CHAPTER 4

RESEARCH DESIGN

The appropriateness of research design is a major consideration in the testing of any hypothesised relationships between variables. Consequently, this chapter describes the design chosen for this study. It covers four major areas of the research process, beginning with the definition and discussion of the sampling frame and the selection of sample used. This is followed by an explanation of the constructs operationalised and the development of the measurement scales used. Subsequently, the method of administration of questionnaires, and the pilot testing associated with this, are discussed. Finally, methods of data analysis with the key focus on the path analysis procedures are presented.

4.1   Sampling Design

The sample selection for this study comprises executives, managers and professional people in services, manufacturing, mining and construction companies located mainly in the Klang Valley, Malaysia. This sample was selected for two reasons. Firstly, major industries were selected in order to represent the major sphere of activities in Malaysia. These industries are among the more dominant industries in Malaysia that contribute significantly to the Gross Domestic Product (GDP) and employment. It is also believed that the power of the theoretical framework would be increased substantially if the predicted relationships between leadership styles, downward influence tactics, organisational structure, satisfaction with supervision, and OCB were observed in a more

diverse industrial setting. Secondly, samples were drawn only from companies who employed more than 35 employees, in order to include only organisations where a more formalised structure and system of supervision and interactions were more likely to exist and function (Blau & Schoeherr, 1971; Hall, 1977; Pugh, Hickson, Hinnings, MacDonnald, Turner, & Lupton, 1963).

The companies that met the above criteria were selected from the list of companies compiled from the Federation of Manufacturers, Malaysia, Service Directory, Construction Industry Development Board Directory, and Malaysian Trade and Commerce Directory published in 2008. A combination of convenient and stratified random sampling was used in selecting the samples from the large databases, for example, setting certain selection criteria such as the size of the company, number of respondents per company and numbers of samples that is based on the proportion of industry size. Effort was made to sample respondent from the three (3) major industries that is service, manufacturing and minig and construction which play a significant role in providing employment in Malaysia economy. The number of sample to be surveyed is stratified based on the objective to secure adequate or proportionate representation of these industries. The proportion of industry size was based on the data published in the Malaysia Economic Report (2008/2009). Data from respondents were obtained through a survey questionnaire, a sample of which appears in Appendix I. A cover letter describing the purpose of the study was enclosed with the questionnaire together with a self-addressed and stamped envelope. The cover letter also requested that the questionnaires be distributed to the executive, managerial or professional staff within the company. This indicates that the unit of analysis is individual and not organisation. It was stressed

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that questionnaire responses were confidential, anonymity of respondents was guaranteed, and that participation was voluntary. In addition, questionnaires were also distributed via electronic mail to the researcher's acquaintances who held executive positions in companies within the selected industries.

For this study, the method of sample selection provided certain advantages. Apart from accessibility and minimal costs, there was the advantage of being able to pre-screen the sample in terms of the size of the organisation within which the superior-subordinate relationship was examined. Finally, it is stated clearly that the purpose of the research based upon this sample was not to determine or describe the norms of organisational members; rather, the primary intention was to discover latent relationships among variables. Such relationships are likely to appear even if the set of subjects departs somewhat from an accurate probability sample drawn from the entire industries' population. Based upon this design, the study sample closely represents firms of various sizes and major industrial sectors classified in the region.

4.2. Construct and Measurement Scales

In this integrative study, a total of fourteen constructs were used. These constructs were organised into five groups: (i) leadership styles; (ii) downward influence tactics; (iii) organisation contexts (consists of structure and span of control); (iv) intervening variables (role ambiguity and subordinates' competence) and (v) outcomes (organisational citizenship behaviour and satisfaction with supervision). All data used in the study consist of responses to questionnaire items. Measures of the relevant constructs were adapted from previous studies with some modifications. All the scales used to

assess the constructs were pre-tested in the first round of the survey distributed to thirty

five (35) PhD and MBA candidates and were revised prior to the data collection.

4.2.1   Leadership Styles

There are two popularly used instruments available for measuring transformational and

transactional leadership styles. These instruments are: (i) the Bass and Avolio (1995)

Multifactor Leadership Questionnaire (MLQ, Form 5X Short) and (ii) Podsakoff et al.

(1990) Transformational Leadership Behaviour Inventory (TLI) and Leader Reward and

Punishment Behaviour (LRP). LRP is also called Transactional Leadership (Avolio,

1999; Bass, 1985b; Burns, 1978; Howell & Avolio, 1993).

4.2.1.1   Transformational Leadership

For the purpose of this study, the instrument developed by Podsakoff et al. (1990)

was used to assess leadership style. The transformational leadership style measurement

is called Transformational Leadership Behaviour Inventory (TLI). This instrument uses a

seven-point Likert-type scale to measure subordinates' perceptions of their superior's

transformational style of leadership. The TLI was designed to measure six dimensions of

transformational leadership style that have been identified in the research literature

(Bennis & Nanus, 1985; Bradford & Cohen, 1984; Conger & Kanango, 1987; Kouzes &

Poasner, 1987; MacKenzie et al., 2001; Podsakoff et al., 1996b; Podsakoff et al., 1990;

Trichy & Devanna, 1986; Wang et al., 2005). These dimensions are: articulating a

vision, providing an appropriate role model, fostering the acceptance of group goals, high

performance expectations, supportive leader behaviour, and intellectual stimulation.

