Chapter 3  Research Design

The preceding chapter outlined the six research questions to be addressed. To address these questions, the choice of appropriate paradigms and methods is crucial, as the best research design would be the one that can address the research questions effectively and with the utmost inferential quality. The first research question is ‘Has changing from OAS to SA system affected compliance behaviour of Malaysian individual taxpayers?’ The other five research questions encompass varying causes that were likely to affect taxpayers’ compliance behaviour as the result of the introduction of SA. These other causes were the assessment system, tax structure features, taxpayers’ tax knowledge, their financial constraints and their attitudes towards tax. Given the nature of these questions, a single research paradigm was considered at the outset to be insufficient to gather adequate evidence and to achieve the objectives of this research. Further, “...the use of multiple methods can neutralise...” some of the limitations or “...disadvantages of certain methods” (Creswell et al 2003:211). As such, a mixed method strategy, encompassing both the quantitative and qualitative research paradigms was considered to be the most appropriate design. The mixed method research design adopted herein includes a survey, an experimental design and a case study. The validity of the findings would be greatly enhanced as the consolidated and triangulated results of the survey, experimental design and case study would provide more reliable evidence to address the research questions when compared with findings based on any one single method.

This chapter begins with the introduction of the quantitative and qualitative research paradigms and the methods associated with these paradigms. A more robust rationale for using a mixed method design is then provided. This is followed by discussions and justifications of the chosen methods (namely, survey, experiment and case study). Within each method, the description of the research instrument used, application of the instruments or procedures, data analysis techniques and the appropriateness of each technique used, are outlined. Finally, the chapter concludes with detailed justifications of the mixed method and the linkages between the research questions and the three phrases of data collection, including the appropriate data analysis techniques.
Chapter 3 Research Design

3.1 Research design

A quantitative research paradigm is an approach or study for developing knowledge (Creswell 2003:118). This paradigm draws and develops knowledge from various literatures or evidence and deductively forms a framework to develop research questions and subsequently formulate relevant hypotheses (Ticehurst & Veal 2000). Rational investigation of real world phenomena is conducted to yield universal truth about the character or behaviour of such phenomena (Riley et al 2000:10). The behaviours are explained based on facts and observations gathered using theories and models that have been developed (Ticehurst & Veal 2000).

Generally, the methods employed in the quantitative research paradigm usually build on the principles of a positivist approach (Riley et al 2000; Neuman 2003) in which it is assumed that, in reality, a cause and effect relationship exists between variables. To test the relationships between the variables, strategies such as surveys, experiments, observations or data from secondary sources are employed. A survey or an experiment normally involves the collection of data via predetermined instruments, of which questionnaires are commonly used. It is acknowledged that questionnaire-based research carries limitations in terms of being solely dependent on the respondents’ self-reported behaviour, attitude or intention (Hasseldine & Li 1999:98). In order to improve the reliability of the results, data collected is often from large populations. It is then analysed and interpreted statistically by either accepting or not accepting a particular hypothesis. If a hypothesis is accepted, it “...technically is a contribution to theory...” (Riley et al 2000:11). In addition, results may be generalised with a series of descriptive information and some indications of their statistical significance. Nevertheless, the quantitative research paradigm has been criticised for its failure to incorporate a broader range of information, neglecting the essence of life and unable to capture the real meaning of social behaviour (Tashakkori & Teddlie 1998; Sarantakos 1999).

In contrast, the qualitative research paradigm builds on the principle of a critical interpretive approach (Ticehurst & Veal 2000; Neuman 2003) which is “...a field of inquiry in its own right” (Denzin & Lincoln 2000:2). A critical interpretive approach is more inclined towards uncovering meanings and understandings of broad interrelationships. It also places more reliance on the population being studied to
provide their own explanation of their behaviour. Further, the qualitative research paradigm is usually adopted for identification, description and explanation-generation and generally involves the gathering of information from a small number of people (Ticehurst & Veal 2000). The objective is to understand the meaning of individual experience that are socially and historically constructed, "...with an intent of developing a theory or pattern" (Creswell 2003:18).

In addition, the qualitative research paradigm aims at explaining an observed phenomenon that does not involve any formation of hypotheses. Typically, under this research paradigm, methods of inquiry to gather data include the use of narratives, phenomenologies, ethnographies, grounded theory studies or case studies. Both phenomenologies and ethnographies require researchers to carry out studies over a prolonged period. A phenomenological study requires researchers to 'leave' their own experience in order to understand the experience encountered by the subjects. The research process under ethnographies "...typically evolves contextually in response to the lived realities encountered in the field setting" (LeCompte & Schensul 1999, quoted in Creswell 2003:14). In comparison, a grounded theory study requires multiple stages of data collection and refinement by constantly comparing data of different sample groups in order to maximise the similarities and differences of information gathered (Charmaz 2000). These methods of inquiry (other than case study) require a prolonged period of data gathering. Given this requirement, a case study was considered a more appropriate\(^{223}\) option for this research.

A case study allows researchers to explore in depth one or more subjects or observations. Data gathered through various procedures and case(s) are bounded by time and activity (Burns 1994). Through an inductive approach, a case study aims to discover theory rather than the verification of existing theories (Merriam 1998; Gillham 2000). As a result, there is no manipulation of variables and no predetermined outcomes. This does not mean that a researcher should have an 'empty mind' of what to research on. In fact, a researcher should have a set of

---

\(^{223}\) A case study is considered an appropriate option based on the grounds that firstly, the main objective of this research is to explore on the influence of the introduction of SA on individual taxpayers' compliance behaviour. Secondly, the necessary and relatively short timeframe for collection of relevant data for this research was during the transition from OAS to SA (i.e. the timeframe just prior to and after the implementation of SA).
research objectives, which will guide the formulation of the relevant research framework and the process and conduct of the research.

Regardless of the method of inquiry, studies using the qualitative research paradigm do not make general statements about large or total populations. The qualitative paradigm has been criticised for being selective in reporting results because no simple data reduction method is available (Tashakkori & Teddlie 1998). However, studies using the qualitative paradigm are useful when the focus of research is on the attitudes and behaviour of a population (Ticehurst & Veal 2000). The purpose of this research involves the understanding of individual taxpayers' attitudes and behaviour, which in itself could be too complex to be addressed with quantitative methods of inquiry. Hence, logically a qualitative paradigm could complement what the quantitative paradigm is unable to offer (Newman et al 2003).

Quantitative and qualitative research approaches differ in terms of their objectives, the nature of the data collected, the assumptions made about social life, and their inherent limitations. However, the superiority of combining both paradigms in a mixed method approach, whereby they could complement each other in searching for comprehensive answers to the research questions is well recognised (Tashakkori & Teddlie 1998; Denzin & Lincoln 2000; Neuman 2003).

