3. Research Methodology

3.1. Framework

After a thorough literature review, the following framework is developed for the purpose of this research.

There would be four variables.

Dependant variables would include quality performance, innovation performance. Independent variables would include quality management practices containing 8 factors and the second independent variable is organizational culture.

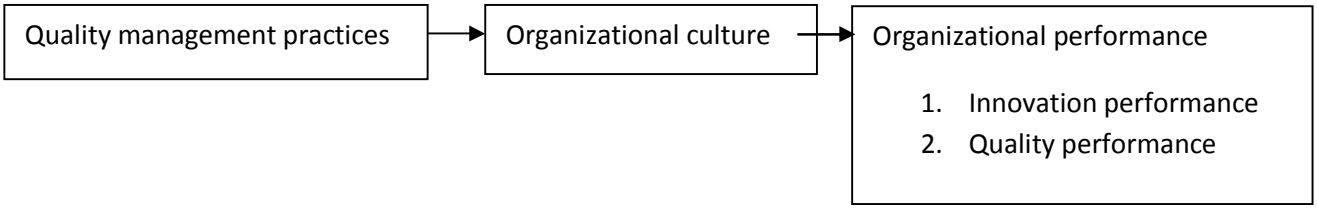

Figure 3.1 : Figure showing the relationship between independent variables and dependant variables.

3.2. Hypothesis development

The following hypothesis are hereby developed and proposed after sufficient readings.

H1 : Quality management practices significantly affects organizational performance.

H1(a) : Quality management practices significantly affects innovation performance.

H1 (b) : Quality management practices significantly affects quality performance.

H2 : Organizational culture mediates the relationship between quality management practices and organizational performances.

H2(a) : Organizational culture mediates the relationship between quality management practices and innovation performance.

H2(b) : Organizational culture mediates the relationship between quality management practices and quality performance.

3.3. Research instrument

Sampling tool contains a Questionnaire derived from articles mentioned below. The questionnaire is posted online through the method of Google documents.

a. 5 points likert scale for items under the 8 factors for quality management practices' perception (Kanapathy, 2008)), where it would also serve as an assessment of how integrated is quality management practices in the sampled companies.

Table 3.1 : Table containing factors for variable Quality management practices and its corresponding items alongside with their codes.

Factors	Codes	Items (note : the numbering below reflects the number of the variable in the statistical analysis)
Top Management Support	TOP_M_S1	1. Extent to which the top company executive assumes responsibility for quality performance
	TOP_M_S2	2. Acceptance of responsibility for quality by major department heads within the company
	TOP_M_S3	3. Degree of participation by top management in the quality improvement process
	TOP_M_S4	4. Extent to which the top management has objectives for quality performance
	TOP_M_S5	5. Extent to which quality goals are made specific within the company
	TOP_M_S6	6. Importance attached to quality by the top management in relation to cost and schedule objectives
	TOP_M_S7	7. Amount of review of quality issues in top management meetings.

Table 3.1 (continue): Table containing factors for variable Quality management practices and its corresponding items alongside with their codes.

Quality Information Availability	Q_INFO_AV1	8. Availability of quality data (error rates, quality costs, defect rates, scrap, rework, returns, etc.)
	Q_INFO_AV2	9. Extent to which necessary quality data are available on time
	Q_INFO_AV3	10. Extent to which quality data are available to managers and supervisors.
Quality Information Usage	Q_INFO_U1	11. Extent to which quality data are used by top management in decision making.
	Q_INFO_U2	12. Extent to which quality data are used by middle management in planning and controlling
	Q_INFO_U3	13. Extent to which quantity data are used by hourly workers in their operations.
Employee Training	EMP_TRA1	14. Extent to which quality related training is given to hourly employees throughout the company/division
	EMP_TRA2	15. Extent to which training in the basic statistical techniques (such as histograms, cause and effect diagrams, control charts, etc) is provided in the company/division as a whole.
	EMP_TRA3	16. Availability of resources for employee training in the company/division
	EMP_TRA4	17. Extent to which training in specific work skills (technical and vocational) is given to employees throughout the company.
Employee Involvement	EMP_INV1	18. Extent to which employee involvement programs are implemented in the company/division
	EMP_INV2	19. Extent to which hourly/non-supervisory employees are implemented in quality decisions.
	EMP_INV3	20. Extent to which employees are held responsible for the output of their process
	EMP_INV4	21. Extent to which quality awareness building among employees is ongoing.
	EMP_INV5	22. Extent to which company/division measures employee morale.