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Examples of items of each dimension include "My superior inspires me with his or her plans for the future" (articulating a vision), "My superior leads by example" (providing an appropriate role model), "My superior encourages me to be a team player" (fostering the acceptance of group goals), "My superior insists on only the best performance" (high performance expectations), "My superior considers my personal feelings before acting" (supportive leader behaviour), and "My superior has stimulated me to rethink the way I do some things" (intellectual stimulation).

Previous research has provided strong evidence supporting the hypothesised factor structure, internal consistency reliability as well as concurrent and discriminant validity of the scale (Podsakoff et al., 1996b; Podsakoff et al., 1990). Subsequently, three dimensions (i.e. articulating a vision, providing an appropriate model, and fostering the acceptance of group goals) were found to be highly intercorrelated and were subsumed and modelled as indicators of a second-order construct called core transformational leader behaviour as reported in the Podsakoff et al. (1990) study.

In this study and in the interest of parsimony, the core transformational scale was similarly treated as representative of the description of the original instrument produced by Podsakoff et al. (1990), involving five-items in respect of articulating a vision, three items concerned with providing an appropriate model, and four items about facilitating the acceptance of group goals. In addition, the core transformational scale emerged as highly intercorrelated in this study, so the recommendation by Cohen and Cohen (1983) to sum up the scores to form the composite core transformational values was followed.

The shortened and combined version of the scale was constructed based on the description of second order constructs by Podsakoff et al. (1996a) that concisely capture

the essence of the dimension. As the three dimensions are combined through summation, their accuracy is less influenced by the precision of individual measurement of the dimension. Overall, the TLI were operationalised through fourteen questionnaire items. In brief, the scale as shown in Appendix I was adapted from the scale by Podsakoff et al. (1990) with minor modifications. The questionnaire items D1, D8 and D13 measure core transformational leadership, D2, D10 and D17 measure high performance expectations, D4, D6, D15 and D18 measure supportive leader behaviour and D9, D14, D19 and D21 measure intellectual stimulation. These questions were asked for each of the four TLI factors and ascertained on a seven-point Likert scale.

A similar approach to combining subscales has been reported by previous researchers (Bartram & Casimir, 2007; Bass & Avolio, 2000; Boerner et al., 2007; Bono & Judge, 2003; Deluga, 1988b; Engelbrecht & Chamberlain, 2005; Hambley, Kline, & O'Neil, 2005; Kerlinger & Lee, 2000; Krafft, Engelbrecht, & Theron, 2004; MacKenzie et al., 2001; Nemanich & Keller, 2006; Schlechter & Engelbrecht, 2006; Walumba, Orwa, Wang, & Lawler, 2005; Walumbwa et al., 2004) who combined the Bass and Avolio (1995) transformational leadership's subscale of charisma, inspirational motivation, intellectual stimulation and individualised consideration into a single transformational leadership variable. These four subscales are theoretically and empirically related (Avolio, Bass, & Jung, 1999; Bass, 1998; Bass & Avolio, 1989; Bono & Judge, 2003; Kark et al., 2003; Walumbwa & Lawler, 2003; Walumbwa et al., 2004). This is also consistent with other empirical developments on transformational leadership which have constantly proven the dimensions to be highly correlated and reflect a high-order construct of transformational leadership (e.g. Antonakis, Avolio, &

Sivasubramaniam, 2003; Avolio et al., 1999; Bass, 1998). Bass (1998) has discussed this combination confirming that it meets the needs for parsimony in research. The internal consistency (coefficient alpha) of transformational leadership scale reported was 0.92 and the subscales demonstrated high intercorrelations with average $r = 0.83$, $p < 0.005$ (Bass & Avolio, 2000).

In the same vein, a study by Schlechter & Engelbrecht (2006) tested the validity and reliability of the transformational scale developed by Bass and Avolio (1995) - Multifactor Leadership Questionnaire (MLQ). The measurement was subjected to confirmatory factor analysis (CFA) and exploratory factor analysis (EFA). A single factor representing transformational leadership emerged when the data was analysed via EFA. Their finding of a unidimensionality of transformational leadership subscales suggested that the factors loaded satisfactorily ($0.50 \leq \lambda \leq 0.86$) on the four dimensions (Engelbrecht & Chamberlain, 2005; Krafft et al., 2004; Kerlinger & Lee, 2000). This single factor explained 60% of the variance in the sample. The reliability and predictive validity of the transformational leadership scales were good, being established between the range of $0.75 \leq \alpha \leq 0.87$. A meta-analysis of studies using the MLQ in previous studies confirmed the reliability of the transformational, and demonstrated it to possess strong predictive ability (Lowe, Kroeck, & Sivasubramaniam, 1996). The EFA measurement model when testing by CFA also confirmed a satisfactory fit index with an alpha of $\alpha = 0.97$. The final conclusion of Schlechter and Engelbrecht (2006) was to use the EFA-derived measurement model as a measure of transformational leadership instead of the CFA-derived measurement model, because of the CFA model did not fit the data in their study.