3.1.1 A mixed method approach

The concept of a mixed method approach came from a psychology study by Campbell and Fiske in 1959 (quoted in Creswell 2003:15). A mixed method is also known as a triangulation of different data collection strategies involving mixing qualitative and quantitative styles of research and data (Neuman 2003:139; Creswell 2003). It is argued that triangulation will neutralise any inherent bias in a single method. It is also widely suggested that for most applications of social and behavioural sciences, a mixed method approach is the most appropriate research design in answering research questions, rather than solely relying on either a quantitative or qualitative approach (Tashakkori & Teddlie 1998:x). Moreover,

"...mixed methodology adds complexity to a design and uses the advantages of both the qualitative and quantitative paradigms...the overall design perhaps best mirrors the research process of working back and forth between
Chapter 3  Research Design

"inductive and deductive models of thinking in a research study" (Creswell 1995:178).

Mixing styles can be conducted either sequentially (Dressler 1991, quoted in Neuman 2003:139) or simultaneously. A sequential strategy involves the collection and analysis of quantitative data followed by the collection and analysis of qualitative data or vice versa. Results of the later phase are used to assist in explaining and interpreting the earlier results. Conversely, in a simultaneous strategy, both data collection phases are conducted at the same time. The objective of using different methods is to confirm, cross-validate, or corroborate findings within a single study (Greene, Caracelli & Graham 1989; Morgan 1998; Steckler et al 1992, quoted in Creswell 2003:217). Hence, a mixed method research design, comprising of both the qualitative and quantitative paradigms, combines the rigor and precision of quantitative designs and qualitative data with the in-depth understanding of qualitative methods. Further, data and findings from each of the methods can be complementary and used for cross-validation.

With the understanding of the benefits and strength derived from a mixed method approach, the following section presents and justifies the three methods implemented concurrently in three phases between November 2004 and July 2005. Phase I and Phase II are related to the quantitative research paradigm from which a survey and an experimental design were conducted respectively. Phase III utilises a qualitative research paradigm from which a case study was conducted. Discussion on each of the three phases is set out in the following sections.

3.2 Survey

A survey, as a quantitative method, was conducted to establish the extent to which the five categories of causes, based on literature, namely: assessment system, tax knowledge, tax structure features, financial constraints and attitudes towards tax, had influenced compliance behaviour (Lewis 1982b; Jackson & Milliron 1986; Roth, Scholz & Witte 1989). The survey method was chosen because it is "...a system for collecting information to describe, compare or explain knowledge, attitude and practices or behaviour" (Fink, 1995a:1). In addition, since this research also touches

---

224 Also known as concurrent strategy (Creswell 2003:217).
225 See 1.3.
on the behavioural aspects of tax compliance, a survey would be an appropriate method to gather information on SA factors relating to taxpayers’ knowledge of the tax law and also on demographic and cultural variables (Hasseldine, Kaplan & Fuller 1994; Andreoni, Erard & Feinstein 1998). Surveys are normally attempts to cover a representative sample of a given population. Therefore, for respondents located in a wide geographical area such as Malaysia, a mail survey was previously found to be the most reasonable method (Ahmad Mahdzan 1997). For a large-scale study, a mail survey is relatively cheaper and a common means of obtaining information. One important advantage of a mail survey is that it generally enables respondents to complete the questionnaires at their own time, the convenience of which may be significant as compared with the usual single interview (Sandford 1995). Further, surveys involving questionnaires generally consist of many items that, when combined, would be expected to produce more reliable measures than would any single item (Dooley 2001:100).

There is no doubt that the most common limitation of a mail survey is that the response rate is often very low. In addition, a mail survey relies on the respondents’ honesty and their ability to correctly interpret the questions (Hasseldine, Kaplan & Fuller 1994; Sandford 1995; Hasseldine & Li 1999). However, these limitations can be minimised to some extent, for example, by follow up mailings to improve the response rate, and by proper pilot testing to improve the comprehensibility of the instrument.

Broadly, the survey was designed to include tax and non-tax factors as determinants of individual taxpayers’ compliance behaviour and to address the impacts of these factors on their compliance behaviour. The determinants (or tax factors) included were the assessment system, tax structure, tax knowledge and attitudes towards tax. The non-tax factors included were those related to financial constraints (such as marital status, number of dependants and income level) which could be determinants of individual taxpayers’ compliance behaviour. The non-tax factors also included the characteristics and background of the individual taxpayers (such as gender, level of education, occupation, age, ethnic group) which may have mediating effects on

226 The total area of Malaysia is 328,600 kilometres$^3$ of which Peninsular Malaysia is 131,600 kilometres$^2$, Sabah is 73700 kilometres$^2$ and Sarawak is 123,300 kilometres$^2$. Peninsular Malaysia is separated from Sabah and Sarawak by 720 kilometres. (Source:http://www.rrcap.unep.org/le/cd/html/countryrep/malaysia/studyarea.html).
the determinants of compliance behaviour. Discussion on the implementation and data analysis techniques is set out below.

3.2.1 Instrument and procedures

The survey instrument consisted of open-ended and closed questions in three major parts (see Appendix VI). Part I solicited information on the profile of respondents. This part contained items that were mostly related to the moderating factors as shown in Figure 2.7. Part II\textsuperscript{227} contained items relating to one of the independent variables/causes (i.e. tax knowledge). Overall, Part II attempted to investigate the respondents’ level of tax knowledge in relation to personal taxation. This included knowledge in relation to the type of income taxable, relief available, rebates allowable to individual taxpayers and a simple computation of tax liabilities. Questions on taxable income and exempted income formed the first two dependent variables. For questions on the reporting of taxable income, it was assumed that ‘yes’ responses by respondents would indicate that they ‘complied’ while ‘no’ responses indicated ‘non-compliance’ and ‘not sure’ responses indicated ‘unintentional non-compliance’. For questions on reporting of exempted income, ‘yes’ responses indicated that the respondents ‘over complied’, ‘no’ responses indicated they ‘complied’ and ‘not sure’ responses indicated ‘unintentional non-compliance’. Respondents who were SE were requested to respond to questions in an additional section on business income and deductions, the objective of which was to assess their knowledge on issues pertaining to business taxation.

Part III of the survey instrument attempted to investigate other independent variables/causes as stated in Figure 2.7. These variables included perceptions on the change of assessment system and experience encountered by respondents. The experience encountered included dealings with the tax authority, perceptions in relation to fairness of the tax system and issues pertaining to morals and attitudes towards the tax system. This part consisted of statements that required responses based on a five-point Likert scale, ranging from strong agreement to strong disagreement.\textsuperscript{228} The next section of Part III required respondents to indicate their level of confidence relating to assessments and returns. The last three questions of

\textsuperscript{227} Except items in F2 and F3 (see Appendix VI) which were related to tax structure.

