

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

Research methodology is the process that will be the guideline of the research. In this chapter, the research design, population and sampling, data collection procedures, questionnaire development process, measurement of variables and data analysis procedures were explained concisely.

3.2 Research Design

In research, Ticehurst and Veal, (2000) connoted that research paradigms are the reflection of the basic set of philosophies that are related to the nature of the world. Thomas, (2003) added that these basic philosophical beliefs of the researcher reveal the perception he holds of the world, reality and how he understands this reality along with the methods that assist him in obtaining the knowledge regarding a reality. It is necessary for the scholars to have the view of justifying an approach to reality, on the ontological, epistemological and methodological bases (Banister, 2011).

There are four (4) main points that must be elaborated upon by the researcher. These are (1) related to the nature of the phenomenon under study; (2) the relationship of the researcher with the phenomenon; (3) the methodology to study the phenomenon and (4) the method or technique to study the phenomenon (Gringeri et al., 2013).

The concept of reality or the social phenomena under investigation depends on the researcher's understanding of the nature and issues. In addition, it also depends on how the researcher will gather the knowledge and information. Nevertheless, any research approach that is explicit in nature will lead to appropriate research design (Ekanem, 2007). Also, Hesse-Biber and Leavy, (2010) viewed that all research approaches like ontological, epistemological, theoretical and methodological approaches are interrelated with one another. Thus, it is better for the researcher to be clear on the method that can best answer the research question. Most of the researchers are in favor of the quantitative methods as for the scientific approach and robustness (Saunders et. al., 2012).

Quantitative research, according to Pallant (2011) is a research approach aimed at testing theories, determining facts, demonstrating relationships between variables, and predicting outcomes. Quantitative research uses methods from the natural sciences that are designed to ensure objectivity, generalizability and reliability (Weinreich, 2009). In this study, the researcher used a quantitative method approach of data collection.

According to Sekaran and Bougie (2010), using surveys or questionnaires is an efficient data collection strategy, which allows the researcher to know exactly what is required and the way to measure the variables of interest. Conversely, the ontological

assumptions of objectivism match the researcher's assumptions on the nature of reality while the epistemological assumptions match the researcher's assumptions on what constitutes knowledge and how knowledge can be expanded. Furthermore, this research is quantitative in nature for the ease of collecting observable and measurable data on variables. As there are theories and models in the literature, a deductive study that allows the researcher to develop hypotheses and test them using empirical data will be used, as recommended by Saunders, Lewis, and Thornhill (2009). Hence, this study employs a confirmatory research study.

In this research, quantitative data was collected based on structured closed-ended questions or the Likert scale. According to Creswell, (2009), the quantitative research is more appropriate for understanding how one or more variables can influence each other. The methods involves the procedure of structured questions where a number of respondents were involved and the selections of responses have been fixed. The Likert scale has been considered to measure the variables due to the fact that such scale has high validity (Henard & Dacin, 2010; Zehir et. al., 2011). Likert scale is also suitable for data to be used for factor analysis, regression analysis or structural equation modelling (Dawes, 2008).

3.3 Location of the Study

For this study, the respondents' location was identified by the respective public universities that are located in Klang Valley's area of territory only. Those universities are UiTM (Selangor campuses), UM, UPM, UKM, IIUM, UTM (KL campuses) and UPM.

3.4 Population

The population selected in this study was the 480 Assistant Registrars who are currently employed in seven (7) public universities located in the Klang Valley area. Although the assistant registrars are servicing and employed in public universities and not directly linked with federal government offices, they are still considered as public sector employees. As stated by Fauziah and Ng (2016), the recruitment of university staff either academic or non-academic ones, is considered as part of the civil service and the way public universities are managed by Ministry of Higher Education (MOHE) still depends much on the government governance and policies. Therefore, the researcher chooses to select the assistant registrars as the population for this study to represent the similar job designation of government administrators. Below is the total number of population for 7 public universities in the Klang Valley.