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The justification for treating the leadership scale as unidimensional is the need to achieve construct parsimony that best differentiates the leadership style. This is the approach adopted in this study. For all items, the respondents were asked to indicate on a seven-point Likert-type scale (1 = Strongly disagree to 7 = Strongly agree), the extent of their superiors' use of a particular style of leadership. Responses were then coded, mean scores (range 1-7) was calculated for each dimension, with high scores indicating greater use of transformational style. The twenty one-item scale is shown in Appendix I, Part D of the questionnaire. The order of items was randomised in the questionnaire to avoid response bias. Additionally, some items were phrased positively and others negatively to overcome the problems of acquiescence. The scores for the negatively phrased items were reversed before analysis. Moreover, a number of studies have reported an adequate test-retest and internal consistency coefficients (reliabilities) for this instrument (Podsakoff & MacKenzie, 1989; Podsakoff et al., 1984; Schriesheim, Hinkin, & Podsakoff, 1991).

4.2.1.2 Transactional Leadership

The transactional leadership measurement applied in this study is Leader Reward and Punishment (LRP), a scale developed by Podsakoff et al. (1990). It consists of seven items that employed a seven-point Likert scale to measure two dimensions of transactional leadership called Leader Reward and Punishment (Podsakoff et al., 1984; Podsakoff et al., 1982). Although there are other measures such as the Multifactor Leadership Questionnaire (MLQ) developed by Bass (1985b), this measure was used because of the LRP has demonstrated excellent psychometric properties in previous

studies and also because of its robustness in assessing transactional leader behaviour (MacKenzie et al., 2001; Podsakoff et al., 1984; Podsakoff et al., 1982). The first four items were used to measure contingent reward behaviour (Podsakoff et al. 1984; Podsakoff & Organ, 1986). The sample items include "My superior always gives me positive feedback when I perform well" and "My superior gives me special recognition when I produce at a high level". The other three items assessing the contingent punishment are: "My superior would indicate his or her disapproval if I performed at a low level", "My superior lets me know about it when I perform poorly" and "My superior points it out to me when my productivity is not up to par". Previous research has treated these two scales as unidimensional (Podsakoff et al., 1984; Podsakoff, MacKenzie & Fetter, 1993; Podsakoff, Niehoff, MacKenzie & Williams, 1993).

In this study, the transactional leadership scale is again treated as unidimensional. This is consistent with the approach that some researchers have taken by combining the scores of all dimensions belonging to transactional leadership (MacKenzie et al., 2001; Podsakoff, MacKenzie & Fetter, 1993; Podsakoff, Niehoff, MacKenzie & Williams, 1993; Podsakoff et al., 1984). The seven-item scale of transactional leadership as shown in Appendix I, Part D was randomised with the transformational leadership items to avoid direct identification of the leadership styles items.

The measurement scale used was adapted with some modifications from the original scale. Table 4.1 shows the transactional leadership scale items re-worded to reflect a more distinct transactional style from the original scale after a pilot test was conducted with the assistance of thirty-five (35) PhD and Master scholars. The respondents were directed to think about their superior's leadership style and indicate the

degree to which each of the statements characterised that individual. Two items were modified from the original scales following this pilot test. Item 11 seems to overlap with item 5, thus it is replaced by scale item that capture another essence of exchange relationship. The item 20 also seems to invite similar response as item 5, thus it is replaced with a statement that indicate a typical conditional relationships that is prevalent in transactional style.

Table 4.1: Transactional Leadership Scale Items with Modifications

Item	Original Scale Item	Modified Scale Item
3.	My superior always gives me positive feedback when I perform well.	My superior only gives me positive feedback when I perform well.
5.	My superior would indicate his or her disapproval if I perform at a low level.	My superior will clearly show his or her disapproval if I perform at a low level.
7.	My superior gives me special recognition when I produce at a high level.	My superior assures special recognition when I produce at a high level.
11.	My superior lets me know about it when I perform poorly.	My superior tells me there is a close agreement between what I am expected to put into the group effort and what I can get out of it.
12.	My superior commends me when I exceed my productivity goals.	My superior usually commends me only if I exceed my productivity goals.
16.	My superior frequently does not acknowledge my good performance.	My superior usually does not care to acknowledge me unless it is related to my good performance.
20.	My superior points it out to me when my productivity is not up to par.	My superior states in a matter-of-factly about what I can get from what I accomplish.

4.2.2 Downward Influence Tactics

The researcher measured the downward influence tactics from the subordinates' perceptions of their superior's use of influence tactics on them by using the Influence Behaviour Questionnaire (IBQ-2000) of Yukl and Falbe (1990). This influence typology is widely used in research (Aguinis et al., 1994; Barbuto et al., 2002; Ceasar & Gardner, 2004; Charbonneau, 2004; Falbe & Yukl, 1992; Sparrowe et al., 2006; Yukl et al., 1993; Yukl et al., 1995; Yukl & Tracey, 1992). The IBQ-2000 comprised of 44 items measuring all directions of influence tactics, upward, lateral and downward. It was operationalised through a multi-item scale representing nine dimensions of influence tactics, these being: inspirational appeals, consultation, rational persuasion, ingratiation, exchange, personal appeals, coalition, legitimating and pressure tactics. Yukl (2002) concludes from his finding on the directional use of influence tactics that inspirational appeals, consultation, ingratiation, exchange, legitimating and pressure tactics are more downward than lateral and upward tactics.

