THE KEY DETERMINANTS OF LEADERSHIP PERFORMANCE EFFECTIVENESS IN PUBLIC RESEARCH AND COMPREHENSIVE UNIVERSITIES: AN ADVANCED PLS-SEM STUDY IN MALAYSIAN CONTEXT

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ABSTRACT

This study was an attempt to highlight the role of capabilities and competencies in determining leadership performance in Malaysian Public Research & Comprehensive Higher Education Institutions (HEIs). The previously developed capabilities, competencies, and leadership performance scales in Malaysian academic context were used to collect data from leaders in 6 Public Research and Comprehensive HEIs. In total, 196 completed surveys were collected and the data were screened. SmartPLS 3 was used to analyze the data and the results were extended using Finite Mixture Segmentation Partial Least Squares (FIMIX-PLS) and Importance-Performance Map Analysis (IPMA). The outcome of FIMIX-PLS implied the existence of two models namely University-Faculty Level Leaders and Department-Individual Professorial Level Leaders models. Additionally, the results of IPMA showed that generic competency and change-oriented capability were the main areas of improvement to be addressed by management activities on the basis of University-Faculty Level Leaders and Department-Individual Professorial Level Leaders models, respectively.

Keywords: Leadership Capability, Managerial Competency, Leadership Performance, FIMIX-PLS, IPMA, Malaysian Public Research and Comprehensive Universities

INTRODUCTION

HEIs, as mature social entities, survive today in a society where they need to undergo significant developments (Hussin & Ismail, 2009) in order to respond to market needs and intense competition. Arguably, achieving these developmental objectives is rather unlikely if university organizations are not led by qualified leaders who can initiate and launch required change and development programs productively. This implies that academic leaders need continuous professional development and must raise their leadership and management traits to lead their institutions.

The difference between leadership and management as well as the attributes of leaders and managers in social organizations have been discussed in detail in some classic studies such as Zaleznik (1992) and Kotter (1999). Additionally, focusing on socio-educational contexts, Cuban (1988) linked leadership to change and management to maintenance activities whereas Day, Harris, and Hadfield (2001) proposed linkages between leadership with people development as well as management with systems and paper. Also, Bush (2010) argued that leadership was associated with values or purpose and management was related to execution or technical issues. In the context of the evolving academic environments, leadership was linked to capabilities and management was assigned to competencies (Fullan & Scott, 2009; Scott, Coates, & Anderson, 2008; Scott & McKellar, 2012; Scott, Tilbury et al., 2012).

As elaborated by Scott et al. (2008), leadership capabilities including personal, interpersonal, and cognitive capabilities, focus on deploying particular capacities as well as refining, updating, and developing them. In other words, they are abilities to learn which are associated with creativity and consider future trends to work productively and effectively in turmoil, unstable, uncertain, and complex evolving social environments. Moreover, personal and interpersonal capabilities have strong conceptual relation with emotional intelligence (Cherniss, Extein, Goleman, & Weissberg, 2006; Goleman, 2000, 2004) and social intelligence (Goleman, 2006; Goleman & Boyatzis, 2008) as a frequently debated concept (Fullan & Scott, 2009; Scott et al., 2008).

Also, academic managerial competencies, which have been classified into generic and role-specific (Fullan & Scott, 2009; Scott et al., 2008), have been viewed as performance-related skills which provide users with the complete picture of the most valuable behaviors, values, and tasks required for organizational success (Rankin, 2004).

All these capabilities and competencies are essential for effective academic leadership performance as conceptualized through five components namely personal and interpersonal outcomes, learning and teaching outcomes, recognition and reputation, financial performance, and effective implementation (Fullan & Scott, 2009; Scott et al., 2008).

This argument to considerable degree indicates that for productive and effective leadership in HEIs as a social place of meeting and melting of all sorts, training and developmental programs need to emphasize fostering leadership capabilities and managerial competencies. The prominence of developing and upholding leadership and managerial abilities is even higher in developing countries such as Malaysia, as the focus of this study.

Malaysian HEIs, in response to globalization, technological, and demographic turnarounds taking place in developing countries, need to develop appropriate models to meet the future economic and societal expectations, needs, and standards. For this reason, it has been proposed that the Malaysian universities must be expanded, university privatization must be initiated, competitive strategies must be enhanced, and improvements must be efficient and effective (Azman, Jantan, & Sirat, 2011). Consequently, this country, as a successful country in expanding its private HE sector in the late 1990s, boasting a large number of foreign branch campuses, and positioning itself as a regional educational hub in comparison with Singapore and Hong Kong (Lee, 2014), has undergone significant transformations to counter and solve the social, cultural, environmental, and economic

challenges. In doing so, Malaysia has emerged as an unexpected contender in the world market for international students in HE (Yean Tham, 2010) and since 2000, has made a lot of effort to expand the public HEIs while encouraging private HE to meet the nation's growing demand (Azman et al., 2011). Launching of the Malaysian National Higher Education Strategic Plan (MNHESP) and establishing the Higher Education Leadership Academy (AKEPT in Malay language) have been considered as two other main initiatives in achieving the predefined HE objectives in Malaysia.

Considering the aforementioned issues and in accordance with the argument made by Yukl and Mahsud (2010) regarding the necessity of addressing the core skills to detect threats and opportunities in social environments and the suggestions of Bryman (2007) in terms of undertaking further studies focusing on academic leadership performance, the current study aims at identifying the main leadership capabilities and managerial competencies as the determinants of leadership performance in Malaysian Public Research and Comprehensive HEIs. Another main reason to carry out this research was that even though many studies have addressed social issues in university settings (Denice, 2015; Hu & Qian, 2016; Koehler & Skvoretz, 2010; Long & Tienda, 2010), few studies (Asif & Searcy, 2013; Fullan & Scott, 2009; Ghasemy, Hussin, & Megat Daud, 2016; Scott et al., 2008; Scott & McKellar, 2012; Scott, Tilbury et al., 2012) were identified focusing on traits of university leaders.