Table 3.1 Number of Population

Name of University		Total Number of N41 AR's	Percentage (%)
1.	Universiti Putra Malaysia (UPM)	120	25%
2.	Universiti Kebangsaan Malaysia (UKM)	99	20.63%
3.	UiTM Selangor		
	- Shah Alam		
	- Puncak Alam	98	20.41%
	- Puncak Perdana		
	- Hosp. Sg Buloh		
4.	Universiti Islam Antarabangsa (UIA/IIUM)		
	- Gombak	68	14.17%
5.	Universiti Malaya (UM)	60	12.5%
6.	Universiti Pertahanan Nasional Malaysia (UPNM)	20	4.17%
7.	Universiti Teknologi Malaysia (UTM)		
	- Jalan Semarak KL	15	3.12%
TOTAL		480	100%

3.4 Sampling Frame

Sampling frame is a list of all the individual sampling units (elements) in the population (Friedrich, 2000). For this study, the data were collected from public universities' Assistant registrar's scheme; namely Administration Officer, Assistants Administration Officer or Executive Officer (titles differ by organization) with the salary scheme of N41; they are currently employed in seven (7) public universities in Klang Valley. This study chosen 7 public universities in Klang Valley because of the huge population of assistant registrar, easy to access respondent and nearby with researcher to collect the data.

3.5 Sampling Technique

To select the respondent for this study, the stratified random sampling was used. According to Salkind (2003), stratified sampling is important to ensure that the strata (or layers) in the population are fairly represented in the sample. Three steps involved in the stratified random sampling are elucidated below:

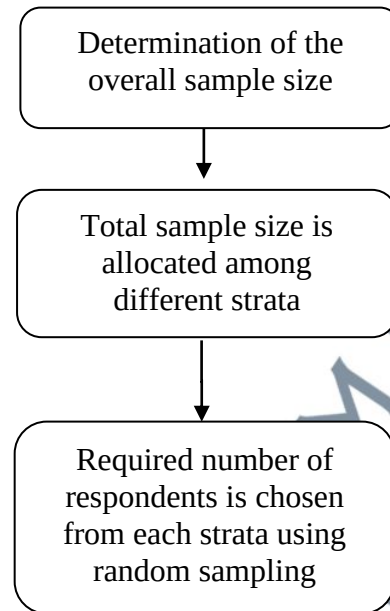


Figure 3.1 Stratified Random Sampling Approach

Source: Chughtai (2008)

The total population of each specific group was used, and in this phase, the sampling bias, non-independent or unequal chance of selecting a sample is not an issue. The results obtained from this technique may be of natural interest and can be analyzed separately. Besides that, the stratified technique ensures better coverage of the population than simple random sampling (Hunt & Tyrrell, 2001).

Table 3.2 Stratified Random Sampling Calculation for Sample Size

Name of University	Total Number	Formula (Ratio)	Sample Size
1. Universiti Putra Malaysia (UPM)	120	$120/480 \times 214$	53
2. Universiti Kebangsaan Malaysia (UKM)	99	$99/480 \times 214$	44
3. UiTM Selangor -Shah Alam - Puncak Alam -Puncak Perdana -Hospital Sg. Buloh	98	$98/480 \times 214$	44
4. Universiti Islam Antarabangsa (UIA) -Gombak	68	$68/480 \times 214$	30
5. Universiti Malaya (UM)	60	$60/480 \times 214$	27
6. Universiti Teknologi Malaysia (UTM) -Jalan Semarak Kuala Lumpur	15	$15/480 \times 214$	7
7. Universiti Pertahanan Malaysia (UPNM)	20	$20/480 \times 214$	9
TOTAL	480		214

3.6 Sample Size

In determining the sample size in descriptive surveys, Salkind (2003) stated that the sample size should be more than 30 and less than 500. For this study, the researcher followed the suggestion of Krejcie and Morgan (1970) when choosing the samples size. To determine the number of participants that can represent an adequate sample size, this study used the data on the total population size of 480 as a sampling frame. A

recommended sample size of 214 for the 480 respondents was based on the sample size in Table 3.3 as provided by Krejcie and Morgan (1970).

Table 3.3 Sample Size

Population (N)	Sample (n)	Population (N)	Sample (n)	Population (N)	Sample (n)
10	10	220	140	1,200	291
15	14	230	144	1,300	297
20	19	240	148	1,400	302
25	24	250	152	1,500	306
30	28	260	155	1,600	310
35	32	270	159	1,700	313
40	36	280	162	1,800	317
45	40	290	165	1,900	320
50	44	300	169	2,000	322
55	48	320	175	2,200	327
60	52	340	181	2,400	331
65	56	360	186	2,600	335
70	59	380	191	2,800	338
75	63	400	196	3,000	341
80	66	420	201	3,500	346
85	70	440	205	4,000	351
90	73	460	210	4,500	354
95	76	480	214	5,000	357
100	80	500	217	6,000	361
110	86	550	226	7,000	364
120	92	600	234	8,000	367
130	97	650	242	9,000	368

Population (N)	Sample (n)	Population (N)	Sample (n)	Population (N)	Sample (n)
140	103	700	248	10,000	370
150	108	750	254	15,000	375
160	113	800	260	20,000	377
170	118	850	265	30,000	379
180	123	900	269	40,000	380
190	127	950	274	50,000	381
200	132	1,000	278	75,000	382
210	136	1,100	285	100,000	384

214 questionnaires were used to run the data analysis. Based on the sampling adequacy of Wisdom and Creswell (2013) it was found that the sample size of 214 is adequate to provide reliable and valid results, which is the minimum requirement of 214.