Not all of the original 44 items on the influence tactics measurement scale developed by Yukl and Falbe (1990) capturing all directions were used in this study since the focus is confined to downward influence tactics. Only thirty (30) items were selected based on their face validity and as a result of the factor structure in various previous studies (Soetjipto, 2002; Sparrowe et al., 2006). These thirty (30) items represent the six downward influence tactics used in this study. The respondents were asked to indicate on a five-point Likert-type scale, the extent of their superiors' use of a particular downward influence tactic. The measure for each style is shown in Appendix I Part E of the questionnaire which consists of Inspirational appeals (7 items i.e. E1, E7, E8, E13, E19,

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E25 and E30); Consultation tactics (4 items i.e. E2, E10, E15 and E22); Ingratiation

tactics (4 items i.e. E9, E17, E21 and E28); Exchange tactics (8 items i.e. E4, E5, E11,

E12, E16, E18, E24 and E27); Pressure tactics (4 items i.e. E3, E20, E26 and E29) and

Legitimating tactics (3 items i.e. E6, E14 and E23). An overall measure of the degree to

which the leaders conformed to a specific influence tactic was derived by taking the mean

score across the respective scale items defining the 'style'. The 30-item scale underwent

validity and reliability checks by means of factor analysis to estimate the number of

factors. The scale clearly differentiates the six downward influence tactics postulated in

this study framework, demonstrating their multi-dimensionality with all styles and

yielding an Alpha value greater than 0.78.

4.2.3   Organisational Structure

In this study, structure is conceptualised on a mechanistic-organic continuum. The term

'organicness' indicates the extent to which an organisation possesses what Burns and

Stalker (1961) would call an organic structure that is, a structure not represented by

highly specified and delimited job descriptions or highly formalised procedures.

Organisation structure was captured by a seven-item scale which measures organicity,

that being the extent to which organisations are structured as organic versus mechanistic

entities. The seven-item scale was developed by Khandwalla (1977) and later used by

Covin and Slevin (1989) and Low (2005). The respondents were asked to indicate on

seven-point Likert-type scale the position of their firms' organizing inclination between

two extreme ends of mechanistic and organic structure. The firms' mean rating on these

seven items was used as the measure of their organicity index. The higher an index

indicates the greater, the tendency towards organic structure. This scale is shown in

Appendix I, Part F of the questionnaire. Covin and Slevin (1989) demonstrated that the scale has an inter-item reliability coefficient of 0.80, while Low (2005) reported a coefficient of 0.79.

4.2.4 Span of Control

The span of control is an indication of the number of direct subordinates being supervised by a superior. For statistical analysis the span of control is simply measured as the number of employees reporting to the supervisor. This scale is shown in Appendix I, Part B7 of the questionnaire.

4.2.5 Subordinates' Competence

The Wagner and Morse (1975) 23-item self-report measure of individual sense of competence was used to measure employees' competence in lieu of a more direct measure of competency level. An example of a scale item is "I honestly believe I have all the skills necessary to perform this task well." All items were scaled on seven-point agree-disagree Likert rating scale. Evidence pertaining to the reliability and predictive validity of this measure is located in several sources (Morse, 1976; Wagner & Morse, 1975). Using this scale means that competence was assessed from the subordinate's own perspective rather than manipulated directly as in the laboratory study. Although the present assessment of competence is subject to common method variance due to the self-report measure, it should be noted that previous research (Morse, 1976; Tharenou & Harker, 1984; Wagner & Morse, 1975; Snyder & Bruning, 1985) has given strong support for this measurement. For example, Steel, Mento, Davis, and Wilson (1989) who

explore the Wagner and Morse (1975) psychometric properties of the Sense of Competence Questionnaire (SCQ) using data of 849 individuals, found that the construct validation of self and supervisory ratings of competence converged on a common evaluation. The SCQ measures the skill and ability, job feedback and need for achievement and the concurrent validation indicated that the SCQ instrument demonstrated a moderate predictive validity (r = 0.26, p < .001).