THEORETICAL UNDERPINNINGS

One of the main studies on essential leadership capabilities and managerial competencies for leadership performance in universities and colleges was carried out by Scott et al. (2008). This study, which is known as the Australian Learning and Teaching Council (ALTC) study, conducted in the Australian HE context, and guided by a conceptual framework known as the Academic Leadership Capability Framework, forms the foundation of the current study. It is notable that the framework was used to direct another study in the context of HE in Australia and New Zealand known as the Association for Tertiary Education Management (ATEM) study (Scott & McKellar, 2012).

The conceptual framework in the ALTC and ATEM studies consisted of five interconnected essential qualities for leadership performance namely personal capability, interpersonal capability, cognitive capability, generic competency, and role-specific competency. All of these components have strong theoretical grounds as elaborated by Ghasemy, Hussin, and Megat Daud (2016).

However, the review of literature surrounding leadership performance suggested the integration of change-oriented capability (Arvonen, 2008; Ekvall, 1991; Ekvall & Arvonen, 1991; Yukl, 1999, 2004, 2012; Yukl, Gordon, & Taber, 2002) into the Academic Leadership capability Framework since this type of leadership capability covered a wider scope of behaviors to enhance leadership performance, comparing with other grand theories of leadership namely transformational and charismatic leadership theories (Yukl, 2004). As a consequence, the following modified version of the Academic Leadership Capability Framework was utilized to direct the current study in order to identify the extent to which leadership capabilities and managerial competencies determine leadership performance in Malaysian Public Research & Comprehensive HEIs.
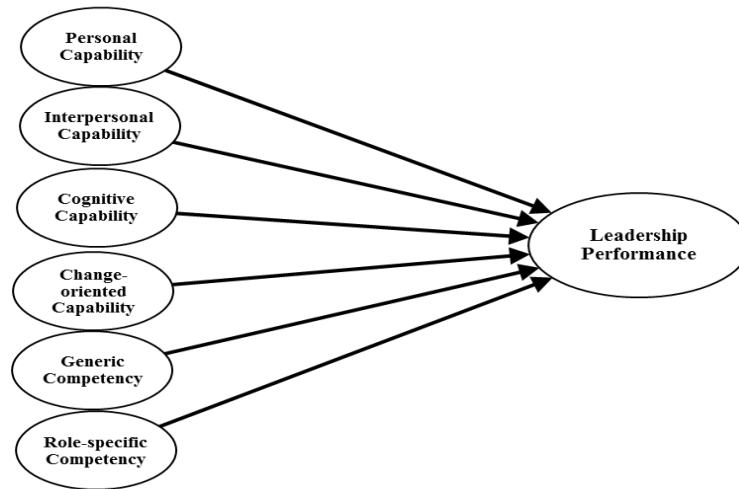
Figure 1. The conceptual framework of the study.

METHOD

Design and Instrumentation

Through this quantitative research, the data were collected using the leadership capabilities, managerial competencies, and leadership performance scales developed by Ghasemy, Hussin, Megat Daud, Ghavifekr, and Kenayathulla (2016), Ghasemy, Hussin, Zabidi Abul Razak, Maah, and Megat Daud (2016), Ghasemy, Hussin, Megat Daud, and Md Nor (2015), and Ghasemy, Hussin, and Megat Daud (2015) in the context of Malaysian HE. A 5-point Likert scale starting from low importance (1) to high importance (5) was also used to enable the respondents to rate the items of the survey instrument. The scales under each measure have been displayed in the following table. Also, the selected items have been provided in the appendices.

Table 1
The Scales of Capabilities, Competencies, and Leadership Performance

Domain	Scale	Scale items	Alpha
Personal Capability	Making Decisions and Judgments (MDJ)	8	.821
Interpersonal Capability	Sharing Information and Data (SID)	9	.851
Cognitive Capability	Strategic Adaptive Thinking (SAT)	7	.891
	Analyzing Problems and Alternatives (APA)	6	.841
Change-oriented Capability	Strategic Environmental Scanning (SES)	9	.924
	Supporting Organizational Culture (SOC)	6	.887
	Thinking Out of the Box (TOB)	5	.867
	Having Clear Objective Focus (HCOF)	3	.768
	Overcoming Obstacles (OOb)	3	.739
Generic Competency	Being Performance Driven (BPD)	4	.852
	Understanding Operations and Risks (UOR)	4	.815
Role-specific Competency	Benchmarking Standards and Practices (BSP)	4	.889
Leadership Performance	Recognition and Prestige (RP)	11	.932
	Academic Professional Excellence (APE)	8	.916

Upon completing data collection, data preparation and screening were performed using IBM SPSS Statistics 23. Given the nature of the study and as proposed by Hair, Hult, Ringle, and Sarstedt (2014), PLS-SEM, which has been widely used in social science research (Hair, Sarstedt, Ringle, & Mena, 2011; Henseler, Hubona, & Ray, 2016; Richter, Cepeda, Roldán, & Ringle, 2015), was considered as the main approach for the data analysis, and SmartPLS 3 software package (Ringle, Wende, & Becker, 2015) was employed to analyze the data and extend the results.

Sampling

This study focused on academic leaders, as the target population, leading Malaysian Public Research and Comprehensive HEIs. Academic leaders in this study refer to vice-chancellors, deputy vice-chancellors, deans, directors, deputy deans, deputy directors, heads of departments, and professors without any formal positions in Malaysian HEIs.

To collect data, 6 universities were selected randomly and the online version of the instrument was sent to 1669 academic leaders in these universities. In total, a number of 196 completed surveys were collected (response rate = 11.74%). In the following Table 2, the selected demographic information of the respondents has been presented.

Table 2
Main Demographic Information

Attributes	Frequency	Percent
Gender		
Male	114	58.2
Female	82	41.8
Academic Qualification		
Prof	112	57.1
Associate Prof	41	20.9
Assistant Prof / S. Lecturer	38	19.4
Other	5	2.6
Background		
Agriculture and environmental studies	10	5.1
Architecture and building	4	2.0
Education	36	18.4
Engineering and technology	41	20.9
Health	31	15.8
Information technology (IT)	5	2.6
Law	1	.5
Management and commerce	16	8.2
Nature and physical sciences	11	5.6
Society and culture	11	5.6
Other	30	15.3
Leadership Level		
University Level	3	1.5
Faculty Level	73	37.2
Department Level	60	30.6
Individual Professorial Level	60	30.6

Preliminary Analysis

Missing values were analyzed using Expectation-Maximization (EM) algorithm as the proposed strategy by Tabachnick and Fidell (2013). For subscales which failed to meet the statistical assumption of EM technique, another regression-based method was employed to predict and replace the missing values.