3.7 Measurement of Variables

According to the review of Zikmund, Babin, Carr, and Griffin (2010) the operational definition of variables is the process of identifying the scale involved in the research process. In other words, the measurement variables describe in detail how the researchers measure the variables that exist within the framework. For this study, hope, optimism, resilience and self-efficacy are the independent variables. Meanwhile, the mediating variable is work engagement and the dependent variable for this study is the

job performance. This study adapted all variables measures from previously established studies, albeit from different countries and in different contexts.

3.7.1 Measurement Scale

In this study, a Likert scale is applied to evaluate the questionnaires that have been prepared. According to Kotrlik, Bartlett, Higgins and Williams (2002) studies collect data that represent the population. The most important thing that needs to be done in every study is to identify the type of Likert scale that will be used. Nunnally (1978) and Babbie (1990) stated that the Likert scale is easy to build, has excellent reliability and efficient adaptability. Ploumis, Phan, Hess and Wood (2014), stated that a Likert Scale is a proficient instrument to evaluate people's attitudes and opinions (Nunnally, 1978; Ticehurst & Veal, 2000). In short, five-point Likert scale refers to certain degree which might be different from other variables (i.e., 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree) for hope, optimism, resilience, self-efficacy and job performance. On the other hand, the five-point Likert scale ranging from 1=almost never, 2=rarely, 3=often, 4=very often and 5=always was used to measure work engagement. This study uses a self-administered structured questionnaire.

The questionnaires comprise three sections with 59 questions. The design includes multiple-choice questions and Likert scale questions. The questions were simplified and structured to avoid ambiguity and technical details. The first part was drawn to collect

information on the demographics of respondents, followed by the second part that aims to assess hope, optimism, resilience, self-efficacy. Later, the third part assessed the job performance capabilities of in role and extra role concept and finally the fourth part concerns with the mediating effect namely work engagement.

3.8 Measurement Design

The discussion of the variables and the items were adapted from the previous studies. According to De Vaus (2001), it can be observed that the measurement of construct or concept is defined as operational definition. The study comprises six major variables, namely hope, optimism, resilience and self-efficacy as the independent variables and work engagement as mediator while the job performance is the dependent variable.

3.8.1 Demographic

Seven (7) control variables included in this study were gender, marital status, age, race, years of working experience and previous organization background. These variables are measured as follows:

- i. Gender: The respondents are asking to report their gender and the answer is coded as: male and female.
- ii. Marital status: The respondents are asking to report their marital status and the answer is coded as: single, married and others.

- iii. Age: The respondents are requesting to report their group age in years such as less than 21-30 years old, 30-40 years old, 40-50 years old or more than 50 years old.
- iv. Race: The respondents are asking to report their race, whether they are Malay/bumiputra, Chinese, Indian or others.
- v. Years of working experience: The respondents are requested to state their years of working whether it is less than 3 years, 3-10 years, 10-20 years or more than 20 years.
- vi. Status of employment: The respondents are needed to state the previous employment status, be it government, or private institutions.
- vii. Previous background: The respondents are requested to answer their history of services and state which sector they have been working in before.

3.8.2 Psychological Capital (PsyCap)

PsyCap was measured using psychological capital questionnaires (PCQ) developed by Luthans, Avey and Avolio (2007). The researcher acquired the permission from the Mind Garden, the copyright owner of the questionnaire to reuse the questionnaire for the entitled research purpose and collecting data using their developed scale. Among the self-rater and other rater version, the researcher found that the self-rater version with 24 questions was the most suitable to be included in this thesis. The researcher also prefers to use PCQ-24 instead of PCQ-12 (shorter version) due to the

interest in testing all the measurements on the respondents as this field has rarely been tested in the Malaysian public sector.

