UNIVERSITI TEKNOLOGI MARA

FACTORS THAT INFLUENCE INNOVATIVENESS PERFORMANCE AMONG PETRONAS SUPPLY CHAIN MANAGEMENT EMPLOYEES

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

FACTORS THAT INFLUENCE INNOVATIVENESS PERFORMANCE AMONG PETRONAS SUPPLY CHAIN MANAGEMENT EMPLOYEES

ABSTRACT

Purpose – The purpose of this paper is to examine the innovativeness performance among PETRONAS supply chain management employees.

Methodology/Approach – A total of 120 respondents from PETRONAS supply chain management department at PETRONAS Carigali Sdn. Bhd. had participated through convenient sampling technique in answering the questionnaire.

Findings – Most of respondents are female, the age is between 31-40 years old. The Cronbach's Alpha result for training shows it is a strong positive relationship, leadership shows it is moderate positive relationship, work process shows it is weak positive relationship and open innovation shows it is strong positive relationship. Regression analysis shows that work process has a positive relationship with the open innovation compared to the two variables. For the recommendation, there are some recommendations and suggestions to improve the innovativeness performance among PETRONAS supply chain management employees, for example, to increase number of training program and inculcate the sense of leadership in each employee.

Keywords – Open innovation, supply chain management, training program, leadership, work process

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter will be presenting the overview of the whole research project. The purpose of this research is to determine the performance innovativeness among PETRONAS supply chain management (SCM) employees. PETRONAS involves in oil and gas industry. Oil and gas industry in Malaysia has been ranked as the second largest exporter of liquefied natural gas and the second largest oil and natural gas producer in Southern Asia (U.S Energy Information Administration, 2014). In addition, Malaysia's oil and gas industry has successfully contribute to the the growth of the country's economy and it makes about 20% of total gross domestic product. This industry was started in 1910 when the first drilling activity was taken place in Miri, Sarawak. There was no drilling activity held in any other places neither in Peninsular Malaysia nor Borneo during that time. (Bank Pembangunan Malaysia Berhad). In the late 1960s, foreign petroleum companies also looked for the golden opportunity of expanding their business to offshore Peninsular Malaysia. There were few companies that started off their oil and gas business here in Malaysia such as ExxonMobile. Right after few years, PETRONAS came into being four of the nineteen oil fields in Malaysia that had been discovered up to 90,000 to 99,000 bbls/d.

Petroliam Nasional Berhad or also globally known as PETRONAS was primarily founded in 17th August 1974, which it is Malaysia's fully integrated oil and gas multinational ranked amongst the largest organizations in the world. It is an organization that is fully-owned by the government of Malaysia. PETRONAS business activities include the exploration and production, gas and downstream. PETRONAS fully integrated value

spans from exploration to marketing, logistics to technological infrastructures, with operations in over 50 countries around the world (PETRONAS, 2011). Now, PETRONAS able to reserve stands at 27.12 billion barrel of oil equivalent with an average of production of 1.1 million barrel of oil equivalent per day (PETRONAS E&P Quick Facts, 2014). The contribution by PETRONAS to the government of Malaysia is huge since 1974 until the financial year ended December 2012 with the total of RM732 billion and it comes from the divided which is amounted up to RM278 billion, proceeds from petroleum (RM124 billion), income tax (RM130 billion) and export duty (RM20 billion) (Borneo Post Online, 2013). Nonetheless, PETRONAS has now experiencing the downturn of its production due to the drop of world's crude oil price. In the fourth of 2014, the crude oil benchmarks Brent for June 2014 hikes up to USD112 per barrel and for West Texas Intermediate (WTI) up to USD105 per barrel (Today in Energy, 2015). Nonetheless, 2015 is a pretty bad year for PETRONAS as the crude oil Brent decreases down to USD58.25 and crude oil Western Texas Intermediate (WTI) down to USD50.43 (Energy and Oil Price, 2015). Thus, these affect the production and performance of PETRONAS where all employees have to aggressively improve the production activities and the performance.

Supply chain management department practically supports key business of PETRONAS by managing and providing access to the best and, most-cost effective resources and specialized requirements. Also, it emphasizes more on engaging a good relationship amongst the stakeholders, contractors, end-users, suppliers and project teams which may supports the entire business activities. In the division of supply chain management (SCM), it consists of multiple departments such as SCM planning and strategy, SCM governance, contract management, strategic sourcing, logistic and local capability development that help the innovativeness performance of all departments.

1.2 Background of study

In general, innovation can be defined as the application of new ideas the practice of application to new product, process or any other firm's activity. In addition, innovation concerns with the process of extracting or commercializing the value from ideas and to transform it into useful result (Rogers, 1998). However, it is slightly vary from the understanding towards the open innovation. The open innovation is more precise in executing the external and internal ideas to develop the management and production of the organization. In other words, the organization has to let the knowledge, ideas and resources to flow in in order to improve the innovativeness of performance in one particular organization (Lord-Tarte D. D., 2013).

The open innovation is an important element to be practiced among PETRONAS supply chain management (SCM) department because it is to enhance both internal and external idea to be fully adapted in the daily basis business activities. Furthermore, PETRONAS collaborates with many multinational and international companies, thus it may help PETRONAS to improvise its business performance when all employees able to practice the open innovation in their daily tasks. It also may help all employees to exchange ideas not just internally but externally as well which means they may seek the external ideas from the other business partners of PETRONAS with hope it may help to expand the business activities into a wider area.

1.3 Problem statement

PETRONAS has two different departments which are upstream and downstream. These two major components provide high outcomes towards the performance of PETRONAS. Thus, each of employees in both sectors has to provide the best job performance and

ensure that their work is following the right regulations according to the needs of PETRONAS itself.

