Education Institution Funding

HEIs are required to follow a prescribed set of priorities and activities to maintain and improve the quality of the services that satisfy the demands of the public they serve. Strategic planning ensures that publicly funded institutions like HEIs maintain accountability to external constituents (state, provincial and federal government) (Welsh, Nunez & Petrosko 2006). Apart from this general ethical accountability, Taylor, Machado and Peterson (2008) argue that strategic planning has also been adopted in HEIs to initiate policy reforms that enable them to cope with the changing economic conditions. Responding to Taylor, Machado and Peterson (2008), Kettunen (2008) also explains that strategic planning can be formulated in HEIs to help them adjust their strategies and actions in alignment with the government agenda.

Salmi and Hauptman (2006) identified three main goals of public policy for higher education: (1) increase access to, and equity in, tertiary education by factors such as students enrolments, opportunities of lifelong learning, private sector investment; (2) increase the effectiveness of tertiary education systems by improving the quality of teaching and research; and (3) improve the efficiency and sustainability of tertiary education system by maximising the return of the resource allocated. In their study of a new compact for higher education, Kallison and Cohen (2009) recommend several approaches for ensuring accountability as well as autonomy in funding reforms: (1) each individual university must set educational goals that reflect their vision and mission; (2) accountability measures should be made available to public; and (3) greater focus on performance with respect to government goals.

The key issue about strategic planning is whether a centrally managed policy from the government can work in dispersed relatively autonomous HEIs across a nation. After reviewing the literature and conducting further discussion with the experts, Dooris, Kelley and Trainer (2004) made the conclusion that a convincing, generalisable empirical study of the efficacy of strategic planning in higher education has yet to be published and there is no definite answer to the question. This is because strategic planning in HEIs is undertaken in a relatively complex manner in a changing environment (Dill 1996). Further, the operationalisation and administration of strategic planning in HEIs is not readily amenable to controlled studies, or even to quasi-experimental research (Dooris, Kelley & Trainer 2004). Therefore, Choban, Choban and Choban (2008) add that the process of executing strategic planning in HEIs is often truncated by the absence of clearly defined and reliably documented outcomes. In general, this is caused by several factors such as leaderships, demographic changes, government funding regimes, politics, social and cultural forces.

3.4   Funding Mechanisms

The previous section outlined how the integration of strategic planning in higher education has provided a framework for incorporating policy reforms that facilitate an institution to align its vision, mission, values, goals and strategies in line with the government agenda. Strategic planning can be used to measure institutional performance and is heavily linked to the process of decision making including the budget (Holwick 2009). Existing literature has also indicated that there is a significant association between strategic planning and the allocation of resources in influencing institutional performance. In particular, findings show that strategic planning implement through funding systems is one of the most prevalent methods of developing institutional strategies for HEIs (HEFCE 2010; Kettunen 2008; Rolfe 2001; Strehl, Reisinger & Kalatschan 2007a). Improving the funding system in higher education sector is expected to stimulate strategic activities relating to staff development, administrative functions and educational output in HEIs.

Strehl, Reisinger and Kalatschan (2007) relate that there are many challenging issues in implementing funding reforms because of the multiplicity of stakeholders' values and views. Sanyal and Martin (2009) have pointed out some factors that need to be considered when making policy decisions in strategic planning about funding reforms: (1) increase total enrolment in HEIs; (2) state financing cannot match the costs of massive expansion; (3) governments are unable to absorb the pressure from increase in costs; (4) cost sharing between public and government; (4) the GATS and World Trade Organization make higher education a tradable commodity; and (5) diversification of funding resources with reduction of government responsibility will lead to rise in higher education costs and widen inequality of opportunities. According to Schiller and Liefner (2006), funding reforms comprise of government budget cuts, PBF mechanisms, and diversification of the funding base. Todea and Tilea (2011) discovered that there is no perfect model of funding methods in higher education and it could comprise of a variable mix of funding methods. The following sections will address two main thrusts in funding reforms that accommodate these various demands for change.

3.4.1 Traditional funding

In the traditional funding method, the allocation of funding is determined through a negotiation between the government and HEIs, by referring to the input criteria and historical trends (Salmi, Reviewed & MacMillan 2006; Strehl, Reisinger & Kalatschan 2007a). The procedures for allocating budget are based on the proposal submitted by the institutions to the government as the starting point of the negotiations (Jongbloed 2000b). In practice, there are four methods of traditional funding in HEIs: (1) negotiated budget; (2) formula funding; (3) categorical funds; and (4) competitive funds.

Negotiated budgets refer to a type of budget allocation that is set through negotiation between the institutions and the government. According to Strehl, Reisinger and Kalatschan (2007a), the primary purpose of negotiation is to determine the funding level on the basis of input criteria and performance. Meanwhile, Salmi and Hauptman (2006) state that historical precedents in budget allocation determine whether the funding based on line-item budgets or block grants.

A *categorical fund* is another mode of traditional funding method. In general, this method of funding allocates resources for specific purposes or projects such as funding for infrastructure, equipment or program. According to Salmi and Hauptman (2006), this method of funding is usually available for projects with special needs.

Meanwhile, the use of *competitive funds* refers to the use of a tendering process in allocating funds on a project-to-project basis. The government announces availability of funds for deserving projects. The received proposals are subjected to a peer review and selected.

Finally, *funding formula* is an alternative method involving both negotiation and categorical funding methods. The criterion of this method is based on input factors such as number of staff or students; however, the implementation of formula may differ in different countries (Salmi & Hauptman 2006).

3.4.2 Performance-based funding

PBF systems focus on the output of universities in teaching and research, and performance indicators are used to determine the level of funding (Harriet 2011; Jongbloed & Vossensteyn 2001). Their achievements are measured according to indicators in order to ensure accountability, performance and funding level in managing public money (Layzell 1998). Further, this method focuses on the institutions' real performance. Marks and Caruthers (1999) state that performance-based funding is expected to alter the emphasis from quantity to quality. At the same time, the university–government relationship has been altered with PBF (Schiller & Liefner 2006). According to Kivistö (2005), since the implementation of PBF is aimed at aligning the interests and goals of HEIs with the government objectives, the normal or pre-existing operations of HEIs can be modified. Moreover, PBF forges a closer relationship between the government and HEIs.

Recently, performance-based methods of funding have become very popular in the higher education sector (Kretovics & Michaels 2007a). Indeed, research on OECD countries show the increasing use of PBF to separate teaching and research activities (Salerno 2005). Most universities in the world have already adopted PBF mechanisms that rely on performance indicators (Jongbloed & Vossensteyn 2001) and encourage an entrepreneurial culture (Sharma 2004). In practice, there are four types of PBF, as stated below.

i. Performance contract

In this method, the government and the institutions enter into a contract of agreement that outline mutually determined performance objectives. The contract should also provide incentives that encourage institutions to achieve their objectives and penalties for failing to achieve them (Salmi & Hauptman 2006). France, Finland, Denmark, and Spain are some countries that have implemented these funding methods.

ii. ***Performance set asides***

The implementation of performance contract depends on the portion of funding that has been set aside on the basis of performance. The amount of funding is determined on the basis of negotiation between the government and institutions. South Africa and US have used performance set asides to determine their funding allocations (Salmi & Hauptman 2006).

iii. ***Competitive funding***

Competitive funding refers to a method in which the performance records of HEIs are subjected to a peer review and the deserving candidates are selected for the funding opportunities. According to Salmi and Hauptman (2006), the purpose of competitive funding is to improve the quality of educational services and promote accountability in managing public funds. Indonesia implemented a system of competitive funding in 2004 under the Competitive Grants Scheme (PHK). Argentina, Bolivia, Bulgaria, Chile, Ghana, Hungary, Mozambique and Sri Lanka have also implemented this funding system (Salmi & Hauptman 2006).

iv. ***Payment for results***

This method of funding is a market-based approach, where HEIs are given a set of objectives after which their performance is measured and given the appropriate reward. Thus far, the countries that have implemented this method of payment for results are England, Denmark, Netherlands and Norway.

3.5   Issues in Implementing Funding Reforms

3.5.1   Problems in performance-based funding

While the PBF funding mechanism is gaining popularity in HEIs, in practice there are some uncertainties about this funding system (Burke & Modarresi 1999). Dougherty and Rebecca (2009) state that PBF is very popular but unstable. In addition, Burke (2002) points out that this funding system is facing some conceptual problems. In a survey of all public two and four year colleges and universities in Florida, Missouri, Ohio, South Carolina and Tennessee in 1999 and 2000, Burke

found that performance funding was a difficult funding system to implement in the complex and varying structures of different HEIs.

However, despite these problems, Landsman (2009) has predicted that this method will make a comeback since more universities in the US are considering the implementation of PBF. PBF was also shown to be a success in Tennessee and Missouri. These two states used quality performance indicators to measure T&L outcomes by focusing on parameters of quality in graduation, teachers and the performance of graduates (Heller 2004).

Layzell (1998) has pointed out that the key to the success of a PBF mechanism is to keep it simple, communicate with stakeholders to develop understanding, leave space for error, learn from those who have already implemented the system and design your own methods. Meanwhile, Burke and Lessard (2002) state that the effectiveness of a PBF system depends on the institutions' reactions. Ashworth (1994) also stipulates that the system should be flexible and simple while providing data to measure performance. Another major area of concern associated with the implementation of PBF is its design (Salmi & Hauptman 2006). Some crucial components in designing PBF are the selection of good indicators and measures to evaluate institutions and development of appropriate reward programs.

3.5.2 Performance indicators

As the last section pointed out, performance indicators are a central issue to address while implementing funding reforms. Indeed, previous research has shown that assessment remains the foremost issue in developing an strategic planning for making the desired impact on HEIs (Tapinos, Dyson & Meadows 2005). It is not surprising that most important performance measures used in strategic management relate to the measurement of outcomes (Poister 2003). As Murias, de Miguel and Rodríguez (2008) argue, universities produce a variety of tangible and intangible products that are difficult to measure; therefore, it is difficult to ascertain the quality of these services in contrast to other consumer products. Moreover, the costs of

monitoring the performances of HEIs are also increasing at an exponential rate (Choban, Choban & Choban 2008).

Table 3.1: Performance Indicators Used in Higher Education

Source	Teaching	Research
Selected performance indicators in higher education *Cave, Kogan and Hanney (1989)*	• Cost per student or ratio • Value added • Rate of return • Wastage and non-completion rates • Employment on graduating or after five years • Student and peer review	• Number of research students • Publications patents • Research quality • Research income • Peer review • Reputational ranking
Variables for analysing HEIs in Europe. *Bonaccorsi and Daraio (2007)*	• Number of undergraduate students • Number of undergraduate degrees • Number of PhD students • Number of PhD degrees	• ISI publications • Other publications • Licensing revenues • Patents held • Spin-off companies formed
Teaching and research indicators in Australia *Guthrie and Neumann (2007) Neumann and Guthrie (2006)*	• Student load by category • Student load % of sector • International student as % of institution's load • EFTSU (equivalent full-time students unit against targets) • Equity • Indigenous	• Research income • Research publication • Research training scheme students by field of study • Research students by category • % students in high-cost places • Research student completions • Share of national completions and separations • Research training scheme over and under allocations

In the context of HEIs, the most recent type of performance indicators used to measure institutional performance in teaching and research are set out according to budgeting and resource allocation. Kivistö (2005) adds that the government has to utilise indicators that are not only relevant for measuring institutional performance but responsive to broader social and economic factors in a particular context. Thus, performance indicators can become a cornerstone for measuring institutional effectiveness and promoting quality of output (Chen, Wang & Yang 2009). Tracking the performance of higher education help improve the business process utilised in institutions (Serdar 2010).

At the same time, they can also be used to diminish information asymmetries (Kivistö & Hölttä 2008). As explained in Table 3.1, the government can implement output-connected average cost measure (such as average cost per credit unit or average cost per graduate) as a way to reduce information asymmetry. Najmi, Rigas and Fan (2005) also conclude that the use of performance measurement system (PMS) can improve an organisation's strategic alignment and communication with the government in the long term.

Anderson, Johnson and Milligan (1996, pp. 3-4) explain that the indicators chosen for any measurement system should help identify the following things: (1) which are the most efficient institutions or components that are likely to best use the funds received; (2) which are the most effective institutions or components in achieving their goals; and (3) which institutions or components achieve the highest quality or rate of quality improvement? Further, trends accumulating over several years are reliable indicators and outcomes for assessing institutional performance (Alexander 2000; Fernández et al. 2011; Pugh, Coates & Adnett 2005).

Pugh, Coates and Adnett (2005) have pointed out that performance indicators being currently implemented in the UK higher education aim to (1) disseminate information about higher education performance in a more transparent manner; (2) become more accountable to the public; (3) provide information for the purpose of comparison between institutions; (4) provide a benchmark in order for the

institutions to compare their performances; (5) enable institutions to provide information on the current policy developments; (6) help determine the funding to be allocated on the basis of the performances; and (7) publish information to students before making decision on their choices related to their study.

Today, there are a great numbers of integrated frameworks available such as the Balanced Scorecard (Kaplan & Norton 1996), the Performance Prism (Neely, Adams & Crowe 2001), and the Performance Pyramid (Wedman 2009), the Integrated Performance Measurement Methodology (Bititci, Carrie & McDevitt 1997) and the Cambridge Performance Measurement Methodology (Bititci, Turner & Begemann 2000) for monitoring and measuring organisational performance.

However, Rantanen et al. (2007) point out that there is empirical evidence to suggest that organisations in the public sector faced more problems in measuring and implementing PMS than the private sector. Further, they find that problems in the design and implementation process of PMS in HEIs are common because there is a lack of definition of the main purpose of the measurement system leading to confusion, conflict or indifference. Serdar (2010) adds that the main problem faced by HEIs relate to method of collecting the data for performance management due to a lack of integrated and standardised systems.

Another problem faced by policymakers relates to the selection of indicators since the process is complicated and unpredictable (Serban & Burke 1998). Assigning funding weights for each indicator according to the priorities in an agenda is often quite problematic because it is difficult to determine the importance of one priority over another. Moreover, indicators are not always accurate or relevant in their measurement of outcomes and achievements (Burke & Modarresi 2000)

3.5.3   Different effects of funding reforms on research and teaching

Now, most countries around the world have begun to implement policies of funding reforms by categorising universities into research or teaching universities on the basis of the core functions they perform (Brew 2002; Marlin 2009; OECD 2010).

Governments have different packages and funding mechanisms for these different universities that stimulate and encourage a specific sets of behaviours and attributes oriented towards teaching or research (Cheung 2003).

Kongkiti et al. (2011) found that the development of a university classification model in Thailand has brought about a positive impact on stakeholders' perceptions about their HEIs. They mention that the financial support for a teaching-based university should not be the same as a research-based university. In China, the government introduced many funding constraints on its HEIs but continued to provide most of the funding to its research universities through the central-government-funded support programs (Altbach 2009). However, the total R&D investment ratio in China is still lower when compared to the US, Japan, UK and Canada (Wang & Liu 2011).

For RAUs, the key indicator of performance is the ability of the institutions to generate revenues from all sources (Litwin 2006). Mohrman, Ma and Baker (2008) point out that RAUs facilitate social and economic development by the contributing new knowledge to the society. They also find that while the decision to establish RAUs entails high operation costs, especially in times of funding crisis, RAUs are required for a nation to compete at the international level. Government funding cuts must not have a negative impact on research such as medicine, science and technology, which can provide long-term benefit to the public as a whole (Postiglione 2011).

One effect of the current funding reforms has been the increased focus on research across the world. Despite of the funding cuts, governments across the world have made provisions to continue to expand their support of research activities in their HEIs. For example, in the UK, even with the implementation of competitive funding mechanisms, there has been an increase in the budget for research expenditure (Himanen et al. 2009). In the current landscape, institutions of higher learning are given the priority to lead research activities in the UK to produce new knowledge, technology and highly skilled people for economic and social development. Typically, research projects in HEIs are funded by the government as primary

sources and followed by support from private sector. The government funds for R&D for higher education are based on dual support with resources coming from different government bodies called the Research Councils and the Funding Councils (Bakker 2007). The Funding Councils (Higher Education Funding Council for England (HEFCE), Scottish Funding Council (SFC), and Higher Education Funding Council for Wales (HEFCW) provided core funding as block grants to cover the general costs of basic research infrastructure (laboratories, equipment and salaries), and the Research Council provided funds to meet the costs of specific research projects and indirect costs of the research. The funding is allocated to individual researchers and research groups on a competitive basis after reviewing their grant proposals (Leišyt 2007).

Taylor (2001) found that performance indicators influenced the teaching and research activities of academics in Australian universities. The results indicated that the motivation of the academics had shifted from teaching to research when the reward structure within universities favoured research activities. Moed et al. (2011) found that measuring the number of publications has now become one of the key indicators of a good outcome, which in turn promotes in the ranking of RAUs focused on better research performance. However, the pressures brought about by the increased attention on producing research and securing funding has lessened the focus of academics on teaching. Given this predicament of the lessening focus on teaching, Brew (2002) proposed an integrated approach combining the research strength and staff interest with the taught curriculum to ensure that research is carried out in alignment with teaching activities.

3.6   Funding from a comparative Perspective of Developed and Developing Countries

At the international level, both developed and developing countries have different histories and practices of funding reforms. Today, most developed countries have reformed their funding systems by introducing more autonomous funding methods with reduced dependency on taxpayer money in higher education system. New

Zealand introduced their Performance-based Research Fund (PBRF) in 2002 with the strategic vision of improving the institutional ranking score (Curtis 2008). Diana (2012) describes the different criteria in the PBRF system: (1) research needs be assessed; (2) research assessment must be *ex post*; (3) research output needs to be evaluated; (4) distribution of government research funding system must rely or will depend on the results; and (5) it must be a national system. In Norway, the government introduced a PBF model in 2002 with an output-oriented based funding model (Strehl, Reisinger & Kalatschan 2007a).

Of particular interest is the Higher Education Council for England (HEFCE), which was established as a non-departmental public body for funding HEIs and promoting their financial health while maintaining good practice (Katayama & Gough 2008; Lewis 2002). In practice, most funds received by HEIs in the UK come from both the public and private sectors. HEFCE determines the distribution of funding allocation on the basis of the performance indicators to ensure that the investment of public money is transparent and HEIs deliver services in alignment with the government agenda (Draper & Gittoes 2004). HEFCE distributes funds as block grants to institutions to promote high-quality, cost-effective teaching and research in universities and colleges focusing on special funds for different activities and earmarked capital funding. Funding is allocated on the basis of certain formulae as well as the amount paid to each institution in the previous year. The amount is also adjusted by inflation and the number of student enrolments (Bakker 2007).

In Australia, most funding for universities comes from the Federal Government in the form of block grants that are shared between teaching and research activities according to the number of student enrolments (Abbott & Doucouliagos 2003). According to Guthrie and Neumann (2007), the Australian Government provides funding to its universities in the form of negotiated grants between the university and the government, performance-based funds, and sector-wide competitive funds. Apart from government funding, another important contribution in Australian universities comes from tuition fees. This compulsory private funding has also been tied to government financing of university placements through the Higher Education

Contribution Scheme (HECS) (Abbott & Doucouliagos 2003; Williams 1998). To improve the effectiveness of this scheme, the Higher Education Loan Program (HELP) was introduced by the Australian Government for students who have difficulties in signing up to the HECS scheme (Australia 2009). In order to improve the funding system, the Australian Government introduced the Learning and Teaching Performance Fund (LTPF) and the Research Quantum operating grant to allocate funds for research based on university performance (Abbott & Doucouliagos 2003; Anderson, Johnson & Milligan 1996; Walshe 2008).

Developed countries have begun adopting many funding reforms in face of the rapid growth of demand for HEI services and rising need for resources in the expanding HEI sector (Todeva 2000; Wolf 2003). Higher education in developing countries is also under reform and there is rapid development of higher education with great concern about the quality of teaching and research (Huang 2006; Lee & Healy 2006).

Trends in several Asian countries demonstrate a dramatic increase in the number of students and HEIs. In fact, in Asia, there are about 45 million students, which accounts for nearly 45 per cent of total number of students in the world (Global University Network for Innovation 2009). The most important challenges faced by government funding for HEIs in Asia is the rapid growth and increase in public demand, especially in East Asia (Hong Kong, Singapore, Taiwan, South Korea, China and Japan) (Hawkins 2008; Tilak 2003; Welch 2007b).

In developing countries, governments continue to be the major source of funding. Albrecht and Ziderman (1992) point out the need for developing countries to provide effective policies for funding mechanisms in order to stabilise the supply of resources and create links between subsidies and higher education admissions. Higher education system in developing countries also experience deficiencies in the quality of the faculty, students and resources and autonomy that restrict development (Mundial-Unesco 2000; Salmi 1992). Tilak (2000) found that the main issues for the HEI sector in developing countries are that: (1) higher education has over-expanded; (2) higher education heavily subsidised by the government; and (3) higher education

is not considered important for social development. Further, Deogratias, Bugandwa and Mungu (2009) explained that without adequate autonomy, it is difficult for HEIs to implement any strategic change towards commercialisation or market orientation.

The Global University Network for Innovation (2009) reviewed the cross-regional performance of HEIs to determine the situation of HEIs in developing countries across the world. According to the findings of the report, HEIs in sub-Saharan Africa went into crisis in the late 1980 and 1990s, with high student enrolment, shortage of funds, and poor quality. Arab states also faced problems in higher education relating to a lack of research expertise and gender inequity in teaching positions. El-Araby (2011) further explained that financing HEIs in the Arab region is becoming increasingly difficult due to the current set of education policies and misallocation of resources. Finally, in the Asia Pacific, HEIs were found to have little autonomy compared to HEIS in other countries (Global University Network for Innovation 2009; World Bank/EPU 2007).

In addition, the political climate of a nation also has an impact on the funding policies used in developing countries. Schiller and Liefner (2006) have argued that although these issues exist in the HEI funding of developed countries, universities in developing countries experience extreme politicisation of their environments (Jongbloed 2000b).Taking the case of Malaysia, Sato (2007, p. 74) states that:

> We can see that the public universities are caught in the midst of divergent expectations and pressures in an environment where social and political issues, especially the ethnic and national language issues, make it difficult to change the balance of power between government and university.

In face of these obstacles and challenges, some change is already underway in the funding of HEIs in developing countries. Varghese (2004a) points out that many developing countries have begun to adopt strategies to help HEIs become more independent by reducing the use of public resources and privatising universities.

With the higher education boom in China, the structural change in financing has been quite massive and government financial support for higher education in China has

actually declined from 93.5 per cent to 50 per cent from 1990 to 2002. In other words, the real value of government allocations for higher education has declined and institutions have relied upon the financial abilities of local governments and individual contributions (Mok & Lo 2007). Due to the funding pressures, the Chinese government has shifted the mode of governance and funding in HEIs to adopt a mixed method containing: (1) a state supervising model; (2) a diversified funding base; and (3) fee charges (Chow & Shen 2006; Tilak 2003). The introduction of student tuition fees and overall commercialisation of HEI services has turned into an approved strategy to fund the increasing costs of higher education in China (Vidovich, Yang & Currie 2007).

Further, de Villiers and Steyn (2009) state that public expenditure on higher education in South Africa has also shown a drastic decrease from 0.86 per cent of GDP to 0.66 per cent in 2006. With the lowered government support, HEIs are expected to generate funds from others sources, such as tuition fees. South Africa has come out with a funding model of higher education with four phases. The latest funding model called New Funding Framework was implemented in 2004. Similar conditions can also be seen in Nigeria and Uganda, where the governments have begun to apply more funding constraints to its public HEIs (Akinsolu 2008; Ssempebwa 2007).

Albrecht and Ziderman (1992) state that apart from reducing dependency on the government, HEIs need to diversify activities of R&D, consultancy, entrepreneurship, patenting and commercialisation to generate returns for resource funding. In order to implement this policy, HEIs need to be given academic autonomy and control of their own resources with structural adjustment. With such autonomy and structural adjustments, institutions can focus on strategies to attract more funding from private sectors (Varghese 2004a; Welch 2007b). Tilak (2003) states that a number of institutions in China have started to adopt innovative methods to generate their own funds by running businesses, commercialising their research for the industry, using contracts for training and development, providing consultancy and IT services to the public.

3.7   Summary

Higher education is a powerful vehicle of human development that helps engender economic, social and political stability in a country. However, due to growing public demand as well as resource constraints, developing and funding HEIs is a problematic issue for governments across the world. In adapting to the growing pressures of the funding crisis in the higher education sector, institutions and governments need to focus on methods that improve the accountability of financing HEIs while ensuring that HEIs are able to produce the whole range of services required to fulfil society's needs (Moja 2007). Ultimately, the most important question is to maintain the nature and scope of HEIs in teaching and research that can contribute to the economic growth and social progress of the nation. Litten and Terkla (2007) point out that the sustainable progress of HEIs is a critical mission to ensure the provision of traditional functions of teaching and research services. Weber and Bergan (2005) explain that if the market for higher education and research function properly, the equilibrium between the demand and supply will yield an optimum solution.

This chapter has given a review of the funding crisis in HEIs in the face of growing demand and pressure from globalisation. It has also highlighted the role that strategic planning can play in meeting these challenges by introducing funding reforms. These reforms include the use of more transparent funding models, output-oriented methods based on performance indicators and market-driven mechanisms. The chapter also reviewed the issues in introducing these funding reforms. Further, it provided a comprehensive review of funding reforms from a comparative perspective in developed and developing countries.

CHAPTER 4

HIGHER EDUCATION SYSTEM IN MALAYSIA

4.1 Introduction

Malaysia has taken many steps to improve its education system and achieve the goal of becoming a regional hub for higher education by 2020. The MoHE announced the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010 in 2007 with the aim of strengthening the national higher education system to meet global standards while promoting sustainable development. The government has introduced performance-boosting measures to improve the quality of service on the one hand while streamlining the HEI funding system. With increasing global competition and commercialisation of education, HEIs are expected to expand their services while reducing dependency on the government for funding. Thus, it has become increasingly necessary for Malaysian public universities to diversify their revenue sources as well as improve their performance to gain competitive funding from the government (Sirat 2008a). The government has also ramped up the monitoring, auditing, and reporting system of HEI performance in order to ensure that HEIs are adhering to the stipulated government objectives. The ultimate aim of implementing these methods is to provide a standard measurement for the institutions. However, conflicts arise when agents and principal have different objectives and therefore it is difficult for the principal to monitor the report and actions to be taken by the agents (Lane & Kivisto 2008; Milgrom & Roberts 1992). As a result, the effectiveness and efficiency use of resources and funds to the activity performed by the agents in delivering their educational services is inconsistent with the desired outcomes. Therefore, Agency Theory provides a framework as an alternative way of assessing the relationship between principal and agents with the intention to reduce the agency problem (Kivistö 2005, 2008).

Figure 4.1: Chapter Organisational Flow

4.1. Introduction	→	4.2. Malaysian Higher Education Background	→	4.3. The Structure of the Education System in Malaysia
4.4. Malaysian Higher Education Strategic Planning	→	4.5. Funding Higher Education in Malaysia	→	4.6. Summary
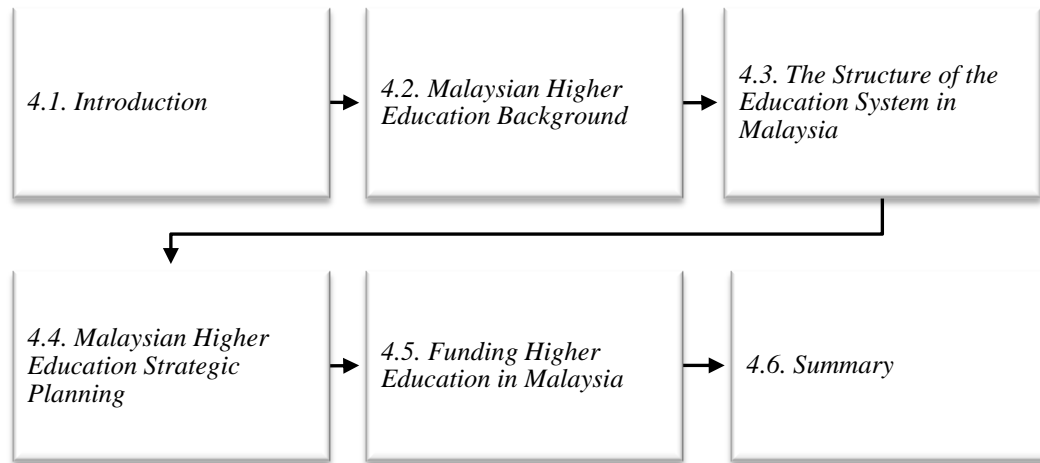
This chapter aims to provide some contextual background about Malaysian higher education systems with emphasis on its history, structure, strategic planning and funding mechanisms. The flow chart in Figure 4.1 illustrates the content of the overall literature review in this chapter.

4.2   Malaysian Higher Education Background

Developing the country's education system has been an important priority in the national agenda in Malaysia since the nation gained independence in 1957. Successive Malaysian governments have formulated many policies and initiatives to ensure that the national education system develops in line with the requirements of the national mission of producing first-class human capital for the purpose of economic development (Kamogawa 2003; Lee 2000a; MoHE 2007a). The government has stipulated that HEIs have a special responsibility to promote social, economic and technological progress in the country. Universities are also expected to contribute to a high-income economy by producing graduates with high competence and advanced skills to garner high-paying jobs in the market or produce innovative enterprises (EPU 2010a, 2010b).

In order to move towards these goals, it is essential that universities work more closely with the government, students and other stakeholders to meet these

challenges. As a result, the government has formulated many regulations, policies and plans to foster the development of education system in Malaysia to monitor the HEIs' behaviour according to its objectives and maintain a tight control over the advancement of the higher education system (Lee 2000b). The various efforts made by the government in improving the quality of human capital (knowledge, skills and professionalism), included the introduction of Human Capital Policy, National Service Training Program and Vision 2020.

The first major initiative in education was taken by the government in 1962 when it established the first university in Malaysia known as University Malaya (UM) in 1962. Today, Malaysia has about 20 public universities and it is expected that the Malaysian Government will upgrade more polytechnics and teacher's institution colleges to the status of universities in the next few years. In addition, the government is committed to make Malaysia a regional hub for higher education by ensuring excellence in service and reputation for quality (MoHE 2007a). Indeed, this goal of making Malaysia an education hub was announced as the ultimate goal of Malaysian education policy by the former Prime Minister Tun Dr Mahathir Mohamed, who argued that producing quality education was a key component in the larger plan to achieve the status of an industrialised and developed country by 2020 (Lee 1999).

Recognising the importance of education in the overall national agenda, the Federal Government has taken many initiatives to transform the education system in line with the National Education Philosophy outlined in the Education Act 1996 (Parliament Malaysia 1996):

> Education in Malaysia is an on-going effort towards further developing the potential of individuals in a holistic and integrated manner, so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonic, based on a firm belief in and devotion to God. Such an effort is designed to produce Malaysian citizens who are knowledgeable and competent, who possess high moral standards and who are responsible and capable of achieving high level of personal well-being as well as being able to contribute to the harmony and betterment of the family, the society and the nation at large.

On 27 March 2004, the fifth Prime Minister of Malaysia, Tun Abdullah Bin Hj. Ahmad Badawi set up the MoHE to monitor the development of higher education (Muniapan 2008; Salleh 2006; Sirat 2009a). Rashid (2000) explains that with world-class education the government means an education system that is able to spearhead dynamic social change, progress in human development, rapid economic growth, improved living standards, social welfare, social reform and modernisation of society. More specifically, the government seeks a quality education system that will inculcate a culture of research excellence in science and technology and increase literacy rate in the broader society.

Indeed, much of this process is already underway in HEIs across Malaysia. The features of traditional university (teaching, research, scholarship and innovation) in Malaysia are now being further expanded to meet the growing demand for HEI services from the public. Under the new economic model, institutions of higher learning have been designated as a major driving force that can advance new avenues in social and economic progress by boosting national innovation and producing valuable R&D output (Abdullah, SC 2010).

An important study by the World Bank/EPU (2007) has found that the important factors impeding the development of Malaysian universities into HEIs of a global standard are: (1) governance and financing; (2) quality of research and teaching; (3) unemployment; and (4) research and collaboration between university and industry. The finding has indicated that deficiencies in governance and financing were the most important problems to be seriously addressed by the government. Here, some of the key recommendations focused on increasing opportunities for Malaysians to participate in national higher education, enhancing the quality of T&L, upgrading the quality of R&D, increasing collaboration with the local communities, diversifying programs and activities, increasing national competitiveness at the global level and enhancing the efficiency and effectiveness of HEI governance.

4.3   The Structure of the Higher Education System in Malaysia

Higher education in Malaysia runs on a dualistic system comprising of public and private HEIs that provide education services for local and international students. Both these types of institutions of higher learning offer courses leading to the award of certificates, diplomas, first degrees and higher degrees. The distribution of Malaysian HEIs across the two types is illustrated in the table below.

Table 4.1: Higher Education Institution in Malaysia

Public	Number	Private	Number
Public University	20	Private University	28
Polytechnic	30	Private University Colleges	22
Community College	80	Foreign Branch Campus University in Malaysia	7
		Private Colleges (Non-University status)	393
Total	**130**	**Total**	**450**

Source: MoHE (2012c)

In total, there were about 130 public HEIs and 450 private sector-owned HEIs in 2011. Even though private HEIs comprise the bulk of the higher education sector in Malaysia, they rely on individual resources; therefore, funding reforms proposed by the Malaysian Federal Government do not apply to them. Out of the total number of public HEIs in Malaysia, 20 are public universities, and 110 non-university institutions that include polytechnics and community colleges.

4.3.1   The categorisation of public universities in Malaysia

In line with the objective to make Malaysia a centre of higher education excellence in the region by 2020, the MoHE has categorised the public universities into three categories in 2007 (MoHE 2007). Of the 20 public universities in Malaysia, there are five RAUs, four CUs and 11 FUs. RAUs have a central function in the enhancement of R&D in the country and are given the responsibility of discovering new

knowledge in different disciplines and promoting other research-based T&L activities in Malaysia (Mohrman, Ma & Baker 2008). Due to the critical role of research excellence in quality education as well as innovative thinking in bringing about social and economic development, RAUs attract a significant amount of funding (Beerkens 2010). CUs and FUs deliver educational programs to students at all levels from undergraduate, graduate and postgraduate. In contrast to the RAUs, the core functions of RAUs and FUs focus on T&L excellence in delivering quality education to students. The classification of public universities in Malaysia is shown in Table 4.2.

Table 4.2: The Categorisation of Public Universities in Malaysia

Categories	Functions	Universities	Characteristics
RAU	Focus on research activity and learning based	1. Universiti Malaya (UM) 2. Universiti Kebangsaan Malaysia (UKM) 3. Universiti Putra Malaysia (UPM) 4. Universiti Sains Malaysia (USM) (*Apex University*) 5. Universiti Teknologi Malaysia (UTM)	• Focused on research • With highly competent academicians • Competitive student admission • Ratio of undergraduates to postgraduate 50:50 • Established universities

Categories	Functions	Universities	Characteristics
CU	Offers learning courses and field for all level including undergraduate, graduate and postgraduate	6. Universiti Teknologi MARA (UiTM) 7. Universiti Islam Antarabangsa (UIAM) 8. Universiti Malaysia Sabah (UMS) 9. Universiti Malaysia Sarawak (UNIMAS)	• Multi-disciplinary fields of study • Competitive student admission • Highly competent academicians • Ratio of undergraduates to postgraduate 70:30
FU	Focus in areas such as technical, education, management and defence	10. Universiti Utara Malaysia (UUM) 11. Universiti Pendidikan Sultan Idris (UPSI) 12. Universiti Malaysia Pahang (UMP) 13. Universiti Tun Hussein Onn Malaysia (UTHM) 14. Universiti Teknikal Melaka (UTeM) 15. Universiti Malaysia Perlis (UniMAP) 16. Universiti Malaysia Terengganu (UMT) 17. Universiti Sains Islam Malaysia (USIM) 18. Universiti Sultan Zainal Abidin (UniSZA) 19. Universiti Malaysia Kelantan (UMK) 20. Universiti Pertahanan Nasional Malaysia (UPNM)	• Focused field of study • Competitive student admission • Highly competent academicians • Ratio of undergraduates to postgraduate 70:30

Source: MoHE (2007a) and (2008)

All of the Malaysian public universities have their own KPIs and are constantly monitored by MoHE through MyRA. Non-research universities (FUs and CUs) have to work hard to enable them obtain the status of RU. The assessment instruments for RU status is made through an on-line system. Results of self-assessment could be used by the public universities to monitor their performance in research annually (Yassin et al. 2011). The CUs and FUs have the opportunity to achieve RU status if they can meet the eight criteria under MyRA which includes: (1) general information; (2) quantity and quality of researchers; (3) quantity and quality of research; (4) quantity and quality postgraduates; (5) innovation; (6) professional services and gifts: (7) networking and linkages; and (8) laboratories accreditation (MoHE 2007). Here, performance indicator could be used by the principal to measure the performance of agents in order to reduce the goal conflict and information asymmetry (Kivistö 2005, 2008).

The categorisation of Malaysian public universities are now used as a platform to determine the funding that best fits their core functions (Sirat & Kaur 2007). Due to the privilege and prestige attached to an RU-status university, HEIs compete to gain accreditation as an RU. The MoHE uses a strict assessment tool called Malaysian Research Assessment Instrument (MyRA) to evaluate the performance of public universities in Malaysia (Yassin et al. 2011). MyRA is administered by the MoHE to collect information from HEIs and audited to assess their performance in the areas outlined in the government objectives of the strategic plans. Here, eight main parameters are used for the purpose of evaluation: (1) quantity and quality of research; (2) post graduate quantity; (3) post graduate quality; (4) quantity and quality of researchers; (5) innovation; (6) professional services; (7) networking and linkages; and (8) support facilities (MoHE 2011b; Yassin et al. 2011).

In a recent press statement, the Minister for Higher Education Datuk Seri Mohamed Khaled Nordin extended the decision to maintain the status of USM, UM, UKM and UPM as RAUs status for another three years during which they will be put under strict surveillance of the MyRA to determine whether they will continue as RAUs (Lim 2010; MoHE 2011b). The decision was made based on the audit that showed

that the four RAUs had contributed to a significant increase in R&D activities. Data indicated that the number of postgraduate students had increased from 29,794 in 2007 to 39,819 in 2009, an increase of 10,025 or 34 per cent. At the same time, the four universities showed an increase of 89 per cent in publication in citation-indexed journals from 2,303 in 2007 to 4,346 in 2009. Meanwhile, patent and intellectual property rights data showed an increase from 217 in 2007 to 237 in 2009, an increase of 9 per cent, and finally, the success of income generation showed a significant increase of RM310.7 million from RM436 million in 2007 to RM746.7 million in 2009 (Utusan Malaysia 2010b). The government also provided additional funding of RM153 million for R&D activities for these newly recognised RAUs, four of which were given the RU status in the Ninth Malaysia Plan and one in the Tenth Malaysia Plan (Azizan 2007).

At an international level, university rankings are often used as a method to measure the quality of HEIs. In 2004, UM was ranked by the *Times* at number 89. However, the performance of the oldest university in Malaysia was dropped to 169 due to definitional changes (Thakur 2007). According to Holmes (2006), the drop in ranking was not due to a decrease in the quality of education at UM; they had given it additional points for the high proportion of international students, but when realising that in 2004 that QS mistakenly defined ethnic minorities in Malaysia as international students, the marks were retracted. With the mistake corrected in 2005, UM's ranking dropped. USM was also not in the top 200 list. Khoon et al. (2011) pointed out that some of the RAUs that take part in the THES-QS have performed reasonably well. In 2007, UM was ranked 230, UKM was 250, and USM was 313. The 2012 ranking by the *Times* reported that there were no Malaysian public universities in the top 200 (Times 2012). The 2012 QS Asian University Rankings indicated that the UM has maintained its position as the premier university for the fourth consecutive year when ranked 35. Meanwhile, in the Asia QS ranking, UM overall scored 71.4 out of 100 and gained fourth place for a student exchange programs (Utusan Malaysia 2012b). Indeed, the Universitas 21 (U21) rankings of National Higher Education Systems 2012 (based on a review of the Institute of Applied Economic and Social Research, University of Melbourne) ranked the higher

education system in Malaysia as 36th in the world with a score of 50.5 (University of Melbourne 2012; Utusan Malaysia 2012c).

The pinnacle of institutional quality in Malaysia is the Apex University. The government categorises an HEI to be an Apex University when it is deemed as being of the highest national standard in education and worthy of competition on the world stage (Khalid 2008). The MoHE recognised USM as an Apex (*Accelerated Programme for Excellence*) University in 27 August 2008 (Morni et al. 2009; Nordin 2008). The Apex University must: (1) drive world-class universities to K-Economy (research, design, and dissemination of knowledge, graduate/first-class human capital); (2) support the national goal of making Malaysia a hub for higher education; (3) act as a catalyst for the transformation of other institutions through best practice, collaborative research, academia, and policy improvements; and (4) promote competitiveness and a drive for excellence (Abdul Razak & Mohamed 2011; MoHE 2007a; Morni et al. 2009).

In addition to prestige and increased financial resources, Sirat (2008a) has also found the Apex University had a more decentralised financial system and more autonomy compared to other Malaysian public universities. Nevertheless, he adds that often greater autonomy in finance, student selection, setting tuition fees, management, and appointment of leadership positions is difficult to implement in an Apex University due to continuing bureaucratic problems and government control.

4.3.2   Regulation and autonomy

Higher education systems in Malaysia are regulated and administered within a legal and operational framework stipulated by government policies and acts. Many legislative acts have been passed to build the framework for education, namely: (1) Education Act 1996; (2) Universities and University Colleges 1971; (3) The Private Higher Educational Institutions Act 1996; (4) National Council on Higher Education Act 1996; and (5) National Higher Education Board Act 1997. These laws provide a comprehensive and practical guide for higher education providers in Malaysia and

are also being continually revised to increase the relevance and efficiency of HEIs in a changing environment to keep up with global standards.

The Universities and University Colleges Act (UUCA) was enacted in 1971 as a mechanism to regulate the establishment of private universities and university colleges and is an important instrument through which the state maintains its control over HEIs in Malaysia (Ahmad 1998; Lee 2003; Sirat 2009a). The UUCA gives the government full authority to make decisions in HEIs on student enrolments, staff appointments, educational program and financing, and HEIs are expected to adhere to this act and any decisions made by the government (Lee 2003; Sirat 2009a). Since the act's inception, it has been revised a number of times. Hambali, Faruqi and Manap (2008) note that the latest amendment to the act is geared towards promoting good governance of public universities. However, Muda (2008) makes an interesting point arguing that the amendments are cosmetic in nature and in practice the amendments have not resolved the issues of wider autonomy that have been a subject of contentious debate in Malaysia for some time (Sirat 2009a). However, in 2012, a study conducted by the Malaysian Government recommended one more amendment to the UUCA and this proposition will soon be tabled in parliament (MoHE 2012a; The Star 2012).

Indeed, autonomy in HEIs is a thorny issue that has been much debated and investigated in countries across the world. Former USM Vice Chancellor, Prof. Tan Sri Dato' Dzulkifli Abdul Razak (Abdul Razak & Mohamed 2011, p. 24) stated that:

> The struggle for autonomy remains one of the biggest challenges in laying the foundation which ended in last year. Notwithstanding, it is still a case of so near yet so far for the new constitution is yet to be gazetted for implementation … the autonomy dimension seems very much overdue.

According to Md. Zain et al. (2008), the ideal strategy for ensuring more growth in Malaysian public universities is to give more autonomy in managerial and financial matters. To overcome the barriers of stagnating growth and low quality of education, they suggest a move to reform Malaysian universities by giving HEIs more autonomy in the governance, financial management, academic program, faculty administration and student learning. This also includes a suggestion to lessen

government control in HEIs by strengthening the collaboration between the industry and public universities.

According to Kivistö (2007), institutional autonomy refers to freedom in a university to function collectively for making decisions on matters relating to teaching and research. A study from the Association of European Universities (Lisbon Declaration 2007) identifies four essential elements of autonomy that give universities the ability to decide matters relating to: (1) academic and scientific orientation; (2) financial administration; (3) organisation and governance structure; and (4) human resources.

The Federal Government has a relatively tight control over public universities in Malaysia and there is a model of centralised governance of HEIs in the country, which causes public universities in Malaysia to have less autonomy. Sato (2007) further adds that the government still maintains a strong influence in running of HEIs even when the corporatisation policy supposedly allows for greater autonomy to public universities. According to Sirat (2009a), higher education policy and regulation in Malaysia has features of both neo-liberal and state-centric models. A study by the World Bank/EPU (2007) indicated that Malaysia and Indonesia have less autonomy power compared to other OECD countries in various aspects, as shown in Table 4.3.

Table 4.3: Extent of University Autonomy in OECD Countries and Malaysia

Category	Countries							
	NL	**AU**	**IE**	**GB**	**DK**	**SE**	**FI**	**MY**
Own building and equipment	x	x	x	x				
Borrow funds	x				x			
Spend budgets to achieve objectives	x	x	x	x	x	x	x	x
Set academic structure and courses		x	x	x		x	x	
Employ and dismiss staff	x	x	x	x	x	x	x	x
Set salaries	x	x		x		x	x	
Decide size of students enrolment	x		x		x			

Note   : (x) means that the university has the power to perform this function autonomously

NL   Netherlands
AU   Austria
IE   Ireland
GB   Great Britain
DK   Denmark
SE   Sweden
FI   Finland
MY   Malaysia

Source: Adapted from World Bank/EPU March 2007

To some extent, this affects the efforts of improving the effectiveness of higher education planning programs in Malaysia. It restricts public HEIs from many activities such as having their own building and equipment, borrowing funds, setting academic structure and courses, setting salaries and deciding the size of student enrolments. Sirat (2009a) argue that public universities in Malaysia require autonomy to manage the financial aspects of their operations, as shown in Figure 4.2.

Figure 4.2: Autonomy and Devolution in Malaysia's Higher Education System: A Proposal
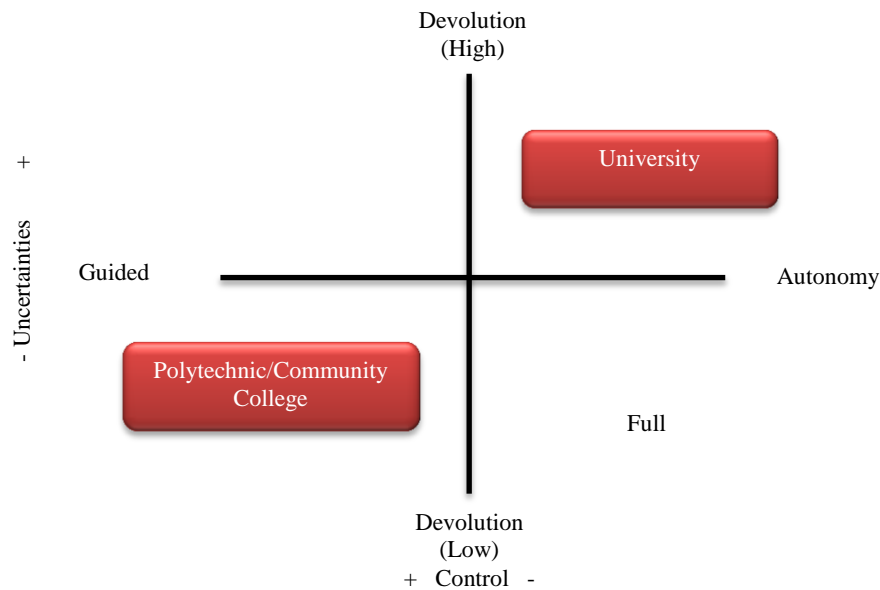
Source: Adapted from Sirat (2009a)

To overcome the problem, the Minister of Higher Education in his 2010 speech indicated the government's efforts to give more autonomy to university in key areas of university governance including legal, operational (governance), academic, financial matters and in issues relating to human resources, enrolment and income generation. The Ministry developed a framework of autonomy that proposes the important prerequisites for building an internal control mechanism based on the principles of autonomy, authority and responsibility to be granted to public universities.

To measure the level of the Malaysian public universities readiness, the University Code of Good Governance (CUGG) and University Good Governance Index (UGGI) have been adopted. The principles of CUGG are to measure the university governance best practices, while UGGI is used to measure the readiness for autonomy implemented in four designated areas namely governance institutions, financial and wealth creation, human resource management and academic management, and admission of students (Berita Harian, 2011). Here, the public

universities will be measured based on the results of the audit to determine their readiness for an autonomous status – whether they are eligible or not, and whether they are willing to accept the status of autonomy or not. As mentioned before, the implementation of the autonomy agenda will be the main focus of the MoHE in order to increase the competency of the universities. In addition, greater transparency in performance will enable the Government to make improvements and provide necessary support in the field. Indeed, granting autonomous status is a challenge and a test for the public universities. Principles of integrity and accountability will be central to the process of granting autonomy, which will then determine the ability of each of the public institution to develop. Some indicators are used to determine whether the autonomous status granted to a university has contributed to improvement in academic, financial, and managerial issues, and whether the university has shown progress in R&D and innovation. As a consequence, all public HEIs were measured for their readiness for an autonomous status in 2011. It was declared that all public HEIs that gave evidence of a positive report will be granted the status of an autonomous institution by 2015 (Utusan Malaysia 2010a). Datuk Seri Mohamed Khaled Nordin announced UTM as the first public university to be granted with full autonomy by the MoHE (Utusan Malaysia 2012a) followed by other four universities namely USM, UM, UKM, and UPM (Kulasagaran 2012).

However, the government has adopted a cautious approach by ensuring that it allows HEIs a suitable degree of autonomy, while maintaining guidelines and mechanisms to control the education system. This is because social factors such as solidarity and equality should be taken into account before autonomy can be implemented (Berita Harian 2010b). In many cases, autonomy is not a zero-sum game where the government is completely released from its obligations and universities assume all the power. Instead, the goal is to maintain a fine balance between government control and HEI autonomy so that the government ensures the prioritisation of national agenda in HEI operations while HEIs seek out more competitive advantages, creativity, and independence without relying too much on the government (Berita Harian 2010a).

Recent evidence suggests that in order for Malaysia to implement administrative innovation effectively, high political commitment is required along with technical competence and parallel changes to other areas of governance (Noore Alam 2010). The idea of university autonomy and devolution in Malaysia has evolved from a general move towards decentralisation of university governance to a strategic action of adapting to today's competitive environment and increased demand. Increased autonomy and decentralisation not only gives public universities more independence to conduct their operations it also gives them more flexibility to quickly adapt to changing circumstances without having to go through lengthy bureaucratic procedures with the government.

4.4 Malaysian Higher Education Strategic Planning

Strategic planning is an important policy instrument to ensure that the development agendas of public universities in Malaysia are in line with the government objectives of increasing the quality of higher education system in T&L, R&D and quality of university management (Hussin, Yaacob & Ismail 2008; Singh & Schapper 2009; World Bank/EPU 2007). Strategic planning enables government to develop a coherent and methodical framework to initialise required changes and manoeuvre universities into the right direction for the future (Larsen & Langfeldt 2005). Strategic planning can use government funding to modify the behaviour of HEIs and give them incentives to achieve the principal objectives in the national agenda (Frølich, Schmidt & Rosa 2010).

Two blueprints (National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010) outlining detailed strategic plans for the transformation of higher education in Malaysia were announced in 2007 (Country Report - Malaysia 2008; MoHE 2007a, 2007b). According to Bryson (1988), it is important for institutions to align their strategic planning and budgeting processes with government objectives to make more efficient use of government resources. Typically, the Government determination to increase investment in higher education is to bring more concern to the national priorities (Neave 1985). However, due to

increasing concern on greater accountability and transparency, the Government has to take strategic approach in managing public funds, and thus assuring systems are used to track the performance of the higher education institutions in order to reduce goal conflicts and information asymmetries (Bayenet, Feola & Tavemier 2000). In return, it is very important for the institutions to clearly demonstrate that the activities are in line with the principal objectives.

This section examines the two documents and how their strategic plans aim to initialise the vision of reforming higher education in Malaysia.

4.4.1 National Higher Education Strategic Plan beyond 2020

In order to foster the development of HEIs in Malaysia, the MoHE announced the National Higher Education Strategic Plan beyond 2020 in August 2007. It is the most comprehensive plan launched to date and it intends to transform the Malaysian higher education system. It aims to help HEIs achieve a world-class standard and make Malaysia a hub for higher education in Southeast Asia (Ministry of Higher Education August 2007). This plan was divided into four phases: Phase I—Laying the foundation (2007–2010); Phase II—Strengthening and enhancement (2011–2015); Phase III—Excellence (2016–2020) and Phase IV—Glory and sustainability (beyond 2020).

HEIs in Malaysia have to incorporate the KPIs outlined in the SP into their institutional agenda and implement a comprehensive strategic plan in line with government strategic planning (Khalid 2008). The strategic plan focuses on seven strategic thrusts, as illustrated in Figure 4.3.

Thrust 1: Widening Access and Enhancing Quality

This government objective seeks to increase educational opportunities and widen access to higher education by providing more opportunities to students. By 2020, the government hopes that 50 per cent of the cohort of 17–23 years attains higher education and 33 per cent of workers have tertiary qualifications, especially in science and technology.

Figure 4.3: The Seven Strategic Thrusts

Thrust 1	→	Widening access and enhancing quality
Thrust 2	→	Improving the quality of teaching and learning
Thrust 3	→	Enhancing research and innovation
Thrust 4	→	Strengthening institution of higher education
Thrust 5	→	Intensifying internationalisation
Thrust 6	→	Enhancing quality Enculturation of lifelong learning
Thrust 7	→	Reinforcing higher education ministry delivery system

National Higher Education Strategic Plan

Source: Adopted from MoHE (2007a)

Thrust 2: Teaching and Learning

To build a more responsive plan, with some flexibility in its vision, objectives and scope for improvement, this strategic plan also provides the input necessary to enhance the quality of T&L environment. This strategic thrust will ensure that all

students in institutions of higher learning receive the benefit from quality learning experiences in line with the needs of individuals, economy and society (MoHE 2007a). In order to enhance R&D activities and create a research culture in universities, MoHE encourages public universities to increase the number of students at postgraduate level to between 18 to 24 per cent in 2010 (Sidhu & Kaur 2011).

Thrust 3: Research and Development

Over the period of this strategic plan, the government has developed a plan to enhance the R&D capacity of universities. With this new development, the government objectives have set the goals of developing and strengthening research capacity and innovation that can compete globally. The government's goal is to ensure that at least six public universities are able to be classified as RAUs by 2020, with 20 centres of excellence receiving international recognition and ten per cent of the research commercialised (MoHE 2007a).

The government has recognised the important contribution of the higher education sector in promoting ecosystem-based innovation through R&D (Abdullah, SC 2010). Therefore, the government has encouraged public universities, especially RAUs, to collaborate with industries to promote innovation in the form of MoU/MoA in areas of staff mobility, supervision, product development, commercialisation and technology transfer at the local and international level (Sirat et al. 2010). The R&D collaboration carried out by the universities and industries are expected to contribute to additional income through commercialisation and business activities. For example, in 2000, the research collaboration between USM and 35 organisations from 12 countries gave the institution access to 81 projects with a value of RM5.9 million (Kaur, Sirat & Mat Isa 2011). However, Hambali, Faruqi and Manap (2008) argue that in reality it is not an easy task to adopt a business culture in public universities. A previous study based on data from 16 Malaysian public universities reports that out of 313 potential products only 58 were successfully marketed in 2008 (Ab Aziz, Harris & Norhashim 2011).

Thrust 4: Strengthening the institution of higher education

This strategic thrust focuses on meeting the growing demand in private and public higher education, which is a significant concern of the Malaysian Government. In addition, the government has stipulated that by 2020, at least 75 per cent of academic staff in public universities must have a PhD. According to statistical data provided by the MoHE, in 2010, out of 30,252 academic staff, 9,199 had a PhD qualification, 16,420 had a Master's degree and 4,318 had a bachelor's degree. Further, any university that achieves the targets set for income generation will be given autonomy.

Thrust 5: Intensifying Internationalisation

With respect to strategies for intensifying the internationalisation of higher education in Malaysia, the government aims to promote initiatives that can mould and shape private and public higher education in the country so that they can compete globally. In the coming years, this thrust aims to make Malaysia a hub for excellence in higher education in order to attract foreign students to pursue programs in Malaysia (Mohamad et al. 2008). Sirat (2008b) has outlined three key trends in the global market that affect Malaysia and its plan for internationalising education: (1) the number of international students from China has declined; (2) the rapid development of higher education infrastructure in the Arabian Gulf region attracts students from middle east countries to the region; and (3) bureaucratic blocking in Malaysia affects efforts of internationalising higher education.

The government aims to provide better programs and teaching quality in order to attract international students to pursue their studies in Malaysia. As stated before in Table 4.1 there are about 450 private HEIs in Malaysia compared to only 130 public HEIs (MoHE 2012c). From the 130 HEIs there are only 20 public universities. The establishment of private universities and colleges is aimed at broadening the access of local and international students to study in Malaysia. In addition, the government has been encouraging foreign universities to open their branches in Malaysia. One reason given for this expansion is to attract international students to study in Malaysia. By 2020, international students enrolment in HEIs in the country is targeted to be about 15 per cent of the total student enrolment (MoHE 2007a; Yusof

& Sidin 2008). Currently, data show that the number of international students enrolled in Malaysian HEIs in 2010 was 62,705 (MoHE 2011a), which is a much lower number than the target of 100,000 set in the National Higher Education Action Plan 2007–2010 (MoHE 2007b; Sirat 2008b).

Thrust 6: Enhancing Quality Enculturation of Lifelong Learning

In general, this strategic thrust aims to encourage individuals and communities to enhance their knowledge and skills so that they can adapt readily to a changing work environment. Universities have an important role to play in this development of human capital as institutions that enable learning, reflecting and engaging citizens (Ehlers & Schneckenberg 2010). Therefore, the government has set targets for HEIs to help individuals to enrich their knowledge and skills through distance education, e-learning, learning in the workplace, and part-time learning. This aims to create lifelong learning as a culture and a way of life to support the development of first-class human capital.

Thrust 7: Reinforcing the Higher Education Ministry Delivery System

In order to ensure the successful execution of the strategic plan, the government has established 23 Critical Agenda Projects (CAPs), each with its own objectives, indicators and targets (Embi 2011). This CAP is divided into five pillars: (1) governance; (2) leadership; (3) Academia; (4) T&L; and (5) R&D (MoHE 2007a). The CAPs also cover other areas such as Apex University agenda, internationalisation, graduate employability, Mybrain 15, lifelong learning, quality assurance, development of holistic students, industry academia, e-learning, top business school, centre of excellence, entrepreneurship and knowledge transfer program. In addition, the CAP Governance is one of the listed agendas to encourage public universities to move towards an autonomous system of governance such as corporate governance, financial and wealth creation, human resources, and academic management (MoHE 2007a). Here, the generation of income by public universities should consider the interests of the university and Government.

In addition, the MoHE has established a body called the Programme Management Office (PMO) at the ministry level and affiliated agencies called Institutional Programme Management Offices (i-PMOs) at the university level. The PMO and i-PMOs aim to provide support for the implementation, planning and execution of National Higher Education Strategic Plan beyond 2020. While the PMO acts as a steering committee that structures the universities' performances according to the strategic plans, the i-PMOs are required to provide information on these areas to the PMO. The PMO and i-PMOs act as a monitoring mechanism that helps overcome the problem of moral hazard and ensures that the government receives returns on its investment in higher education (Kivistö 2005).

Figure 4.4: The HEI PMO and i-PMO Programme Structure
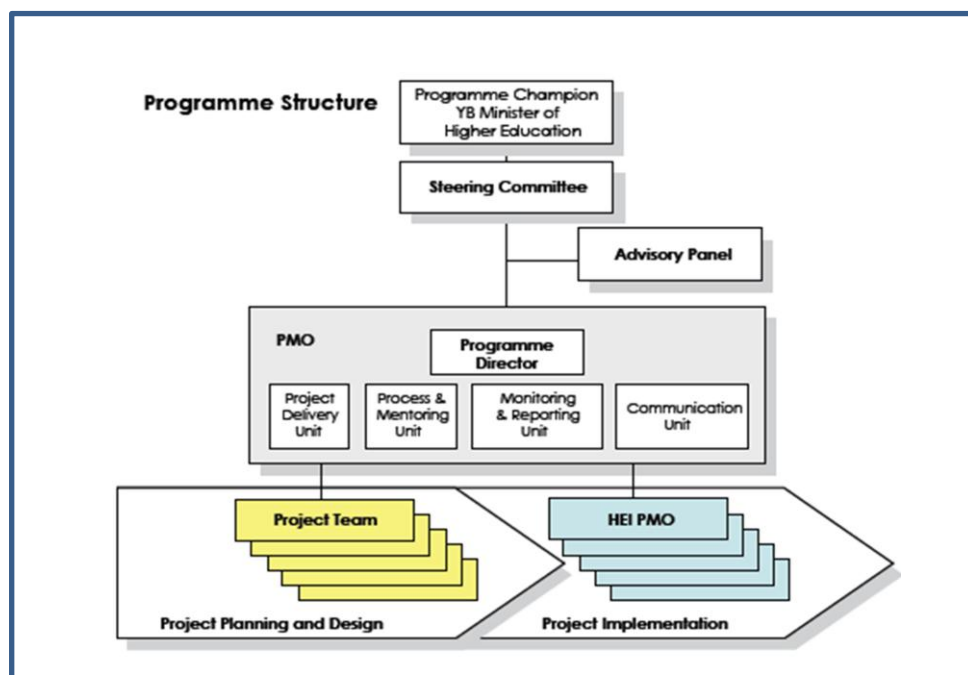
Source: Adapted from MoHE (2007a)

The programme structure of roles and the reporting mechanisms for PMO at the MoHE level and i-PMO at the university level is shown in the figure above. As indicated the Programme Champion is the Minister of Higher Education. The PMO Programme Director component includes: (1) Project Delivery Unit; (2) Process and

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Mentoring Unit; (3) Monitoring and Reporting Unit; and (4) Communication Unit. The Project implementation is at the university level (MoHE 2007a).

The Prime Minister Dato' Seri Mohd. Najib Tun Razak outlined the general direction of financial reforms in the higher education sector in conjunction with a broader vision to transform public sector governance during the 2010 budget speech. He announced that expanding access to quality and affordable education was one of the KPIs for the government (Mohd Najib Tun Abdul Razak 2009). The proposed funding changes for HEIs in Malaysia were announced by the Prime Minister on 10 June 2010 while tabling the Tenth Malaysian Plan (2011 to 2015). A host of changes were introduced, such as performance-based funding for public tertiary institutions and the implementation of Rating of Malaysian Universities and University Colleges or SETARA. Under the SETARA system, information about the rating of universities will be available to the public who can assess the performance of HEIs. It will then ensure that finance flows to HEIs are transparent, thus promoting accountability in the expenditure of public funds. The design of the system is comprised of two components: fixed and variable. As the fixed component does not take into account to assess the performance of public universities, the variable component such as intellectual development in R&D and student co-curricular activities will be based on the SETARA performance rating (EPU 2010a). The considerations elaborated in relation to this approach have been addressed by Leruth, Paul and Premchand (2006). They suggested the implementation of measuring performance that was based on a mix of indicators (output, outcome, and impact) in order to minimise the inappropriate agent behaviour. Performance measurement by the Government could be beneficial by providing value added in measuring the output of teaching and learning, and in research and development in the university in order to reduce agency problem (Kivistö & Hölttä 2008).