Under the PCQ-24, all the four variables namely self-efficacy, hope, resilience and optimism were listed to test the hypotheses. Items of efficacy were adapted from Parker (1998), items of hope were adapted from Snyder et. al. (1996), items of resiliency were adapted from Wagnild and Young (1993) and the items of optimism were adapted from Scheier and Carver (1985).

Table 3.4 Psychological Capital Items

Code	Items	Sources
Self-Efficacy		
EFF-1	I feel confident analyzing a long-term problem to find a solution.	Luthans, Avey & Avolio (2007).
EFF-2	I feel confident in representing my work areas in meetings with management.	
EFF-3	I feel confident contributing to discussions about the organization's strategy.	
EFF-4	I feel confident helping to set targets/goals in my work area.	
EFF-5	I feel confident contacting people outside the organization (e.g. suppliers / customers) to discuss problems.	
EFF-6	I feel confident presenting information to a group of colleagues.	
Hope		
HO-1	If I should find myself in a traffic congestion at work, I could think of many ways to get out of it.	

Code	Items	Sources
HO-2	I am energetically pursuing my work goals.	
HO-3	I find there is a lot of ways to solve any problem.	
HO-4	I see myself as being successful at work.	
HO-5	I can think of many ways to reach my work goals.	
HO-6	At this time, I am meeting the work goals that I have set for myself.	
<i>Resilience</i>		
RES-1	When I have a setback at work, I have trouble recovering from it, or moving on.	
RES-2	I usually manage difficulties one way or another at work.	
RES-3	I can be “on my own”, so to speak, at my work.	
RES-4	I usually take stressful things at work in stride.	
RES-5	I can get through difficult times at work because I have experienced difficulties before.	
RES-6	I feel I can handle many things at a time in job.	
<i>Optimism</i>		
OPT-1	When things are uncertain for me at work, I usually expect the best.	
OPT-2	If something can go wrong for me work-wise, it will.	
OPT-3	I always look on the positive side regarding my job.	
OPT-4	I am optimistic about my future pertaining to work.	
OPT-5	In this job, things never work out the way I want to.	
OPT-6	I approach this job as “every cloud has a silver lining”.	

3.8.3 Job Performance

Job performance consists of 2 dimensions such as in-role performance and extra role performance. The details about the 2 dimensions will be explained in the next section.

3.8.3.1 In-role Performance

In-role performance is measured using a self-appraisal approach (Chughtai, 2008) which required the respondents to rate their performance based on job description and performance. The dimensions involved are communication skills, collaboration and team building skills, supervisory skills, leadership qualities, planning and organization skills and time management. These dimensions and items are taken from Tacoma Community College Assessment Form. This study used measurement based on appraisal approach because of to understand its employees' evaluation on their desiring skill set to perform a specific task. A good employee can helps an organization to understand its human capital needs and its weakness. It also highlights an individual's weakness and strength. With the help of different appraisal approach an organization can achieve the organizational objectives, individual objectives and also mutual objectives. The method of self-appraisal performance has been on previous research such as Ashforth and Saks (1996); Yousef (1998) and has produced satisfactory results.

Table 3.5 In Role Performance Items

Code	Items	Sources
IRP-1	I am able to compose written materials concisely.	Taken from: Tacoma Community College Assessment Form
IRP-2	I am able to communicate to diverse audiences.	
IRP-3	I am able to communicate one-to-one and in group settings.	
IRP-4	I am able to complete the task within the time given.	
IRP-5	I am approachable when colleagues need support.	
IRP-6	I am able to cooperate and coordinate with other administrators	
IRP-7	I am able to give clear instructions.	
IRP-8	I am able to monitor performances and give feedback.	
IRP-9	I am able to provide coaching in needed skill areas and support professional development.	
IRP-10	I am able to foster innovation.	

3.8.3.2 Extra role Performance

Extra role performance or familiarly known as OCB is measured using 15 items constructed and tested by Lievens and Anseel (2004), which originated from Konovsky and Organ (1996), with 32 items of the OCB questionnaire. From the original 32 items, Lievens and Anseel (2004) had come across the result and found that only 15 items were reliable and valid towards the end. Furthermore, from these 15 questions, the researcher chose only 9 questions to be inserted in the questionnaire based on the result and feedback from the content validity expert.