In order to enhance the productivity of individuals and communicating organizational to new personnel, it is a positive requirement to actually explore the training process as a whole. The low innovation of employees' job performance can indirectly lead to the poor result of task assigned to them which may reflects the internal and external performance of one particular organization (Bell, 2003). For example, in the supply chain management division consists of four different departments, thus the manager could not assist training program of the logistic job scope to the engineering and construction department because it does not compatible with the job scope of engineering and construction department. Therefore, it could be resulted to some negative impacts towards the performance of the employee because it does not imply the focus on the actual job scope given to them.

Other than that, leadership sense is important in determining the level of innovativeness performance among employees. A poor leadership in one particular organization may impacts the employees as well as the organization which it creates barriers in communicating, assisting, discussing and team working. Overall, a poor leadership will lead to the ineffective job performance for both employees and organization.

In another words, the low level of innovation of employees' performance can indirectly lead to the poor result of task assigned to them. On the other hand, the high level of innovation of employees' performance could improve one employee's self-development progress to be better as expected by the organization. In fact, it could expand the range of critical and creative thinking of the employees so that they able to grow a brighter and multiple ideas for the organization's purpose.

1.4 Research objectives

Research objective plays a crucial role in this whole research. Research objective responsible in determining what the researcher wish to achieve in performing the whole activities involved in reaching the full success to complete the research. Thus, the main objective of this research is to determine the performance innovativeness among PETRONAS supply chain management employees. It seeks the understanding on which factor that could influence the performance innovativeness among PETRONAS supply chain management employees. Those factors may be due to the leadership among the employees, training provided by the organization and work process exercises by all employees. Below are the factors that could influence the innovativeness performance among supply chain management employees:

i) To determine whether training influences open innovation among PETRONAS supply chain management employees.

ii) To determine whether leadership influences open innovation among PETRONAS supply chain management employees.

iii) To determine whether work process influence open innovation among PETRONAS supply chain management employees.

1.5 Research questions

Research question can be defined as statements of the specific components of the problem involved. Although the components of the problem define the problem specific term, it might still need further details in order to develop the specific approach. Below are several questions related to the performance innovativeness among PETRONAS supply chain management employees:

i) Is there any relationship between training and open innovation among PETRONAS supply chain management employees?

ii) Is there any relationship between leadership and open innovation among PETRONAS supply chain management employees?

iii) Is there any relationship between work process and open innovation among PETRONAS supply chain management employees?

1.6 Scope of study

The scope of this study majorly focuses on the all employees under PETRONAS supply chain management department. The supply chain management department play a high role in performing the daily basis business activities because they responsible in executing the exploration, development and production of resources. Hence, it is easier to evaluate their open innovation since they may reflect the organization's outcomes.

1.7 Significance of study

This research is to study the performance innovativeness among PETRONAS supply chain management employees. It is essential for the PETRONAS supply chain management to produce highly innovated and motivated employees because their innovativeness would determine the whole performances of the organization. In fact, it can affect the production of PETRONAS end-products.

Also, when the level of performance innovativeness among PETRONAS supply chain management employees can be determined, it helps to see which level of innovation that strikes by all of PETRONAS supply chain management employees; either it is low or high. When this research has been completed, the result will be shown on what factor that contributes to the performance innovativeness of employees. In addition, the result will be shown what could encourage employees towards achieving the performance

innovativeness. Once the organization discovers the factors that could impact the performance innovativeness among PETRONAS supply chain management employees, it is convenient for the organization to conduct the appropriate training program that could encourage them more towards striking the highest level of innovativeness performance as possible.

1.8 Definition of key term

1.8.1 Upstream

Upstream sector is commonly known with the activities involving the exploration and production (Jerina, 2014). Thus, it comprises the essential first step in the whole extraction to refining process. It is a step to explore the crude oil to be processed for multiple uses.

1.8.2 Downstream

Downstream sector refers to the refining of crude oil, selling and distributing the natural gas or other products derived from the crude oil. Hence, it is crucial for the implementation of marketing expertise in order to supply the end products to the end users effectively (PSG Dover).

1.8.3 Supply chain management

Supply chain management encompasses various activities to bring products to the market and create customers' satisfaction. There are few core SCM functions such as planning, sourcing and contract management, project support, materials management, warehouse management, and logistics management. These aspects are important in ensuring the whole activity managed by SCM literally meet the requirement of the upper management.

1.8.4 Open innovation

Generally, open innovation practices the implementation of internal and external ideas or knowledge in one particular environment (Huizingh, 2010). By assembling both internal and external ideas, it helps the organization to reform a better result due to the process of exchanging ideas and knowledge.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Literature review for each of the research is pivotal because the research has to evaluate the previous research in order to conduct a new research. Thus, literature review can be assisted by few previous materials such as journals, articles, questionnaires, speeches, books and other confidential materials. The research may gain multiple information needed by evaluating such materials in order to be included as an evidence for the new research. Also, it can be as a trusted guideline for the research in completing a good research. In fact, these may help the researcher to avoid from experiencing any errors and as a proof what the proposal is for.

2.1.1 Training

Training may be one of the elements that could influence the innovativeness of employee job performance because it involves the quality circles, self-managing team and virtual team. Hence, it is resulted to the difference degrees of autonomy (Conditions, 2007). In addition, training reflects on how the employees is willing to learn improve himself. Furthermore, job training is provided to upgrade employees' ability to cope with specific situations and tasks with level of simplicity (Batool, 2012). It is important for a trainer to be able to provide trainees with the right information and also to be well prepared to run the whole training program (Sims, 1990). Hence, the quality of information and communication during training program are also essential in determining the result that impacts employees after joining the training program (Hanchane, 2010).

Training program creates a greater awareness among the employer and employees in improving performance of all people at every level (Kendrick, 1980). It is based on research on where an experienced trainer provided training to the staff at call centre and the trainer also listened to the feedback on how they handled their work. Five call centres that provided this kind of training has grown a rapid growth compared to the other 26 call centres that did not carry out this training assessment for their employees. Thus, it shows the effectiveness of training that help the employees to boost up their job performance (Streumer, 2002). In addition, the impact of training also influences the employee's job satisfaction and future achievement, as well as career development (Gaetani, 2013).