The government has also proposed reforms for enhancing the funding cost effectiveness of higher education in Malaysia, by concentrating on: (1) strengthening industry and research collaboration; (2) providing greater autonomy to universities; and (3) strengthening their performance culture in order to encourage teaching and

research activities. The Tenth Malaysian Plan states that the proportion of government funding to public universities will be reduced and public universities must seek alternative funds to improve the quality of teaching and research (EPU 2010a). The government has emphasised that the financial reforms are crucial to achieve the desired transformation in HEIs as envisioned in the National Higher Education Plan beyond 2020. As pointed out above, the review of HEIs by a host of authorities from the Board of Directors (BOD), Vice Chancellors to the Senate have provided greater level of autonomy and accountability to public universities by reforms such as the amendments of UUCA in 2008.

4.4.2   National Higher Education Action Plan 2007–2010

In order to put the government's vision into action, the National Higher Education Action Plan 2007–2010 was introduced in August 2007 as the preliminary strategy or stepping stone before the launch of the National Higher Education Strategic Plan beyond 2020. This temporary action plan deals with the implementation of the preliminary strategy and laying the foundations in phase I of the plan through the Ninth Malaysian Plan. The transformation plan is based on five institutional pillars and five critical agenda programs where each item has a set timeline of action during which the lead agency is expected to deliver the output in the given timeframe (MoHE 2007b). As illustrated in Table 4.4, MoHE and governance task force is the agency that is accountable for these actions.

Table 4.4: Strengthen the Institutional Pillars (Governance)

Action	Lead Agency	Deliverable	Timeline
Review of authority levels of HEIs (BOD, Vice Chancellor and Senate)	• MoHE Governance Task Force	Authority levels report Situation report Assessment report	2008
Amendments of UUCA	• MoHE Governance Task Force	UUCA amendments	2008:Q3
Empowerment for governance and management of HEIs	• MoHE Governance Task Force	Governance Book	2008:Q3
A system of performance-based competitive funding will be implemented at all public HEIs	• MoHE Governance Task Force	Funding policy	2009 - 2010
HEIs have greater responsibility for sourcing and pursing alternative funding		Funding policy	2009 - 2010

Note: *BOD—Board of Director; *UUCA—Universities and University Colleges Act

Source: Adapted from MoHE (2007b)

Under the performance-based mechanism, funding level promotes better alignment of university goals and government objectives. Finding from the previous study (Verhoest, 2005) indicated that the performance funding system could be a strong motivator in order to reduce informational asymmetry and goal conflict. Therefore, the Government's proposals to introduce the performance-based funding might promote better alignment of government-university relationship and eventually reduce the agency problem.

4.5   Funding Higher Education in Malaysia

In practice, most public HEIs costs are financed by the Malaysian Federal Government through the annual budgets as well as lump-sum funding for

development and capital expenditures (Country Report - Malaysia 2008; Ismail & Abu Bakar 2011). The government makes up for 90 per cent funding for all public HEIs and rest of the10 per cent comes from student fees and other sources (Lee 2000a; MoHE 2007b). A study conducted by the World Bank indicated that the Malaysian Government contributes quite a high proportion of its national income, about 2.7 per cent of its Gross Domestic Product (GDP), to education, compared to other developing countries like Thailand, China and India, which contribute 1.0 per cent, 0.8 per cent and 0.7 per cent respectively (World Bank/EPU 2007).

Figure 4.5: Influence of External Elements on University Management
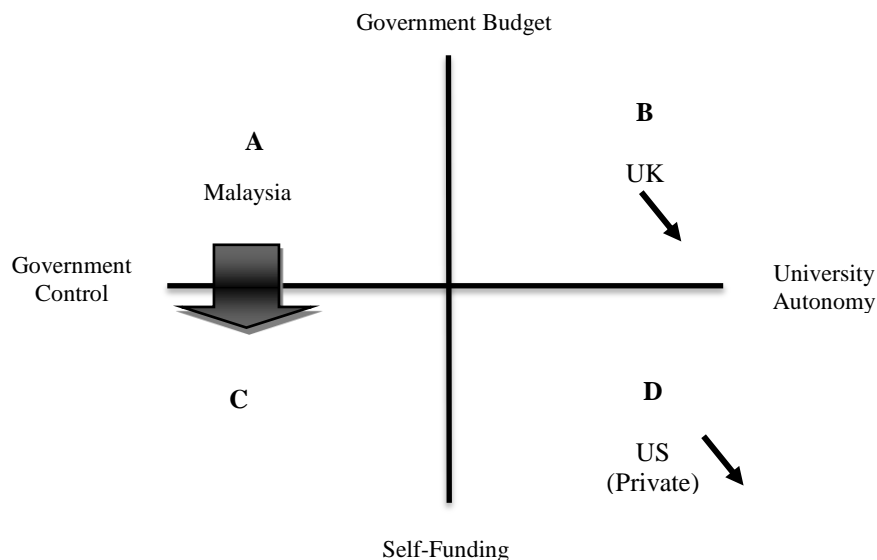
Source: Adapted from Sato (2007)

However, in today's competitive market, the cost of providing higher education services is relatively high (Global University Network for Innovation 2009; Jongbloed 2000b; Jongbloed & Vossensteyn 2001). Woodhall (2009) pointed out that there is a shift from government sources of funds to private funds in higher education services in the world. Sato (2007) points out that funding Malaysian public universities is now moving from less government budget to self-funding with a focus on creating more capability for institutions to generate income (see Figure 4.5). Although education levels are expected to rise, global trends show a common feature

of declining levels of government support per student (Miller & Salkind 2002). In fact, the contribution of public expenditure on higher education per student (% of GDP per capita) in Malaysia has shown a decline from 116.6 per cent in 1990 to 71 per cent in 2006 (Tilak 2008).

However, the direction of reform in Malaysia is different from what is happening in British and US universities. As Sato explains, the reform in British and US universities can be situated at quadrants B and D where the universities have more autonomy and the governments have implemented fully fledged corporate models for HEIs. In contrast, in Malaysia, the government is more concerned with the generation of income for operation and development expenditure. Sirat (2009) has argued that this overall shift to self-funding and neo-liberalism is vital for public universities in Malaysia for confronting the pressures and changes in the global higher education landscape.

The Malaysian Government continues to provide the bulk of funding for Malaysian HEIs (Lee 2000b; MoHE 2006, 2007a). The committee on the development and direction of higher education in Malaysia identified the higher education industry in Malaysia as a crucial site for strategic investment. It also recommended that the Federal Government should continue to provide financial support and increase the total funding in order to improve the quality and quantity of Malaysian human capital (MoHE 2006). Given the increasing resource constraints faced by the government, the success of any system that depends on the mandate and will power of the government to pursue a long-term vision for development. Therefore, in order to ensure that the public universities behaviour is monitored, the Government incurs monitoring indicators to make sure that the agents act in appropriate ways. With that, the universities need to behave according to the objectives set by the Government.

4.5.1   Funding from Federal Government

The budget allocated to the MoHE is discussed and determined every year in the parliament in light of the various activities and projects proposed for HEIs in that year. According to Mazuki, Ravindran and Al Habshi (2006), the existing budget

procedure has some element of a competitive performance-based mechanism, as the amount of money and its allocation is determine by the government on the basis of the government objectives. However, in practice, funding and resource allocation mechanisms in Malaysia is mostly oriented to the traditional approach of funding based on negotiations between public universities and the MoHE (World Bank/EPU 2007).

Figure 4.6: Income Generation
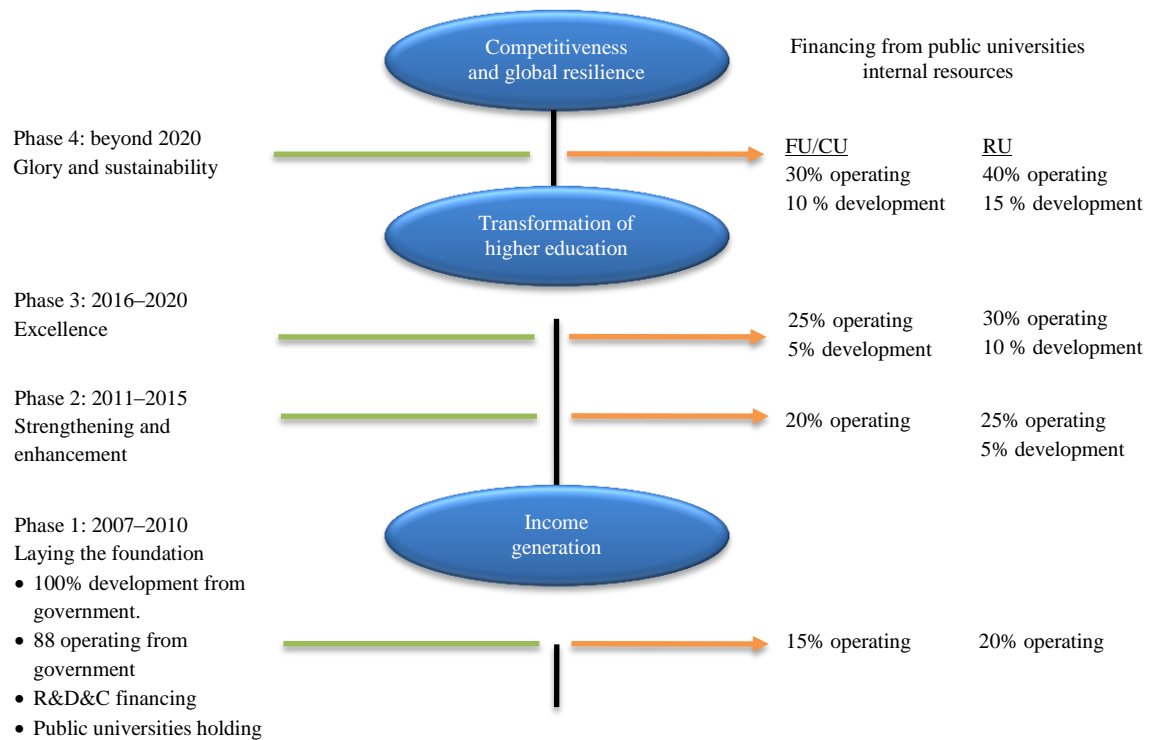
Source: Adopted from MoHE (2007a)

The National Higher Education Strategic Plan beyond 2020 outlines the strategies needed for universities to subsidise their income from internal resources as shown in Figure 4.6. Phase I of this strategic planning (2007–2010) requires that operating expenditures be subsidised through internal resources by 15 per cent in Comprehensive/Focused Universities and 20 per cent in research universities. Phase 2 of the strategic planning (2011–2015) aims to strengthen the financial resources of CUs/FUs to achieve a target of 20 per cent of operating expenditure, while RAUs have a target of 25 per cent of operating expenditure and 5 per cent of development

expenditure. In Phase 3 (2016–2020), the government will expect CUs/FUs to supplement 25 per cent of their operating expenditure and 5 per cent of development expenditure, with RAUs supplementing 30 per cent of their operating expenditure and 10 per cent of development expenditure.

Figure 4.7: Malaysia's Budgeting System
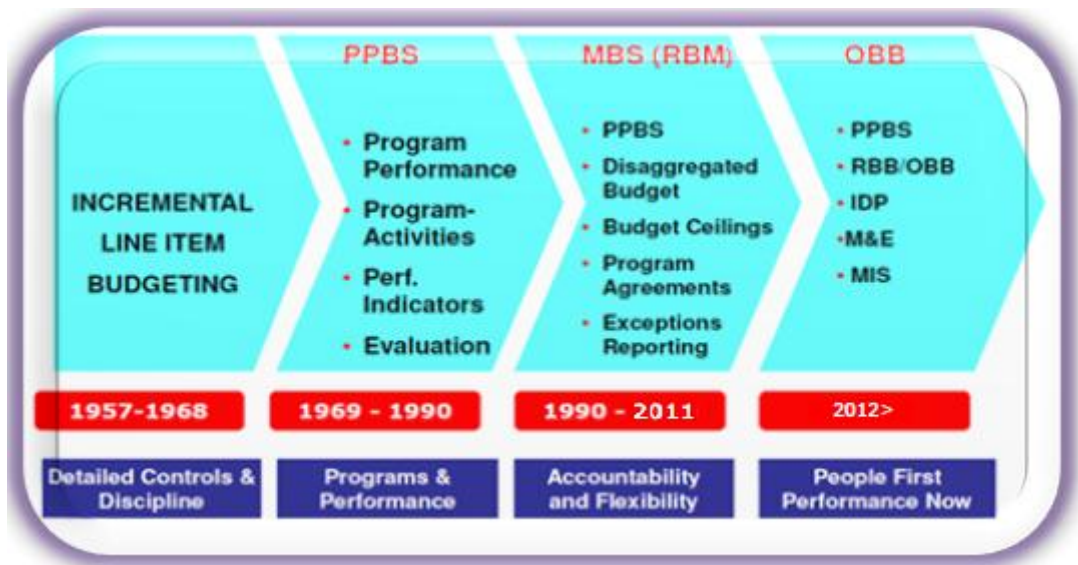
Source: Adapted from Perbendaharaan Malaysia (2010)

As indicated in Figure 4.7, the Malaysian Government introduced the Performance Budgeting System (PBS) in 1969 to modernise the implementation of budgeting system in public sector. According to Siddiquee (2010), this system emphasises performance measurement and devolution of authority where the department clearly states their goals and HEIs act in line with that mission and vision. However, the system has not been completely successful due to several problems such as the absence of adequate linkages between inputs and outputs, unclear performance indicators, and lack of delegation of authority (Siddiquee 2010; Xavier 1996). In a study of the reporting practices used in Malaysian public universities, Ismail and Abu Bakar (2011) found that the annual report disclosure level is satisfactory and there is room for improvement with greater focus on the enforcement of the reforms by the MoHE. Indeed, in their previous research interviewing people in some Federal Ministries in Malaysia, Neilson and Mucciarone (2007) found that performance

measruements were not being adequately recorded, reported and/or used for decision making at the management level. The mechanism that ties performance to funding will then contribute to have better alignment between institutional behaviour and government objectives. As a result, it is expected that strategy that fits between principal and agents can be used as one of the mechanisms to minimise the problem. To promote efficiency and greater accountability in public sector institutions, the MoF implemented the MBS in 1990 (Mazuki, Ravindran & Al Habshi 2006). MBS is a budgeting system that is designed to establish linkages between inputs, outputs and impacts. MBS also involves the use of indicators to measure the performance of HEIs and ensure the successful of implementation government policies and strategies (Mazuki, Ravindran & Al Habshi 2006).

However, Neilson and Mucciarone (2007) find that MBS is not an effective system of funding in Malaysia. Noore (2010) also finds evidence from her study that suggests that this budgeting approach is far from satisfactory. In her study of 12 Federal Malaysian Government ministries, she found that there is a limited impact of the types of disclosure and implementation of performance indicators. This is because the indicators used in the system were not reliable in practice. According to Sirat (2008a), the problem with MBS is that it still relies heavily on the results derived from inputs instead of balancing the assessment by objectively measuring the outputs.

Even though accountability and efficiency are difficult goals to achieve (Johnstone, Arora & Experton 1998), as evidenced by the unsatisfactory results from initiatives like PBS and MBS, the government is still pursuing continued efforts of financial reform. The Malaysian Government has recently announced its plan to introduce OBB in designated ministries in 2012, which will then be rolled out across the public sectors from 2013 (Sinchew 2010). According to the Second Finance Minister, Datuk Seri Ahmad Husni Hanadzlah:

> The purpose of OBB is to ensure that we will achieve the concept of value for money for our budget expenditure management. This has been the principle the government will have to adopt.

Source: AseanAffairs (2010)

Thus, the move towards OBB is timely and crucial to ensure optimal use of scarce resources to achieve national priorities and goals. This approach can help enhance the government' capacity to assess efficient management of resources, assist in eliminating redundancy of programs and projects and ensure that the nation's resources are allocated proportionately to its priorities (EPU 2010a).

In line with the plans for transformation of higher education, the Federal Government has allocated RM45.1 billion for expenditure on education and training development as well as an increase in the budget for R&D. The Ministry of Science, Technology, and Innovation (MoSTI) and MoHE are the main agencies that have the authority to provide funding for R&D for HEIs. For the period of the Ninth Plan, RM5.3 billion will be provided to encourage a culture of R&D in Malaysia. A more responsive plan accommodating some amendments to these earlier strategies was announced by the Malaysian Prime Minister Dato' Seri Mohd. Najib Tun Razak during the Tenth Malaysian Plan on 10 June 2010.

The growing number of public universities has also had some implications for funding allocation to the universities. Although the general amount of the government budget for public universities in the Ninth Malaysian Plan has increased, this amount is shared by a growing number of universities, which then means that the actual amount received by each university is comparatively less (National Higher Education Research Institute 2006). Further, in the early stages of development, new universities need extra funding for operation and development compared to the established universities.

4.5.2   Income from students fees

The relative share of student fees in the total amount of funding for public universities in Malaysia is considerably low and student fees only contribute 10 per cent of the total funding. In recent years, a rise in the number of international students has also contributed to making student fees a source of income for HEIs. It is quite clear that education costs for students in Malaysia are much cheaper than in other countries. Increasing tuition fees is beyond the authority of public universities.

Any increase in tuition fees is controlled by government policy and has to be approved by the National Council on Higher Education (Lee 1999, 2004). However, it is not restricted to the international students. The public universities are able to increase their income by increasing the enrolment of international students. This will bring benefits especially to build confidence to international students to pursue their studies in Malaysia public universities (MoHE 2007a).

In addition, education is subsidised by various other schemes run by the government. The National Higher Education Fund Corporation or PTPTN is a semi-autonomous agency responsible for administering student loans with direct support from the government budget (Abu Bakar, Masud & Md Jusoh 2006; Ismail, Serguieva & Gregoriou 2008; Zainal, Kamaruddin & Nathan 2009). Loans from the PTPTN can be utilised by students for tuition fees, equipment costs and living expenses during the period of study (Foong 2008). Today, financial help from the PTPTN has become one of the major sources of financing HEIs in Malaysia (Abu Bakar, Masud & Md Jusoh 2006). From its inception in 1997 and until 2006, PTPTN disbursed a total of RM11.8 billion to 900,000 students (MoHE 2007b).

Moreover, the government provides a subsidy of tuition fees at a yearly average of RM85,000 for each student pursuing higher education in order to keep tuition fees low in public institutions. In a press statement, the Higher Education Minister Datuk Seri Mohamed Khaled Nordin stated that this subsidy of up to 90 per cent of the original cost of education was meant to lighten the burden on parents and students (Ismail 2010).

In a report outlining a university model for Malaysia, National Higher Education Research Institute (2006) has suggested that the university should be given authority to determine the rate of fees charged to the students. The National Council on Higher Education (2006) has also suggested that the MoHE should devise a reasonable range of fees to be charged based on the nature of the program while public universities should be allowed to determine the amount of fees to be charged within the limits of that range. This could help reduce government expenditure in higher education

(Ismail, Serguieva & Gregoriou 2008) and also provide more opportunities for students to further their studies.

However, this recommendation is difficult to implement because as a public service, Malaysian HEIs cannot completely act in the interest of profits and cost saving like a private company (National Higher Education Research Institute 2006). The government must provide guidelines to increase funding from different sources while maintaining its support of HEIs and the overall cost of higher education should be shared by government funding and tuition fees charged to students (Sanyal & Martin 2009).

4.5.3 Alternative sources of funding

The MoHE has launched quite a few initiatives since 1998 to promote the corporatisation of Malaysian public universities so that they can operate like limited companies (Lee 1999; Yahya & Abdullah 2004) and pursue market-related activities (Lee 2004). The purpose of this policy is to encourage universities to diversify their revenue and enable the institutionalisation of corporate managerial practices (Lee 2004; Siddiquee 2006).

Strategies like funding reforms, diversified funding, cost sharing mechanisms, and entrepreneurship programs have also been used to raise necessary funds for HEIs. Although in practice, public universities in Malaysia depend on the Federal Government for the bulk of their financial resources, some efforts are being made by the universities to generate income from alternative sources. These alternative sources of funding include income from investments, campus services, alumni fundraising and royalty income from commercialised research and patents (Clark 2001).

The MoHE is encouraging the commercialisation of research as the main source of alternative funding. Indeed, the government has placed high priority on R&D and market-oriented commercialisation of R&D (EPU 2010a). The Commercialisation of Research and Development Fund (CRDF) has facilitated the development of a new

products and production processes that help the companies involved to start the production. In addition, the Technology Acquisition Fund (TAF) provides help to companies to gain strategic foreign technologies to increase their earning capacity (EPU 2010a; Berita Harian 2010c). Deputy Higher Education Minister Datuk Saifuddin Abdullah said that all universities must undertake more R&D in collaboration with the private sector (UTHM 2009). The MoHE is encouraging collaboration between RAUs and corporate entities in commercialising university research and focusing on strategic studies and research at universities across the country that can enrich the national economy. HEIs are given control over the funds they raise through research activities undertaken for the private sector. RAUs have used their expertise in research and commercialisation as an important strategy to attract more public players to invest in their project. For example, USM managed to generate a revenue of RM1.5 million as a result of commercialisation of R&D, which is the highest amount earned by any RAU in Malaysia (Berita Harian 2010c).

Nevertheless, this move towards corporatisation has not yielded the desired results and there is still a lack of entrepreneurial spirit and productive research. According to Sato (2007), industries in Malaysia do not want to invest in R&D because the research conducted in HEIs is more oriented towards solving existing problems and not introducing new technology. This was confirmed by recent data that show that only 3.2 per cent of the R&D conducted at public universities could be commercialised in 2011 generating an income of RM7.6 million (Berita Harian 2011). As a result, HEIs have not been able to realise the full potential of academic research and financial autonomy, leading to the continued dominance of government control (Beerkens 2010).

4.6   Summary

This chapter has provided a contextual background of Malaysian higher education system, in terms of its history and structure. In order to develop a competitive advantage in this challenging global environment, universities need to develop strong strategic plans. This chapter has provided a comprehensive overview of the National

Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010, which are the latest strategies announced by the government to bring about a positive transformation in higher education in Malaysia. This chapter has also outlined the current status and past changes in funding mechanisms from government funds, students' fees and alternative sources of funding. It has explained the challenges and issues for HEIs as they adapt to the reforms in funding policies that can overcome declining levels of government support and make HEIs market-competitive institutions. Here, Agency Theory provides a framework on significant impact changes of government funding on the universities behaviour and its response towards a changing environment in order to achieve the government objectives.

CHAPTER 5

RESEARCH DESIGN AND METHODOLOGY

5.1 Introduction

The purpose of this chapter is to present the mixed-methods approach used to answer the research problems presented in Chapter 1. It includes the rationale for the selection of strategies used in data collection and data analysis in order to provide clarification regarding the choices made, and it includes a discussion of both quantitative and qualitative techniques.

Specifically, the main section of this chapter begins with a discussion on research paradigms, and includes a rationale of the application of a mixed-methods research design (see Figure 5.1). Following this, the chapter elaborates on the data analysis strategy, and focuses on a triangulation technique to compare and contrast the overall data findings. Ethical considerations are also discussed.

Figure 5.1: Chapter Organisational Flow
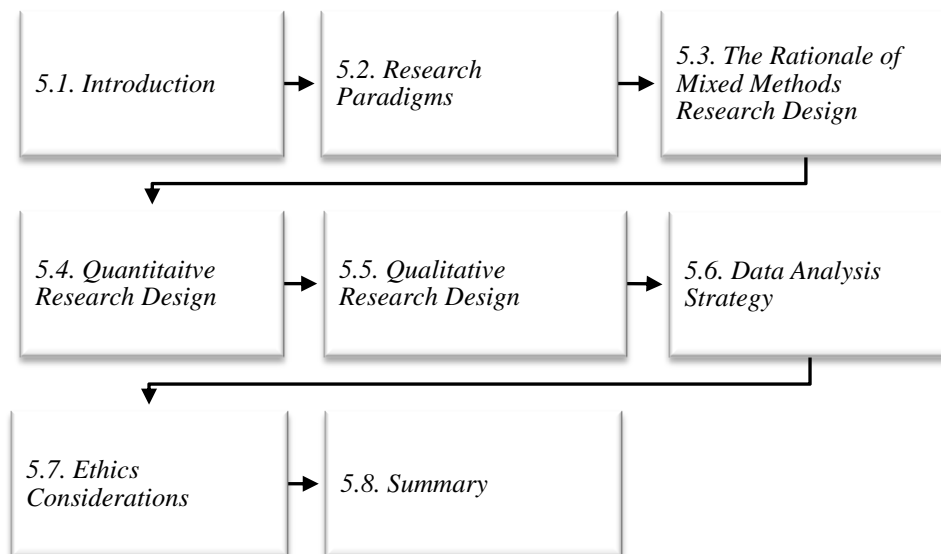
This chapter describes the methodology applied to answer the main objective of this study to assess, through the lens of agency theory, the relationship between the funding used by the Malaysian Federal Government to fund public universities and the achievement of government objectives for the sector, with specific attention paid to the influence of any reduction in goal conflict and/or information asymmetry. The objective can be broken down into the following sub-objectives, with the goals being to determine:

i.   If changes in government funding for public universities in Malaysia have made an impact on the strategic planning of these universities by assessing if there is a reduction in goal conflict and/or information asymmetry;

ii. If changes in government funding for public universities in Malaysia have made an impact on their approaches to R&D by assessing if there is a reduction in goal conflict and/or information asymmetry;

iii. If changes in government funding for public universities in Malaysia have made an impact on their approaches to T&L by assessing if there is a reduction in goal conflict and/or information asymmetry;

iv. The differences in the impact of these changes outline in (i), (ii), and (iii) across the different types of universities across the Malaysian public university sector (RAUs, FUs and CUs); and

v.   The role that the funding reforms have played in achieving the government objectives stated in the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010 by reducing goal conflict and information asymmetry.

5.2 Research Paradigms

A research paradigm distinguishes the set of beliefs, conventions and assumptions that guide the direction and philosophy (Denzin & Lincoln 2005; Teddlie & Tashakkori 2009) of the researcher in reaching the knowledge needed to draw conclusions for the study (Tashakkori & Teddlie 2003). In other words, the research paradigm influences the research design with the intention of providing quality research outcomes (Creswell 2003; Creswell & Plano Clark 2007). Table 5.1 below summarises an overview of commonly used research paradigms, followed by a discussion of the paradigms relevant to the present study.

Table 5.1: The Research Paradigms

Research Paradigms	Summary
Positivism	- primary method quantitative approach - measure, test, hypotheses - determination based on what they can observe and measure
Constructivism	- primary method qualitative approach - understanding or meaning phenomenon - subject point of view
Advocacy and Participatory	- influence by political concern - often associate with qualitative approach and then quantitative approach - apply method include focus groups, observation and interviews - based on logic
Pragmatism	- associate with mixed-methods research - support both qualitative and quantitative methods using best methods - focus on consequences of research - concern of RQ rather than methods used in the research project

Source: Byrne-Armstrong, Higgs and Horsfall (2001), Creswell and Plano Clark (2007) and Teddlie and Tashakkori (2009)

The application of mixed methods in this study adopts a pragmatic research paradigm that supports both qualitative and quantitative approaches to answer the RQs. Teddlie and Tashakkori (2009) have pointed out a number of pragmatic and mixed-methods characteristics as including (1) suitability to the study; (2) a mixed method that advocates the efficent use of both quantitative and qualitative approaches; (3) the RQ being more important than the methdological approach; (4) the methods match the purpose of the RQs; and (5) the approach is practical and applicable to the type of research presented. In accordance with that, this research presents the appropriate instruments of a quantitative survey for major data collection and focus group interviews to further examine data findings from the survey instruments. This pragmatic approach results in the use of triangulation strategies in providing additional insights into the study. The adoption of different techniques is designed to gain in-depth information on the reaction to the educational funding policies. The following are the results that the researcher wants to find out: the impact of changes in government funding on the Malaysian public universities in relation to strategic planning, T&L and R&D; the impact of changes in government funding to the categorisation of public universities; and the degree of alignment of government objectives in accordance to the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010. Findings from previous research studies have shown the usefulness of a combination of qualitative and quantitative methods in investigating issues related to higher education funding (Liefner 2003; Schiller & Liefner 2006; Bonaccorsi & Daraio 2007).

5.3   The Rationale of Mixed-Methods Research Design

The mixed-methods design in this study aims to integrate the advantages of both qualitative and quantitative approaches to enhance the accuracy of research findings (Bazeley 2008; Creswell 2003; Creswell & Plano Clark 2007) and maximise reliability of the data (Kothari 2005). In agreement with Creswell (2003), Morse and Niehaus (2009), Ridenour and Newman (2008) and Tashakkori and Teddlie (2003) pointed out that the advantages of using a mixed-methods approach in research design include:

i.   Each methodological design is complementary to the core component of the project and provides quality answers to address the research problems (Morse & Niehaus 2009);

ii.   The quantitative and qualitative methods provide strengths that offset possible weaknesses (Creswell 2003);

iii.   Mixed methods provide more comprehensive evidence and help to answer the questions that cannot be answered by either quantitative or qualitative methods alone (Creswell 2003);

iv.   Mixed-methods research is able to answer the RQs that the other methodologies cannot accomplish by simultaneously answering the confirmatory and exploratory questions; it can therefore verify and generate theories in the same study (Tashakkori & Teddlie 2003);

v.   Mixed-methods design can produce reliable and valid research findings (Ridenour & Newman 2008); and

vi.   Mixed-methods research provide better (stronger) inferences (Tashakkori & Teddlie 2003).

According to Yin (1994), qualitative methods are used to address questions of how and why in the investigations of research. At the same time, quantitative methods are also associated with the answering of what and how questions. In accordance with this approach, this research design uses qualitative interviews for pilot testing, a quantitative survey for major data collection, and qualitative focus group interviews for enhanced understanding of the survey. As depicted in Figure 5.2, this study applies this research design to achieve the research objectives.

Figure 5.2: The Research Design
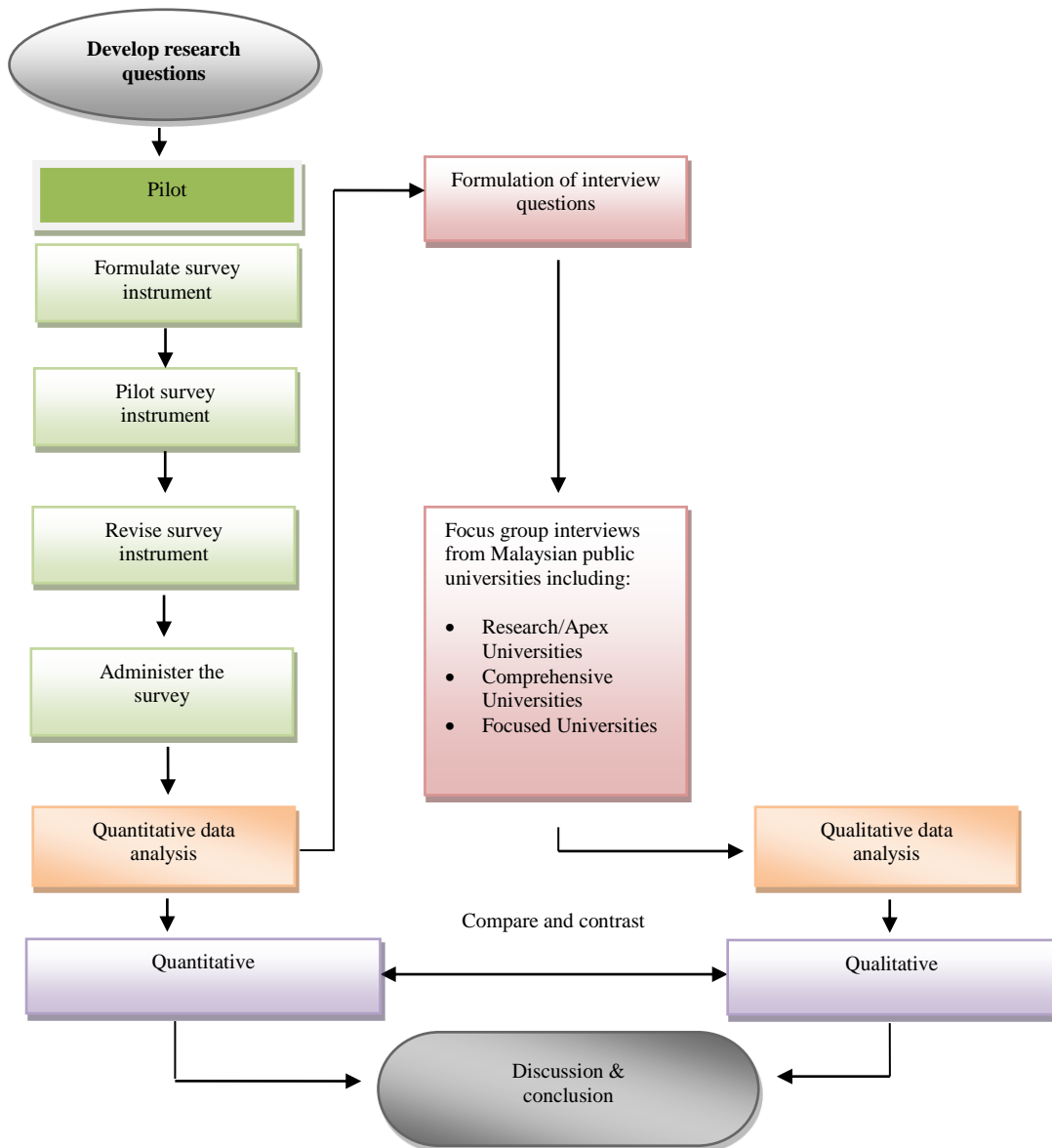
As this research design emphasises a combined mode of qualitative and quantitative methods, several data collection strategies are adopted. Firstly, in order to develop the survey instrument, interviews with the Director of NHERI were undertaken. The Director of NHERI gave positive feedback to support the development of the survey instrument. The first interview was employed as a basis for developing the survey questions and followed by the second interview aimed at confirming the survey instrument.

The next stage was to pilot the survey with an appropriate group including four potential respondents who were not involved with the people who assisted in formulating the survey instrument. Following this, the main questionnaire, to be distributed to all Malaysian public universities, was finalised. Questions in this survey were organised in two sections, the first including questions related to the demographic information, and the second including questions related to the government funding changes. The survey also included closed questions using Likert scales to enable analysis of government funding changes on the strategic planning of Malaysian public universities. A typical scale included a seven-point scale range to assess the situation before and after the funding reform proposed by the Malaysian Federal Government. This questionnaire was distributed to all 20 public universities in Malaysia, requesting responses from Vice Chancellors, Deputy Vice Chancellors, Deans, Director of Strategic Planning or equivalent, and Head of Bursar Office or equivalent.

In order to increase data from the quantitative analysis, this research moved one step further by adopting focus group interviews for the purpose of triangulation; this serves to provide credibility through using both qualitative and quantitative analysis (McLafferty 2004). Thus, data gathered from the survey were then confirmed and enhanced by results from the focus group interviews. Participants in the focus group interviews had the experience and knowledge needed to contribute additional information to enrich the results, drawing from the Dean, Director of Strategic Planning Office or equivalent, Head of Research and Management Centre or equivalent and Head of Bursar Office or equivalent. These interviews were well planned using the practice framework for focus group interviews suggested by Krueger and Casey (2009).

5.4 Quantitative Research Design

The goal of this section is to present the methods employed in gathering data from the quantitative research design using a questionnaire.

5.4.1 Questionnaire design

Based on the results from the interviews with the Director of NHERI, a process adapted from Frazer and Lawley (2000), Churchill (1979) and Gillham (2000) was used to design the questionnaire in this thesis. In accordance with these authors, five steps including determining the domain of the construct, preparing the draft questionnaire, asking expert advice, piloting the questionnaire and analysing and finalising the questionnaire were implemented (see Figure 5.3). These processes are discussed in more detail in the next section. Importantly, this survey instrument was developed in the English language since all respondents have professional English levels due to their academic background. The text of the questionnaire was printed in font size 12 using bold letters to permit ease of reading for participants. The questionnaire is provided in Appendix I.

Step 1: Specify domain of construct

In this study, the first step employed in questionnaire design as suggested by Churchill (1979) is to define the domain of construct. In the words of Frazer and Lawley (2000), the researcher first needs to consider the information to be included in the survey, what should be excluded from the survey and what information can be best obtained. As proposed by Churchill, Frazer and Lawley, the previous literature review was used as a principle to develop the questions. In this thesis, each variable is clearly defined in order to frame the questions aligning to the research objectives. Each variable developed aims to seek an answer in accordance to strategic planning, T&L, R&D and the government objectives as stated in the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010. In this thesis, the questions mainly focus on the effect of changes in government funding to Malaysian public universities in order to reduce goal conflict and/or information asymmetry.

Figure 5.3: Questionnaire Design Process

Step 1 → Specify domain of construct

Step 2 → Prepare the draft questionnaire
- Content of the questions
- Question wording
- Response format
- Structure & layout

Step 3 → Expert advice and revise the questionnaire

Step 4 → Pilot study

Step 5 → Analysis and finalising the questionnaire
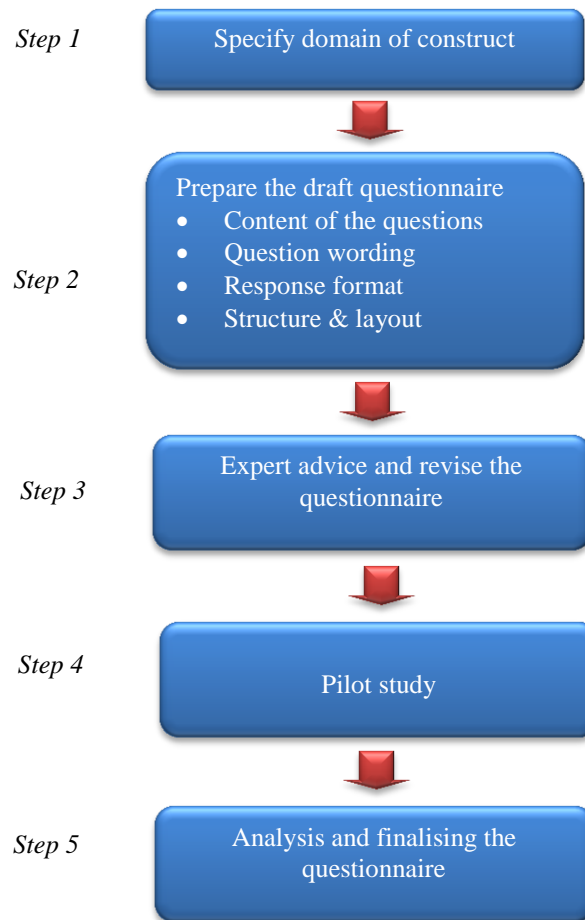
Source: Modified from Frazer and Lawley (2000), Churchill (1979), and Gillham (2000)

Step 2: Prepare the draft questionnaire

In preparing the draft questionnaire to fit for the purpose of this thesis, four general principles are considered (Frazer & Lawley 2000). These include question content, question wording, response format, and structure and layout.

Question content

In deciding the question content for the survey in this thesis, the main concern is to gauge the impact of changes in government funding in Malaysian public universities on strategic planning, T&L, R&D and government objectives through assessing whether there is a reduction in goal conflict and/or information asymmetry. Therefore, the strategies adopted in drafting the question content of the questionnaire are decided based an analysis of the previous interviews with the Director of NHEIR as well as discussion with the supervisor and literature related to this study.

Question wording

A choice of wording is critical in maximising the rate of response in questionnaire design (Frazer & Lawley 2000). The researcher has to ensure that the items designed are free from jargon and technical terms. This will ensure the questions asked and information given are as clear as possible, and ensure the quality of data collected (Brace 2004; Gillham 2000).

Response format

The format of the questionnaire is presented in two sections with closed-ended questions: A and B.

Table 5.2: Questionnaire Response Format

Section	Question	Type	Response Format
A	1 to 4	Participants' demographic information	Fixed alternative
B	1.1 to 1.14	Strategic planning	Likert scale from a value ranging from (1) 'strongly disagree' to (7) 'strongly agree'
	2.1 to 2.7	R&D	
	3.1 to 3.6	T&L	
	4.1 to 4.6	Government objectives	

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Section	Question	Type	Response Format
	5.1 to 5.7	R&D	Likert scale from a value ranging from (1) 'well below 2009 national average' to (7) 'well above 2009 national average'
	5.8 to 5.11	T&L	
	5.12 to 5.13	Strategic planning	
	5.14A to 5.14F	Government objectives	
Suggestions and comments concerning this research in the space provided in the last section of the questionnaire			

Section A focuses on participants' demographic information with four questions related to public university category, designated position, length of time of working in the designated position and length of time of working in the university (see Table 5.3). These questions are based on a fixed alternative; they are sometimes used as closed-ended questions with responses to items by ticking (x) in only one box.

Table 5.3: Question in Section A of the Questionnaire

No	Questions	Fixed Alternative
1.	University category	Research University (Apex) Research University CU FU
2.	Designated position	Vice Chancellor/Rector Deputy Vice Chancellor/Deputy Rector Dean Head of Bursar Office or equivalent Director of Strategic Planning Office or equivalent
3.	Length of time working in your designated position	Less than 2 years 2 to 4 years 5 to 7 years More than 7 years
4.	Length of time spent working in universities	Less than 5 years 5 to 10 years 11 to 20 years More than 20 years

Next, Section B (see Appendix I) covers the main issues of the study, which is the impact of the changed government funding on the strategic planning of Malaysian public universities. Here, the questionnaire utilises a seven-point Likert scale to investigate respondents' perceptions of the impact (Clason, Dormody & Scales 1993). The previous studies have shown that the Likert scale was widely used in responses to the items in questionnaires (Burke & Lessard 2002; Jongbloed 2008a; Ramsden 1991; Zhao 1998). Although the optimal number of scale points on rating is debatable, the best range is considered to be from five to seven scale points (Sekaran 2000).

As demonstrated, the two different scales in area of interest were used in this study. Firstly, a point agree/disagree form of Likert scale ranging from (1) 'strongly disagree' to (7) 'strongly agree' and then secondly using an anchored scale of the 2009 national average for Malaysian public universities on the relevant area of interest as the anchor point with (1) 'well below 2009 national average' to (7) 'well above 2009 national average' were used. The responses will be indicative of whether there is a reduction in goal conflict and/or information asymmetry. To avoid confusion, questions were grouped by the type of response scale. Therefore, Likert scale values ranging from strongly disagree to strongly agree were arranged in one group and this was followed with the next scale used in the questionnaire.

In addition, the variables related to the informational asymmetries and goal conflict questions were shown in table below. There are three questions in strategic planning (B1.09, 1.10 & 1.11) asking about information asymmetries and 11 questions related to goal conflicts (B1.01, 1.02, 1.03, 1.04,1.05,1.06, 1.07, 1.08, 1.12, 1.13 & 1.14). The main purpose is to demonstrate that there is a reduction in goal conflicts and/or information asymmetries on the impact of government funding reforms on the strategic planning of Malaysian public universities.

Table 5.4: Informational Asymmetries and Goal Conflicts Questions

Variables	Question Number	Number of Items
Strategic planning (Information Asymmetries)	B1.09, 1.10 & 1.11	3
Strategic planning (Goal Conflicts)	B1.01, 1.02, 1.03, 1.04,1.05,1.06, 1.07, 1.08, 1.12, 1.13 & 1.14	11

Clear instructions were provided at the beginning of the questions one and five to leave any questions blank if they are not qualified to answer. In this study, the respondents were selected from different backgrounds and designations, which require specific responses according to their personal opinion and knowledge. At the end of the questions, participants were encouraged to make suggestions and comments concerning this research. The respondents are asked if they would like to make any suggestions and comments concerning this research in the space provided that could be used in the designing question for focus group interviews.

Structure and layout

In order to ensure that the questionnaire was clearly understood, the structure and layout in the survey form was carefully designed in this study. A cover letter was prepared explaining the purpose of the study. It comprised the title of the study, objectives, student details, university ethics and contact information, which were clearly displayed on the front page of the survey instrument (Brace 2004). To make it attractive, the researcher used coloured paper and attached a bookmark containing instructions to increase the response rate since the respondents in this study consisted of only university top management.

Step 3: Expert advice

The third step in the questionnaire design was to obtain feedback from an expert in order to improve the appearance and clarity of the survey instrument (Ouimet et al. 2004). In this step, the researcher asked Professor Morshidi Sirat, the Director of NHERI (21 July 2010) to read the questionnaire and ensure that all information was

relevant in the context of this study. Following this, the researcher sent an email to the Director (October 2010) in order to discuss his feedback and seek further advice before drafting the final pilot questionnaire. He was able to offer valuable suggestions on the items to be used in the instrument, and helped the researcher to ensure that all information was in line with the aims of the study.

Step 4: Pilot study

In this fourth step, a pilot study was carried out with a cohort similar to the target population to evaluate the clarity and comprehensiveness of the instrument prior to collecting the primary data (Churchill 1979; Munn & Drever 1990). According to Baker (1994), pilot interviews are a mini version of a full-scale study and useful for specific pre-testing of a questionnaire. The objectives of this trial run were to improve the research methods and procedures before undertaking the main survey, to find out the respondents' reaction in answering the questions, and to improve the reliability and validity of the survey instrument (Kreuger & Neuman 2002; Marican 2009; Paul & Lars 2003; Sekaran 2003; Teijlingen & Hundley 2001). The pilot interview was carried out with a small group of respondents similar to those intended for participation in the final survey. The pilot interviews were conducted in September and October 2010. Selection of top management suited to interviewing in this study was based on three different categories of Malaysian public universities. Respondents agreeing to participate in this study included one Deputy Vice Chancellor, one Dean, one Head of Bursar and one Director of Strategic Planning. A set of questionnaires was sent to each of these respondents, and appointments for interviews were made for an appropriate place and time approximately three weeks later.

In the process of conducting the interviews with top university management, the researcher followed all procedures and methods necessary in order to increase the quality of data. During the interviews, the researcher asked each of the questions outlined in Sections A and B to obtain qualitative feedback. Next, respondents were asked about the words, phrases and time taken to answer the questionnaire. At the end of each pilot interview, there were extremely positive responses to the survey

with very few problems being noted. The analyses of these findings are discussed in next step.

Step 5: Analysis and finalising the questionnaire

This last step provided useful insights into the parts of the questionnaire that needed to be reviewed prior to the main study. Findings of the pilot interviews are shown in the table below.

Table 5.5: Findings from Pilot Interviews

Respondent	Comment/Opinion
A	• There were no problems in answering the questions. • Suggested the provision of statements related to government funding changes as outlined in the National Higher Education Strategic Plan beyond 2020 and National Higher Education Plan 2007–2010 • In accordance with the instructions, this respondent noted a question that was not related to his area
B	• Some survey questions were not in the area of the respondent's area of expertise • Questions 4.1 to 4.6 were considered too broad and need of revision • Statement/information of government funding changes was noted as missing • In order to obtain further information of the Malaysian public universities strategic planning, this respondent suggested further communication with officers in MoHE

Respondent	Comment/Opinion
C	• No problem in answering and understanding the questions
	• Suggestion of preparing clearer questions especially in questions 5.14
	• No problems in interpreting the meaning of national average
D	• No problem in answering all the questions in the questionnaire
	• Respondent noted his awareness of changes in Malaysian Government funding as stated in the strategic plan
	• Agreed that there were changes in government funding recently due to the government's policy of creating more accountability
	• Noted appreciation of this study because it can provide a framework and schedule for universities to play a primary role in their planning framework, even beyond 2020

From the feedback provided in the interviews, some questions were reframed and validity of the questionnaire was improved. Further, the average time needed to complete the questionnaire was reduced from 25 to 20 minutes. One of the main issues raised during the interviews concerned the statement of government funding changes as stated in the National Higher Education Strategic Plan beyond 2020 and National Higher Education Plan 2007–2010. To resolve this matter, the researcher added the planning information about government funding changes in Malaysian public universities as described in the strategic plans outlined in Section B of the questionnaire. These actions were addressed accordingly with the supervisors. Throughout the above process, all appropriate steps were taken to help improve the quality of the finalised questionnaire instrument used for primary data collection.

5.4.2 Population and data collection

In this study, criteria for selecting the population were carefully designed to include the positions occupied in university top management in order to increase the quality of information needed. It is necessary for the respondents selected to have an understanding of the: (1) university strategic planning; (2) government funding reforms in public universities; and (3) consequences of the changes with respect to information asymmetry and goal conflicts. This was achieved using the seniority of respondents and requiring at least 15 years' experience in the Malaysian public universities system. Staff in such senior positions has extensive management experience and expert knowledge related to changes in university strategic planning, T&L and R&D. They have also acquired extensive knowledge on government strategic planning and objectives as stated in the documents released as part of the change process.

Table 5.6: Populations of the Study

University Categories	Positions					Total
	VC/R	*DVC/DR	*DEAN	BO	DSP	
RAUs	5	18	85	5	5	118
CUs	4	14	52	4	4	78
FUs	11	24	82	11	11	139
Total	**20**	**56**	**219**	**20**	**20**	**335**

Note: * Total number based on data gathered from the individual university website
VC/R=Vice Chancellor/Rector; DVC/DR=Deputy Vice Chancellor/Deputy Rector; DSP; Director of Strategic Planning; and BO= Head of Bursar.

The population of this study includes all of respondents from the 20 public universities in Malaysia and can be grouped into three categories: RAU, FU and CU. As mentioned above, the targeted population includes only the universities' top management: Vice Chancellors/Rector, Deputy Vice Chancellors/Deputy Rectors, Deans, Directors of Strategic Planning or equivalent, and Heads of Bursar or equivalent. Accordingly, the researcher was assured by the Director of National Higher Education Research Institute that all respondents selected fulfilled the relevant knowledge criteria. The study is limited to the selected target population as

mentioned above and cannot be generalised to the others groups such as the MoHE, students, and lecturers.

Table 5.6 explains the distribution of respondents in this study, according to types of Malaysian public universities. Information on participants is mainly gathered from individual university websites. As indicated, the Dean represents the main targeted population for this study, and followed by Vice Chancellors/Deputy Rectors. Vice Chancellors/Rector, Director of Strategic Planning or equivalent and Head of Bursar or equivalent has the same number representing all university categories. Thus, a total number of 335 respondents selected from all Malaysian public universities were contacted in this study.

Questionnaires were sent to participants of the selected universities by direct delivery, mail and email. Participants were informed that the purpose of this study is to investigate the impact of government funding reforms on Malaysian public universities with the intention of fostering the development of academic and institutional excellence, as stated in the National Higher Education Strategic Plan 2020 and the National Higher Education Action Plan 2007–2010.

Table 5.7: Locations and Methods of Questionnaire Distribution

Locations	Methods	Number of Universities
Klang Valley	Directly visited	6
South Malaysia	Directly visited	4
Northern Malaysia	Directly visited, mail and email	4
East Coast Malaysia	Directly visited, mail and email	4
Sabah and Sarawak	email	2
	Total	**20**

In order to reach the target population represented in this study, the researcher compiled a contact list with names, designations, telephone numbers and email addresses from websites of all the participating institutions. The researcher used these contact details as references for data collection and strategies to increase the

response rate. Questionnaires were sent to the universities between December 2010 and March 2011.

Figure 5.4: Location of Public Universities in Malaysia
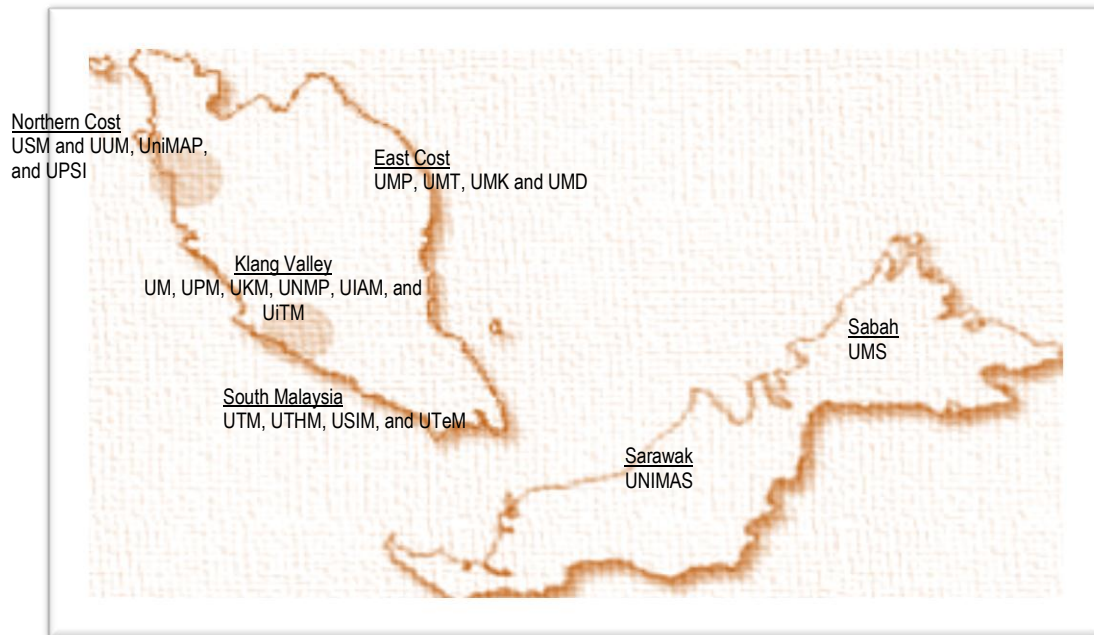
The researcher took full responsibility for the administration of the questionnaire survey, which included the process of contacting participants, and distributing and collecting the questionnaires. Targeted populations of the Malaysian public universities were arranged for visits, mail and email in the following order: (1) *Klang Valley* (UM, UPM, UKM, UPNM, UIAM, and UiTM); (2) *South Malaysia* (UTM, UTHM, USIM, and UTeM), *East Coast Malaysia* (UMP, UMT, UMK and UniSZA); (3) *Northern Malaysia* (UUM, USM, UPSI and uniMAP); and (5) *Borneo* (UNIMAS and UMS). In addition to distributing the questionnaire, the researcher wrote officially to the EPU and MoHE for permission to conduct a study in the government agencies as well as the public universities. Letters of approval are presented in Appendix II.

The following are among the assumptions used during the research procedures where the researcher assumes that the:

i.   participants answered all the questions in the questionnaires correctly and honestly;

ii.   data gathered through the questionnaire is correct and true; and

iii.   participants understood the items and questions highlighted in the questionnaire.

5.5   Qualitative Research Design

Qualitative research methodology was used to gain further information to address the RQs in this thesis. In this procedure, focus group interviews are used to compare and contrast the information gained in the questionnaire analysis. These focus group interviews aimed to represent a valuable opportunity for the researcher to acquire a greater diversity of viewpoints and greater details with the hope that they could subsequently lead to the discovery of additional relevant information. This assisted in reducing the risk of reaching incorrect conclusions in this study (Langford & McDonagh 2003). Looking at the issue from another angle, the results of focus group interviews can lend confidence to the findings of the questionnaire survey. Alternatively, results of focus group interviews may spark off parallel or follow-up studies, which can provide new information to support conclusions.

In the following section, details of the implementation of the focus group interviews including method, purpose and framework are discussed.

5.5.1   Focus group planning framework

As indicated in the research design (see Figure 5.2), this study aims to maximise the reliability of data by adopting a mixed-methods approach. Focus group interviews employed in this research have used a qualitative approach used to obtain in-depth information of the impact of changes in government funding on the strategic planning of Malaysian public universities. Information obtained from the focus group interviews helps confirm and improve the data finding from the questionnaire (Morgan 1998). This method of data collection has enabled the researcher to gain insights into the attitudes, perceptions and opinions of participants who have a significant level of knowledge and experience on the operation of Malaysian public

universities. These help to gain valuable information that may not be obtainable using the survey instrument alone. For this reason, the researcher has adapted a focus group interview practice framework from Krueger and Casey (2009), as shown in Figure 5.5. This is to ensure the systematic plan approach is implemented in this research study.

Figure 5.5: Planning Framework for Focus Group Study

Step 1	Determine the purpose
Step 2	Decide whether focus group interviewing is the right method
Step 3	Determine what types of people can give you the information that you want
Step 4	Determining how many groups to conduct
Step 5	Balancing the design with the resources available
Step 6	Designing the focus group study
Step 7	Developing a written plan and determining resources needed

Source: Adapted from Krueger and Casey (2009)

Step 1: Determine the purpose

The first step in the focus group planning framework is to determine the interview purpose in order to focus participants and obtain better quality data by generating ideas. The data are then screened and revised to gain an in-depth understanding of

the research problem (Lederman 1990; Morgan 1997; Stewart & Shamdasani 1990). Focus group interviews were designed to elicit the following:

i.   Confirmation and contrast of results from the survey instrument;

ii. Support for data findings from the survey instrument;

iii. Exploration of further details on the data findings that could not be gathered from the survey instrument of Malaysian Government strategic planning in higher education with emphasis on funding changes;

iv. Comparison and contrast of data findings of the survey and interview results; and

v.   Provision of a broader and deeper understanding of the data findings.

Step 2: Justification for the use of focus group interviews

The second stage in the planning framework is to decide the rationale for choices made to employ a focus group methodology in this study. In order to obtain more in-depth information on the impact of changes in government funding at Malaysian public universities, data that could not be gathered from the survey instrument were collected using focus group interviews. In this way, perceptions of the implementation of new funding changes will be used to strengthen the findings obtained through analysis of the survey instrument.

Figure 5.6: Proposed Mixed-methods Research
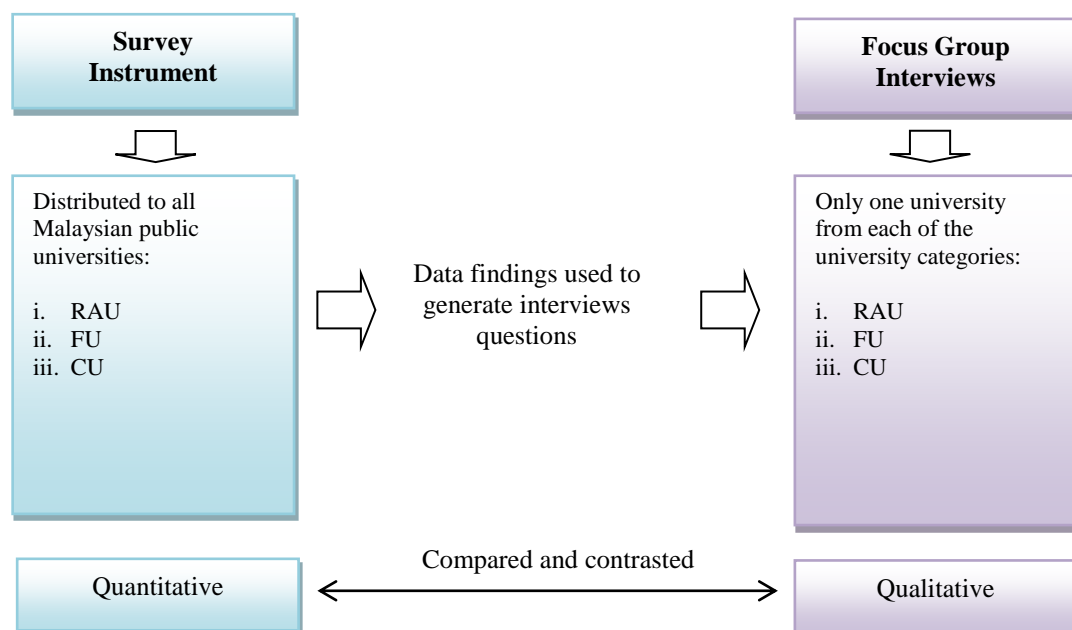
As indicated in Figure 5.6, the questionnaire was distributed to all Malaysian public universities in order to obtain preliminary data. This information forms the basis for a comparative analysis to determine if differences exist in reactions to government funding changes. Data that could not be gathered from the questionnaire were collected using focus group interviews. This method will help the researcher to illustrate the findings from different perspectives before making any comparison to address the objectives of the study (Morse & Niehaus 2009).

Step 3: Determining which people can give you the required information

In this thesis, participants were selected from those who have experience and knowledge in the following areas: (1) T&L; (2) R&D; (3) government financial management; and (4) university strategic planning. The key is to elicit the most relevant thoughts from the most suitable people. Therefore, selected participants are relatively senior officers who have similar functions and purposes. However, their focus and strategies may be different since they come from three different categories of public universities. Therefore, participants selected from each university include Director of Strategic Planning Office or equivalent, Head of Bursar Office or equivalent, Dean, and Director of Research Management Centre or equivalent. Each participant is expected to contribute to the pool of ideas according to his or her main areas of expertise in the university management team.

Step 4: Determining the number of groups

The fourth step in the planning framework is to determine the correct number of focus groups to fully represent the 20 public universities in Malaysia, consisting of five RAUs, four CUs, and 11 FUs. Each type of focus group represented a particular university category and reflects a balanced composition of participants. Groups consisted of the people suitable to give the in-depth information and points of view that represent their particular disciplines. The focus group interviews were conducted at the participants' respective universities at times and locations appropriate to the participants working schedules.

Step 5: Balancing the design with the resources available

In determining the timing of the focus group interviews, the timeframe was very much dependent on the timing of obtaining the questionnaire results. Additionally, information derived from the questionnaire provided the basis and ideas for generating questions for the interviews. According to the schedule arranged, focus group interviews are conducted at the respective universities with the time and location determined by accessibility of these busy participants in order to create a relaxed environment (Krueger & Casey 2009). The researcher was very particular about the time and budget available for conducting these interviews.

Step 6: Designing the focus group interviews

Supervisors have been used to validate the questions emerging from the survey instrument that were answered in the focus group interviews. The process involved first developing draft interview questions based on results of the survey and the discussing them with the two supervisors. Comments and suggestions were addressed to ensure that all questions covered the main issues in the research. The focus group questions were then sent to participants two weeks before conducting the interviews. These interactions were important to ensure that questions related closely to the main issues of the research.

Focus group meetings were organised in a less structured manner. Participants in the interviews were encouraged to participate in the discussion and give their opinion on issues related to the study. The saturation point was decided when information pertaining to the core problem of the research was obtained (Krueger & Casey 2009; Morgan 1997).

Step 7: Developing a written plan and determining resources needed

To reduce the incidence of problems during the implementation of focus group interviews, the researcher decided to develop a written plan and determine the resources needed, as proposed by Krueger and Casey (2009). The purpose of this plan was to ensure the researcher could act effectively in determining the overall flow of the process. This plan was adjusted with the emergence of any unexpected or

anticipated problems (Krueger & Casey 2009). This framework was performed before, during and after the focus group interviews. It helped the researcher to look into the important aspects of activities that required priorities since most of the participants are from universities top management. The details of the plan are shown in Appendix III. The following section discusses the interviews conducted as part of this study.

5.5.2   Conducting focus group interviews

Systematic approaches to planning and conducting focus group interviews are adopted from the framework proposed by Krueger and Casey (2009). Using this framework, focus groups were conducted at their respective universities at times convenient to participants. All discussions were held in university meeting rooms that were conducive to small group interactions. Prior to the commencement of each focus group interview, the researcher elaborated on the purpose and objectives of the study in order to set the mood. Even though the consent forms and interview information sheets were given two weeks in advance, brief introductions were made to ensure that the directions were in line with the objectives of the study. Participants were notified that the discussions would be audio taped to enable the researcher to improve the accuracy of the transcripts. Following this, each participant played the role of fostering meaningful interactions by providing information to all participants.