\textsuperscript{228} For the purpose of statistical analysis, the scale was coded as, 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree and 5=strong agree.
Part III were related to the reporting of casual income, which formed the third dependent variable. Similar to the reporting of taxable income discussed above, it was assumed that when respondents responded ‘yes’ it indicated that they ‘complied’, if ‘no’ it indicated ‘non-compliance’ and if the respondents were ‘not sure’, it indicated ‘unintentional non-compliance’.\(^{229}\) Finally, the last section contained an open-ended question that provided an opportunity for respondents to comment on any issue that may be relevant to tax compliance.

The survey was conducted in two stages. The first stage was conducted between November 2004 and January 2005, before the actual submission of the tax returns under SA. The second stage was conducted between April 2005 and July 2005, after the implementation of SA and the submission of self assessed returns. For both stages, a repeated survey design or ‘repeated cross-sectional design’ was adopted (Firebaugh 1997) where a similar survey instrument was used but targeted at different samples. The selection of a randomised sample was done independently, both in the first and second stages of the survey. The main reason for carrying out a repeated survey before and after the implementation of SA was to focus on how the introduction of the SA may have influenced compliance behaviour.

The questionnaires were prepared in both the English and Malay languages. A covering letter was included describing the nature of the survey and stressing that complete anonymity was guaranteed [see Appendix VII (a) & (b)]. Due to the sensitive nature of tax issues, the covering letter also emphasised that the research was not conducted by or on behalf of the IRB.

Questionnaires were distributed to a total of 6,000\(^{230}\) respondents\(^{231}\) who were selected on a random basis drawing from local telephone directories. This sample

---

\(^{229}\) Responses on K19 were slightly different from K17 and K18 (see Appendix VI), where ‘all’ indicated ‘complied’, ‘not sure’ indicated ‘unintentional non-compliance’, while the remaining responses indicated ‘non-compliance’.

\(^{230}\) The total consisted of 2,500 questionnaires, which were distributed to potential respondents in the first stage i.e. before the implementation of SA system and 3,500 to potential respondents in the second stage i.e. after the implementation of SA system (see Table 3.1).

\(^{231}\) Following the requirement of random selection as approved by The Human Research Ethics Committee (Ref: 7526), potential respondents were selected randomly. Hence, during the process of selection, the researcher had no prior knowledge as to which category of taxpayers (SW or SE) the potential respondents belonged.
size was drawn from multiple phases of sample selections\textsuperscript{232} in order to draw sufficient usable responses for statistical analysis. In terms of determining the sample size, there are a number of views. It has been proposed that the appropriate sample size for most survey research should be larger than 30 and less than 500 (Sekaran 2003). However, in order to analyse the data using multivariate statistical analysis, it has been argued that the sample size should be several times more (preferable ten times or more) than the numbers of variables\textsuperscript{233} under study (Sekaran 2003:295). For practical purposes in conducting a survey, Fowler (1993:14) suggested that a random sample size of 150 would describe a population of 15,000 or 15 million with virtually the same degree of accuracy. Taking these views into consideration, the above sample size is considered adequate to describe the Malaysian population of approximately 26 million with total individual taxpayers of approximately 3 million. When deciding on the sample size for this research, non-responses were also considered. Based on this sample size and method, a response rate of 20 per cent was expected, which is consistent with random survey research carried out in Malaysia (Kasipillai et al 1999; Nik Ahmad & Sulaiman 2005).

Prior to the conduct of the survey, a pilot study was carried out among a small group of individual taxpayers (academics, professionals and other lay taxpayers) in order to assess the validity of the research instrument and to enhance its reliability, and to improve and refine the wording used in the questionnaires. Effective piloting can improve the wording of questionnaires and make it "...possible to obtain high reliability of response" (Robson 2002:231).

The reliability is operationalised as internal consistency where the degree of intercorrelations among items with the same concept is measured (Sekaran 2000). Cronbach's coefficient alpha is one common inter-item reliability measure applicable to multi-item tests (Dooley 2001). A Cronbach's alpha of 0.70 or more is desirable as an adequate indicator of the internal consistency (Devellis 2003).

\textsuperscript{232} For example, in the second stage (post SA survey), 800 potential respondents were randomly selected in the first phase. Due to insufficient questionnaires being returned within two weeks, the second phase of sample selection was carried out, which involved another 800 potential respondents. Similar procedures were carried out for phase III and IV. In the final phase, only 300 potential respondents were selected randomly.

\textsuperscript{233} Theoretically, there are five independent variables and one moderating variable to be tested in this research.
To ensure the validity of the responses, some questions were negatively worded. In addition, the researcher carefully scrutinised and checked each questionnaire returned prior to coding. Questionnaires with completely unrealistic responses (obvious outliers) were rejected.

To assess the construct validity of a measure, factor analysis can be used (Kim & Muler 1978, quoted in Dooley 2001:90) to identify how many different constructs (or factors) of a test’s items, and the extent to which each item of a test, is related to each factor being measured. After correlating all the items of a test, factor analysis is then able to identify groups of items that correlate more highly among themselves than with items outside the groups. Hence, each such group of items defines a common factor. Normally, factor analysis is used when the measurement has theoretical expectable factor structure (usually unidimensional) (Dooley 2001).

Out of the 6,000 questionnaires distributed, a total of 939 questionnaires were returned, of which 350 were from the pre SA survey and 589 from the post SA survey (see Table 3.1). The response rates\textsuperscript{234} for both surveys were marginally lower than expected. However, the total number returned was sufficient for statistical analysis as suggested earlier.

<table>
<thead>
<tr>
<th></th>
<th>Total Distributed</th>
<th>Total Returned</th>
<th>Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre SA survey</td>
<td>2,500</td>
<td>350</td>
<td>14%</td>
</tr>
<tr>
<td>Post SA survey</td>
<td>3,500</td>
<td>589</td>
<td>17%</td>
</tr>
<tr>
<td>Total</td>
<td>6,000</td>
<td>939</td>
<td></td>
</tr>
</tbody>
</table>

3.2.2 Data analysis techniques

The data obtained from the survey questionnaires was coded and analysed using SPSS and Genstat\textsuperscript{235} packages. Negatively worded questions were recoded in order to be consistent with other questions. For questions used as dependent variables (as

\textsuperscript{234} Non-response bias could not be computed due to the nature of random sampling as approved by the Human Research Ethics Committee. Similarly, the non-response follow up could not be carried out due to the limited time frame available for the pre and the post SA situations. In addition, in a mail survey, one usually does not know how biased non-responses are (Fowler 1993:40). The possibility of non-responses might be due to the low tax literacy of respondents in understanding the questionnaires, or that tax may be a sensitive issue to which most people would not want to respond.