2.1.2 Leadership

When the team members endeavor on improving skills and abilities within a group or within multiple groups, it drives employees towards a continual changes and improvement. Also, it improves the relationship between team members either between manager and employees or any related situation. Also, a leader should construct environments that favor the creativity and ultimately innovation (Hemlin S. a., 2011) In addition, leadership also can be as a determinant for the teamwork effectiveness as well as employees job performance. The well-determinant leader shares goals, builds confidence among team members, sets priorities, and manages performance through feedbacks. Other than that, a positive working environment also impacts the performance done by employees (Fapohunda, 2013).

Other researcher has found that the innovation may be impacted by the capability of the leadership. The relationship between the innovation and leadership is hard to articulate the variety functional of leader's behavior. One of the reason behind the low of

innovation in one organization is because the fear of the leader to create a transformation to change the attitude and behavior to lead the fellow members of the team. Nevertheless, the effect of innovation has not widely investigated (Crawford,2001). Besides that, a leader should perform charismatic, interactive and creative leadership in order to enhance the highest level of leadership (Bossink, 2004).

Other than that, the leadership and innovation is indeed closely related. When we discuss about both elements, it definitely emphasized on creating a better changes either it is small or large, continuous or breakthrough. The most important aspect of this situation is where the leadership supposedly brings a better future to the organization. Hence, leaders may be an important person in ensuring the success of innovation, but without any shared norms and ambition of excellence, leader's influence may be limited (Hemlin L. D., 2012). A leader has to determine on which part of defection of the management that needs a little bit touch of changes to be made and to fix it in the most possible way. In another words, innovation takes place on the different levels of the improvements either towards the production or process of the management (Selmen, 1999).

2.1.3 Work process

People will experience physical, social and psychological influences. Thus, it shows that those factors may influence employees working process, result and outcome towards fulfilling requirements stated by the organization. In addition, the motivation provided by the organization could also influence employees to sustain the high work capability, also remain competitive amongst them. A motivated employee has the urge to achieve specific goals and strive it for the present result as well as for the future result (Tinofirei, 2011). Hence, complex tasks indirectly motivate employees to imply creative ways and

innovation to solve the problem. Nonetheless, simpler tasks drive the employee's fulfillment comes from solving the existing problem with an established knowledge and idea (Shalley, 2004).

The relationship between work process and teamwork is somehow resulted to a positive result. It means that the teamwork allows job task expansion as well as supporting peer for time and quality standard. Similarly, it allows employees to give suggestions and opinions regarding the task assigned to them. In fact, it also indicates management confidence in employees' ability to multi-task (Fernandes J. A., 2012).

2.1.4 Open innovation

The innovation can be considered as involving the idea implementation only (Damanpour, 1984). Yet, it sometimes can be the combination of the idea implementation and idea generation (Ven, 1986). Thus, the purpose of this research is to evaluate the relationship between the idea generation as well as the idea implementation and how it affects the employee innovation. As a result, it shows that the innovation of employees influenced the practice of their creativity, job competence and motivation. It also believed that these criteria may improvise the innovation of employee performance into the highest possible level of performance. Moreover, open innovation enables the organization to adjust the integration and commercialization resources and capabilities to maximize profit and capture value (Krithika Randhawa, 2014)

The open innovation can be referred as the use of both internal and external knowledge. As for the internal factor, it includes few visible aspects such as demographic, profits, demographic and age of the employees as well as for the organization (Huizingh, 2010). On the other hand, the external factor can be influenced by few aspects such as the globalization, technology and knowledge fusion (Gassmann, 2006). Somehow, the open

innovation requires the involvement of the manager to exploit and develop the innovation activities in order to enable the delivery of a great service and business relationship with customers, suppliers and competitors. It is also believed that when the manager able to perform such method, it is useful for the development of the organization and also, for the development of all employees of the organization.

In addition, the innovation generally refers to changing or creating more effective process, products and ideas, as it is also expected to increase the likelihood of a business succeeding. In fact, innovation entails an outcome and the steps involved to reach this outcome at the same time (Erin Quintane, 2011). Moreover, innovation also can be understood in the way that it can be adapted to be having a shorter decision chains and faster flexibility. Hence, innovation also able to improve efficiency and potential value as it can be regarded a new intangible asset for one particular organization (Utami, 2013) and innovation could improve the total factor of productivity (Salas-Fumás, 2004).

The open innovation closely related to the managerial ties which mean the needs to internalize the external ideas from different innovation sources and use it against developing the firm's current business model. Therefore, in other to develop the current business model through this collaboration, the firm needs to strengthen the relationship between the firm and external partners. Nonetheless, it is not easy to grow a good collaboration but both parties have to be able to extend value that may help both to achieve their goals. In addition, a networked manager may help the firm to identify and exploit proper sources of knowledge and use it for the benefit of the firm (Kaur M. M., 2001)

2.2 Theoretical framework

This research studies on factors that influence the performance innovativeness among PETRONAS supply chain management and the related type of innovation. The theoretical framework shown in Figure 1 illustrates that various variable consisted such as leadership, training and work process.