During discussion, the researcher ensured that each group provided quality insightful information to the study. Therefore, questions (see Appendix IV) based on findings from the questionnaire were covered within the allocated time. Here, the researcher used an interview checklist to track the topics covered. This was achieved by considering several strategies adopted to meet the objectives. Following this, the same procedure was repeated in each category of Malaysian public universities. All discussion lasted about one and a half hours as planned. In the concluding remarks of each discussion, the researcher briefly addressed the outcomes gathered during the interviews. At the same time, the researcher requested additional comments from the participants where needed. To end each discussion, the researcher thanked the participants for spending their valuable time in the discussion.

Table 5.8: Participants in Focus Group Interviews

Research/Apex Universities		Comprehensive University	Focused University
University A	**University B**	**University C**	**University D**
Director of Strategic Planning	One Senior Officer from Strategic Planning Office	Officer from Strategic Planning Office	Director of Strategic Planning
Three officers from Strategic Planning Office			Officer from Strategic Planning Office
Head of Bursar	Two Senior Officers from Bursar Office	Head of Bursar	Head of Bursar
Deputy Dean	Officer from Academic Management Office	Officer from Academic Management Office	Deputy Dean
	Two senior Officers from Research Management Office	Head of Research and Development	

At first, the discussions were organised to include only the heads of department representing the Strategic Planning Office, Bursar Office, Dean, and Research Management Centre. However, due to their heavy work schedules, some could not attend interviews. For this reason, representatives who had sufficient knowledge and experience to contribute on their behalf were appointed as replacements. In addition, the RU and Apex University results were combined in this study, referred to as RAUs to protect the identity of Apex University. As indicated in Table 5.8, nearly all participants present at the interview consisted of heads of departments.

5.6 Data Analysis Strategy

As the majority of mixed-methods studies employ sequential use of different methods rather than the integration of data analysis, in accordance with Tashakkori and Teddlie (2003), this study adopted the strategy of sequential methods for data analysis in order to obtain maximum information from the findings. Bergman (2008) indicated that the sequential (Explanatory, Exploratory, and Embedded) method uses both quantitative and qualitative data, which are implemented and connected at different phases. According to Creswell (2003), this design is relatively easy to implement and describes findings well where mixed methods are employed.

Figure 5.7: Sequential Explanatory Design

Stage 1	Stage 2	Stage 3
Separate QUAN data analysis	Identify QUAN results to use	Apply QUAN results to QUAL phase

QUAN data analysis

Options
- Outliers
- Extreme cases
- Significant-no significant result
- Demographics
- Comparison groups

- Select cases
- Explain results
- Compare groups
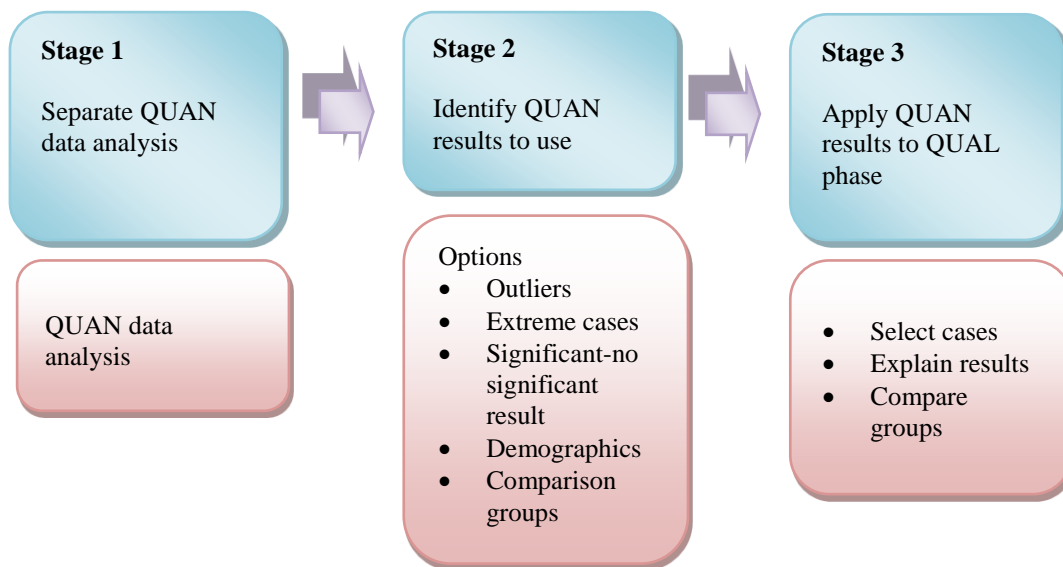
Source: Adapted from Creswell and Plano (2007)

In this study, an Explanatory Design framework was employed to analyse data, adopting a questionnaire survey in Stage 1 and then followed by focus group interviews to explain the initial survey instrument results in Stage 2 (see Figure 5.7). In Stage 3, the researcher then used findings from the quantitative results to compare and contrast with results gathered from the qualitative data gained in focus groups. In order to ensure that the correct approaches were adopted, guidelines from Creswell and Plano (2007) were then implemented as follows:

i.   Utilise the data from the first method to inform the second database;

ii.   Address the mixed-methods questions on how quantitative results can generalise the qualitative findings; and

iii. Analyse the first database to provide understanding of the study for use in the second method depending in which quantitative data are analysed.

In this thesis, the results cover data from survey and focus group interviews (see Figure 5.8). Here, quantitative and qualitative results are analysed separately. Then, the researcher will compare and contrast the findings for expanding the understanding the research study in order to see if there are similarities and differences. Creswell and Plano (2007) explain that by using this approach of concurrent data analysis for mixed-methods or triangulation approaches, the qualitative data may support and even confirm the quantitative results.

Figure 5.8: Data Analysis Strategy

Compare and Contrast
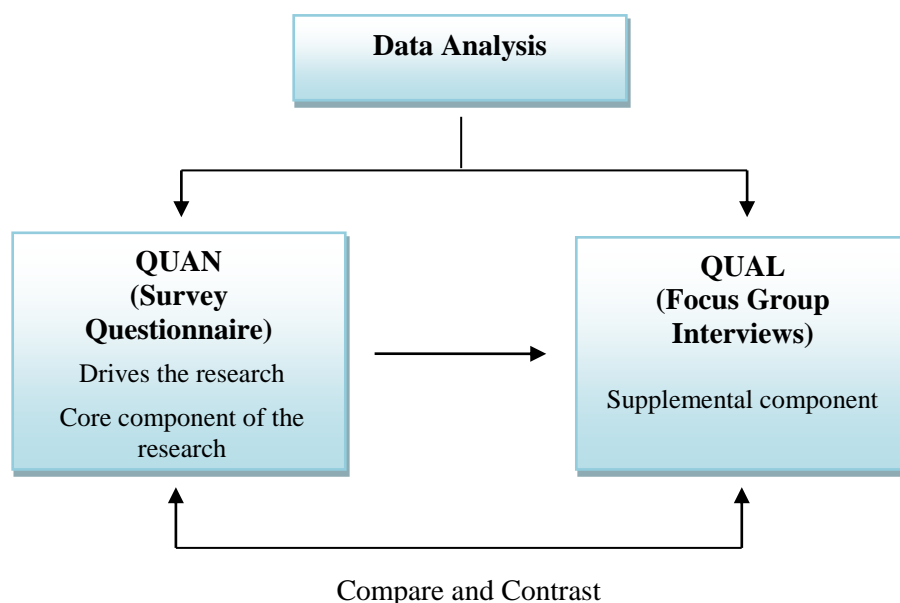
Data findings from the different categories of Malaysian public universities are examined and analysed according to patterns and information that fit into this research. This analysis will reveal differences and similarities of the impact of Malaysian Government funding changes on strategic planning, T&L, R&D and

attainment of government objectives. In other words, the aim is to provide analysis of the context and processing of the database to address the RQs in this study. The combination of data analysis from questionnaire survey and focus group interviews allows the triangulation of quantitative and qualitative data to be incorporated into a single research design to help validate the data findings.

5.6.1   Data analysis from questionnaire

The Predictive Analytic Software (PASW) 18 for windows (previously known as Statistical Package for Social Science or SPSS) was used to analyse the data collected from the questionnaire. Data input is firstly prepared using Microsoft Excel software and then imported into PASW. Before the start of this procedure, data screening and cleaning processes were performed to ensure that data were entered correctly. Data from the questionnaires were initially screened for errors using both Microsoft Excel and SPSS due to the possibility of manually coded data creating serious problems during analysis (De Vaus 2002; Pallant 2004).

In step one, data were entered into a Microsoft Excel worksheet and coding errors were tested for by conducting a range of checks on all variables. In the second step, PASW was used to also inspect the same problem by running frequency analyses for each of the variables according to the range of responses. This analysis produces results in the form of a percentile distribution for each variable, which is practical for error recognition in data coding.

For the purpose of this study, two statistical techniques were used: (1) descriptive (2) inferential (Sekaran 2003; Tashakkori & Teddlie 2003; Zikmund 2003). Descriptive statistics were employed to explain the respondents' demographic characteristics using both frequency and percentage. Here, data findings were presented using tables and figures that are easy to understand and interpret (Zikmund 2003). The purpose is to facilitate simple presentation and effective communications of the meaning of the data. Frequency and percentage tests were then used to discover the frequencies of respondents according to university category, designation, length of time working in designated position and length of time working in university.

Inferential statistics were used to compare the independent variable (IV) and dependent variable (DV) with the purpose of generalising the findings from a sample of respondents in Malaysian public universities to the entire population. In this study, the IV used was a university category in which the researcher had control on the effect of the DV. The controlled variables that were being manipulated were designation, length of time of working in designated position, and length of time of working in universities. The DV to be explored were strategic planning, R&D, T&L and government objectives. Here, the researcher's interest was to investigate the impact of changes in government funding on the Malaysian public university categories on the DV of the study (strategic planning, R&D, T&L and government objective) in order to find answers to the RQs, as stated in Chapter 1.

Regardless of the RQs being tested, both nonparametric and parametric tests have been performed in this study. Both of the statistical tests have the advantages and disadvantages. Nonparametric statistics deal with data where no assumption can be made about the probability distribution of the data and parametric statistics deal with normality as part of the important assumptions. A nonparametric test is also suitable for small samples and unequal variances. Norman (2010) points out that parametric statistics can be used with small sample sizes of unequal variance, and with non-normal distributions, with no fear of '*coming to the wrong conclusion*'. Nonparametric statistics are used in this study for two main reasons. The first is to confirm the data obtained using parametric statistics, and the second is to apply a test that is robust with respect to the violation of the normality assumptions.

The advantages of nonparametric statistical (Dallal 2000; Gibbons 1993; Siegel 1956) test are as follows:

i.   Nonparametric statistics make fewer assumptions about the data and may be more relevant to a particular situation (Siegel 1956);

ii.   Nonparametric statistics procedures can sometimes be used to obtain a quick answer with little calculation (Dallal 2000);

iii.   Nonparametric methods are available to treat data that are simply classificatory or categorical (Siegel 1956); and

iv.   Nonparametric statistics can be applied in a very wide variety of practical research situations in which classical statistics are not appropriate (Gibbons 1993).

Specifically, the nonparametric tests performed in this study are: (1) one-sample Wilcoxon signed rank test; (2) multi-sample Wilcoxon signed rank test; and (3) Kruskal-Wallis test. The parametric one-sample t-test is used to compare with results from the one-sample Wilcoxon signed rank test. Further, the parametric factorial analysis of variance (ANOVA) gives the results of the multivariate analysis that cannot be performed using the Kruskal-Wallis test. Parametric tests will increase the power of the tests if the normality assumption is true. All these tests are the most common statistical approaches used to evaluate group differences. The results from both parametric and nonparametric tests complete each other. As is common practice in such studies, the standard level of significance used in this study is at the level 0.05.

One-sample Wilcoxon signed rank test and one-sample t-test
A one-sample Wilcoxon signed rank test that is equivalent to the one-sample t-test was used to evaluate the median of the DV to test whether or not the respondents agree overall with statements made in response to the questions (DeCoster 2006). A seven-point Likert scale is used where a value of four represents a neutral response; both tests are designed to test if the average response in the population is greater than four. The test then indicates the respondents' agreement or disagreement with each statement related to the impact of government funding changes in Malaysian public universities. Both tests were carried out to add additional strength to the results. They assess whether there is agreement in a reduction of goal conflict and/or information asymmetry.

Multi-sample Wilcoxon signed rank test
The multi-sample Wilcoxon signed rank test, also known as Wilcoxon Matched Pairs Signed Rank Test was used (Pallant 2004; Rosner, Glynn & Lee 2006). This test procedure is used when comparing two dependent samples (Sheskin 2007) and

generally has more power than the sign test to ascertain differences associated with two populations (Gilbert 1987). In this study, it compares the categories of the DV with response to: (1) 2010 compared to 2006; (2) 2015 compared to 2010; and (3) 2015 compared to 2006 for the whole university sector. These questions used a seven-point Likert scale with an anchor of the national average of the relevant factor in 2009, with ranging from 1 = well below 2009 national average to 7 = well above 2009 national average. In addition, all results from Z score based on a negative rank of significant difference were reported.

Kruskal-Wallis test

The Kruskal-Wallis test was used to draw statistical conclusions in order to make comparisons across the components of Malaysian public universities. The Kruskal-Wallis test is very similar to Mann-Whitney where data are ranked across three or more groups (Cohen & Lea 2004). The results of this test are comparable to the one-way ANOVA variance in the parametric test. Keller (2005) indicates that this test is applied to problems with the following characteristics: comparisons of three or more populations; and data that are either ordinal or interval but not normal, with independent samples. In addition, in agreement with Sheskin (2007), the significant results in this study indicate a significant difference between at least two of the sample medians in the set of k medians. The mean rank results are then further investigated in order to assess the highest and lowest scores across the university groups.

Two-way analysis of ANOVA

A two-way analysis of ANOVA or factorial ANOVA was employed to examine the main effects of more than two IVs with one DV. This test also includes the control variables of designation, length of time of working in designated position, and length of time of working in universities in the IV. Previous literature indicates that two-way ANOVA is robust with respect to the violation of normality assumptions in many applications within a moderate or large sample size (Gomaa et al. 2008; Green & Salkind 2008; Montgomery 2005). The researcher's main interest was to analyse results to determine the significant differences across the university groups.

Moreover, a Levene's test was used to test the homogeneity assumption. Variables with significance levels of less than 0.05 were considered to have violated the homogeneity assumption, and were not used for further analysis in this study (Field 2005).

The test of between-subjects effects, which is the main output from the two-way ANOVA, provides the information about the significant main effects required for this study (Pallant 2004). Here, a significant value of 0.05 was used to determine if there is a statistically significant difference. Next, *post hoc* multiple comparisons using a Tukey HSD procedure were performed when the main effects from the tests of between-subjects effects were reporting to be significant. According to Pallant (2004), the *post hoc* tests systematically compare the pairs of groups and suggest whether there is a significant difference in the means of each. The purpose of the *post hoc* test is to determine where there are significant difference across the university groups.

The presentation of the statistical tests used in this thesis are organised in three parts as follows.

Research questions 1 to 3

The first part, data from questions 1.1 to 3.6 and 5.1 to 5.13, was used to answer RQs1 to 3 as depicted in Figure 5.9. Questions 1.1 to 3.6 regarding on the impact of government funding reforms in Malaysian public universities were designed to assess whether the respondents agreed or disagreed with each statement on altering the approach to strategic planning, R&D and T&L through a reduction in information asymmetry and/or goal conflict. Therefore, in order to answer these RQs, both one-sample Wilcoxon signed rank test and one-sample t-test were performed.

In addition, data from questions 5.1 to 5.13 were used to further investigate the respondents' opinions on the impact of government funding reforms across the given period. This is achieved by making comparisons with the 2009 national averages

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based on respondents' perceptions. These are used to compare changes over time by comparing:

i.   2010 and 2006
ii.   2015 and 2010
iii.   2015 and 2006

Figure 5.9: Statistical Procedure for Research Questions One to Three
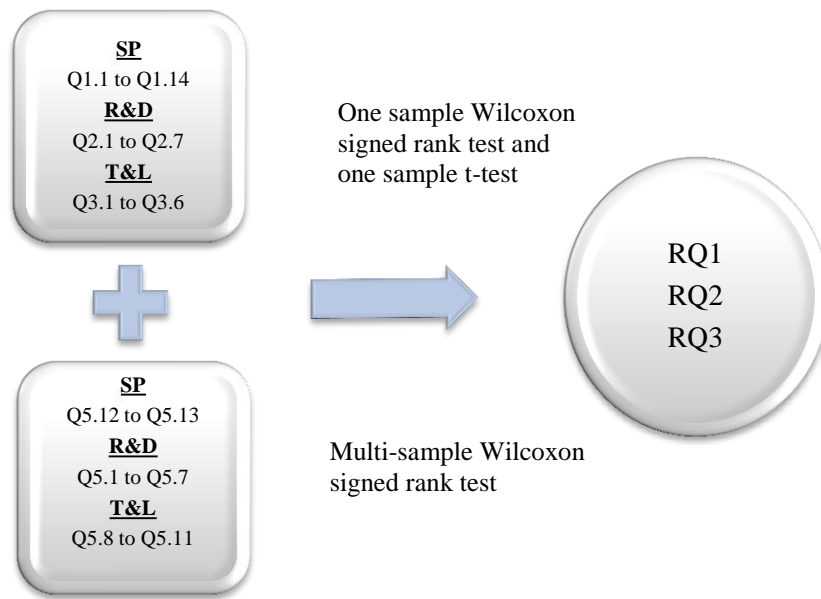
In order further investigate the respondents' opinions based on the period of time, the multi-sample Wilcoxon signed rank test was then performed. The purpose of this is to determine whether there is evidence of specific directions in differences of the respondents' perceptions over time that are related to the impact of government funding reforms in accordance with the strategic planning, R&D and T&L.

Research question 4

In this second part, the purpose of this RQ is to extend the results and further investigate the influence of government funding reforms on different types of Malaysian public universities due to altering the approach of strategic planning, R&D and T&L (see Figure 5.10).

Figure 5.10: Statistical Procedure for Research Question Four

SP
Q5.12 to Q5.13

R&D
Q5.1 to Q5.7

T&L
Q5.8 to Q5.11

Kruskal-Wallis test & Factorial ANOVA test

RQ4

The main idea is to investigate the mean differences across the period of time covering 2006, 2010 and 2015 (expected outcome) for the questions 5.1 to 5.13 across the university groups (RAUs, FUs and CUs). In addition, the RU and Apex University results were combined in this study and referred to as RAUs to protect the identity of the Apex University. Therefore, the Kruskal-Wallis and factorial ANOVA tests were performed to answer this RQ.

Research question 5

In the third part of statistical testing, data from questions 4.1 to 4.6 and 5.14A to 5.14F were designed to assess participants' opinions on the program imposed by the MoHE in accordance with the government strategic plans through a reduction in goal conflict and/or information asymmetry. Therefore, in order to answer RQ5, the previous tests used in the first two parts are repeated. Firstly, the one-sample t-test and one-sample Wilcoxon signed rank test were performed on questions 4.1 to 4.6. Following this, the multi-sample Wilcoxon signed rank test was performed to obtain results from the whole university sector for questions 5.14A to 5.14F.

Secondly, the Kruskal-Wallis and factorial ANOVA tests are performed for questions 5.14A and 5.14F across the university groups (RAUs, FUs and CUs). Here. the analysis of factorial ANOVA performed in this RQ is arranged based on: (1) 2006; and (2) 2015 versus 2006. Firstly, the 2006 data were used as a starting point,

as at this stage government blue prints had not been announced. A 2015 versus 2006 factorial ANOVA analysis allows the researcher to test the total impact of the implementation of government strategic plans and funding reforms over the entire period to compare with the period before the announcements of change were made.

Figure 5.11: Statistical Procedure for Research Question Five
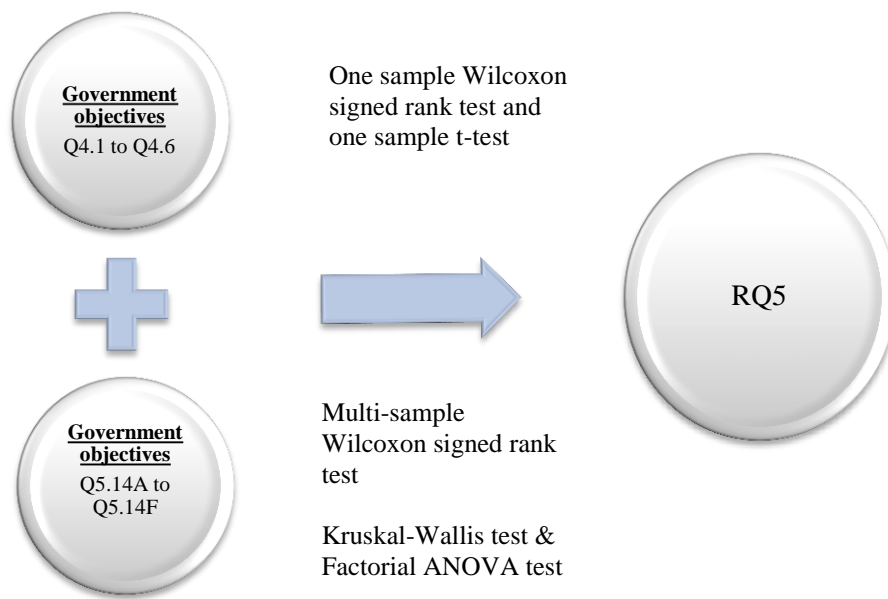
The RU and Apex University results from the Kruskal-Wallis test and factorial ANOVA were combined in this study and referred to as RAUs to protect the identity of the Apex University.

A summary of the statistics applied in this study is shown in the following table.

Table 5.9: Summary of the Statistics Used in this Study

Research Questions	Items	Tests		Details	
		Parametric	**Non parametric**		
RQ1 = strategic planning	1.1 to 3.6	One-sample t-test	One-sample nonparametric test	To test whether the average response is above four to indicate respondents' level of agreement that funding changes alter the approach through a reduction in goal conflict and/or information asymmetry	To the whole university sector
RQ2 = R&D RQ3 = T&L	5.1 to 5.13	-	Multi-sample Wilcoxon signed ranks test	Responses to: (1) 2010 compared to 2006; (2) 2015 compared to 2010 questions; and (3) 2015 compared to 2006	
RQ4 = University Category	5.1 to 5.13	**-**	Kruskal-Wallis test	Based on Malaysian public university category with the aim of assessing impacts on: (1) R&D; (2) T&L; and (3) strategic planning	Focus on analysis according to university categories in order to investigate differences
		Two-way ANOVA	-		

Research Questions	Items	Tests		Details	
		Parametric	Non parametric		
	4.1 to 4.6	One-sample t-test	One-sample nonparametric test	To test whether the average response is above four, which indicates respondents' agreement that funding changes alter the approach through a reduction in goal conflict and/or information asymmetry	To the whole university sector
	5.14A to 5.14F	-	Multi-sample Wilcoxon signed ranks test	Responses to: (1) 2010 compared to 2006; (2) 2015 compared to 2010 questions; and (3) 2015 compared to 2006	
	5.14A to 5.14F	-	Kruskal-Wallis test	Based on the Malaysian public university category in which the aim is to assess funding impacts on government objectives	Focus on analysis according to university categories in order to investigate differences
		Two-way ANOVA	-		

5.6.2 Reporting survey results

As described previously, the results of the questionnaires were organised based on the RQs and statistical tests specifically determined in this study. Further, the reporting of questionnaires were also organised according to results based on each item and composite measure. In this thesis, the reporting begins with the results based on items analysis and follows with the reporting of results from the composite measure (average scores). Figure 5.12 below explains the organisation of reporting of survey results.

Figure 5.12: The Organisation of Reporting Survey Results
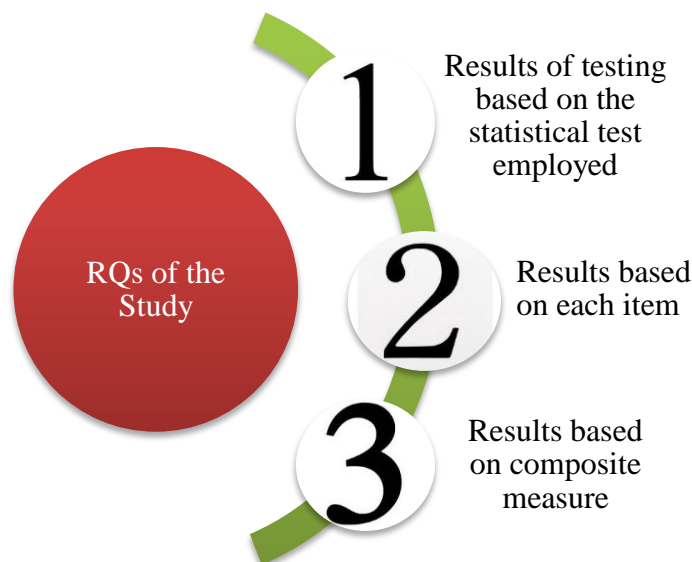
5.6.3 Missing and valid data

Clear instructions were provided at the beginning of questions one and five to ensure that respondents left any questions blank if they were not qualified to answer them. As a result of this instruction, there are parts of the questions that respondents did not answer, resulting in missing data. Here, valid data refer to the questions that are answered by the respondents. Pallant (2004) suggests that the 'exclude cases listwise' and 'exclude cases pairwise' can be used to analyse both validated and missing data. In this study, the missing values in questionnaire were checked using the descriptive statistical analysis gathered from SPSS. The results from this analysis

show that only two items have the missing values of 5.8 per cent. Therefore, it can be concluded that most of the items in the survey instruments were answered by the respondents.

5.6.4 Reliability analysis

Reliability of the composite measures used in this research were tested using Cronbach's alpha measure of reliability (internal consistency). As the purpose of reliability testing is to analyse the extent to which the survey instrument is not biased (error free), this will ensure consistency of measurement across time and items used in the composite measure. Consequently, the reliability analysis conducted ensures that the composite measures are stable and consistent. This instrument measures the concept, and Cronbach's alpha helps to assess 'goodness' of the composite measure. A Cronbach's alpha of 0.70 indicates an acceptable reliability in most cases, with higher internal consistency indicating better reliability (Sekaran 2003). Further, as Yockey (2011) points out, a coefficient alpha range from 0.70 to 0.79 is fair, 0.80 to 0.89 is good, and above 0.90 is excellent.

Table 5.10: Results of Reliability Analysis

Variables	Questions	Cronbach's Alpha	Number of Items
Likert scale: 1=strong disagree to 7=strongly agree			
strategic planning	B1.1 to B1.14	.959	14
R&D	B2.1 to B 2.7	.919	7
T&L	B3.1 to B3.6	.840	6
Government objectives	B4.1 to B4.6	.921	6
Likert scale: 1=well below 2009 national average to 7=well above 2009 national average			
R&D	B5.1 to B5.7		
	2006	.968	7
	2010	.959	7
	2015	.939	7

Variables	Questions	Cronbach's Alpha	Number of Items
T&L	B5.8 to B5.11		
	2006	.923	7
	2010	.885	7
	2015	.081	7
Strategic planning	B5.12 to B5.13B		
	2006	.917	3
	2010	.917	3
	2015	.893	3
Government objectives	B5.14A to B5.14F		
	2006	.945	6
	2010	.919	6
	2015	.885	6

As shown in Table 5.10, the Cronbach alpha coefficients reported were more than 0.9 for most constructs, with only four of these having Cronbach's alpha value in the range of 0.80 to 0.89. To test whether the inclusion of all questions in each of the composite measures was justified, further testing was performed. This was achieved by recalculating the Cronbach alpha in each question, leaving out the composite to find no case in which the Cronbach alpha increased significantly for revised composite measures.

Table 5.11: Results of Reliability Analysis for Informational Asymmetries and Goal Conflicts Questions

Variables	Question Number	Cronbach's Alpha	Number of Items
Strategic planning (Information Asymmetries)	B1.09, 1.10 & 1.11	0.89	3
Strategic planning (Goal Conflicts)	B1.01, 1.02, 1.03, 1.04,1.05,1.06, 1.07, 1.08, 1.12, 1.13 & 1.14	0.95	11

The above table shows the Cronbach alpha for strategic planning composite measures divided into two components: information asymmetry and goal conflict. The results from the three questionnaire items used to measure information asymmetries indicated that the Cronbach's alpha was 0.89 for this construct. Meanwhile, the 11 items used to measure goal conflicts indicated a Cronbach's alpha value of 0.95.

The Cronbach alpha coefficients reported in this thesis further justifies the used of all composite measures in this research.

5.6.5   Data Analysis from the focus group interviews

In this research, the focus groups are qualitatively analysed in order to obtain in-depth information. These interviews were conducted in the English language and recorded. The results were then transcribed and coded to identify themes and meanings according to the five RQs. Findings from this process helped to identify the patterns associated with each variable among respondents in the different categories of Malaysian public universities. Here, the goal was to integrate the themes in order to assist the researcher in understanding the relationships between variables. As proposed by Miles and Huberman (1994), the strategies used to collect and analyse data from the focus group interviews include data collection, data reduction, data display, and conclusion (see Figure 5.13).

Figure 5.13: Components of Data Analysis: Interactive Model
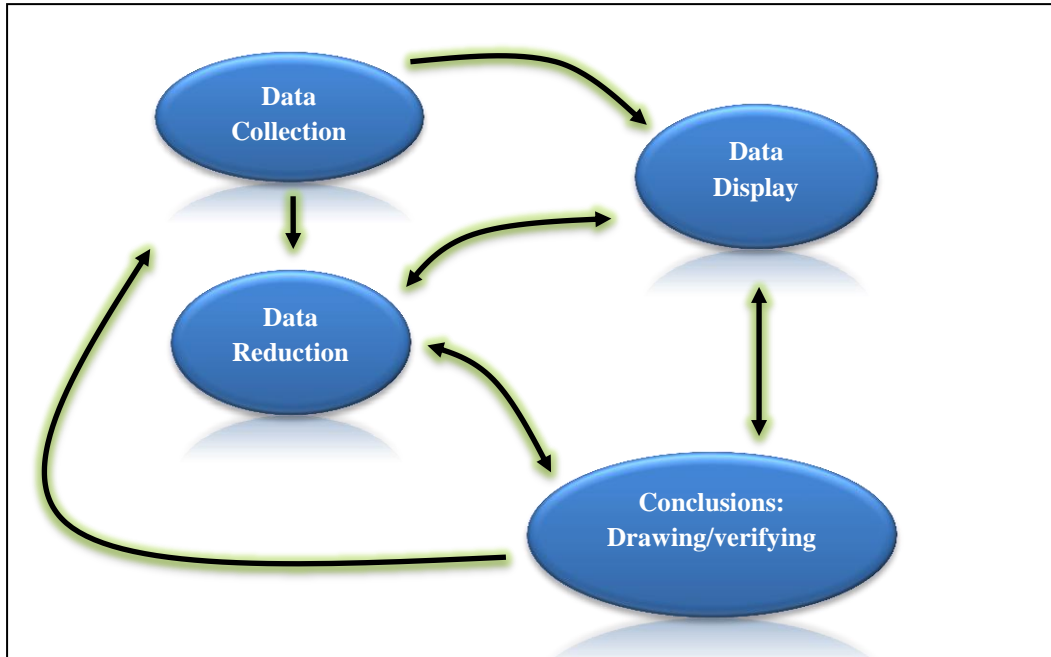
Source: Adapted from Miles and Huberman (1994)

Data for this study were then collected through focus group interviews conducted at Malaysian public universities in order to further investigate the impact of funding reforms. In accordance with Krueger and Casey (2009), the data were coded and analysed. During each phase of data analysis, new information, ideas and concepts were grouped into categories. Each category was carefully analysed in order to highlight both similarities and differences in data gathered from the focus group interviews. Initially, two groups of data were created, similar and dissimilar. Next, these data were stored using Microsoft Excel software to enable the retrieval of data and further reduction as required according to the themes of the study.

Initially, the first part of data analysis is data reduction. The techniques adopted in this thesis included deleting, selecting, simplifying and transforming data gathered in written notes (Miles & Huberman 1994). In this process, data were coded according to the strategic planning, T&L, R&D categorisations of Malaysian public universities and Malaysian Federal government objectives. Thus, in agreement with Miles and Huberman, interim data reduction using coding schemes was employed. The

approach employed in this activity was focused on the data gathered from the focus group interviews according to the coding based on the participants opinions and views. For that, the attention was given to similarities and differences of opinion on the impact of government funding reforms to Malaysian public universities.

Next, the data display process began with the initial categories of data available from the focus group interviews. A thematic structure report within and across the four focus groups that is based on the content analysis was used in this process (Eriksson & Kovalainen 2008). They pointed out that the thematic structure report normally adapted many quotations and therefore it is important for the researcher to identify the most appropriate data to put in the report. Data were then coded into the units of categories and themes. Next, patterns and themes were unitised to see the similarities and differences to identify units of information as a basis for defining the findings from different categories of Malaysian public universities related to the impact of changes in government funding. Here, the data display matrices were used to help the researcher identify the relevant data to guide in drawing the conclusions in the study.

In this final activity, data conclusion was generated according to the RQs. Here, the approach was to draw and verify the conclusion of the study by cross-checking the data in order to confirm the conclusion (Miles & Huberman 1994). This process was addressed systematically based on each of the RQs through content analysis and in cases of inconsistent data, the process of data analysis as repeated until consistency was obtained.

As a conclusion, the data analysis strategy adopted in this study was designed to answer the RQ of the study with the main intention of assessing whether there is a reduction in goal conflict and/or information asymmetry. The summary of this strategy is described in the following figure.

Figure 5.14: Summary of Data Analysis Strategy

Research Objectives

RO1: Changes in the government funding for Malaysian public universities have impacted upon the Strategic Planning of these universities through assessing whether there is a reduction in goal conflict and/or information asymmetry

RO2: Changes in the government funding for Malaysian public universities have impacted on their approaches to Research and Development through assessing whether there is a reduction in goal conflict and/or information asymmetry

RO3: Changes in the government funding for Malaysian public universities have impacted on their approaches to Teaching and Learning through assessing whether there is a reduction in goal conflict and/or information asymmetry

RO4: There are differences across the components of the Malaysian public university sector (Focused Universities, Research/Apex Universities, and Comprehensive Universities) with respect to study objectives (RO1), (RO2), and (RO3)

RO5: Role changes in the government funding of Malaysian public universities have played in achieving the Malaysian Government objectives as stated in the National Higher Education Strategic Plan 2020 and National Higher Education Action Plan 2007–2010 through reducing goal conflict and information asymmetry

Survey Questionnaire

Focused Group Interviews

RQ1 Strategic Planning

RQ2 Research and Development

RQ3 Teaching and Learning

RQs 1 to 3
One sample Wilcoxon signed rank test/One-sample t-test

Multi-sample Wilcoxon signed rank test

RQ4 Kruskal-Wallis test

Factorial ANOVA

RQ4 The categorisation of Malaysian public universities

RQ5 One sample Wilcoxon signed rank test/one-sample t-test

Multi-sample Wilcoxon signed rank test

Kruskal-Wallis test

Factorial ANOVA

RQ5 Government Objectives

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5.6.6 Compare and contrast

In order to make a comparison of qualitative and quantitative data, Creswell and Plano (2007) suggested a matrix method to illustrate the findings. Data analyses from both methods help to explain the reactions of Malaysian public universities according to the different categories of Malaysian public universities on government funding changes in accordance to the RQs. Teddlie and Tashakkori (2009) point out that with this strategy, the objective is to identify the subcomponents of a construct through factor analysis of quantitative data; the next step is to collect qualitative data to validate the categories or to expand on the available information about these subcomponents. Data findings are compared and contrasted to see the differences and similarities that exist in different types of universities categories. At this stage, a matrix method was employed to identify categories or theme in more detail. This process helps the researcher to gain better understanding of the differences and similarities between the variables in the consensus matrix that shows the idea and concepts. With that, information gaps that exist in the survey will be filled by further details in qualitative data findings.

5.7 Ethics Considerations

Ethics approval was obtained in October 2010 from the Faculty of Business and Law Research Ethics Committee, Victoria University of Melbourne (see Appendix V). This was performed prior to data collection because this study involves groups of people. Throughout the study, the consent form and information of participants involved in this study were distributed. The participants of the survey and the interviews were assured that there were no foreseeable risks in the participation of this study.

In respect to the confidentiality, the researcher informed the participants that the focus group interview sessions were be conducted in their university. All procedures in designing and conducting the focus group interviews were clearly explained. The sessions were recorded so that the issues discussed could be studied later. The recording of the sessions will be erased when the research is completed. In addition,

the results of this study may be presented to the institutions' management, at professional meetings, and published in a professional journal, but the names and any other identifying information of participants will not be revealed.

5.8   Summary

This chapter discussed the methodology and procedure used in conducting this study whereby mixed-methods approaches were applied for data collection and analysis. The following chapter will present results from the questionnaire and the focus group interviews.

CHAPTER 6

RESULTS I–QUANTITATIVE ANALYSIS

6.1 Introduction

This chapter presents the research findings derived from a questionnaire employed to answer the RQs of this study. In analysing the survey data, PASW was used. The discussion begins with a demographical analysis. Next, results are presented according to RQs and statistical analysis of the study. Accordingly, tables and graphs are used to improve the presentation of data findings in this study.

Results from the questionnaire are discussed in detail, as outline in the figure below.

Figure 6.1: Chapter Organisational Flow
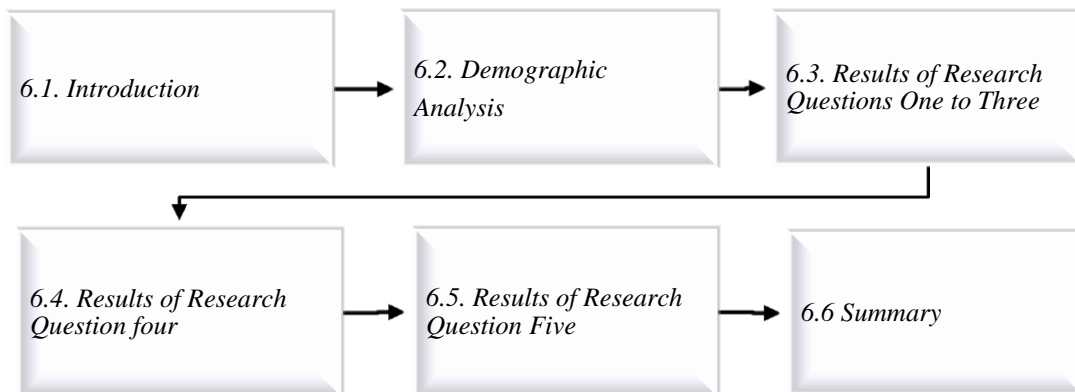
6.2   Demographic Analysis

This section provides information based on the results gathered from demographic characteristics in the survey administrated to university top management. In total, 335 questionnaires were distributed to respondents from 20 Malaysian public universities between January 2011 and March 2011. Out of this total, 120 (35.8 per cent) respondents returned a completed questionnaire. Table 6.1 presents the distribution of responses to the questionnaire survey according to demographic profiles: university category, designated position, length of time working in designated position, and length of time spent working in universities.

Table 6.1: Respondent Demographic Analysis

Demographic Characteristics	Frequency	Percentage (%)
University category		
RAUs	41	34.1
CUs	27	22.5
FUs	52	43.3
Designated position		
Vice Chancellor/Rector	2	1.70
Deputy Vice Chancellors/Deputy Rectors	20	16.7
Deans	81	67.5
Heads of Bursar Office or equivalent	9	7.50
Directors of Strategic Planning Office or equivalent	8	6.70
Length of time working in designated position		
Less than 2 years	37	30.8
2 to 4 years	48	40.0
5 to 7 years	28	23.3
More than 7 years	7	5.80

Demographic Characteristics	Frequency	Percentage (%)
Length of time spent working in universities		
Less than 5 years	-	-
5 to 10 years	8	6.70
11 to 20 years	39	32.5
More than 20 years	73	60.8
Total	**120**	**100**

Figure 6.2: University Category
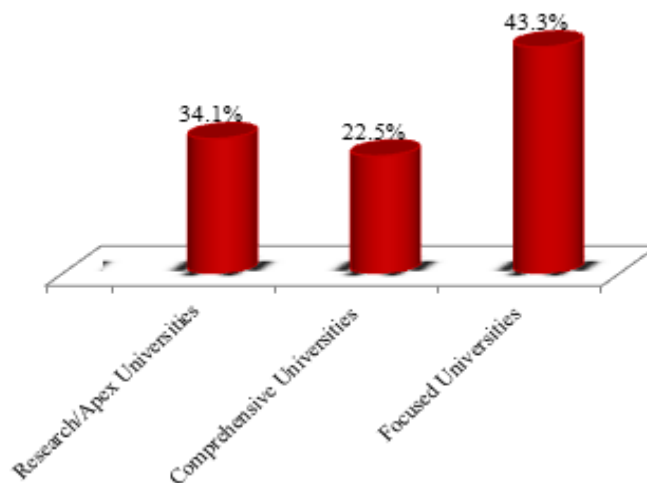
University category. Of the 120 respondents, 52 participants (43.3 per cent) were from the FU groups. The reasonable explanation of high responses from this category is that it consists of 11 public universities. This category was followed by respondents from the RAUs groups (34.1 per cent). Additionally, 27 participants (22.5 per cent) were from CU groups. The results are represented in Figure 6.2.

Figure 6.3: Designated Position
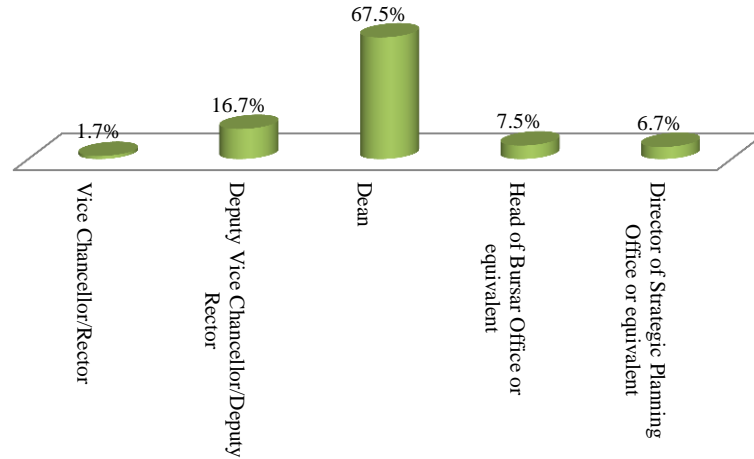
Designated position. Most respondents participating in this study held positions as Dean (67.5 per cent), and Deputy Vice Chancellors/Deputy Rectors (16.7 per cent). Approximately 7.5 per cent of the respondents were Heads of Bursar Offices or equivalent. Finally, only two respondents (1.7 per cent) were Vice Chancellors. These results are illustrated in Figure 6.3.

Figure 6.4: Length of Time Working in Designated Position
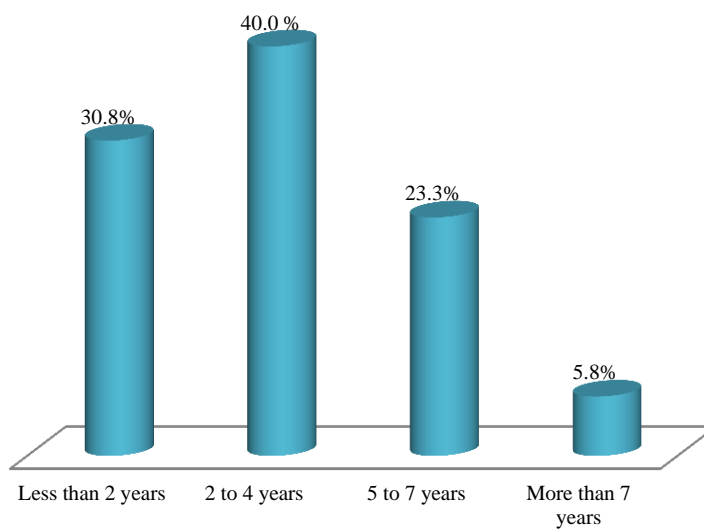
Length of time working in the designated position. Responses to the question related to working experience in a designated position are summarised in Figure 6.4. The majority of respondents (40.0 per cent) reported having two to four years working experience in their designated positions with 37 or (30.8 per cent) reporting less than two years working experiences, and 28 respondents (23.3 per cent) reported five to seven years of time working in their designated position. Only seven (5.8 per cent) had more than seven years working experience.

Figure 6.5: Length of Time Spent Working in University
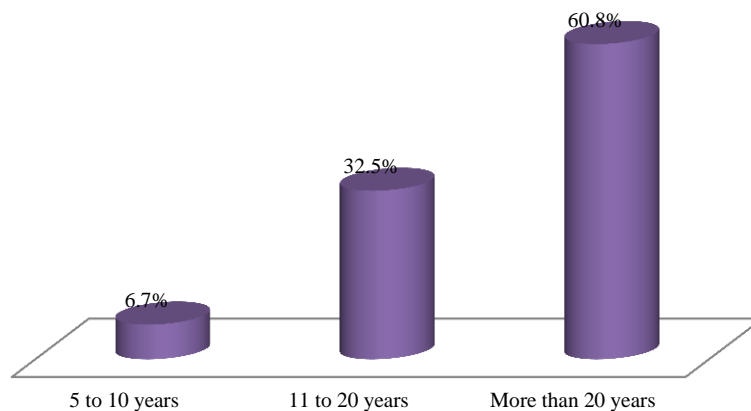
Length of time spent working in universities. More than half of the respondents (60.8 per cent) had being serving in universities for more than 20 years. This was followed by those with 11 to 20 years of services (32.5 per cent) and only 6.7 per cent of respondents have been working in universities between five to ten years. These results are illustrated in Figure 6.5 above.

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6.3   Results of Research Questions One to Three

As the first three RQs use the same statistical test, they are discussed concurrently in this section. Their levels of significance were set at p<0.05. The statistical tests necessary to be conducted are one-sample Wilcoxon signed rank test and one-sample t-test, and Wilcoxon signed rank test. As explained in the previous chapter, the proposed statistical methods were employed in order to answer RQ1, RQ2 and RQ3 as follows:

RQ1:   Have changes in the Malaysian Federal Government funding altered the approach in strategic planning of public universities in Malaysia through reductions in goal conflict and/or information asymmetry?

RQ2:   Have changes in the Malaysian Federal Government funding altered the approach to R&D in Malaysian public universities through reductions in goal conflict and/or information asymmetry?

RQ3:   Have changes in the Federal Government funding altered the approach to T&L in Malaysian public universities through reductions in goal conflict and/or information asymmetry?

One-sample Wilcoxon signed rank test and one-sample t-test

The one-sample Wilcoxon signed rank test is a nonparametric alternative method of testing a similar hypothesis to the one-sample t-test. They are used in this study to determine whether the population measure of central tendency/median for one-sample Wilcoxon signed rank test and mean for the one-sample t-test of a measurement is greater than or equal to a specified value (a one-tailed test). For each measurement, the test was whether the true population measure of central tendency could be accepted as being greater than four since this corresponds to agreement with the proposition in the measurement. A statistically significant result would show agreement of government funding changes in Malaysian public universities' approaches to strategic planning, T&L and R&D through a reduction in goal conflict and/or information asymmetry.

Results of testing whether strategic planning is improved by changes in government funding using the one-sample Wilcoxon signed rank test and one-sample t-test

- **Results based on each item**

The table below summarises results of the 14 items in question one, indicating that the median/mean of the data differs significantly from the stipulated value of four, as shown by a very low p-value (Sig.=0.000). The details of the results can be obtained in Table A-1 of Appendix VI.

Table 6.2: Summary of the One-sample Wilcoxon Signed Rank Test and One-sample t-test Results for Strategic Planning

Items	One-sample Wilcoxon Signed Rank Test		One-sample T-test	
	Sig	**Median**	**Mean**	**Sig**
Q1.1	**.000**	6	5.89	**.000**
Q 1.2	**.000**	6	5.94	**.000**
Q 1.3	**.000**	6	5.92	**.000**
Q 1.4	**.000**	6	6.03	**.000**
Q 1.5	**.000**	6	6.04	**.000**
Q 1.6	**.000**	6	6.08	**.000**
Q 1.7	**.000**	6	5.83	**.000**
Q 1.8	**.000**	6	5.88	**.000**
Q 1.9	**.000**	6	5.86	**.000**
Q 1.10	**.000**	6	5.68	**.000**
Q 1.11	**.000**	6	5.63	**.000**
Q 1.12	**.000**	6	5.70	**.000**
Q 1.13	**.000**	6	5.65	**.000**
Q 1.14	**.000**	6	5.63	**.000**

As the median and mean values in the two tests shown in Table 6.2 above all exceed four, respondents have agreed that changes in the government funding system have improved the direction of Malaysian public universities towards a better alignment with their approaches to strategic planning through reductions in goal conflict and/or information asymmetry. The one-sample t-test result indicates that the mean sample data were significantly different to the test value of four at $p<0.0005$. Therefore, data from the sample support that the changes in the government funding systems have positively impacted on the approaches to strategic planning in Malaysian public universities (as stated in the National Higher Education Strategic Plan beyond 2020 and the National Higher Education Action Plan 2007–2010) and reduce agency problems. Since in all cases the medians/means are above four there are statistically significant differences, the results obtained support the research objective of the study (see Chapter 1).

- **Results based on composite measure**

Table 6.3 presents the results of the statistical analysis based on the average scores for strategic planning. The items are differentiated based on two factors, informational asymmetry (Questions B1.09, B1.10 and B1.11) and goal conflict (Questions B1.01, B1.02, B1.03, B1.04, B1.05, B1.06, B1.07, B1.08, B1.12, B1.13 and B1.14). These composite measures are represented by the average scores of a median six for information asymmetry and goal conflict.

Table 6.3: Results of One-sample Wilcoxon Signed Rank Test and One-sample t-test for Strategic Planning Based on Average Scores

Items	One-sample Wilcoxon Signed Rank Test		One-sample T-test				
	Sig	Median	Mean	t	Sd	df	Sig
Informational Asymmetry	.000	6.00	5.7222	17.628	1.07	119	.000
Goal Conflict	.000	6.09	5.8735	22.734	0.90	119	.000

The results indicate a significant difference between four and the median data stipulated value, as shown by very low Sig. value 0.000. Here, the one-sample t-test results show the same significance as the one-sample Wilcoxon signed rank nonparametric test. These results support the objective of the study, as a significant difference in median values was found.

Results of testing whether research and development is improved by changes in government funding using the one-sample Wilcoxon signed rank test and one-sample t-test

- **Results based on each item**

Table 6.4 summarises results of the seven items of question two, indicating that the median/mean of the data differs significantly from the stipulated value of four, as shown by a very low p-value (Sig.=0.000). Details of the results can be obtained in Table A-2 of Appendix VI.

Table 6.4: Summary of the One-sample Wilcoxon Signed Rank Test and One-sample t-test Results for Research and Development

Items	One-sample Wilcoxon Signed Rank Test		One-sample T-test	
	Sig	**Median**	**Mean**	**Sig**
Q2.1	**.000**	6	5.48	**.000**
Q2.2	**.000**	6	5.39	**.000**
Q2.3	**.000**	6	5.41	**.000**
Q2.4	**.000**	5	5.43	**.000**
Q2.5	**.000**	6	5.41	**.000**
Q2.6	**.000**	6	5.53	**.000**
Q2.7	**.000**	6	5.29	**.000**

The result shows that the respondents have agreed that changes in the government funding mechanisms have positively improved the approaches to R&D in Malaysian public universities through reductions in goal conflict and/or information asymmetry. Since in all cases the medians/means are above four there are statistically significant differences, the results obtained support the research objective of the study (see Chapter 1).

- **Results based on composite measure**

Table 6.5 shows the results of the statistical analysis based on the average scores across all seven questions measuring for R&D. This composite measure is represented by the average scores of a median 5.57 for results of one-sample Wilcoxon signed rank test and mean 5.42 for results of one-sample t-test.

Table 6.5: Results of One-sample Wilcoxon Signed Rank Test and One-sample t-test for Research and Development Based on Average Scores

One-sample Wilcoxon Signed Rank Test		One-sample T-test				
Sig	Median	Mean	*t*	Sd	df	Sig
.000	5.57	5.4202	16.697	0.93	119	**.000**

The results indicate a significant difference between four and the median data as shown by very low Sig. value of, 0.000. Here, the one-sample t-test results show the same significance as the one-sample Wilcoxon signed rank nonparametric test. These results shows that the respondents have agreed that the changes in the government funding have improved the direction of Malaysian public universities towards a better alignment with their approaches to R&D through reductions in goal conflict and/or information asymmetry.

Results of testing whether teaching and learning is improved by changes in government funding using the one-sample Wilcoxon signed rank test and one-sample t-test

- **Results based on each item**

Table 6.6 summarises results of the six items of question three, indicating that the median data differ significantly from the stipulated value of four, as shown by a very a low p-value (Sig.=0.000). The details of the results can be obtained in Table A-3 of Appendix VI.

Table 6.6: Summary of the One-sample Wilcoxon Signed Rank Test and One-sample t-test Results for Teaching and Learning

Items	One-sample Wilcoxon Signed Rank Test		One-sample T-test	
	Sig	Median	Mean	Sig
Q3.1	.000	6	5.33	.000
Q3.2	.000	5	4.88	.000
Q3.3	.000	6	5.58	.000
Q3.4	.000	5.5	5.32	.000
Q3.5	.000	5	4.89	.000
Q3.6	.000	6	5.27	.000

As the median and mean values in the two tests shown in Table 6.6 above all exceed four, respondents have agreed that changes in the government funding system have improved the direction of Malaysian public universities towards a better alignment with their approaches to T&L through reductions in goal conflict and/or information asymmetry for all items. Since in all cases the medians/means are above four there are statistically significant differences, the results obtained support the research objective of the study (see Chapter 1).

- **Results based on composite measure**

Table 6.7 presents the results of the statistical analysis based on the average scores across all six questions measuring for T&L. This composite measure is represented by the average scores of a median 5.53 for results of one-sample Wilcoxon signed rank test and mean 5.19 for results of one-sample t-test.

Table 6.7: Results of One-sample Wilcoxon Signed Rank Test and One-sample t-test for Teaching and Learning Based on Average Score

One-sample Wilcoxon Signed Rank Test		One-sample T-test				
Sig	Median	Mean	*t*	Sd	df	Sig
.000	5.33	5.1944	14.729	0.89	119	.000

The results indicate a significant difference between four and the median data as shown by very low Sig. value of 0.000. Here, the one-sample t-test results show the same significance as the one-sample Wilcoxon signed rank nonparametric test. As the median and mean values in the two tests shown in Table 6.7 above all exceed four, respondents have agreed that the government funding reforms have improved the direction of Malaysian public universities towards a better alignment with their approaches to T&L through reductions in goal conflict and/or information asymmetry.

The Multi-sample Wilcoxon signed rank test

The multi-sample Wilcoxon signed rank is a nonparametric test used in this study to investigate the impact of changes in the government funding system in accordance with the National Higher Education Strategic Plan beyond 2020 and National Higher Education Plan 2007–2010 through reductions in goal conflict and/or information asymmetry according to the direction of changes. In this study, it is used to compare changes over time by comparing:

i.   2010 and 2006
ii. 2015 and 2010
iii. 2015 and 2006

The goal of this test is to evaluate the median difference in paired scores (paired across time) for items 5.1 to 5.13 that are based on a seven-point Likert scale ranging from 1 = well below 2009 national average to 7 = well above 2009 national average.

The survey questions were designed to access opinions on the changes over the period from 2006 to 2015 (expected outcome). This is accomplished by making comparisons with the 2009 national averages based on their perception. The 2009 national averages were used to create a common reference point across respondents. The ranking of respondents' opinions and knowledge were analysed using this statistical test.

Results of testing whether research and development is improved by changes in government funding using the multi-sample Wilcoxon signed rank test

The multi-sample Wilcoxon signed rank test is conducted to determine whether there would be a significant difference in the impact of government funding reforms in R&D at Malaysian public universities through reductions in goal conflict and/or information asymmetry for items 5.1 to 5.7 according to direction of changes. Table 6.8 summarises results of the seven items for R&D.

Table 6.8: Summary of the Multi-sample Wilcoxon Signed Rank Test Results for Research and Development

Items	2010 Compared 2006		2015 Compared 2010		2015 Compared 2006	
	z^a	Asymp. Sig	z^a	Asymp. Sig	z^a	Asymp. Sig
5.1	−8.615	**.000**	−8.547	**.000**	−9.231	**.000**
5.2	−8.874	**.000**	−8.901	**.000**	−9.273	**.000**
5.3	−8.906	**.000**	−9.059	**.000**	−9.340	**.000**
5.4	−8.905	**.000**	−9.012	**.000**	−9.229	**.000**
5.5	−8.935	**.000**	−8.935	**.000**	−9.140	**.000**
5.6	−8.981	**.000**	−8.904	**.000**	−9.265	**.000**
5.7	−8.671	**.000**	−8.822	**.000**	−9.226	**.000**

a. Based on negative ranks

Results of the multi-sample Wilcoxon signed rank test for research and development in response to 2010 compared to 2006

- **Results based on each item**

As indicated in Table 6.8, the results of the nonparametric multi-sample Wilcoxon signed rank test are significant at $p<0.0005$ (Sig.=0.000) with z-scores ranging from −8.62 to −8.99. This suggests that the two sets of scores are significantly differences, with R&D at 2010 significantly favoured by the respondents, as indicated by the negative ranks.

- **Results based on composite measure**

Table 6.9 presents the results of the statistical analysis based on the average scores for R&D. The results indicate a significant difference at $p<0.0005$ for average scores in response to 2010 compared to 2006.

Table 6.9: Results of the Multi-sample Wilcoxon Signed Rank Test for Research and Development in Response to 2010 Compared to 2006 Based on Average Scores

	2010 Compared 2006
z [a]	−9.027
Asymp. Sig. (2-tailed)	**.000**

a. Based on negative ranks

The results indicate that the R&D at 2010 is indeed perceived to be higher than R&D at 2006 for this variable with z-scores at −9.03. As seen in the table above, it can be concluded that there were significant difference in the R&D scores at 2010 and 2006.

Results of the multi-sample Wilcoxon signed rank test for research and development in response to 2015 compared to 2010

- **Results based on each item**

The multi-sample Wilcoxon signed rank test for related measures in Table 6.8 yielded the significant differences with z-scores ranging from −8.82 to −9.06 at p<0.0005 (Sig.=0.000) between the level for R&D activities at 2015 and 2010. Therefore, data from the sample support the research study stating that changes in the government funding mechanisms have positively impacted on the approaches to R&D activities in Malaysian public universities from 2015 (expected outcome) to 2010 as indicated by the negative ranks.

- **Results based on composite measure**

Table 6.10 shows the results of the statistical analysis based on the average scores for R&D in response to direction of changes between 2015 and 2010 with a significant difference at p<0.0005.

Table 6.10: Results of the Multi-sample Wilcoxon Signed Rank Test for Research and Development in Response to 2015 Compared to 2010 Base on Average Scores

	2015 Compared 2010
z ^{a}	−9.182
Asymp. Sig. (2-tailed)	**.000**

a. Based on negative ranks

The results indicate that the R&D for 2015 (expected outcome) is indeed perceived to be higher than R&D in 2010 with z-scores at −9.18. Therefore, it can be concluded that the two set of scores are significantly different.

Results of the multi-sample Wilcoxon signed rank test for research and development in response to 2015 compared to 2006

- **Results based on each item**

The multi-sample Wilcoxon signed rank test confirmed that the results of the R&D activities in response to 2015 compared to 2006 was significantly different (Sig=0.000). The differences for these seven items are significants with z-scores ranging from –9.14 to –9.34 (see Table 6.8). Therefore, it can be concluded that the two sets of scores are significantly differences, with R&D for 2015 (expected outcome) significantly favoured by the respondents, as indicated by the negative ranks.

- **Results based on composite measure**

Table 6.11 shows the results of the statistical analysis based on the average scores for R&D in response to direction of changes between 2015 and 2006.

Table 6.11: Results of the Multi-sample Wilcoxon Signed Rank Test for Research and Development in Response to 2015 Compared to 2006 Based on Average Scores

	2015 Compared 2006
z ^{a}	–9.058
Asymp. Sig. (2-tailed)	**.000**

a. Based on negative ranks

The results show that the R&D for 2015 is indeed perceived to be higher than R&D in 2006 with a significant difference (Sig. 0.000) between the two sets of variables. The z-scores for this direction of changes was –9.06. Therefore, it can be concluded that the direction of changes for two sets of scores are significantly different. As seen

in the table above, it can be concluded that there was a significant difference in the R&D scores in 2015 (expected outcome) and 2006.

Results of testing whether teaching and learning is improved by changes in government funding using the multi-sample Wilcoxon signed rank test

The multi-sample Wilcoxon signed rank test was conducted to determine whether there would be a significant difference in the impact of government funding reforms in T&L at Malaysian public universities through reductions in goal conflict and/or information asymmetry for items 5.8 to 5.11 according to direction of changes. Table 6.12 summarises results of the seven items for T&L.

Table 6.12: Summary of the Multi-sample Wilcoxon Signed Rank Test Results for Teaching and Learning

Items	2010 Compared 2006		2015 Compared 2010		2015 Compared 2006	
	z^a	Asymp. Sig	z^a	Asymp. Sig	z^a	Asymp. Sig
5.8	−8.925	**.000**	−8.718	**.000**	−9.235	**.000**
5.9A	−7.552	**.000**	−6.859	**.000**	−7.798	**.000**
5.9B	−8.650	**.000**	−8.948	**.000**	−9.026	**.000**
5.9C	−8.331	**.000**	−8.949	**.000**	−8.877	**.000**
5.10A	−8.700	**.000**	−8.531	**.000**	−9.017	**.000**
5.10B	−8.478	**.000**	−8.780	**.000**	−9.155	**.000**
5.11	−8.699	**.000**	−9.051	**.000**	−9.065	**.000**

a.   Based on negative ranks

Results of the multi-sample Wilcoxon signed rank test for teaching and learning in response to 2010 compared to 2006

- **Results based on each item**

The multi-sample Wilcoxon signed rank test for related measures in Table 6.12 yielded the significant differences with z-scores ranging from -7.55 to -8.93 at $p<0.0005$ (Sig=0.000) between the level for T&L activities in 2010 and 2006. Thus, the statistical measures support the claim that the government funding changes have positively impacted to T&L approaches with significant difference between the two set of scores as indicated by the negative ranks.

- **Results based on composite measure**

The results in Table 6.13 indicate the direction of changes for T&L in response to 2010 compare to 2006.

Table 6.13: Results of the Multi-sample Wilcoxon Signed Rank Test for Teaching and Learning in Response to 2010 Compared to 2006 Based on Average Scores

	2010 Compared 2006
z [a]	−8.964
Asymp. Sig. (2-tailed)	**.000**

a. Based on negative ranks

As shown in the table above, results from this test suggested that there were significant differences at $p<0.0005$ level found with z-scores −8.96 for these two sets of data. Therefore, it can be concluded that the two set of scores were significantly different, with T&L for 2010 significantly favoured by the respondents, as indicated by the negative ranks.