4.2.6   Role Ambiguity

The present study employed a six-item scale developed by Rizzo et al. (1970) to measure role ambiguity. The items were designed to "reflect certainty about duties, authority, allocation of time and relationship with others; the clarity or existence of guides, directives, policies and the ability to predict sanctions as outcomes of behaviour" (p. 156). Individual scale items were evaluated on a seven-point Likert-type scale (1 = very false, 2 = false, 3 = slightly false, 4 = neither true nor false, 5 = slightly true, 6 = true, 7 = very true). The scale was reverse coded such that higher number responses reflect greater levels of role ambiguity. The selection of this scale was due to its frequent use in management research to measure role ambiguity. In fact, 85% of previous studies have applied the role ambiguity tool developed by Rizzo et al. (1970) according to Jackson and Schuler (1985) and Tubre and Collins (2000). Secondly, it seems to have adequate construct reliability and validity which all support the continuous use of this scale (House, Schuler, & Levanoni, 1983; Schuler et al., 1997). The reported Cronbach coefficient alpha levels of the Rizzo, House, and Lirtzman (RHL) scale range from 0.65 to 0.82, while Nicholson and Goh (1983) demonstrated $\alpha = 0.84$ for both role conflict and

role ambiguity. Finally, the RHL scale is substantially shorter - that is six items versus 45 items - than some other measurement instruments that have been designed (Singh & Rhoads, 1991).

However, the RHL scale has been criticised due to its one-dimensional nature and its linear view of role ambiguity. According to King and King (1990), despite its widespread use, the RHL measures have shortcomings because the scale items lack clarity and precision, and ignore the multidimensionality of the underlying construct. This prompted Sawyer (1992) and Singh and Rhoads (1991) to develop multidimensional measurement tools by examining the components of role ambiguity such as expectations, priorities, process and behaviours. Nonetheless, although the RHL scale has attracted criticism, Jackson and Schuler (1985) strongly suggest that it should be used due to its widespread acceptance and the validations and reliability of this instrument conducted by many previous researchers. In this study, the researcher made the decision to use the RHL scale that suit the purpose of this study which demands less computing effort and analysis, even if a more precise instrument is available.

4.2.7 Organisational Citizenship Behaviour (OCB)

There are several OCB scales found in the literature. The scale that developed by Farh et al. (1997) consists of self realisation, organisational identification, collegiality, conscientiousness, unselfishness and interests. Podsakoff et al. (1990) produce five dimensions of OCB on their scale, measuring altruism, conscientiousness, sportsmanship, civic virtue and courtesy. Likewise, Organ (1988) chose the same five dimensions, namely: courtesy, civic virtue, conscientiousness, altruism and sportsmanship. OCB is

considered as a global concept made up of two key dimensions called altruism and generalised compliance, and these two dimensions were used in the earlier empirical works of Bateman and Organ (1983), Organ (1988), Organ and Konovsky (1989) and Smith et al. (1983).

In the present study, the researcher has decided to adopt the OCB instrument developed by Smith et al. (1983) and measure it as a global construct. This instrument consisted of seven items on the altruism and compliance dimension. The two-dimensional view of OCB was chosen over the broad categories of OCB due to its popularity in earlier studies conducted by Smith et al. (1983). In a test of the scale produced by Smith et al. (1983) involving 58 supervisor-raters and 422 employee-ratees, two distinct factors of altruism and compliance of OCB emerged, with alpha coefficients of 0.88 and 0.85 respectively. Jones and Schaubroeck (2004) reported the reliabilities of the two measures as being 0.79 (altruism) and 0.80 (compliance) for the employee-rated measures.

The OCB scales were completed by the respondents themselves who were asked to rate on a seven-point scale with anchors ranging from "never" (1) to "always" (7) with which they have engaged in these citizenship behaviours. Examples of sample items for the OCB are "I help others with their work when they have been absent even when I am not required to do so"; "I volunteer to do things not formally required by the job"; "I take the initiative to orient new employees to the department even though it is not part of my job description"; "I willingly attend functions not required by the company management, but which help its overall image". Scores for these constructs were calculated by

averaging the item responses for each respective factor. This scale is shown in Appendix I, Part G of the questionnaire.

4.2.8   Satisfaction with Supervision

Operationally, job satisfaction has been investigated as a person's affective state relative to several job facets (Churchill et al., 1974; Smith, Kendall, & Hulin, 1969). There are several measurement scales available to assess the employee satisfaction, for example, Smith et al. (1969) measure subordinate satisfaction using the Job Descriptive Index (JDI), which comprises five dimensions: satisfaction with job, co-workers, pay, supervision, and career advancement. Weiss, Dawis, England, and Lofquist (1967) developed the Minnesota Satisfaction Questionnaire (MSQ) to measure job satisfaction. Porter and Lawler (1968) divide the job satisfaction construct into intrinsic and extrinsic components, and global satisfaction measure, with no division into separate facets (Bagozzi, 1980a, 1980b; Hackman & Oldham, 1975). Intrinsic satisfaction is derived from actually performing the work and experiencing feelings of accomplishment, self-actualisation and identity with the task. Extrinsic satisfaction is derived from the rewards bestowed upon an individual by peers, superiors or the organisation and can take the form of recognition, compensation and advancement. Global satisfaction has been conceptualised as a linear aggregation of intrinsic and extrinsic satisfaction by some (Weiss et al., 1967), as an aggregation of satisfaction with various job facets (Levin & Stokes, 1989), or as an aggregation of a few measures of general satisfaction (Hackman & Oldham, 1980).