\textsuperscript{235} Genstat software was used to conduct the ordinal stepwise logistic regression; other analyses were conducted using SPSS software.
mentioned in 3.2.1 above), the aggregate scores of the questions were further recoded to form three dependent variables. Four questions on taxable income formed dependent variable 1; three questions on exempted income formed dependent variable 2; and three questions on casual income formed dependent variable 3.

Data was analysed using both descriptive and inferential statistics. Generally, descriptive statistics describe the patterns of behaviour, whereas inferential statistics use probability arguments to generalise findings from samples to population of interest. Descriptive statistics such as frequency, mean ($\bar{x}$) and standard deviation ($s$) were utilised to analyse the profile of respondents such as their demographic and specific socio-economic backgrounds. These descriptive statistics were also used to illustrate the level of tax knowledge as well as the perceptions and attitudes of respondents. To examine the association between variables, cross tabulation\(^{236}\) was used. In addition, chi square ($\chi^2$) (goodness of fit) tests and $p$-value measure of statistical significance were used to determine whether a set of data matches a specific probability distribution; and compare the observed frequencies in a category to the frequencies that are theoretically expected if the data follows a specific probability distribution (Bryman & Cramer 2005). Chi square was also used to test whether there were significant differences between the pre and post SA surveys on the relevant variables.

For both the pre and post SA surveys, as the dependent variables consist of polytomous\(^{237}\) categories with ordinal data, and the independent variables consist of a combination of continuous and discrete data (see Table 3.2), it

"...cannot be easily modelled with a classical regression. Ordinary linear regression is inappropriate because of the non-interval nature of the dependent variable – the spacing of the outcome choices cannot be assumed to be uniform. On the other hand, multinomial logit models,..., though they could be used, would fail to account for the ordinal nature of the dependent

---

\(^{236}\) It was suggested that for cross tab "...if one or more variables are nominal, multivariate analysis through contingency tables is probably the best way forward for most purposes" (Bryman & Cramer 2005:295).

\(^{237}\) In a polytomous (also called polychotomous or multinomial) case, the dependent variable has more than two categories rather than two categories as in a dichotomous situation.
variable and thus not employ all the information available in that variable”  
(Liao 1994:37).

Hence, an ordinal stepwise\(^{238}\) logistic regression\(^{239}\) analysis with logit function (as in generalised linear model techniques\(^{240}\)) was considered appropriate to analyse the relationship between a single dependent variable\(^{241}\) and a few independent variables for the pre SA and post SA surveys respectively. It can also determine the effect of all the five main categories of causes/factors and the two moderating variables on the three separate dependent variables.

**Table 3.2: Variables and types of data**

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Type of data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taxable income (DV1)</td>
<td>Ordinal (1,2,3)</td>
</tr>
<tr>
<td>Exempted income (DV2)</td>
<td>Ordinal (1,2,3)</td>
</tr>
<tr>
<td>Casual income (DV3)</td>
<td>Ordinal (1,2,3)</td>
</tr>
<tr>
<td><strong>Independent Variables:</strong></td>
<td></td>
</tr>
<tr>
<td>Assessment system (AS)</td>
<td>Continuous</td>
</tr>
<tr>
<td>Tax knowledge (TK)</td>
<td>Continuous</td>
</tr>
<tr>
<td>Tax structure features (TS)</td>
<td>Continuous</td>
</tr>
<tr>
<td>Financial constraints (FC)</td>
<td>Continuous</td>
</tr>
<tr>
<td>Attitude towards tax (AP)</td>
<td>Continuous</td>
</tr>
<tr>
<td><strong>Moderating Variables:</strong></td>
<td></td>
</tr>
<tr>
<td>Demography variables</td>
<td>Categorical/nominal</td>
</tr>
</tbody>
</table>

\(^{238}\) Stepwise logistic regression is “...best seen as a screening or hypothesis generating techniques” (Tabachnick & Fidell 2001:535). Stepwise was criticised “...as an admission of ignorance about the phenomena being studied...” (Studermund & Cassidy 1987, quoted in Menard 1995:54). However, proponents of the use of stepwise procedures argue that it is useful in predictive and exploratory research where a model can be identified, that includes a set of predictors that provides accurate predictions of some phenomena (Menard 1995).

\(^{239}\) Pampel (2000:v) argued that an ordinary least squares regression produced an inefficient estimation because of multiple problems caused by heteroscedasticity, non-normal error term, non-linearity, and predicted probabilities beyond 1.0. This “...can be overcome with a logit dependent variable; that is, a dependent variable that is the natural log of the odds of Y occurring or not...” (Menard 1995:v; Tabachnick & Fidell 2001:517). Therefore, logistic regression was selected rather than ordinary least squares. In a logistic regression analysis, there were two possible estimation techniques i.e. probit and logit (Aldrich & Nelson 1984; Gujarati 2003). The main difference between these two techniques is the concern of the probability distribution. A probit model assumes an underlying normally distributed dependent variable, while for logit model, a logistic distribution is assumed. Hence, the logit model is more appropriate for this research.

\(^{240}\) “...The advantage of generalised linear model context is that we need not worry about the type of restrictions to impose on the parameters” (Frees 1996:240).

\(^{241}\) There is a possibility of analysing all the three dependent variables and all the independent variables using a single multivariate analysis of variance. However, the result might not be useful for explaining the three different dependent variables at once due to differences in types of income. Hence, analysis on each single dependent variable provides a clearer picture on the reporting compliance behaviour upon these three different types of income (i.e. taxable income, exempted income and casual income).
Chapter 3 Research Design

Generally, the equation for the relationship between the dependent variable and the independent variables is:

\[ \text{Logit} \left( Y \right) = \alpha + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k \]

Where
- \( Y \) = dependent variable
- \( X \) = independent variable
- \( \beta \) = change in \( Y \) associated with one unit change in \( X \)
- \( \alpha \) = constant representing the value of \( Y \) when \( X \) is zero

As stated in the above equation, a significant difference among factors would imply that knowledge of \( X \) could be used to predict the performance of \( Y \). Contribution from each of the independent variables to the model was evaluated by testing its statistical significance (chi-square probability value) and “…then examining the substantive significance of its effect on the dependent variables” (Menard 1995:37).

In the process of ordinal stepwise logistic regression, cases with missing values were further deleted\(^{242}\) from the analysis in order to give a better response to some factors under study. Hence, the total cases analysed in ordinal stepwise logistic regression might differ from the frequency distribution.