Results of the multi-sample Wilcoxon signed rank test for teaching and learning in response to 2015 compared to 2010

- **Results based on each item**

The multi-sample Wilcoxon signed rank test results indicate a significant difference (Sig. =0.000) between the groups with z-scores ranging from −6.86 to −9.05. Details of the results can be obtained in Table 6.12. Therefore, it can be concluded that the two sets of scores are significantly different, with T&L for 2015 (expected outcome) significantly favoured by the respondents, as shown by the negative ranks.

- **Results based on composite measure**

The table below shows the results of the statistical analysis based on the average scores for T&L in response to 2015 compared to 2010.

Table 6.14: Results of the Multi-sample Wilcoxon Signed Rank Test for Teaching and Learning in Response to 2015 Compared to 2010 Based on Average Scores

	2015 Compared 2010
z [a]	−9.276
Asymp. Sig. (2-tailed)	**.000**

a. Based on negative ranks

The results indicate that the T&L for 2015 (expected outcome) is indeed perceived to be higher than T&L in 2010 at the $p<0.0005$ level. Thus, the statistical measures support the claim that the government funding reforms have positively affected the T&L approaches with significant difference between the two set of scores as indicated by the negative ranks.

Results of the multi-sample Wilcoxon signed rank test for teaching and learning in response to 2015 compared to 2006

- **Results based on each item**

The multi-sample Wilcoxon signed rank test results indicate a significant difference (Sig.=0.000) between the groups with z-scores ranging from −7.80 to −9.24 for all items related to T&L. Details of the results can be obtained in Table 6.12. Therefore, it can be concluded that the two sets of scores are significantly different, with T&L for 2015 (expected outcome) significantly favoured by the respondents. Thus, changes in the government funding system have positively impacted on the approaches to T&L activities in Malaysian public universities as indicated by the negative ranks.

- **Results based on composite measure**

Table 6.15 shows the results of the statistical analysis based on the average scores for T&L in response to 2015 compared to 2006.

Table 6.15: Results of the Multi-sample Wilcoxon Signed Rank Test for Teaching and Learning in Response to 2015 Compared to 2006 Based on Average Scores

	2015 Compared 2006
z ^{a}	−9.179
Asymp. Sig. (2-tailed)	**.000**

a. Based on negative ranks

As shown in the table above, the results from this test indicated that there were significant differences at p<0.0005 level with z-scores −9.18 for these two sets of data. At the p=0.000, it can be concluded that there is impact of government funding reforms on the Malaysian public universities T&L in response to this direction of changes.

Results of testing whether strategic planning is improved by changes in government funding using the multi-sample Wilcoxon signed rank test

The Wilcoxon signed rank test is conducted to determine whether there would be a significant difference in the impact of government funding reforms in strategic planning at Malaysian public universities through reductions in goal conflict and/or information asymmetry for items 5.12 to 5.13 according to direction of changes. Table 6.16 summarises results of the three items for strategic planning.

Table 6.16: Summary of the Multi-sample Wilcoxon Signed Rank Test Results for Strategic Planning

Items	2010 Compared 2006		2015 Compared 2010		2015 Compared 2006	
	z^a	Asymp. Sig	z^a	Asymp. Sig	z^a	Asymp. Sig
5.12	−8.77	**.000**	−8.67	**.000**	−9.35	**.000**
5.13A	−8.71	**.000**	−8.60	**.000**	−9.13	**.000**
5.13B	−8.29	**.000**	−8.45	**.000**	−8.91	**.000**

a.   Based on negative ranks

Results of the multi-sample Wilcoxon signed rank test for strategic planning in response to 2010 compared to 2006

•   **Results based on each item**

The multi-sample Wilcoxon signed rank test for related measures in Table 6.16 yielded the significant difference with z-scores ranging from −8.29 to −8.77 at p<0.0005 (Sig.=0.000) between the level for strategic planning activities for 2010 and 2006. Therefore, data from the sample support the research study stating that changes in the government funding mechanisms have positively impacted on the approaches to strategic planning activities in Malaysian public universities with

strategic planning for 2010 significantly favoured by the respondents, as indicated by the negative ranks.

- **Results based on composite measure**

Table 6.17 shows the results of the multi-sample Wilcoxon signed rank test for strategic planning in response to 2010 compared to 2006 based on the average scores.

Table 6.17: Results of the Multi-sample Wilcoxon Signed Rank Test for Strategic Planning in Response to 2010 Compared to 2006 Based on Average Scores

	2010 Compared 2006
z^a	−8.901
Asymp. Sig. (2-tailed)	**.000**

a. Based on negative ranks

As shown in the table above, the results from this test indicated that there was a significant difference at p<0.0005 level with z-scores −8.90 for these two sets of data, with strategic planning for 2010 is indeed perceived to be higher than strategic planning in 2006.

Results of the multi-sample Wilcoxon signed rank test for strategic planning in response to 2015 compared to 2010

- **Results based on each item**

The multi-sample Wilcoxon signed rank test, for which the results are indicated in Table 6.16, was conducted to evaluate the changes in participants' response on the strategic planning activities of their respective university between 2015 and 2010. The results indicate significant difference at p<0.0005 (Sig.=0.000) with z-scores ranging from −8.45 to −8.67. Therefore, it can be concluded that the two sets of

scores are significantly different, with strategic planning for 2015 (expected outcome) significantly favoured by the respondents, as indicated by the negative ranks.

- **Results based on composite measure**

Table 6.18 presents the results of the statistical analysis based on the average scores for strategic planning. The results indicate a significant difference at $p<0.0005$ for average scores in response to 2015 compared to 2010.

Table 6.18: Results of the Multi-sample Wilcoxon Signed Rank Test for Strategic Planning in Response to 2015 Compared to 2010 Based on Average Scores

	2015 Compared 2010
z [a]	−8.905
Asymp. Sig. (2-tailed)	**.000**

a. Based on negative ranks

The evidence shows that the strategic planning in response to 2015 (expected outcome) was statistically higher compared to 2010. The difference is significant with z-scores at –8.91. Thus, it can be concluded that the strategic planning for 2015 does change significantly compare to 2006.

Results of the multi-sample Wilcoxon signed rank test for strategic planning in response to 2015 compared to 2006

- **Results based on each item**

The multi-sample Wilcoxon signed rank test results confirmed that the changes were significantly difference at $p<0.0005$ (Sig.=0.000) level with z-scores ranging from –8.91 to –9.35 for all items related to strategic planning as depict in Table 6.16. The majority of participants pointed the opinions with strategic planning for 2015 was

greater than in 2006. It can therefore be concluded that the two sets of scores are significantly different.

- **Results based on composite measure**

Table 6.19 presents the results of the statistical analysis based on the average score for strategic planning in response to 2015 compared to 2006.

Table 6.19: Results of the Multi-sample Wilcoxon Signed Rank Test for Strategic Planning in Response to 2015 Compared to 2006 Based on Average Scores

	2015 Compared 2006
z [a]	−9.098
Asymp. Sig. (2-tailed)	**.000**

a. Based on negative ranks

As shown in the table above, results from this test indicate that there were significant differences at $p<0.0005$ level with z-scores −9.10 for these two sets of data. At the $p=0.000$, it can be concluded that strategic planning for 2015 (expected outcome) is indeed perceived to be higher than strategic planning in 2006.

6.4 Results of Research Question Four

This section examines the results directly answering RQ4: Do the results for RQ1, RQ2 and RQ3 vary across the Malaysian public universities sector (RAUs, CUs and FUs)?

In seeking to explore these differences, a Kruskal-Wallis test and factorial ANOVA were performed.

The Kruskal-Wallis test

The Kruskal-Wallis test is a nonparametric test used in this study to examine the impact of changes in government funding on different types of Malaysian public universities (RAUs, CUs and FUs). In this study, it is used to compare the scores of continuous variables (university category) based on mean rank for each group in order to assess the differences in results from 2006, 2010 and 2015 (expected outcome). The presentation of results from the Apex University was combined with RU groups to be known as RAUs to protect the identity of the Apex University.

The Factorial ANOVA: Main Effects Model

The factorial ANOVA test of main effect is used to make comparisons across the subjects of multiple IVs on one DV. In order to run a factorial ANOVA, the researcher uses control variables to address the types of university category. Here, the intention is to look at the control variables in order to ascertain respondents' opinions, depending designation, length of time working in the designated position, and length of time working in universities. In addition, by controlling these variables, the researcher's main purpose is to address the main question by looking at differences according to university category. A five-way univariate ANOVA was executed with four independent groups (4 x 5 x 4 x 4). The normality test was not displayed because ANOVA is robust according to normality assumption that previously discussed in Chapter 5.

Results of testing whether research and development has improved/expected to improve by changes in government funding using the Kruskal-Wallis and factorial ANOVA tests for Q5.1 to Q5.7

- **Results based on each item**

Overall quality of research and development

Kruskal-Wallis test

The results of statistical analysis (see Table A-4) indicate that the quality of R&D according to university categories, which differ significantly for each time period in 2006 [x^2(3, N=115) =28.3, p=0.000], 2010 [x^2(3, N=119)=52.2, p=0.000], and 2015 [x^2(3, N =120)=49.1, p=0.000]. This result suggests that there is a significant difference in quality of R&D across the different university groups. Further, by observing a mean rank suggest that the RAU groups have the highest scores, and FU and CU groups reporting the lowest for 2006, 2010 and 2015 (expected outcome).

Factorial ANOVA

The Levene's test of homogeneity of variances assumption in Table A-5 of Appendix VI shows no significant difference, suggesting that the variance of DV across groups is equal to meet the homogeneity assumption. Factorial ANOVA results show a significant main effect of overall quality R&D in 2006 when *F*(3, 102)=13.64, p<0.0005; 2010, *F*(3, 106)=30.35, p<0.0005; and 2015, *F*(3, 107)=25.83, p<0.0005 (see Table A-6).

Further, results in Table A-8 of Appendix VI show the *post hoc* comparison using the Tukey HSD test indicated that the mean score RAUs were significantly different from the CU and FU groups in 2006, 2010 and 2015 (expected outcome). The RAU groups mean score also differ significantly from CU and FU groups in 2006, 2010, and in expected 2015.

Quality of publication

Kruskal-Wallis test

Table A-4 of Appendix VI shows the results of the statistical analysis yielding a p-value of 0.000 for each time period in 2006 [x^2(3, N=120) = 29.2, p =0.000], 2010 [x^2(3, N=120)=51.5, p=0.000] and 2015 to be [x^2 (3, N=119)=44.5, p=0.000]. Further, by observing the mean rank of the university groups, RAUs have the highest overall ranking compared to FU and CU groups have the lowest score for 2006, 2010 and 2015 (expected outcome).

Factorial ANOVA

Table A-9 of Appendix VI indicates that the results of homogeneity of variances assumption show no significant difference. This means that the variance is equal and therefore meets the homogeneity assumption in 2006, 2010 and 2015. Table A-10 (see Appendix VI) revealed statistically significant main effect in the quality of publication for 2006, $F(3, 102)=16.14$, p<0.0005; 2010, $F(3, 106)=31.78$, p<0.0005; and 2015, $F(3, 106)=27.74$, p<0.0005.

Tukey HSD *post hoc* tests, shown in Table A-12 of Appendix VI, were conducted to determine the source of the group differences. The results indicated that the quality of publication mean score differ significantly for RAUs with the CU and FU groups over the period from 2006 to 2015 (expected outcome). The RAU groups differ significantly from either of the groups in 2006, 2010, and in expected 2015.

Number of publications

Kruskal-Wallis test

Table A-4 of Appendix VI shows the results for each time period (2006, 2010 and 2015), and the number of publications according to university categories. The results indicate a significant difference of p<0.001 in 2006 [x^2(3, N=117)=27.2, p = 0.000], 2010 [x^2(3, N=120)=50.4, p=0.000], and 2015 [x^2(3, N=120)=45.6, p=0.000]. The mean rank for RAU groups are significantly higher compared to CU and FU at 2006, 2010 and 2015 (expected outcome). Following this, the factorial ANOVA test was performed.

Factorial ANOVA

Table A-13 of Appendix VI reveals that in 2015 there was a significant difference of p=0.002, suggest that the variance across groups is unequal. No significant difference has been reported from 2006 to 2010. The test of between-subjects effects in Table A-14 suggest a significant main effect on the number of publications in 2006, $F(3, 104)=14.58$, p<0.0005 2010, $F(3, 107)=29.88$, p<0.0005, and expected 2015, $F(3,$

107)=21.78, p<0.0005. However, the results in 2015 have violated the homogeneity assumption.

The results of the *post hoc* test in Table A-16 of Appendix VI indicate a significant difference in the number of publications for RAUs from the CU and FU groups in 2006, 2010 and 2015 (expected outcome). The same patterns also differ significantly for RAUs with the CU and FU groups. However, the results in 2015 expected outcome have violated the homogeneity assumption.

Commercialisation activities

Kruskal-Wallis test

From the results indicated in Table A-4 of Appendix VI, the commercialisation activities according to the university categories showed a significant difference for each time period in 2006 [x^2(3, N=116)=41.5, p=0.000], 2010 [x^2(3, N=118)= 45.2, p=0.000], and 2015 [x^2(3, N=118)=36.9, p=0.000]. The mean rank for the university groups show that the RAU groups have the highest scores compared to CU and FU groups for 2006, 2010 and expected 2015. The results from this test were then further supplemented using the factorial ANOVA test.

Factorial ANOVA

The Levene's test confirms that the variances of DVs across the groups are equal for each time period (2006, 2010 and 2015) as shown in Table A-17 of Appendix VI. Further, a significant difference main effect on commercialisation activities confirmed in 2006, F(3, 103)=20.96, p<0.0005; 2010, F(3, 105)=23.14, p<0.0005; and 2015, F(3, 105)=14.98, p<0.0005.

The *post hoc* mean score results show a significant difference in the commercialisation activities for the RAUs with CU and FU groups from 2006, 2010 and 2015 (expected outcome). The present results are consistent among RAU groups with CU and FU groups with significant differences were found at p<0.05 level on the period of time (see Table A-20).

Number of patents generated

Kruskal-Wallis test

The results of the statistical analysis yielding a significant difference reported on the number of patents generated according to university category in 2006 [x^2 (3,N=113)=54.3, p=0.000], 2010 [x^2(3, N=117)=55.6, p=0.000], and 2015 [x^2(3, N=117)=43.0, p=0.000]. The RAUs have the significant highest mean rank compared to CU and FU groups for each time of period.

Factorial ANOVA test

The Levene's test of equality of error variances indicated in Table A-21 of Appendix VI confirms that no significant difference was reported in 2006, 2010 and 2015. The test of between-subjects effects results indicate a significant main effect of number of patents generated in 2006, *F*(3, 100)=34.85, p<0.0005; 2010, *F*(3, 104)=34.25, p<0.0005; and 2015, *F*(3, 104)=22.45, p<0.0005.

Further, *post hoc* comparisons mean score results differ significantly for the RAU with CU and FU groups from 2006, 2010 and 2015 (expected outcome). Thus, the same results differ significantly for RAUs with either of the university groups over the time of period at p<0.05 level. The *post hoc* test results further confirmed that the number of patents generated varies across the university groups.

Research and development cooperation

Kruskal-Wallis test

This test as indicated in Table A-4 of Appendix VI revealed a significant difference across the university groups in 2006 [x^2(3, N=116)=39.0, p=0.000], 2010 [x^2(3, N=119)=46.2, p=0.000], and 2015 [x^2(3, N=119)=34.5, p=0.000]. Further, by observing the mean rank of the university category, RAU groups have the highest overall ranking compared to FU and CU groups that have the lowest score for 2006, 2010 and 2015 (expected outcome).

Factorial ANOVA

The Levene's test results indicates that the p-value greater than 0.05 for all period of time, therefore the variance of DV is equal across groups. Table A-26 of Appendix VI shows that there were significant main effect of number of R&D cooperation with industry in 2006, $F(3, 103)=19.78$, $p<0.0005$; 2010, $F(3, 106)=24.08$, $p<0.0005$; and 2015, $F(3, 106)=15.56$, $p<0.0005$.

The *post hoc* test results procedure indicated that the mean score for the RAU groups were significantly different from CU and FU groups as shown in Table A-28 of Appendix VI. Moreover, there is significant difference (mean score) at $p<0.05$ level for RAU groups with CU and FU groups at over the period from 2006 up to 2015 (expected outcome).

Generating funding through research and development collaboration with Industry

Kruskal-Wallis test

The tabulated p-values from this test indicate a highly significant difference at $p<0.001$ level in 2006 $[x^2(3, N=115)=34.6, p=0.000]$, 2010 $[x^2(3, N=120)=36.7, p=0.000]$ and 2015 $[x^2(3, N=120)=23.6, p=0.000]$. A comparison of the mean rank according to university category shows that the RAU groups have the highest overall rankings compared to CU and FU groups across the time period of 2006, 2010 and 2015 (expected outcome). In order to evaluate the differences between groups the factorial ANOVA was conducted.

Factorial ANOVA

Table A-29 of Appendix VI shows the result of the test of homogeneity of variances assumption with no significant difference found in 2006 and 2015. However, a significant difference was reported in 2010 and violated the homogeneity assumption. The between-subjects test for the ability of public university to generate funding from R&D through collaboration with industry shows a significant

difference of main effect confirms in 2006, $F(3, 102)=21.59$, p<0.0005; 2010, $F(3, 107)=18.76$, p<0.0005; and 2015, $F(3, 107)=8.40$, p<0.0005.

The *post hoc* analysis performed indicated that the mean score for the ability of university to generate funding from R&D through collaboration with industry for the RAU groups were significantly different from CU and FU groups in 2006 (see Table A-32 of Appendix VI). Further analysis showed that RAU groups mean score differed significantly from CU and FU groups in 2015 (expected outcome).

- **Results based on composite measure**

Kruskal-Wallis test

Table 6.20 shows that the results of the statistical analysis based on the average scores for R&D according to each time period (2006, 2010 and 2015) are significantly different with p-value 0.000. In other words, there is at least one pair of university categories that have different average scores.

Table 6.20: Results of Kruskal-Wallis Test for Research and Development Based on Average Score

University Category	2006		2010		2015	
	Mean rank	Sig	Mean rank	sig	Mean rank	sig
RAU	82.11	**.000**	86.20	**.000**	85.15	**.000**
RAU	81.24		91.60		89.02	
CU	41.33		37.42		37.44	
FU	40.60		43.57		46.66	

As indicated, the Kruskal-Wallis test yields a p-value of 0.000, which is highly significant in 2006 [$x^2(3, N=109)=40.97$, p=0.000], 2010 [$x^2(3, N=115)=56.00$, p= 0.000] and 2015 [$x^2(3, N=116)=46.77$, p=0.000]. Further, by observing the mean ranks of the university category, the RAU groups have the highest scores and FU and

CU groups has the lowest score. Next, the factorial ANOVA was performed to analyse the differences between university groups.

Factorial ANOVA

Table 6.21 shows the results of the test for the homogeneity of variances assumption for R&D based on the average scores.

Table 6.21: Test of Homogeneity of Variances for Research and Development Based on the Average Score

Year	F	Sig.
2006	.943	.583
2010	1.307	.156
2015	1.254	.196

The results obtained from the Levene's test of variances show no significant difference across the groups for each of the time periods in 2006, 2010 and 2015, and therefore met the homogeneity of variances assumption.

Table 6.22: Test of Between-Subjects Effects for Research and Development Based on the Average Score

2006		2010		2015	
F	sig	F	sig	F	Sig
23.515	**.000**	38.445	**.000**	29.638	**.000**

Table 6.22 presents the results from the test for between-subjects effects based on the average score. The results show a significant difference main effect is confirmed in 2006, $F(3, 96)=23.52$, $p<0.0005$; 2010, $F(3, 102)=38.45$, $p<0.0005$; and 2015, $F(3, 103)=29.64$, $p<0.0005$.

Table 6.23: Mean and Standard Deviation for Research and Development Based on the Average Score

University Category	2006			2010			2015		
	M	SD	N	M	SD	N	M	SD	N
RAU	3.86	1.25	9	4.93	1.07	10	6.00	1.07	10
RAU	3.80	1.11	29	5.27	0.93	29	6.13	0.83	29
CU	2.02	0.89	24	2.96	0.82	26	4.24	0.85	26
FU	2.06	1.08	47	3.16	1.03	50	4.54	0.98	51

Following this, the *post hoc* comparisons using the Tukey HSD test was conducted when main effects were found to be statistically significant in order to determine the source of the university groups' differences.

Table 6.24: *Post hoc* Comparisons Test (Tukey HSD) for Research and Development Based on the Average Score

(I) University Category	(J) University Category	Mean Difference (I-J)	Std. Error	Sig.
DV: 2006				
RAU	RAU	.0542	.39381	.999
	CU	1.8393*	.40340	**.000**
	FU	1.7964*	.37552	**.000**
RAU	RAU	−.0542	.39381	.999
	CU	1.7851*	.28480	**.000**
	FU	1.7422*	.24371	**.000**
CU	RAU	−1.8393*	.40340	**.000**
	RAU	−1.7851*	.28480	**.000**
	FU	−.0429	.25893	.998
FU	RAU	−1.7964*	.37552	**.000**
	RAU	−1.7422*	.24371	**.000**
	CU	.0429	.25893	.998
DV: 2010				
RAU	RAU	−.3374	.34928	.769
	CU	1.9725*	.35441	**.000**
	FU	1.7657*	.32993	**.000**
RAU	RAU	.3374	.34928	.769
	CU	2.3100*	.25724	**.000**
	FU	2.1032*	.22231	**.000**
CU	RAU	−1.9725*	.35441	**.000**
	RAU	−2.3100*	.25724	**.000**

(I) University Category	(J) University Category	Mean Difference (I-J)	Std. Error	Sig.
	FU	−.2068	.23029	.806
FU	RAU	−1.7657*	.32993	.000
	RAU	−2.1032*	.22231	.000
	CU	.2068	.23029	.806
DV: 2015				
RAU	RAU	−.1379	.32389	.974
	CU	1.7527*	.32864	.000
	FU	1.4622*	.30545	.000
RAU	RAU	.1379	.32389	.974
	CU	1.8907*	.23854	.000
	FU	1.6001*	.20541	.000
CU	RAU	−1.7527*	.32864	.000
	RAU	−1.8907*	.23854	.000
	FU	−.2906	.21283	.524
FU	RAU	−1.4622*	.30545	.000
	RAU	−1.6001*	.20541	.000
	CU	.2906	.21283	.524

The *post hoc* test results shown in Table 6.24 indicated that significant differences were found in R&D activities for RAU with CU and FU groups in 2006, 2010 and 2015 (expected outcome). The present results also showed that the RAU groups mean score differs significantly from CU and FU groups according to period of time. The results obtained support the objective of the study, as a difference reporting varies across the Malaysian public universities sector.

Results of testing whether teaching and learning has improved/expected to improve by changes in government funding using the Kruskal-Wallis and factorial ANOVA tests for Q5.8 to Q5.11

- **Results based on each item**

Quality of teaching and learning

Kruskal-Wallis test

Table A-33 of Appendix VI shows the results of statistical analysis for quality of T&L according to university categories, which differ significantly to period of time 2010 at x^2(3, N=119)=12.86, p=0.005. However, no significant difference was found in 2006, [x^2(3, N=117)=6.90, p=0.075] and expected 2015, [x^2(3, N=119)=0.40, p=0.94]. The significant mean rank of 2010 indicated that the RAU groups were among the highest, followed by FU and CU groups. Next, the factorial ANOVA test was performed.

Factorial ANOVA

Table A-34 of Appendix VI presents the Levene's test of variances assumption results with no significant difference in 2006 and 2010. However, in expected 2015, the result shows a significant value of p =0.019 and the variance of DV is not equal across the groups. Further, Table A-35 of Appendix VI reports the significant main effect of quality T&L in 2006, *F*(3, 104)=3.31, p<0.05; and 2010, *F*(3, 106)=5.12, p<0.0005. However, no significant difference (p=0.79) is reported in 2015 as an expected outcome.

Post hoc tests using the Tukey HSD procedure revealed that the mean score of quality in T&L for RAU groups (M=5.48) was significantly different from CU groups (M=4.70) and FU groups (M=4.76) in 2010. However, no significant difference was reported in 2006 and 2015 (expected outcome) across the university groups.

Number of undergraduate students

Kruskal-Wallis test

The result indicates in Table A-33 of Appendix VI revealed a significant difference in relation to the number of undergraduate students in 2006, [x^2(3, N=116)=22.8, p= 0.000] and 2015, [x^2(3, N=119)=19.82, p=0.000]. However, no significant difference was found at 2010, [x^2(3, N=119)=1.13, p=0.769]. Nevertheless, the mean ranks quoted give an idea of the distribution of undergraduate students according to university groups. An inspection of the mean ranks for 2006 suggests that RAU groups had the highest scores, with the FU and CU groups reporting the lowest.

However, in 2015 expected outcome, the CU and FU groups have the highest mean scores compared to RAU groups.

Factorial ANOVA

The factorial ANOVA tests were then conducted to confirm the results obtained from the above test. Table A-38 of Appendix VI shows the results of the homogeneity of variances assumption with no significance difference in 2006 and 2010. However, the significance p=0.048 (p<0.05) revealed that the homogeneity of variances assumption was violated in 2015 expected outcome. Further, the test of between-subjects effects suggests a significant main effect on the number of undergraduate students in 2006, F(3, 103)=11.71, p<0.0005; and 2015, F(3,106)=8.24, p<0.0005 (violated the homogeneity assumption). However, no significant difference (p=0.185) was found in 2010.

The *post hoc* analysis (see Table A-41 of Appendix VI) indicated a significant mean difference between RAU and FU groups and between RAU and FU groups in 2006 (p<0.05). Moreover, the FU groups differ significantly from either of the other university groups in 2006. Therefore, the results obtained vary significantly across the university category as in 2006.

Number of postgraduate students

Kruskal-Wallis test

The tabulated p-value results shows a highly significant difference for each of the time periods in 2006 [x^2(3, N=116)=34.8, p=0.000], 2010 [x^2(3, N=119)=48.7, p=0.000] and 2015 [x^2(3, N=119)=32.1, p=0.000]. This indicates that there is at least one pair of university categories that have differences across the groups (see Table A-33 of Appendix VI). Further, by observing the mean rank of the university category, RAU groups have the highest mean scores, and FU and CU groups report the lowest from 2006, 2010 and 2015 (expected outcome). The researcher has conducted the factorial ANOVA test to further explore results presented using the Kruskal-Wallis test.

Factorial ANOVA

Table A-42 of Appendix VI presents the results for the homogeneity of variance assumptions, with no significant differences reported in 2006, 2010 and 2015. The analysis of between-subjects effects revealed that there was a significant main effect on the number of postgraduate students in 2006, $F(3,103)=17.28$, $p<0.0005$; 2010, $F(3,106)=28.5$, $p<0.0005$; and 2015, $F(3,106)=13.27$, $p<0.0005$.

Post hoc results confirmed that the mean scores on the numbers of postgraduate students for RAU groups differ significantly with CU and FU groups in 2006, 2010 and 2015 expected outcome. This difference was also reported at 2006 and 2015 (expected outcome) for RAU groups with CU and FU (see Table A-45). These results suggest that the number of postgraduate students vary across Malaysian public universities.

Number of international students

Kruskal-Wallis test

The results of statistical analysis for the number of international students (see Table A-33 of Appendix VI) according to university categories differ significantly for each time period in 2006 [$x^2(3$, N=116)=36.1, p=0.000], 2010 [$x^2(3$, N=119)=45.0, p=0.000] and 2015 [$x^2(3$, N=119)=37.4, p=0.000]. This indicates that at least one pair of university categories differ across groups. Further, by observing the mean rank of the university categories, RAU groups have the highest score, and FU and CU groups has the lowest score from 2006, 2010 and 2015 (expected outcome).

Factorial ANOVA

Table A-46 of Appendix VI indicates that the results of homogeneity of variances assumption show no significant difference. This means that the variance is equal and therefore meets the homogeneity assumption of period of time in 2006 and 2010. However, in 2015 the significant difference at $p<0.05$ (Sig=0.026) reported, and violated the homogeneity assumption. The results from the between-subjects effects show a significant main effect on the number of international students in 2006, $F(3,$

103)=21.66, p<0.0005; 2010, F(3,106)=30.46, p<0.0005; and 2015, F(3,106)=16.37, p<0.0005.

Post hoc comparisons test results in Table A-49 of Appendix VI shows that the mean score in the number of international students for RAU groups from CU and FU groups in 2006, 2010 and 2015 expected outcome. These differences were also found for RAU with the CU and FU groups in 2006, 2010 and 2015 (expected outcome). However, as mentioned previously, in 2015, the violated the homogeneity assumption was reported.

Number of undergraduate degrees offered

Kruskal-Wallis test

The Kruskal-Wallis results (see Table A-33 of Appendix VI) of the statistical analysis revealed a significant difference in relation to the number of undergraduate degrees offered in 2006, x^2(3, N=117)= 23.8, p=0.014, and 2010, x^2(3, N=120)=10.3, p=0.014 across the university categories. However, there was no significant difference found in expected 2015 x^2(3, N=119)=4.90, p=0.18. An inspection of the mean scores indicated the highest among RAU groups, followed by CU and FU groups. In 2015, expected outcome, the FU and CU groups have the highest mean rank compared to those at RAU groups. However, there was no significant difference found in 2015 (expected outcome) to support the findings. The findings from this test were than further confirmed using a factorial ANOVA.

Factorial ANOVA

The Levene's test of equality of error variances assumption in Table A-50 of Appendix VI shows no significant difference, suggesting that the variance of DV across groups is equal to meet the homogeneity assumption in 2006, 2010 and 2015 expected outcome. The results of the test of between-subjects effects indicated a significant main effect reported in 2006, F(3, 104)=11.87, p<0.0005; and 2010 F (3, 107)=5.16, p<0.0005. However, no significant difference was reported in 2015.

Post hoc analysis confirmed that the mean score for RAU groups (M=4.10) was significantly different from FU groups (M=2.82) in 2006. The difference was also found for RAU groups (M=4.94) and FU groups (M=4.13) in the same year. However, *post hoc* test analysis revealed no significant difference in 2015 (expected outcome), as shown in Table A-53 of Appendix VI.

Number of postgraduate degrees offered

Kruskal-Wallis test

Table A-33 of Appendix VI shows the results for each time period (2006, 2010 and 2015) for the number of postgraduate degrees offered. The result shows that there is a significant difference for each time period in 2006 [x^2(3, N=118)=36.1, p= 0.000], 2010 [x^2(3, N=120)=33.2, p=0.000] and 2015 [x^2(3, N=119)=36.2, p= 0.000]. The mean rank for RAU groups are the highest compared to CUs and FUs at 2006, 2010 and 2015 (expected outcome). The factorial ANOVA test was employed to explore the statistical differences between university groups.

Factorial ANOVA

The test of homogeneity of variances assumption confirms that there are no significant differences reported in 2006, 2010 and 2015 (see Table A-54) of Appendix VI). The results in Table A-55 reveal that a significant difference main effects in the number of postgraduate degrees offered in 2006, *F*(3, 107)=17.72, p<0.0005; 2010, *F*(3, 107)=17.72, p<0.0005; and 2015, *F*(3, 106)=8.54, p<0.0005.

Results from a *post hoc* analysis confirmed that the mean score for RAUs were significantly different from FU groups and between RAU groups with FU groups in 2006. Moreover, the significant differences were reported for FU from either of the university groups. In 2010 and 2015 (expected outcome), the mean score for RAU groups differ significantly from FU groups, and between RAU groups with CU and FU groups.

Development of infrastructure for teaching and learning

Kruskal-Wallis test

Table A-33 shows the results for the development of infrastructure for T&L according to university categories. A significant difference is reported in 2006, x^2(3, N=116)=14.6, p=0.002 and 2010, x^2(3, N=120)=14.71, p=0.002. As for 2015 (expected outcome), the results show no significant difference. An inspection of the mean scores suggests that RAU groups had the highest scores from 2006 and 2010, with CU and FU groups reporting the lowest. Next, the factorial ANOVA test was performed.

Factorial ANOVA

Table A-58 of Appendix VI shows the results for the homogeneity of variances with no significant difference, suggesting that the variance is equal to meet the assumption in 2006, 2010 and 2015 expected outcome. The results in Table A-59 indicated a significant main effect of development infrastructure for T&L in 2006, F(3, 103)=8.40, p<0.0005; and in 2010 F(3,107)=6.28, p<0.0005. However, no significant difference was found in predicted 2015.

Further, *post hoc* comparisons analysis using a Tukey HSD procedure showed that the mean scores for the development of infrastructure facilities for T&L for RAUs were statistically different from FU and RAU groups in 2006. Further, this significant difference was found for RAU and FU groups in 2010. However, no significant difference was reported in 2015 (expected outcome).

- **Results based on composite measure**

Kruskal-Wallis test

Table 6.25 shows the results of the statistical analysis based on the average scores for T&L for each time period that were significantly different in 2006, x^2(3, N=114)=35.43, p=0.000; 2010, x^2(3, N=118)=35.58, p=0.000; and 2015, x^2(3,

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N=118)=6.59, p=0.000. In other words, there is at least one pair of university categories that have a different average score.

Table 6.25: Results of Kruskal-Wallis Test For Teaching and Learning Based on the Average Score

University Category	2006		2010		2015	
	Mean rank	Sig	Mean rank	sig	Mean rank	sig
RAU	76.95	**.000**	78.00	**.000**	76.44	**.000**
RAU	82.05		86.61		68.15	
CU	56.46		52.37		57.57	
FU	39.03		42.84		52.27	

The mean rank for RAU groups is significantly higher compared to CUs and FUs at 2006, 2010 and 2015 (expected outcome). As indicated, there is a significant increase in the mean rank for CU and FU groups from 2006 to 2015 (expected outcome).

Factorial ANOVA

The results indicated in the table above were then further explored using the factorial ANOVA test. Table 6.26 shows the results of the homogeneity of variances for T&L based on the average scores for T&L.

Table 6.26: Test of Homogeneity of Variances for Teaching and Learning Based on the Average Score

Year	F	Sig.
2006	1.099	.362
2010	1.421	.091
2015	.945	.584

As indicated in the table above, no significant differences were found in 2006, 2010 and 2015 expected outcome for the homogeneity of variances assumption, which is not violated.

Table 6.27: Test of Between-Subjects Effects for Teaching and Learning Based on the Average Score

2006		2010		2015	
F	sig	F	sig	F	sig
19.846	**.000**	19.894	**.000**	3.200	**.026**

The test of between-subjects effects shown in Table 6.27 indicated that there were significant main effects in 2006 $F(3, 101)=19.85$, p<0.0005; 2010, $F(3, 105)= 19.89$, p<0.0005; and 2015 expected outcome $F(3, 105)=3.20$, p<0.05 with regard to the government funding changes that altered the approach to T&L.

Table 6.28: Mean and Standard Deviation for Teaching and Learning Based on the Average Score

University Category	2006			2010			2015		
	M	SD	N	M	SD	N	M	SD	N
RAU	4.08	1.08	10	5.06	0.96	10	5.84	1.03	9
RAU	4.07	0.86	30	5.22	0.96	10	5.89	0.57	31
CU	3.39	0.81	25	4.33	0.66	27	5.56	0.81	27
FU	2.80	0.91	49	4.05	0.80	50	5.46	0.87	51

Table 6.29: *Post hoc* Comparisons Test (Tukey HSD) for Teaching and Learning Based on the Average Score

(I) University Category	(J) University Category	Mean Difference (I-J)	Std. Error	Sig.
DV: 2006				
RAU	RAU	.0190	.31020	1.000
	CU	.6914	.31786	.137
	FU	1.2810*	.29478	**.000**
RAU	RAU	−.0190	.31020	1.000
	CU	.6724*	.23005	**.022**
	FU	1.2620*	.19694	**.000**
CU	RAU	−.6914	.31786	.137
	RAU	−.6724*	.23005	**.022**
	FU	.5896*	.20879	**.029**
FU	RAU	−1.2810*	.29478	**.000**
	RAU	−1.2620*	.19694	**.000**
	CU	−.5896*	.20879	.029
DV: 2010				
RAU	RAU	−.1641	.27641	.934
	CU	.7238	.28136	.055
	FU	1.0057*	.26329	**.001**
RAU	RAU	.1641	.27641	.934
	CU	.8879*	.20008	**.000**
	FU	1.1698*	.17375	**.000**
CU	RAU	−.7238	.28136	.055
	RAU	−.8879*	.20008	**.000**
	FU	.2819	.18152	.410
FU	RAU	−1.0057*	.26329	**.001**
	RAU	−1.1698*	.17375	**.000**
	CU	−.2819	.18152	.410
DV: 2015				
RAU	RAU	−.0481	.29490	.998
	CU	.2857	.29977	.776
	FU	.3791	.28159	.536
RAU	RAU	.0481	.29490	.998
	CU	.3338	.20502	.367
	FU	.4272	.17737	.082
CU	RAU	−.2857	.29977	.776
	RAU	−.3338	.20502	.367
	FU	.0934	.18536	.958
FU	RAU	−.3791	.28159	.536
	RAU	−.4272	.17737	.082
	CU	−.0934	.18536	.958

The results of *post hoc* comparisons analysis confirmed that the mean score on T&L activities for RAUs (M=4.08) were significantly different from FU groups (M=2.80) in 2006. The mean score were also reported significant for RAU groups with CU and FU groups in 2006 and 2010. However, no other significant difference was found in 2015 expected outcome. The results obtained support the objective of the study, as a difference reporting varies across the Malaysian public universities sector in 2006 and 2010.

Results of testing whether strategic planning has improved/expected to improve by changes in government funding using the Kruskal-Wallis and factorial ANOVA tests for Q5.12 to Q5.13

- **Results based on each item**

Ability to generate funding from internal resources

Kruskal-Wallis test
Table A-62 of Appendix VI shows the results of the statistical analysis yielding a significant difference in the ability to generate funding from internal resources in 2006 [x^2 (3, N=117)=24.5, p=0.000], 2010 [x^2(3, N=119)=28.6, p=0.000] and 2015 [x^2(3, N=119)=11.55, p=0.009]. The mean rank for RAU groups is significantly high when compared to FU and CU groups, which report the lowest in 2006, 2010 and 2015 (expected outcome). Following this, the factorial ANOVA test was performed.

Factorial ANOVA
The Levene's test of homogeneity results in Table A-63 of Appendix VI shows no significant difference found in each period of time. Further, the test of between-subjects effects in Table A-64 of Appendix VI show a significant main effect in 2006 $F(3,104)=13.68$, p<0.0005; 2010 $F(3,106)=14.18$, p<0.0005; and 2015 $F(3, 106)=3.07$, p<0.05.

Moreover, Table A-66 of Appendix VI shows the results for *post hoc* comparisons using the Tukey HSD procedure. The mean score in the ability of Malaysian public

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universities to generate funding from internal resources for RAU groups (M=3.84) was significantly different from CU groups (M=2.68) and FU groups (M=2.63) in 2006. These results imply in 2010 and 2015 (expected outcome).

Ability to generate funding from internal resources: operational expenditure

Kruskal-Wallis test

The Kruskal-Wallis results shown in Table A-62 of Appendix VI indicate a significant difference in 2006 [x^2(3, N=117)=24.0, p=0.000], 2010 [x^2(3, N=120)=31.9, p=0.000] and 2015 [x^2(3, N=119) = 18.3, p=0.000]. The RAUs had the highest scores, with the CU and FU groups reporting the lowest in 2006, 2010 and 2015 (expected outcome). The factorial ANOVA test was performed to support the findings from the Kruskal-Wallis test.

Factorial ANOVA

The Levene's test presented in Table A-67 indicated that there was a significant difference found in 2015 (p=0.019), which therefore violated the homogeneity assumption. The results in 2006 and 2010 show no significant difference. Further, the test of between-subjects effects for the ability of public universities to generate funding from internal resources to support the operational expenditure confirmed the significant main effect in 2006, *F*(3, 104)=12.87, p<0.0005 2010; *F* (3, 107)=12.84, p<0.0005; and 2015, *F*(3, 106)=6.05, p<0.0005.

Further, the *post hoc* analysis is performed. The results in Table A-70 of Appendix VI confirmed that the means score for RAUs were significantly different from FU groups in 2006 and 2010. *Post hoc* analysis also confirmed that the RAU groups differ significantly from either of the other university groups in 2006 and 2010.

Ability to generate funding from internal resources: development expenditure

Kruskal-Wallis test

Table A-62 of Appendix VI shows the results of the Kruskal-Wallis test, which demonstrate the significant difference among university groups in 2006 [x^2(3, N=117)=22.2, p= 0.000], 2010 [x^2(3, N=120)=23.8, p=0.000] and 2015 [x^2(3, N=118)=12.5, p=0.006] on the ability to generate funding from internal resources for the development expenditure. The results obtained from the mean rank indicated that RAU groups had the highest scores, with the CU and FU groups reporting the lowest. Next, the factorial ANOVA test was performed.

Factorial ANOVA

Table A-71 of Appendix VI indicates that the results of homogeneity of variances assumption show no significant difference. Further, results show that there were significant main effects in the ability of Malaysian public universities to generate funding from internal resources to support the development expenditure in 2006, F(3, 10)=11.76, p<0.0005; 2010, F(3, 107)=11.39, p<0.0005; and 2015, F(3, 105)=5.25, p<0.0005.

As demonstrated in Table A-74 of Appendix VI, there was a significant difference in mean scores found for RAU groups with CU groups and for RAU groups with CU and FU groups in 2006. Moreover, RAU groups differ significantly from CU and FU groups in 2010 and 2015 (expected outcome).

- **Results based on composite measure**

Kruskal-Wallis test

Table 6.30 shows the results of the statistical analysis based on the average scores for strategic planning according to each time period (2006, 2010 and 2015) are significantly different with p-value 0.000. In other words, there at least is one pair of university category that has a different average score.

Table 6.30: Results of Kruskal-Wallis Test for Strategic Planning Based on the Average Score

University Category	2006		2010		2015	
	Mean rank	sig	Mean rank	sig	Mean rank	sig
RAU	77.10	**.000**	71.05	**.000**	69.28	**.001**
RAU	81.06		87.95		79.63	
CU	49.54		50.78		50.20	
FU	45.27		45.73		50.46	

The results of the testing shows a statistically significant difference according to university categories in 2006 [x^2(3, N=116)=26.85, p=0.000], 2010 [x^2(3, N=119)=32.31, p=0.000] and 2015 [x^2(3, N=118)=17.16, p=0.001]. The mean rank for RAU groups are significantly higher compared to CUs and FUs at 2006, 2010 and 2015 (expected outcome). As indicated, there is a significant increase in the mean rank for CU and FU groups from 2006 to 2015 (expected outcome).

Factorial ANOVA

Table 6.31 shows the results of the statistical analysis based on the average scores for strategic planning.

Table 6.31: Test of Homogeneity of Variances for Strategic Planning Based on the Average Score

Year	F	Sig.
2006	1.085	.378
2010	1.023	.465
2015	.899	.657

As shown in the table above, the homogeneity variances assumption is not violated because there were no significant differences reported in each period of time (2006, 2010 and 2015).

Table 6.32: Test of Between-Subjects Effects for Strategic Planning Based on the Average Score

2006		2010		2015	
F	**sig**	**F**	**sig**	**F**	**Sig**
15.684	**.000**	16.197	**.000**	5.856	**.001**

The test of between-subjects effects for strategic planning as indicated in the table above shows that there was a statistically significant main effect of $p<0.0005$ level values by source of university category in 2006, 2010 and 2015 (expected outcome).

Table 6.33: Mean and Standard Deviation for Strategic Planning Based on the Average Score

University Category	2006			2010			2015		
	M	**SD**	**N**	**M**	**SD**	**N**	**M**	**SD**	**N**
RAU	3.60	0.84	10	5.06	0.96	10	5.41	1.21	9
RAU	3.80	1.01	31	5.22	0.69	31	5.74	1.13	31
CU	2.75	0.95	25	4.33	0.67	27	4.80	0.94	27
FU	2.58	1.10	50	4.05	0.88	50	4.76	1.25	51

Post hoc comparisons using the Tukey HSD test were conducted when main effects were significant.

Table 6.34: *Post hoc* Comparisons Test (Tukey HSD) for Strategic Planning Based on the Average Score

(I) University Category	(J) University Category	Mean Difference (I-J)	Std. Error	Sig.
DV: 2006				
RAU	RAU	−.2065	.34830	.934
	CU	.8533	.35835	.087
	FU	1.0200*	.33177	**.014**
RAU	RAU	.2065	.34830	.934
	CU	1.0598*	.25745	**.000**
	FU	1.2265*	.21894	**.000**
CU	RAU	−.8533	.35835	.087
	RAU	−1.0598*	.25745	**.000**
	FU	.1667	.23460	.893
FU	RAU	−1.0200*	.33177	**.014**
	RAU	−1.2265*	.21894	**.000**
	CU	−.1667	.23460	.893
DV: 2010				
RAU	RAU	−.5882	.37033	.390
	CU	.6432	.37696	.326
	FU	.8908	.35217	.061
RAU	RAU	.5882	.37033	.390
	CU	1.2314*	.26806	**.000**
	FU	1.4790*	.23191	**.000**
CU	RAU	−.6432	.37696	.326
	RAU	−1.2314*	.26806	**.000**
	FU	.2476	.24236	.737
FU	RAU	−.8908	.35217	.061
	RAU	−1.4790*	.23191	**.000**
	CU	−.2476	.24236	.737
DV: 2015				
RAU	RAU	−.3345	.42955	.864
	CU	.6049	.43666	.511
	FU	.6492	.41017	.393
RAU	RAU	.3345	.42955	.864
	CU	.9395*	.29864	**.011**
	FU	.9838*	.25836	**.001**
CU	RAU	−.6049	.43666	.511
	RAU	−.9395*	.29864	**.011**
	FU	.0443	.27000	.998
FU	RAU	−.6492	.41017	.393
	RAU	−.9838*	.25836	**.001**
	CU	−.0443	.27000	.998

Post hoc comparison tests in Table 6.34 above show that the mean score for the RAUs were significantly different from the FU groups in 2006. There was a significant mean score difference found for RAU groups with CU groups in the same year. Additionally, the significant differences were confirmed for the RAU groups with CU and FU groups in 2010 and 2015 (expected outcome). These results support the objective of the study, as a difference reporting varies across the Malaysian public universities sector.

6.5   Results of Research Question Five

This section examines the results directly answering RQ5: Has the change in the Federal Government funding contributed to the achievement of the government objectives stated in the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010 through reductions in goal conflict and/or information asymmetry?

Results of testing whether government objectives are improved by changes in government funding using the one-sample Wilcoxon signed rank test and one-sample t-test

- **Results based on each item**

The table below summarises the results of the six items in question four indicating that the median/mean of the data differs significantly from the stipulated value of four, as shown by a very low p-value (Sig.=0.000). Details of the results can be obtained in Table A-75 of Appendix VI.

Table 6.35: Summary of the One-sample Wilcoxon Signed Rank Test and One-sample t-test Results for Government Objectives

Items	One-sample Wilcoxon Signed Rank Test		One-sample T-test	
	Sig	**Median**	**Mean**	**Sig**
Q4.1	**.000**	6	5.39	**.000**
Q4.2	**.000**	6	5.41	**.000**
Q4.3	**.000**	6	5.68	**.000**
Q4.4	**.000**	6	5.58	**.000**
Q4.5	**.000**	6	5.42	**.000**
Q4.6	**.000**	6	5.58	**.000**

As the median and mean values in the two tests shown in Table 6.35 above all exceed four, respondents have agreed that changes in the government funding systems of Malaysian public universities have improved the direction towards a better alignment with the approaches in achieving the Malaysian government objectives as stated on the strategic plans. Since in all cases the medians/means are above four, there are statistically significant differences, and the results obtained support the research objective of the study (see Chapter 1).

- **Results based on composite measure**

Table 6.36 shows the results of the statistical analysis based on the average scores across all seven questions measuring for government objectives. This composite measure is represented by the average scores of a median of 5.67 for the results of one-sample Wilcoxon signed rank test and a mean of 5.51 for results of one-sample t-test.

Table 6.36: Results of One-sample Wilcoxon Signed Rank Test and One-sample t-test for Government Objectives Based on the Average Score

One-sample Wilcoxon Signed Rank Test		One-sample T-test				
Sig	Median	Mean	t	Sd	df	Sig
.000	5.67	5.5111	18.960	.87307	119	.000

The results show a significant difference between four and median data, as shown by a low Sig. value of 0.000. With regard to these results, the respondents have agreed that the changes in the government funding system have improved the direction towards better alignment with approaches in achieving the Malaysian government objectives as stated in the National Higher Education Plan beyond 2020 and National Higher Education Action Plan 2007–2010.

Results of testing whether government objectives are improved by changes in government funding using the multi-sample Wilcoxon signed rank test

The multi-sample Wilcoxon signed rank test is conducted to determine whether there would be a significant difference in the impact of government funding reforms in government objectives at Malaysian public universities through reductions in goal conflict and/or information asymmetry for items 5.14A to 5.14F according to direction of changes. Table 6.37 summarises results of the six items for government objectives.

Table 6.37: Summary of the Multi-sample Wilcoxon Signed Rank Test Results for Government Objectives

Items	2010 Compared 2006		2015 Compared 2010		2015 Compared 2006	
	z^a	Asymp. Sig	z^a	Asymp. Sig	z^a	Asymp. Sig
5.14A	−8.900	**.000**	−8.751	**.000**	−8.942	**.000**
5.14B	−9.295	**.000**	−9.182	**.000**	−9.206	**.000**
5.14C	−8.963	**.000**	−8.788	**.000**	−9.090	**.000**
5.14D	−9.341	**.000**	−8.864	**.000**	−9.349	**.000**
5.14E	−9.404	**.000**	−8.919	**.000**	−9.313	**.000**
5.14F	−9.549	**.000**	−9.326	**.000**	−9.443	**.000**

a. Based on negative ranks

Results of the multi-sample Wilcoxon signed rank test for government objectives in response to 2010 compared to 2006

- **Results based on each item**

The multi-sample Wilcoxon signed rank test in Table 6.37 was conducted to evaluate the changes in participants' response on the program plan imposed by the government. The results indicate a significant difference at $p<0.0005$ (Sig.=0.000) with z-scores ranging from −8.90 to −9.55. Therefore, it can be concluded that the scores in 2010 are indeed higher than scores in 2006.

- **Results based on composite measure**

Table 6.38 shows the results of the multi-sample Wilcoxon signed rank tests based on the average scores for government objectives in response to 2010 compared to 2006.

Table 6.38: Ranks of the Multi-sample Wilcoxon Signed Rank Test for Government Objective in Response to 2010 Compared to 2006 Based on Average Scores

	2010 Compared 2006
z ^{a}	−9.243
Asymp. Sig. (2-tailed)	**.000**

a.   Based on negative ranks

As shown in the table above, the results from this test indicate a significant difference at p<0.0005 level with z-scores −9.24 for these two sets of data. As seen in the table above, there were significant differences in the program plans imposed by the government in 2010 and 2006, as indicated by the negative ranks.

Results of the multi-sample Wilcoxon signed rank test for government objectives in response to 2015 compared to 2010

- **Results based on each item**

The multi-sample Wilcoxon signed rank test results indicate a significant difference (Sig.=0.000) between the groups with z-scores ranging from −8.75 to −9.33 for all items related to government objective (see Table 6.37). Therefore, the two sets of scores are significantly different. Here, changes in the government funding system have positively impacted on the approaches to the program plan imposed by the government in Malaysian public universities, with government objectives for 2015 (expected outcome) significantly favoured by the respondents, as indicated by the negative ranks.

- **Results based on composite measure**

Table 6.39 shows the results of the statistical analysis based on the average scores for government objectives in response to direction of changes between 2015 and 2010.

Table 6.39: Results of the Multi-sample Wilcoxon Signed Rank Test for Government Objectives in Response to 2015 Compared to 2010 Based on the Average Scores

	2015 Compared 2010
Z ^{a}	−9.118
Asymp. Sig. (2-tailed)	**.000**

   a. Based on negative ranks

As demonstrated in the table above, there was significant difference found within this timeframe with z-scores at −9.11 at the p <0.0005. At the p=0.000, therefore, the results indicate that the program plans imposed for 2015 (expected outcome) are higher than in 2006.

Results of the multi-sample Wilcoxon signed rank test for government objectives in response to 2015 compared to 2006

- **Results based on each item**

The multi-sample Wilcoxon signed rank test results indicate a significant difference (Sig.=0.000) between the groups with z-scores ranging from −8.94 to −9.44 for all items related to government objective (see Table 6.37). Therefore, the two sets of scores are significantly different. Here, changes in the government funding system have positively impacted on the approaches to the program plan imposed by the government in Malaysian public universities for 2015 (expected outcome) significantly favoured by the respondents, as indicated by the negative ranks.

- **Results based on composite measure**

The multi-sample Wilcoxon signed rank test results in Table 6.40 show the directions of changes of government objectives in 2015 compared to 2006 based on the average scores.

Table 6.40: Results of the Multi-sample Wilcoxon Signed Rank Test for Government Objectives in Response to 2015 Compared to 2006 Based on the Average Scores

	2015 Compared 2006
z ^{a}	−9.269
Asymp. Sig. (2-tailed)	**.000**

a. Based on negative ranks

The results indicate that the program plan imposed by the government for 2015 is indeed higher than in 2006 at $p<0.0005$ level with z-scores −9.27. Thus, the statistical measures support the claim that the government funding reforms that will impact on the government objectives for 2015 are higher than government objectives at 2006.

Results of testing whether government objectives has improved/expected to improve by changes in government funding using the Kruskal-Wallis test

This section highlighted results from Kruskal-Wallis test used to examine the impact of government funding reforms on different types of Malaysian public universities on the program plans imposed in accordance with the National Higher Education Plan beyond 2020 and National Higher Education Plan 2007 to 2010.

- **Results based on each item**

Table A-76 of Appendix VI summarises the results of the six items analysed in the Kruskal-Wallis test for each time period of 2006, 2010 and 2015 (expected outcome) for Q5.14A to Q5.14F.

Plan imposed on expanding the objective for widening access and enhancing quality

The results confirmed that there was a significant difference for expanding the objective to widening access and enhancing quality at Malaysian public universities.

This is reinforced by the p-values of the Kruskal-Wallis test that are shown to be highly significant in 2006 x^2(3, N=115)=21.5, p=0.000; 2010 x^2(3, N=118)=24.9, p=0.000; and 2015 x^2 (3, N=118)=10.2, p=0.017. The mean rank results found that RAU groups have the highest score and FU and CU groups report the lowest for 2006, 2010 and 2015 (expected outcome). The findings revealed that there is a significant difference between the university groups in each of the time periods.

Plan imposed on improving the objective for quality of teaching and learning

Results shown in Table A-76 of Appendix VI confirm that the program plan imposed to improve the objective for quality of indicate a significant difference in 2006, x^2(3, N=118)=15.4, p=0.001; and 2010, x^2(3, N=120)=10.2, p=0.017. However, no significant difference is found in the expected results for 2015, x^2(3, N=120)=4.35, p=0.23. Further, by observing the mean rank of the university categories, RAU groups have the highest score, and FU and CU groups have reported the lowest. Here, the results indicate that there is a significant difference suggested between the university groups in 2006 and 2010.

Plan imposed on improving the objective for enhancing research and innovation

The results indicate that there is a significant difference in the program imposed for improving the objective for enhancing research and innovation according to university categories. The tabulated p-values from this test indicate highly significant differences in 2006 x^2(3, N=118)=27.7, p=0.000; 2010 [x^2(3, N=120)=38.9, p=0.000; and 2015 x^2(3, N=120)=24.7, p=0.000. The mean rank in each condition indicates that RAUs were significantly higher from 2006 up to the expected for 2015 compared with those at CU and FU groups. This test shows that changes in the government funding difference between the university groups in each of the time periods.

Plan imposed on improving the objective for strengthening higher education institutions

Results indicated in Table A-76 of Appendix VI exhibit a significant difference in the impact of funding changes on improving the objectives for strengthening HEIs in

2006, x^2(3, N=117)=19.2, p=0.000; 2010, x^2(3, N=119)=21.6, p=0.000; and 2015, x^2(3, N=119)=10.8, p=0.013 across the categories of Malaysian public universities. An inspection of the mean ranks for the groups suggests that the RAU groups have the highest scores, with the FU and CU groups reporting the lowest. The findings revealed that there is a significant difference between the university groups in each time period.

Plan imposed on improving the objective for enculturation of lifelong learning

Table A-76 of Appendix VI shows the results of the statistical analysis on the plan imposed on improving the objective for the enculturation of lifelong learning according to university categories that differed significantly in 2006, x^2(3, N=117)=29.3, p=0.000; 2010, x^2(3, N=120)=37.5, p=0.000; and 2015, x^2(3, N=120)=15.0, p=0.002. Further, regarding the mean rank of the university category, RAU groups have the highest scores, and FU and CU groups reported the lowest. Here, in each time period, there are significant differences found across the university groups.

Plan imposed on improving the objective for intensifying internationalisation

The results obtained from Kruskal-Wallis analysis capture the significant difference found in 2006 x^2(3, N=117)=20.6, p=0.000; 2010 x^2 (3, N=120)=25.1, p=0.000; and 2015 x^2(3, N=120)=15.9, p=0.001 (see Table A-76 of Appendix VI). The significant higher mean was found in RAU groups in 2006 and 2010, with CU and FU groups the lowest. However, in 2015's expected outcome, the FU groups reporting the highest mean ranks compared to CU groups and RAU groups. The results confirmed that there are differences between the university groups in each of the time periods in 2006 and 2010.

- **Results based on composite measure**

Table 6.41 shows that the results of the statistical analysis based on the average scores for government objectives according to each time period is significantly different in 2006 x^2(3, N=115)=31.07, p=0.000; 2010 x^2(3, N=118)=35.55,

p=0.000; and 2015 x^2(3, N=118)=17.76, p=0.000. In other words, there is at least one pair of university categories that has a different average score.

Table 6.41: Results of Kruskal-Wallis Test for Government Objectives Based on the Average Score

University Category	2006		2010		2015	
	Mean rank	sig	Mean rank	sig	Mean rank	sig
RAU	71.50	**.000**	68.90	**.000**	63.55	**.000**
RAU	85.12		90.53		81.17	
CU	47.32		45.26		45.59	
FU	45.17		47.78		53.86	

A comparison of the mean rank according to university category shows that the RAU groups have the highest scores, with CU and FU groups reporting the lowest.

Results of testing whether government objectives has improved/expected to improve by changes in government funding using the factorial ANOVA

• **Results based on each item**

In answering the RQ of this study, the factorial ANOVA test was performed for the six items to explore whether there is a significant difference in the mean scores of DVs on program plans imposed by the Malaysian Government in accordance with the National Higher Education Strategic Plan beyond 2020 for Q5.14A to Q5.14F. Here, the analysis of factorial ANOVA performed in this RQ is arranged based on: (1) 2006 (starting point); and (2) 2015 versus 2006, as explained in the previous chapter.

Plan imposed on expanding the objective for widening access and enhancing quality

The Levene's test of equality of variances, shown in Table A-77 of Appendix VI, reported no significant difference in 2006 and 2015 versus 2006, thus meeting the homogeneity assumption. Further, there were significant main effects found in 2006, $F(3, 102)=10.67$, $p<0.0005$ and 2015 versus 2006, $F(3, 102)=3.17$, $p<0.05$.

Results from *post hoc* comparisons using the Tukey HSD procedure (see Table A-80) show that a mean score for RAU groups (M=4.24) was significantly different from the CU groups (M = 3.40) and FU groups (M=2.90) in the 2006 starting point. However, no significant difference was reported in 2015 versus 2006. This test shows that changes in the government funding have positively impacted on the expanding the objective to widening access and enhancing quality, and changes over time across different types of Malaysian public universities.

Plan imposed on improving the objective for quality of teaching and learning

The Levene's test suggests no significant difference reported in 2006 and 2015 versus 2006, thus meeting the homogeneity assumption (see Table A-81 of Appendix VI). The result of the test for between-subjects effects indicated that there were significant main effects confirmed for improving the objective on quality of T&L in 2006, $F(3, 105)=9.96$, $p<0.0005$, and 2015 versus 2006, $F(3, 105)=4.77$, $p<0.005$.

Further, the results from *post hoc* comparisons using the Tukey HSD procedure confirmed that the mean score for RAU groups (M=4.60) was significantly different from FU groups (M=5.29) in 2006 (starting point). In 2015 versus 2006, the mean score for RAU groups differed significantly from FU groups. This test shows that changes in the government funding have positively impacted on the plan imposed for improving the objective for quality of T&L and changes over time.

Plan imposed on improving the objective for enhancing research and innovation

Table A-85 of Appendix VI shows a significant value of more than 0.05, indicating that the homogeneity of variances assumption has not been violated in 2006.

Essentially, in 2015 versus 2006, the Levene's test shows no equal variances with statistical significance (p=0.002). As shown in Table A-86 of Appendix VI, the test of between-subjects effects reported significant main effects on enhancing research and innovation in 2006, $F(3, 105)=14.45$, p<0.0005. However, no significant difference was reported in 2015 versus 2006 (p=0.59).

Results from *post hoc* comparisons using the Tukey HSD procedure shown in Table A-88 of Appendix VI confirm that the mean score for the RAUs (M=4.00) was significantly different from the FU groups in 2006 (M=2.83). These results suggest that the objectives on enhancing research and innovation vary across Malaysian public universities in 2006 (starting point) where at this stage the government blue prints have not been announced. This test shows that changes in government funding have positively impacted on improving the objective for enhancing research and innovation, in varying degrees across different types of Malaysian public universities.

Plan imposed on improving the objective for strengthening HEIs
Table A-89 of Appendix VI shows no significant difference reporting in 2006 and 2015 versus 2006; therefore, the homogeneity of variances assumption was not violated. The results revealed that there were significant main effects reported in 2006, $F(3, 104)=10.88$, p<0.0005 and 2015 versus 2006, $F(3, 104)=3.49$, p<0.05.

Further, results from a *post hoc* comparisons test using the Tukey HSD procedure confirm that the objectives of strengthening HEIs mean score for RAUs (M=4.10) were significantly different from the CUs (M=3.32). Moreover, the 2015 versus 2006 *post hoc* results indicated that the RAUs (M=1.60) mean score differed significantly from FU groups (M=2.71). This test shows that changes in the government funding have positively impacted on improving the objectives for strengthening HEIs that are changes over time across different types of Malaysian public universities.

Plan imposed on improving the objective for intensifying internationalisation

The Levene's test showed no significant difference in the reporting of 2006 and 2015 versus 2006 (see Table A-93 of Appendix VI). Moreover, these results confirm significant main effects in expanding the objective of intensifying internationalisation in 2006, F (3, 104)=16.13, p<0.0005, and 2015 versus 2006, F(3, 104)=6.76, p<0.005.

Results from *post hoc* comparisons using the Tukey HSD procedure shown in Table A-95 of Appendix VI confirm that there were significant differences reporting for RAU groups with CU and FU groups. The RAU groups mean score differs significantly from either of the university groups in the same year. Moreover, the 2015 versus 2006 *post hoc* analysis found that the mean score for RAUs were significantly different from CU and FU groups. This test shows that changes in government funding have positively impacted on their approaches to improving the objective for intensifying internationalisation that are changes over time across different types of Malaysian public universities.