Next, the guidelines provided by Field (2013) were followed to screen the data prior to undertaking the main analysis. This procedure was followed by re-investigating the existence of outliers in the dataset on the grounds of standardized factor scores (Garson, 2016) using SmartPLS 3. These screening procedures resulted in identifying and eliminating 15 problematic cases from the dataset. As a consequence, PLS algorithm was run for the data collected from 181 respondents in the context of Malaysian Public Research and Comprehensive HEIs. The initial model has been displayed in the ensuing table.
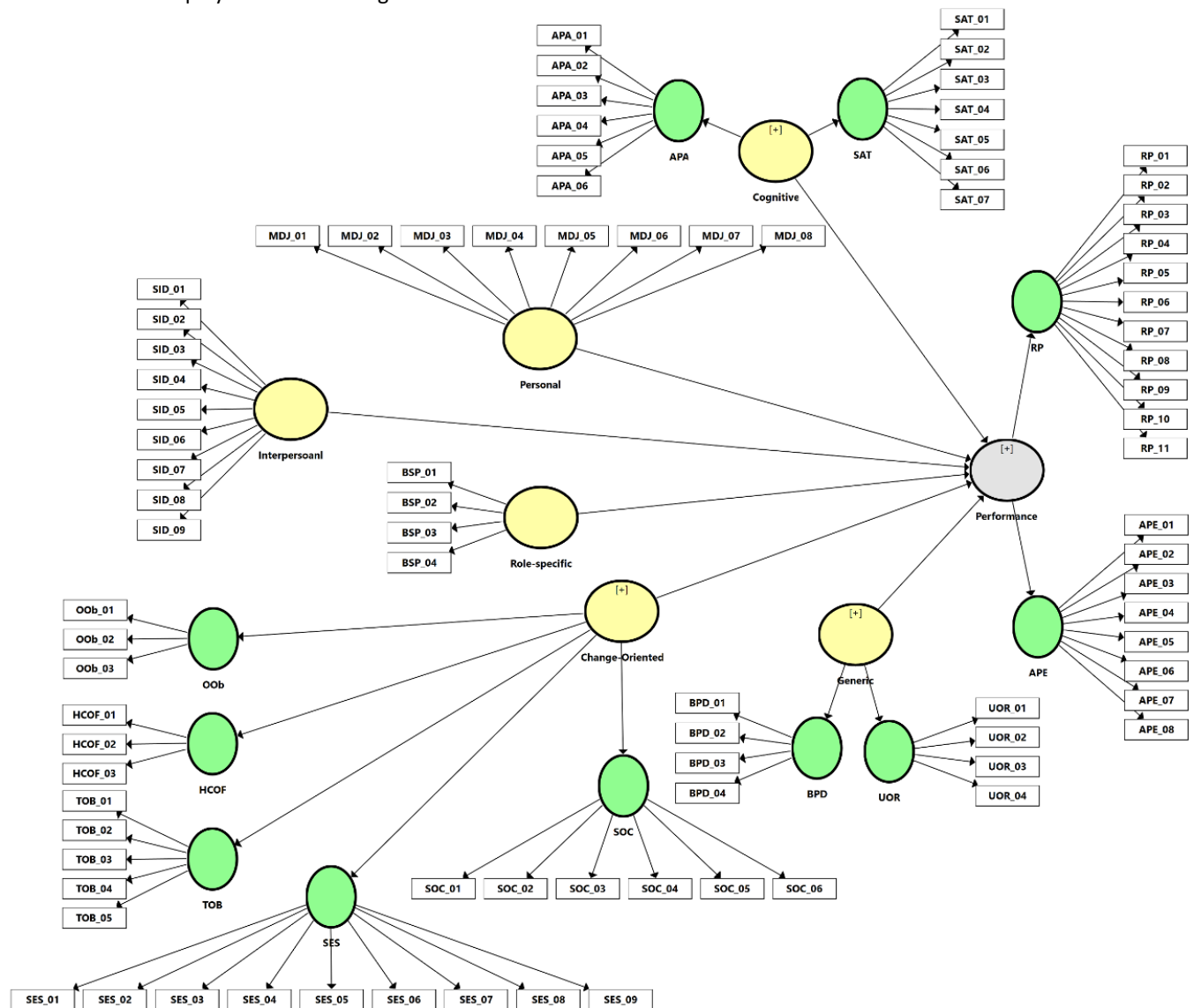

Figure 2. The initial path model.

Measurement Models Evaluation

The outer loadings of the items, as the measures of the relationship between the items and the latent constructs, were evaluated on the grounds of the guidelines provided by Hair, Hult, et al. (2014). Through this procedure, 25 non-contributing items were deleted from their respective constructs. Then, Cronbach's alpha and composite reliability as the measures for estimating internal consistency reliability (Hair, Black, Babin, & Anderson, 2010), and convergent validity as an extent of positive correlations among the items of a construct (Hair, Hult, et al., 2014; Hair, Ringle, & Sarstedt, 2011), were estimated. The results displayed in the following table shed light on the fact that all the relevant requirements had been fulfilled since the reliability values were above .7 and there was no Average Variance Extracted (AVE) value smaller than 0.5.