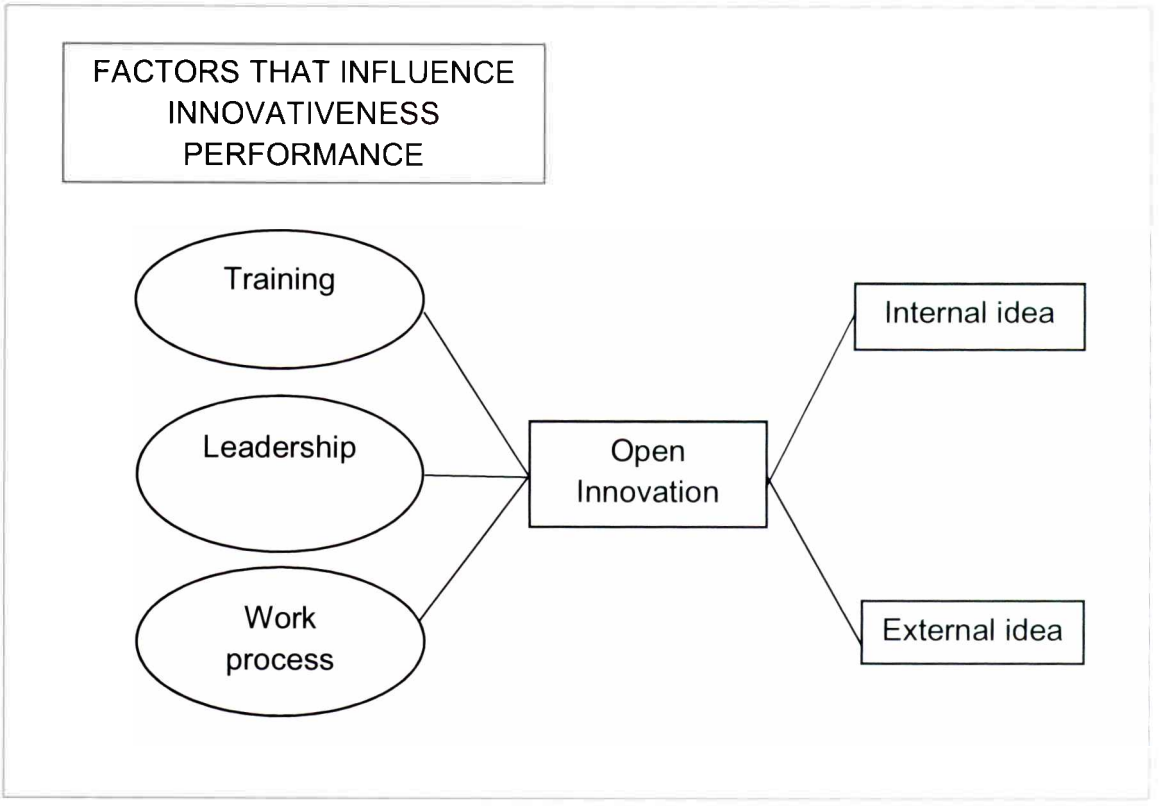

Figure 2.2.1 Theoretical framework of the study

As for this research, few factors that can be related to the innovativeness of performance among PETRONAS supply chain management employees consist of leadership, training and work process. These three independent variables will be studied on how it affects the type of innovation which is the open innovation.

2.3 Hypothesis

Hypothesis is a statement that expresses the relation between two or more variables. Moreover, hypothesis able to test problems occurs either it is related or not.

H1: Relationship between training and open innovation of performance among PETRONAS supply chain management employees.

H0: There is no relationship between training and open innovation of performance among PETRONAS supply chain management employees.

H1: There is a relationship between training and open innovation of performance among PETRONAS supply chain management employees.

H2: Relationship between leadership and open innovation of performance among PETRONAS supply chain management employees.

H0: There is no relationship between leadership and open innovation of performance among PETRONAS supply chain management employees.

H1: There is a relationship between leadership and open innovation of performance among PETRONAS supply chain management employees.

H3: Relationship between work process and open innovation of performance among PETRONAS supply chain management employees.

H0: There is no relationship between work process and open innovation of performance among PETRONAS supply chain management employees.

H1: There is a relationship between work process and open innovation of performance among PETRONAS supply chain management employees.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the methodology used in this study. This research study is conducted based on the methodology. Therefore, it is essential in implementing this research accordingly and correctly. It also functions as a data collection and data decision in executing the research.

3.2 Research design

In this research study, the type of research design has to be determined. Therefore, as for this research, it uses the method of quantitative research. Quantitative research is all regarding the step in collecting numerical data in order to explain a particular situation. According to Burns and Bush (2006), quantitative research can be classified as the use of structural questions where options of respondents have been pre-determined and it inquires the large number of respondents. Thus, with the use of quantitative research, it may help to determine the relationship between variables involved such as independent variables and dependent variables.

3.2.1 Descriptive research

Descriptive research responsible in conducting the process of describing, interpreting and explaining the specific condition of present. Also, the descriptive research concerns to examine an occurred phenomenon at a particular place or time (Zikmund, Babin and Carr, 2010). Hence, it focuses on few important factors such as conditions, practices, differences and structures or relationships that exist or processes that are on-going or trends with valid evidence. As for this study, questionnaires will be distributed to selected

respondents and once questionnaires have been completed, the researcher will collect them back and proceed with the data analysis in order to gain the result.

3.3 Data collection method

Data collection method is one of the steps taken by the researcher to gain information from data and collect it to be sources in order to complete this whole research. Therefore, it involves two types of data which are primary data and secondary data.

3.3.1 Primary data

Primary data collection method can be classified as an experiment strategy (J.Hox, 2005). Therefore, as for this research, it implements the use of questionnaire. It is the first-hand experience because it is developed and gathered by the researcher. So, the researcher will distribute questionnaires to qualified respondents and will collect it once respondents finished filling all the answers required. It also can be as a platform for the researcher to receive genuine answers and opinions by respondents regarding the present situation.

3.3.2 Secondary data

Official data archived are easy to retrieve by using the secondary data. Secondary data can be in terms of files obtained from the Internet, CD-ROM, newspapers and articles (Boeije, 2005). Hence, the secondary data collection process is much cheaper compared to the process of collecting the primary data. In fact, the use of book as a reference is convenient to be understood by the researcher. Also, it contains valid data that can be interpreted into this research.

3.4 Sampling data

Sampling can be categorized as a process of using small number of items or part of larger population to be concluded regarding the whole population. On the other hand, population can be defined as a group that shares common or similar set of characteristics (Albandoz).