Plan imposed on improving the objective for enculturation of lifelong learning

The results presented in Table A-97 of Appendix VI show no significant differences in reporting in 2006 and 2015 versus 2006. Thus, this result confirms that the homogeneity of variances has not been violated. Indeed, the results reveal a significant main effect on expanding the objective of enculturation of lifelong learning in 2006, F(3, 107)=6.76, p<0.0005, and 2015 versus 2006, F(3, 104)=6.06, p<0.0005.

Results from *post hoc* comparisons using the Tukey HSD procedure confirm that in 2006, there were significant differences between RAUs (M=3.90) and CUs (M=2.92). Significant differences were also reported between respondents in RAUs (M=1.40) and FU groups (M=2.88) in 2015 versus 2006 (see Table 100 of Appendix VI). This test shows that changes in government funding have positively impacted on universities' approaches to plans imposed for improving the objective for enculturation of lifelong learning that are changes over time across different types of Malaysian public universities.

- **Results based on composite measure**

Table 6.42 shows the results used to test the homogeneity of variances of assumption for government objectives based on the average score.

Table 6.42: Test of Homogeneity of Variances for Government Objectives Based on the Average Score

Year	F	Sig.
2006	1.052	.424
2015 versus 2006	1.040	.441

As indicated in the table above, no significant differences were reported, thus meeting homogeneity assumption in 2006 starting point and 2015 versus 2006.

Table 6.43: Test of Between-Subjects Effects for Government Objectives

2006		2015 - 2006	
F	sig	F	sig
16.244	**.000**	4.627	**.004**

The test of between-subjects effects indicates that there were significant main effects in 2006 (p=0.000) and 2015 versus 2006 (p=0.004). *Post hoc* comparisons using the Tukey HSD test were conducted and main effects were found to be of statistical significance in order to investigate further the source of university group differences.

Table 6.44: Mean and Standard Deviation for Government Objectives Based on the Average Score

University Category	2006			2015 - 2006		
	M	SD	N	M	SD	N
RAU	3.85	0.94	10	1.78	1.15	10
RAU	4.15	0.89	29	2.22	.95	29
CU	3.23	0.82	25	2.39	.67	25
FU	2.97	1.00	51	2.77	1.08	51

Table 6.45: *Post hoc* Comparisons Test (Tukey HSD) for Government Objectives Based on the Average Score

(I) University Category	(J) University Category	Mean Difference (I-J)	Std. Error	Sig.
DV: 2006				
RAU	RAU	−.2994	.32073	.787
	CU	.6233	.32725	.233
	FU	.8761*	.30248	**.024**
RAU	RAU	.2994	.32073	.787
	CU	.9228*	.23869	**.001**
	FU	1.1756*	.20341	**.000**
CU	RAU	−.6233	.32725	.233
	RAU	−.9228*	.23869	**.001**
	FU	.2528	.21353	.638
FU	RAU	−.8761*	.30248	**.024**
	RAU	−1.1756*	.20341	**.000**
	CU	−.2528	.21353	.638
DV: 2015 versus 2006				
RAU	RAU	−.4408	.34277	.574
	CU	−.6100	.34973	.306
	FU	−.9912*	.32326	**.015**
RAU	RAU	.4408	.34277	.574
	CU	−.1692	.25509	.911
	FU	−.5504	.21738	.061
CU	RAU	.6100	.34973	.306
	RAU	.1692	.25509	.911
	FU	−.3812	.22820	.345

(I) University Category	(J) University Category	Mean Difference (I-J)	Std. Error	Sig.
FU	RAU	.9912[*]	.32326	**.015**
	RAU	.5504	.21738	.061
	CU	.3812	.22820	.345

The results from *post hoc* comparisons test (see Table 6.45) using a Tukey HSD procedure confirmed that the mean score on the program plan imposed for RAU (M=3.85) was significantly different from FU groups (M=2.97) in 2006. Significant differences were suggested between respondents in RAUs and CUs in the same year. This trend was consistently significant for RAU groups and FU groups in 2015 versus 2006. The results obtained support that the role of changes in the government funding of Malaysian public universities have played in achieving the MoHE blue prints and changes over time.

6.6   Summary

The overall results of the quantitative analysis indicated that the respondents believes that the government funding reforms in Malaysian public universities have altered approaches in achieving government objectives through reductions in goal conflict and/or information asymmetry. Statistical tests indicated that there were significant differences in the impact of funding reforms in relation to strategic planning, R&D and T&L, as well as in achieving the Malaysian government objectives. Kruskal-Wallis test and factorial ANOVA indicated that there were significant differences in the results of RQ1, RQ2 and RQ3 across the Malaysian public universities sector (RAUs, FUs and CUs). The conclusion that can be drawn is that the Malaysian Government's funding reforms contributed to a reduction in goal conflict and/or information asymmetry. The results indicate that the universities are increasingly turning to aligning education activities to government strategy, and to monitoring performance in order to meet strategic goals. In practice, public universities are largely funded by the government, and therefore should ensure that strategies and action should encourage social and economic development. In return, it is vital that

institutions must clearly demonstrate their activities as being in line with the principal government objectives.

The next chapter discusses the results obtained from the focus group interviews.

CHAPTER 7

RESULTS II–QUALITATIVE ANALYSIS

7.1   Introduction

This chapter presents an analysis of the qualitative data gathered from the focus group interviews conducted in Malaysian public universities. As mentioned in Chapter 5, the main objective of these interviews was to acquire relevant information and opinions from subjects in the field that could supplement the quantitative data and better address the research problem. With these focus group interviews, the researcher could also acquire an in-depth understanding of the issues universities are facing due to government funding reforms through personal contact with a wide range of respondents with differing levels of knowledge and experience. Information gained from these interviews is used to confirm and add to the information obtained from the results of the questionnaire. The similarities and differences found in respondents' opinions will be used to compare to the quantitative data and used as a basis for an in-depth understanding of the impact of changes in government funding.

The researcher conducted focus group interviews at four participating public universities. Two RAUs, one CU and one FU were chosen to create a diverse and representative sample of universities in Malaysia. In this study, the presentation of results from Apex University was combined with the RU group known as RAUs to protect the identity of Apex University. The findings reported are based on the four focus group interviews conducted known as Universities A, B, C and D. These were analysed according to the five RQs of the study and followed by the overall conclusion of the qualitative findings.

The flowchart below presents the organisation of the topics of discussion in the chapter.

Figure 7.1: Chapter Organisational Flow

| 7.1. Introduction | → | 7.2. RQ1: Strategic Planning | → | 7.3. RQ2: Research and Development | → | 7.4. RQ3: Teaching and Learning |

| 7.5 . RQ4: Categorisation of Malaysian Public Universities | → | 7.6 . RQ5: Government Objectives | → | 7.7 . Summary |
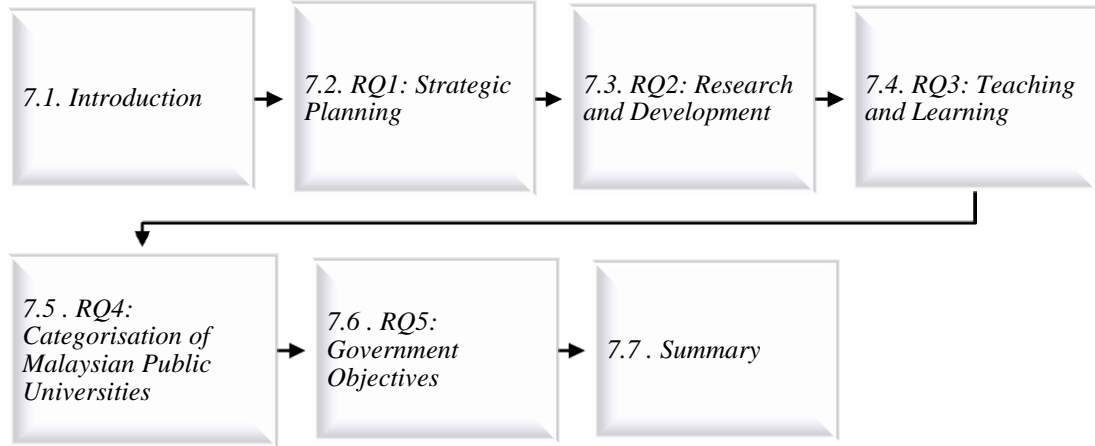
7.2 Strategic Planning

The objective of this section is to examine the feedback from the respondents with regard to RQ1: Have changes in the Malaysian Federal Government funding altered the approach in strategic planning of public universities in Malaysia through reductions in goal conflict and/or information asymmetry?

The findings of the focus group interviews indicate an affirmative response to the above question. Responses indicated that funding changes have improved strategic planning and communication in the concerned universities to ensure that government objectives were addressed. However, due to funding constraints and expectations for better performance, the universities were required to have effective strategic planning to overcome these challenges. As a result, when the behaviour of agent is observed, the alignment between the universities' strategic planning and the government's objectives can potentially affect universities' performance.

In this section, the researcher organised the qualitative results in three different sub-section includes (1) effects of funding on strategic planning; (2) accountability and transparency; and (3) efficient use of university resources.

7.2.1 Effects of funding on strategic planning

Participants from Universities A, B, C and D pointed out that there is a need for public universities to be more aligned with the government's objectives due to the financial changes under the implementation of National Higher Education Strategic Plan beyond 2020 and the National Higher Education Action Plan 2007–2010. A participant from University D said:

> *Strategic planning that we do is based on the National Higher Education Strategic Plan beyond 2020. What we do here is to develop our strategy in alignment with the seven thrusts of the plan.*

Such responses indicate that the government's strategic planning is used as a reference for universities to formulate and implement their strategic planning. A participant from University A highlighted the necessity and desirability of seeking such alignment between the government and university strategic planning:

> *It is clear that when we develop our strategic plan, we are always aware of the National Higher Education Strategic Plan beyond 2020. We look at that as a strategy conceived at the national level. It is about cascading down to the university. So we do not run away from the plan.*

Thus, the results of this study showed that the concerned universities in the study are working in line with the government's directives as stated in the National Higher Education Strategic Plan beyond 2020 and the National Higher Education Action Plan 2007–2010. As these universities are publicly funded and the operation and development of the university is mostly overseen by the government, the funding granted when tied in with a demand for greater alignment and cohesion between university and government should have a positive impact for the government's larger initiative for Vision 2020.

Effective communication. The findings also indicate that funding changes have influenced how the universities manage clear and effective communication with the MoHE. For example, a participant at University B stated:

The current status quo necessitates that we provide the government access to any information they want. From time to time, we have to send detailed data and reports to defend our budget ...'

A senior officer at University C also noted greater communication between the university and government, although he also expressed a hint of helplessness or resentment at having to constantly report to the government. He said:

We want our university's plan to be aligned with the government's strategic plan, more so because of current changes in the government's policy. In other words, because of the National Higher Education Strategic Plan beyond 2020 and funding changes, we are more or less forced to ensure clear communication with the government.

A participant at University B argued that they have always maintained good communication with the government since they depend on them for funding, but accepted that the current funding constraints have increased the level of communication even more. He stated:

Obviously, we now communicate more with the government than before. So if your question is whether these changes have influenced us in ensuring clear and effective communication, the answer is yes. I would say prior to this period of reduced funding, the university always maintained effective communication with the Federal Government. This is because you need to talk with them in order to get what you want, whether you like it or not.

Elaborating the nature of the communication and the requirements, a participant at University D related:

I think from time to time a report is required that is sent to our stakeholders. When I say the stakeholders, I don't only mean the MoHE, it can be the Economic Planning Unit or Ministry of Finance (MoF).

Despite this reservation about having to supply constant information to the government, participants at University B argued that such communication is needed for the government to have a better understanding of the areas that need improvement. A senior officer accepted this but also expressed some frustration about the process of reporting:

> *Sending feedback and reports is not a problem for us. However, the manner in which the Federal Government agencies interpret and perceive the information can be problematic. Sometimes they cannot see our viewpoint. I have been here for 32 years and that is how I see this issue. Every time they ask for a particular report and we give it to them, they come back to us asking for the same thing again. Sometimes three departments under the MoHE could ask you for the same thing in different formats. It always happens.*

Other members in this focus group interview also expressed similar views about their frustrations with the communication process with the government. Nevertheless, the participants at University B agreed that communication is improving and the government has made some improvements to the objectives and mechanisms that were previously unclear.

Further, participants at University C pointed out the importance of technology as a mechanism to ensure that information reaches the concerned authorities in real time. They felt that technology helped in producing quality information and promoting integrity of communication with fast and high-quality data. A respondent said:

> *We have to change with times. The biggest transformation is from technology. By using technology, we need to move to a system of office automation, complete documentation of important issues as well as production of quality documents. We are moving to second ISO in teaching and research. We want to know where we are. From there we can deduce the amount of money we need.*

Monitoring mechanism. Given this need for effective communication, the government has made a number of efforts to improve the mechanisms for monitoring communication with the universities. A PMO has been set up at MoHE to oversee the implementation of National Higher Education Strategic Plan beyond 2020 and the National Higher Education Action Plan 2007–2010. Every university has a small PMO office, which they call i-PMO, to facilitate activities at the institutional level and help the project team at the ministry level to obtain relevant data, information, and expertise from the university. These mechanisms help to improve communication between the university and government.

In addition to PMO and i-PMO, the CAPs act as a platform to monitor the implementation of government strategic plan. A participant at University D complimented the efficiency of CAPs:

> *Communication between the university and government has improved since the implementation of CAPs. It is actually helping us to work in line with their needs. In fact, we believe that the performance indicators that are developed can be implemented even with the funding reforms.*

At the same time, CAPs also coordinate all activities related to teaching and research. Participants at University A explained that there are many mechanisms used in order to monitor the quality of teaching and research at the public universities:

> *For example, I think that there is a stipulation whereby the university needs to produce a yearly annual report. It goes right up, I would say even up to the parliament.*

Overall, participants agreed that the current developments in funding changes and mechanisms of monitoring like CAPs allowed the government to monitor performances of public universities in Malaysia, this had also made that the management of universities more efficient if a little demanding for the administrators themselves. Participants at University D voiced this ambivalence:

> *Managing the university today is not easy because we are always monitored by various instruments. Setting clear targets with funding constraints is a challenge today.*

However, the participants agreed that the monitoring is conducted on a regular basis with the good intent of ensuring that the processes of strategic planning are on the right track. A participant at University C stated:

> *It's actually helping us because with constant communication and reporting we know what we have and where we are heading to in our strategic plan and also in other aspects of university development.*

They pointed out that the regular meetings at the top management level were conducted to monitor the latest developments and search for any constraints that the university faced in implementing government objectives.

Performance measurement. KPIs have been established by the university to determine specific targets required by the government and observe university performance towards these targets. Findings gathered from the focus group interviews at University A, B, C, and D show that respondents agreed with the implementation of KPIs by the MoHE about communicating and monitoring the performances of universities. A participant at University C spoke positively about the KPI and saw this as providing tangible targets in the long run of achieving strategic planning:

> *In my understanding, this makes the managing process clear. For us now the program is now established, clear and legible. We are not talking about planning anymore. We are now implementing the program and now we have to follow the target. Now that the target has been set, the ball is in our court. My concern is more about readiness. It involves the working staff of the university as a whole and not only the academician. All employees must support the program.*

A respondent at University A elaborated about how they prepare for the clear measurement of targets required by KPI:

> *We are improving our readiness by grasping these clear ideas about what to measure and when to measure. We will not measure everything but just what matters, when it matters.*

The issues of readiness pointed out by the participants in this study indicate that the support-staff in these universities are learning to move forward in alignment with the plan but also appreciating clear, measurable, objective-oriented procedures like KPI.

In relation to performance measurement, participants clearly stated that the university would respond and do whatever is required to meet the KPIs and objectives stated in the government strategic plan, but at the end of the day, they made the decisions about how to benchmark the KPIs and the government objectives. A participant at University D commented at this:

> *We are be given our KPIs. The government does all KPIs for RAUs like us. These KPIs are stated clearly and cannot be negotiated. We will work to ensure that it is aligned with government objectives.*

Evidence from this study also indicates that the MoHE is using the audit mechanism to monitor the performance of universities. According to the participants, audits also help the university to understand the new system and provide feedback about the improvements that need to be implemented. A participant at University A supported:

> *We are audited from time to time by the government agency. This helps us to know what went wrong and the feedback from audit committee helps us to improve our system.*

However, another comment on this issue indicated that while the auditing process did happen, they were never given any feedback. A participant at University B pointed this out:

> *Every time they audit us, we are always ready with our documentation. When we do that indirectly we can monitor our goals in line with what*

the government wants. But the problem is that when they audit us they never give us feedback.

Participants at University B argued that the committee audited the university in 2010 and they were told that they got the highest marks but were not given the audited official results.

7.2.2   Accountability and transparency

This section will discuss findings regarding the government's efforts to build a more reliable system to track the university performance to ensure greater accountability and transparency in managing public funds. The findings indicate that the participants are aware of these changes and appreciate them because the money comes from the taxpayer and therefore the universities must give value to the public. With regard to financial monitoring, participants in the study understood that mechanisms such as MyRA, CAPs and financial auditing are tools developed by the government to monitor the programs and activities of the universities. A participant at University C expressed his approval about this monitoring:

The current situation is that whatever resource is given for use by the stakeholders is reported back to the government. It is part of our accountability to the government and public.

Following this, participants at University D even agreed with the government initiatives to implement a mechanism to monitor institutional behaviour. According to one of them:

I would say yes monitoring the overall behaviour and attitude of the university management. Transparency is a key KPI for universities to obtain funding from the government and in order to ensure that transparency certain mechanisms must be instrumentalised.

Funding changes or political factors. The participants were then asked to further discuss their perceptions of government-imposed mechanisms and determine whether these were due to funding changes or political factors. The finding indicates

mixed views from the participants. University A and B agreed that both factors had resulted in the current changes. A participant from University A said that it was a combinatory effect of funding changes and political factors but rationalised the presence of a political agenda saying:

There is always some political agenda ... but it is aligned to achieve the national agenda. You know the government must not only work hard, they also need to work smart ... and that is not all their hard work must also be visible to the public at large. The public must see the results of all these policies and I am very happy to say that we have seen some results. The RAU agenda, for example indicates tremendous results on the front of enhancement of research output. Since 2004 all the four RAUs have improved our productivity in R&D.

In contrast, participants at University C and D argued that funding changes were the main reason for this concern about greater accountability and transparency, which they maintained had nothing to do with political factors. A respondent at University C gave an extremely well-reasoned and eloquent defence of his position:

I think it's the evolution of the university in the country which has nothing to do with political factors. Government is looking back at what we have and how we can move from what we are. They have tried to optimise the little money we have and it is not for a political reason. If it was indeed for the political reason of winning the election, such an opportunistic strategy would have to be short term. This is long term, because we want to be a developed country.

7.2.3   Efficient use of university resources

In relation to the issue of promoting the efficient use of university resources, evidence indicates that alternative approaches are often used to overcome financial limitations. This included efforts by the university management to integrate planning and effective coordination to optimise the resources of the university. However, despite these challenges, they felt that the universities must continue to work in line

with the government strategic plan. A comment by a participant at University D illustrates this commitment to the government strategic planning:

> *Even with the financial constraints, we are not prevented from reaching the targets that have been set. We are using our creativity to ensure the objective will be achieved.*

Managing limited resources. Participants at University A and B suggested that the most effective way to overcome the issue of limited resources is by sharing of research and equipment facilities within universities. This would include implementing a system of integration in laboratories so that research equipment could be used by different faculties and staff. A respondent at University B highlighted that this would not only mean capitalise on full use of the equipment but also the manpower in those laboratories:

> *Indirectly it will give us cost savings in terms of manpower and resources that will be profitable not only in financial terms but also in terms of human resources. When you have different labs everywhere, you need to have technicians in each one of them. We are now sharing our resources, the laboratories and the technicians are multi-tasking now.*

Participants also pointed out that multi-tasking in this manner ensured that the workload was efficiently distributed among existing employees and reduced cost in terms of staff remuneration. Multi-tasking according to respondent refers to a method in which tasks, or processes performed by sharing the existing resources. This is due to limited funding resources. This was important because universities are bound by rules and regulations in appointing new staff that state that unless there is a completely new job profile with an additional allocation, it is difficult to recruit permanent staff because no new warrants are created. Consequently, the universities have to maximise the existing workforce even if the current workload has increased. In these circumstances, all the participants highlighted the efficacy of multi-tasking as the best way to utilise personnel and contribute to efficient use of resources. A participant at University B stated:

> *Of course, in tandem with the current policy, although our workload has been increased the number of staff members has remained the same. So everybody is multi-tasking right now.*

A senior officer at University D also elaborated other methods like cutting corners in some superfluous administrative activities besides multi-tasking:

> *With the limited resources at our university, we have reduced building maintenance activities and renovation to save some money. In terms of staffing, we recruit based on our capacity and try to avoid recruiting non-academic staff if the workload can be divided between existing workers. Therefore, we have to use what we have. For it, they should be multi-tasking. This is because our ability to generate funding is minimal.*

The results of this study demonstrated that universities need to consider further diversification of limited resources without compromising the main objectives in teaching and research. It is suggested that the universities are and should continue to be more creative in looking at resources and should gain new opportunities to balance the impact of government funding cuts in various ways.

Income generation. In this research, evidence pointed out that the funding changes have led the universities to generate additional income to overcome their financial limitations. Participants agreed that in transforming higher education in public universities, administrators needed to generate income so that the universities could function autonomously. Methods used for generating income differ according to the creativity and strength of each university. For example, according to a respondent from the research-focused University B, they try to commercialise their research:

> *We create an initiative for them to commercialise products that may help the university to generate income. Because we understand that if they are successful in marketing their research products, the funds will flow in to support it. In addition, we also try to establish joint ventures with international and local companies.*

Conversely, participants at University C said that they were working to strengthen their internal mechanisms of financial administration in order to increase liquidity:

> *Now we talk about how to save, how to generate and how to collect. We are trying to improve on these three fronts because the bottom line is you must have money. Now it must be liquid, meaning that, we have to collect money from the students and then get funding from other institutions to do collaborations on research.*

Participants at University D were not tweaking their monetary mechanism but simply investing funds received for development expenses in fixed deposits. With that additional income, the university could generate using internal resources. Although they added that this method of saving did not contribute to increased additional income since the income generated was comparatively miniscule. As a CU, University D had no research projects or activities that could contribute to income generation.

7.3   Research and Development

The objective of this section is to examine results pertaining to RQ2: Have changes in the Malaysian Federal Government funding altered the approach to R&D in Malaysian public universities through reductions in goal conflict and/or information asymmetry? Conclusions from the focus group interviews feedback show an affirmative response to this research objective.

This section will elaborate feedback from the focus group interviews about how the funding changes have had a positive impact on R&D in three different themes includes (1) effects of funding on R&D; (2) reporting information on R&D; and (3) performance measurement.

7.3.1   Effects of funding on research and development

In relation to the effects of funding on R&D, participants confirmed that the government had recently increased its support and involvement. The Federal

Government has put greater focus on increasing the level of funding available to support R&D activities at public universities in Malaysia. For example, evidence from the qualitative study indicate that RAUs are receiving additional funding of RM50 million to RM80 million. A participant at University A welcomed this additional funding:

> *Now we are getting more resources for R&D. We have been given the opportunity to conduct these activities more efficiently with the extra money.*

Being a teaching-focused university, participants at University C did not benefit so much from the R&D funding, but they agreed that the MoHE is doing a good job in R&D. However, they felt that although the government is now trying to focus on funding in certain universities by promoting excellence in research, this only has direct benefit to universities that already have an established name in research. As a university with the CU status, they are required to excel in both research and teaching. A participant at University C expressed a little resentment for these funding changes:

> *As a CU we are not only looking at R&D; we also have to look at many other aspects including T&L. As far as I am concerned, I do not think we should make drastic changes in the way funding is given now.*

In addition, participants at University D, which is also a FU, further commented that the funding changes have minimum impact on their researchers. This is because the internal funding provided is not fully utilised. Instead, the chances of receiving external research grants from external resources are few. Therefore, the participants felt that they could still provide resources to support research activities without too much dependence on external funding.

Research funding. Although the government has increased research funding, evidence from the qualitative data shows that the funding changes have also paradoxically had a negative impact on the number of research grants available to public universities. For example, participants in this study reported that their

researchers were now running short of research grants and they were forced to search for grants from both local or international agencies because the additional funding promised to RAUs are not only used for research but others activities related to it. A senior officer at University B said:

> Of course, with the additional money it's not all given to research. We have to pay for post-docs that we have appointed ... to help the researchers, publication of journals, articles and more. It can also be allocated for expenditure on seminars, fellowships and the purchase of new equipment.

Further, participants at the University C and D argued that they were affected from the funding changes in two ways. Firstly, as mentioned earlier, there was no additional funding provided for R&D in universities with the CU status. Secondly, they had to compete with the RAUs to obtain funds from the Fundamental Research Grant Scheme (FRGS), which is a competitive grant open to all researchers provided by the MoHE. Participants from University C and D argued that these competitive grants are difficult to obtain due to their status as new universities with no research background, lack of professors, and expertise. A participant at University D said:

> If we compete with them, we will surely lose. Take FRGS for example ... we only secured three grants. I think this maybe because we are a new university. Consequently, we have still not seen any major changes in terms of funding.

Perception on impact of funding changes. Findings from the focus group interviews indicate that participants at University A happy with these funding changes in R&D. A participant at University A felt that the additional research funding provided benefited their researchers and actively promoted a research culture:

> With the current funding status, academic staff can get more research grants, which was not the case before. That is one of the beneficial results of the funding changes. If someone is not doing research something must be wrong with that staff member and they should leave

because the work environment in today's research-driven universities is not the same as before.

A participant at University C argued that the increased focus on R&D and competitive nature of the research grants encouraged a proactive research culture:

In my opinion, the changes on R&D have been beneficial. The money is there in these research grants, it is open to all public universities. If you are diligent and able you will grab those opportunities, if you are not you will be penalised by the lack of money.

Interestingly, participants at University B had mixed feelings about the funding changes. They said:

My reaction is to say yes and no to the funding changes at the same time.

This is because people have become more creative in getting funds from external sources. They do it online and search for external funding and do not just rely on the government.

But sometime the amount in the grants is a little too less which is more troubling since these grants are the only funds available. The MoHE has a grant for fundamental research. From the 200 applications sent in, we only got 59 grants. Obviously, the unsuccessful applicants were disappointed. Those who did not get it were knocking on our doors to find out what could be done. But the assessment was done at Ministry level and we could not answer them.

Meanwhile, participants from University D expressed their disappointment with the changes. They said that these changes have created difficulties for them in obtaining extra funding and competition with established universities has reduced their chances at receiving any of the grants.

Research support. Despite government funding initiatives behind R&D activities, participants in this study explained that the research support in their universities was primarily provided through internal resources to motivate academic staff to conduct research and commercialise their products. According to participants at University D, funding from money earned from internal resources was provided every year to academic staff to conduct research. However, they are also encouraged to apply for grants from external sources, as part of the effort to improve the university's name.

Participants at RAUs stated that the research support provided by the universities was focused on strengthening the quality of research output and maximising their research impact. A participant at University A said:

> *We set up small entities to help researchers move their output onto a higher level and with that I mean not only publishing in ISI Journals but things like patents. Now funding does not just mean giving the researchers resources and waiting for a report at the end of the day. We are building a comprehensive KPI in our system so that even during the process as far as the finances are concerned we continue to give incentives so that the researchers remain motivated throughout the project.*

In contrast, CU and FU had some separate issues that needed to be considered. Participants at University D argued that currently they were in the process of transforming to full university status. This process had led to impediments in conducting research. A participant stated:

> *This is due to several factors. Firstly, we look at the ability of our staff to do research. Secondly, we lack a mentor, someone with a professor status who can lead the research activities. Other universities have a mentor that can guide the research efforts but not us.*

7.3.2 Reporting information on research and development

Participants noted that with the current changes, the government has begun to demand reports on a regular basis and demand information about their R&D

activities. These changes were attributed to the implementation of National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010, and the obligation to be more transparent and accountable to stakeholders. As a participant at University A noted:

> *The government is our major stakeholder and our major sponsor. We have the responsibility to report our activities. They need the information to keep track of our performance.*

A participant at University C noted that the government now demanded more reports:

> *Earlier the government did not ask for these kinds of reports. They left it up to the university to identify and decide what information to provide. I think now they want all the information they can get about our activities.*

In addition, a participant at University B explained that the government is monitoring these R&D activities more frequently to ensure that the public investment is actually contributing to better performance. As stated by a participant at University B:

> *Every time a research project ends, a report must be handed to funding agencies whether it is the government or a private agency. I think that aspect is still the same as before. The only difference is the monitoring process, which is done more frequently now.*

This shows that with today's funding constraints and the need to be more transparent, universities now only need to report their activities but are also monitored on a more regular basis sometimes even in the middle of a research project.

Types of information. Participants in these focus group interviews confirmed that the types of information the government required in the reports have remained the same as before. The government demanded basic information on the number of research projects, number of publications, qualification of researchers and number of external research grants to the university. Overall, the participants in the focus group

interviews agreed that the information reported to the government were focused on the quantity and quality of R&D activities at the public universities.

However, the participants also noted some positive changes in the form of reporting and quality of information. The reporting format and information required has been standardised for all Malaysian public universities since the implementation of the Malaysian Research Assessment (MyRA). According to a participant at University C:

> *This assessment is good because it is standard for everyone. With this system, we can see where we have performed well within a particular year. It is very a comprehensive form of reporting our research performances and our achievement.*

Participants at University A noted that the types of information demanded by the government have shown a minor change with a shift of focus from quantity to quality data. One respondent said:

> *The government now pays attention not just on the quantity of research but also its quality. For example, how many of your research products have been commercialised, what is the quality of your publication et cetera.*

Information obtained from different departments were collected and evaluated before the report was sent to the government. The participants at this university further added that the reports were not only sent according to prescribed guidelines but were enhanced in any way possible to include any information of value. This they said would help them secure additional funding from the government in future. As a participant revealed:

> *We really need to get the quality data and not just comply with the prescribed guidelines. We send any information of value that has meaning ... and that is the hard part of reporting. For me submitting is not just filling up the prescribed form, we want to go beyond compliance.*

*We also mention our constraints and difficulties and do not send a nice
story for them to read.*

Next, the researcher investigated respondent perceptions about how they thought the government used all of the reported information from these public universities. In this study, evidence indicates that all the participants from University A, B, C and D agreed that the ministry used the information to make decisions and monitor their performance. A participant at University A stated:

*They use the information for monitoring us as well making decisions in
many things, for example, the budget for the coming year and strategic
planning.*

Thus, the evidence indicates that participants in this study were cognisant of the importance of providing good information to the government since they need it to make important decisions, allocate their yearly budget and craft their strategic plans.

7.3.3 Performance measurement

Results from the focus group interviews provided support for the research objective that performance measurement required by the government in relation to quantity and quality of R&D was leading to better communication mechanisms. Evidence indicates that the government has strong interests in monitoring and reporting R&D performances at public universities because it is one of the most important goals on its higher education agenda. Thus, the MyRA used by the MoHE to assess the public universities' performance.

MyRA is an online instrument system used to assess and evaluate R&D activities at all Malaysian public universities. A participant at University B spoke about how the monitoring of their research activities seemed to be very important for the government because their university is an RAU:

*Yes ... the government now has very strong interests in monitoring our
performance especially when a university gets an RAU status. This is
because to be an RAU you should have research outcomes. The time*

spent on research is more than time spent on teaching in RAUs. *The government now has strong interests in what research we do and they monitor us through annual reporting.*

Although not a research-focused university, University D also indicated positive support stating how the increased monitoring was also useful for measuring their activities as well:

All these fall under CAPs and we need to report our activities. If you ask whether this has led to better communication, I would say yes. The performance measurement used is almost the same as before but it has become much better. We are trying to close with them. In terms of monitoring, the mechanisms are standard; we all have an annual report and an annual budget. The current funding has changed the way the government monitors us.

These statements from participants at University B and D confirm that the MoHE is now using a systematic approach in monitoring R&D activities and performance at public universities.

7.4   Teaching and Learning

The objective of this section is to examine results directly to RQ3: Have changes in the Federal Government funding altered the approach to T&L in Malaysian public universities through reductions in goal conflict and/or information asymmetry? Feedback from the focus group interviews shows an affirmative response to this question and this response will be analysed below in three themes.

7.4.1   Effects of funding on teaching and learning

In this section, the analysis of data from the focus group interviews concerning the effects of funding changes on T&L is discussed. Evidence indicates that participants from University A, B, C and D have the same impressions about government efforts towards maximum utilisation of available funding. They all felt that apart from

research the government is trying to put greater focus on increasing the quality of T&L according to university strengths. However, due to funding constraints, public universities are required to be more creative to ensure that the T&L quality remains their main priority.

However, participants in this study pointed out that at this stage, universities were facing a problem in recruiting new academic staff due to some budget constraints. They pointed out that this problem may affect their strategic planning in T&L. In the short run, universities were using their own creativity like multi-tasking and appointing contract staff for a short period, to overcome this problem. A participant at University D highlighted spoke about the impact of funding changes on T&L and their strategies to overcome obstacles to good teaching:

> *If we speak of the impact on T&L, we use our creativity to deal with the financial limitations and you could say that the teaching standards are not greatly affected by these funding changes. In fact, since T&L is our main objective, this cannot be sacrificed on any account. Whether there is a lack of government money or not, we will not compromise on this issue and things that contribute directly to T&L are put down as a major priority.*

Interestingly, participants at University A, which being the RAU is more research-oriented, also expressed an unshakeable commitment for teaching before all else. They said:

> *As far as T&L is concerned we do not compromise on quality. When there is a need to provide facilities for teaching we say yes. We ensure the provision of at least the minimum requirements to maintain quality of teaching.*

> *The equipment used in teaching some courses is so expensive but we do not compromise on such matters. If there is a requirement to buy such equipment for the students, we do that ... and this is the case for postgraduate teaching as well, which is heavily aligned with research.*

Perception about impact of funding changes. Regarding the direct impact of funding changes on T&L, participants at University A and C replied that they were happy with the changes. However, participants at University B felt that it had positive as well as negative implications for T&L at their university. Finally, participants at University D said that they were not happy with these changes. A participant at University D commented:

> *In terms of T&L we are not happy with the reduction in funding, because now we as a teaching university do not have enough funds.*

Maximise resources. Evidence indicates that some of the universities are multi-tasking to overcome the shortage of academic staff. This is to ensure that even at the most difficult times, T&L activities are not affected. As explained by one participant at University A:

> *In term of T&L, because of restricted funding we need to look into a program in new areas. Therefore, we have to maximise our resources by multi-tasking.*

In the meantime, participants at University B pointed out that they were using the facilities of R&D on a shared basis with T&L activities to maximise their resources but still felt the shortage of skilled academic staff. A respondent said:

> *I think in terms of facilities, activities for T&L and R&D at our university are packed together. Because when we buy equipment for research, we also use it for teaching. Therefore, we do not face any shortage of facilities for teaching, but in terms of human resources, we are facing problems in recruiting good and adequate teaching staff.*

While there are some other issues detracting from good T&L, it can be concluded that these are not the result of the funding changes. On the contrary, evidence indicates that universities are working in line with government objectives despite the funding constraints and the participants agreed that changes in funding would not affect the quality of T&L. A participant at University D further stressed this point saying:

We want to make sure that all the KPIs targeted are reached. In other words, students should be able to graduate with a program that is recognised as being of a suitable standard. We do not want to run courses that are substandard or unrecognised by the government to make easy money because of these financial problems. That would be unfair and unethical.

7.4.2   Reporting information on teaching and learning

Findings from the focus group interviews confirmed that the government now demanded information about T&L on a regular basis from public universities. In addition, participants in this study pointed out that the information reported must comply with the objectives stated in National Higher Education Strategic Plan beyond 2020 and the National Higher Education Action Plan 2007–2010.

***Types of information*.** The reports were now made in a standardised format with prescribed guidelines from the government. Evidence from this study indicates that the information requested are more or less the same as before except that the government now requested more valuable information in nature. Participants at University A pointed out some subtle changes in the nature of reporting:

We are now sending more information like what is the percentage of our teaching staff holding a PhD. In earlier days we would only report on things like the staff and student ratio. While those same questions are also asked today, the difference is that they also consider new issues like the percentage of PhD holders, quality of research publication. They want information about quantity as well as quality.

The types of information requested are comparatively different. For example, they ask information on how many of our graduates are employed within six months.

We are looking at the performance and the impact. Earlier on, we reported on things like the percentage of graduating students from our university. Now we report on how many graduates are employed.

A participant at University B spoke specifically about how the government demanded a whole host of information about a recent Memorandum of Understanding (MoU) they had signed with another university:

In the MoU we just signed, the government is not just looking at a number, they also want to know which country the MoU comes from, how active the MoU is, and what activities come under the MoU.

While these participants corroborated the current increase in government interest in quality information, a participant at University C gave a positive appraisal of this change in the following manner:

As for me, I am very supportive of this program. We are now realising the importance of quality data since they give us a clear picture of outcomes. This is very important. Before this, we just produced data, data that did not contribute any valuable information to help the government make decisions. That is why they have introduced these changes to guide us now.

7.4.3   Performance measurement

The government has also indicated strong interest in monitoring and reporting T&L performances at public universities. As mentioned before, some of the KPIs under CAPs are used to monitor the T&L. At the university level, a department monitors the performance of T&L activities and the KPIs were audited and monitored by the government on a regular basis. All the information reported is for the use of the government to make decisions and create strategic plans to improve the quality of T&L by providing additional resources to the public universities if needed.

In this study, participants agreed that such a performance measurement required by the government led to better communication. They were enthusiastic about the

systematic manner of performance measurement ushered in by KPIs that set clear goals and gave measurable outcomes. A participant at University D said:

> We tried to achieve our own KPIs. We have been audited in 2009. Most of the targeted KPIs are in line with the government objectives, which were marked with green indicators at selected fields. But in terms of research, we received a red sign indicating that our research output was unsatisfactory. We replied to the MoHE saying that this was because we are a new university. However, we met our target, especially in T&L.

7.5   The Categorisation of Malaysian Public Universities

The objective of this section is to examine results of the interviews regarding RQ4: Do the results for RQ1, RQ2 and RQ3 vary across the public university sector (FUs, RAUs and CUs) in Malaysia? Conclusions drawn by the researcher from the focus group interviews shows that these results vary across different types of universities and this matter will be elaborated below in three sub-sections: (1) strategic planning; (2) R&D; and (3) T&L.

7.5.1   Strategic planning

Evidence indicates that although the broad nature of the strategic planning implemented does not vary across public universities, there may be a difference in the types of focus that the strategic planning encourages in universities according to their strengths and specialisations. With the additional funding, the RAUs are working more on R&D while maintaining emphasis on T&L at the same time. As for CUs and FUs, the focus of strategic planning is more on T&L than R&D. Evidence indicates that the categorisation of Malaysian public universities provided clarity of goal and job profile about what and how each university needed to perform. This also ensured that public universities did not engage in unwanted competition or waste resources in areas outside their expertise. A participant at University C said:

> This is because once you enter into a competitive battle, someone is bound to lose. That is why the concept of collaboration comes into picture. We must look a win-win strategy like this.

Categorisation and funding. The evidence in this study indicates that nearly all participants agreed that the categorisation of public universities in Malaysia might be used as one of the yardsticks to determine the type of funding that best fits with their core functions. The categorisation of public universities more or less helps the government determine the allocation of resources and resource planning based on university strengths. Using this approach, the government can allocate their limited resources to the different universities according to their niche areas. A participant at University A briefly spoke about the efficacy of this method and the advantage to his university:

> *It has already been used by successfully the government in the allocation*
> *of resources. We get more funding compared to FUs and CUs because*
> *we had RAU status.*

A participant at University B gave a more extended rationale arguing that this method ensured that the funding was not wasted on unrealistic goals since money was only given in an area where a university could prove its credibility in delivering results:

> *I think it is true that the objective should be realistic if it is to be*
> *implemented. This means that funding must be allocated according to the*
> *specialisation and past record of accomplishment of the university in that*
> *area. So if we say that we are an RAU and funding for an RAU should be*
> *based on KPIs, then our funding should be based on our performance in*
> *research.*

In contrast to the above statements, University D (FU status) felt that the while categorisation played an important role in funding allocation, the policy has a negative impact on them because the funding was more research-oriented and the mechanism monitoring university performance being the same for all university categories, it ignored a university's achievement in T&L. He said:

> *The overall university performance is measured on the basis of R&D and*
> *not on T&L. For me, T&L is the fundamental, all universities can*
> *perform well in teaching. Your R&D performances is one of the*

> *yardsticks to measure whether you are a great university or not. R&D is now considered a key indicator of the standard of a university.*

As pointed out earlier, most participants from University A spoke positively about the linkage between categorisation and funding, since they also gained the most from the funding changes due to their strong research strengths. Surprisingly, one respondent at University A seemed a bit sympathetic about the situation of non-RAUs. He said.

> *The staff in these universities do not have much time to do research because much of the workload is teaching-based.*

Some participants at University D further suggested that the government should revise this policy related to the categorisation of Malaysian public universities, especially in terms of performance measurement ranking universities. They argued that they fail to gain additional funding for R&D compared to the RAUs because most of the FUs are newly established universities lacking expertise and research facilities. They also argued that given the difference in the nature of activities and orientations of research- and teaching-focused universities, the same measurement mechanism must not be used for them.

Autonomy. The government envisions this policy of funding changes as providing flexibility to the operation of public universities and improving their autonomy. The participants were also agreed that they have achieved a greater degree of autonomy, which has improved the day-to-day administration, decision-making process and university performance. However, a participant at University C (CU status) pointed out that there must be a right balance between autonomy and accountability:

> *Although autonomy will give us more flexibility this still needs to be guided by government policy. But the guidelines must help the university to perform without too much restriction while ensuring proper monitoring of their activities.*

Another participant at University C added that since the public is the most important stakeholder, universities must ensure accountability to them while seeking autonomy in their activities:

> *There should be accountability, because the money comes from the taxpayer, therefore we must give value to the people. For me the most important voice is that of the stakeholders. Any program or strategy that we implement must benefit the people.*

This indicates that the participants appreciated greater autonomy but were conscientious of the need that this should also be complemented with accountability to ensure that public universities are responsible for their performance.

7.5.2   Research and development

Participants in the focus group interviews pointed out that the categorisation of public universities in Malaysia plays an important role in the development of R&D because the core functions of universities have changed and R&D is now accorded greater importance in the categorisation system. In the new funding reform, the core function of RAUs is now focused on R&D activities compared to CUs and FUs, which still consider T&L a major activity. Participants from the RAU status university justified these changes saying that the government wanted to use the best resources available needed for wealth creation and capitalising on R&D was the best option to do so. Respondents from RAUs applauded the focus on research saying that this they would be more productive and competitive:

University A:

> *I think if our university is not recognised as RAU we will maintain the status quo and there will be no transformation in our university. But because of this policy we are more focused now.*

University B:

> *I think when we are given the RAU status; it was understood that research will be the main focus.*

With the additional funding and resources provided, they are expected to meet the KPIs targeted in MyRA or otherwise their status is forfeited. A participant at University A stated:

With the RAU status we have to excel in research. We are given additional fund, which is then earmarked for our researchers.

The results of this study revealed that CUs and FUs felt comparatively less pressure to excel in R&D activities because they were involved in other educational activities besides research. In addition, most of the CUs and FUs are relatively new and these universities did not have a previous history with which they could measure the impact of current changes in government policy to measure any differences. Conversely, universities with the RAU status having been established for a long time have worked under different government policy regimes and have sufficient expertise to work in research to feel the pressure of current demand from the government to improve university research. A participant at University C elaborated:

Being a CU means that our university is involved in all the activities of a higher education institution from A to Z. This also means that we have more opportunities compared to FUs. Taking care of all these duties is not something new for us because we started off as a CU and are used to doing all these things from the beginning. Being run as a CU does not make much of a difference to our existent workload unless they actually ask us to do something new not included in our job profile. We were already a university running research and teaching responsibilities concurrently, it is just that we have now been officially categorised as such under the name of CU. So I don't think there have been any major changes for us.

In contrast, universities with CU and FU status still needed to have R&D activities even without any additional funding for research. However, with the funding constraints, these categories of universities are now focusing more on T&L. Participants from the FU and CU expanded upon some of the limitations they faced in excelling in research. A participant at University C said:

When the government categorised us as a CU this just maintained the status quo as far as our university name and ability is concerned. This new status of a CU was not a promotion but just an official name to categorise as per our existing profile. Nothing changed as such. Anyway, this categorisation happened around 4 or 5 years ago so it's still new for us. Maybe after 10 years you will probably see a difference and measure the progress our university has made.

7.5.3 Teaching and learning

The data revealed that the categorisation of public universities does play an important role in the development of T&L activities. These results can be further confirmed by the feedback from participants in the focus group interviews. Participants at the RAU stated that although they have acquired the RAU status with its research-focused agenda, T&L remains a core function and the university will not compromise on the quality of T&L. A participant at University A elaborated on this:

So you are an RAU and therefore you think teaching is the second priority ... Not at all. Teaching is a must. If we compromise on the quality of your teaching, we have to answer the Vice Chancellor. Nobody should compromise on teaching. We are not a research institute ... we are an RAU, a research/apex university.

However, the participants added the focus on T&L is now different in comparison to earlier times. A participant at University B argued:

Research is considered important because the number of research projects has increased from what it was previously. But of course teaching is a core function ... we cannot deny that. So, indirectly we have not forgotten what our core business is ... but we have gone in the right direction as far as the categorisation is concerned.

Data from this study revealed that RAUs are now focusing on a smaller number of undergraduates and a larger number of postgraduate programs and students. Doing this seems to have emerged as an efficient way to promote research culture and

maintain a balance between R&D and T&L. By lessening the focus on undergraduate classes and encouraging more advanced, independent study-based postgraduate classes, they could still maintain their commitment to T&L without hampering research.

It seems that FUs and CUs are also working to increase the number of seats and degrees offered at the postgraduate level. However, for the time being, with their present status as teaching-oriented universities, FUs and CUs need to take in more undergraduate students. It is also interesting to note that FUs are now required by the government to increase the number of students at the diploma level due to recent changes in government policy. Participants at University D informed the research of this trend, with one stating:

> *The government policy now is to increase the number of diploma students at universities. This is because the industry requires such candidates as middle management with technical knowledge.*

7.6   Government Objectives

The objective of this section is to examine feedback from the interviews to RQ5: Has the change in the Federal Government funding contributed to the achievement of the government objectives stated in the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010 through reductions in goal conflict and/or information asymmetry? Conclusions drawn by the researcher from the focus group interview results shows a positive answer for this question.

An analysis of the findings is provided in five themes: (1) reporting information; (2) funding mechanism; (3) widening access and enhancing quality; (4) expanding the objective of lifelong learning; and (5) difficulties in implementing the National Higher Education Strategic Plan.

7.6.1 Reporting information on university achievement

The MoHE demands feedback on a regular basis about any achievements made the university in fulfilling any activities stated in the government strategic plan.

A participant at University B pointed out that the frequency of reporting the feedback has increased since the implementation of National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010:

> *But now we need to send the report more frequently and we have to find all the relevant information from our database. Thankfully, we are ready at most times and give them whatever information they want.*

Monitoring. The MoHE monitors the implementation of all activities stated in the strategic plan at the public universities on a regular basis. In the focus group interviews, participants agreed that there were some improvements in the monitoring system now adopted by the government. The present monitoring system was more systematic, contained a set of standard guidelines and made the most effective use of information collected. Participants at University C and D had positive views about the current monitoring system and said:

University C:

> *The government makes use of the information for important purposes like presenting it in the parliament. Not only that, they also want to monitor our progress in implementing the strategic plan.*

University D:

> *The government uses that information to monitor our performance. Take our finances for example. Sometimes if our expenses are more than our budget, then the government can provide us additional funds.*

7.6.2 Funding mechanism

Nearly all participants agreed with the government's intention to implement the PBF mechanism as stated in the National Higher Education Action Plan 2007–2010. A participant at University A said:

Yes, sure that PBF will assist us in achieving government objectives. I don't just think so… I know so. It is clear that PBF is the right way to allocate funds based on performance.

This was than further supported by a participant at University B:

Yes, I agree with that idea because it's the right way to go forward to become a world-class university whether your focus is in research or teaching. We have now found out how we can move forward. So definitely, PBF is the best way to manage university funding.

Following this, participants at University B pointed out that while the RAUs were allocated funds on the basis of their performance; they suggested that the government should look into the categorisation of public universities before implementing the PBF mechanism. A clear policy and accompanying documentation is needed to ensure that it can actually yield the best approach of funding needed at public universities. A participant at University B argued:

PBF must look into the categorisation of public universities. For example, FUs may not be able to perform in research. It is hard for such small and new universities to work on publication and commercialisation of their research. I think they need to really look at issue before basing all their funding decisions on performance.

Participants at University D also felt that there were issues that needed to be clearly explained before the PBF mechanism was implemented. They believed that with the implementation of this mechanism, the indicators would be based on performance and objectives. A respondent said:

We are a government-owned services provider. Today, the government provides us funding based on the number of students. If we have 10,000 students the costs will be based on that figure and we will get the required funds from the government. Education as welfare is another issue, but who gets how much is all based on performance.

Participants at University C believed that government's intention to implement the PBF mechanism is to improve the performance of public universities and manage funding in a transparent and accountable manner. Apart from these issues, a participant at University C noted that the success of PBF mechanism depended on the university and its staff:

> *My personal opinion on performance-based funding is that it will assist the university to become aligned with government objectives. For me it depends on the readiness, not only of the university itself but also of the people (staffs) concerned. They really need to move forward with these changes.*

Further, a respondent from University B also stated that another mechanism currently in use called MBS is also based on performance. However, the government is moving to OBB, which puts more emphasis on the impact of the effectiveness of government projects and programs, as a participant at University C explained:

> *I consider this change as an evolution. Even when we talk about Malaysian budgeting as a whole, it has evolved from a traditional budgeting system which has moved to performance-based budgeting from traditional budgets at our universities we moved to MBS and recently they want us to move to performance-based budgeting.*

7.6.3   Widening access and enhancing quality

Evidence in this study shows that universities are working towards the goals of widening access and enhancing quality; two major policy objectives of the National Higher Education Strategic Plan beyond 2020. In the focus group interviews, participants pointed out that universities have directly or indirectly provided special funding for equity groups that require extra support. A participant at University A said:

> *I think that PTPTN funding also addresses disadvantaged groups. At the university level, we also have a lot of additional funding from government agencies or the industry. But the university will determine*

whether that is enough or not and take the required initiatives. We also have equity as a goal in our strategic plan.

A participant at University C made a similar comment:

When we talk about education, we cannot deny these disadvantaged groups. If they meet certain criteria, we do not deny them and even provide some funding or help for them.

In addition, the Student Affairs Department provides services and support to students to assist them in short- or long-term financial matters. A participant at University A said:

We don't want the students to leave their studies because of money problems. We are proactive about this and we work to help them out in such situations.

A participant at University B also said:

We know the student's status from the information provided to us in their admission form. We have student loan schemes under the Student Affairs Department for students that need help before getting their scholarship. When they get the scholarship, we deduct the money already given to them. We have short-term and long-term funds; long-term funds for students that need help before they graduate and short-term funds for students that need to pay some urgent fees immediately with that loan.

7.6.4   Expanding the objective of lifelong learning

This section discusses findings about the objective of expanding lifelong learning in public universities. Participants in this study stated that the universities are working to encourage individuals and communities to enhance new knowledge and skills at HEIs. Universities have begun to show greater concern to ensure that it is consistent with the government objective to build skills and knowledge of the nation. Although there was no direct funding provided by the university to support this program, evidence indicates that universities provided support indirectly in the form of

reduced tuition fees to mature or continuing students. A participant at University A said:

> *We do not provide such students loans or finances directly, but indirectly the university helps them out with lower fees. We provide them the opportunity to continue studies at a lower fee as part of our social responsibility.*

Conversely, participants at University D pointed out that there was no clear operational definition of lifelong learning in their university at the moment but they ran many short courses for mature or continuing students. A respondent said:

> *The definition for lifelong learning is not so clear. In our university giving lectures, courses, and short programs that may increase the knowledge of the society can be considered as lifelong learning.*

Therefore, this participant explained that they run these short programs and courses at the certificate level but they do not have a lifelong learning program specifically tailored for undergraduate programs.

Participants at University B informed the researcher about three different categories of courses under the lifelong learning program at their university. A participant at this university said:

> *We have three categories of programs for them—'warga emas', 'warga budaya' and 'warga sukan'. They get special classes and lectures.*

7.6.5 Difficulties in implementing the National Higher Education Strategic Plan

In this study, participants were asked about any difficulties that the universities faced in implementing the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010. Participants at University A and C felt that the difficulties accompanying the government strategic plan must be seen as a challenge rather than an obstacle. A participant at University A spoke positively about the plan in these words:

> *I do not see any difficulties with the strategic plan ... it is more about challenges than problems. And anyways the world is full challenges.*

In contrast, a participant at University C was quite pessimistic in his evaluation of the strategic plan:

> *I think personally it is a huge challenge. If you read the plan, what is expected from each university is honestly quite difficult to achieve. The plan is quite idealistic.*

Although they were generally optimistic about the plan, participants at University A did face some difficulties in understanding the real meaning of what the government wanted in the early stages of the plan. However, they managed to resolve this issue through dialogue with the government and now spoke quite positively of the difficulties they faced as an obstacle overcome by their diligence. A respondent elaborated:

> *In our meeting with the MoHE, we had lots of arguments with regard to the National Higher Education Strategic Plan and CAPs. Take CAPs for example, there is still argument about what to measure and when to measure. We wanted to get clarity on these issues. But as I mentioned earlier it was a challenge for us. The good news is that we are improving, we are getting better and better.*

Conversely, participants at University B pointed out that the key difficulty faced by the university in implementing the government strategic plan was funding. The proportion of funds limited for the plan has created imbalance in the resources available for the university in implementing the plan. They argued that despite these difficulties in funding, the university did not use it as a reason for not performing. In fact, the university KPIs were on the right track and the university management was working hard to ensure that the targets are achieved. In fact, these respondents from University B spoke of their diligence and ingenuity in working towards the strategic plan despite of these funding difficulties:

Yes, certainly because sometimes when people have limited money they perform better than those who have more money but do not work hard. When money is difficult to get, we work harder to earn it.

The focus groups then further discussed similarities and dissimilarities in the difficulties or challenges that they faced in implementing the strategic plan. University C and D felt that their status as a new university and their location away from the national hub of Klang Valley contributed to some problems. Evidence shows that both these universities were struggling to meet government expectations due to limited internal expertise and inadequate research funding. One of the key difficulties they pointed out was competing with other established universities to obtain research funding. They also did not have much success in commercialising their research output. Participants from University D also added that the main difficulty for them was obtaining the required funding to implement programs for internationalisation, mobilisation and recruitment of experts at the university.

7.7   Summary

This chapter analysed the feedback derived from the focus group interviews conducted by the researcher at four Malaysian public universities of different categories. The chapter presented the feedback according to the five RQs that led the discussions at these interviews. The answers to each question were then further organised and presented according to relevant themes. Overall, the results of this qualitative part of the study show positive support indicate that funding changes made by the Federal Government have altered the approach to strategic planning and create greater alignment to R&D and T&L in Malaysian public universities by reducing goal conflict and/or information asymmetry. The evidence also shows that the respondents felt that public universities have become more aligned with government objectives and reporting information has become more regular with the implementation of these funding reforms under the National Higher Education Strategic Plan beyond 2020 and the National Higher Education Action Plan 2007–2010.

The next chapter will present a joint discussion of the findings from both the quantitative and qualitative results of the study in order to examine these questions in further detail through a comparative analysis.

CHAPTER 8

DISCUSSION AND CONCLUSION

8.1 Introduction

The purpose of this chapter is to discuss and conclude the findings obtained from both the quantitative and qualitative data collection using agency theory to examine how the funding reforms initiated by the Federal Government have altered the approach to strategic planning in public universities in Malaysia by reducing information asymmetries and/or goals conflicts, as stated in the RQs of the study. Accordingly, the results from the quantitative questionnaires (see Chapter 6) and qualitative focus group interviews (see Chapter 7) are discussed in detail in this chapter. As mentioned in Chapter 5, data gathered from the focus group interviews confirmed and enhanced the results obtained from the questionnaire. The combination of questionnaires and focus group interviews in this study also enabled the triangulation of quantitative and qualitative data to validate the findings more rigorously. The discussion and conclusion will cover the analysis of the findings ranging from the similarities and differences in the results of the data from both methods as well as a comparison of the findings of the study as a whole with previous literature to discover similarities or contradictions (Swales 2004). Finally, this chapter concludes with the recommendations and closing statements of the thesis.

This chapter is organised and discussed as outlined in Figure 8.1.

Figure 8.1: Chapter Organisational Flow
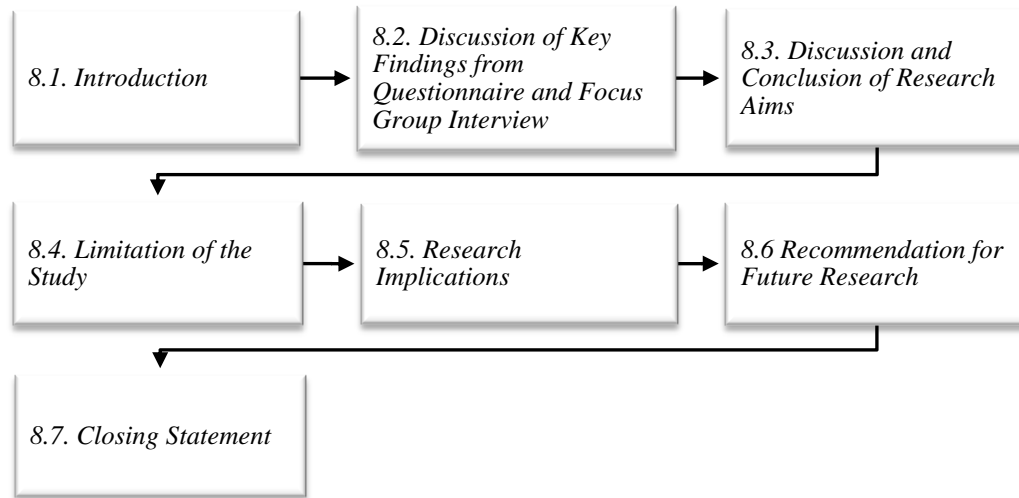
This study has shown that agency theory can be used to assess a government–university relationship in public universities in the context of a non-Western developing country like Malaysia. In seeking to explore the government–university relationship, this study employed a mixed-methods approach of data collection with both quantitative and qualitative data providing empirical evidence to pursue the research objectives of the study. These findings suggest that, in general, a shift towards new funding reforms are likely to result in a change of behaviour at public universities in Malaysia (Kivistö 2008; Schiller & Liefner 2006) and to bring their activities into better alignment with government objectives. The findings of this study suggest that in the context of Malaysia as a developing country, both political and governmental intention play roles in these changes.

8.2   Discussion of Key Findings from Questionnaire and Focus Group Interview

This section presents the outcomes of the comparative analysis of the findings from the quantitative and qualitative data collection with a particular focus on the similarities or differences in the results as explained in Chapter 5. Most of the points from the comparative analysis predictably showed strong congruence between the

two types of data, but it also threw up some that were quite unexpected. The discussion is organised around the five RQs as follows.

8.2.1   Research Question One

Have changes in the Malaysian Federal Government funding altered the approach to strategic planning of Malaysian public universities through reductions in goal conflict and/or information asymmetry?

Overall, the findings suggested that strategic planning in public universities is intended to align their individual agendas and activities with government objectives. Here, communication between government and university has improved with the adoption of performance indicators, reporting, and auditing, due to better monitoring of the universities' performances with these funding reforms and government strategic plans.

The statistical test results show that the respondents agreed with each statement that the impact of government funding changes in Malaysian public universities have altered their approach to strategic planning through a reduction of goal conflict and/or information asymmetry. The one-sample t-test and one-sample Wilcoxon signed rank test results indicate strong significant value (p = 0.000) for all 14 items. In fact, the findings from the composite measures that are differentiated based on the two variables informational asymmetry and goal conflict has shown a median score of six for both items. In accordance to that, the findings from the questionnaires supported this research objective of the study.

Findings from the quantitative data indicate that all Malaysian public universities are working in the same direction of generating income for operational and development expenditure as proposed in the National Higher Education Strategic Plan beyond 2020. The results from the Wilcoxon signed ranks test indicated that there were significant differences found in the response to 2010 compared to 2006, 2015 compared to 2010 and 2015 compared to 2006 in the ability of all public universities to generate income from internal resources in accordance with the National Higher Education Strategic Plan beyond 2020. Further, participants in the interviews also

pointed out that the universities are using alternative approaches to reduce expenses and generate more income due to the funding constraints. To promote the efficient use of resources some universities have already implemented some tactics like multi-tasking and sharing research facilities and equipment.

In addition, results from the focus group interviews further confirmed the finding from the questionnaire. The results of this study indicated that the MoHE has a strong interest in managing clear and effective communication with the public universities. The MoHE has also introduced many audit mechanisms to monitor the universities' performances and to observe the quality of outcomes to reduce information asymmetry and/or goal conflict. These indicators are standards prescribed by MyRA and CAPs for all universities and feedback from these audit procedures help the government and university to work out any practical issues or difficulties in improving their performance. Apart from using MyRA, i-PMO and CAPs, participants from the interviews also mentioned that the universities now produce annual reports as well. Not only that, the MoHE has also made all of this information available on the website so that the public and other stakeholders can access it at any time.

However, the results from the focus group interviews were quite mixed. At one point, the respondents were in agreement that communication between universities and government had improved in terms of its frequency but in another instance, it was also remarked that the communication process is hampered by the lack of coordination within the MoHE. Due to overlapping functions of the different departments in the Ministry, there were duplicate requests for information from these departments, which posed some amount of inconvenience for the universities. However, a respondent from University B confirmed that these miscommunication problems are currently being addressed by the MoHE. Participants in the focus group interviews mentioned that:

i.   The communication process within the MoHE is not well coordinated and some functions are overlapping between different departments. As a consequence, more than one department often dispatch requests for the same

report without being aware of each other activities. This increases the workload on the universities quite unnecessarily and also causes confusion. However, some participants from University B agreed that communication is improving with several adjustments at the ministry has been taken to better align with the strategic plans.

ii.   After reviewing their performance, the government needs to provide feedback to the public universities so that they can have a better understanding of their performance and identify the areas in which they need some improvement. Under the current reforms, the universities are required to furnish regular reports to the government to keep them updated with their work; however, the flow of communication must work both ways. In response, the government should also send the universities feedback on their reports and give them further guidelines. Two-way communication between the government and universities can help both parties determine future plan of action and guarantee their long-term success.

The respondents of the questionnaires agreed that public universities should provide the government with relevant quantitative data and qualitative information on a regular basis. Thus, the analysis undertaken from the focus group interviews confirmed that the communication with the MoHE has improved and the universities now communicate more frequently with the government due to the changes brought in by the funding reforms.

This research has found that there are several possible explanations for the perceptions that participants in this study expressed about the government-imposed mechanism. An interesting conversation with the participants revealed that both political factors as well as objective evaluation of the funding reforms were influencing the participants' opinions. This study has also proven that apart from the funding changes political factors have also contributed to the government's decision behind reforming higher education policy and changing its funding structure in Malaysia. The respondents' opinions with regard to these issues can be observed in Figure 8.2.