Table 3.6 Extra Role Performance Items

Code	Items	Sources
ERP-1	I will help to make another worker productive.	Lievens and Anseel (2004)
ERP-2	I will help others who have heavy workloads.	
ERP-3	I will help others who are absent.	
ERP-4	I do not complain about my work tasks.	
ERP-5	I maintain a clean workspace.	
ERP-6	I will always inform about company development.	
ERP-7	I will exceed my working hour to finish my tasks.	
ERP-8	I always find fault in what my organization is doing.	
ERP-9	I am willing to work overtime and over the weekend.	

3.8.4 Work Engagement

This variable was measured using an Utrecht Work Engagement (UWES) that is shortened to 9 items (UWES-9). UWES has been introduced and developed by Schaufeli, et al (2002) with 24 items listed and after psychometric evaluation, seven (7) unsound items were removed. Leaving only 17 questions, the shorter versions of UWES-9 are believed to be more comprehensive and fit the data best. UWES has been established concerning three (3) dimensions of work engagement namely vigor, dedication and absorption. This study chooses UWES as measurement because of the measurement to assesses levels of energy and mental resilience while working, along with sense of significance, inspiration, pride, challenge and concentration in work.

Table 3.7 Work Engagement Items

Code	Items	Sources
WEV-1	At my work, I feel bursting with energy.	Schaufeli, et al. (2002)
WEV-2	At my job, I feel strong and vigorous.	
WEV-3	When I get up in the morning, I feel like going to work.	
WEV-4	I am enthusiastic about my work.	
WEV-5	My job inspires me.	
WEV-6	I am proud of the work that I do.	
WEV-7	I feel happy when I am working intensely.	
WEV-8	I am immersed in my work.	
WEV-9	I get carried away when I am working.	

3.9 Content Validity

According to McMillan and Schumacher (2006), the validity of instruments is the extent to which uses made based on scores are reasonable and appropriate. The questionnaires are tested for both the face and content validity by experts who check for errors, ambiguity, and concept. One (1) academic expert in the human resource field of study checked the validity for the questionnaires and another one (1) expert from the industry was consulted to review the questions. The feedback obtained from these experts was used to improve the instruments. Participants for the content validation study were experts from the human resource and management academic field (CV1) and Senior Vice Manager (Administration) in one of the mega listed organizations in Malaysia

(CV2). From the feedback, CV1 and CV2 have supported and agreed with the questions and beliefs that, it was appropriate for the current situation that exists and is happening in the world of organization nowadays. They strongly believe that this kind of question might help in giving the research proper analyses and findings because the questions are found to be complete and justifiable.

3.10 Pilot Test

According to De Vaus (2002), carrying out pilot testing is always advisable for the first draft of the questionnaire before the actual survey is conducted. The purpose is to confirm the pilot study instruments for data collection to measure the validity of the items and review the items (Kumar et al. 2018). Also, the pilot test can help researchers determine the design of sample size and components appropriate to achieve the desired level.

3.10.1 Reliability Test

According to Hair, Ringle and Sarstedt (2011) reliability measurement ensures the level of internal consistency among multiple measurements of a construct with a similar population or within the same population. There are different methods to estimate the reliability of the construct. However, the most widely used method is Cronbach's alpha (Sekaran, 2006). The Cronbach's alpha reliability coefficient is examined from the

Cronbach's alpha coefficient that ranges between 0 and 1, the greater would indicate the higher internal consistency of the items in the scale. Consistent measurement items can measure the reliability coefficient known as Cronbach's alpha values whereby >0.70 are acceptable, while >0.80 are good and >0.90 are considered excellent (Nunnally, 1978). Moreover, the minimum acceptable level for the exploratory research of Cronbach's alpha value is 0.60 (Hair et. al., 2010).

In this study, a pilot study was conducted to test the reliability of the survey methods and items on the respondents. A pilot study involved 50 administrators from multiple departments in *Pejabat Setiausaha Kerajaan Negeri Perak* (SUK). Before initiating the pilot study, the Human Resource Department in SUK Perak has been approached and explained with regard to the process and objectives of this study. The confidentiality of their answers and responses was explained and they were asked to answer as openly as they could. The procedure involved are similar to the procedure of the actual study, whereby the respondents were asked to submit their responses from the questionnaire provided and their direct responses were taken if there were any ambiguous, confusing questions. Table 3.8 shows the reliability of construct to be used in measuring the variables.

The reliability of the instruments based on the pilot study was tabulated in table 3.8. The findings show that the Cronbach's alpha (α) for all constructs reported were above of .70 (ranging from 0.72 to 0.92) and thus, it was considered reliable.