Hackman and Oldman (1980) have segregated the facet satisfaction which includes the five aspects of job security, pay, co-worker, supervision and opportunities for personal growth. Although there appears to be a good deal of variety in the specific conceptualisation of satisfaction, this study will focus on one facet of job satisfaction called satisfaction with supervision (Warren, 1998). The satisfaction consists of three items assessing satisfaction with supervision, method of supervision and quality of supervision. Respondents rated their level of agreement with these items using a five-point scale ranging from 1 "extremely unsatisfied" to 5 "extremely satisfied". The satisfaction with supervision is measured by averaging the scores from answers to three items assessing the degree of agreement with various statements. Sample items are "Overall, how satisfied are you with your supervisor?", "How satisfied are you with the methods of supervision used by your supervisor to get your job done?" and "How satisfied are you with the overall quality of the supervision you receive on your work?". The internal consistency reliability for this scale as reported by Warren (1998) is 0.93. The scale is shown in Appendix I, Part H of the questionnaire.

4.3   Pre-testing of Questionnaire and Questionnaire Administration

The main data collection tool used in this research is the survey questionnaire. A pre-test by self-administration with 35 target respondents who were PhD and MBA students was carried out before the questionnaire was revised and mailed so that unclear wording or misleading sentences could be corrected. This step provided the real test of the effectiveness of the questionnaire on how it performs under actual conditions of data collection. The pre-testing was conducted by a 'sit-in' personal interview to directly

observe if any of the questions seemed confusing, leading or bias inducing, or if they caused any respondent to resist or hesitate for whatsoever reason. This step proved to be invaluable, as some feedbacks called for further clarification and explanation and this resulted in a more comprehensible set of questionnaire items. Most of the statements corrected were related to leadership styles, which had a tendency to be viewed as overlapping.

Questionnaires were mailed to the executives or managers of companies in Klang Valley with an introductory letter (shown in Appendix I) which requested for their participation, explained the purpose and significance of the research and at the same time promise anonymity of the respondent. As it was expected that the lengthy questionnaire typically demanded by an integrative study might not generate a good response (Steeh, 1981), the electronic mailing method was used to send the questionnaire to selected respondents known to the researchers who had earlier agreed to respond to the questionnaire. Overall, the respondents were expected to return the questionnaire using the provided self-addressed and stamped envelopes or via electronic mail.

4.4.   Data Preparation and Scale Purification

4.4.1   Data Screening and Coding

The returned questionnaires were analysed for missing data, respondent biases and inconsistent or illogical data. Decision criteria as prescribed earlier were set for rejecting and accepting the sample based on the size of organisation. The quality of the responses was gauged from the pattern and consistency of the answers given. Too random or a monotonous scoring reflects an unconsidered answer or a certain lack of interest, and in

these circumstances, responses must be discarded to prevent them from confounding the overall results.

Since most of the questionnaire items were pre-coded, the data was readily entered into the data file without the need for a coding sheet. The data file was cleaned for final analysis. This involves the use of frequency and descriptive statistics to determine the missing data and pinpoint the highest and lowest values that indicated an illogical entry. The missing data when suspected to arise from act of omission only was treated by substituting the mean response to the question. This approach tends to have a small effect on computations such as correlations although responses with more than three missing data were discarded.

4.4.2   Measurement Reliability

To enhance the quality of measurement, scale items were tested for reliability and consistency in construct dimensionality. These analyses were performed on the multi-item scale of measurement of the leadership styles, downward influence tactics, organisational contexts, subordinates' competence, role ambiguity, satisfaction with supervision and OCB. The statistical software used for this computation is the Statistical Package for Social Science (SPSS) version XII, which is widely used in social science research.

Foremost, the set of items used to measure construct was assessed and refined with factor analysis. This was carried out on the multi-item measures, which were often formulated using the taxonomic approach, the purpose being to test whether the data being analysed were consistent with the imposed dimensionality of the construct in

question. Additional, this step was to determine whether items in the instrument could be used in totality or in part to analyse the present data. This analysis was performed using the FACTOR procedure in SPSS. The typical analysis involved three steps: (i) the preparation of the covariance or correlation matrix, (ii) the extraction of the initial factors – the exploration of possible data reduction, and (iii) the rotation to a terminal solution – the search for simple and interpretable factors. The factor analytic procedure selected was the maximum likelihood method which is quite commonly used in the implicit testing of hypotheses about the underlying dimensions of a set of data (Joreskog, 1974). Varimax rotation was chosen to simplify factors (Hair, Anderson, & Tatham, 1987; Hair, Black, Babin, Anderson, & Tatham, 2006). The output of the procedure FACTOR includes the correlation matrix, inverse of correlation matrix, communalities, eigenvalues and proportion of common variance, rotated-factor matrix and transformation matrix, factor-score coefficient matrix and plot of rotated factors. A more elaborate explanation of the factor analysis can be found in many data analysis reference books (Green, Tull, & Albaum, 1988; Hair et al., 1987; Hair et al., 2006; Harman, 1967).