Figure 8.2: Perception on Funding Reforms or Political Factors
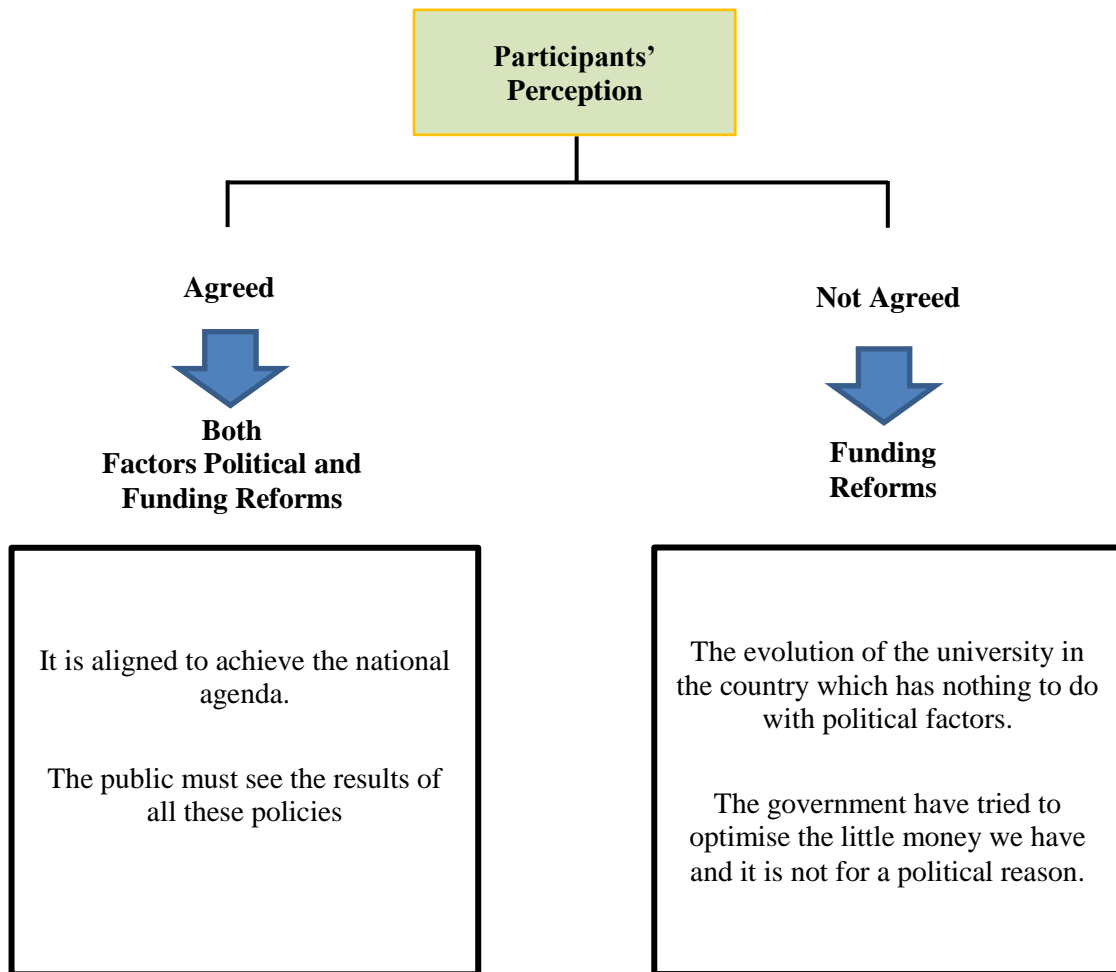
In summary, the Federal Government funding reforms has altered the approach to strategic planning in Malaysian public universities by reducing information asymmetries and/or goal conflicts. The government initiative to introduce the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010 are to strengthen higher education and higher education institutions (HEIs) should respond positively to the government efforts. The results of this study can contribute to a better approach required by both public universities and government in order to implement the strategic planning. The public universities must ensure the principal objectives remain the main priorities when creating their strategies.

8.2.2   Research Question Two

Have changes in the Federal Government funding altered the approach to R&D Malaysian public universities through reductions in goal conflict and/or information asymmetry?

The second RQ investigates the impact of government funding changes on R&D activities. Overall, the findings suggest that university R&D has improved and is expected to improve further. The performance indicators as well as reporting, monitoring and auditing instruments have been used to oversee research performance in Malaysian public universities. The government is also using a standardised form of all these monitoring mechanisms to ensure all the agents are given an equal and fair evaluation. Public universities send in the reports of their research performance and the assessments are then made available online.

Findings from questionnaires support that the government's funding changes have altered the approach to improving the overall quality of R&D in public universities. The government goals to enhance the R&D quality are clearly addressed in the National Higher Education Strategic Plan beyond 2020. In this study, results from one-sample nonparametric tests and one-sample t-tests suggested that the respondents agreed that the institutions are working to improve overall R&D quality with statistically significant difference found (p=0.000) for all seven items. The main purpose of government investment was to encourage the development of science and technology. The Malaysian Government has put greater focus on R&D with additional funding available to RAUs and the research grants are awarded based on competitive assessment. These findings are consistent with the government objectives to maximise the limited resources available to excel in research with the funding focus more on wealth creation. Participants in the interviews explained that the R&D performances are one of the government's important agendas. Therefore, in performing the government R&D goals, the public universities' performances are tied to the funding resources.

Results from the questionnaire indicated that the quality and quantity of publications have not been negatively affected during the government funding reforms. In fact,

respondents agreed that the funding reforms improved and increased the number and quality of publications in their institutions. Moreover, findings from the qualitative data show that information related to quantity and quality of institutions publication is then reported to the government using MyRA monitoring procedure.

In this study, commercialisation activities had also showed a significant improvement during the government funding reforms. The one-sample t-test and one-sample Wilcoxon signed rank test results indicated respondents' agreement with the statement. This result may be explained by the fact that the cooperation between the universities and industries can contribute to income generation. These findings are confirmed in the focus group interviews. Perhaps the concentration should look into the types of cooperation and policies related to it. Findings from the qualitative data show that some of the universities are already establishing a business entity to commercialise the R&D products produced by their own researchers. The purposes are to support and motivate the researcher to do more research and commercialise their products. The present results are significant because this effort influences the R&D activities with the purpose to focus on improvement.

This study has identified that the overall quality of R&D, publication, commercialisation, patents and cooperation with industry are some of the performance indicators used by the government to measure the universities' performances. In the context of the study, all this information is needed to be reported back to the government for the purpose of monitoring activities. The MyRA system is adopted to monitor activities related to R&D besides the annual report and periodic reports if required. The results show that the government has improved the mechanisms used to measure the universities' performance using both output and outcomes indicators to reduce information asymmetry and/or goal conflict. The study found that the government is deeply concerned with this development and more frequent monitoring has been implemented to ensure that the investment made achieves the desired goals.

The current study found that the types of information demanded by the government in relation to R&D remain the same with both focusing on quantity and quality. The results from the survey instrument supported that the government funding changes has led to improving the quality of overall R&D at the universities. Further, findings from the qualitative data show that the Federal Government used all information reported for decision making and for the purpose of monitoring and allocation of funding. These factors may explain the reason for government request for the information provided by the universities. The implementation of the information and monitoring system can be used to control the university behavour aligned with the government objectives and at the same time reduce the information asymmetry and/or goal conflict.

The Wilcoxon signed rank test results were conducted to evaluate the changes in participants' responses on the R&D activities of their respective university according to the direction of changes associated to R&D at Malaysian public universities in response to: 2010 compared to 2006; 2015 compared to 2010; and 2015 compared to 2006. The results show that the two sets of scores are significantly different for all seven items, with R&D at each direction significantly favoured by the respondents, as indicated by the negative ranks. Therefore, it can be concluded that the government funding reforms have statistically significant impact on the R&D activities in Malaysian public universities. The findings from the qualitative focus group interviews revealed the similarities found and confirmed the questionnaires' findings.

The present results from the focus group interviews found that the government funding reforms have impact on the numbers of research grants for the public universities. All public universities are required to submit a research proposal to the government. The assessment is based on peer review reports. These changes lead to ensuring only research that has quality will be given a grant. However, the findings from the qualitative data found that the government funding reform has caused the universities to be short of research grants. As a result, the focus has changed where the academic staff have to explore options for alternative grant at local and

international levels. They have to search for available funds without too much depending on one resource. Moreover, due to competitive assessment, the success rate has been very small compared to the actual number proposals sent by the researchers from the public universities.

Next, results from the focus group interviews in this study discovered a mixed perception of the impact of funding changes, as indicated below.

Figure 8.3: Perceptions of Impact Government Funding Reforms for Research and Development
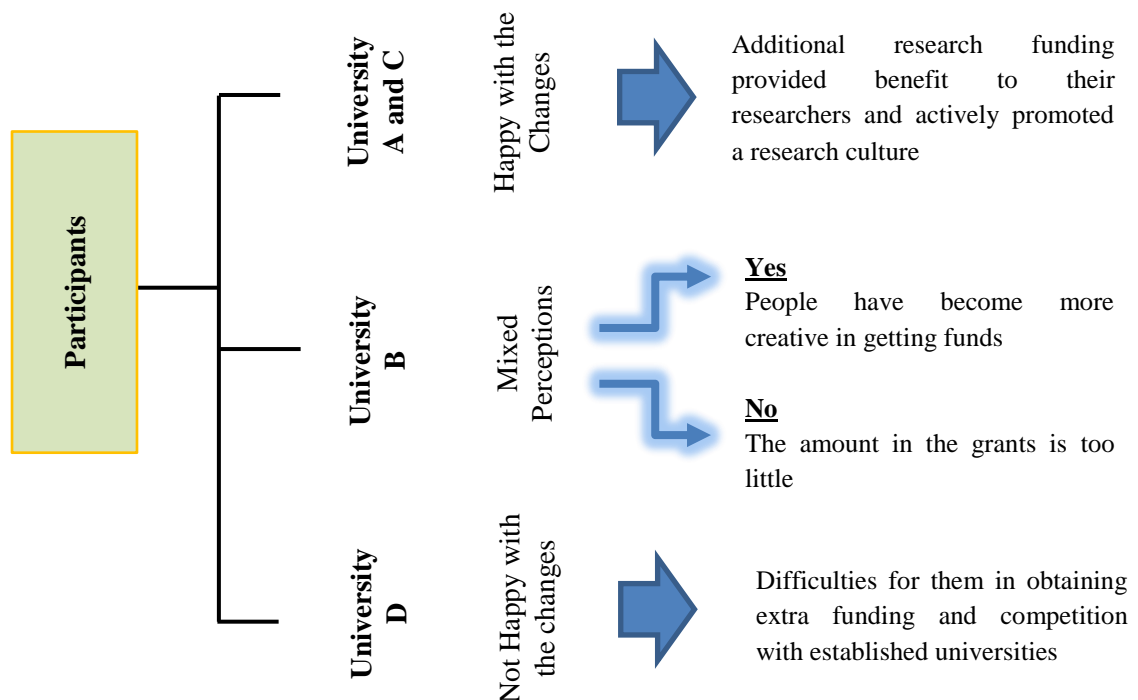
In conclusion, the discussion above indicates that agency theory is applicable to understanding the government–university relationship. The results from this study indicate that the Malaysian Government funding reform has altered the approach to R&D in Malaysian public universities through reductions in goal conflict and/or information asymmetry. Based on the arguments, the reporting, information, performance indicators, auditing, performance reporting, controlling, and

government objectives have influenced the public universities to be more accountable to the government blueprints. In addition, the R&D is one of the important agenda in Malaysia and the stakeholders have a desire to know the success of investments made that can bring impact to the national interest.

8.2.3   Research Question Three

Have changes in the Federal Government funding altered the approach to T&L in Malaysian public universities through reductions in goal conflict and/or information asymmetry?

The purpose of this sub-section is to investigate the impact of changes in the Federal Government funding in altering the approach to T&L in Malaysian public universities. Overall, the findings suggested the T&L activities in Malaysian public universities have improved and government funding reforms have not been negatively affected the quality of T&L even though the institution may be facing government budget cuts. The results obtained have discovered that the performance indicators, reporting, communication and auditing practices ensure that information is always available for the government to monitor the T&L performance at the public universities. More interestingly, the government initiative to execute the monitoring and control mechanisms ensures that the public universities work more effectively in line with the government objectives and reduce information asymmetry and/or goal conflict.

In the present study, findings from the quantitative data suggested that the Malaysian public universities are committed to improving the overall quality of T&L at their institutions. It appears that this result is consistent with the data gathered from the qualitative interviews. However, findings from the qualitative data found that during the government funding reforms, participants in the focus group interviews argued that the institutions are facing several challenges in order to excel in T&L activities. It was found that the universities are currently having a shortage of academic staff and funding constraints have limited the numbers of new staff that can be appointed. Surprisingly, these problems did not turn out to be an obstacle for the universities to improve the quality of T&L to a minimum level as required by the government.

Further, the participants have clearly stated that universities will not compromise on quality when there is pressure to do so. Participants mention that they are using creativity to resolve this problem. In order to face the challenges, the participants' universities have appointed staff on a contract basis while waiting for a warrant granted by the government. It is interesting to note that some of the universities are now working with industry to create a program that best fits with their needs.

Results from the questionnaires revealed that changes in government funding systems have altered the approach to increasing the number of undergraduate, postgraduate and international students at the public universities, as stated in the government strategic plans. One-sample nonparametric test and one-sample t-test analysis confirmed the participants' agreement with each of the statements with the median/mean above four found to be significant (p=0.000). The results from the qualitative interviews confirmed the findings from the quantitative data.

In relation to the above quantitative data, the results from this study demonstrated that funding changes have also increased the number of undergraduate and postgraduate degrees offered at all Malaysian public universities. The public universities are required to offer more programs at undergraduate and postgraduate level to handle the increasing demand from the public. However, this result does not differentiate between the programs offered either by research or coursework, especially for postgraduate programs. The implication of this result according to university categories will be discussed in the next section.

The results from the quantitative data demonstrated that there are significant differences found in relation to the direction of changes for T&L in response to: 2010 compared to 2006; 2015 compared to 2010; and 2015 compared to 2006 for all seven items. The national goals of making Malaysia a hub for higher education have required greater improvement in the quality of T&L. The fact of the categorisation of Malaysian public universities has put the focus on T&L as well as R&D, which has contributed to increased numbers of undergraduate students and postgraduate

students. Moreover, the findings from the qualitative interviews have revealed the similarities found and confirmed the questionnaire results.

Interestingly, results from the qualitative interviews found that the universities are bound to provide information to the government that are compliant with the National Higher Education Strategic Plan beyond 2020. The government commitment to achieving the national goals are then further confirmed from the results obtained in this study. Participants agreed that the MoHE has demanded information related to both quantity and quality data. Conversely, the government's greater concern has changed to a bigger focus on quality information. The major issue here is that the information provided is very important for the government to monitor the universities' performance and this approach may lead to reducing the information asymmetry and/or goal conflict.

Further, this study demonstrated that the process of obtaining valuable information from the public universities is executed using standard instruments established by the government. The MoHE has provided the guidelines of reporting information needed as stated in CAPs. Indirectly, this method helps the government to accelerate the monitoring activities and reduce the information asymmetry and/or goal conflict Moreover, results from the qualitative interviews indicated that the performance indicators under CAPs become very important indications required by the government to monitor and control the T&L performances in the public universities. As stated by the participants in the interviews, to ensure the effectiveness of monitoring activities, the universities have established departments to coordinate the monitoring activities.

The results from the focus group interviews in this study discovered the mixed perception on the impact of funding changes, as indicated in the figure below.

Figure 8.4: Perceptions of Impact Government Funding Reforms for Teaching and Learning
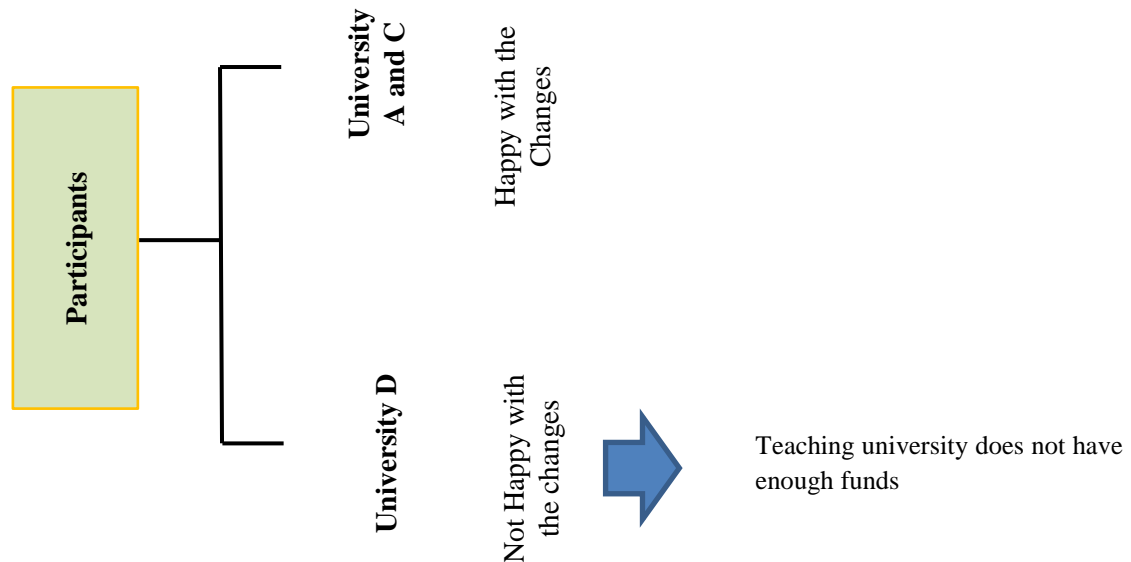
Based on the overall discussion, it can be concluded that the T&L activities in Malaysian public universities are in line with the government objectives as stated in the national strategic plans. The results in this study indicate that the Federal Government funding reforms altered the approach to T&L in the public universities through reductions in goal conflict and/or information asymmetry. The information, reporting, auditing monitoring system and performance indicators implemented play a major role in reducing the goal conflict and/or information asymmetry. Here, the purpose of these mechanisms ensures that the public universities' T&L strategic planning framework being implemented aligns with the government objectives. Indeed, the government control mechanism through various instruments helps to lessen the agency problem.

8.2.4 Research Question Four

Do the results for RQ1, RQ2 and RQ3 vary across the Malaysian public universities sector (RAUs, FUs and CUs)?

Findings of the current study indicated that the categorisation of Malaysian public universities signalled a positive impact to improve the strategic planning, R&D and T&L activities according to the institutions core functions. It is suggested that the public universities' actions are aligned with the blue prints introduced by the MoHE in order to transform the higher education in Malaysia, even during the funding reforms. The findings undoubtedly suggest that the public universities in Malaysia have high commitment to work according to the principal's objectives.

A summary of the research findings are presented in Table 8.1.

Table 8.1: Summary of Results for Categorisation of Malaysian Public Universities

No	Category	Result
i.	strategic planning	Vary across the RAU, CU and FU groups
ii.	R&D	Vary across the RAU, CU and FU groups
iii.	T&L	Vary across the RAU, CU and FU groups

The discussion of results obtained from the questionnaire and focus groups interviews are organised according to the table above.

i. Strategic planning

The current study found that all Malaysian public universities are working in the same direction to achieve the government goals as stated in the National Higher Education Strategic Plan beyond 2020. Evidence from the qualitative interviews pointed out that the public universities are developing the strategic planning according to universities' core functions with the government blue print being used

as a main reference. For the RAUs, the additional incentives provided to excel in R&D activities have moved the universities' direction to concentrate more on research and this strength is then being used to improve the quality of T&L. In addition, the CUs and FUs' strategies are intended to focus on both research and teaching. However, evidence from the qualitative data has revealed that due to funding constraints and the implementation of competitive research funding, these universities are focusing more on teaching rather than research due to lack of availability of research grants and due to teaching workloads. This finding has important implications for developing the evidence on the characteristics of Malaysian public universities that are going to be discussed in this sub-section.

Results from the Kruskal-Wallis test provided evidence that there were statistically significant differences (p=0.000) found regarding the ability of the Malaysian public universities to generate funding from internal resources. In addition to these results, the factorial ANOVA analysis also indicated a statistically significant difference. A *post hoc* analysis was conducted to examine the differences according to university group. Based on the results, three items related to strategic planning were found to be significant according to university category from 2006 and 2010, and are expected in 2015. The RAU groups are able to utilise their internal operation and strengths to generate more income compared to FU and CU groups. Further, most RAUs are already established universities compared to those from CUs and FUs. For example, most of the FU groups consist of College Universities that were promoted to full university status. As indicated in Figure 8.5, the RAU mean rank was significantly higher compared to the teaching universities. These results indicated that the RAU will lead the ability to generate income compared to teaching universities.

Figure 8.5: Results of Kruskal-Wallis Test for Strategic Planning

(Mean Rank)
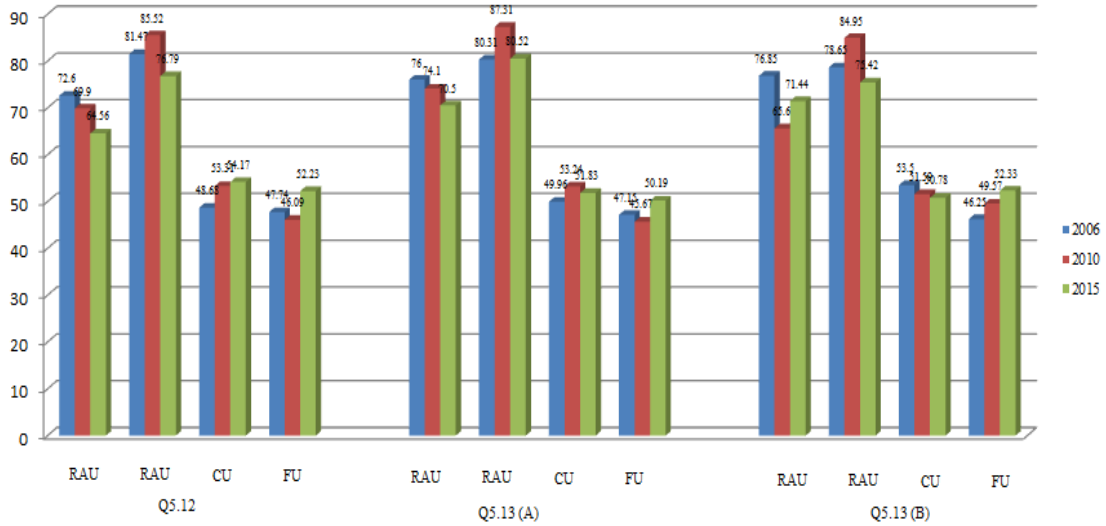
In addition, the results from the Kruskal-Wallis test suggested that the mean rank for FU and CU groups in the ability to generate income has increased or is expected to increase from 2006 up to 2015 (expected outcome), as shown in the figure above.

The study has found that the categorisation of Malaysian public universities might be used by the Federal Government as a mechanism to allocate the funding sources that best fit according to the universities' core functions. These arguments are based on results obtained from the focus group interviews. The RAUs have the advantage to diversify their funding sources from their core T&L and R&D activities to generate more income and this ability is limited for FUs and CUs. The basis of the FUs and CUs income is mainly come from government and student fees. However, the present results show that not all participants in the interviews agreed with this statement (see Figure 8.6). This might result from the evaluation system of the universities' performance that currently applies to all types of universities. These factors are due to the fact that the FU and CU groups are still new and the government should have clear policy before wanting to implement this approach.

Figure 8.6: Participants Perception on funding based on the Categorisation of Malaysian Public Universities

Agreed

Participant from Universities

University A & B (RAU)

University D (FU)

Not Agreed

Reasons

- Advantages to the university
- Implemetation realistic
- Funding must be allocated according to the specialisation and past record
- RAU funding should be based on KPIs

Reasons

- University performance is measured on the basis of R&D and not on T&L
- The funding was more research-oriented

Suggestion

Suggestion from University A

Consider situation for non-research/apex universities:

- FU
- CU

Revise policy related to the categorisation of Malaysian public universities on:

- Performance measurement
- Ranking universities.

Participants in the interviews further confirmed that autonomy is required to increase the universities' performance. The participants agreed that the autonomy that is planned to be implemented by the government should come with accountability and guidance in the form of policies to encourage academic excellence in Malaysian public universities. Therefore, the government decision to create more flexible regulation and rules supports the implementation of autonomy at the public universities.

ii.   Research and development

In relation to R&D, findings from the questionnaire confirmed that the R&D activities were significantly different according to types of public universities. The results indicated that the RAU groups have contributed to R&D with the status given as shown in Figure 8.7 below. The results of Kruskal-Wallis test for R&D mean rank based on composite measure confirmed this.

Figure 8.7: Results of Kruskal-Wallis Test for Research and Development (Mean Rank Based on Composite Measure)
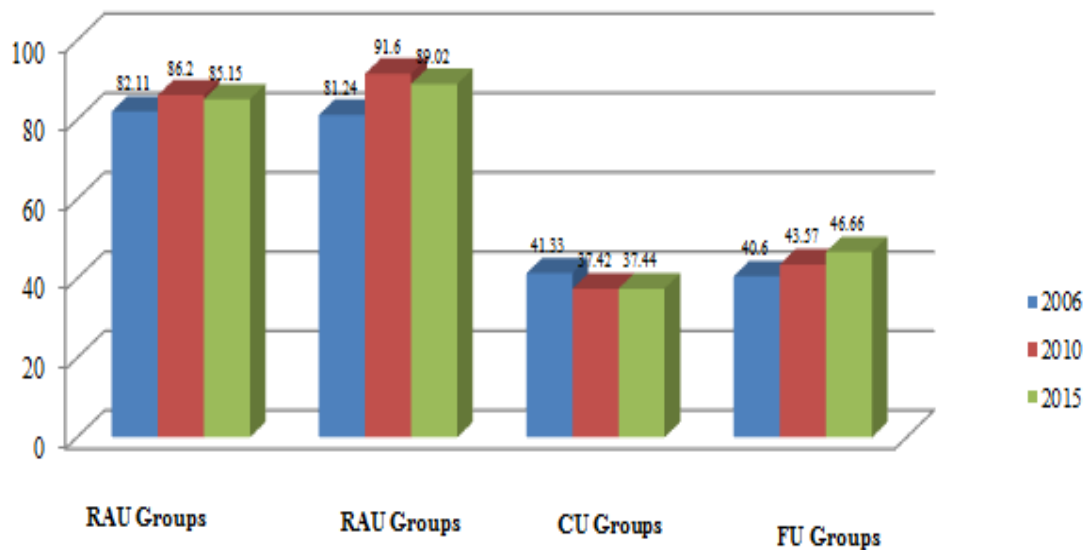
As mentioned before, the RAU status granted to the universities is based on their performances and it is audited on a yearly basis. With the status given, RAUs are granted additional incentives in the form of research funding. If the universities reach targeted KPIs, the RAU status will be continued or else withdrawn. Further, results from the focus group interviews further confirmed the findings. Participants from RAU groups stated that the categorisation of public universities has changed the university strategic direction with greater emphasis on R&D in their universities. It is interesting to note that, if not for the categorisation strategy, the institutions would maintain the status quo and no transformation would take place in the participants' universities.

Next, this research has demonstrated the overall quality of R&D difference according to the university category. The results from the Kruskal-Wallis test suggested that there is at least one pair of university categories that have different average scores; and *post hoc* test analysis undertaken from factorial ANOVA further confirmed that the differences were found to be statistically significant according to university group. The results show that the RAUs are expected to perform better compared to FU and CU groups with the statistical data proving that there were significant differences between 2006, 2010 and expected in 2015.

In addition, the statistical analysis has proven that the number and quality of publications, commercialisation, number of patents generated and R&D collaboration with industry were different according to the university category. The results from the Kruskal-Wallis test indicated the RAU groups have the higher mean rank compared to FU and CU groups. Indeed, the *post hoc* test results from factorial ANOVA suggested that there were significant differences found between RAU and teaching-based universities from 2006 up to expected in 2015.

Findings from the quantitative data supported that the ability of public universities to have R&D collaboration with industries was found to be significantly different according to the university category. In this study, results show that the RAU groups gain more benefits from the collaboration activities with higher mean rank compared

to FU and CU groups. These results were then further supported by the respondents in the focus group interviews. The participants from University C and D argued that location, expertise, funding and lack of facilities create barriers for them to engage in collaboration activities with industries.

Further, with the status of CUs and FUs, the emphasis on R&D activities remains an important priority for these universities. Participants from FU and CU pointed out that the overall universities' performance is measure based on R&D but not in T&L. The rule is still the same whereby these types of universities need to perform in research even when no additional incentives were promised to them. Indeed, these universities need to compete with RAU groups to obtain grants from the government. However, what distinguishes them is that there are no pressures for them in the sense of needing to excel in R&D activities compared to RAU groups. Meanwhile, participants in CU indicted that there are several obstacles in terms of physical and human factors for the university to excel in research.

In this study, results from the qualitative data suggested that not all participants' universities in the interviews were happy with the government funding reforms in R&D. It is found in this study that the additional incentives are provided to RAU groups to excel in R&D and these incentives are not available for CUs and FUs. Moreover, the assessments to evaluate these universities' performance are based on the same indicators used by the RAU groups. In practice, FUs and CUs have to compete with RAUs to obtain research grants from the government. Thus, it is difficult for them to compete with the RAUs because the latter have professors who are capable of producing good research proposals. In addition, the gap between academics is quite substantial. Therefore, it is difficult for FU and CU groups to excel in research activities because most of the lecturers are fresh PhD graduates.

iii.   Teaching and learning

Findings from the questionnaire revealed that the quality of T&L was partly varied across the university categories. The results from the Kruskal-Wallis test indicated that significant differences were only found in 2010. Meanwhile, the factorial

ANOVA results indicated the significant main effect reported in 2006 and 2010. The *post hoc* test found that no significant difference was found in 2006, and in 2010, there was a significant difference between the university groups. Interestingly, in expected 2015 both statistical tests indicated no significant differences. The Kruskal-Wallis mean rank based on the average scores as shown in Figure 8.8 suggested that there were increased in the T&L mean rank for FU and CU groups over the period. Indeed, results obtained from the interviews confirmed the findings from survey instrument where the university FU and CU groups have continuously working to improve the quality in T&L activities despite the funding constraints. Meanwhile, for the RAUs, the developments of T&L at these institutions are allied with the R&D activities.

Figure 8.8: Results of Kruskal-Wallis Test for Teaching and Learning

(Mean Rank Based on Composite Measure)
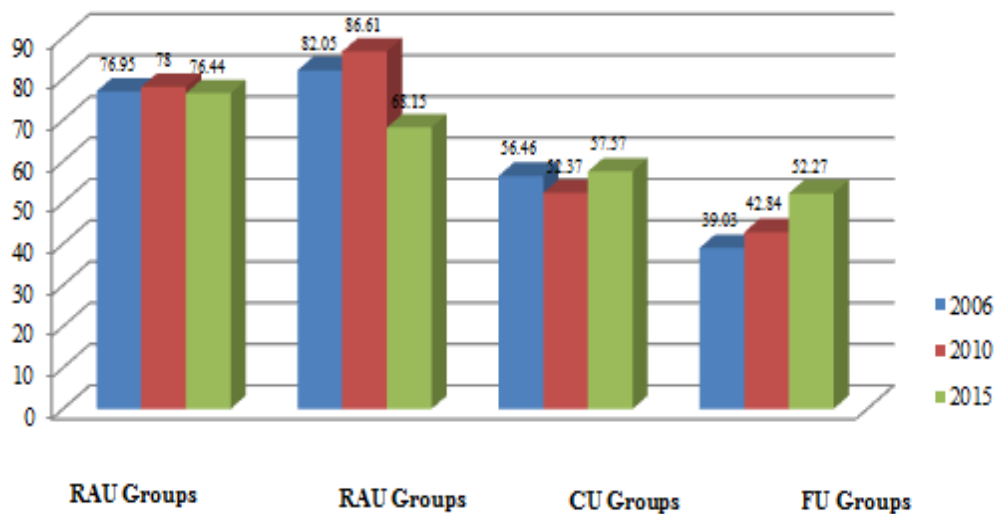
In relation to the number of undergraduate students, findings from the factorial ANOVA and Kruskal-Wallis data indicated that the differences were found to be significant based on the university category in 2006 and expected in 2015. The rational of these results is that the categorisations of Malaysian public universities have shifted the focus on the number of undergraduate students. This finding further supports the rationale of there being categorisation of public universities by the

government as stated by the participants in the focus group interviews. The accepted ratios of undergraduate degrees to postgraduate degree are 70:30 for FUs and CUs and 50:50 for RAUs, as it is stated in Chapter 4. Surprisingly, participants from FU have mentioned that the university ought to take more students at diploma level due to the government objectives instruction to increase the number of diploma holders that have technical backgrounds.

Results show that the numbers of undergraduate degrees offered were varying across the types of public universities and consistent with above findings. As indicated, the FUs and CUs will offer more undergraduate degrees compared to RAUs in order to accommodate the increasing number of students. However, the Kruskal-Wallis and factorial ANOVA showed that no significant differences were expected in 2015.

In the context of the number of students at the postgraduate level, findings from both quantitative and qualitative data confirmed that the differences were found according to university category. The direction of changes indicates that the differences emerge from 2006 up to expected in 2015 where RAUs led the number of postgraduate students' enrolment with a higher mean score found based on the Kruskal-Wallis results. The *post hoc* test results from factorial ANOVA then further confirmed that the differences occurred based on the university category. The results of this study are significant because RAUs should encourage the culture of research through the T&L and the students will gain benefit from the R&D activities. The ratio for undergraduate to postgraduate should be 50:50 at RAU and the results from this study further confirmed by the participants in the interviews. However, the finding does not distinguish the number of students either by research or by coursework.

Findings from the above statements were further supported by the number of programs offered at the postgraduate level. The results from statistical tests show that RAUs were offering a greater number of programs at postgraduate level compared to FUs and CUs from 2006, 2010 and expected in 2015. However, findings from this study do not differentiate the program either by coursework or by research. This differentiation on postgraduate student helps to explain some data about research

activities taken in RAUs. This is due to the function of RAUs to cultivate research activities among postgraduate students. Nevertheless, for the RAUs, the purpose of increasing the number of postgraduate degrees can be associated with intensification of research activities.

The issue was further explored by looking into the number of international students. The results from the factorial ANOVA show that there were significant main effects found at 2006, 2010 and expected in 2015 based on the university category. The *post hoc* analyses presented suggested the perceived differences between RAU groups with CU and FU groups according to the direction of changes. In addition, the Kruskal-Wallis test also indicates the significant differences. The increase in international students pursuing degrees in RAUs indirectly fuelled the R&D activities in line with the status granted.

Findings related to the development of infrastructure facilities of T&L show that the significant differences were only found to vary according to university category in 2006 and 2010. However, the statistical tests show that no differences were expected in 2015. This may be due to the factors that all FUs and CUs are expected to afford at least the minimum requirement for T&L facilities with the support from Federal Government funding and internal sources. As mentioned, the new universities require more funding to develop infrastructure to meet the stakeholders' requirements. By 2015, the respondents' perception is that the facilities will be improved from what they have at the present. This is important because in order to improve the quality of T&L, public universities should provide the best possible facilities to meet the growing number of undergraduate and postgraduate students. Based on the previous results, FUs and CUs are expected to take more students at the undergraduate level. Thus, the present infrastructure should be improved to meet the growing demand.

In conclusion, the results in this study found that the strategic planning, R&D and T&L vary across Malaysian public universities. The results from the factorial ANOVA and Kruskal-Wallis tests confirmed that the RAUs played a significant role

in the R&D activities as well as T&L. Indeed, results from the qualitative interviews indicated that the categorisation of Malaysian public universities might be used as a mechanism to define the allocation of funding mechanisms that are best according to the universities' core functions. However, the government is required to study the best methods before implementing any plans by taking into consideration CUs and FUs' strengths and weaknesses.

8.2.5   Research Question Five

Has the change in the Federal Government funding contributed to achieving the government objectives as stated in the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010 through reductions in goal conflict and/or information asymmetry?

This sub-section discusses the results from the quantitative and qualitative data focused on findings related to funding reforms together with an examination of achieving government objectives through a reduction in goal conflict and/or information asymmetry, as stated in the government blue prints.

The questionnaire indicated that the respondents agreed that funding reforms have contributed to widening access and enhancing quality of education in Malaysian public universities. This was confirmed based on the results from the one-sample nonparametric test and one-sample t-test. These results tend to suggest that funding reforms have contributed to achieving the widening of access and enhancement of quality in education. The public universities agreed to accept the performance objectives specified in the strategic plans, even during funding cuts. Moreover, results from the Kruskal-Wallis test indicated significant differences according to university categories in 2006, 2010 and 2015 (expected outcome). The factorial ANOVA test showed significant main effects occurring in 2006 starting point and 2015 versus 2006. Interestingly, results from the *post hoc* test further confirmed that the objective to widen access and enhance quality have varied across Malaysian public universities in 2006. These results were further confirmed by the respondents from the focus group interviews who explained that at a university level, the direct and indirect funding is provided for students that require extra short- or long-term assistance. They said that the Student Affairs Department plays a major role in

monitoring this matter and taking action to help students as required. Student records can be used to gain further information.

Second, findings from both the quantitative and qualitative results suggest that government funding reforms have improved the quality of T&L and R&D, as stated in the government strategic plans. Results from the focus group interviews indicate that universities are working in line with the government objectives to improve the quality of T&L at par with the leading institutions around the world. These includes: (i) improving the curriculum so that its remain relevant; (ii) monitor and evaluate the quality of curriculum implemented; (iii) strengthen the learning assessment systems and support services to the students; (iv) recognition to the institutions that achieved a highest quality rating; and (4) increase the numbers of PhD academic staff.

As discussed, the MoHE has implemented approaches to monitoring the activities related to teaching and research at public universities. This approach assists in reducing information asymmetries and/or goal conflicts through the compulsory reporting of current performance levels to the government. The multiple goals set by the government in strategic plans have not been an obstacle to the universities in achieving their objectives. Importantly, these findings support the results from RQ2 and RQ3, in which there was overall improvement in the quality of T&L and R&D. However, the MoHE should place more emphasis on the quality information related to the T&L, including quality programs and employment surveys.

Third, results from the quantitative data showed that the results of the government funding reforms have fulfilled the objectives of strengthening HEIs. Interviewees recognised that the government had taken numerous actions (such as amending regulations and giving more autonomy) to improve university governance. They believed that improving these actions will assist in the decision-making processes in public universities in Malaysia to ensure that any institutional change will align in accordance with principal interest.

Next, findings from this study show that government funding reforms have improved the objectives of intensifying internationalisation in Malaysian public universities. As indicated in the previous findings, these public universities are working to increase the number of international students, further confirming the findings from the quantitative and qualitative data. Further, results from the *post hoc* test data have indicated differences between the university categories in the 2006 starting point and 2015 versus 2006. Moreover, the Kruskal-Wallis tests capture the significant differences between the groups in 2006, 2010 and 2015 (expected outcome). The mean ranks for RAU groups were significantly higher in 2006 and 2010, with CU and FU groups reporting the lowest. These indicate that the government's intention to increase internationalisation has become one of the most successful agendas in Malaysia public universities. This supports the view of agency theory in which the agents' behaviours reacting in accordance with the principal interests may reduce the agency problem.

In addition, results from the statistical tests indicated that funding reforms have contributed to improve the enculturation of lifelong learning in Malaysian public universities in accordance with the government strategic plans. These findings were confirmed from the qualitative interview data. Even though there was no direct funding provided, the management have offered assistance to support this program at their universities, for instance, discounts in tuition fees and flexibility to enrol compared to other students. Moreover, the short course programs established by the universities also offer great opportunities to the students, and therefore support the activities in improving the quality of education through ongoing training and exploration of new knowledge.

As described previously, findings from the qualitative data confirmed that the public universities are required to report the institutions' current performance to the government on a regular basis. However, in this sub-section, the discussion emphasises the activities related to the program plans imposed by the government as stated in the blue prints. The purpose of gathering this information is to ensure that the government is able to monitor the current development of strategic planning

implemented in the public universities. Further, the information might be used by the government for forthcoming planning. As of 2011, the National Higher Education Strategic Plan beyond 2020 is in the second phase of its implementation. In Phase II (2011–2015), the government emphasis is on strengthening and enhancement of HEIs in Malaysia. The evidence provided in Phase I is very important for the government to improve the accomplishments that require in Phase II. Nevertheless, the reporting mechanisms implemented would reduce the informational asymmetries and/or goal conflicts.

Another important finding to have emerged from this study reported from the participants' perception of the MoHE plans to implement the PBF mechanism in the public universities. Interestingly, the results indicated that the participants agreed with the government's intent to implement this funding mechanism. This proposed mechanism was clearly stated at the National Higher Education Action Plan 2007–2010 and has been addressed again by the Prime Minister during tabling the Tenth Malaysian Plan (2011–2015). Indeed, participants from RAUs indicated that this funding mechanism is the right approach to be implemented in a way to achieve the world-class university. However, participants from FU suggested that the government should provide clear guidelines before implementing this funding system. Apart from the PBF mechanism, the Malaysian Government is in the process of implementing new budgeting system called OBB and until this study has being conducted, this budgeting system is in the pilot stage.

In this study, the qualitative data further explored the difficulties and challenges the public universities faced in order to implement the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010. The results in this study revealed that the participants see the government strategic plans as a challenge rather than an obstacle. Indeed, the findings indicated that the public universities have taken several approaches to facing these problems. The approached executed to some extent helps to overcome the challenges in order to implement the government strategic plans.

Table 8.2: Difficulties and Challenges Universities Face in Implementing the Malaysian Government Strategic Plans

Difficulties and Challenges as stated by Participants	University			
	A	B	C	D
Funding	√	√	√	√
Obtaining warrant for the appointment of new staff, especially academic staff	√	√	√	√
New university status			√	√
Location of new universities			√	√
Mentoring for R&D			√	√
Recruitment of expert staff				√
Internationalisation				√
Age disparity of academic staff		√		
Collaboration with industries			√	√
Developing outstanding students in thinking, creativity and innovation		√		
Mobilisation of resources				√

Findings from the qualitative data as indicated in Table 8.2 illustrated that funding and the appointment of new staff are among the most difficult challenges that have been expressed by the participants in the interviews. These problems to some extent create barriers to the implementation of strategic planning at the universities. However, as stated before, the universities have taken several steps including appointing contract staff, multi-tasking and cost cutting to overcome these difficulties and challenges. In addition, the status as new university, location, resource person and collaboration with industries cause FUs and CUs to have difficulties carrying out the R&D activities.

In conclusion, The National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010 intends to address the national innovation for improving the Malaysia education system. The current study found that that change in the Federal Government funding contributed to achieving the government objectives as stated in the blue prints through a reduction in goal conflict and/or information asymmetry. Therefore, the results in this study reveal that

Malaysian public universities have interpreted the plans with a focus on improving the quality of T&L and R&D to achieve institutional and national priorities.

A summary of the overall results based on the RQs of the study is presented in Table 8.3.

Table 8.3: Summary of Results Based on the Five Research Questions

No	Research Questions	Results
1	Have changes in the Malaysian Federal Government funding altered the approach to strategic planning of Malaysian public universities through reductions in goal conflict and/or information asymmetry?	Supported
2	Have changes in the Federal Government funding altered the approach to R&D in Malaysian public universities through reductions in goal conflict and/or information asymmetry?	Supported
3	Have changes in the Federal Government funding altered the approach to T&L in Malaysian public universities through reductions in goal conflict and/or information asymmetry?	Supported
4	Do the results for RQs (1), (2), and (3) vary across the Malaysian public universities sector (RAUs, FUs and CUs)?	Supported
5	Has the change in the Federal Government funding contributed to achieving the government objectives as stated in the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010 through reductions in goal conflict and/or information asymmetry?	Supported

8.3   Discussion and Conclusion of the Research Aims

This section will discuss and draw conclusions from the overall research findings. An analysis of previous literature is used to discover any similarities or contradictions found in this thesis. The organisation of the discussion is based on the five research aims of the thesis.

8.3.1   Research Aim One

Changes in government funding for public universities in Malaysia have made an impact on the strategic planning of these universities by assessing if there is a reduction in goal conflict and/or information asymmetry.

The result of this study is consistent with previous studies, which found that the new funding system leads institutions behaviour in the right direction (Strehl, Reisinger & Kalatschan 2007a; Strehl, Reisinger & Kalatschan 2007b) and those suggested that information asymmetry and goal conflict exist in the operation of HEIs (Kivistö and Hölttä, 2008) and therefore agents should be accountable and make information available to public (Kivistö 2005, 2008; Leruth, Luc & Paul 2006).

As demonstrated in this study, the government strategic plans are now being used as the main reference for formulating plans at the university level. The accomplishment of common objectives by both parties shows a healthy relationship between the agent and principal that will lead to favourable outcomes and benefit the principal (Kivistö 2008). The results discovered that funding reforms in Malaysian public universities have altered the approach to strategic planning through a reduction in goal conflicts and/or information asymmetries. These arguments are based on the findings that show that agents and principal share the same goals and interests.

The results of the analysis demonstrated a positive improvement in communication between the public universities and government during this funding changes as well as the implementation of MoHE strategic plans. This improvement is one of the major elements help to reduce the information asymmetry (Kivistö 2005, 2008; Rungfamai 2008). This is influenced by the fact that the public universities in Malaysia are required to produce the report within the timeframe that reflects their

performances. However, as stated previously (see section 8.2.1), the communication process is hampered by a lack of coordination within the MoHE. This ministry was first established in 2004 to coordinate and organise a very important system of government required full skill and knowledge worker. In this regard, it is necessary to conduct streamline integration activities between HEIs and ministry in order to prevent any barriers that could create problems in the future. Additionally, it is urgently required that the standard work procedure should be established to overcome this problem. Indeed, the bureaucratic procedure which redundant the job processes should be eliminated or simplified to prevent the slowdown of decision-making action.

As previous research by Bayenet, Feola and Tavemier (2000) and Alexander (2000) has shown, governments across the world have begun to take a strategic approach in managing public funds invested into HEIs by establishing several instruments to monitor institutional performance. The funding reforms that have been implemented by the Malaysian Federal Government have been successful in gaining the approbation of university staff as confirmed by the qualitative interviews. The MoHE has set up the PMO to monitor public universities' performance and the implementation of government strategic plans. Meanwhile, the i-PMO has been established at the institution level to coordinate the monitoring activities and response directly to PMO in order to control the university behaviour in line with the government objectives (MoHE 2007b). There is also a system called the MyRA that is specifically used to monitor the performance of different HEIs in R&D activities and determine the accreditation of RAUs. All these mechanisms ensure that the performances of the individual HEIs are carefully measured and they are appropriately rewarded or penalised with funding. The funding budget is also determined by the extent to which universities pursue activities that are in alignment with the government objectives and this monitoring system help the government to control teaching and research activities at the universities. In other words, the government can easily gather information from the database to allocate funding to the universities based on their current performance. The government investments in monitoring universities yields returns in the form of the reduction of hidden action

and enhanced alignment between government objectives and university behaviour. Indeed, the information asymmetries in the quantity and quality of teaching and research can be diminished when all universities use a standardised instrument for monitoring. A previous study by Kallison and Cohen (2009) has also recommended that universities need to set educational goals and implement mechanisms to monitor universities' performance. The findings of this study also suggest that the funding reforms in Malaysian public universities have ushered in greater accountability and transparency in managing public funds.

In the literature on agency theory, it is suggested that the implementation of performance indicators can be used by the government to minimise inappropriate behaviour among agents (Leruth, Luc & Paul 2006) even though in reality, it is difficult for the principal to observe and monitor the activities or the outcomes of the HEIs (Kivistö & Hölttä 2008; Liefner 2003). Universities are complex institutions and produce a mix of products that are difficult to measure. There are several methods that the government can employ to reduce this agency problem. This study provided evidence regarding the government's approach to implementing a monitoring system to help reduce the information asymmetries and/or goal conflicts during the funding reforms. Findings suggest that the information provided to measure the output of T&L and R&D in the university can be used to reduce information asymmetries (Kivistö & Hölttä 2008). Therefore, this research has identified that the approach of reporting used by the public universities to produce information for the government and other stakeholders are consistent with the previous research. Burke (2003) has explained that performance reporting is part of the duty of accountability that HEIs owe to their stakeholders. Therefore, first, this study suggests that in order to maximise the impact of public investment, universities are required to establish performance indicators to align with the National Higher Education Strategic Plan beyond 2020. Second, the MoHE and public universities should disseminate the performance indicators being implemented to the public as it is being implemented in UK higher education (Pugh, Coates & Adnett 2005).

Although previous studies show that the use of annual reports and websites in Malaysia has received satisfactory feedback (Ismail & Abu Bakar 2011), the MoHE should encourage HEIs to keep information more up to date on the internet. Stakeholders search for information on topics of interest on the institution website to find answers according to their interests. The information available on the website helps the stakeholder to make decisions based upon what meets their own needs (Kivistö 2008). Therefore, based on these arguments, this study suggests that the public universities should commit to updating and allocating sufficient information to multiple stakeholders. It is suggested that the Malaysian Government should provide rules and guidelines for public universities to comply with the guidelines set. The regulations should not restrict the universities from being more creative and innovative.

Previous research has shown that incentives can be used as a mechanism to control agent behaviour (Aulakh & Gencturk 2000; Eisenhardt 1988; Verhoest 2005). Verhoest (2005) added that the government should provide better systems that link performance to financial incentives since financial incentives can be a strong motivating factor in reducing the negative impact of goal conflict. Feedback in the questionnaires given to respondents in this study supported this and indicated that incentives can improve academic performance, quality and efficiency to better align with government objectives. Based on these arguments, this study suggests that the government should provide more incentive to Malaysian public universities, especially in a way to reduce the information asymmetries and/or goal conflicts. A potential explanation for this suggestion is that in situations in which financial incentives that link to performance, the public universities will work hard to grab the additional funding that could be used for the purpose of operating and development expenses.

This study produced results consistent with the suggestions by Kretovics and Michaels (2007b) who said that diversification of funding is important for universities to maximise the use of resources during the government funding cuts. The findings of the current study are consistent with those of Jongbloed (2004) and

Lepori et al. (2007), who found that the funding level at public universities is insufficient and therefore institutions must search for other sources to fill the gap. However, as mentioned in the literature, there are restrictions in the form of policies and regulations that restrict the Malaysian public universities from generating income. As stated by Sirat (2008a), the bureaucratic problems and government control may lead to this factor. As public universities, operations are subject to government financial regulation set by the Ministry of Finance. Thus, it is suggested that particular regulations and laws need to be revised in order to suit the current environment. This is especially important due to pressure from the market to expand and because of the economic conditions in Malaysia. Therefore, the government's move to give full autonomy to five public universities is a good start in order for them to generate their own income (Kulasagaran 2012; Utusan Malaysia 2012a).

Government-imposed mechanisms are related either to funding reforms or to political factors. This study supports previous research that found that political, social and economic factors in a developing country may contribute to the central challenges in implementing funding reform (Schiller & Liefner 2006). It has also been said that universities experience the extreme politicisation of their environments (Jongbloed 2000b). In Malaysia, a study by Noore Alam (2010) indicated that in order to implement administrative innovation effectively in public agencies, political commitment from the government is one of the most important factors that need to be considered. This shows that having political influence in public universities ensures the growth of the institutions. However, as a responsible government, the steps to transform the funding system ensures that HEIs operate in a more effective and efficient manner in terms of the use of resources and accountability of their use of public funding (Newman, Couturier & Scurry 2004b; Zhao 2001). It was clear from the qualitative focus group data interviews that political issues were perceived as one of the factors that contributed to the government-imposed mechanism. However, several respondents did not agree with this statement and mentioned funding reforms as the main reason.

Conclusion of research aim one

The first conclusion relates to the impact of the funding reforms launched by the Federal Government in improving the activation of strategic planning in Malaysian public universities through the reduction in goal conflicts and/or information asymmetries. The findings demonstrated that changes in government funding has altered the approach of strategic planning in public universities encouraging greater focus on the government objectives in accordance with the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010. Specifically, the analysis of both the quantitative and qualitative data confirmed that public universities have used the strategic plans devised by the government as the main reference to guide their activities and agendas. In order to monitor university performance, the government has implemented monitoring mechanisms to control and accumulate information effectively. This close monitoring is meant to reduce information asymmetries and provide the government with accurate and relevant information to make effective decisions. Indeed, just as Leruth and Paul (2006) discovered greater transparency and accountability, public universities in Malaysia are now more accountable for making information available to the stakeholders. In addition, the mechanisms for monitoring and controlling also provide the background and explanation for specific patterns of university behaviour in order to understand how these can be manoeuvred for performing specific tasks in line with the government preferences.

8.3.2 Research Aim Two

Changes in government funding for public universities in Malaysia have made an impact on their approaches to R&D by assessing if there is a reduction in goal conflict and/or information asymmetry.

The results of this study suggest that agency theory is relevant to the study of the government–university relationship in order to understand the approaches used to reduce the goal conflicts and/or information asymmetries. Specifically, the MoHE goals to implement the monitoring, auditing and reporting mechanisms to assess the R&D outcomes are to ensure that the public universities' actions align with the principal's objectives (Eisenhardt 1989; Kivistö 2005). The results from both

quantitative and qualitative data demonstrated a strong influence towards productive behaviour of the public universities for improving the R&D activities during the government funding reforms.

Generally, the results suggest that all Malaysian public universities are responsible for providing information to the government based on the performance indicators set by the principal. From the perspective of agency theory, this exercise could be used to control the institutions behaviour. The monitoring procedure adopted by the MoHE (MyRA and CAPs) will be a catalyst for public universities to work harder in order to achieve the required performance in R&D during this funding change. According to this study, the universities will execute the tasks as stated in the strategic plans. In other words, public universities are controlled through the contract stated in the blue prints. Therefore, in order to observe the university, behaviour monitoring and reporting methods help to reduce the information asymmetries and goal conflicts. At the same time, the government should also monitor the information flow related to R&D in order to supervise the activities of the agents.

The discussion above clearly specifies that the implementation of performance indicators in R&D contributed to achieving the principal's desired outcomes. Hence, it is suggested by this study that the Malaysian Government should implement the indicators that are not only relevant for measuring institutional performance but that are also responsive to broader social and economic factors (Kivistö 2005). These include the indicators measuring public universities' effectiveness and efficiencies (Chen, Wang & Yang 2009), and to track the institutional performance (Serdar 2010). This indication is therefore a critical factor in providing direction for better research performance in Malaysian public universities.

From the current study, the researcher found that the policy related to R&D in Malaysia has changed. The government strongly emphasised transforming the R&D, and public universities are playing an important role in this regard. This argument can be further supported by the announcement of the Prime Minister during tabling of the Tenth Malaysian Plan (2011 to 2015) and the implementation of national

higher education blue prints (EPU 2010a; MoHE 2007a, 2007b). Moreover, the public universities are working to improve their R&D activities through publication, patents, commercialisation and cooperation with industry to acquire external funding. These efforts made by the public universities are in line with the objectives set by the government in an effort to bring the R&D to an international level. Based on the above findings, it is suggested that the MoHE continually support the R&D activities in Malaysian public universities. A possible explanation for this suggestion is that, based on the researcher observation and feedback obtained from the respondents, it is difficult for public universities in Malaysia to obtain research funding from external resources. Therefore, it is critically important that the Federal Government provides strong support to the public universities.

In addition, the government should consider assisting the public universities to commercialise their research products. A previous study highlighted that the successful rate of commercialisation is very small in Malaysia (Ab Aziz, Harris & Norhashim 2011). Based on this argument, this study suggests that a one-stop centre to accumulate and commercialise universities' research products should be established to market them at local and international levels.

In order to encourage the research environment in the public universities, the Federal Government and the universities' management should also consider providing incentives to the researchers. Therefore, this study suggests that the monetary and non-monetary incentives for research quality and quantity should be considered. Even though participants in the focus group interviews stated that the universities have provided incentives to researchers, the policies are unclear. Therefore, clear performance policies from both government and institutions should be established and made available to the public. The principal can set up the incentives program for pursuing activities that are suited to the government objectives over autonomous functions of the university that do not add to or detract from government objectives.

Conclusion of research aim two

It was shown that funding reforms launched by the Federal Government have altered the approach towards R&D in public universities in Malaysia through reductions in goal conflicts and information asymmetries. The analysis confirmed that the R&D activities in public universities have improved and become more aligned with the government goals stated in the strategic plans. A specific area of focus in these funding reforms has been the implementation of competitive research assessment, which has encouraged academic staff to explore other avenues for research grants without relying too much on the government. Moreover, results from the focus group interviews found that the government has now displayed a strong interest in monitoring R&D activities in public universities. The government now demands quality and quantity in the information that it receives from the universities about research performance. Detailed information about all the aspects of research endeavours needs to be reported back through the MyRA online system and the reports produced from the system are audited by the government. From the perspective of agency theory, the government assessment of reporting information and auditing found in this study has led to a reduction in information asymmetries and goal conflicts, allowing the government to monitor the quality of R&D at the universities better. In addition, the government has introduced a monetary reward system in the form of incentives to boost R&D activities that is used to motivate the institutions to pursue certain desired outcomes. Therefore, it can be concluded that results obtained from this study support the second research objective of the study.

8.3.3 Research Aim Three

Changes in government funding for public universities in Malaysia have made an impact on their approaches to T&L by assessing if there is a reduction in goal conflict and/or information asymmetry.

The discussion of the research aim in this sub-section focused on the impact of funding changes on the approach to T&L in Malaysian public universities. The discussion also concerned the key question of whether there is a reduction in goal conflict and/or information asymmetry during the government funding reforms.

This study confirms the findings of previous research that changes in funding mechanisms affect the composition of T&L where the universities are more accountable with public expenses in order to improve the quality (Liefner 2003; Schiller & Liefner 2006). There is a greater concern that the public universities would never be neglected in the quality of T&L even in a difficult position. The results are constructive since the MoHE has a vision to make Malaysia a higher education hub in Southeast Asia region (EPU 2010; Knight & Sirat 2011; MoHE 2007a). The public universities should play a significant role in implementing educational policies that to increase the number of local and international students as stated in the National Higher Education Strategic Plan beyond 2020. The results of this study are very useful to the government because they demonstrate that all of the effort outlined in the strategic plans is given full attention by the public universities, especially during the limited sources of funds. Moreover, during the execution phase of the government strategic plans, it is critical for the principals to have precise access to a large quantity of quality information for T&L at public universities (Rungfamai 2008). This current study produces results that are consistent with the statement from Kivistö and Hölttä (2008). Based on these arguments, it is suggested that the public universities in Malaysia should introduce more degree programs (either at undergraduate or postgraduate level) in the near future. This move could encourage more local and overseas students to study in public universities.

The agency literature ascertained that the incidence of information asymmetry and goal conflict can be reduced by the principal through regular audits (Kivistö & Hölttä 2008). This statement was further support by Billy and To (2011) who explained that the formal control system affects the work performance and principal agent relationship. In the present study, it was clear from the qualitative focus group interviews that the information reported to the MoHE has been audited regularly. For example, as stated by the participants in University D, the government audited the institution in 2009. As a result, the university has achieved the targeted KPIs aligned with the government objectives. The T&L has indicated the green signed when meet the target KPIs. The implications of this study may offer important information regarding the fact that the audit system makes a significant contribution to a positive

relationsip with the universities. Thus, the government may also consider making available the outcomes from the audit to the public.

Despite the above improvement in T&L activities, the public universities in Malaysia also face problems due to shortage of academic staff during these funding reforms. The interview data revealed that the universities are using their creativity to overcome this problem to ensure the quality of T&L at the standard level. Surpringsly, the findings suggest that the universities are not going to use the shortage of staff as a reasons when confronted with this issue. The results are also consistent with other studies and suggest that the universities should implement a cost-sharing strategy to overcome the funding cuts (Mohrman, Ma & Baker 2008; Ogbogu 2011). Based on these arguments, this study suggests that in dealing with these challenges, the public universities should focus on innovation in designing the curriculum. The MoHE may consider the incentives for T&L improvement in the public universities. This incentives program can be associated with the enforcement of performance indicators to assess the T&L outcomes. The task force should be instituted and regular audits should be conducted to ensure the quality of T&L is in line with the government objectives. Nevertheless, the information of the audit should be available to the public. The purposed of this suggestion is to make sure public universities are accountable for public funding.

Conclusion of research aim three

This research concludes that the government funding reforms have altered the approach taken towards T&L in Malaysian public universities through reductions in goal conflicts and/or information asymmetries. This was supported by findings from both the quantitative and qualitative data. It appears that the government funding reforms have a positive impact on the overall quality of T&L as indicated from the results obtained from the quantitative survey instruments. According to this study, public universities do not neglect their responsibility towards ensuring a certain level of quality in the T&L activities despite funding constraints. The participants in the focus group interviews reiterated the commitment within their institutions to ensure that the quality of T&L is maintained even with the challenges and difficulties that

the institutions now face with the funding cuts. In addition, the monitoring procedure implemented by the MoHE has demanded greater accountability from public universities towards the government objectives and stakeholders. The CAPS system initiated by the government uses a standardised reporting format that helps the government control and monitor T&L performance at public universities. All the information provided by the universities through the reports is then audited by the government. The systematic procedure of auditing information ensures that the outcomes reported by the universities are closely assessed and scrutinised to prevent the university from giving incorrect information. Indeed, as agency theory suggests, such monitoring and auditing strategies can minimise inappropriate of agent behaviour.

8.3.4   Research Aim Four

Differences in the impact of these changes outlined in (i), (ii), and (iii) across the different types of universities in the Malaysian public university sector (FUs, RAUs and CUs)

The discussion of the research finding in this section is interesting because it relates to the various aspects of components regarding the impact of government funding reforms as outlined in RQ1, RQ2 and RQ3 across the categorisation of Malaysian public universities. As mentioned earlier, this section further discussed the research findings with the aim of determining the difference and similarity that exists according to the RAU, CU and FU groups.

In this study, the analysis of strategic planning indicates that the characteristic of Malaysian public universities does not prevent the institutions from implementing the government's strategic plan. Moreover, data from the qualitative interviews found that the different types of universities are used to develop strategies at the institutional level. These present findings have confirmed that the public universities have behaved according to the principal interests. Moreover, this finding supports the previous statement from McKelvie (1986) that the government's central goals provide direction to the universities.