Table 3.8 Reliability of Variables

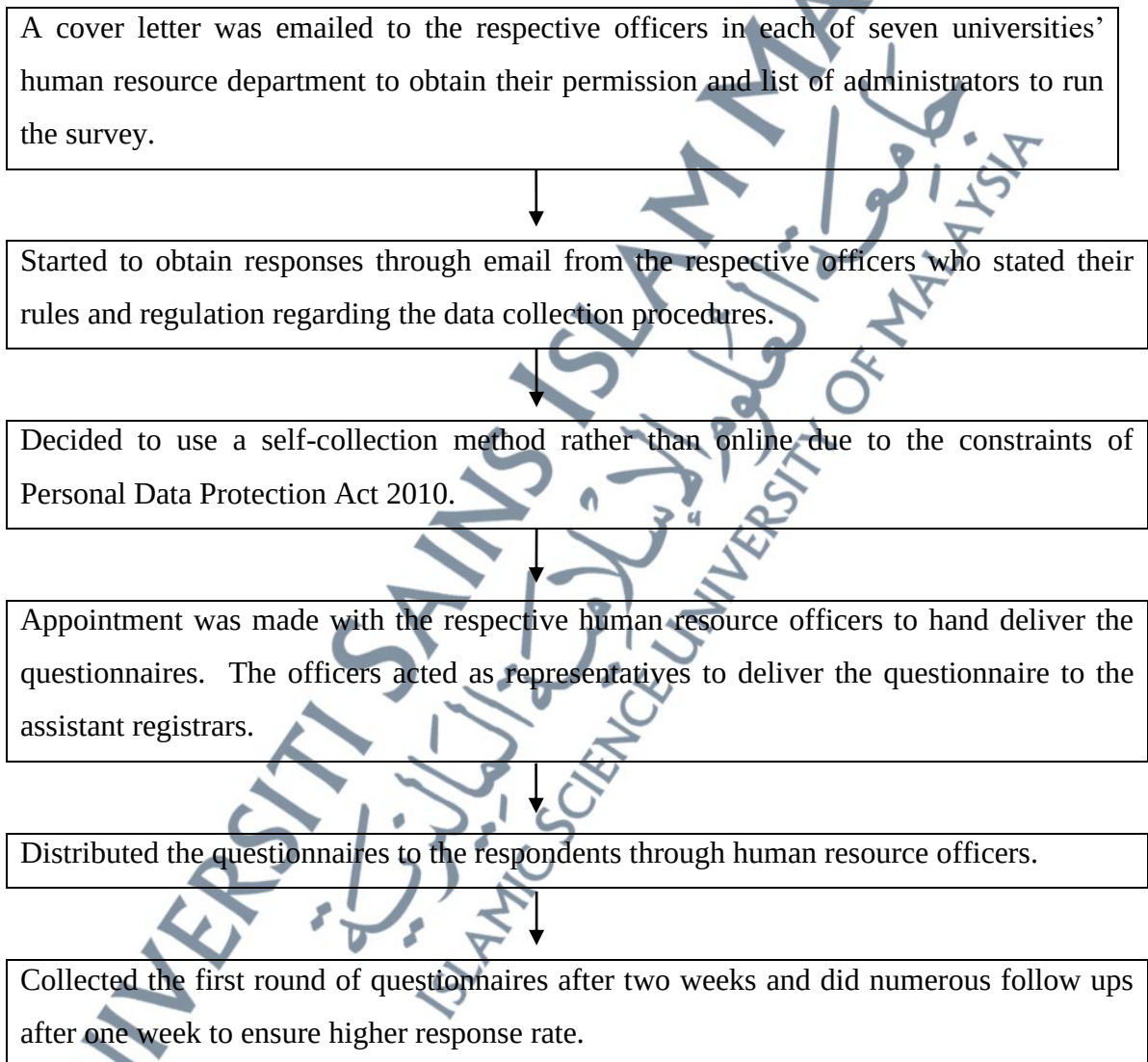
Variables	Total Items	Cronbach's alpha (α)
<i>Job Performance</i>		
In-role performance	10	0.80
Extra role performance (OCB)	9	0.82
<i>Psychological Capital</i>		
Efficacy	6	0.92
Hope	6	0.90
Resilience	6	0.82
Optimism	6	0.88
<i>Work Engagement</i>		
Vigor	3	0.72
Dedication	3	0.84
Absorption	3	0.71