Prior to logistic regression analysis, multivariate factor analysis\(^{243}\) was carried out on the two sets of data in order to identify the relevant variables in the five main categories of causes before establishing a cause-effect relationship of the independent and dependent variables. Factor analysis was chosen to examine the correlations between variables in a large set of data in order to look for a smaller set of underlying factors that could explain the variation in the original set of data (Hinton, Brownlow & Cozens 2004). Hence, factor analysis was used as a way of summarising or reducing data. A Kaiser-Meyer-Olkin (KMO) value of higher than 0.5 provided an indicator that factor analysis was suitable for the both sets of data. Furthermore, the usable data collected had exceeded the requirement of a sample size greater than 250\(^{244}\) for which factor analysis is considered appropriate (Sekaran 2000).

---

\(^{242}\) A number of cases deleted are discussed in the relevant findings in the next chapter (see 4.1.16).

\(^{243}\) Principal component method was used in the factor analysis.

\(^{244}\) As previously discussed, a sample size of 10 times or more of the items under study is desirable. For the purpose of factor analysis, multiple items set in the questionnaires were assigned according to the five independent variables presented in the theoretical model (see above n 233). The number of items assigned to each of the independent variables ranged from 4 items to a maximum of 25 items.
Chapter 3  Research Design

In the process of factor analysis, those variables that showed multicollinearity were eliminated. It was suggested that variables with correlation of matrix greater than 0.8 (r>0.8) be eliminated from the analysis. In addition, factors with eigenvalue of greater than one were chosen, as they are highly desirable. “An eigenvalue of one means that the factor can explain as much variability in the data as a single original variable” (Hinton, Brownlow & Cozens 2004:341). With the variance explained and the eigenvalue size determined, a varimax rotation of selected factors was performed to get a clearest and simplest way of associating the original variables to the factors. A rotation also provides a clearer picture of which variables loaded most on the factors. However, it was suggested that only variables having a loading of greater than 0.3 be taken to have make a significant contribution to a factor (Hinton, Brownlow & Cozens 2004).

The research question, ‘Are there relationships between the five causes (assessment system, tax knowledge, tax structure features, attitude towards tax and financial constraints)?’ also sought to look at the relationships between variables. Thus, a correlation analysis was conducted on these variables based on the data used for ordinal stepwise logistic regression. “Correlation entails the provision of a yardstick whereby the intensity or strength of a relationship can be gauged…” (Bryman & Cramer 2005:214).

3.3 Experimental design

The second quantitative method used in this research was an experimental design. Experimental design takes “…root as an organised procedure as early as the 13th century…” and Sir Isaac Newton had recognised its success (Brown & Melamed 1990:1). An experiment means modifying something in a situation, then comparing the outcome with what is existing without modification (Neuman 2003:238). In the 20th century, ‘classical’ randomised experiments were common practices among studies in the pure sciences. A classical randomised (true) experiment means that the

---

Taking the maximum multiple items of 25, the sample size should be greater than 250, i.e. 25 x 10 times = 250.

245 Prior to elimination, the original data set was re-examined to ensure that important variables were not left out as the result of multicollinearity.

246 It was suggested that factors having eigenvalue greater than one are considered to be significant, while all factors with eigenvalue less than one are regarded as insignificant and should be disregarded (Hair et al 1998:103).
participants are randomly assigned to either a control group or an intervening group. However, a number of applied research studies have not been able to assign participants randomly simply because these groups were already intact or in existence, such as those in classroom settings. Hence, a non-randomised method - known as a quasi-experimental research approach - is used (Neuman 2003; Keppel 1991, quoted in Creswell 2003:14). Campbell and Stanley (1963, quoted in Brewer & Hunter 1989:52; Shadish 2000:13) argued that quasi-experimental design could provide a prototype for multi-method investigations in which other feasible methods alone might not be able to provide compelling evidence, specifically in the testing of causal relationships.

Generally, a quasi-experimental approach is divided into three categories, pre-test post-test design, time series design and single subject design. Time series design and single subject design were not appropriate for this research as both involve numerous measurement periods prior to and after the introduction of interventions. Further, it was considered not possible to get a control group to participate in this research. Hence, in Phase II of this research a ‘One-Group Pre-test Post-test’ design was chosen as the most appropriate. In a ‘One-Group Pre-test Post-test’ design, the experiment includes a pre-test, a treatment and a post-test, and no control group is needed (Neuman 2003). A diagrammatic representation of this design is shown at Figure 3.1.

**Figure 3.1: One group pre-test-post-test design**

![Diagram of One Group Pre-test-Post-test Design](image)

Having no control group could be expected to reduce the risk of withdrawal from the group, as no intervention or no treatment given might not attract the interest of participants to continue to participate in the experiment. Therefore, the only comparison available would be the pre-test and the post-test within the same group. This could be expected to threaten the internal validity of the design as well as giving rise to possible problems such as carryover effects from the pre-test to post-test. To overcome these threats, it was expected that increasing the number of dependent
variables in the measurement tools would improve control and thus enhance the validity of the interpretation of the results (Gliner & Morgan 2000).

It is widely acknowledged that research involving taxation often encounters difficulties in getting actual data (Alm 1991; Torgler 2002), either from the tax authority or from taxpayers themselves. In particular, getting information from the SE can be even more difficult. The factors that were included in the survey instrument for this research may or may not have any actual influence on taxpayers' behaviour. Through a simulation experiment, it may either possibly confirm or repudiate the survey results as well as the appropriateness of other factors used in the survey on the influence of SA on compliance behaviour. In addition, simulation studies are able to provide insights into the behaviour by observations of reactions set up in hypothetical situations (Nesbitt 1971; Friedland, Maital & Rutenberg 1978; Spicer & Becker 1980).

In Phase II, two main groups of undergraduate students were chosen to participate in the experiment, using two different simulation packages (Spicer & Becker 1980; Alm & McKee 1998; Torgler 2002). The basic criteria was that both groups of students had not studied any subject related to income tax, had never paid any income taxes and had never carried out any employment nor engaged in any SE ventures.

The two different main groups of students participating in the experiments were taken to represent the two main target groups of individual taxpayers for the purpose of this research. It is acknowledged that the use of these two groups of students is pragmatic and does have shortcomings. Students with no knowledge on tax, particularly in the pre-test, might not be able to handle issue related to tax returns. However, a review of the literature does indicate that experimental design using students does give certain indications of the actual behaviour of taxpayers (Andreoni, Errad & Feinstein 1998; Eriksen & Fallan 1996). Through simulations, theoretical relationships between reporting behaviour and tax structure features (such as tax rate, audit rate and penalty rate) could be experimentally determined (Lewis 1982b). Meaningful factors associated with SA and compliance behaviour could possibly be...