Table 3
Cronbach's Alpha, Composite Reliability, and Convergent Validity

Constructs	Cronbach's alpha	Composite Reliability	AVE
APA	.874	.905	.616
APE	.856	.893	.584
BPD	.782	.86	.607
Change-oriented	.944	.95	.516
Cognitive	.916	.928	.521
Generic	.880	.905	.544
HCOF	.829	.898	.746
Interpersonal	.822	.871	.532
Performance	.894	.913	.513
Personal	.780	.851	.534
RP	.758	.847	.580
Role-specific	.868	.919	.791
SAT	.839	.882	.556
SES	.892	.915	.606
SOC	.85	.899	.691
TOB	.849	.898	.689
UOR	.833	.889	.666

Thereafter, discriminant validity as an extent to which a construct is truly distinct from other constructs by empirical standards (Hair, Hult, et al., 2014) was assessed using the newly introduced measure known as HeteroTrait-MonoTrait (HTMT) criterion (Henseler, Ringle, & Sarstedt, 2015). The following table displays HTMT values as well as 95% confidence intervals (two tailed) for these statistics which were generated using the bootstrapping routine with 5000 subsamples. As displayed in the table, none of the HTMT values exceeded 0.9 indicating the establishment of discriminant validity on the basis of the $HTMT_{0.9}$ criterion. Also, the upper levels of the confidence intervals for all of the HTMT values were less than 1, implying that discriminant validity had been achieved based on $HTMT_{inference}$ criterion as well.

Table 4

Discriminant Validity of the Latent Variables on the Basis of HTMT$_{0.9}$ and HTMT$_{inference}$ Criterion

Constructs	Personal	Interpersonal	Cognitive	Change-oriented	Generic	Role-specific	Performance
Personal	****						
Interpersonal	.683 (.558, .804)	****					
Cognitive	.793 (.696, .878)	.833 (.754, .9)	****				
Change-oriented	.729 (.627, .82)	.756 (.655, 0.841)	.886 (.836, .928)	****			
Generic	.632 (.494, .76)	.741 (.634, .836)	.761 (.659, .851)	.837 (.757, .906)	****		
Role-specific	.548 (.425, .667)	0.697 (.577, .8)	.762 (.675, 0.84)	.79 (0.711, 0.861)	.892 (.829,.947)	****	
Performance	.586 (.457, .7)	.811 (.72, .891)	.827 (.744, .896)	0.857 (.788, .914)	.9 (.846, .948)	.883 (.824, .936)	****

Structural Model Evaluation

Collinearity and path coefficients

As suggested by Hair, Hult et al. (2014), the existence of high correlations among the exogenous constructs in the model which is referred to as collinearity was assessed through checking the VIF values. This procedure revealed that all the values were smaller than .5, implying that collinearity could not be a problem for the initial model under study. Hence, the model was evaluated for the significance of the path coefficients as the hypothesized relationships among the constructs (Hair, Hult, et al., 2014; Hair, Ringle et al., 2011). For this reason, bootstrapping routine with 5000 samples was run. Through this procedure, personal and cognitive capabilities were identified as non-significant constructs to determine leadership performance in the context of Malaysian Public Research and Comprehensive HEIs. As a consequence, these two exogenous constructs were eliminated from the model before it was re-estimated. The following Table 5 displays the path coefficients along with other relevant statistics for the structural model.

Table 5

Final Path Coefficients Assessment Using Bootstrapping Routine

Paths		Original Sample	T Statistics	*p* Values
Change-oriented Performance	->	0.262	3.309	0.001
Generic -> Performance		0.268	3.455	0.001
Interpersonal -> Performance		0.199	3.369	0.001
Role-specific -> Performance		0.264	4.502	0.000

According to the contents of this table, the effect of generic competency on leadership performance, as the endogenous latent variable, was greater than other exogenous constructs. Upon completing this evaluation, collinearity among the existing exogenous constructs was re-assessed. The output of this analysis confirmed the fact that collinearity was not a matter of concern in this analysis.

Table 6
Collinearity Assessment

Constructs	VIF
Change- oriented	2.949
Generic	3.401
Interpersonal	1.943
Role-specific	2.859

Model's predictive accuracy and relevance

The values of R^2, which is a measure of the model's predictive accuracy, its adjusted version, and Q^2, as the main output of blindfolding module in SmartPLS 3 which represents the model's predictive relevance (Hair, Hult, et al., 2014), have been displayed in the following table for all of the endogenous constructs in the model.

Table 7
R^2, Adjusted R^2, and Q^2 Values of the Endogenous Constructs in the Model

Endogenous Construct	R^2	Adjusted R^2	Q^2
APE	.924	.923	.534
BPD	.837	.836	.501
HCOF	.684	.682	.509
Performance	**.766**	**.760**	**.384**
RP	.819	.818	.469
SES	.83	.829	.499
SOC	.829	.829	.571
TOB	.705	.704	.481
UOR	.873	.873	.577

Focusing on the inner model, the results of the analysis showed that 76.6% of the variance in leadership performance was explained by the exogenous constructs in the model. This indicated that the predictive accuracy of the model in the context of Malaysian Public Research and Comprehensive HEIs was above the substantial level (Cohen, 1988). The adjusted R^2 value in this analysis was .760 and the model demonstrated predictive relevance for data points of the indicators in reflective measurement models of the endogenous construct in the model since all of the Q^2 values were greater than zero (Hair, Hult, et al., 2014).

F^2 And Q^2 Effect Sizes

The f^2 effect size, which is computed automatically in SmartPLS 3, is a measure to evaluate the effect of exogenous constructs on the model's predictive accuracy. Similar to f^2 effect size, the relative impact of exogenous constructs on the model's predictive relevance (q^2 effect size) can be computed manually (Hair, Hult, et al., 2014). In the following table, f^2 and q^2 effect sizes have been presented for all of the exogenous constructs in the model.

Table 8

f^2 and q^2 Effect Sizes of the Exogenous Constructs on Model's Predictive Accuracy and Relevance

Constructs	f^2	q^2
Change-oriented	0.01	0.018
Generic	0.09	0.016
Interpersonal	0.09	0.016
Role-specific	0.10	0.019

Provided that all of the f^2 values were in the range of small to relatively medium (Cohen, 1988), the effect of role-specific competency on the model predictive accuracy, comparing with other exogenous constructs, was maximum. Also, despite the fact that all the q^2 effect sizes were small, the size of the effect of role-specific competency on the model's predictive relevance, comparing with other exogenous constructs, was greater.