3.4.1 Target population

Target population can be defined as a group of people that the researcher targeted to distribute questionnaires and require answers or feedback from them to be interpreted as a data. Therefore, as for this research, the target population can be employees who work under PETRONAS supply chain management department and they can be from various divisions. The range of age of PETRONAS supply chain management employees can be approximately from 21-50 years old. The size of population and amount of errors determine the size of randomly selected sample. Thus, the population of PETRONAS supply chain management employees is approximately around 170 employees. Therefore, the sample size of this population is 120 employees according to (Morgan, 1970). Below is the example of the sample size and population size determined by (Morgan, 1970):

N	S	N	S	N	S
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size. *S* is sample size.

Source: Krejcie & Morgan, 1970

Figure 3.4.1.1 Krejcie & Morgan

3.4.2 Sampling Technique

Sampling techniques consist of two elements which are probability and non-probability. Probability sampling is a process that utilizes certain form of selection. In probability sampling, each unit is drawn with known probability. In fact, it has zero chance of being

selected in the sample. On the other hand, non-probability sampling depends on subjective judgment.

3.4.3 Sampling size

There are few types to determine the sample size. For example, use a census for small populations, published tables, imitate a sample size of similar studies and apply selected formulas to calculate a sample size.

3.5 Research instrument

It is essential for the researcher to ensure the instruments chosen are valid and reliable. The reliability and validity of the research is determined by the large extent on the appropriateness of instruments. As for this research, the chosen instrument is self-administrated which questionnaires given to all selected respondents and they answer it without any present of trained interviewer. Therefore, all the answers given are right away based on respondent's opinions and perspectives.

3.5.1 Questionnaire design

The survey conducted uses the questionnaire design. The researcher has to be extra caution in designing the questionnaire in order to avoid from any errors occur.

3.6 Sample of questions

Variable	Sample item	Sources
1.1 Training	1.1.1 My working skills improve after I join the training program 1.1.2 I believe that training helps me to enhance my skills and knowledge	• (Hanif, 2013) • (Umaselvi,

	1.1.3 Training helps me to promote my self-confidence 1.1.4 Training educates me to perform my task better 1.1.5 Training enables me to set objectives that are relevant to my job 1.1.6 I improve my networking during training program 1.1.7 Training motivates me to be more committed 1.1.8 Training helps me to grow my career path 1.1.9 Training program includes all aspect of quality needed by employees 1.1.10 Job practices encourage me to seek more knowledge	2010) • (Bowley, 2007)
1.2 Leadership	1.2.1 I work with my colleague to stimulate new ideas 1.2.2 My manager regularly acknowledges me when I initiate new ideas 1.2.3 I establish trust in my relationship with others 1.2.4 I always set my own specific	• (Bowley, 2007) • (Lyse Langlois, 2014) • (Neck, 2002)

	goals for my performance 1.2.5 I believe that everyone has rights to participate in decision-making 1.2.6 I believe that a leader should be able to inculcate the culture of innovation in the organization 1.2.7 I believe that a leader should have a collaborative mindset with others 1.2.8 I seek to preserve bond and harmony in the organization 1.2.9 I always volunteer myself to lead the given task/project 1.2.10 I can visualize myself as a good team player	
1.3Work process	1.3.1 All given tasks are relevant to my job scope 1.3.2 I start my new task right after I finished the old ones efficiently 1.3.3 I closely monitor the time taken to complete one task 1.3.4 I have several troubles in setting priorities of my work 1.3.5 I and others share similar	• (Umaselvi, 2010) • (Koopmans, 2012) • (Bowley, 2007) • (Christopher Honts, 2012)

	values 1.3.6 I review with others about negative aspects of my work 1.3.7 I am determinant to improve my performance efficiently 1.3.8 I and others always ensure the working environment remains safe 1.3.9 It is important to fully understand the task before we begin 1.3.10 It is essential for my team to check on each other's work to avoid errors	• (Neck, 2002)
2. Open innovation	2.1.1 I able to collect external ideas to be implemented in my job scope 2.1.2 I am encouraged to propose my own ideas which may help in accomplishing my company's goals 2.1.3 My organization believes it is good to use the external sources as inputs (eg: knowledge, idea, etc.) 2.1.4 My organization appreciates a positive teamwork between the internal and external parties 2.1.5 I receive adequate information of organization's long-term strategies	• (Little, 2014) • (Umaselvi, 2010) • (Kaur M. M., 2014) • (Elssawabi, 2015)

Table 3.6.1 Sample of questions

3.7 Scale of measurement

For this research, questionnaires will be used as a tool to collect data and information from respondents. The questionnaire is divided into three sections; Section A (Demographic profile), Section B and Section C (Construct management). These three information sections will be using three types of scale which are the nominal scale and interval scale.

3.7.1 Nominal scale

Nominal scale represents the highest level of basic level of measurement. Basically, it is useful for labeling variables yet without any quantitative value present. On the other hand, it only requires unique identifiers such as colors, letter and etc (Velleman, 1993). The most importantly, it is about the relationship between individuals and their identifiers. On the questionnaire, the nominal scale will be providing questions regarding demographic profile of the respondent such as gender and age.

3.7.2 Interval scale

Interval scale represents numeric scale which it does not only consist orders, but also the exact differences between values. Interval scale practices the use of Likert five point scales on the questionnaire on Section C. For example, independent variables consist of leadership, training and work process, thus, respondents are given 5 options which are 1 as "Strongly disagree", 2 as "Disagree", 3 as "Neutral", 4 as "Agree" and 5 as "Strongly agree". As for this effort, it shows the degree of agreement and disagreement of respondents' opinion and perspective.

3.8 Data processing

Data process is being guided by the preliminary plan of the data analysis that is formulated in the research design phase. In addition, data preparation is important in ensuring a better decision-making by improvising the quality of findings. Thus, data processing consists of data checking, data editing, data coding, data transcribing and data cleaning.