---

247 Student participation was entirely voluntarily as required by the Human Research Ethics Committee (Ref: 7527). Any student was allowed to withdraw at any point of time if he/she did not wish to continue in the experiment.
established using this design. Discussion on the implementation and data analysis techniques are set out in the following section.

3.3.1 Instrument and procedures

For the first main group of students, the pre-test experiment involved the solving of a simulation package [see Appendix VIII (a)]. The simulation package presented a scenario of a SW. The second main group was given a simulation package (see Appendix IX) which presented a scenario of a SE. Information furnished in the simulation package of the SW scenario included income from various non-business sources (such as employment income, dividend, interest and rental income) and donations made. Personal particulars (such as marital status and number of dependants) and insurance premium payments pertaining to relief available were also included. In the simulation package for the SE scenario, a profit and loss account presenting and disclosing the income and expenses of a business, and income from other non-business sources (except from employment), together with similar personal particulars such as those given to the SW, were included.

A total of 125 undergraduates participated in two different experiments—of which 62\textsuperscript{248} represented the SW group and 63\textsuperscript{249} represented the SE group. To undertake the experiment, each of the two main groups was subdivided into 12 small sub-groups, consisting of five students per group.\textsuperscript{250} In addition to the simulation package provided, participants were also informed of the possibility of being audited. The probability of being audited was between 10 per cent and 50 per cent, with different percentages being assigned to different sub-groups. A different penalty rate (of between 1 per cent and 20 per cent) was also assigned to each different sub-group (see Appendix XI for detailed design). At the end of the simulation, participants were required to fill in their own tax returns that were attached with the simulation

---

\textsuperscript{248} It is proposed that for possible success in experimental research, a sample size as small as 10 to 20 is sufficient (Sekaran 2003:295).

\textsuperscript{249} Ibid.

\textsuperscript{250} For the SW, in the pre-test, (except for one sub-group with four students), all the other sub-groups consisted of five students each. Three students were absent during the pre-test simulation and as a result, in the post-test simulation, one was assigned to the sub-group that had four students and one each was assigned to two other sub-groups, resulting in these two sub-groups having 6 students each. As for the SE, due to the odd number of participants, there were three sub-groups having 6 students per group and 9 sub-groups having five students each.
package and to compute their own tax liabilities. In the pre-test experiment, tax returns for the YA 2003 were used [see Appendix VIII (b)].

Subsequent to the pre-test experiment, the group representing the SW was given a two-hour lesson on personal income tax knowledge as treatment, followed by a post-test experiment. For the post-test experiment, a similar simulation package was given. At the end of the post-test experiment, participants were again required to fill in their tax returns and to compute their tax liabilities under SA, where the tax returns for the YA 2004\textsuperscript{251} were used [see Appendix X (a) & (b)].

Similar procedures were conducted on the second main group that represented the SE. However, five hours of lessons on personal income tax knowledge were given as treatments. The treatments of the two main groups differed mainly due to the additional coverage required for business taxation. For both the main groups, participants were given similar coverage on personal income tax knowledge. This included the computation of aggregate income from various income sources, computation of total income, the understanding of various relief and rebates available to individual taxpayers as well as the computation of tax liabilities. For the SE group, additional lessons on business taxation covering adjustments on business income (or receipts) and allowable deductions were given.

3.3.2 Data analysis techniques

The main purpose of experimental design is to test whether the effect of one factor (e.g. A) is dependent on the level of another factor (e.g. B) by examining the interactions between them. In a one way analysis of variance (ANOVA), the variance of the means of the groups is compared with the variance within them combined for all the groups (Bryman & Cramer 2005), which might provide an estimation error. In a factorial design, “...these variances due to the other factors can be removed from the overestimation of the error variance, whereby giving a more accurate calculation...” (Bryman & Cramer 2005:525). Factorial design is considered appropriate when the research interest is in the effects of more than one independent variable on the dependent variable. “Factorial designs are usually analysed as linear models...” of which the simplest models are the main effect

\textsuperscript{251} For YA 2004, the tax returns for SW and SE taxpayers were different.
models (Stenson 2002:235). The equation of a main effect model is summarised as follows:

\[ y = \mu + \alpha_i + \beta_j + \ldots + \varepsilon \]

Where \( y \) is the response variable and \( \alpha, \beta, \ldots \) represent the treatment effects of the factors. The goal of the models is not necessarily to identify all the effects realistically but merely to identify influential factors (Stensen 2002).

Three factors were manipulated across participants, namely, tax rate, audit rate and penalty rate, resulting in a ‘2 x 2 x 3’ completely crossed factorial design. Due to the unbalanced/unequal sub-group size of both main groups;\(^{252}\) a general ANOVA (with no block and no covariate) was selected from Genstat software to analyse the data collected (Genstat Committee 2003).

A four way ANOVA was used to investigate the interactions between the variables, namely, the pre-test score, audit rate, tax rate, penalty rate and the effects of lessons on tax knowledge on the post-test score of participants. "...A significant interaction occurs when the effect of one factor is different at the different conditions of the other factors..." (Hinton 2001:155). A probability value of less than 0.05 is desirable to identify factors with significant interactions. Where there was no significant interaction between these four factors, a three way ANOVA was to be conducted. However, if there were still no significant interactions between factors, a final two way ANOVA would be used.

As discussed earlier, two separate experiments were conducted, one on the SW and the other on the SE. The number of hours on the lessons given to these two main groups differed. As such, it is appropriate to analyse the outcome of the experiments separately for each of the experiments conducted in order to determine the factors that had significant interactions with tax knowledge.

The outcomes of the two experiments were subsequently ‘stacked’ together to investigate the significant differences between these two groups. A T-test was used to test the significant differences between pre-test and post-test score of these two main groups. A four way ANOVA was conducted to investigate whether there were

\(^{252}\) See above n 250.
Chapter 3  Research Design

significant interactions between factors and tax knowledge for both the SW and SE groups.

3.4 Case study

The main concerns of qualitative research are the search for evidence and the development of a theory. A case study is a detailed research inquiry into a single example or a social unit that can be made up of people or organisations (Payne & Payne 2005). It is a strategy involving empirical investigation of a particular contemporary phenomenon within its real life context and seeks a range of different kinds of evidence to get the best possible answers to the research questions (Yin 1994:23; Gillham 2000; Robson 2002). Unlike quantitative research, a qualitative case study permits “...intensive analysis that does not commit the researcher to a highly limited set of variables and thus increases the probability that critical variables and relations will be found” (Eckstein 1975, quoted in Merriam 1990:59). As such, the interest of a qualitative case study is in the context rather than specific variables, in discovery rather than confirmation (Merriam 1998:19). It is also less concerned with generalisability or representative of a sample. However, a single case could be used to disprove a general statement, to challenge any earlier assumption of a theory and to develop fresh insight (Payne & Payne 2005:32-33).