Detecting And Treating Unobserved Heterogeneity

The results of measurement models and structural model evaluations for the aggregate data are displayed in the following Figure 3.
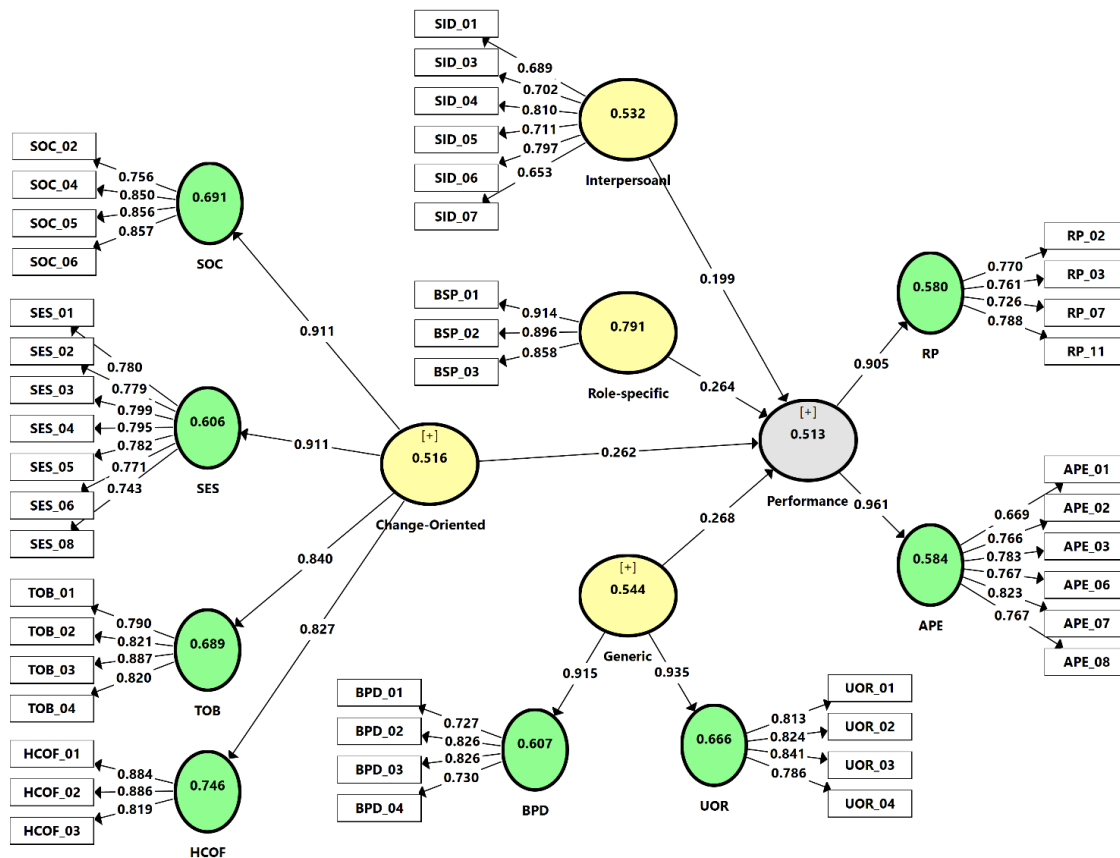
Figure 3. The Path Model Before Performing FIMIX-PLS.

For detecting unobserved heterogeneity within the data as a threat to the model validity, the guidelines related to performing FIMIX-PLS module in SmartPLS 3 software package (Hair, Hult, et al., 2014; Hair, Sarstedt, Matthews, & Ringle, 2016; Matthews, Sarstedt, Hair, & Ringle, 2016) were followed and the analysis was performed 4 times for evaluating the results of 1-segment to 4-segment solutions. The sample size and required minimum samples size were 181 and 40, respectively, denoting that performing the analysis for a 5-segments solution was not reasonable. The results of the analysis are presented in Table 9.

Table 9

Fit Indices and Relative Segment Sizes for FIMIX-PLS Solutions

Criteria	1 Segment (N= 181)	2 Segments (N1= 128, N2= 53)	3 Segments (N1= 117, N2= 34, N3= 30)	4 Segments (N1= 54, N2= 52, N3= 45, N4= 30)
AIC	1,854.878	**1,660.255**	-2,215.738	-2,236.118
AIC3	1,875.878	**1,703.255**	-2,150.738	-2,149.118
AIC4	1,896.878	**1,746.255**	-2,085.738	-2,062.118
BIC	1,922.046	**1,797.791**	-2,007.836	-1,957.849
CAIC	1,943.046	**1,840.791**	-1,942.836	-1,870.849
MDL5	**2,358.720**	2,691.932	-656.226	-148.772
LnL	-906.439	-787.128	1,172.869	1,205.059
EN	N/A	**0.848**	0.930	0.814

These findings show that selecting a 3-segment or 4-segment solution was not sensible. In addition, the results indicated a 2-segement solution since AIC3, AIC4, BIC, and CAIC values in this solution were minimum and also EN was greater 0.5. These procedures were followed by conducting Ex Post Analysis on the grounds of guiding principles proposed by Matthews et al. (2016) and Hair et al. (2016). The results, displayed in the following Table 10, show that the data categorized by Leadership Level, as one of the 13 explanatory variables in the dataset, had an overlap of 66 percent with the data partitioned using FIMIX-PLS module of SmartPLS 3.

Table 10

FIMIX-PLS Groups

Groups based on Leadership Level	FIMIX-PLS Groups		Total
	Group 1	Group2	
University-Faculty Level	39	**31**	**70**
Department-Individual Professorial Level	**89**	22	**111**
Total	**128**	**53**	**181**

This suggested the use of Leadership Level as the exploratory variable in the further segment-specific PLS-SEM analysis. It is noticeable that University Level and Faculty Level corresponded to FIMIX-PLS Group 1 and Department Level and Individual Professorial Level corresponded to the FIMIX-PLS Group 2.

Consequently, the two emerged models on the grounds of FIMIX-PLS namely University-Faculty Level Leaders and Department-Individual Professorial Level Leaders models were reassessed. All of the statistical requirements of the analysis were met and the detailed information regarding relevant statistics such as Cronbach's alpha, composite reliability, convergent validity, discriminant validity, path coefficients, collinearity, models' predictive accuracy and relevance as well as their related effect sizes for both of the models have been provided in the appendices section.