3.11 Data Collection Procedures

The data from this study were collected using sets of questionnaires that are personally delivered to all 214 respondents in seven (7) public universities' assistant registrars in Klang Valley. The questionnaires distribution was on December 5, 2006 and it took almost 6 (six) months to collect all the questionnaires back until get the fully satisfied response rate. The researcher opted to hand deliver the questionnaire upon the request from some universities' human resource departments to keep the confidentiality and privacy of their staff. A cover letter accompanied the questionnaires and a two-week grace period was given to the respondents to submit their feedback. After two weeks, a reminder has been sent to the non-respondents to return their questionnaires and another

one week was given for them to respond. The summary of the data collection procedures is as follows:

Figure 3.2 The Data Collection Procedures



The researcher had emailed the request letters to all the universities involved to obtain their permission and views to do the survey. The respective human resource officers were briefed with the enclosed official letter from USIM Center for Graduate Studies (CGS). However, five from the seven universities requested for the questionnaires to be hand-delivered through human resource department rather than direct negotiation following the Personal Data Protection Act 2010. Instead of this barrier, the researcher had agreed to meet the human resource officers and deliver the questionnaires. After two weeks, the questionnaires were collected via the human resource officers with 80% of response rate and the researcher decided to give one-week additional time to collect all the 214 sets of questionnaires that were distributed earlier.

3.12 Data Analysis

Data from the questionnaire were then analyzed using two main statistical software, the IBM SPSS Version 23.0 and AMOS Version 23.0.

3.12.1 Descriptive Analysis

Descriptive analysis can be used to review, organize, and describe the set of scores or results. The use of descriptive analysis is to summarize sets of individual measurements from the survey questionnaire (e.g., professional background and working experience) so that they can be clearly presented and interpreted. Besides, it can also report the performed frequencies and percentage of the data.

3.12.2 Inferential Analysis

The inferential analysis technique was performed using the Structural Equation Modelling (SEM) AMOS. Structure Equation Modelling (SEM), by contrast, is intended to maximize and to test the degree of consistency between the model and data (Ringle et. al., 2011). SEM allows for the modelling of simultaneous relationships among the independent and dependent constructs (Gefen & Straub, 2005). Apart from that, SEM is also used to run the factor and path-model analysis simultaneously in Analysis of Moment Structures (AMOS), in order to confirm the research model. Most importantly, other similar research had also utilised the SEM Amos as a data analysis technique in job performance (Chughtai & Buckley, 2011), also in psychological capital (Priyatama, Zainudin & Handoyo, 2018).

Table 3.9 Measurements Fit Indices for the SEM analysis

Fit Indices	Description
Factor Loading	The correlation between a new variable and the previously developed variable of the study is known as factor loading (Hair, Bush, & Ortinau, 2003).
CFI	The goodness of model between proposed model and independence model can be determined through the Comparative Fit Index (CFI) (Moss, 2009), However, the CFI value must be more than 0.90 Byrne, 2010).
RMSEA	Hair et. al. (2006) explained that Root Mean Square of Approximation (RMSEA) is determined by how well a model fits a population, not just a sample used for estimation. RMSEA with lower values indicate a better fit while the value of 0.10 indicates a —good value for most acceptable models. RMSEA is a confidence interval that can be constructed giving the range of RMSEA values for a given level of

Fit Indices	Description
	confidence. Thus, RMSEA is between 0.03 and 0.08, for example, with 95% confidence.
Normed square	Moss (2009) stated that chi-square index is less sensitive to sample size. Normed chi-square is χ^2/df to make the χ^2 less dependent on sample size. The desired value for normed Chi-square is less than 3.
Chi-square	Hair et. al. (2006) stated that the chi-square test can provide a statistical test of the resulting difference. SEM estimation procedures such as maximum likelihood produce parameter estimates that mathematically maximize this difference for a specified model
Degree of freedom (df)	The total mathematical information which is used to approximate the model parameter is represented by the term, the degree of freedom (Hair et. al., 2006).

Sources: Chin, (2011)

From Table 3.9, a comparison of the fit indices produced by AMOS for the structural model indicates that the chi-square is significant, which in turn, implies that the model does not have a good fit. However, it is generally agreed among scholars that the chi-square tends to be significant where the assumptions of the structural equation model are violated or where the sample size is large ($N > 200$). Therefore, since a large sample size is used in this study, it might have caused the significance of the chi-square value. Besides chi-square and its degree of freedom, the alternative GOF indices had proven that the model has a good fit. Table 3.10 shows the GOF measure recommended cut-off value.