The case study was chosen for this research as it is able “...to explain the presumed causal links in real-life interventions that are too complex for the survey or experimental strategies” (Yin 2003:15). In addition, this research encompassed compliance activities (of SW and the SE) that are widely acknowledged to have been heavily influenced by behavioural phenomenon. Thus, a case study would be an appropriate research strategy, particularly in relation to the SE because it sought to understand the phenomena of single example and also provided opportunities to conduct exploratory research (Romano n.d.; Ticehurst & Veal 2000).

Tax compliance research in general has been based on self-reported, simulated or hypothetical behaviour, all of which have been questioned in terms of their

---

253 See above n 223.
254 Yin (1989) stated that the results of a case study are in principle generalisable to theoretical propositions, not to the population or universal. Hence, it is analytical rather than statistical generalisation (Mitchell 1983, quoted in Verschuren 2003:135).
indicativeness of actual behaviour. The case study attempts to address these shortcomings. In addition, the factors that were included in the survey might or might not actually influence compliance behaviour or reflect the respondents’ actual experience. Likewise, the hypothetical setting of experimental design only focuses on a few variables. Hence using the case study may provide an inductive research approach to identify the impact or influence of SA on compliance behaviour. The survey results may confirm or repudiate the findings of the case study.

A case study also provides indications of the influence of SA based on actual behaviour as close as possible to the time of occurrence, judged objectively based on a wider range of information obtained (i.e. the examination of the actual tax returns, taxpayers’ records and documents as well as the opportunities to systematically interview the taxpayers).\textsuperscript{255} Further, the case study, relying on the researcher’s judgement is the most appropriate methodology for gaining better insights into how SA had influenced the individual taxpayers’ behaviour.\textsuperscript{256}

To strengthen the construct validity of the design, data collection involved multiple sources and chains of evidence. Multiple replications of the case study protocol were conducted in order to strengthen external validity. However, there is no evidence as to the ideal number of replications required for pattern matching; even having two replications would be sufficient to form a pattern (Yin 2003). However, more replications would contribute towards enhancing confidence in the findings.

Traditionally, observations of subjects in case studies were being criticised as researcher-dependent. However such similar issues also surfaced in other research strategies such as survey and experiment (Verschuren 2003). Case studies also have been criticised as lacking rigor and allowing biases to influence the directions of the findings and conclusions. However, by coupling the case study protocol (as an observation and interview guide) with the expertise of the researcher, preconception biases can be minimised (Yin 2003; Verschuren 2003).

\textsuperscript{255} The researcher was able to view and scrutinise the subjects’ documentation and was able to seek clarification from subjects in relation to their documentation. Some document kept by some subjects were found to be not relevant for claims of deductions, and such claims, based erroneously on such document resulted in unintentional under reporting of tax liabilities. Some document relevant for claims of deductions were not kept, thus the forgoing of such claims resulted in unintentional over compliance.

\textsuperscript{256} The researcher was able to interact and discuss with the subjects and to observe the subjects’ responses to issues pertaining to the preparation of their (the subjects’) actual tax returns.
Chapter 3  Research Design

The first research question of this research is 'Has changing from OAS to SA system affected compliance behaviour of Malaysian individual taxpayers?'. The other questions deal with the factors within the five main categories of causes (i.e. assessment system, tax knowledge, tax structure features, financial constraints and attitudes towards tax) and their impact on compliance behaviour. The six research questions are used to develop a theory at the outset, but this will subsequently be modified as patterns emerged through the conduct of the case study. At the outset, it was theorised that the introduction of SA does influence the compliance behaviour of individual taxpayers. It is presumed that the SA factors (and other factors) might result in a certain level of intentional or unintentional error when taxpayers (SW and the SE) file their tax returns. Discussion on the implementation and data analysis techniques are set out in the following section.

3.4.1 Procedures

A single unit case study was conducted, bounded by activity and time, (i.e. respectively by the preparation of tax returns on income earned for the year ended 31 December 2004 and the deadline for filing tax returns). The deadline for submission of tax returns by the SW was 30 April 2005 and 30 June 2005 for the SE. In this case study, detailed information was collected using various data collection procedures including observations, interviews, examinations and inspections of relevant and related document. A diagrammatic representation adopted from Yin (1994) of a single unit case study is shown in Figure 3.2.

Documentation (a protocol) for the case study was prepared (see Appendix XII). This documentation contains a set of substantive questions reflecting the actual inquiry. It allows data collection to follow a general plan with some consistency, allowing for inferences to be as unbiased as possible. Nevertheless, the documentation is a guide only and does not have to be necessarily adhered to rigidly.
Figure 3.2: Single Unit Case Study (adapted from Yin (1994:49))

Chapter 3 Research Design
Chapter 3  Research Design

The subjects in the case study were recruited locally in Malaysia via convenience sampling.\(^{257}\) The recruitment of subjects was through invitations\(^{258}\) to the faculty staff of MARA University of Technology, Malacca Campus and the Main Campus in Shah Alam,\(^{259}\) as well as to the local community.\(^{260}\)

For each subject, an observation included the examination of the subject’s tax returns prior to lodgement and an inspection of any available relevant supporting documents. This was followed by an in-depth interview in order to arrive at a judgement on the pattern of the subject’s compliance.

At the outset, it was expected that only about 20 repetitions or observations would be undertaken. Surprisingly however, a total of 74 subjects consisting of 64 SW and 10 of the SE voluntarily participated in this research. This high response rate could be due to SA being implemented for the first time, and also that individual taxpayers would like to be certain that their tax returns were properly filled and that their tax liabilities were accurately computed. All the observations, examinations, inspections and interviews in relation to each subject were conducted independently without any interaction among the subjects (at least as far as the researcher was aware).

3.4.2 Data analysis techniques

Qualitative data analysis techniques were utilised for this case study. Data collected from examinations of tax returns, inspections of relevant supporting document and in-depth interviews were coded and form the basis of a narrative that is to be presented as a description of the compliance behaviour observed. The techniques not only involved identifying and marking of the underlying idea\(^{261}\) in the data, but also for grouping or classification of similar information to enable the formation of analytical generalisations (Neuman 2003). One of the most desirable techniques is pattern matching logic, which “...compares an empirically based pattern with a

\(^{257}\) Convenience sampling is one of non-probability sampling and often used during the exploratory phase of a research project, where collections of information are from members of population who are conveniently available to provide it (Sekaran 2003:276-277).

\(^{258}\) As approved by the Human Research Ethics Committee (Ref: 7525), the researcher was not permitted to directly approach any potential subjects. Thus, an email was sent to staff members to invite them (or any other interested person) to participate in the case study.