As stated in the literature reviews, RAU groups play a critical role in producing quantity and quality R&D activities (Abdullah, SC 2010). The audited report indicated that the RAU groups have made significant improvements (Kulasagaran 2012; Utusan Malaysia 2010b). In fact, as mention before, the R&D of RAU performance are monitored strictly by the MoHE through MyRA system (MoHE 2011b; Yassin et al. 2011). However, the accomplishment of R&D activities seem difficult for the FU and CU groups due to difficulty in obtaining research grants, lack of staff expertise and teaching workload. As a consequence, results from interviews revealed that the participants from CU groups are now focusing more on T&L. Based on these arguments; this study suggests that the teaching load in FU and CU groups should be reduced and more time should be allocated for research. The academic staff should also consider combining research with their teaching. This could increase the quality of T&L experiences from research activities by integrating this approached in designing the curriculum (Brew 2002)

Figure 8.9: The Categorisation of Public Universities in Malaysia
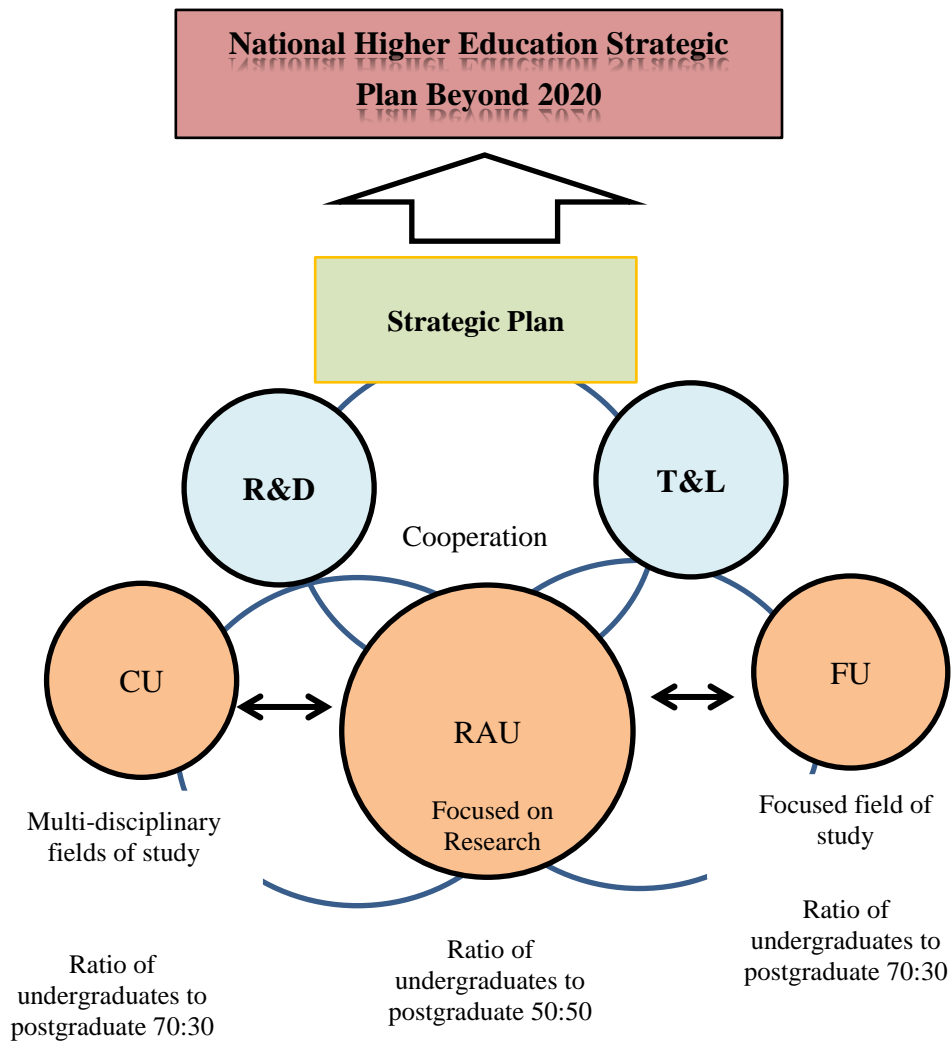
Figure 8.9 illustrates the suggestion for cooperation among the public universities in Malaysia. Research and teaching activities might be integrated among all the public universities. In some areas, the collaboration and cooperation from the academic staff stimulate teaching and research productivity. For instance, the researchers from FU and CU groups can work together with the researchers from FU groups to conduct the research activities. They can share the teaching and research facilities to produce positive outcomes. The research strengths in RAU groups should be used to jointly develop the research activities in FU and CU groups that have problems in terms of staff expertise and research grants. The researchers from RAU groups can function as mentors to the young researchers in FU and CU groups. This collaboration would

ensure healthy competition among difference types of public universities in Malaysia during the government funding reforms. The result of this cooperation would help to improve the outcomes of the government strategic plans.

As stated in the literature review, the public universities in Malaysia still depend on funding provided by the Federal Government (Lee 2000b; MoHE 2007a). Despite the continuous efforts made by the public universities in Malaysia to generate income, the main funding sources are from the government and these remain significant. However, the government's financial constraints can become an obstacle for the development of public universities if immediate steps are not taken. Although this study shows that the public universities are competent at generating income, the advantage appears to favour RAU groups compared to FU and CU groups. This is because the incentives given to them could be used to generate more income from R&D activities (such as commercialisations, patents and cooperation with industries). Based on these arguments, this study suggests that the Federal Government should continue to provide funding for FU and CU groups in T&L and R&D. However, the performance mechanism should be in place to synchronise universities' strategic goals and activities and align them with the government objectives. The government should also consider allocating the incentives for FU and CU groups if these universities are able to generate income exceeding the set target.

As discussed previously, results from the qualitative data show that the categorisation of public universities in Malaysia might be used by the government to allocate funding that best fits according to university category. These results confirm the findings of Sirat and Kaur (2007). Based on these arguments, the RAU groups funding allocation should be determined based on competitive assessment. For CU and FU groups, the status as teaching universities requires them to obtain support from the government. These universities' sources of income mainly come from students fees. However, the students' fees are control by the government, and any changes have to be approved by the National Council on Higher Education (Lee 1999, 2004). Therefore, income from the government remains very important for these universities. This study suggests that in order for the government to implement

a funding framework according to university category, several factors should be considered:

i.   Academic and non-academic staff development in the FU and CU groups
ii.   Geographical location of public universities
iii.   The formula of allocation sources of funding for teaching and research universities
iv.   The KPIs, which should be differentiated based on teaching and research universities.

This study suggests that the Malaysian Government should consider providing incentives for teaching-based universities. The Malaysian Government may consider adopting the mechanisms applied in Thailand in which the financial and incentive support for the teaching and research differs depending on university classification (Kongkiti et al. 2011). The mechanism to monitor institutional performance in T&L should be established before this program is implemented. This can have positive effect because the incentives will ensure that those universities work in line with the government objectives as stated in the strategic plans. The monitoring and auditing system is required to reduce the information asymmetries and goal conflicts. Therefore, performance indicators can be used to monitor the universities' T&L performances. A previous study by Cheung (2003) pointed out that the different funding packages for different types of university categories might stimulate and encourage the specific behaviours in achieving the government goals.

Next, the results of this study are consistent with the previous literature in which autonomy will assists the universities to make quick decisions on their operation in order to improve quality and innovation (Cheung 2003; Frølich & Klitkou 2006; Kelchtermans & Verboven 2008) in today's fast-changing environment. In 2012 the MoHE has granted autonomy in the governance, financial management, academic program, faculty administration and student learning to five RAUs (Kulasagaran 2012). Prior studies have noted the importance of financial autonomy for Malaysian public universities (Sirat 2009a). Jongbloed (2004) added that autonomy contributes to effective decision making regarding universities' academic work and research.

These discussions were further supported by Sirat (2010), who stated that autonomy helps public universities to become more independent. As stated before the government's efforts to give more autonomy to universities in key areas of university governance including legal, operational (governance), academic, financial matters and in issues relating to human resources, enrolment and income generation were announced in 2011 (Utusan Malaysia 2012a). All five RAUs have been announced to be granted full autonomy by the MoHE after the measurement of readiness is conducted by assessing accountability and excellence. Here, the Code of University Good Governance (CUGG) and University Good Governance Index (UGGI) are used to assess the readiness of granting the autonomy to the Malaysian public universities. However, no evidence indicated that autonomy was granted to CU and FU. Therefore, this study suggested that the autonomy should be granted to all universities. This is because autonomy is the important element toward the implementation of performance funding in Malaysian public universities.

In contrast, the autonomy granted by the government should be based on clear guidelines for the public universities to be competitive and accountable to the public. Based on the above arguments, this study suggests that the government should establish an independent body to monitor and establish the appropriate framework to improve autonomy in the public universities so they can implement government objectives in the best possible ways. This includes the development of performance indicators to measure the triumph plan of this system. The autonomy reforms should help to improve the higher education system in Malaysia, particularly during the government funding changes. Kallison and Cohen (2009) recommend that autonomy reform approaches should include the following:

i.   Each university must set educational goals that reflect its vision and mission

ii.   Accountability measures should be made available to the public

iii.   Greater focus should be placed on performance with respect to government goals.

Conclusion of research aim four

The fourth research aim relates to the impact of the government's strategic effort to categorise Malaysian public universities. This study has found that the strategic planning, R&D and T&L implemented vary across Malaysian public universities. This research has found that the RAU status granted to five universities has led to significant improvements in their performance, with these universities generating more income in their R&D and T&L activities. One significant aspect of these funding reforms has been a focus on R&D, with greater incentives provided by the government to promote a research culture in Malaysian universities. RAUs have been the greatest beneficiary of these reforms, as they receive greater funding in comparison to other universities for their research activities. However, while their status as a research-focused HEI may give these institutions greater access to funds, the government constantly measures whether the RAUs are maintaining their standards of research activities. After being initially recognised as an RAU, the performance of an HEI in research activities is carefully monitored and the RAU status is extended for another three years after the strict evaluation process using the MyRA system (Lim 2010).

Moreover, participants from CUs and FUs also confirmed that the T&L and R&D activities at their institutions are being audited more frequently by the government. Although the results confirmed that the CUs and FUs are focused on T&L activities, they have showed greater involvement in some activities such as enrolling postgraduate students, running postgraduate programs and recruiting international students, which are normally under the jurisdiction of the RAUs. The results prove that the quality of T&L remains a significant priority in the FUs and CUs despite the funding constraints, and it appears that these universities are able to provide T&L with the same standards as the RAUs.

This study has found that the categorisation of public universities can be used by the government to allocate funding based on the universities' specialisation according to their records and established strengths. It was also found that RAUs are able to generate more income produced by the R&D activities compared to CUs and FUs. It

is suggested that the government must take several aspects of the strengths and weaknesses of a university into account before implementing the funding system. This finding is consistent with the study conducted by Sirat and Kaur (2007).

8.3.5 Research Aim Five

To identify the role that the funding reforms have played in achieving the government objectives stated in the National Higher Education Strategic Plan beyond 2020 and National Higher Education Action Plan 2007–2010 by reducing goal conflict and information asymmetry.

This research aim intends to explore the impact of government funding reforms in achieving the government objectives as stated in the blueprints. The results from both methods were unexpected. This research has established that the public universities in Malaysia are working to achieve the government objectives as stated in the strategic plans despite the government funding cuts. Two blueprints introduced indicated the MoHE intention to transform the higher education system in Malaysia with greater focus on increasing the quality of T&L, R&D (Hussin, Yaacob & Ismail 2008; Singh & Schapper 2009; World Bank/EPU 2007) and promoting better alignment between university goals and government objectives (Kivistö 2008; Liefner 2003). Although the funding reforms caused some difficulties and challenges to the public universities, the results show consistent improvement in the institutions' behaviour towards achieving the government objectives. These results have provided an explanation of Malaysian public universities' intention to become a centre of excellence for education (Muniapan 2008; Salleh 2006). Therefore, good university strategic plans should be able to adapt to the changing environment to achieve the desired outcomes (Kettunen 2008; Taylor, JS, Machado & Peterson 2008). The systematic and continuous efforts in formulating and implementing effective policies should be viewed positively to meet the challenges in response to the government objectives.

The qualitative interviews revealed that the MoF is in the process of introducing a new budgeting system. A previous study from Neilson and Mucciarone (2007) found that the MBS is not an effective system. Therefore, the new budgeting approach will

improve the weaknesses in the existing budgeting system. In reviewing the literature, OBB is focusing more on the impact and the effectiveness of government programs. However, further work is required to establish these findings, as the OBB has not yet been implemented at all government agencies. Therefore, the government's move to introduce the new budgeting system that is based on performance should be supported by the public universities. With the new system, monitoring will be effective and efficient at managing public funds and ensuring the system is used to track universities' performance (Auranen & Nieminen 2010; Bayenet, Feola & Tavemier 2000). Based on the above argument, this study suggests that in order to ensure the smooth implementation of the OBB system, the communication process between the government and public universities should be improved, with a focus on implementation and monitoring, greater accountability, incentives and autonomy.

A performance-based mechanism could be used as a strong motivator by the MoHE to reduce information asymmetry and goal conflict (Liefner 2003; Verhoest 2005). There are a number of explanations for this argument. Under the PBF, the government wants to ensure that the universities are more accountable for using public funds provided for the benefit of stakeholders according to the key performance areas. This funding system ensures that the reporting system would clarify the Malaysian public universities' objectives and ensure they align with the government's desired outcomes. Therefore, this study further supports the government initiative to implement PBF in the public universities. As stated in the Tenth Malaysian Plan, the system that is going to be implemented comprises fixed components, which include salary and cost of utilities, and variable components, which include development of R&D and student co-curricular activities (EPU 2010a). However, several issues need to be clearly addressed before the government implements this funding mechanism. These include the indicators used to measure the universities' performances. Further, the government needs to evaluate the performance indicators used in FUs and CUs, as these universities' core functions are related to T&L. In this way, the teaching universities can improve their performances to meet the government's goals. In addition, the amendment of UUCA is necessitated to provide more flexibility for managing the public universities, especially the

financial aspects. The government should learn from the experience of developed countries that have implemented this type of system because according to previous studies, this system has its own weaknesses (Burke 1999, 2002; Dougherty & Rebecca 2009). Therefore, based on the above arguments, the Malaysian Government should consider the suggestions listed in Table 8.4 before implementing the PBF mechanism in Malaysian public universities. In addition, this study recommends that the Malaysian Government might consider studying the execution of PBF mechanisms in developed countries such as Australia, New Zealand, the UK and the US. The comparisons of the findings from this study can be altered according to the culture, political and economic condition in Malaysia.

Table 8.4: Suggestion for the Implementation of Performance Based Funding in Malaysian Public Universities

Authors	Suggestions
Layzell (1998)	- Keep it simple - Communicate with stakeholders - Leave space for error - Learn from those that have already have implemented the system - Design your own methods
Burke and Lessard (2002)	The effectiveness and efficiencies of this system depends on the institutions' reactions
Ashworth (1994)	System should be flexible, simplified, and provide data availability to measure performance.
Salmi and Hauptman (2006)	PBF design system should have: - Good indicators to evaluate good and weak institutions - Reward programs

In the meantime, the government should contemplate the funding reforms from developing countries where the majority of the funding is provided by the government. For example, the Chinese government has shifted planning and regulation of its higher education system towards the market oriented approach. In

responding to increasing demand for greater quality, efficiency and to readjust the strategic structure (Mok 2005a), university merging has changed the landscape of higher education in China (Wan & Peterson 2007). Meanwhile, the Indonesian government introduced competitive funding by 1990s in effort to implement its new Higher Education Long Term Strategy (HELTS) (Tadjudin 2007; Varghese 2004a). Tadjudin (2007) pointed out that the study on competitive funding from DGHE in 2007 shows that the method has changed the Indonesia public universities to be more competitive, proactive, and creative.

According to data from the focus group interviews, some of the respondents mentioned several challenges and difficulties faced by the participants' universities with regard to implementing the MoHE strategic plans. Most importantly, public universities in Malaysia should transform the challenges and difficulties they experience into opportunities to improve the universities' overall performance. Therefore, this study suggests that the universities should be more innovative and creative. The public institutions should not rely on the Federal Government funding anymore, and to be innovative and effective they are required to devise different approaches in order to generate their own source of income. As stated previously in Chapter 4, the universities have been required to transform themselves to meet the challenges and align themselves with the objectives set by the MoHE to achieve specific goals related to T&L and R&D. Effective management, according to Casteen (2011), is the best approach to adapt to any difficulties and challenges faced by the institution in this difficult time.

This study found that agency theory can be applied in higher education through reductions in goal conflict and/or information asymmetry in the context of Malaysia as a developing country. To reduce information asymmetries and goal conflicts, the government has been monitoring and controlling on a regular basis. In contrast, the empirical results from this research have proved that funding reforms by the Federal Government can be implemented in Malaysian public universities with special emphasis on Malaysia as a developing country. Schiller and Liefner (2006) found

that changes in the funding system related to the relationship between government and universities have proven difficult to be implemented in developing countries.

Conclusion of research aim five

The fifth research aim of this study is concerned with the role of the funding reforms in contributing to achievement of the government objectives stated in the National Higher Education Strategic Plan 2020 and National Higher Education Action Plan 2007–2010 through reductions in goal conflicts and/or information asymmetries. This research has found that the funding reforms have enabled the public universities to be more proactive in implementing government programs. The government has made use of a number of instruments to assess the congruence between the stipulated government objectives and the activities in the university environment. The various systems of performance measurement implemented by the government can reduce information asymmetry because the universities need to report information about their performance on a regular basis. These monitoring mechanisms not only allow the government to access up-to-date information about university performance but covertly enable the government to control agents' behaviour because the agents are more careful about observing the government objectives in their daily operations because the information is directly reported back to the government.

8.4   Limitations of the Study

While the findings of the study provide extensive evidence about the positive impact of the funding reforms, the researcher must note certain limitations of the study that need to be taken into account when considering the conclusions that can be drawn. Firstly, the respondents employed in this study do not represent the broad population of Malaysian public universities. As the funding changes introduced by the Federal Government only apply to public HEIs, this study only focused on the proposed changes to Federal Government funding of public universities in Malaysia. As mentioned earlier, of the total number of public institutions, 20 are public universities and 110 are non-university institutions. This research focuses only on public university funding reforms proposed by the Federal Government. Therefore,

results obtained from this research cannot be used to make generalisation regarding other public HEIs. Due to the limited sample size, the findings of this study are not meant as a generalisation on the issue. The 120 completed questionnaires that were used in the survey constitute about 35.8 per cent of the respondents solicited for their feedback. The respondents in this study belong to one level of administrative staff: university top management (Vice Chancellors/Rectors, Deputy Vice Chancellors/Deputy Rectors, Deans, Directors of Strategic Planning or equivalent and Heads of Bursar or equivalent). Moreover, public universities are scattered across the geographical area of Malaysia, thus adding to the difficulty of obtaining high-quality responses. This means that more energy and budget should have been considered during the data collection period using the questionnaire. The focus group interviews were conducted according to the categories of Malaysian public universities. Therefore, the findings from this method do not represent the entire population of public universities.

The next limitation of this study was the time constraint. As mentioned in Chapter 5 (Research Design and Methodology), this study employed a sequential method of data analysis. This meant that the steps taken in the focus group interviews depended on the progress of first method. The researcher had to complete the first phase of data collection and data analysis before developing the questions and proceeding with the second phase. The researcher allocated three months for data collection and another three months for data analysis and interpretation. Moreover, the focus group interviews helped to improve the quality data in this research. Information provided from questionnaires helped to determine questions that focus on the specific issues of the study.

Finally, the current investigation was limited upon two MoHE strategic plans: (1) National Higher Education Strategic Plan beyond 2020; and (2) National Higher Education Plan 2007-2010 (Phase I). The implementation planning of Phase I has been completed. In 2011, the MoHE announced the implementation of National Higher Education Strategic Plan 2 with the theme '*Malaysia's Global Reach: A New*

Dimension'. Therefore, this study does not take into account of strategic planning in Phase 2.

8.5   Research Implications

This section highlights the theoretical, methodological and practical implications from the present study.

8.5.1   Theoretical implications

The results indicate that agency theory is a useful theoretical framework for research in higher education, especially with regard to the government's implementation of strategic policy change for universities. This study has demonstrated that agency theory might be applied in the study of government–university relationships in the context of a developing country like Malaysia. Based on these findings, the researcher recommends that agency theory can be used in different national contexts. Agency theory is not only useful as an analytical framework to examine the government–university relationship, it can also provide the government with suggestions about what it can do to reduce the information asymmetry and goal conflicts.

8.5.2   Methodological implications

The questionnaire used in this study can also be referenced for future studies in higher education research in Malaysia. Other aspects of the research instruments, such as suggestions from the experts, pilot interviews and data analysis strategies, also offer valuable information for researchers.

Firstly, in order to design the questionnaire, the researcher utilised the expertise of both supervisors and expert advisors whose feedback and recommendations provided beneficial insight into obtaining the quality data required for the study. In this thesis, the researcher interviewed four different types of respondents, representing different levels of administrative staff and university type.

Secondly, the pilot interviews offered ideas that were helpful in designing the questionnaires for the study. The feedback and comments received from these pilot interviews were effective in improving the design, question quality, time and clarity of the questionnaire design.

Thirdly, a diverse range of methods was used to disseminate the questionnaires. Face-to-face contact, email, mail and regular follow up were used to increase the response rate in this study. It is suggested that future researchers use a host of tactics to ensure that a high response rate is achieved. Although a researcher may dispatch questionnaires to prospective respondents, it is necessary to undertake direct visits and face-to-face contact or communication by telephone to follow up on their respondents. This is necessary to receive good feedback because the top management in universities have limited time to spend answering such questionnaires.

Finally, it is recommended that a mixed-methods research design is suitable for future studies in this area. As for this research, the application of focus group interviews provided additional quality information to confirm and contrast with the data from the questionnaire. The focus group interviews provided additional information that could not be gathered using the questionnaire. The use of a range of methods helped to increase the quality of research findings. Overall, the research design developed for this study has proven useful for this study and can be emulated for similar studies of Malaysian higher education in the future.

8.5.3   Practical implications

Perhaps the most important implications of this research relate to the practical aspects of the administration of public universities in Malaysia. Findings from this study can be used by universities in Malaysia to compare their response and experience to the funding reforms with those of other universities. They can also compare the results to examine how different categories of universities have fared under the funding reforms and realise their own strengths and specialisations to maximise their potential. Although it is a case study on a specific topic, the

researcher has obtained a wide variety of information about the status of public universities in Malaysia, which can be of use to other researchers.

This study generated useful information for the Malaysian Federal Government and its agencies that can be used to understand how these funding reforms have contributed to the achievement of their objectives and to make necessary adjustments to improve their policies. The findings indicate that the funding changes have had a positive effect on the government objectives; however, the MoHE needs to pay attention to certain issues while implementing such funding reforms. The government needs to pay more attention to the logistical difficulties that new universities are facing in implementing the government strategic plans. Moreover, it is advised that the government allocate more autonomy to the public universities so that they can better pursue the desired outcomes. The autonomy implemented must be followed with policies that guide the universities to behave according to government aspirations. The findings of this study can also be helpful for governments in other countries, especially developing countries, when they are deliberating about the appropriate design of university funding reform that best fits their political, economic and social environment.

8.6   Recommendations for Future Research

Based on the findings and implications discussed above, this study presents recommendation for future research. There is still a relative dearth of empirical research using agency theory, particularly in the context of higher education. Therefore, previous researchers have also suggested that more research be undertaken (Kivistö 2005; Schiller & Liefner 2006).

Further research is necessary to study the impact of government funding changes on specific areas of operations in Malaysian public universities. The research and analysis conducted in this thesis present a holistic but general study of the impact of the funding reforms on five areas: strategic planning, T&L, R&D, categorisation and government objectives. In order to obtain a clearer, more detailed picture of the

impact of funding reforms on each of these areas, it is suggested that future research be conducted with an in-depth individualised focus on each of these areas. In particular, the researcher believes that the categorisation of Malaysian public universities is a rich and complex subject that offers many opportunities for future research. This research has discovered an array of issues, including the comparative edge of RAUs over other universities and the complexity of distributing funding according to university status, which can be further analysed by focusing on the impact of funding reforms and categorisation of universities.

It would also be beneficial to dedicate a study to ascertain the degree to which the government funding changes have helped in the successful execution of the National Higher Education Strategic Plan 2007–2010. This first phase of establishing the foundation of the strategic plan for higher education was completed in 2010; therefore, further studies are needed to understand the effectiveness of this plan in achieving the government objectives. The information about the strengths and weaknesses in the execution of the first phase can help improve the second phase of the government strategic plan, which was implemented in 2011.

8.7   Closing Statement

Agency theory has proven to be a useful framework that can be applied to higher education research in general. In this study, agency theory has proven to be a useful framework for examining the implementation of government funding changes in higher education in a developing country such as Malaysia. The results obtained from the quantitative questionnaire and qualitative focus group interviews were significant and validated the overall positive impact of the funding reforms on public universities in Malaysia**. This means that the funding reforms have improved the approach taken with regard to strategic planning, T&L, R&D, and government objectives in public universities in Malaysia by reducing information asymmetries and/or goals conflicts. Although the government needs to consider some issues, such as the difference in resources between RAUs and other universities and the difficulty of commercialising research, the funding reforms have led to some positive changes

as evidenced in the positive feedback from the participants in the focus group interviews. Overall, public universities seem to have embraced the changes brought about by the funding reforms. In spite of the obstacles in the way of the implementation of the National Higher Education Strategic Plan beyond 2020 and the National Higher Education Plan 2007–2010, the majority of the participants viewed these reforms as necessary interventions for improving the standard of higher education, and displayed a positive and optimistic attitude emphasising that the changes were challenges to be tackled rather than difficulties to be shunned.

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APPENDICES

VICTORIA UNIVERSITY | A NEW SCHOOL OF THOUGHT

INFORMATION TO THE RESPONDENT

Y.Bhg. Tan Sri Prof./Dato Seri/Dato/Prof/Dr/Mr/Mrs

My name is **ABD RAHMAN AHMAD, a PhD candidate at the School of Accounting, Victoria University, Melbourne, Australia.** For your information, my thesis title is: **'Impact of Government Funding Reforms on the Strategic Planning of Malaysian Public Universities'.**

This study intends to investigate the impact of changes in government funding mechanism on public universities with the intention of fostering the development of academic and institutional excellence as stated in the National Higher Education Strategic Plan 2020 and the National Higher Education Action Plan 2007–2010. This research will provide valuable information to university strategic planning and assist in achieving government objectives. For this purpose, I would like to invite Y.Bhg. Tan Sri Prof./Dato Seri/Dato/Prof/Dr/Mr/Mrs to take part in this research.

Below is important information related to the questionnaire attached.
i.   The questionnaire consists of two sections:
        Section A: Demographic information
        Section B: Statements related to the changes in government funding mechanism

ii.   Completion of the questionnaire should take around **20 minutes**.

iii.   All information is only for research purposes and will be treated as private and confidential, hence it will not be revealed under any circumstances.

If you have any question or queries, contact me at **abd.ahmad@live.vu.edu.au**, Tel: +6013-738 7967 or my supervisor, Prof Alan Farley and Dr Stella Sofocleous, School of Accounting, Victoria University, Australia at **Alan.Farley@vu.edu.au** and **Stella.Sofocleous@vu.edu.au** Tel: 613 9919 4885 and 9919 5321 for verification.

Your cooperation would be highly appreciated.

Thanking you in advance.

Yours truly,

ABD RAHMAN BIN AHMAD
Phd Candidate
School of Accounting
Victoria University
Melbourne, Australia

SECTION A

Instruction:
For each statement, please mark your response with an X in only one box.

1. University category.

i.	Research University (Apex status)	☐
ii.	Research University	☐
iii.	Comprehensive University	☐
iv.	Focused University	☐

2. Designated position.

i.	Vice Chancellor/Rector	☐
ii.	Deputy Vice Chancellor/Deputy Rector	☐
iii.	Dean	☐
iv.	Head of Bursar Office or equivalent	☐
v.	Director of Strategic Planning Office or equivalent	☐

3. Length of time working in your designated position.

i.	Less than 2 years	☐
ii.	2 to 4 years	☐
iii.	5 to 7 years	☐
iv.	More than 7 years	☐

4. Length of time spent working in universities.

i.	Less than 5 years	☐
ii.	5 to 10 years	☐
iii.	11 to 20 years	☐
iv.	More than 20 years	☐

SECTION B

Funding reforms according to Schiller and Liefner (2006) comprise of government budget cuts, PBF mechanism, and diversification of the funding base.

Changes in government funding to strengthen institutions of higher education for the achievement of world class status

In transforming higher education to achieve world-class status, public universities need to generate income so that they can be autonomous. In Phase 1 of strategic planning (years 2007–2010) the government has requires that operating expenditures be subsidised through internal resources by 15 percent in comprehensive / focused universities and 20 percent in research universities.

Phase 2 of planning (years 2011-2015) aims to strengthen financial resources of comprehensive / focused universities to achieve targets of 20 percent of operating expenditure, whereas research universities are targeted to meet 25 percent of operating expenditure and 5 percent of development expenditure.

Phase 3 (year 2016-2020) the government will expect comprehensive / focused universities to supplement 25 per cent of their operating expenditure and 5 per cent of development expenditure, with research universities supplementing 30 percent of their operating expenditure and 10 percent of development expenditure. Autonomy will be given when focused / comprehensive universities are able to finance 30 percent of their operating expenditure and 10 percent of their development from internal resources. Meanwhile, the goal of autonomy for research universities is 40 per cent of operating expenditure and 15 per cent of development expenditure.

Global resilience and competitiveness

Funding from public universities internal resources

Phase 4 beyond 2020

Glory and sustainability

FU/CU	RU
30% operating	40% operating
10 % development	15 % development

Higher education transformation

Phase 3: 2016-2020
Excellence

25% operating
5% development

30% operating
10 % development

20% operating

25% operating
5% development

Phase 2: 2011-2015
Strengthening and enhancement

Transformation roadmap

Phase 1: 2007–2010
Laying the foundation

- **100% development from government.**
- **88 operating from government**
- **R&D&C funding**
- **Public universities holding companies**

15% operating

20% operating

Source: Adapted from Pelan Strategik Pengajian Tinggi Negara Melangkau Tahun 2020, page 111-112

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Instruction:
Please respond to the questions based on your personal opinion and knowledge. Mark your responses with an X in only one box.

If you are not qualified to answer any question, please leave it blank.

Question 1

Please indicate your agreement or disagreement with each statement on the impact of government funding changes in Malaysian public universities (as stated in the National Higher Education Strategic Plan 2020 and the National Higher Education Action Plan 2007–2010) on the approach to strategic planning in your university.

		Strongly Disagree			Neutral			Strongly Agree
		1	2	3	4	5	6	7
Q1.1	Improved direction of the university towards the desired goals of the government.	☐	☐	☐	☐	☐	☐	☐
Q 1.2	Improved strategic planning focus to increase responsiveness in line with government objectives.	☐	☐	☐	☐	☐	☐	☐
Q 1.3	Improved the operation and planning process for information in line with government objectives.	☐	☐	☐	☐	☐	☐	☐
Q 1.4	Greater alignment between government strategic planning and institutional strategic planning.	☐	☐	☐	☐	☐	☐	☐
Q 1.5	Increased accountability of your institutions to meet government objectives.	☐	☐	☐	☐	☐	☐	☐
Q 1.6	Better alignment of institutional objectives with government objectives.	☐	☐	☐	☐	☐	☐	☐
Q 1.7	Provides incentives for improving academic performance, quality, and efficiency to better align with government objectives.	☐	☐	☐	☐	☐	☐	☐
Q 1.8	Improves the use of performance indicators to align with government objectives.	☐	☐	☐	☐	☐	☐	☐
Q 1.9	Monitors institutional performance according to government objectives.	☐	☐	☐	☐	☐	☐	☐
Q 1.10	Provides fast and flexible analysis and reporting of data to assist accurate strategic decisions.	☐	☐	☐	☐	☐	☐	☐
Q 1.11	Produces quality and timely information relevant to government requirements.	☐	☐	☐	☐	☐	☐	☐
Q 1.12	Establishes steering mechanisms to ensure that government policy goals and objectives are addressed	☐	☐	☐	☐	☐	☐	☐
Q 1.13	Improved financial resources' strategy in accordance with government objectives.	☐	☐	☐	☐	☐	☐	☐
Q 1.14	Increased use of internal resources as part of the strategy to generate funding according to government objectives.	☐	☐	☐	☐	☐	☐	☐

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Question 2

Please indicate your agreement or disagreement with each statement on the impact of government funding changes in Malaysian public universities (as stated in the National Higher Education Strategic Plan 2020 and the National Higher Education Action Plan 2007–2010) on altering the approach to Research and Development (R&D) in your university.

		Strongly Disagree			Neutral			Strongly Agree
		1	2	3	4	5	6	7
Q 2.1	Improved overall R&D quality.	☐	☐	☐	☐	☐	☐	☐
Q 2.2	Improved quality of publication.	☐	☐	☐	☐	☐	☐	☐
Q 2.3	Increased number of publications.	☐	☐	☐	☐	☐	☐	☐
Q 2.4	Improved extent of commercialisation.	☐	☐	☐	☐	☐	☐	☐
Q 2.5	Increased R&D cooperation with industry.	☐	☐	☐	☐	☐	☐	☐
Q 2.6	Improved research performance.	☐	☐	☐	☐	☐	☐	☐
Q 2.7	Increased number of patents.	☐	☐	☐	☐	☐	☐	☐

Question 3

Please indicate your agreement or disagreement with each statement on the impact of government funding changes in Malaysian public universities (as stated in the National Higher Education Strategic Plan 2020 and the National Higher Education Action Plan 2007–2010) on altering the approaches to Teaching and Learning (T&L) in your university.

		Strongly Disagree			Neutral			Strongly Agree
		1	2	3	4	5	6	7
Q 3.1	Improved overall quality of T&L.	☐	☐	☐	☐	☐	☐	☐
Q 3.2	Increased number of undergraduate students.	☐	☐	☐	☐	☐	☐	☐
Q 3.3	Increased number of postgraduate students.	☐	☐	☐	☐	☐	☐	☐
Q 3.4	Increased number of international students.	☐	☐	☐	☐	☐	☐	☐
Q 3.5	Increased number of undergraduate degrees.	☐	☐	☐	☐	☐	☐	☐
Q 3.6	Increased number of postgraduate degrees.	☐	☐	☐	☐	☐	☐	☐

Question 4

Please indicate your agreement or disagreement with each statement on the changes that new government funding of Malaysian public universities has played in achieving the Malaysian Government objectives (as stated in the National Higher Education Strategic Plan 2020 and National Higher Education Action Plan 2007–2010).

		Strongly Disagree			Neutral			Strongly Agree
		1	2	3	4	5	6	7
Q 4.1	Widens educational access and enhances quality education.	☐	☐	☐	☐	☐	☐	☐
Q 4.2	Improves quality of teaching and learning.	☐	☐	☐	☐	☐	☐	☐
Q 4.3	Improves the enhancement of research and innovation.	☐	☐	☐	☐	☐	☐	☐
Q 4.4	Improves the objective of strengthening your institutions.	☐	☐	☐	☐	☐	☐	☐
Q 4.5	Expands your objectives to enculturation lifelong learning.	☐	☐	☐	☐	☐	☐	☐
Q 4.6	Improves your objective to intensify internationalisation.	☐	☐	☐	☐	☐	☐	☐

Instruction:

Please respond to the questions based only on your personal opinions and knowledge of the impact of government funding changes at your institution in accordance with the National Higher Education Strategic Plan beyond 2020 and National Higher Education Plan 2007–2010. Mark your responses with an X in only one box.

If you are not qualified to answer any question, please leave it blank.

(Note: Questions 5.1 to 5.14 ask you to make comparisons with national averages based on your perceptions)

Question 5

Q5.1 How do you rate the overall quality of Research and Development (R&D) in your university?

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

Q5.2 How do you rate the quality of publications in your university?

	Well Below 2009 National Average 1	2	3	At 2009 National Average 4	5	6	Well Above 2009 National Average 7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

Q5.3 How do you rate the number of publications in your university?

	Well Below 2009 National Average 1	2	3	At 2009 National Average 4	5	6	Well Above 2009 National Average 7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

Q5.4 How do you rate the extent of commercialisation in your university?

	Well Below 2009 National Average 1	2	3	At 2009 National Average 4	5	6	Well Above 2009 National Average 7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

Q5.5 How do you rate the number of patents generated at your university?

	Well Below 2009 National Average 1	2	3	At 2009 National Average 4	5	6	Well Above 2009 National Average 7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

Q5.6   How do you rate the R&D cooperation with industry at your university?

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

Q5.7   How do you evaluate the ability of your university to generate funding for R&D through collaboration with industry?

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

Q5.8   How do you rate the quality of teaching and learning in your university?

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

Q5.9 In relation to teaching and learning in your institution, how do you rate the number of students held/to be held under the following categories?

(a)   Undergraduate students.

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

(b)   Postgraduate students.

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

(c)   International students

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

Q5.10 In relation to teaching and learning in your institution, how do you rate the number of degrees offered under the following categories?

(a) Undergraduate degrees.

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

(b) Postgraduate degrees.

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

Q5.11 How do you rate the development of infrastructure facilities for teaching and learning   in your university?

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

Q5.12 How do you rate the ability of your institution to generate funding from internal resources in accordance with the National Higher Education Strategic Plan beyond 2020?

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

Q5.13 How do you rate the ability of your institution to generate funding from internal resources in accordance with the National Higher Education Strategic Plan beyond 2020 from:

(a)   Operational expenditure.

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

(b)   Development expenditure.

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

Q5.14 How do you rate the following program plans imposed in accordance with the National Higher Education Strategic Plan beyond 2020 and National Higher Education Plan 2007–2010 at your university?

(a)   Expanding the objective to widening access and enhancing quality.

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

(b)   Improving the objectives on quality of teaching and learning.

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

(c)   Improving the objective to enhancing research and innovation.

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

(d)   Improving the objective of strengthening institutions of higher education.

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

(e)   Expanding the objective of intensifying internationalisation.

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

(f)   Expanding the objective of enculturation of lifelong learning.

	Well Below 2009 National Average			At 2009 National Average			Well Above 2009 National Average
	1	2	3	4	5	6	7
In 2006	☐	☐	☐	☐	☐	☐	☐
Now	☐	☐	☐	☐	☐	☐	☐
In 2015 (expected)	☐	☐	☐	☐	☐	☐	☐

If you would like to make any suggestions and comments concerning this research in the space below it would be highly appreciated.

_____

_____

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Thank you for your time and cooperation in completing this questionnaire

Please return your questionnaire either by mail or email to:

Abd Rahman Ahmad
No. 47 Jalan Universiti 16
Taman Universiti, Parit Raja
86400 Batu Pahat, Johor
Malaysia

abd.ahmad@live.vu.edu.au/mankuittho@yahoo.com
+6013-738 7967

Appendix II: Letter of permission to conduct a study in the government agencies from Ministry of Higher Education (MoHE) and Economic Planning Unit

UNIT PERANCANG EKONOMI
Economic Planning Unit
JABATAN PERDANA MENTERI
Prime Minister's Department
BLOK B5 & B6
PUSAT PENTADBIRAN KERAJAAN PERSEKUTUAN
62502 PUTRAJAYA
MALAYSIA

EPU

Telefon : 603-8872 3333

Ruj. Tuan:
Your Ref.:   UPE: 40/200/19/2668

Ruj. Kami:
Our Ref.:

Tarikh: 10 August 2010
Date:

Abd Rahman Ahmad
No. 47 Jalan Universiti 16,
Taman Universiti, Parit Raja
Batu Pahat, Johor
Email: mankuittho@yahoo.com

APPLICATION TO CONDUCT RESEARCH IN MALAYSIA

With reference to your application, I am pleased to inform you that your application to conduct research in Malaysia has been *approved* by the **Research Promotion and Co-Ordination Committee, Economic Planning Unit, Prime Minister's Department**. The details of the approval are as follows:

Researcher's name :   **ABD RAHMAN AHMAD**

Passport No. / I. C No: 770818-01-6713

Nationality   :   **MALAYSIAN**

Title of Research   :   "IMPACT OF THE CHANGED GOVERNMENT FUNDING MODELS ON THE STRATEGIC PLANNING OF MALAYSIAN PUBLIC UNIVERSITIES"

Period of Research Approved: **THREE YEARS**
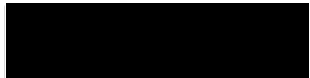
2.   Please collect your Research Pass in person from the Economic Planning Unit, Prime Minister's Department, Parcel B, Level 4 Block B5, Federal Government Administrative Centre, 62502 Putrajaya and bring along two (2) passport size photographs. You are also required to comply with the rules and regulations stipulated from time to time by the agencies with which you have dealings in the conduct of your research.

3.   I would like to draw your attention to the undertaking signed by you that you will submit without cost to the Economic Planning Unit the following documents:

   a)   A brief summary of your research findings on completion of your research and before you leave Malaysia; and

   b)   Three (3) copies of your final dissertation/publication.

4.   Lastly, please submit a copy of your preliminary and final report directly to the State Government where you carried out your research. Thank you.

Yours sincerely,

███████████

(MUNIRAH ABD. MANAN)
For Director General,
Economic Planning Unit.
E-mail: munirah@epu.gov.my
Tel: 88882809
Fax: 88883961

ATTENTION

This letter is only to inform you the status of your application and **cannot be used as a research pass**.

Cc:

Ketua Setiausaha
Kementerian Pengajian Tinggi Malaysia
Bahagian Perancangan dan Penyelidikan
Aras 3, Blok E3, Kompleks E.
Pusat Pentadbiran Kerajaan Persekutuan
62505 Putrajaya.
(up: Hjh. Raihanah Bt. Hj. Khudri)

KEMENTERIAN PENGAJIAN TINGGI MALAYSIA
BAHAGIAN PERANCANGAN DAN PENYELIDIKAN
ARAS 3, BLOK E3, KOMPLEKS E,
PUSAT PENTADBIRAN KERAJAAN PERSEKUTUAN 62505 PUTRAJAYA

TEL : 03-8883 5384 FAX : 03-8889 3471 WEB : http://www.mohe.gov.my

Ruj. Kami : KPT.R.620 – 1/1/1 Jld.15(48)
Ruj. Tuan : UPE: 40/200/19/2668
Tarikh : 28 Julai 2010

Ketua Pengarah :
Unit Perancang Ekonomi
(Seksyen Ekonomi Makro)
Jabatan Perdana Menteri
Blok B5 & B6
Pusat Pentadbiran Kerajaan Persekutuan
62502 Putrajaya

(u.p.: Pn. Munirah Bt. Abd Manan, Tel: 8872 5281 / Faks: 8888 3961)

Y.Bhg. Tan Sri/Datuk/Dato'/Datin/Prof./Dr./Tuan/Puan,

PERMOHONAN UNTUK MENJALANKAN PENYELIDIKAN DI MALAYSIA
Nama Calon: Abd. Rahman Ahmad

Dengan hormatnya saya diarah merujuk kepada perkara di atas dan ingin memaklumkan bahawa Bahagian ini telah meneliti *proposal* kajian yang dicadangkan oleh penyelidik di atas.

2. Sehubungan itu, sukacita bersama-sama ini dikemukakan ulasan dan pandangan Bahagian ini terhadap cadangan kajian tersebut seperti di **Lampiran 1.**

3. Kementerian ini tiada halangan untuk membenarkan kajian tersebut dijalankan dengan syarat **tidak melibatkan responden tahun akhir (*final year students*)** di atas sebab-sebab tertentu. Walau bagaimanapun, sekiranya sampel kajian melibatkan responden daripada institusi-institusi di bawah Kementerian

1

MENERAJU KEGEMILANGAN ILMU
Memperolehi persijilan ISO 9001 : 2000

Pengajian Tinggi, maka kebenaran menggunakan sampel kajian perlu diperoleh daripada:

Setiausaha Bahagian
Bahagian Perancangan dan Penyelidikan
Kementerian Pengajian Tinggi
Aras 3, Blok E3, Parcel E
Pusat Pentadbiran Kerajaan Persekutuan
62505 Putrajaya

(u.p. Seksyen Penyelidikan)

Sekian, terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menurut perintah,

(CHUAH BEE LENG)
Bahagian Perancangan dan Penyelidikan
b.p. Ketua Setiausaha
Kementerian Pengajian Tinggi Malaysia

2

NAMA: Abd. Rahman Ahmad

TAJUK KAJIAN: Impact of the Changed Government Funding Models on the Strategic Planning of Malaysian Public Universities

Ulasan terhadap cadangan kajian:

i)   Bidang yang dikaji:

      a)   Mengkaji hubungan antara model pendanaan (*funding model*) kepada IPTA oleh kerajaan dengan tahap pencapaian objektif kerajaan di sektor pengajian tinggi melalui *Agency Theory*;

      b)   Mengkaji kesesuaian pengaplikasian *Agency Theory* dalam konteks model pendanaan tersebut.

ii)   Kawasan-kawasan kajian yang dikenal pasti:

20 IPTA

iii)   Faedah-faedah yang mungkin dapat diperoleh dari kajian ini.

Hasil kajian ini dijangka dapat memberi penentuan tentang kesesuaian pengaplikasian *Agency Theory* dalam konteks Universiti. Di samping itu juga, kefahaman yang lebih mendalam tentang keberkesanan dan kecekapan melalui penggunaan model pendanaan kerajaan demi mempertingkatkan objektif pencapaian sektor pengajian tinggi melalui IPTA.

Ruj. Kami   : USM/IPPTN/HE/19

Tarikh   : 28 Julai 2010

Abd Rahman Ahmad
No 47 Jalan Universiti 16
Taman Universiti, Parit Raja
86400 Batu Pahat
Johor

Tuan

KEBENARAN UNTUK MENJALANKAN KAJIAN BERTAJUK:
- IMPACT OF CHANGED GOVERNMENT FUNDING ON THE STRATEGIC PLANNING OF MALAYSIAN PUBLIC UNIVERSITIES

Dengan segala hormatnya saya merujuk kepada perkara tersebut di atas dan surat tuan bertarikh 22 Julai 2010.

2.   Sukacita dimaklumkan bahawa, Institut Penyelidikan Pendidikan Tinggi Negara (IPPTN) tiada halangan untuk memberi kebenaran kepada tuan bagi tujuan mendapatkan khidmat sokongan dan nasihat daripada pihak kami bagi tujuan menjalankan kajian di atas.

Sekian, terima kasih

"BERKHIDMAT UNTUK NEGARA"
'Memastikan Kelestarian Hari Esok'

Yang menjalankan tugas,

PROFESOR MORSHIDI SIRAT
Pengarah

Appendix III: Focus Group Planning Framework

Focus Group Number   :

Type of university   :

Location   :

Date   :

Time   :

Before the Interview:

- Organise the interview 3 weeks before the session.

- Appoint the university representative to coordinate the appointment.

- Sending a consent letter, question, objectives of the study and executive summary of research study to participants through email

- Follow up with the university representative to finalise the date and time.

- Arrange to order foods.

- Sent email to the participant before 1 week before the interview.

During the Interview:

- Be in the meeting room 30 minutes early

- Setting the chair according to the number of participants

- Place the tape recorder near to participants

- Place a copy of questions for focus group interviews

- Check the availability of participants

- Make sure all questions are covered within the time

After the Interview:

- Check the tape recorder

- Explain the questions all covered and asked if they want to add further comments or suggestion

- End the discussion with small token appreciation to the participants.

Strategic Planning

1.   The impacts you have seen in your strategic planning due to recent changes in government funding in your institution.

a)   Have these changes influenced you in managing clear and effective communication strategies with the Federal Government?

b)   Have you found your communication with the Federal Government has improved since they implement the funding changes?

c)   What types of mechanisms have you put in place to assist in producing timely and accurate information alignment with the government requirements?

d)   Do you think that an efficient incentive structure is closely linked with the development of a successful system to monitor the progress of reaching government requirements?

2.   Due to increasing concerns on greater accountability and transparency, the government has taken strategic approach in managing public funds to assure the reliable systems are used to track university performance.

a)   Do you think that the mechanism tied to performance contributes to the achievement better alignment between institutional behaviour and government objectives?

b)   To what extent do the government imposed mechanisms increase demands for synchronizing of university strategic goals activities aligned with government objectives, in the process of increasing the quality of teaching and research in your university?

3.   Are there any aspects of the funding changes in Malaysian public universities that are promoting the efficient use of resources in your university?

a)   Based on your answer to Question 3, in your opinion what are the consequences of this reaction at your university?

4.   In your opinion, do you think that the government funding changes/funding model is the best way to create better alignment with government objectives?

5.   To what extent do you believe that the government imposed mechanisms is related to funding changes or political factors?

Research & Development and Teaching & Learning

1.   What impression do you have concerning the affects of funding changes at your university on:
   i.   Research & development; and
   ii.   Teaching & learning

2.   Based on your answer to Question 1, are you happy with these changes in relation to your research & development and teaching & learning at your university?

3.   Has the government demanded any reports about your information on research and teaching activities recently since the funding changes?
   a)   What types of information have your university provided in relation to research & development and teaching & learning?
   b)   Are there any differences in reporting the information?
      - What types of new information does the government require today?
      - Are there any differences with what your university has previously been doing?
   c)   How does the government use the old and new information related to research & development and teaching & learning in your university?

4.   What do you think about the performance measurements required by the government in relation to the quality of research and development and teaching and learning in your university?
   a)   To what extent do the funding changes lead to better communication mechanisms between your university and government?

      b)   Do you think that the government has indicated strong interest in monitoring and reporting of the research and development and teaching and learning performance at your university?

      c)   Why do you think that the government needs that such of information from your university?

5.   In your opinion, do you think that the government intention to implement Performance Based Funding (PBF) in the future will assist your university to achieve the government objectives?

6.   Do you think that, PBF is the right way to assess your university performance in research & development and teaching & learning?

Categorisation of Malaysian Public Universities

1.   To what extent do the categorisations of your university (Focused Universities, Research Universities, and Comprehensive Universities**)** play an important role in the development of teaching and research?

2.   Evidence from the survey indicated that the categorisation of Malaysian public universities has created changes to your university core functions (research and teaching).

      a)   How is the government categorisation being implemented at your university?

      b)   Based on your answer to Question 2(a), do you think government categorisation will become a benchmark of your university performance from now and in future?

3.   Do you think that the categorisation of Malaysian public universities might be used as one of the platform to determine the funding that best fits according to core functions?

      a)   Do you think that this objective is realistic to be implemented?

      b)   If yes, is your university ready with these changes?

4.   Do you think that university has enough autonomy power to promote flexibility of

university operation?

5.   Do you think that the autonomy level given to public universities are sufficient to realistically pursue the government objectives?

Government Objectives

1.   The impact you have seen in your university due to recent changes in government funding in achieving the Malaysian Government objectives (as stated in the National Higher Educational Strategic Plan beyond 2020 and National Higher Education Plan 2007–2010).

    a)   Has the government demanded any reports about your information on the achievement in any relation activities as stated in the government strategic plan since the funding changes?

    b)   Do you know how the government makes use of any such information in related to the achievement in any relation activities as stated in the government strategic plan at your university?

    c)   Why do you think that the government needs that such of information from your university?

2.   Is there any special funding available for the equity groups that require extra support at your university?

3.   Is there any special funding available for encouraging lifelong learning at your university?

4.   In your opinion, do you know any difficulties that your university face in order to implement the National Higher Educational Strategic Plan beyond 2020 and National Higher Education Strategic Plan 2007–2010?

MEMO

TO	Prof Farley	DATE	12/10/2010
	School of Accounting		
	Footscray Park Campus		
	Ms Stella Sofocleous		
	School of Accounting		
	Footscray Park Campus		

FROM	Dr Nick Billington
	Chair
	Faculty of Business and Law Human Research
	Ethics Committee

SUBJECT	Ethics Application – HRETH 10/185

Dear Prof Farley and Ms Sofocleous

Thank you for submitting your application for ethical approval of the project entitled:

HRETH 10/185   Impact of the Changed Government Funding on the Strategic Planning of Malaysian Public Universities
The proposed research project has been accepted and deemed to meet the requirements of the National Health and Medical Research Council (NHMRC) 'National Statement on Ethical Conduct in Human Research (2007)', by the Chair of the Business & Law Human Research Ethics Committee. Approval has been granted from 12th October 2010 to 1st July 2012.

Continued approval of this research project by the Victoria University Human Research Ethics Committee (VUHREC) is conditional upon the provision of a report within 12 months of the above approval date (by **12th October 2011**) or upon the completion of the project (if earlier). A report proforma may be downloaded from the VUHREC web site at: http://research.vu.edu.au/hrec.php

Please note that the Human Research Ethics Committee must be informed of the following: any changes to the approved research protocol, project timelines, any serious events or adverse and/or unforeseen events that may affect continued ethical acceptability of the project. In these unlikely events, researchers must immediately cease all data collection until the Committee has approved the changes. Researchers are also reminded of the need to notify the approving HREC of changes to personnel in research projects via a request for a minor amendment.

On behalf of the Committee, I wish you all the best for the conduct of the project. If you have any queries, please do not hesitate to contact me at Nick.Billington@vu.edu.au

Kind Regards,

Dr Nick Billington
Chair
Faculty of Business and Law Human Research Ethics Committee

Appendix VI: Results I – Quantitative Analysis

Appendix

Table A-1: Results of One-sample Wilcoxon Signed Rank Test and One-sample T-test for Strategic Planning

Items	One-sample Wilcoxon Signed Rank Test		One-sample T-test				
	Sig	**Median**	**Mean**	***t***	**Sd**	**df**	**Sig**
Q1.1	**.000**	6	5.89	19.41	1.07	119	**.000**
Q 1.2	**.000**	6	5.94	20.46	1.04	119	**.000**
Q 1.3	**.000**	6	5.92	20.31	1.03	119	**.000**
Q 1.4	**.000**	6	6.03	21.00	1.06	119	**.000**
Q 1.5	**.000**	6	6.04	22.02	1.02	119	**.000**
Q 1.6	**.000**	6	6.08	22.08	1.03	119	**.000**
Q 1.7	**.000**	6	5.83	18.88	1.06	119	**.000**
Q 1.8	**.000**	6	5.88	19.71	1.05	119	**.000**
Q 1.9	**.000**	6	5.86	18.34	1.11	119	**.000**
Q 1.10	**.000**	6	5.68	14.74	1.25	119	**.000**
Q 1.11	**.000**	6	5.63	15.07	1.19	119	**.000**
Q 1.12	**.000**	6	5.70	15.09	1.23	119	**.000**
Q 1.13	**.000**	6	5.65	14.11	1.28	119	**.000**
Q 1.14	**.000**	6	5.63	13.47	1.33	119	**.000**

Table A-2: Results of One-sample Wilcoxon Signed Rank Test and One-sample T-test for Research and Development

Items	One-sample Wilcoxon Signed Rank Test		One-sample T-test				
	Sig	Median	Mean	t	Sd	df	Sig
Q 2.1	**.000**	6	5.48	14.29	1.14	119	**.000**
Q 2.2	**.000**	6	5.39	14.03	1.09	119	**.000**
Q 2.3	**.000**	6	5.41	13.10	1.18	119	**.000**
Q 2.4	**.000**	5	5.43	14.75	1.06	119	**.000**
Q 2.5	**.000**	6	5.41	13.43	1.15	119	**.000**
Q 2.6	**.000**	6	5.53	14.68	1.14	119	**.000**
Q 2.7	**.000**	6	5.29	11.88	1.19	119	**.000**

Table A-3: Results of One-sample Wilcoxon Signed Rank Test and One-sample T-test for Teaching and Learning

Items	One-sample Wilcoxon Signed Rank Test		One-sample T-test				
	Sig	Median	Mean	t	Sd	df	Sig
Q 3.1	.000	6	5.33	12.43	1.16	117	.000
Q 3.2	.000	5	4.88	7.10	1.35	119	.000
Q 3.3	.000	6	5.58	16.06	1.07	119	.000
Q 3.4	.000	5.5	5.32	13.21	1.09	119	.000
Q 3.5	.000	5	4.89	7.78	1.26	119	.000
Q 3.6	.000	6	5.27	12.47	1.11	119	.000

Table A-4: Results of Kruskal-Wallis Test for Research and Development

Items	University Category	2006		2010		2015	
		Mean rank	sig	Mean rank	sig	Mean rank	sig
5.1	RAU	84.39	**.000**	93.50	**.000**	90.15	**.000**
	RAU	78.69		90.06		90.76	
	CU	46.86		41.83		46.07	
	FU	45.99		44.77		44.25	
5.2	RAU	90.15	**.000**	90.15	**.000**	86.50	**.000**
	RAU	90.76		90.76		88.53	
	CU	46.07		46.07		40.15	
	FU	44.25		44.25		47.97	
5.3	RAU	81.50	**.000**	85.85	**.000**	88.70	**.000**
	RAU	80.29		92.58		89.10	
	CU	44.04		40.50		39.44	
	FU	49.08		46.88		48.96	
5.4	RAU	81.55	**.000**	82.10	**.000**	81.45	**.000**
	RAU	86.02		89.97		86.53	
	CU	48.27		40.88		41.00	
	FU	42.91		46.88		48.93	
5.5	RAU	85.00	**.000**	83.05	**.000**	80.40	**.000**
	RAU	87.41		93.78		89.33	
	CU	41.50		43.42		40.27	
	FU	41.20		42.77		47.34	
5.6	RAU	85.40	**.000**	89.45	**.000**	90.85	**.000**
	RAU	84.33		89.57		83.13	
	CU	43.04		42.91		42.50	
	FU	45.61		46.15		49.81	
5.7	RAU	76.11	**.000**	71.65	**.000**	73.50	**.000**
	RAU	83.79		90.27		83.50	
	CU	48.58		45.02		46.93	
	FU	43.46		48.64		51.34	

Table A-5: Test of Homogeneity of Variances for Overall Quality of Research and Development

Year	F	Sig.
2006	.892	.666
2010	.863	.713
2015	1.098	.359

Table A-6: Test of Between-Subjects Effects for Overall Quality of Research and Development

2006		2010		2015	
F	sig	F	sig	F	sig
13.642	**.000**	30.351	**.000**	25.827	**.000**

Table A-7: Mean and Standard Deviation for Overall Quality of Research and Development

University Category	2006			2010			2015		
	M	SD	N	M	SD	N	M	SD	N
RAU	4.33	1.50	9	5.80	1.03	10	6.50	0.71	10
RAU	3.94	1.50	31	5.61	0.99	31	6.52	0.72	31
CU	2.56	1.12	25	3.48	1.01	27	4.81	1.18	27
FU	2.52	1.37	50	3.59	1.33	51	4.71	1.24	52

Table A-8: *Post hoc* Comparisons Test (Tukey HSD) for Overall Quality of Research and Development

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: R&D 5.1 (2006)				
RAU	RAU	.40	.483	.843
	CU	1.77	.496	**.003**
	FU	1.81	.462	**.001**
RAU	RAU	-.40	.483	.843
	CU	1.38	.343	**.001**
	FU	1.42	.292	**.000**
CU	RAU	-1.77	.496	**.003**
	RAU	-1.38	.343	**.001**
	FU	.04	.312	.999
FU	RAU	-1.81	.462	**.001**
	RAU	-1.42	.292	**.000**
	CU	-.04	.312	.999
DV: R&D 5.1 (2010)				
RAU	RAU	.19	.414	.969
	CU	2.32	.421	**.000**
	FU	2.21	.394	**.000**
RAU	RAU	-.19	.414	.969
	CU	2.13	.300	**.000**
	FU	2.02	.259	**.000**
CU	RAU	-2.32	.421	**.000**
	RAU	-2.13	.300	**.000**
	FU	-.11	.271	.979
FU	RAU	-2.21	.394	**.000**
	RAU	-2.02	.259	**.000**
	CU	.11	.271	.979
DV: R&D 5.1 (2015)				
RAU	RAU	-.02	.376	1.000
	CU	1.69	.382	**.000**
	FU	1.79	.357	**.000**
RAU	RAU	.02	.376	1.000
	CU	1.70	.272	**.000**
	FU	1.80	.234	**.000**
CU	RAU	-1.69	.382	**.000**
	RAU	-1.70	.272	**.000**
	FU	.10	.245	.975
FU	RAU	-1.79	.357	**.000**
	RAU	-1.80	.234	**.000**
	CU	-.10	.245	.975

Table A-9: Test of Homogeneity of Variances for Quality of Publication

Year	F	Sig.
2006	.980	.530
2010	1.292	.163
2015	1.268	.182

Table A-10: Test of Between-Subjects Effects for Quality of Publication

2006		2010		2015	
F	sig	F	sig	F	sig
16.139	**.000**	31.781	**.000**	23.741	**.000**

Table A-11: Mean and Standard Deviation for Quality of Publication

University Category	2006			2010			2015		
	M	SD	N	M	SD	N	M	SD	N
RAU	4.30	1.12	10	5.40	1.08	10	6.40	1.24	10
RAU	3.90	1.27	31	5.55	1.06	31	6.52	0.89	31
CU	2.40	1.08	25	3.41	0.97	27	4.59	1.19	27
FU	2.49	1.29	49	3.43	1.29	51	4.92	1.25	51

Table A-12: *Post hoc* Comparisons Test (Tukey HSD) for Quality of Publication

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: R&D 5.2 (2006)				
RAU	RAU	.40	.441	.805
	CU	1.90	.454	**.000**
	FU	1.81	.421	**.000**
RAU	RAU	-.40	.441	.805
	CU	1.50	.326	**.000**
	FU	1.41	.278	**.000**
CU	RAU	-1.90	.454	**.000**
	RAU	-1.50	.326	**.000**
	FU	-.09	.298	.990
FU	RAU	-1.81	.421	**.000**
	RAU	-1.41	.278	**.000**
	CU	.09	.298	.990
DV: R&D 5.2 (2010)				
RAU	RAU	-.15	.396	.982
	CU	1.99	.403	**.000**
	FU	1.97	.377	**.000**
RAU	RAU	.15	.396	.982
	CU	2.14	.287	**.000**
	FU	2.12	.248	**.000**
CU	RAU	-1.99	.403	**.000**
	RAU	-2.14	.287	**.000**
	FU	-.02	.259	1.000
FU	RAU	-1.97	.377	**.000**
	RAU	-2.12	.248	**.000**
	CU	.02	.259	1.000
DV: R&D 5.2 (2015)				
RAU	RAU	-.12	.387	.991
	CU	1.81	.394	**.000**
	FU	1.48	.368	**.001**
RAU	RAU	.12	.387	.991
	CU	1.92	.280	**.000**
	FU	1.59	.242	**.000**
CU	RAU	-1.81	.394	**.000**
	RAU	-1.92	.280	**.000**
	FU	-.33	.253	.565
FU	RAU	-1.48	.368	**.001**
	RAU	-1.59	.242	**.000**
	CU	.33	.253	.565

Table A-13: Test of Homogeneity of Variances for Number of Publication

Year	F	Sig.
2006	.753	.857
2010	1.180	.261
2015	2.122	**.002**

Table A-14: Test of Between-Subjects Effects for Number of Publication

2006		2010		2015*	
F	sig	F	sig	F	sig
14.575	**.000**	29.878	**.000**	21.784	**.000**

Table A-15: Mean and Standard Deviation for Number of Publication

University Category	2006			2010			2015*		
	M	SD	N	M	SD	N	M	SD	N
RAU	4.00	1.49	10	5.30	1.06	10	6.50	0.85	10
RAU	3.97	1.47	31	5.65	1.17	31	6.52	0.89	31
CU	2.23	1.14	26	3.19	1.08	27	4.59	1.08	27
FU	2.46	1.33	50	3.46	1.2	52	4.94	1.34	52