Table 3.10 Goodness-of-fit (GOF) indices

	Name of Category	Name of Index	Level of Acceptance
1.	Absolute fit	RMSEA	RMSEA < 0.08
2.	Incremental fit	CFI	CFI > 0.90
		TLI	TLI > 0.90
3.	Parsimonious fit	Chisq/df	Chi-Square/ df < 3.0

SEM is similar to the combination of multiple regression and factor analysis. With the use of SEM, the researcher was able to deal with multi-collinearity and methods for taking into account the unreliability of the data collected in the survey questionnaire in a more effective way (Awang et al. 2015). This research will use SEM and AMOS as tools from the SPSS Inc. AMOS is specially designed to complement SEM and it has a unique graphical interface.

3.13 Measurement Model

Apart from that, SEM adopts a confirmatory factor analysis (CFA) approach to analyze the structural theory based on a specific event by linking the regression analysis with factor analysis (Byrne, 2010). SEM consists of a group of statistical models that can interpret the results of the relationships between variables (Hair et. al., 2006). Its purpose is to test multiple equations involving relationships. No other techniques or models will enable the researcher to test both the measurement properties and relationships at the same time.

There are six stages under the SEM analysis: (1) To define the individual constructs (CFA), (2) To develop the measurement model, (3) To design the study to obtain empirical results, (4) To evaluate the validity of the measurement model, (5) To describe the structural model, and (6) To measure the validity of the structural model (Hair et al., 2006). Validity is the measurement of the degree or the ability of an instrument to measure what it is supposed to measure. In short, it emphasizes the accuracy of a measurement instrument (Cooper, Schindler & Sun, 2006). On the other hand, construct validity is tied to the theories. In other words, there must be existing conceptual or theoretical evidence on the measurement instrument. The construct validity of this research was counted for by deriving the determinants of engagement behavior from the existing literature. There are two types of construct validity: convergent validity and discriminant validity, which can be tested by deducing the results of the confirmatory factor analysis (CFA) (Straub et. al., 2004).

CFA is usually used to test a hypothesis with a factor structure where the factor loading is zero when testing the first factor with the first independent variable (IV). In short, CFA is used to develop a reliability test for the independent variables. Besides that, this study also uses the measurement model to test the degree of interrelationships as well as the co-variation between the latent constructs. For CFA, it produces goodness-of-fit measures to evaluate the model as shown in Table 3.10. All factors that were determined in this study: hope, resilience, self-efficacy, optimism, work engagement and job performance will be analyzed and tested for model fit through Pooled-CFA (Awang et al.

2015). The Pooled-CFA method can assess the unidimensionality, validity, and reliability of a latent construct. The measurement model is the mapping of measures onto theoretical constructs. The purpose is to test for specification error which will help to approximate a structural model which is identified or approximates a confirmatory factor analysis model (no causation, just correlations between the latent variables). The measurement model must first fit before the structural model can be interpreted (Hair et. al, 2013).

3.14 Structural Model

The researcher 's definition and explanation of the relationships between the factors are described in the structural model. The model includes a set of exogenous and endogenous latent variables as well as its direct effects, error variance and the relationship between all the variables. Any variable which is not measured or measured but has an error will reflect in error variance. The exogenous latent variables are conceptualized in order to affect the variance of the other latent variables in the model. As for endogenous latent variables, they are usually influenced by the exogenous variables either directly or indirectly. In contrary, the variance in the values of endogenous variables is explainable because all latent variables which affect the variance are included in the model. According to Hair et. al. (2010), the proposed framework is considered valid to the extent that the parameter estimates are statistically significant and in the predicted direction. If

the model fits the data and the parameter estimates are significant and in the predicted direction, the structural model is assessed.

3.15 Mediation Analysis

To test the mediating effect according to research objective three, there is step being identified by Awang, Afthanorhan and Asri (2015).

- i. The direct effect of independent variable on dependent variable is significant.
- ii. When M (mediator variable) enters the model, the direct effect would be reduced. It is because the effect has moved through the mediator.
- iii. Partial mediation occurs when the direct effect is significant, and M (mediator variable) reduced the mediation effect.
- iv. Meanwhile, full mediation occurs when the direct effect it is not significant, and M (mediator variable) reduced the mediation effect.

3.16 Conclusion

This chapter outlined the research methodology and quantitative designs that are used in this thesis. In the sub sections, the research design model includes population and sampling, measurement, data collection procedures and data analysis procedures. The direction of relationships among variables in this study is depicted through the explanation of the research questions and methodological design.