3.8.1 Data checking

The main purpose of conducting data checking activity is to detect any problems or defects available in the questionnaire. After any errors have been found, the next step can be proceed which is data editing.

3.8.2 Data editing

Data editing is the second step of data processing. Data editing is an action taken by the researcher or respondents to correct any errors occurred. Also, the early corrective action can be taken in order to repair the present questionnaire so that it could meet the absolute requirement needed in preparing the right questionnaire.

3.8.3 Data coding

Data coding represents a process where all data are converted into variables using numbers. With that, those data can be used to key in into the computer for the analysis purpose.

3.8.4 Data transcribing

Data transcribing represents the process of transferring coded data from questionnaires into computer. After that, the researcher has to use SPSS software to key in all data

obtained from questionnaires. SPSS is a Windows based programme for data entry and data analysis. It also functions as to create tables and graphs.

3.8.5 Data cleaning

Data cleaning represents the process of altering data or checking data that are out of range in order to ensure that the data are all correct and accurate. Therefore, a careful review on this process is required. Moreover, data cleaning also corrects the missing responses which all data are related to unambiguous answers of the question.

3.9 Data analysis

Data analysis takes place to assemble all collected data after all data have been transformed into useful information for further research. As for this research, all collected data will be assembled and analyzed by using SPSS software version 20.0. Therefore, all collected data will be transformed for useful information.

3.9.1 Descriptive analysis

Descriptive analysis is used to describe and summarize the give data set obtained from the respondents. Hence, it also includes the data transformation that can be described by several basic characteristics such as frequency distribution, measure dispersion (range standard deviation and coefficient variance, measure of central tendency (mean, median and mode) and measure the shape of skewness. In addition, descriptive analysis able to measure independent variables such as leadership, training and working process with the dependent variable such as open innovation. The result will be shown in the mean and the highest mean would show the respondent's perception towards the importance of related independent variables with the open innovation.

3.9.2 Scale measurement

The function of scale measurement is to the validity and reliability of data obtained for this research. For the validity test, it can be used to test on how well an instrument measures a specific concept to be focusing on the level of stability and consistency in the measurement. On the other hand, the reliability test can be used to measure the degree of which measures that contain error and a yield consistent result.

3.9.3 Pearson Correlation Analysis

The Pearson correlation coefficient is the measurement of the extent of the statistical relationship between two interval or ratio level variables. The correlation coefficient able to indicate the direction of relationship between both variables and also the magnitude of the linear relationship. Pearson correlation coefficient is scaled so it will always be in between -1 and +1. When r is close to 0, it shows that there is a slight relationship between variables and the farther away from 0 r is, either the negative or positive direction, the greater the relationship between the two variables (Taylor, 1990). A correlation coefficient of zero shows that no association exists between measured variable.

3.9.4 Multiple regression analysis

The multiple regression analysis is to indicate the multiple independent variables that are related to dependent variables. Once the information about the multiple variables and dependent variables have been identified, all information of the independent variables shall be taken and use it to make it more powerful and the predictions shall be more accurate.

3.9.5 Linear Regression Analysis

Generally, the linear regression analysis is used for the tools of understanding the association between two or more variables (P.Hoffmann, 2010). Alternatively, the linear regression analysis is also to seek ascertain the casual effect of one variable upon another (Sykes, 1990). In other words, it is to assess the statistical significance of the estimated relationships which the degree of confidence that the relationship is close to the estimated relationship.

3.10 Conclusion

This chapter describes methods that are used to conduct this research. It includes the data collecting, data analyzing and data interpreting. On the other hands, SPSS software 20.0 is used for data entry and data processing. Also, it is used for the research design, data collection method, sampling design, research instrument, data processing and data analysis to ensure all data collected are useable and accurate.

CHAPTER 4

FINDINGS ANALYSIS

4.1 Introduction

This chapter will be explained further about the methodology and design of this research. This chapter involves the process of gathering and analyzing data in order to gain the significant results. In addition, it also elaborates the research population, data collection, sampling, data analysis and interpretation.

4.2 Demographic Analysis

Characteristics	Frequency	Percentage
GENDER		
Male	41	41.0%
Female	59	59.0%
AGE		
21-30 years old	41	41.0%
31-40 years old	45	45.0%
41-50 years old	14	14.0%
51 years old and above	0	0.0%
RACE		
Malay	64	64.0%
Chinese	23	23.0%
Indian	13	13.0%
RELIGION		
Islam	65	65.0%
Christian	14	14.0%

Buddhist	10	10.0%
Hinduism	11	11.0%
LEVEL OF EDUCATION		
SPM	11	11.0%
Diploma	13	13.0%
Bachelor degree	69	69.0%
Master	7	7.0%
PhD	0	0.0%
MONTHLY INCOME LEVEL		
RM2,000-RM3,000	24	24.0%
RM3,001-RM5,000	34	34.0%
RM5,001-RM7,000	25	25.0%
RM7,001 and above	17	17.0%
POSITION		
Non-executive	29	29.0%
Executive	66	66.0%
Manager	5	5.0%
SERVICE DURATION		
Below 1 year	13	13.0%
1 year-3 years	23	23.0%
3 years-5 years	48	48.0%
5 years-7 years	9	9.0%
7 years and above	7	7.0%

Table 4.2.1.0 Classification of respondents by demographic profile

4.2.1 Gender

In this research, the lists of respondent are divided into two categories which are male and female. Based on the table above, out of 100, 41 or 41.0% respondents are male while the other 59 or 59.0% respondents are female. Based on the result, it shows that female respondents are the dominant towards this questionnaire participation and female respondents tend to give full commitment and support towards this research as they were willing to provide the researcher with sufficient information and cooperation.