*Note: * = violated the homogeneity assumption*

Table A-16: *Post hoc* Comparisons Test (Tukey HSD) for Number of Publication

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: R&D 5.3(2006)				
RAU	RAU	.03	.479	1.000
	CU	1.77	.490	**.003**
	FU	1.54	.456	**.006**
RAU	RAU	-.03	.479	1.000
	CU	1.74	.350	**.000**
	FU	1.51	.301	**.000**
CU	RAU	-1.77	.490	**.003**
	RAU	-1.74	.350	**.000**
	FU	-.23	.319	.889
FU	RAU	-1.54	.456	**.006**
	RAU	-1.51	.301	**.000**
	CU	.23	.319	.889
DV: R&D 5.3 (2010)				
RAU	RAU	-.35	.425	.849
	CU	2.11	.433	**.000**
	FU	1.84	.404	**.000**
RAU	RAU	.35	.425	.849
	CU	2.46	.308	**.000**
	FU	2.18	.265	**.000**
CU	RAU	-2.11	.433	**.000**
	RAU	-2.46	.308	**.000**
	FU	-.28	.277	.752
FU	RAU	-1.84	.404	**.000**
	RAU	-2.18	.265	**.000**
	CU	.28	.277	.752
DV: R&D 5.3 (2015)*				
RAU	RAU	-.02	.391	1.000
	CU	1.91	.398	**.000**
	FU	1.56	.372	**.000**
RAU	RAU	.02	.391	1.000
	CU	1.92	.283	**.000**
	FU	1.57	.244	**.000**
CU	RAU	-1.91	.398	**.000**
	RAU	-1.92	.283	**.000**
	FU	-.35	.255	.521
FU	RAU	-1.56	.372	**.000**
	RAU	-1.57	.244	**.000**
	CU	.35	.255	.521

Table A-17: Test of Homogeneity of Variances for Commercialisation Activities

Year	F	Sig.
2006	1.204	.240
2010	1.013	.479
2015	1.348	.127

Table A-18: Test of Between-Subjects Effects for Commercialisation Activities

2006		2010		2015	
F	sig	F	sig	F	sig
20.956	**.000**	23.140	**.000**	14.982	**.000**

Table A-19: Mean and Standard Deviation for Commercialisation Activities

University Category	2006			2010			2015		
	M	SD	N	M	SD	N	M	SD	N
RAU	3.40	1.35	10	4.40	1.35	10	5.60	1.58	10
RAU	3.70	1.37	30	4.90	1.40	30	5.87	1.22	30
CU	1.83	1.01	24	2.54	1.07	26	3.85	1.00	26
FU	1.85	1.23	33	2.77	1.13	52	4.17	1.31	52

Table A-20: *Post hoc* Comparisons Test (Tukey HSD) for Commercialisation Activities

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: R&D 5.4 (2006)				
RAU	RAU	-.30	.416	.888
	CU	1.57	.429	**.002**
	FU	1.71	.393	**.000**
RAU	RAU	.30	.416	.888
	CU	1.87	.312	**.000**
	FU	2.01	.261	**.000**
CU	RAU	-1.57	.429	**.002**
	RAU	-1.87	.312	**.000**
	FU	.14	.281	.958
FU	RAU	-1.71	.393	**.000**
	RAU	-2.01	.261	**.000**
	CU	-.14	.281	.958
DV: R&D 5.4 (2010)				
RAU	RAU	-.50	.439	.667
	CU	1.86	.448	**.000**
	FU	1.63	.415	**.001**
RAU	RAU	.50	.439	.667
	CU	2.36	.322	**.000**
	FU	2.13	.276	**.000**
CU	RAU	-1.86	.448	**.000**
	RAU	-2.36	.322	**.000**
	FU	-.23	.289	.855
FU	RAU	-1.63	.415	**.001**
	RAU	-2.13	.276	**.000**
	CU	.23	.289	.855
DV: R&D 5.4 (2015)				
RAU	RAU	-.27	.455	.936
	CU	1.75	.463	**.001**
	FU	1.43	.430	**.007**
RAU	RAU	.27	.455	.936
	CU	2.02	.334	**.000**
	FU	1.69	.285	**.000**
CU	RAU	-1.75	.463	**.001**
	RAU	-2.02	.334	**.000**
	FU	-.33	.299	.694
FU	RAU	-1.43	.430	**.007**
	RAU	-1.69	.285	**.000**
	CU	.33	.299	.694

Table A-21: Test of Homogeneity of Variances for Number of Patents

Year	F	Sig.
2006	1.372	.119
2010	1.268	.183
2015	1.425	.089

Table A-22: Test of Between-Subjects Effects for Number of Patents

2006		2010		2015	
F	sig	F	sig	F	sig
34.850	**.000**	34.251	**.000**	22.447	**.000**

Table A-23: Mean and Standard Deviation for Number of Patents

University Category	2006			2010			2015		
	M	SD	N	M	SD	N	M	SD	N
RAU	3.40	0.97	10	4.50	1.43	10	5.60	1.71	10
RAU	3.62	1.08	29	5.10	1.01	29	6.00	1.13	29
CU	1.54	0.88	24	2.54	1.07	26	3.69	0.93	26
FU	1.60	1.05	50	2.56	1.18	52	4.00	1.27	52

Table A-24: *Post hoc* Comparisons Test (Tukey HSD) for Number of Patents

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: R&D 5.5 (2006)				
RAU	RAU	-.22	.353	.924
	CU	1.86	.363	**.000**
	FU	1.80	.334	**.000**
RAU	RAU	.22	.353	.924
	CU	2.08	.266	**.000**
	FU	2.02	.225	**.000**
CU	RAU	-1.86	.363	**.000**
	RAU	-2.08	.266	**.000**
	FU	-.06	.239	.995
FU	RAU	-1.80	.334	**.000**
	RAU	-2.02	.225	**.000**
	CU	.06	.239	.995
DV: R&D 5.5 (2010)				
RAU	RAU	-.60	.415	.470
	CU	1.96	.422	**.000**
	FU	1.94	.391	**.000**
RAU	RAU	.60	.415	.470
	CU	2.56	.306	**.000**
	FU	2.55	.263	**.000**
CU	RAU	-1.96	.422	**.000**
	RAU	-2.56	.306	**.000**
	FU	-.02	.272	1.000
FU	RAU	-1.94	.391	**.000**
	RAU	-2.55	.263	**.000**
	CU	.02	.272	1.000
DV: R&D 5.5 (2015)				
RAU	RAU	-.40	.454	.814
	CU	1.91	.460	**.000**
	FU	1.60	.427	**.002**
RAU	RAU	.40	.454	.814
	CU	2.31	.334	**.000**
	FU	2.00	.287	**.000**
CU	RAU	-1.91	.460	**.000**
	RAU	-2.31	.334	**.000**
	FU	-.31	.297	.729
FU	RAU	-1.60	.427	**.002**
	RAU	-2.00	.287	**.000**
	CU	.31	.297	.729

Table A-25: Test of Homogeneity of Variances for Number Research and Development Cooperation with Industry

Year	F	Sig.
2006	1.045	.432
2010	1.132	.316
2015	.796	.807

Table A-26: Test of Between-Subjects Effects for Research and Development Cooperation with Industry

2006		2010		2015	
F	sig	F	sig	F	sig
19.776	.000	24.077	.000	15.564	.000

Table A-27: Mean and Standard Deviation for Number Research and Development Cooperation with Industry

University Category	2006			2010			2015		
	M	SD	N	M	SD	N	M	SD	N
RAU	3.70	1.16	10	5.00	1.16	10	6.20	1.23	10
RAU	3.70	1.26	30	4.97	0.99	30	5.87	1.11	30
CU	1.84	0.99	25	2.93	0.96	27	4.22	0.93	27
FU	2.02	1.32	51	3.08	1.40	52	4.52	1.28	52

Table A-28: *Post hoc* Comparisons Test (Tukey HSD) for Number Research and Development Cooperation with Industry

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: R&D 5.6 (2006)				
RAU	RAU	.00	.429	1.000
	CU	1.86	.439	**.000**
	FU	1.68	.406	**.000**
RAU	RAU	.00	.429	1.000
	CU	1.86	.318	**.000**
	FU	1.68	.270	**.000**
CU	RAU	-1.86	.439	**.000**
	RAU	-1.86	.318	**.000**
	FU	-.18	.287	.923
FU	RAU	-1.68	.406	**.000**
	RAU	-1.68	.270	**.000**
	CU	.18	.287	.923
DV: R&D 5.6 (2010)				
RAU	RAU	.03	.422	1.000
	CU	2.07	.428	**.000**
	FU	1.92	.399	**.000**
RAU	RAU	-.03	.422	1.000
	CU	2.04	.307	**.000**
	FU	1.89	.265	**.000**
CU	RAU	-2.07	.428	**.000**
	RAU	-2.04	.307	**.000**
	FU	-.15	.274	.946
FU	RAU	-1.92	.399	**.000**
	RAU	-1.89	.265	**.000**
	CU	.15	.274	.946
DV: R&D 5.6 (2015)				
RAU	RAU	.33	.420	.857
	CU	1.98	.426	**.000**
	FU	1.68	.397	**.000**
RAU	RAU	-.33	.420	.857
	CU	1.64	.305	**.000**
	FU	1.35	.264	**.000**
CU	RAU	-1.98	.426	**.000**
	RAU	-1.64	.305	**.000**
	FU	-.30	.273	.697
FU	RAU	-1.68	.397	**.000**
	RAU	-1.35	.264	**.000**
	CU	.30	.273	.697

Table A-29: Test of Homogeneity of Variances for the Ability of Public University to Generate Funding from Research and Development

Year	F	Sig.
2006	.932	.603
2010	1.968	**.005**
2015	1.380	.108

Table A-30: Test of Between-Subjects Effects for the Ability of Public University to Generate Funding from Research and Development

2006		2010*		2015	
F	**sig**	**F**	**sig**	**F**	**sig**
21.585	**.000**	18.757	**.000**	8.395	**.000**

Table A-31: Mean and Standard Deviation for the Ability of Public University to Generate Funding from Research and Development

University Category	2006			2010*			2015		
	M	**SD**	**N**	**M**	**SD**	**N**	**M**	**SD**	**N**
RAU	3.33	1.50	9	4.10	1.66	10	5.20	1.69	10
RAU	3.45	1.20	31	4.90	1.35	31	5.65	1.33	31
CU	2.08	0.95	25	2.89	0.97	27	4.19	1.00	27
FU	1.94	1.11	50	3.00	1.25	52	4.33	1.26	52

*Note: *= violated the homogeneity assumption*

Table A-32: *Post hoc* Comparisons Test (Tukey HSD) for the Ability of Public University to Generate Funding from Research and Development

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: R&D 5.7(2006)				
RAU	RAU	-.31	.397	.861
	CU	1.25	.407	**.014**
	FU	1.39	.379	**.002**
RAU	RAU	.31	.397	.861
	CU	1.57	.282	**.000**
	FU	1.71	.239	**.000**
CU	RAU	-1.25	.407	**.014**
	RAU	-1.57	.282	**.000**
	FU	.14	.257	.948
FU	RAU	-1.39	.379	**.002**
	RAU	-1.71	.239	**.000**
	CU	-.14	.257	.948
DV: R&D 5.7 (2010)*				
RAU	RAU	-.80	.448	.283
	CU	1.21	.456	**.045**
	FU	1.10	.426	.053
RAU	RAU	.80	.448	.283
	CU	2.01	.325	**.000**
	FU	1.90	.280	**.000**
CU	RAU	-1.21	.456	.045
	RAU	-2.01	.325	**.000**
	FU	-.11	.292	.981
FU	RAU	-1.10	.426	.053
	RAU	-1.90	.280	**.000**
	CU	.11	.292	.981
DV: R&D 5.7 (2015)				
RAU	RAU	-.45	.465	.774
	CU	1.01	.474	.146
	FU	.87	.442	.203
RAU	RAU	.45	.465	.774
	CU	1.46	.337	**.000**
	FU	1.32	.290	**.000**
CU	RAU	-1.01	.474	.146
	RAU	-1.46	.337	**.000**
	FU	-.14	.303	.966
FU	RAU	-.87	.442	.203
	RAU	-1.32	.290	**.000**
	CU	.14	.303	.966

Table A-33: Results of Kruskal-Wallis Test for Teaching and Learning

Items	University Category	2006		2010*		2015	
		Mean rank	sig	Mean rank	sig	Mean rank	sig
5.8	RAU	71.60	.075	71.20	**.005**	56.60	.940
	RAU	68.77		75.97		61.92	
	CU	56.87		49.85		57.65	
	FU	51.87		53.47		60.75	
5.9 (A)	RAU	81.50	**.000**	58.50	.769	42.10	**.000**
	RAU	72.79		61.50		40.95	
	CU	61.28		64.80		69.67	
	FU	43.65		56.84		69.97	
5.9 (B)	RAU	81.80	**.000**	87.20	**.000**	77.78	**.000**
	RAU	81.95		90.23		85.94	
	CU	53.98		48.93		49.91	
	FU	41.56		42.16		46.70	
5.9 (C)	RAU	80.80	**.000**	83.20	**.000**	85.72	**.000**
	RAU	82.58		90.27		86.81	
	CU	54.92		45.87		48.74	
	FU	40.90		44.53		45.41	
5.10 (A)	RAU	60.75	**.014**	66.15	**.014**	59.06	.179
	RAU	80.16		71.40		49.65	
	CU	60.86		67.28		68.39	
	FU	44.88		49.39		61.98	
5.10 (B)	RAU	78.65	**.000**	80.30	**.000**	92.28	**.000**
	RAU	81.73		86.47		77.79	
	CU	62.44		57.63		52.61	
	FU	41.15		42.70		47.64	
5.11	RAU	73.15	**.002**	69.80	**.002**	66.50	.283
	RAU	71.98		77.27		68.73	
	CU	60.84		60.35		56.78	
	FU	46.55		48.79		55.35	

**Table A-34: Test of Homogeneity of Variances for Quality of Teaching and
Learning**

Year	F	Sig.
2006	.971	.543
2010	1.152	.294
2015	1.721	**.019**

**Table A-35: Test of Between-Subjects Effects for Quality of Teaching and
Learning**

2006		2010		2015*	
F	sig	F	sig	F	sig
3.306	**.023**	5.124	**.002**	.343	.794

**Table A-36: Mean and Standard Deviation for Quality of Teaching and
Learning**

University Category	2006			2010			2015*		
	M	SD	N	M	SD	N	M	SD	N
RAU	4.30	1.34	10	5.40	1.08	10	6.10	0.99	10
RAU	4.17	1.21	30	5.48	1.06	31	6.29	0.78	31
CU	3.81	0.85	26	4.70	0.72	27	6.15	0.91	27
FU	3.53	1.22	51	4.76	1.01	51	6.22	0.92	51

*Note: *= violated the homogeneity assumption*

Table A-37: *Post hoc* Comparisons Test (Tukey HSD) for Quality of Teaching and Learning

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: T&L 5.8 (2006)				
RAU	RAU	.13	.428	.989
	CU	.49	.436	.673
	FU	.77	.406	.234
RAU	RAU	-.13	.428	.989
	CU	.36	.314	.664
	FU	.64	.270	.091
CU	RAU	-.49	.436	.673
	RAU	-.36	.314	.664
	FU	.28	.283	.758
FU	RAU	-.77	.406	.234
	RAU	-.64	.270	.091
	CU	-.28	.283	.758
DV: T&L 5.8 (2010)				
RAU	RAU	-.08	.356	.995
	CU	.70	.363	.226
	FU	.64	.339	.245
RAU	RAU	.08	.356	.995
	CU	.78*	.258	**.016**
	FU	.72*	.223	**.009**
CU	RAU	-.70	.363	.226
	RAU	-.78*	.258	**.016**
	FU	-.06	.233	.994
FU	RAU	-.64	.339	.245
	RAU	-.72	.223	**.009**
	CU	.06	.233	.994
DV: T&L 5.8 (2015)*				
RAU	RAU	-.19	.314	.930
	CU	-.05	.319	.999
	FU	-.12	.298	.980
RAU	RAU	.19	.314	.930
	CU	.14	.227	.923
	FU	.07	.196	.981
CU	RAU	.05	.319	.999
	RAU	-.14	.227	.923
	FU	-.07	.205	.988
FU	RAU	.12	.298	.980
	RAU	-.07	.196	.981
	CU	.07	.205	.988

Table A-38: Test of Homogeneity of Variances for Number of Undergraduate Students

Year	F	Sig.
2006	1.440	.085
2010	1.050	.425
2015	1.545	**.048**

Table A-39: Test of Between-Subjects Effects for Number of Undergraduate Students

2006		2010		2015*	
F	sig	F	sig	F	sig
11.714	**.000**	1.637	.185	8.244	**.000**

Table A-40: Mean and Standard Deviation for Number of Undergraduate Students

University Category	2006			2010			2015*		
	M	SD	N	M	SD	N	M	SD	N
RAU	4.70	1.25	10	4.60	1.43	10	4.80	1.48	10
RAU	4.16	1.00	31	4.81	0.87	31	4.77	1.38	31
CU	3.84	0.80	25	4.81	0.74	27	5.93	1.11	27
FU	3.10	1.23	50	4.53	1.17	51	5.96	1.04	51

*Note: * = violated the homogeneity assumption*

Table A-41: *Post hoc* Comparisons Test (Tukey HSD) for Number of Undergraduate Students

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: T&L 5.9A (2006)				
RAU	RAU	.54	.390	.514
	CU	.86	.401	.147
	FU	1.60*	.372	**.000**
RAU	RAU	-.54	.390	.514
	CU	.32	.288	.682
	FU	1.06*	.245	**.000**
CU	RAU	-.86	.401	.147
	RAU	-.32	.288	.682
	FU	.74*	.263	**.029**
FU	RAU	-1.60*	.372	**.000**
	RAU	-1.06*	.245	**.000**
	CU	-.74*	.263	**.029**
DV: T&L 5.9A (2010)				
RAU	RAU	-.21	.360	.940
	CU	-.21	.366	.936
	FU	.07	.342	.997
RAU	RAU	.21	.360	.940
	CU	-.01	.260	1.000
	FU	.28	.225	.609
CU	RAU	.21	.366	.936
	RAU	.01	.260	1.000
	FU	.29	.235	.620
FU	RAU	-.07	.342	.997
	RAU	-.28	.225	.609
	CU	-.29	.235	.620
DV: T&L 5.9A (2015)*				
RAU	RAU	.03	.401	1.000
	CU	-1.13*	.408	**.034**
	FU	-1.16*	.381	**.015**
RAU	RAU	-.03	.401	1.000
	CU	-1.15*	.290	**.001**
	FU	-1.19*	.251	**.000**
CU	RAU	1.13*	.408	**.034**
	RAU	1.15*	.290	**.001**
	FU	-.03	.263	.999
FU	RAU	1.16*	.381	**.015**
	RAU	1.19*	.251	**.000**
	CU	.03	.263	.999

Table A-42: Test of Homogeneity of Variances for Number of Postgraduate Students

Year	F	Sig.
2006	1.023	.466
2010	.898	.659
2015	1.280	.172

Table A-43: Test of Between-Subjects Effects for Number of Postgraduate Students

2006		2010		2015	
F	sig	F	sig	F	sig
17.283	**.000**	28.517	**.000**	13.265	**.000**

Table A-44: Mean and Standard Deviation for Number of Postgraduate Students

University Category	2006			2010			2015		
	M	SD	N	M	SD	N	M	SD	N
RAU	4.30	1.42	10	5.40	0.97	10	6.22	1.21	9
RAU	4.13	1.19	31	5.52	0.85	31	6.55	0.62	31
CU	3.08	1.19	25	3.96	0.81	27	5.30	1.20	27
FU	2.48	1.22	50	3.63	1.22	51	5.15	1.23	52

Table A-45: *Post hoc* Comparisons Test (Tukey HSD) for Number of Postgraduate Students

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: T&L 5.9B (2006)				
RAU	RAU	.17	.430	.979
	CU	1.22*	.443	**.034**
	FU	1.82*	.410	**.000**
RAU	RAU	-.17	.430	.979
	CU	1.05*	.318	**.007**
	FU	1.65*	.270	**.000**
CU	RAU	-1.22*	.443	**.034**
	RAU	-1.05*	.318	**.007**
	FU	.60	.290	.170
FU	RAU	-1.82*	.410	**.000**
	RAU	-1.65*	.270	**.000**
	CU	-.60	.290	.170
DV: T&L 5.9B (2010)				
RAU	RAU	-.12	.367	.989
	CU	1.44*	.373	**.001**
	FU	1.77*	.349	**.000**
RAU	RAU	.12	.367	.989
	CU	1.55*	.265	**.000**
	FU	1.89*	.230	**.000**
CU	RAU	-1.44*	.373	**.001**
	RAU	-1.55*	.265	**.000**
	FU	.34	.240	.503
FU	RAU	-1.77*	.349	**.000**
	RAU	-1.89*	.230	**.000**
	CU	-.34	.240	.503
DV: T&L 5.9B (2015)				
RAU	RAU	-.33	.398	.846
	CU	.93	.405	.108
	FU	1.07*	.380	**.029**
RAU	RAU	.33	.398	.846
	CU	1.25*	.277	**.000**
	FU	1.39*	.239	**.000**
CU	RAU	-.93	.405	.108
	RAU	-1.25*	.277	**.000**
	FU	.14	.250	.941
FU	RAU	-1.07*	.380	**.029**
	RAU	-1.39*	.239	**.000**
	CU	-.14	.250	.941

Table A-46: Test of Homogeneity of Variances for Number of International Students

Year	F	Sig.
2006	1.348	.130
2010	1.171	.273
2015	1.661	**.026***

Table A-47: Test of Between-Subjects Effects for Number of International Students

2006		2010		2015*	
F	sig	F	sig	F	sig
21.656	**.000**	30.456	**.000**	16.373	**.000**

Table A-48: Mean and Standard Deviation for Number of International Students

University Category	2006			2010			2015*		
	M	SD	N	M	SD	N	M	SD	N
RAU	3.70	1.42	10	5.00	1.70	10	6.11	1.76	10
RAU	3.74	1.20	31	5.19	1.11	31	6.16	1.13	31
CU	2.64	1.22	25	3.22	1.12	27	4.56	1.31	27
FU	2.04	0.97	50	3.14	1.22	51	4.38	1.29	52

*Note: *= violated the homogeneity assumption*

Table A-49: *Post hoc* Comparisons Test (Tukey HSD) for Number of International Students

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: T&L 5.9C (2006)				
RAU	RAU	-.04	.390	1.000
	CU	1.06*	.401	**.046**
	FU	1.66*	.372	**.000**
RAU	RAU	.04	.390	1.000
	CU	1.10*	.288	**.001**
	FU	1.70*	.245	**.000**
CU	RAU	-1.06*	.401	**.046**
	RAU	-1.10*	.288	**.001**
	FU	.60	.263	.109
FU	RAU	-1.66*	.372	**.000**
	RAU	-1.70*	.245	**.000**
	CU	-.60	.263	.109
DV: T&L 5.9C (2010)				
RAU	RAU	-.19	.409	.965
	CU	1.78*	.416	**.000**
	FU	1.86*	.389	**.000**
RAU	RAU	.19	.409	.965
	CU	1.97*	.296	**.000**
	FU	2.06*	.256	**.000**
CU	RAU	-1.78*	.416	**.000**
	RAU	-1.97*	.296	**.000**
	FU	.08	.268	.989
FU	RAU	-1.86*	.389	**.000**
	RAU	-2.06*	.256	**.000**
	CU	-.08	.268	.989
DV: T&L 5.9C (2015)*				
RAU	RAU	-.05	.493	1.000
	CU	1.56*	.501	**.013**
	FU	1.73*	.470	**.002**
RAU	RAU	.05	.493	1.000
	CU	1.61*	.343	**.000**
	FU	1.78*	.296	**.000**
CU	RAU	-1.56*	.501	**.013**
	RAU	-1.61*	.343	**.000**
	FU	.17	.309	.945
FU	RAU	-1.73*	.470	**.002**
	RAU	-1.78*	.296	**.000**
	CU	-.17	.309	.945

Table A-50: Test of Homogeneity of Variances for Number of Undergraduate Degrees Offered

Year	F	Sig.
2006	1.337	.135
2010	.898	.660
2015	1.051	.424

Table A-51: Test of Between-Subjects Effects for Number of Undergraduate Degrees Offered

2006		2010*		2015	
F	sig	F	sig	F	sig
11.867	**.000**	5.158	**.002**	.911	.438

Table A-52: Mean and Standard Deviation for Number of Undergraduate Degrees Offered

University Category	2006			2010*			2015		
	M	SD	N	M	SD	N	M	SD	N
RAU	3.60	1.08	10	4.80	1.23	10	5.56	1.24	9
RAU	4.10	0.91	31	4.94	0.93	31	5.32	1.05	31
CU	3.44	1.16	25	4.63	1.08	52	5.89	1.16	27
FU	2.82	1.18	51	4.13	1.12	52	5.65	1.17	52

Table A-53: *Post hoc* Comparisons Test (Tukey HSD) for Number of Undergraduate Degrees Offered

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: T&L 5.10A (2006)				
RAU	RAU	-.50	.395	.592
	CU	.16	.407	.979
	FU	.78	.376	.171
RAU	RAU	.50	.395	.592
	CU	.66	.292	.117
	FU	1.27*	.248	**.000**
CU	RAU	-.16	.407	.979
	RAU	-.66	.292	.117
	FU	.62	.265	.099
FU	RAU	-.78	.376	.171
	RAU	-1.27*	.248	**.000**
	CU	-.62	.265	.099
DV: T&L 5.10A (2010)				
RAU	RAU	-.14	.391	.986
	CU	.17	.398	.974
	FU	.67	.371	.282
RAU	RAU	.14	.391	.986
	CU	.31	.283	.702
	FU	.80*	.244	**.007**
CU	RAU	-.17	.398	.974
	RAU	-.31	.283	.702
	FU	.50	.255	.217
FU	RAU	-.67	.371	.282
	RAU	-.80*	.244	**.007**
	CU	-.50	.255	.217
DV: T&L 5.10A (2015)				
RAU	RAU	.23	.420	.945
	CU	-.33	.427	.863
	FU	-.10	.401	.995
RAU	RAU	-.23	.420	.945
	CU	-.57	.292	.219
	FU	-.33	.252	.556
CU	RAU	.33	.427	.863
	RAU	.57	.292	.219
	FU	.24	.263	.809
FU	RAU	.10	.401	.995
	RAU	.33	.252	.556
	CU	-.24	.263	.809

Table A-54: Test of Homogeneity of Variances for Number of Postgraduate Degrees Offered

Year	F	Sig.
2006	.761	.850
2010	1.408	.094
2015	.781	.826

Table A-55: Test of Between-Subjects Effects for Number of Postgraduate Degrees Offered

2006		2010		2015	
F	**sig**	**F**	**sig**	**F**	**sig**
17.717	**.000**	17.717	**.000**	8.543	**.000**

Table A-56: Mean and Standard Deviation for Number of Postgraduate Degrees Offered

University Category	2006			2010			2015		
	M	**SD**	**N**	**M**	**SD**	**N**	**M**	**SD**	**N**
RAU	3.90	1.10	10	5.10	1.20	10	6.44	1.33	9
RAU	3.97	1.02	31	5.59	0.94	31	6.10	0.94	31
CU	3.28	1.17	25	4.22	0.97	27	5.39	0.98	18
FU	2.40	1.17	52	3.58	1.29	52	5.06	1.14	52

Table A-57: *Post hoc* Comparisons Test (Tukey HSD) for Number of Postgraduate Degrees Offered

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: T&L 5.10B (2006)				
RAU	RAU	-.07	.399	.998
	CU	.62	.410	.434
	FU	1.50*	.378	**.001**
RAU	RAU	.07	.399	.998
	CU	.69	.295	.097
	FU	1.56*	.249	**.000**
CU	RAU	-.62	.410	.434
	RAU	-.69	.295	.097
	FU	.88*	.267	**.007**
FU	RAU	-1.50*	.378	**.001**
	RAU	-1.56*	.249	**.000**
	CU	-.88*	.267	**.007**
DV: T&L 5.10B (2010)				
RAU	RAU	-.19	.408	.966
	CU	.88	.415	.155
	FU	1.52*	.387	**.001**
RAU	RAU	.19	.408	.966
	CU	1.07*	.295	**.003**
	FU	1.71*	.254	**.000**
CU	RAU	-.88	.415	.155
	RAU	-1.07*	.295	**.003**
	FU	.65	.266	.078
FU	RAU	-1.52*	.387	**.001**
	RAU	-1.71*	.254	**.000**
	CU	-.65	.266	.078
DV: T&L 5.10B (2015)				
RAU	RAU	.35	.408	.829
	CU	1.19*	.415	**.026**
	FU	1.39*	.389	**.003**
RAU	RAU	-.35	.408	.829
	CU	.84*	.284	**.020**
	FU	1.04*	.245	**.000**
CU	RAU	-1.19*	.415	**.026**
	RAU	-.84*	.284	**.020**
	FU	.20	.256	.860
FU	RAU	-1.39*	.389	**.003**
	RAU	-1.04*	.245	**.000**
	CU	-.20	.256	.860

Table A-58: Test of Homogeneity of Variances for Development of Infrastructure

Year	F	Sig.
2006	.788	.815
2010	.922	.622
2015	.768	.842

Table A-59: Test of Between-Subjects Effects for Development of Infrastructure

2006		2010		2015	
F	sig	F	sig	F	sig
8.401	**.000**	6.281	**.001**	.502	.682

Table A-60: Mean and Standard Deviation for Development of Infrastructure

University Category	2006			2010			2015		
	M	SD	N	M	SD	N	M	SD	N
RAU	4.10	1.20	10	5.10	1.20	10	6.00	1.32	9
RAU	4.07	1.08	30	5.32	1.16	31	6.03	1.35	31
CU	3.68	1.22	25	4.78	0.93	27	5.81	0.96	27
FU	2.97	1.06	32	4.31	1.18	52	5.69	1.16	52

Table A-61: *Post hoc* Comparisons Test (Tukey HSD) for Development of Infrastructure

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: T&L 5.11 (2006)				
RAU	RAU	.03	.385	1.000
	CU	.42	.395	.712
	FU	1.00*	.365	**.035**
RAU	RAU	-.03	.385	1.000
	CU	.39	.286	.532
	FU	.97*	.243	**.001**
CU	RAU	-.42	.395	.712
	RAU	-.39	.286	.532
	FU	.58	.258	.115
FU	RAU	-1.00*	.365	**.035**
	RAU	-.97*	.243	**.001**
	CU	-.58	.258	.115
DV: T&L 5.11 (2010)				
RAU	RAU	-.22	.384	.938
	CU	.32	.391	.843
	FU	.79	.365	.137
RAU	RAU	.22	.384	.938
	CU	.54	.278	.210
	FU	1.01*	.240	**.000**
CU	RAU	-.32	.391	.843
	RAU	-.54	.278	.210
	FU	.47	.250	.244
FU	RAU	-.79	.365	.137
	RAU	-1.01*	.240	**.000**
	CU	-.47	.250	.244
DV: T&L 5.11 (2015)				
RAU	RAU	-.03	.437	1.000
	CU	.19	.444	.975
	FU	.31	.416	.881
RAU	RAU	.03	.437	1.000
	CU	.22	.304	.890
	FU	.34	.262	.565
CU	RAU	-.19	.444	.975
	RAU	-.22	.304	.890
	FU	.12	.274	.970
FU	RAU	-.31	.416	.881
	RAU	-.34	.262	.565
	CU	-.12	.274	.970

Table A-62: Results of Kruskal-Wallis Test for Strategic Planning

Items	University Category	2006		2010		2015	
		Mean rank	sig	Mean rank	sig	Mean rank	sig
5.12	RAU	72.60	**.000**	69.90	**.000**	64.56	**.009**
	RAU	81.47		85.52		76.79	
	CU	48.68		53.31		54.17	
	FU	47.74		46.09		52.23	
5.13 (A)	RAU	76.00	**.000**	74.10	**.000**	70.50	**.000**
	RAU	80.31		87.31		80.52	
	CU	49.96		53.24		51.83	
	FU	47.15		45.67		50.19	
5.13 (B)	RAU	76.85	**.000**	65.60	**.000**	71.44	**.006**
	RAU	78.65		84.95		75.42	
	CU	53.50		51.59		50.78	
	FU	46.25		49.57		52.33	

Table A-63: Test of Homogeneity of Variances for Ability of Public Universities to Generate Funding from Internal Resources

Year	F	Sig.
2006	1.022	.466
2010	1.532	.124
2015	1.043	.435

Table A-64: Test of Between-Subjects Effects for Ability of Public Universities to Generate Funding from Internal Resources

2006		2010		2015	
F	sig	F	sig	F	sig
13.682	**.000**	14.178	**.000**	3.469	**.019**

Table A-65: Mean and Standard Deviation for Ability of Public Universities to Generate Funding from Internal Resources

University Category	2006			2010			2015		
	M	SD	N	M	SD	N	M	SD	N
RAU	3.50	0.97	10	4.50	0.97	10	5.33	1.50	9
RAU	3.84	1.13	31	5.06	1.24	31	5.82	1.20	31
CU	2.68	0.99	25	3.85	1.06	27	5.04	1.09	27
FU	2.63	1.18	51	3.57	1.24	51	4.90	1.39	52

Table A-66: *Post hoc* **Comparisons Test (Tukey HSD) for Ability of Public Universities to Generate Funding from Internal Resources**

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: SP 5.12 (2006)				
RAU	RAU	-.34	.377	.806
	CU	.82	.388	.155
	FU	.87	.358	.077
RAU	RAU	.34	.377	.806
	CU	1.16	.279	**.000**
	FU	1.21	.236	**.000**
CU	RAU	-.82	.388	.155
	RAU	-1.16	.279	**.000**
	FU	.05	.253	.997
FU	RAU	-.87	.358	.077
	RAU	-1.21	.236	**.000**
	CU	-.05	.253	.997
DV: SP 5.12 (2010)				
RAU	RAU	-.56	.410	.516
	CU	.65	.417	.409
	FU	.93	.390	.085
RAU	RAU	.56	.410	.516
	CU	1.21	.297	**.000**
	FU	1.50	.257	**.000**
CU	RAU	-.65	.417	.409
	RAU	-1.21	.297	**.000**
	FU	.28	.268	.717
FU	RAU	-.93	.390	.085
	RAU	-1.50	.257	**.000**
	CU	-.28	.268	.717
DV: SP 5.12 (2015)				
RAU	RAU	-.47	.493	.773
	CU	.30	.501	.935
	FU	.43	.470	.798
RAU	RAU	.47	.493	.773
	CU	.77	.343	.118
	FU	.90	.295	**.015**
CU	RAU	-.30	.501	.935
	RAU	-.77	.343	.118
	FU	.13	.309	.973
FU	RAU	-.43	.470	.798
	RAU	-.90	.295	**.015**
	CU	-.13	.309	.973

Table A-67: Test of Homogeneity of Variances for Ability of Public Universities to Generate Funding from Internal Resources to Support the Operational Expenditure

Year	F	Sig.
2006	1.164	.282
2010	1.236	.207
2015	1.725	**.019**

Table A-68: Test of Between-Subjects Effects for Ability of Public Universities to Generate Funding from Internal Resources to Support the Operational Expenditure

2006		2010		2015*	
F	sig	F	sig	F	sig
12.871	**.000**	12.837	**.000**	6.045	**.001**

Table A-69: Mean and Standard Deviation for Ability of Public Universities to Generate Funding from Internal Resources to Support the Operational Expenditure

University Category	2006			2010			2015*		
	M	SD	N	M	SD	N	M	SD	N
RAU	3.60	0.97	10	4.60	1.08	10	5.44	1.42	9
RAU	3.77	1.20	31	5.06	1.29	31	5.84	1.24	31
CU	2.64	1.11	25	3.74	1.10	27	4.67	1.27	27
FU	2.53	1.19	51	3.38	1.32	52	4.60	1.39	52

*Note: *= violated the homogeneity assumption*

Table A-70: *Post hoc* **Comparisons Test (Tukey HSD) for Ability of Public Universities to Generate Funding from Internal Resources to Support the Operational Expenditure**

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: SP 5.13A (2006)				
RAU	RAU	-.17	.401	.972
	CU	.96	.413	.099
	FU	1.07	.381	**.030**
RAU	RAU	.17	.401	.972
	CU	1.13	.297	**.001**
	FU	1.24	.251	**.000**
CU	RAU	-.96	.413	.099
	RAU	-1.13	.297	**.001**
	FU	.11	.269	.977
FU	RAU	-1.07	.381	**.030**
	RAU	-1.24	.251	**.000**
	CU	-.11	.269	.977
DV: SP 5.13A (2010)				
RAU	RAU	-.46	.449	.730
	CU	.86	.457	.243
	FU	1.22	.427	**.027**
RAU	RAU	.46	.449	.730
	CU	1.32	.325	**.001**
	FU	1.68	.280	**.000**
CU	RAU	-.86	.457	.243
	RAU	-1.32	.325	**.001**
	FU	.36	.293	.619
FU	RAU	-1.22	.427	**.027**
	RAU	-1.68	.280	**.000**
	CU	-.36	.293	.619
DV: SP 5.13A (2015)*				
RAU	RAU	-.39	.506	.864
	CU	.78	.514	.434
	FU	.85	.482	.299
RAU	RAU	.39	.506	.864
	CU	1.17	.352	**.006**
	FU	1.24	.303	**.000**
CU	RAU	-.78	.514	.434
	RAU	-1.17	.352	**.006**
	FU	.07	.317	.996
FU	RAU	-.85	.482	.299
	RAU	-1.24	.303	**.000**
	CU	-.07	.317	.996

Table A-71: Test of Homogeneity of Variances for Ability of Malaysian Public Universities to Generate Funding from Internal Resources to Support the Development Expenditure

Year	F	Sig.
2006	1.234	.212
2010	.864	.712
2015	.672	.934

Table A-72: Test of Between-Subjects Effects for Ability of Malaysian Public Universities to Generate Funding from Internal Resources to Support the Development Expenditure

2006		2010		2015	
F	sig	F	sig	F	sig
11.761	**.000**	11.391	**.000**	5.245	**.002**

Table A-73: Mean and Standard Deviation for Ability of Malaysian Public Universities to Generate Funding from Internal Resources to Support the Development Expenditure

University Category	2006			2010			2015		
	M	SD	N	M	SD	N	M	SD	N
RAU	3.70	0.82	10	4.20	0.63	10	5.44	1.44	9
RAU	3.81	1.08	31	4.94	0.99	31	5.58	1.18	31
CU	2.92	1.19	25	3.78	1.16	27	4.70	1.14	27
FU	2.61	1.19	51	3.60	1.29	52	4.73	1.27	51

Table A-74: *Post hoc* Comparisons Test (Tukey HSD) for Ability of Malaysian Public Universities to Generate Funding from Internal Resources to Support the Development Expenditure

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: SP 5.13B (2006)				
RAU	RAU	-.11	.389	.993
	CU	.78	.400	.213
	FU	1.09	.369	**.020**
RAU	RAU	.11	.389	.993
	CU	.89	.287	**.014**
	FU	1.20	.243	**.000**
CU	RAU	-.78	.400	.213
	RAU	-.89	.287	**.014**
	FU	.31	.261	.630
FU	RAU	-1.09	.369	**.020**
	RAU	-1.20	.243	**.000**
	CU	-.31	.261	.630
DV: SP 5.13B (2010)				
RAU	RAU	-.74	.401	.264
	CU	.42	.408	.730
	FU	.60	.381	.391
RAU	RAU	.74	.401	.264
	CU	1.16	.290	**.001**
	FU	1.34	.250	**.000**
CU	RAU	-.42	.408	.730
	RAU	-1.16	.290	**.001**
	FU	.18	.262	.899
FU	RAU	-.60	.381	.391
	RAU	-1.34	.250	**.000**
	CU	-.18	.262	.899
DV: SP 5.13B (2015)				
RAU	RAU	-.14	.439	.990
	CU	.74	.447	.351
	FU	.72	.420	.322
RAU	RAU	.14	.439	.990
	CU	.88	.305	**.025**
	FU	.86	.264	**.009**
CU	RAU	-.74	.447	.351
	RAU	-.88	.305	**.025**
	FU	-.02	.276	1.000
FU	RAU	-.72	.420	.322
	RAU	-.86	.264	**.009**
	CU	.02	.276	1.000

Table A-75: Results of One-sample Wilcoxon Signed Rank Test and One-sample T-test for Plan Imposed in Accordance with the National Higher Education Strategic Plan

| Item | One-sample Wilcoxon Signed Rank Test | | One-sample T-test | | | | |
	Sig	Median	Mean	t	Sd	df	Sig
Q 4.1	**.000**	6	5.39	13.55	1.13	119	**.000**
Q 4.2	**.000**	6	5.41	14.93	1.03	119	**.000**
Q 4.3	**.000**	6	5.68	18.21	1.01	119	**.000**
Q 4.4	**.000**	6	5.58	17.19	1.01	119	**.000**
Q 4.5	**.000**	6	5.42	14.90	1.04	119	**.000**
Q 4.6	**.000**	6	5.58	18.11	0.96	119	**.000**

Table A-76: Results of Kruskal-Wallis Test for Plan Imposed on Expanding the Government Objectives

Items	University Category	2006		2010		2015	
		Mean rank	sig	Mean rank	sig	Mean rank	sig
5.14 (A)	RAU	58.20	**.000**	63.90	**.000**	79.05	**.017**
	RAU	80.71		84.97		70.67	
	CU	55.62		51.30		54.09	
	FU	46.22		48.71		52.32	
5.14 (B)	RAU	67.60	**.001**	56.20	**.017**	48.10	.226
	RAU	77.26		76.85		69.82	
	CU	56.86		54.83		59.85	
	FU	48.63		54.52		57.66	
5.14 (C)	RAU	77.30	**.000**	84.65	**.000**	73.50	**.000**
	RAU	82.39		87.85		83.15	
	CU	52.20		48.74		45.94	
	FU	45.94		45.65		52.06	
5.14 (D)	RAU	66.10	**.000**	63.95	**.000**	53.85	**.013**
	RAU	79.87		83.13		76.20	
	CU	50.18		50.93		49.87	
	FU	49.84		50.61		57.10	
5.14 (E)	RAU	82.35	**.000**	78.70	**.000**	62.80	**.002**
	RAU	80.92		88.55		79.18	
	CU	48.42		48.50		48.26	
	FU	46.28		46.51		55.28	
5.14 (F)	RAU	76.10	**.000**	66.50	**.000**	54.05	**.001**
	RAU	77.73		84.11		75.89	
	CU	45.02		42.41		41.87	
	FU	51.12		54.66		62.24	

Table A-77: Test of Homogeneity of Variances for Widening Access and Enhancing Quality

Year	F	Sig.
2006	1.171	.276
2015 versus 2006	.630	.958

Table A-78: Test of Between-Subjects Effects for Widening Access and Enhancing Quality

2006		2015 - 2006	
F	sig	F	sig
11.254	**.000**	3.170	**.028**

Table A-79: Mean and Standard Deviation for Widening Access and Enhancing Quality

University Category	2006			2015 - 2006		
	M	SD	N	M	SD	N
RAU	3.40	1.27	10	2.80	1.39	10
RAU	4.24	0.99	29	1.76	1.62	29
CU	3.40	1.04	25	2.24	.92	25
FU	2.90	1.25	51	2.51	1.24	51

Table A-80: *Post hoc* Comparisons Test (Tukey HSD) for Widening Access and Enhancing Quality

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: Government objective 5.14A (2006)				
RAU	RAU	-.84	.410	.177
	CU	.00	.419	1.000
	FU	.50	.387	.574
RAU	RAU	.84	.410	.177
	CU	.84*	.305	**.035**
	FU	1.34*	.260	**.000**
CU	RAU	.00	.419	1.000
	RAU	-.84*	.305	**.035**
	FU	.50	.273	.269
FU	RAU	-.50	.387	.574
	RAU	-1.34*	.260	**.000**
	CU	-.50	.273	.269
DV: Government objective 5.14A (2015 versus 2006)				
RAU	RAU	1.04	.476	.133
	CU	.56	.485	.657
	FU	.29	.449	.916
RAU	RAU	-1.04	.476	.133
	CU	-.48	.354	.528
	FU	-.75	.302	.068
CU	RAU	-.56	.485	.657
	RAU	.48	.354	.528
	FU	-.27	.317	.829
FU	RAU	-.29	.449	.916
	RAU	.75	.302	.068
	CU	.27	.317	.829

Table A-81: Test of Homogeneity of Variances for Improving the Objectives on Quality of Teaching and Learning

Year	F	Sig.
2006	.904	.649
2015 versus 2006	.564	.985

Table A-82: Test of Between-Subjects Effects for Improving the Objectives on Quality of Teaching and Learning

2006		2015 - 2006	
F	sig	F	sig
9.958	**.000**	4.767	**.004**

Table A-83: Mean and Standard Deviation for Improving the Objectives on Quality of Teaching and Learning

University Category	2006			2015 - 2006		
	M	SD	N	M	SD	N
RAU	4.60	1.51	10	1.50	1.18	10
RAU	5.29	0.86	31	2.23	1.09	31
CU	4.67	0.78	27	2.52	1.12	25
FU	4.54	1.09	52	2.81	1.25	52

Table A-84: *Post hoc* Comparisons Test (Tukey HSD) for Improving the Objectives on Quality of Teaching and Learning

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: Government objective 5.14B (2006)				
RAU	RAU	-.33	.386	.829
	CU	.28	.397	.895
	FU	.70	.366	.225
RAU	RAU	.33	.386	.829
	CU	.61	.285	.148
	FU	1.03*	.241	**.000**
CU	RAU	-.28	.397	.895
	RAU	-.61	.285	.148
	FU	.42	.258	.360
FU	RAU	-.70	.366	.225
	RAU	-1.03*	.241	**.000**
	CU	-.42	.258	.360
DV: Government objective 5.14B (2015 versus 2006)				
RAU	RAU	-.73	.393	.257
	CU	-1.02	.404	.062
	FU	-1.31*	.373	**.004**
RAU	RAU	.73	.393	.257
	CU	-.29	.290	.742
	FU	-.58	.245	.089
CU	RAU	1.02	.404	.062
	RAU	.29	.290	.742
	FU	-.29	.263	.694
FU	RAU	1.31*	.373	**.004**
	RAU	.58	.245	.089
	CU	.29	.263	.694

Table A-85: Test of Homogeneity of Variances for Enhancing Research and Innovation

Year	F	Sig.
2006	1.381	.109
2015 versus 2006	2.162	**.002***

Table A-86: Test of Between-Subjects Effects for Enhancing Research and Innovation

2006		2015 – 2006*	
F	sig	F	sig
14.453	**.000**	2.553	0.59

Table A-87: Mean and Standard Deviation for Enhancing Research and Innovation

University Category	2006			2015 – 2006*		
	M	SD	N	M	SD	N
RAU	4.00	1.16	10	2.00	1.25	10
RAU	4.10	1.01	31	2.48	.96	31
CU	3.24	1.23	25	2.24	1.54	25
FU	2.83	1.16	52	2.83	1.29	52

*Note: * = violated the homogeneity assumption*

Table A-88: *Post hoc* Comparisons Test (Tukey HSD) for Enhancing Research and Innovation

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: Government objective 5.14C (2006)				
RAU	RAU	-.10	.382	.994
	CU	.76	.393	.221
	FU	1.17*	.363	**.009**
RAU	RAU	.10	.382	.994
	CU	.86*	.283	**.016**
	FU	1.27*	.239	**.000**
CU	RAU	-.76	.393	.221
	RAU	-.86*	.283	**.016**
	FU	.41	.256	.375
FU	RAU	-1.17*	.363	**.009**
	RAU	-1.27*	.239	**.000**
	CU	-.41	.256	.375

Table A-89: Test of Homogeneity of Variances for Improving the Objective of Strengthening HEIs

Year	F	Sig.
2006	1.396	.103
2015 versus 2006	1.219	.226

Table A-90: Test of Between-Subjects Effects for Improving the Objective of Strengthening HEIs

2006		2015 - 2006	
F	sig	F	sig
10.883	**.000**	3.491	**.018**

Table A-91: Mean and Standard Deviation for Improving the Objective of Strengthening HEIs

University Category	2006			2015 - 2006		
	M	SD	N	M	SD	N
RAU	3.80	0.92	10	1.60	1.65	10
RAU	4.10	0.92	30	2.33	1.03	30
CU	3.32	0.90	25	2.48	.82	25
FU	3.15	1.11	52	2.71	1.19	52

Table A-92: *Post hoc* **Comparisons Test (Tukey HSD) for Improving the Objective of Strengthening HEIs**

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: Government objective 5.14D (2006)				
RAU	RAU	-.30	.344	.820
	CU	.48	.353	.527
	FU	.65	.326	.201
RAU	RAU	.30	.344	.820
	CU	.78*	.255	**.015**
	FU	.95*	.216	**.000**
CU	RAU	-.48	.353	.527
	RAU	-.78*	.255	**.015**
	FU	.17	.230	.887
FU	RAU	-.65	.326	.201
	RAU	-.95*	.216	**.000**
	CU	-.17	.230	.887
DV: Government objective 5.14D (2015 versus 2006)				
RAU	RAU	-.73	.397	.258
	CU	-.88	.407	.141
	FU	-1.11*	.376	**.020**
RAU	RAU	.73	.397	.258
	CU	-.15	.295	.959
	FU	-.38	.249	.431
CU	RAU	.88	.407	.141
	RAU	.15	.295	.959
	FU	-.23	.265	.818
FU	RAU	1.11*	.376	**.020**
	RAU	.38	.249	.431
	CU	.23	.265	.818

Table A-93: Test of Homogeneity of Variances for Expending the Objective of Intensifying Internationalisation

Year	F	Sig.
2006	.761	.849
2015 versus 2006	1.133	.317

Table A-94: Test of Between-Subjects Effects for Expending the Objective of Intensifying Internationalisation

2006		2015 - 2006	
F	**sig**	**F**	**sig**
16.126	**.000**	4.160	**.008**

Table A-95: Mean and Standard Deviation for Expending the Objective of Intensifying Internationalisation

University Category	2006			2015 - 2006		
	M	**SD**	**N**	**M**	**SD**	**N**
RAU	4.20	1.23	10	1.40	1.58	10
RAU	4.06	1.09	31	2.39	1.05	31
CU	2.96	0.98	25	2.52	.770	25
FU	2.82	1.05	51	2.92	1.32	51

Table A-96: *Post hoc* Comparisons Test (Tukey HSD) for Expending the Objective of Intensifying Internationalisation

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: Government objective 5.14E (2006)				
RAU	RAU	.14	.366	.983
	CU	1.24*	.376	**.007**
	FU	1.38*	.348	**.001**
RAU	RAU	-.14	.366	.983
	CU	1.10*	.270	**.000**
	FU	1.24*	.229	**.000**
CU	RAU	-1.24*	.376	**.007**
	RAU	-1.10*	.270	**.000**
	FU	.14	.246	.945
FU	RAU	-1.38*	.348	**.001**
	RAU	-1.24*	.229	**.000**
	CU	-.14	.246	.945
DV: Government objective 5.14E (2015 versus 2006)				
RAU	RAU	-.99	.417	.090
	CU	-1.12	.429	**.050**
	FU	-1.52*	.397	**.001**
RAU	RAU	.99	.417	.090
	CU	-.13	.308	.973
	FU	-.53	.261	.178
CU	RAU	1.12	.429	**.050**
	RAU	.13	.308	.973
	FU	-.40	.280	.481
FU	RAU	1.52*	.397	**.001**
	RAU	.53	.261	.178
	CU	.40	.280	.481

Table A-97: Test of Homogeneity of Variances for Expanding the Objective of Enculturation of Lifelong Learning

Year	F	Sig.
2006	.561	.985
2015 versus 2006	1.426	.090

Table A-98: Test of Between-Subjects Effects for Expanding the Objective of Enculturation of Lifelong Learning

2006		2015 - 2006	
F	sig	F	sig
9.536	**.000**	6.055	**.001**

Table A-99: Mean and Standard Deviation for Expanding the Objective of Enculturation of Lifelong Learning

University Category	2006			2015 - 2006		
	M	SD	N	M	SD	N
RAU	3.90	0.99	10	1.40	1.51	10
RAU	3.94	1.03	31	2.35	.98	31
CU	2.92	0.91	25	2.36	.70	25
FU	3.04	1.11	51	2.88	1.16	51

Table A-100: *Post hoc* Comparisons Test (Tukey HSD) for Expanding the Objective of Enculturation of Lifelong Learning

(I) University category	(J) University category	Mean Difference (I-J)	Std. Error	Sig.
DV: Government objective 5.14F (2006)				
RAU	RAU	-.04	.363	1.000
	CU	.98*	.373	**.048**
	FU	.86	.345	.066
RAU	RAU	.04	.363	1.000
	CU	1.02*	.268	**.001**
	FU	.90*	.227	**.001**
CU	RAU	-.98*	.373	**.048**
	RAU	-1.02*	.268	**.001**
	FU	-.12	.243	.961
FU	RAU	-.86	.345	.066
	RAU	-.90*	.227	**.001**
	CU	.12	.243	.961
DV: Government objective 5.14F (2015 versus 2006)				
RAU	RAU	-.95	.381	.065
	CU	-.96	.392	.074
	FU	-1.48*	.362	**.000**
RAU	RAU	.95	.381	.065
	CU	-.01	.282	1.000
	FU	-.53	.239	.127
CU	RAU	.96	.392	.074
	RAU	.01	.282	1.000
	FU	-.52	.256	.180
FU	RAU	1.48*	.362	**.000**
	RAU	.53	.239	.127
	CU	.52	.256	.180

1. Strategic Planning

Results for questions 1.1 to 1.14 using Likert scale value ranging from (1) 'strongly disagree' to (7) 'strongly agree' were shown in Table App.1.1.

Table App. 1.1: The Impact of Government Funding Reforms on Strategic Planning

No.	Questions	Mean
1.1	Improved direction of the university towards the desired goals of the government.	5.89
1.2	Improved strategic planning focus to increase responsiveness in line with government objectives.	5.94
1.3	Improved the operation and planning process for information in line with government objectives.	5.92
1.4	Greater alignment between government strategic planning and institutional strategic planning.	6.03
1.5	Increased accountability of your institutions to meet government objectives.	6.04
1.6	Better alignment of institutional objectives with government objectives.	6.08
1.7	Provides incentives for improving academic performance, quality, and efficiency to better align with government objectives.	5.83
1.8	Improves the use of performance indicators to align with government objectives.	5.88
1.9	Monitors institutional performance according to government objectives.	5.86
1.10	Provides fast and flexible analysis and reporting of data to assist accurate strategic decisions.	5.68
1.11	Produces quality and timely information relevant to government requirements.	5.63
1.12	Establish steering mechanisms to ensure that government policy goals and objectives are addressed accordingly.	5.70
1.13	Improved financial resources' strategy in accordance with government objectives.	5.65
1.14	Increased use of internal resources as part of the strategy to generate funding according to government objectives.	5.63

Respondents were asked to indicate their agreement and disagreement on the impact of government funding reforms on the strategic planning. The mean scores indicated

that the respondents agreed to each statement on the impact of government funding reforms in Malaysian public universities (as stated in the National Higher Education Strategic Plan 2020 and the National Higher Education Action Plan 2007-2010) and improved the approach on strategic planning. The mean score for questions 1.4, 1.5, and 1.6 were at 6.03, 6.04 and 6.08. Overall, the results showed that the mean score were above four on the scale and clearly support each of the statement.

Meanwhile, questions 5.12 to 5.13B in the table below indicated questions with Likert scale value ranging from (1) 'well below 2009 national average' to 'well above 2009 at national average.

Table App. 1.2: Personal Opinions and Knowledge of the Impact of Government Funding Reforms on Strategic Planning

No. Questions	Mean
How do you rate the ability of your institution to generate funding from internal resources in accordance to the National Higher Education Strategic Plan beyond 2020?	
5.12 (2006)	3.03
5.12 (Now)	4.10
5.12 (2015)	5.20
How do you rate the ability of your institution to generate funding from internal resources in accordance to the National Higher Education Strategic Plan beyond 2020 from:	
Operational expenditure	
5.13A (2006)	2.97
5.13A (Now)	4.00
5.13A (2015)	5.00
How do you rate the ability of your institution to generate funding from internal resources in accordance to the National Higher Education Strategic Plan beyond 2020 from:	
Development expenditure	
5.13B (2006)	3.09
5.13B (Now)	4.03
5.13B (2015)	5.00

The table above indicates that the mean scores for each statement of questions in 2006 were below the level of 2009 national average. Meanwhile, for 2010 the

perception for each statement falls at the level of 2009 national average. The mean score for 2015 (expected outcome) were above four.

In summary, the results indicated that the implementations of funding reforms are expected to improve the Malaysian public universities strategic planning in line with the government objectives.

2. Research and Development

The following table presents the results in measuring the degree of agreement and disagreement with the impact of government funding reforms in Malaysian public universities on the approach to research and development. The primary results indicated the strong agreement on all items with mean scores were above five and the majority of the respondents agreed that steps taken to introduce funding reforms by the government improved their research and development activities.

Table App. 1.3: The Impact of Government Funding Changes on Research and Development

No.	Questions	Mean
2.1	Improved overall R&D quality	5.48
2.2	Improved quality of publication	5.39
2.3	Increased number of publications	5.41
2.4	Improved extent of commercialisation	5.43
2.5	Increased R&D cooperation with industry	5.41
2.6	Improved research performance	5.53
2.7	Increased number of patents	5.29

Table 1.3 shows the questions on the survey questionnaire for Likert scale value ranging from (1) 'well below 2009 national average' to 'well above 2009 national average for research and development.

Table App. 1.4: Personal Opinions and Knowledge on the Impact of Government Funding Changes on Research and Development

No.	Questions	Mean
	How do you rate the overall quality of R&D in your university?	
5.1 (2006)		3.05
5.1 (Now)		4.28
5.1 (2015)		5.35
	How do you rate the quality of publications in your university?	
5.2 (2006)		3.01
5.2 (Now)		4.14
5.2 (2015)		5.39
	How do you rate the number of publications in your university?	
5.3 (2006)		2.94
5.3 (Now)		4.12
5.3 (2015)		5.40
	How do you rate the extent of commercialisation in your university?	
5.4 (2006)		2.39
5.4 (Now)		3.40
5.4 (2015)		4.65
	How do you rate the number of patents generated at your university?	
5.5 (2006)		2.27
5.5 (Now)		3.35
5.5 (2015)		4.56
	How do you rate the R&D cooperation with industry at your university?	
5.6 (2006)		2.56
5.6 (Now)		3.68
5.6 (2015)		4.93
	How do you evaluate the ability of your university to generate funding for R&D through collaboration with the industry?	
5.7 (2006)		2.54
5.7 (Now)		3.56
5.7 (2015)		4.71

The mean scores for each statement for questions in 2006 were below the levels of 2009 national average. Meanwhile, for 2010 the perception for each statement falls at the level of 2009 national average except for questions 5.4 (3.40), 5.5 (3.35), 5.6 (3.68) and 5.7 (3.56). The mean score for 2015 (expected outcome) were at and above four.

3.   Teaching and Learning

This part summarises results with reference to descriptive statistics to analyse respondents agreement and disagreement with each statement on the impact of government funding reforms in Malaysian public universities (as stated in the National Higher Education Strategic Plan 2020 and the National Higher Education Action Plan 2007-2010) on the approach to teaching and learning.

Table App. 1.5: The Impact of Government Funding Reforms on Teaching and Learning

No	Questions	Mean
3.1	Improved overall quality of T&L	5.33
3.2	Increased the number of undergraduate students	4.88
3.3	Increased the number of postgraduate students	5.58
3.4	Increased the number of international students	5.32
3.5	Increased the number of undergraduate degrees	4.89
3.6	Increased the number of postgraduate degrees	5.27

Overall, the average mean scores for six items were at 5.21 which indicate that respondents somewhat agreed with changes in government funding gave an impact to improve the teaching and learning. Hence, the respondents support each of the statement related to teaching and learning.

Table App. 1.6 summarises the mean scores on respondents' opinions and knowledge on the impact of government funding changes on teaching and learning

Table App. 1.6: Personal Opinions and Knowledge of the Impact of Government Funding Changes on Teaching and Learning

No	Questions	Mean
How do you rate the quality of T&L in your university?		
5.8 (2006)		3.82
5.8 (Now)		4.99
5.8 (2015)		6.21
In relation to T&L in your institution, how do you rate the number of students held/to be held under the following categories:		
Undergraduate students.		
5.9A (2006)		3.68
5.9A (Now)		4.67
5.9A (2015)		5.55
Postgraduate students		
5.9B (2006)		3.21
5.9B (Now)		4.34
5.9B (2015)		5.63
International students		
5.9C (2006)		2.77
5.9C (Now)		3.85
5.9C (2015)		5.02
In relation to T&L in your institution, how do you rate the number of degrees offered under the following categories?		
Undergraduate degrees		
5.10A (2006)		3.36
5.10A (Now)		4.51
5.10A (2015)		5.61
Postgraduate degrees		
5.10B (2006)		3.13
5.10B (Now)		4.29
5.10B (2015)		5.48
How do you rate the development of infrastructure facilities for T&L in your university?		
5.11 (2006)		3.56
5.11 (Now)		4.74
5.11 (2015)		5.83

The trends indicated that in 2006, the mean scores were below the 2009 national average. As it is in 2010, the respondents perception on each statement have fallen at 2009 national average and move to point five levels at expected outcome in 2015.

4.   Government Objectives

In addition, results for item 4.1 to 4.6 in table below indicated the respondents' agreement and disagreement for government objectives with an overall average mean scores at 5.51.

Table App. 1.7: The Impact of Government Funding Changes on Government Objectives

No	Questions	Mean
4.1	Widens educational access and enhances quality education	5.39
4.2	Improves quality of T&L	5.41
4.3	Improves the enhancement of research and innovation	5.68
4.4	Improves the objective of strengthening your institutions	5.58
4.5	Expands your objectives to the enculturation of lifelong learning	5.42
4.6	Improves your objective to intensify internationalisation	5.58

In other words, the respondents were somewhat agreed on the changes of government funding of Malaysian public universities as the fundamentals strategies in achieving the Malaysian government objectives as stated in the National Higher Education Strategic Plan 2020 and the National Higher Education Action Plan 2007-2010. Overall, the respondents agreed that the implementation of government funding changes would not prevent the university to work towards the government objectives.

Following this, results for item 5.14A to 5.14F illustrated the respondents perceptions on the impact of government objectives with Likert scale value ranging from (1) 'well below 2009 national average' to 'well above 2009 national average. Respondents were asked to rate the following program plans imposed in accordance to the National Higher Education Plan 2020 and National Higher Education Plan 2007-2010.

Table App 1.8: Personal Opinions and Knowledge of the Impact of Government Funding Changes on Government Objectives

No	Questions	Mean
How do you rate the following program plans imposed in accordance to the National Higher Education Strategic Plan beyond 2020 and National Higher Education Plan 2007–2010 at your university?		
Expanding the objectives to widening access and enhancing quality		
5.14A (2006)		3.39
5.14A (Now)		4.58
5.14A (2015)		5.67
Improving the objectives on quality of T&L		
5.14B (2006)		3.52
5.14B (Now)		4.77
5.14B (2015)		6.00
Improving the objective to enhance research and innovation		
5.14C (2006)		3.35
5.14C (Now)		4.63
5.14C (2015)		5.88
Improving the objective of strengthening institutions of higher *education or learning*		
5.14D (2006)		3.49
5.14D (Now)		4.70
5.14D (2015)		5.93
Expanding the objective of intensifying internationalisation		
5.14E (2006)		3.30
5.14E (Now)		4.56
5.14E (2015)		5.87
Expanding the objective of enculturation of lifelong learning		
5.14F (2006)		3.32
5.14F (Now)		4.61
5.14F (2015)		5.83

These results indicated that the universities are working hard to improve their direction align with the objectives set by the government. Thus, step taken by the government to implement funding changes has encouraged the university to work in line with aims and government objectives in accordance to the National Higher Education Plan 2020 and National Higher Education Plan 2007-2010.