The results of this part of the analysis revealed that 56.9% of the variance in leadership performance was explained by role-specific and generic competencies in the University-Faculty Level Leaders model. Focusing on Department-Individual Professorial Level Leaders model, the outcome showed that interpersonal and change-oriented capabilities as well as generic role-specific competency explained 75.4% of the variation in leadership performance. The final models have been illustrated in Figure 4 and Figure 5.
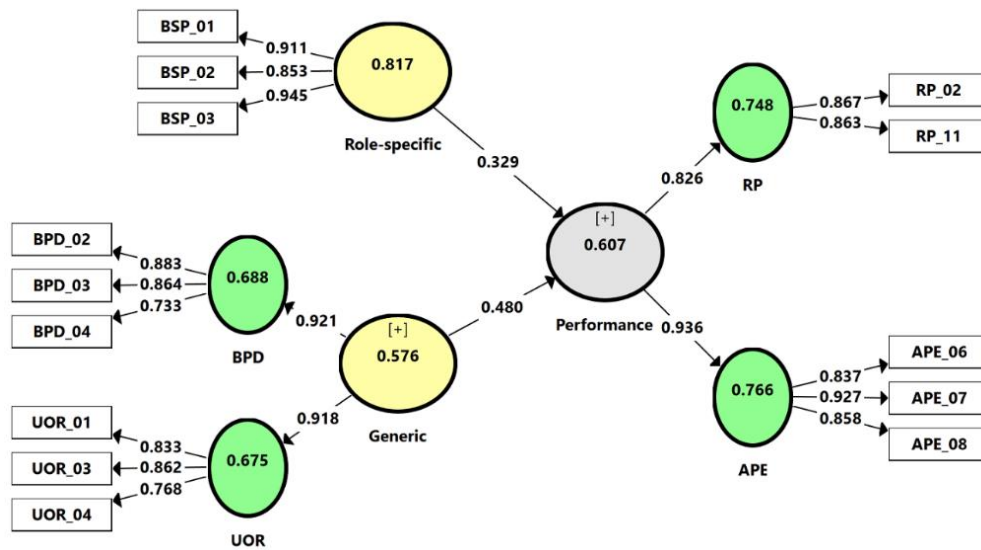
Figure 4. The Final University-Faculty Level Leaders Model
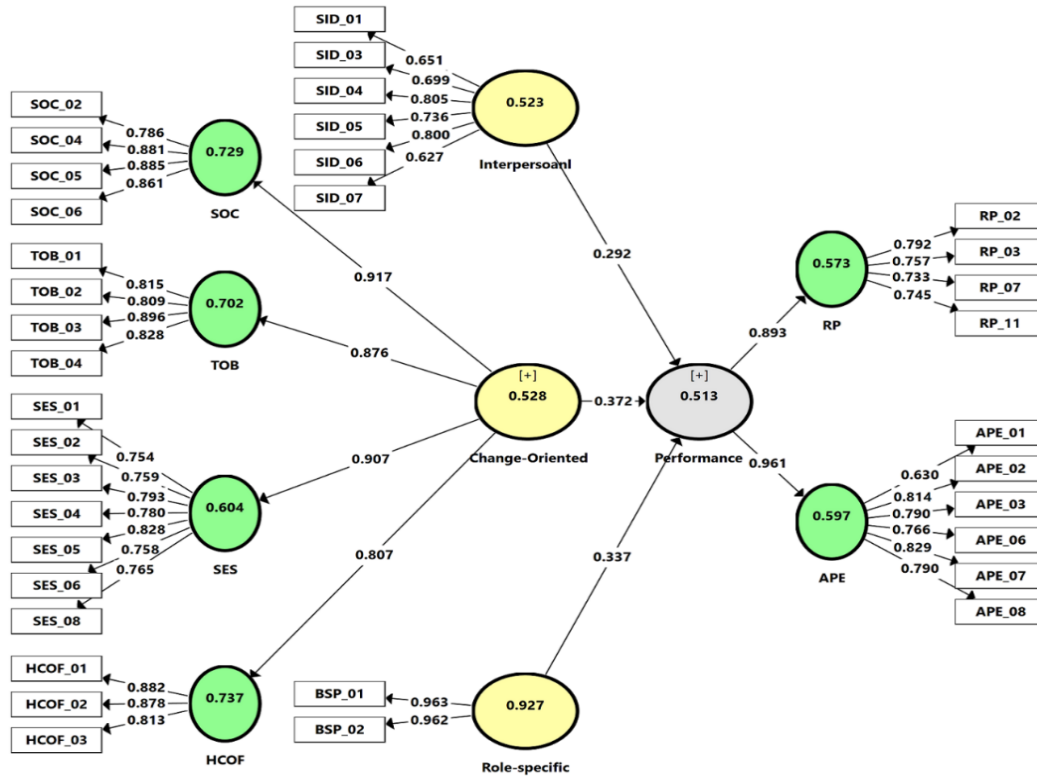
Figure 5. The Final Department-Individual Professorial Level Leaders Model.

Importance-Performance Map Analysis (IPMA)

As explained by Ringle and Sarstedt (2016), the results and findings of the basic PLS-SEM can be extended by the extraction of latent variable scores using IPMA (Völckner, Sattler, Hennig-Thurau, & Ringle, 2010). To evaluate the exogenous constructs performance, IPMA in SmartPLS 3 was employed and the guidelines proposed by Hair, Hult, et al. (2014) were followed. The analysis was performed for the two models as the outcomes of FIMIX-PLS. To this aim, leadership performance was set as the key target construct. The following table and figures show the results of IMPA for FIMIX-PLS outcomes.