Table 3.1 (continue): Table containing factors for variable Quality management practices and its corresponding items alongside with their codes.

Product or Process Design	PRO@PROC_DESIGN1	23. Extent to which product/service design is reviewed before the product/ service is produced
	PRO@PROC_DESIGN2	24. Clarity of product/service specifications
	PRO@PROC_DESIGN3	25. Clarity of product/service procedures
	PRO@PROC_DESIGN4	26. Extent to which Implementation/producibility is considered in the product/service design process
	PRO@PROC_DESIGN5	27. Extent to which Process design minimizes the chances of employee errors
Supplier Quality	SUPPLIER_Q1	28. Extent to which Suppliers are selected based on quality rather than price
	SUPPLIER_Q2	29. Degree to which Your company relies on a few dependable suppliers
	SUPPLIER_Q3	30. Extent to which Your company provides technical assistance to your suppliers
	SUPPLIER_Q4	31. Extent to which The supplier is involved in your product development process
	SUPPLIER_Q5	32. Extent to which You build long-term relationships with your suppliers
	SUPPLIER_Q6	33. Clarity of specifications provided to your suppliers
Customer Orientation	CO1	34. Extent to which Your company /division is totally committed to creating satisfied customers
	CO2	35. Extent to which Your company's goal exceed customers' expectations
	CO3	36. Extent to which Executives demonstrate their actions that customer satisfaction is important
	CO4	37. Extent to which Employees know what customers love about your company's products or services
	CO5	38. Extent to which Information from customers is used in designing company's products and services
	CO6	39. Extent to which Top management frequently contact customers
	CO7	40. Extent to which Customers' complaints are resolved

	CO8	41. Extent to which Employees are encouraged to satisfy customers

b. 5 points likert scale for items under four factors of organizational culture (Prajogo and McDermott, 2011)

Table 3.2 : Table containing factors for variable Organizational culture and its corresponding items alongside with their codes.

Factors	code	Items (note : the numbering below reflects the number of the variable in the statistical analysis)
Group	OC_GROUP1	1. Participation, open discussion
	OC_GROUP2	2. Empowerment of employees to act
	OC_GROUP3	3. Assessing employee concerns and ideas
	OC_GROUP4	4. Human relations, team work, cohesion
Developmental	OC_DEV1	5. Flexibility, decentralization
	OC_DEV2	6. Expansion, growth, and developmental
	OC_DEV3	7. Innovation and change
	OC_DEV4	8. Creative problem solving processes
Hierarchical	OC_H1	9. Routinization, formalization, and structure
	OC_H2	10. Stability, continuity, order
	OC_H3	11. Predictable performance outcomes
Rational	OC_R1	12. Task focus, accomplishment, goal achievement
	OC_R2	13. Direction, objective setting, goal clarity
	OC_R3	14. Efficiency, productivity, profitability
	OC_R4	15. Outcome excellence, quality

c. 5 points likert scale for process quality, product quality, product innovation, and process innovation (Prajogo & Sohal, 2006b; Prajago & McDermott, 2011)

Table 3.3 : Factors for variables of organizational performance, with their corresponding items and codes.

Variable	Factors	codes	Items
Quality performance	Process quality	PQ1	1. We design processes in our firm to be "fool-proof" (preventive oriented)
		PQ2	2. We have clear, standardized and documented process instructions which are well understood by our employees.
		PQ3	3. We make an extensive use of statistical techniques (e.g. SPC) to improve the processes and to reduce variation
	Product quality	PD_Q1	4. The performance of our products
		PD_Q2	5. Reliability of our products
		PD_Q3	6. Durability of our products
		PD_Q4	7. Conformance to specifications of our products
Innovation performance	Product innovation	PD_I1	8. The level of newness (novelty) of our firm's new products
		PD_I2	9. The speed of new product development process
		PD_I3	10. The number of new products our firm has introduced to the market
		PD_I4	11. The number of our new products that is first-to-market (early market entrants)
	Process innovation	PCI1	12. The technological competitiveness of our company
		PCI2	13. The speed with which we adopt the latest technological innovations in our processes
		PCI3	14. The updated-ness or novelty of the technology used in our processes
		PCI4	15. The rate of change in our processes, techniques and technology

3.4. Samples' sources

Samples are sourced from the Members of Federation of Malaysian Manufacturers (FMM). A name list is extracted from FMM directory year 2011. Those extracted are based first and foremost on the prerequisite of being ISO certified, as per stated in the directory. Other than that prerequisite, convenient sampling method is used to decide which company to cold call through phone calls. The calls would directly address the quality managers.