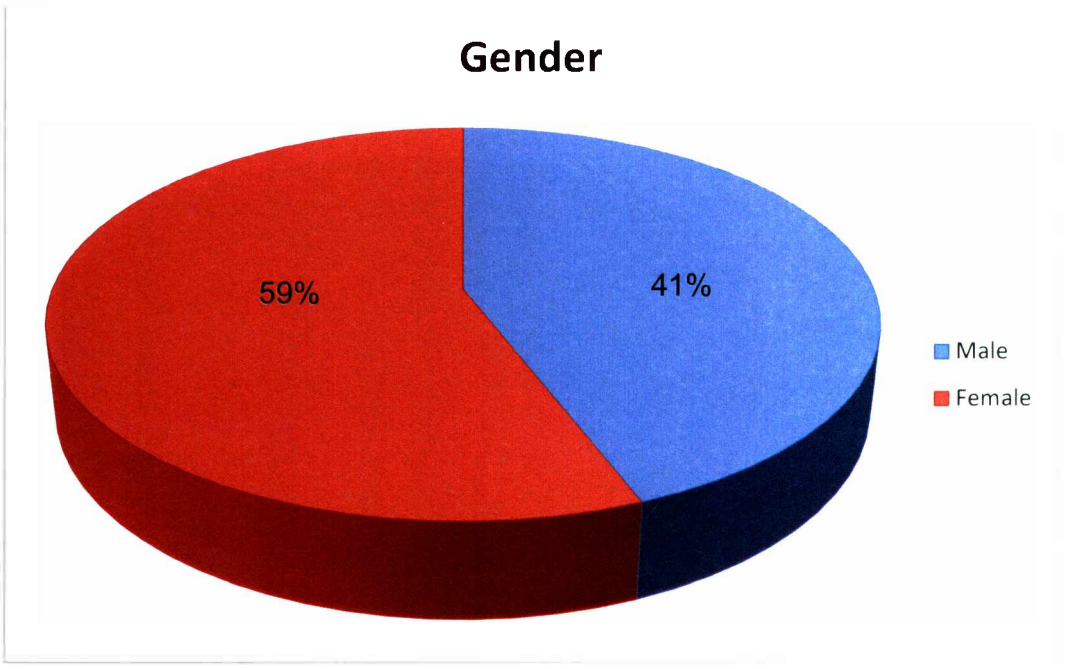

Figure 4.2.1.1 Pie chart of respondent's gender

4.2.2 Age

In this research, it also included the element of age of the respondent because it may influence the information given to the researcher about this research. The levels of age can be categorized into four which are 21 to 30 years old, 31 to 40 years old, 41 to 50

years old, and 51 years old and above. Based on the result, out of 100 respondents, 41 respondents or 41.0% represented the level of age from 21 years old to 30 years old, 45 respondents or 45.0% represented the level of age from 31 years old to 40 years old, 14 respondents or 14.0% represented the level of age from 41 years old to 50 years old and there is no respondent or percentage that represented the level of age from 51 years old and above. From the result obtained, it shows that the major contributor towards this questionnaire is the level of age from 21 years old to 30 years old with the highest percentage of 45.0% that represented 45 respondents.

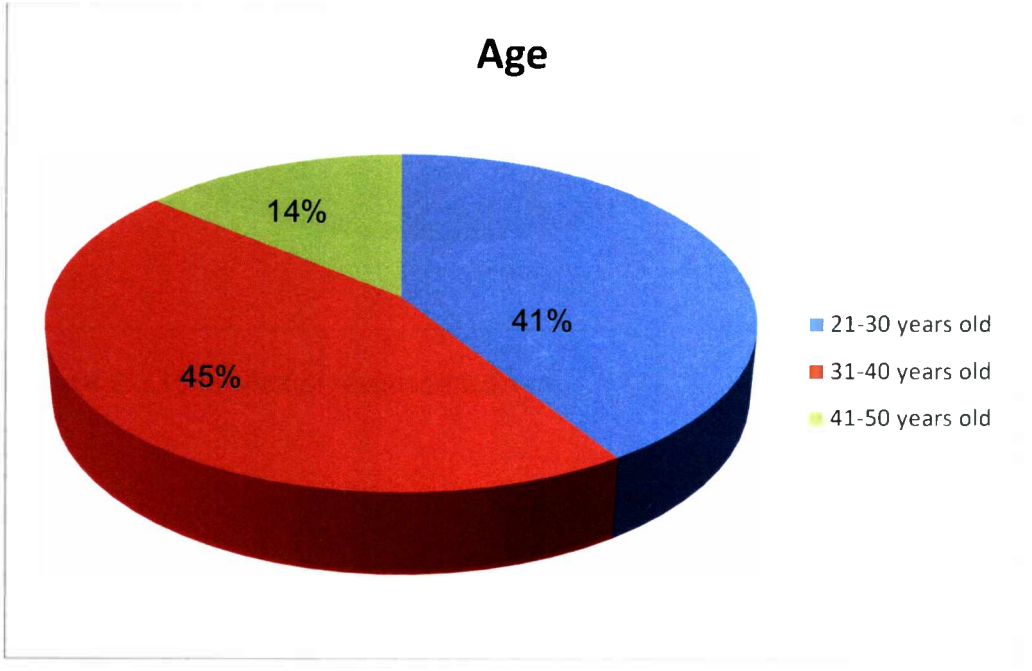

Figure 4.2.2.1 Pie chart of respondent's age

4.2.3 Race

Besides that, the type races of respondents also included in the questionnaire. Types of race are categorized into three races which are Malay, Chinese, Indian and others. Malays consisted of 64 respondents which represented 64.0%, Chinese consist of 23

respondents which represent 23.0% and Indian consisted of 13 respondents which represent the rest of 13.0%. However, there are no respondents for race of others. As total, Malay respondents have contributed the highest percentage with the result of 64.0% that represented 64 respondents.