Table 11

IPMA Results for the University-Faculty and Department-Individual Professorial Level Leaders Models

Construct	University-Faculty Level Leaders Model			Department-Individual Professorial Level Leaders Model		
	Importance	Performance	Index value	Importance	Performance	Index value
Change-oriented	****	****	****	0.327	79.077	4.163
Interpersonal	****	****	****	0.309	85.015	4.401
Generic	0.454	86.308	4.452	****	****	****
Role-specific	0.262	86.808	4.472	0.239	83.973	4.359
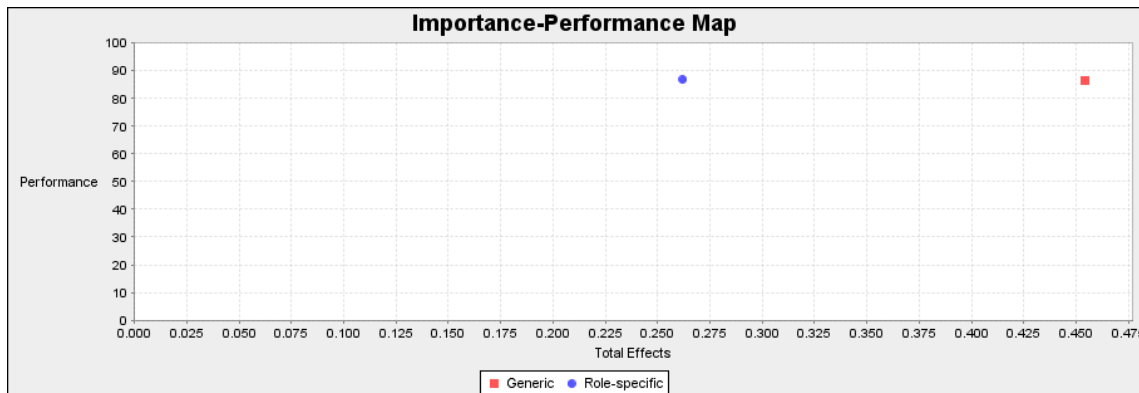
Figure 6. IPMA for the University-Faculty Level Leaders Model
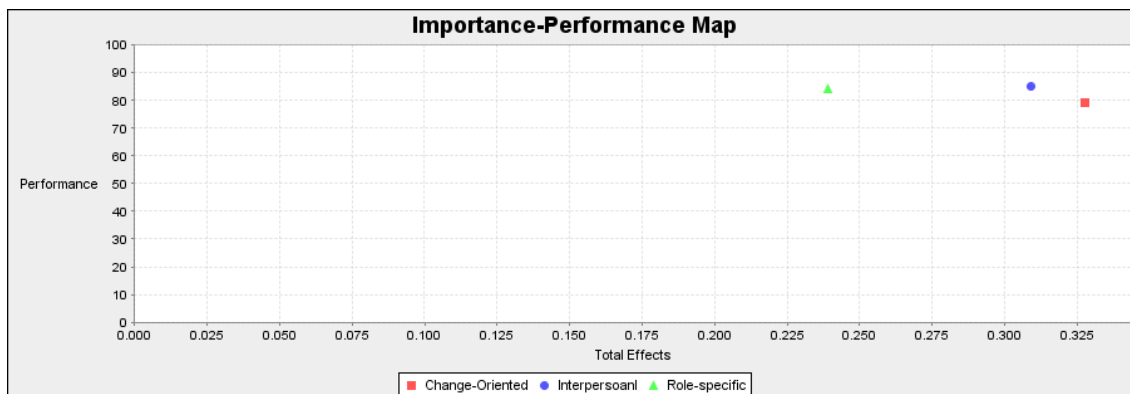
Figure 7. IPMA for the Department-Individual Professorial Level Leaders Model

Regarding University-Faculty Level Leaders model, the output of IPMA revealed that generic competency, due to its higher importance in explaining the target construct in comparison with role-specific competency, must be focused as a priority in terms of improvement. With respect to the Department-Individual Professorial Level Leaders model, the results implied that change-oriented capability had the highest relative importance in explaining the target construct followed by interpersonal capability and role-specific competency.

DISCUSSION AND CONCLUSION

This analysis was undertaken to examine the extent to which different types of capabilities and competencies explained leadership performance in the context of Malaysian Public Research and Comprehensive HEIs. Data analysis at aggregate level indicated that personal and cognitive capabilities were not significant determinants of leadership performance in Malaysian Public Research and Comprehensive HEIs. Afterward, the model was focused for identifying and treating unobserved heterogeneity using FIMIX-PLS (Hair et al., 2016; Hair, Hult, et al., 2014). Through this procedure, two models emerged namely the University-Faculty Level (R^2= 56.9%) and Department-Individual Professorial Level Leaders (R^2= 75.4%) models. Next, PLS-SEM algorithm was run for each of them to evaluate their outer and inner models. The PLS-SEM output showed that in the University-Faculty Level Leaders model, none of the leadership capabilities were significant in explaining leadership performance in the context of Malaysian Public Research and Comprehensive HE. Focusing on the Department-Individual Professorial Level Leader model, the output showed that only the path from generic competency to leadership performance was not significant in the context under study. Finally, IPMA was run in order to extend the results of PLS-SEM for the University-Faculty Level and Department-Individual Professorial Level Leaders models. The output of IPMA showed that generic competency was the major area of improvement in the University-Faculty Level Leaders model. Additionally, change-oriented capability was identified as the major area of improvement to be addressed by managerial activities in the Department-Individual Professorial Level Leaders model.

Even though all of the constructs building Academic Leadership Capability Framework (Fullan & Scott, 2009; Scott et al., 2008; Scott & McKellar, 2012; Scott, Tilbury et al., 2012) were underpinned and supported by a few leadership theories (Ghasemy, Hussin, & Megat Daud, 2016); as illustrated in the University-Faculty Level Leaders model, the evidence in the Malaysian Public Research and Comprehensive HE context did not support the contribution of personal, interpersonal, and cognitive capabilities to leadership performance. In addition, personal capability, cognitive capability, and generic competency were not supported, as the significant determinants of leadership performance, on the basis of Department-Individual Professorial Level Leaders model.