The next stage was to find the mean, standard deviation and standardised Cronbach's (1951) Coefficient Alpha for each subscale or scale used in the study. The mean is useful to illustrate the central tendency for each of the measured variable while the standard deviation provides an indication of dispersion of data about the mean of an interval-level variable. The Cronbach Alpha will give the indication of the internal consistency reliability of the multi-item scales. All of the basic statistics described above were obtained from the RELIABILITY procedure in SPSS. The evaluation of the scale

and items was made from the item means, item variances, inter-item covariances, inter-item correlations and the item-total statistics.

The Pearson correlation coefficient was used to measure the association among the constructs. This allowed a preliminary interpretation of the hypothesised relationships. Predictive validity of the construct was assessed by confirming the anticipated direction of associations among the constructs. The Pearson correlation coefficient was also used to assess whether any inappropriate variable could be dropped from further analysis. The Pearson product-moment correlations (these are zero-order correlations because no control for the influence of other variables are made) which were computed by Pearson correlation serve two purposes. Other than their role as indicators of the goodness of fit of the linear regression, they provide a measure of association indicating the strength of the linear relationship between pairs of variables. This is measured by the Pearson correlation coefficient (r). Mathematically, r is defined as the ratio of covariation to square root of the product of the variation in x and variation in y, where x and y symbolise the two variables.

The coefficient obtained can range from -1.0 for a perfect negative relationship to +1.0 for a perfect positive relationship, with zero indicating absolute independence of the two variables. Since the direction of the associations among the main variables were anticipated in advance, the hypotheses will be rejected only for t values that are of sufficient magnitude and in the direction specified by applying a one-tailed test. Output from this program includes the correlation coefficients, the tests of significance, and the number of cases, N, upon which the correlation coefficients were computed.

4.5 Data Analysis Techniques

In this study, the SPSS software is mainly used to process and statistically analyse the data, since this is a versatile program with many applications, and several sub-programs which are very useful for the analysis of the present survey data. The main impetus of the statistical analyses was the testing of Hypothesis HI to Hypothesis H18 - a total of 18 hypotheses. Due to the theoretical and methodological rigour needed to imply causal relations among phenomena of interest, both first and second order analyses are required to test the hypotheses. The first order analysis involved the descriptive statistics and correlations among the variables. The second order analysis involved a more discriminating statistical method that seeks to evaluate the tenability of causal hypotheses by finding the most parsimonious linkages between a theoretical model and empirical data. A path analytic framework is an ideal way to assess the proposed recursive relationships and the appropriate analytical method when both direct and indirect influences are hypothesised or investigated (James, Muliak, & Brett, 1982). This analytical method forms the main analytical tool for the hypotheses testing of the model represented in Figure 3.1. Path analysis is a multivariate analysis used to estimate the magnitude of linkages between variables. Although the path analysis represents an extension of the regression model, it requires a relatively elaborate computational technique and it is particularly sensitive to model specification. The technique discussed highlights the computational procedures needed to achieve the maximum utility of this method. Other procedures that involve direct application or minimal manipulations of technique of the SPSS procedures will not be discussed here.

4.6   Path Analysis

The theoretical model depicted in Figure 1.1 was assessed through path analysis. Sewell (1921, 1934 and 1960) developed path analysis as a method of analysing the direct and indirect effects of variables hypothesised as causes of variables treated as effects. Path analysis is actually an extension of the regression model. The regression weight is calculated by the model and is compared by the observed correlation matrix. In order to see the model fit, the goodness of fit statistic has to be calculated. It is important to highlight that, being a method, as any other structural equation modelling (SEM) method, the choice of path analysis is not to discover causes but to shed light on the tenability of the causal model developed by a researcher based on his or her knowledge and theoretical understandings. It is also due to the well known computational difficulties experienced by researchers when applying software such as LISREL and AMOS on a large model that the path analysis approach was chosen over SEM.

Additionally, it is documented that a more general SEM approach to analysis yields a more flexible and realistic modelling process compared with path analysis using ordinary least square (OLC) multiple regression. For example, a more general SEM computer program allows for non-recursive paths, does not assume the variables are measured without error, does not assume that the residuals between the variables or between their indicators are zero and more importantly, SEM tests an entire system of variables simultaneously (Pedhazur, 1997). The use of SEM computer program such as LISREL and AMOS is, however, limited to a relatively simple model in which about five to six latent variables are being investigated (Anderson & Gerbing, 1988; Diamantopoulos 1994). Hulland, Chow, and Lam (1996) in their review of causal

modelling of 383 models from 1990-1994, reported that the average theoretical model contained approximately seven constructs, suggesting moderate complexity. As the model size and complexity increase there is no guarantee that the model is identified and yields a meaningful result.

Due to these obvious limitations, path analysis using the ordinary least square regression approach is used instead of LISREL or AMOS SEM software packages. This is not expected to have a serious disadvantage as Kline and Klammer (2001) show that the magnitude of the hypothesised path does not differ much between the two methods and the same conclusion could be drawn regardless of whether the regression or LISREL or AMOS approach was used. It is recognised though, that if the problem is manageable by the software, LISREL or AMOS are superior in their assessment of the multitude of fit indices that can provide more clues about the avenues for further research and modelling that should be pursued.