\(^{259}\) Capital city of the Selangor, one of the states in the Federation of Malaysia.

\(^{260}\) Members of the local community were recruited via staff members of the faculty (see above n 258).

\(^{261}\) Common constructs emerged from the cross-case analysis.
predicted one...” (Trochim 1989, quoted in Yin 2003:116). If the results reveal the pattern as predicted, the internal validity of a case study is strengthened (Yin 2003). Nevertheless, it is possible to analyse the data using quantitative analysis techniques (Ticehurst & Veal 2000). A qualitative analysis is chosen as it helps to identify not only the causes under study, but it also enable the researcher to identify other possible causes that may emerge from the qualitative analysis which cannot be achieved by the quantitative analysis as under the quantitative methods causes are predetermined.

The purpose of the case study was to study the process of completing tax returns with a view to understanding the subjects’ compliance behaviour as well as associated causes. Hence, in the next chapter, the discussions will firstly focus on the problems encountered in the completion of the tax returns, followed by the common errors detected from examination of the tax returns and the cause (or causes) of the errors. Drawing on pattern matching, judgement will subsequently be formed on the patterns of compliance behaviour of the subjects.

3.5 Linkage with research questions

Having discussed and justified the use of the three methods of data collection, it is essential now to link these three methods to the research questions to further clarify the need of the mixed method research design as proposed. The first research question deals with the influence of the change from the OAS to SA. Ideally, the survey should be able to provide an overall indication of the respondents’ perceptions on whether the change in assessment system affected them. Further, the case study should provide an in-depth understanding of the taxpayers’ perceptions on the changes and whether their compliance behaviour has been affected.

The second research question deals with the effect of the tax structure features on taxpayers’ compliance behaviour. While both the survey and the case study could provide an understanding of the tax structure features, the experimental design appeared to be more appropriate in determining how the manipulation of tax structure features and the interactions of these features affected the participants’ compliance behaviour, particularly in relation to their reporting compliance.
Chapter 3 Research Design

The objective of the third research question is to determine whether taxpayers’ attitude towards tax (such as their attitude towards the tax administration as well as towards tax paying) affected their compliance behaviour. A list of self-reported attitudes towards tax could be captured in the survey. The case study could then provide the means to simultaneously, either confirm or repudiate what were observed in the statistical analysis of survey data.

The fourth research question is to investigate whether tax knowledge affects compliance behaviour. Similar to the third research question on attitude towards tax, a survey could only indicate the level of tax knowledge that is self-reported by respondents. However, an experimental design might provide a better means to identify more objectively the taxpayers’ level of tax knowledge and to investigate whether tax knowledge lessons could improve tax compliance (or otherwise). In addition, thorough examination of taxpayers’ tax returns in the case study should enable the researcher to draw conclusions on the level of tax knowledge of subjects, which in turn could provide some linkage to the different compliance behaviour, particularly unintentional non-compliance.

The fifth research question encompasses the effect of taxpayers’ financial constraints on their compliance behaviour. As the variables are specific, a survey and case study should be sufficient to provide details on the financial constraints of respondents.

The sixth and final research question is formulated to investigate the relationships between the five causes, namely, the assessment system, tax knowledge, tax structure features, taxpayers’ attitude towards tax and the financial constraints of taxpayers. The relationships could be identified through statistical analysis, particularly results from the survey, while the other two methods i.e. the experimental design and case study can be used to enhance the overall results underpinning the three research methods.

While the quantitative components of the methods chosen could provide some statistical evidence of the influences on compliance behaviour, the qualitative component should make the data collected from the survey and the experiment more meaningful and understandable. That is, the components can inform each other.
Table 3.3: Key research questions and data collection specifications

<table>
<thead>
<tr>
<th>Research questions</th>
<th>Research method(s)</th>
<th>Analysis techniques</th>
<th>Data collection requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1. Has changing from OAS to SA system affected compliance behaviour of Malaysian individual taxpayers?</td>
<td>Survey</td>
<td>Descriptive/Ordinal stepwise logistic regression Pattern matching</td>
<td>Met by Part II</td>
</tr>
<tr>
<td>Q2. Do tax structure features (tax rates, tax audit and penalty) affect compliance behaviour?</td>
<td>Survey, Experiment</td>
<td>Ordinal stepwise logistic regression Factorial design Pattern matching</td>
<td>Met by Part III</td>
</tr>
<tr>
<td>Q3. Does taxpayer's attitude towards tax affect compliance behaviour?</td>
<td>Survey, Case study</td>
<td>Ordinal stepwise logistic regression Pattern matching</td>
<td>Met by Part III</td>
</tr>
<tr>
<td>Q4. Does taxpayer's tax knowledge affect compliance behaviour?</td>
<td>Survey, Experiment</td>
<td>Descriptive/Ordinal stepwise logistic regression Factorial design Pattern matching</td>
<td>Met by Part II</td>
</tr>
<tr>
<td>Q5. Do financial constraints of taxpayers affect compliance behaviour?</td>
<td>Survey, Case study</td>
<td>Ordinal stepwise logistic regression Pattern matching</td>
<td>Met by Part III</td>
</tr>
<tr>
<td>Q6. Are there relationships between the five causes (assessment system, tax knowledge, tax structure features, financial constraints and attitude towards tax) affected individual taxpayers' compliance behaviour?</td>
<td>Survey, Experiment</td>
<td>Correlation Interaction effect Pattern matching</td>
<td>Met by Part II &amp; III Simulations Observation/ interview/judgement</td>
</tr>
</tbody>
</table>

Drawing from the research questions in Chapter 2 and research design outlined in this chapter, a summary of the specifications of the key research questions, data collection methods and quantitative and qualitative data analysis techniques is presented in Table 3.3. To determine the extent to which the five causes (assessment system, tax knowledge, tax structure features, financial constraints and attitude towards tax) affected individual taxpayers’ compliance behaviour, quantitative methods of analysis are utilised for the two methods derived from the quantitative
paradigm. Data from both the pre and post SA surveys is mainly analysed using ordinal stepwise logistic regression. This method will enable the researcher to identify all possible factors underlying the five causes before and after the implementation of SA. Data acquired via the experimental designs is analysed mainly using factorial analysis. Through factorial analysis, the effect of the causes as well as the interactions between causes would be identified. In respect of the case study, at the outset, it seeks to identify patterns that might emerge, hence a qualitative analysis is used for data gathered. The pattern matching method will also enable the researcher to identify causes other than those mentioned in the problem statement that are not able to be identified from the quantitative methods of analysis. Discussions on the results or outcomes arising from each of the three research methods adopted are set out in the next chapter.