The results also indicated that leaders at University-Faculty level were more management-oriented since in the developed University-Faculty Level Leaders model, only the managerial competencies were identified as the main significant constructs to explain leadership performance. Focusing on the Department-Individual Professorial Level Leaders model, the results did disclose that two types of leadership capabilities and one type of managerial competency were effective constructs in determining leadership performance, suggesting that leaders in this category had a stronger tendency to exercise leadership capabilities. Given the MNHESP and the emphasis on undergoing transformations in Malaysian HE, the results showed that change-oriented capability (Arvonen, 2008; Ekvall, 1991; Ekvall & Arvonen, 1991; Yukl, 1999, 2004, 2012; Yukl et al., 2002) was a significant determinant of leadership performance only in the Department-Individual Professorial Level Leaders model. This highlighted the role of top leaders in universities in managing the higher learning institutions as well as the role of heads of departments and the professors with no formal position in leading change programs.

The majority of the items in the developed models, which have been provided in the appendices section, not only were consistent with the recent literature (Asif & Searcy, 2013; Black, 2015; Bryman, 2007; Fullan & Scott, 2009;

Ramsden, 1998), but also were in line with the encouraged practices through the MNHESP and consonant with the functions of AKEPT, indicating the comprehensiveness and validity of the developed models. For instance, "Listening to different points of view before coming to a decision" has been emphasized by Fullan and Scott (2009), "Having sound administrative and resource management skills" has been proposed by Ramsden (1998), and "Developing and contributing positively to team-based programs" has been stressed by Fullan and Scott (2009) and Asif and Searcy (2013). Also "Identifying environmental threats and opportunities for the university and interpreting the collected information", "Monitoring the external environment more when the university is highly dependent on outsiders, faces severe competition and the environment is rapidly changing", "Creating a climate of psychological safety and mutual trust in the university", "Producing successful learning systems or infrastructures", and "Delivering successful team projects in learning and teaching" have been emphasized by Asif and Searcy (2013). Moreover, "Having a high level of up-to-date knowledge of what engages university students in productive learning" and "Securing competitive funds related to learning and teaching as well as to the area of responsibility" have been suggested by Black (2015) and Asif and Searcy (2013). Lastly, "Delivering successful team projects in learning and teaching", "Bringing innovative policies and practices into action", and "Understanding of industrial relations issues and processes as they apply to higher education" are consonant with the functions of AKEPT and the encouraged practices through MNHESP.

IMPLICATIONS OF THE FINDINGS

Practically, Ministry of HE Malaysia and particularly AKEPT will benefit from the results of this study for some reasons. First, provision of relevant and pragmatic training programs for leaders in Malaysian HE is one of the main roles and core objectives of AKEPT. Second, in this study, collaborating with stakeholders as one of the missions of AKEPT was emphasized since it is related to scanning the external environment as one of the main qualities of change-oriented leaders. This did imply that the exercise of change-oriented leadership in Malaysian HE is consistent with this main mission of AKEPT. Third, the findings of this study were in line with two other missions of this organization in terms of undertaking national transformations in HE and enhancing academic leadership performance. Fourth, two leadership performance determinants of change-oriented leaders including innovativeness and adaptability (Yukl, 2004) were emphasized as two of the values of this organization. Fifth, the assimilation between the target population in this study and the target group of AKEPT was another encouraging practical point to be noted (Please visit the AKEPT website for more information).

From a theoretical perspective, the Academic Leadership Capability Framework was tested in one of the sectors of Malaysian HE. In addition, this research work, as suggested in earlier leadership studies such as Ekvall and Arvonen (1991) and Yukl (2004), extended the literature of change-oriented leadership in the context of HE. Also, using advanced statistical procedures available in second generation quantitative analytic tools (Hair, Hult, et al., 2014), two models for the contribution of leadership capabilities and managerial competencies to leadership performance in Malaysian Public Research and Comprehensive HEIs were developed. The development of these models also played an important role in expanding the knowledge and literature centering around the main constructs under this study, especially leadership performance as emphasized by Bryman (2007).

The study had some methodological implications for the researchers as well such as:
- Selecting the most appropriate and relevant structural equation modeling approach to develop new models (Hair, Hult, et al., 2014).
- Evaluating discriminant validity on the basis of HTMT criterion (Henseler et al., 2015) as a more accurate new criterion to establish discriminant validity in variance-based structural equation modeling.
- Performing FIMIX-PLS (Hair, Hult, et al., 2014; Hair et al., 2016; Matthews et al., 2016) and IMPA (Hair, Hult, et al., 2014; Ringle & Sarstedt, 2016) to extent the results of PLS algorithm.

RECOMMENDATIONS

Many studies need to be undertaken in order to grasp a better understanding on the complexities of HEIs as well as the leaders who lead them to excellence. Replicating the study in other Malaysian educational sectors and making comparisons between the results of the current study with those studies is recommended. Replicating the study in other leading countries in terms of HE provision, especially in the Asia Pacific region such as India, China, Singapore, Taiwan, Korea, Japan, and Hong Kong and comparing the results through a comparative approach is also suggested. Also, replicating the study in other countries having stated intentions to position themselves as educational hubs -- such as United Arab Emirates, Qatar, and Bahrain -- is proposed. Researchers are encouraged to integrate more meaningful constructs into the Academic Leadership Capability Framework on the basis of the results of recent research in the area of HE leadership and use the framework as a foundation for theory building in this area.

Additionally, in terms of methodological recommendations, the followings are suggested:

- Performing segment-specific analysis to detect unobserved heterogeneity in social science research using the combination of FIMIX-PLS and Prediction-Oriented Segmentation (PLS-POS), as advised by Matthews et al. (2016).
- Comparing R^2 of the model developed on the basis of the aggregate data with weighted R^2 on the basis of FIMIX-PLS to check whether heterogeneity significantly affect the data, as proposed by Matthews et al. (2016).
- Undertaking further analysis to check whether the differences between the path coefficients in the models resulted from FIMIX-PLS were significant using the procedure proposed by Henseler, Ringle, and Sarstedt (2016).
- Performing Partial Least Squares Multi Group Analysis (PLS-MGA) in order to compare different groups as suggested by Hair, Hult et al. (2014) and Sarstedt, Henseler, and Ringle (2011) and Hair, Sarstedt, Hopkins, and Kuppelwieser (2014).

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