Path modelling estimates the magnitude of linkages between variables and uses these to supply information about the underlying causal process. As in most model building efforts, path modelling begins with the identification of relevant variables, which can be identified by the way they relate to other variables in the proposed general model. Variables that have little or no relationship with the other variables can be dropped from the model, as they will not add to its explanatory power. Initial recursive multiple regression analysis revealed that structure, despite being the least correlated with other variables, did play a role in the causal linkage of the model. In the current study the variables finally included in the model were the following: leadership styles,

organisational contexts, downward influence tactics, subordinates' competence, role ambiguity, satisfaction with supervision, and OCB.

The leadership styles constructs such as transformational leadership and transactional leadership, together with organisational structure and span of control, are termed exogenous because they are determined by influences which are outside the specified model. In the path analysis, the correlations (r's) between the exogenous variables, represented by curved two-way arrows, will not be analysed except as checks on the multicollinearity problem. On the other hand, the remaining variables constitute the endogenous variables and will be explained by endogenous factors and in some cases by each other. The influences of the explanatory variables are represented by the path coefficients (p's). A residual variable is introduced for each endogenous variable to calibrate the variation not accounted for by the model (D's). The magnitude of these residuals is depicted by path coefficients (Pr's). For clarity, the residuals and their path coefficients will not be shown in the model but it is important to note their presence and effect in every endogenous variable.

The model in Figure 3.1 specifies a set of linear, additive relationships with (straight line) arrows going only in one direction. These indicate one-way effects and suggest that the direction of causation runs from leadership styles to downward influence tactics to outcomes. In this study, two-way feedback effects are not hypothesised. Estimation of path coefficients can be accomplished through multiple regression analysis. The path model can be written as a set of structural equations as follows:

$$X5 \quad = \quad P_{5,1}\,X1 \; + \; P_{5,2}\,X2 \; + \; P_{5,3}\,X3 \; + \; P_{5,4}\,X4 \; + \; Pr_5\,D5 \qquad\qquad (1)$$

$$X6 = P_{6,1} X1 + P_{6,2} X2 + P_{6,3} X3 + P_{6,4} X4 + Pr_6 D6 \qquad (2)$$

$$X7 = P_{7,1} X1 + P_{7,2} X2 + P_{7,3} X3 + P_{7,4} X4 + P_{7,5} X5 + P_{7,6} X6 + Pr_7 D7 \qquad (3)$$

$$X8 = P_{8,1} X1 + P_{8,2} X2 + P_{8,3} X3 + P_{8,4} X4 + P_{8,5} X5 + P_{8,6} X6 + Pr_8 D8 \qquad (4)$$

$$X9 = P_{9,1} X1 + P_{9,2} X2 + P_{9,3} X3 + P_{9,4} X4 + P_{9,5} X5 + P_{9,6} X6 + Pr_9 D9 \qquad (5)$$

$$X10 = P_{10,1} X1 + P_{10,2} X2 + P_{10,3} X3 + P_{10,4} X4 + P_{10,5} X5 + P_{10,6} X6 + Pr_{10} D10 \qquad (6)$$

$$X11 = P_{11,1} X1 + P_{11,2} X2 + P_{11,3} X3 + P_{11,4} X4 + P_{11,5} X5 + P_{11,6} X6 + Pr_{11} D11 \qquad (7)$$

$$X12 = P_{12,1} X1 + P_{12,2} X2 + P_{12,3} X3 + P_{12,4} X4 + P_{12,5} X5 + P_{12,6} X6 + Pr_{12} D12 \qquad (8)$$

$$X13 = P_{13,1} X1 + P_{13,2} X2 + P_{13,3} X3 + P_{13,4} X4 + P_{13,5} X5 + P_{13,6} X6 + P_{13,7} X7 + P_{13,8} X8 + P_{13,9} X9 + P_{13,10} X10 + P_{13,11} X11 + P_{13,12} X12 + Pr_{13} D13 \qquad (9)$$

$$X14 = P_{14,1} X1 + P_{14,2} X2 + P_{14,3} X3 + P_{14,4} X4 + P_{14,5} X5 + P_{14,6} X6 + P_{14,7} X7 + P_{14,8} X8 + P_{14,9} X9 + P_{14,10} X10 + P_{14,11} X11 + P_{14,12} X12 + Pr_{14} D14 \qquad (10)$$

These equations are subject to statistical constraints unique to this method as described in Pedhazur (1997). It has been demonstrated that regression analysis is generally robust in the face of departures from assumptions, except for measurement errors and specification errors (Bohrnstedt & Carter, 1971; Hanushek & Jackson, 1977). The implications of measurement error and specification error were discussed in Pedhazur (1997, pp. 34-35). Hence, a path coefficient can take on the same interpretation as a regression coefficient, and measures the proportion of dependent variable variance accounted for by the explanatory variable when all other factors are held constant. To weed out path coefficients with insignificant effects, the theory-trimming approach as suggested by James et al. (1982) has to be performed in order to construct a more parsimonious model. The residual path coefficients for a dependent variable Xi is also obtainable from the model, that is

$$Pr_i = \sqrt{(1-Ri^2)}$$

where $Ri^2 = R^2$ or the percentage of variance explained in dependent variable Xi.