3.5. Data collection procedure

Both the random sampling method and convenient sampling method was utilized. Random sampling was used when picking the members of the FMM that are ISO certified from the directory of 42nd edition for year 2011. Due to the low response rate of about 5 percent, the author had called all companies on FMM directory that are ISO certified, hence allowing a higher possibility of getting a questionnaire response.

Two techniques of data collection method are used. One, cold calling through phone to the suitable companies listed in FMM directory, direct to their quality control or quality assurance managers. Two, distribution through the UM yahoo group directory to the students and alumni of UM Graduate school of business.

3.6. Data analysis techniques

3.6.1. Assumption of Normality, its verification

All variables would be subjected to the descriptive statistic test in SPSS for verification of their normality by observing the kurtosis and skewness value, and furthermore with the normal Q-Q plot and Detrended Normal Q-Q plot (shown in appendix 1).

3.6.2. Calculation of means of means for each factor of quality management practices

In order to answer the first research question in regards of the level of implementation for quality management practices in Malaysia, the mean of means had been calculated. Method of calculation is by obtaining the mean values of all items (questions) for each factor under each respondent, and then after that to obtain the mean of means for all respondents. Thus, a mean value would be obtained for each factor of quality management practices, revealing the average level of implementation of each factor among the respondents.

3.6.3. Construct validity testing to establish unidimensionality of factors: Factor analysis

All items for eight factors of quality management practices, four factors for organizational culture and four for organizational performance would be subjected to a factor analysis in SPSS to identify the items relevant for this study itself.

Principal Axis factoring was used to discriminate items that have eigenvalues lower than one, with Varimax rotation to double confirm the factors' loadings for

each item. According to Kannan & Tan (2005), Bagozzi (1988) had mentioned that for the sake of convergent and discriminant validity, the items with loadings lower than 0.50 would be dropped. Moreover, items with second loadings higher than .40 would also be dropped.

Due to the fact that this is an established questionnaire method used by many researchers in their studies, the items from each factor are loaded individually (Arumugam, Chang, Ooi & Teh, 2009; Saraph *et al*, 1989). Badri, Davis and Davis (1995) had also mentioned that each of their measures was assumed to be an individual construct when it comes to running the factor analysis for the critical factors of quality management derived by Saraph *et al* (1989).

3.6.4. Construct validity testing in reliability : Reliability analysis

Scale of Cronbach alpha's value for each factor had been analyzed to verify the reliability of each item in measuring the construct they are meant for.

3.6.5. Multiple regression analysis

To investigate the forms of relationship between the variables, on whether does causal relationship exists between the independent variable of quality management practices, organizational culture, and the dependant factor, namely organizational performance. Furthermore, there is a need to discover the pattern of mediating relationship and whether would it be significant, hence the method created by Baron & Kenny (1986) is used. The steps mentioned below would be used to guide the steps of statistical analysis in SPSS multiple regression analysis.

Step 1: linear relationship between the independent variable and the dependant variable

Step 2 : linear relationship between the independent variable and the mediator (to be investigated)

Step 3 : linear relationship between the mediator with the dependant variable

Step 4 : multiple linear relationship between the dependant variable with both the mediator and the independent variable.

The standardized beta value for each linear regression had been taken into consideration on whether or not they are significant at the level of 0.05, and then if the beta value of independent variable for step 4 is less than the beta value in step 1, then a partial mediating relationship exists. If the independent variable is no longer significant when the mediator is included into the multiple regression analysis, then it is a full mediating relationship.

Multiple regression analysis would be conducted in two stages. At the first stage, variables involved are quality management practices, organizational culture and organizational performance. At the second stage, variables involved are quality management practices, organizational culture, and organizational performances in forms of innovation performance and quality performance.

3.6.6. Correlation analysis, bivariate and partial.

In order to investigate the correlation relationship between quality management practices, organizational culture and organizational performance, Pearson Bivariate and partial correlation statistical analysis is conducted. The purpose for

this analysis is to investigate whether the variables significantly correlate with each other and how strong is the correlation relationship.

Full correlation would be done between quality management practices with the organizational performance. Then, partial correlation would be done between quality management practices and organizational performance, with organizational culture controlled.

Then, another round of full correlation and partial correlation would be performed similar to the prior mentioned, but the organizational performance would be substituted by innovation performance and quality performance.