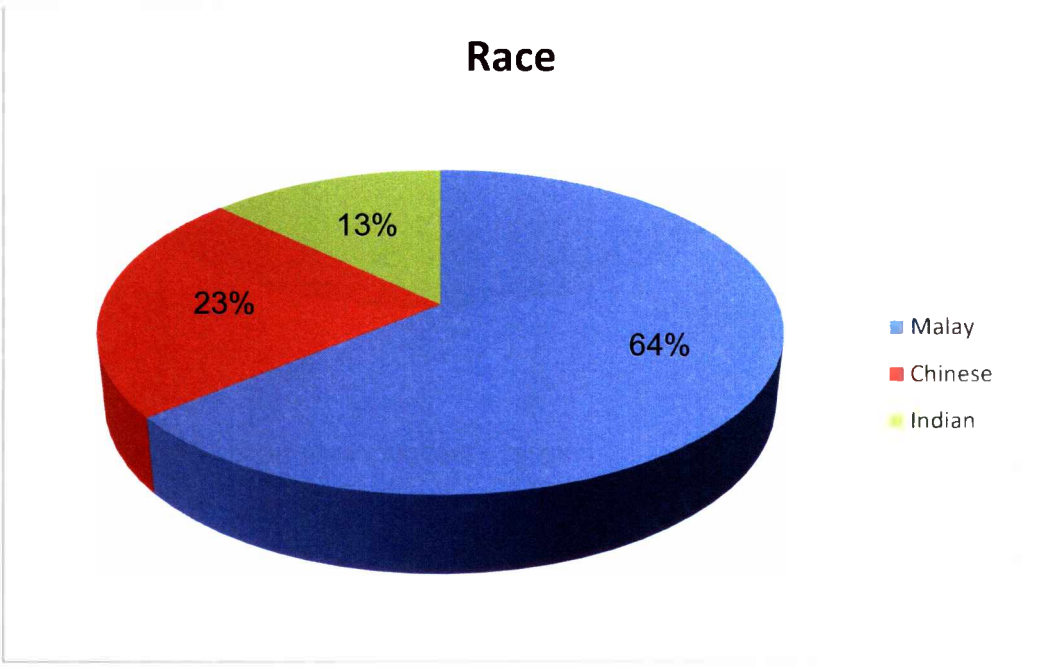

Figure 4.2.3.1 Pie chart of respondent's race

4.2.4 Religion

In addition, types of religion also included in the questionnaire. It is to identify the race of the respondent and the religion of the respondent. Based on the table above, there are four types of race which are Islam, Christian, Buddhist and Hinduism. As a result, Islam consisted of 65.0% which represented 65 respondents, Christian consisted of 14.0% which represented 14 respondents, Buddhist consisted of 10.0% which represented 10 respondents and Hinduism consisted of 11.0% which represented 11 respondents. Therefore, it certainly shows that most of the respondents of the questionnaire are Muslim with the highest percentage of 65.0% amongst other races.

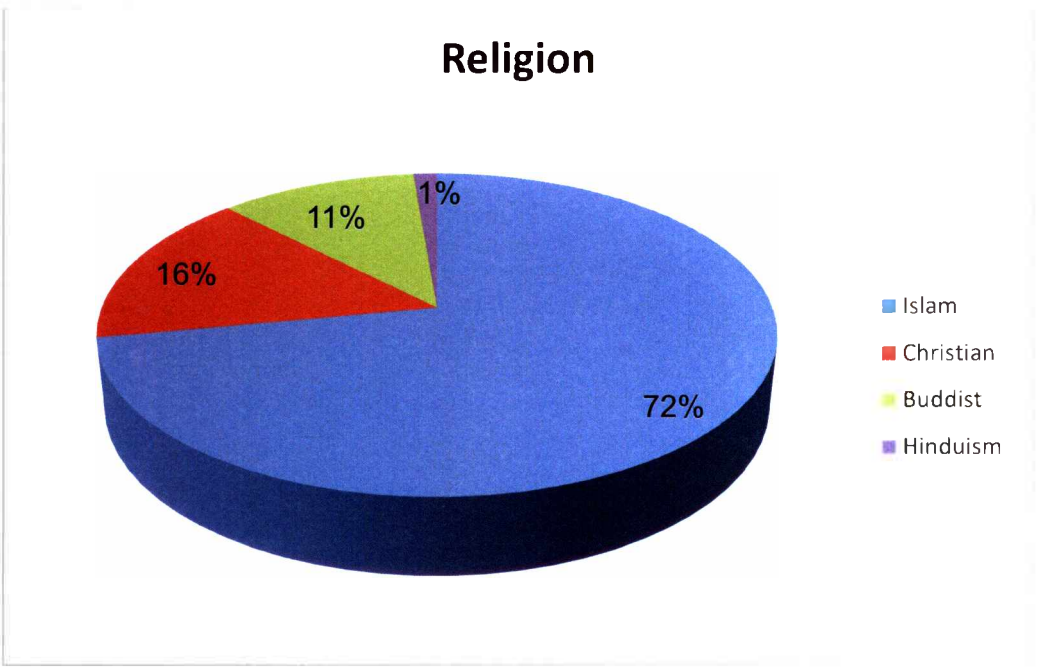

Figure 4.2.4.1 Pie chart of respondent's religion

4.2.5 Level of education

Other than that, level of education of all respondents is important so it is included in the questionnaire. The levels of education can be categorized into Sijil Pelajaran Malaysia (SPM), diploma, bachelor degree, master and PhD. Firstly, respondents who owned Sijil Pelajaran Malaysia (SPM) consisted of 11.0% which represented 11 respondents. Secondly, respondents who owned diploma certification consisted of 13.0% which represented 13 respondents. Thirdly, respondents who owned bachelor degree certification consisted of 69.0% which represented 69 respondents. Lastly, respondents who owned master consisted of 7.0% which represented 7 respondents. However there is no PhD holder as one of the respondent of the questionnaire. It shows that the highest level of education is contributed by respondents who owned bachelor degree with 69.0%.

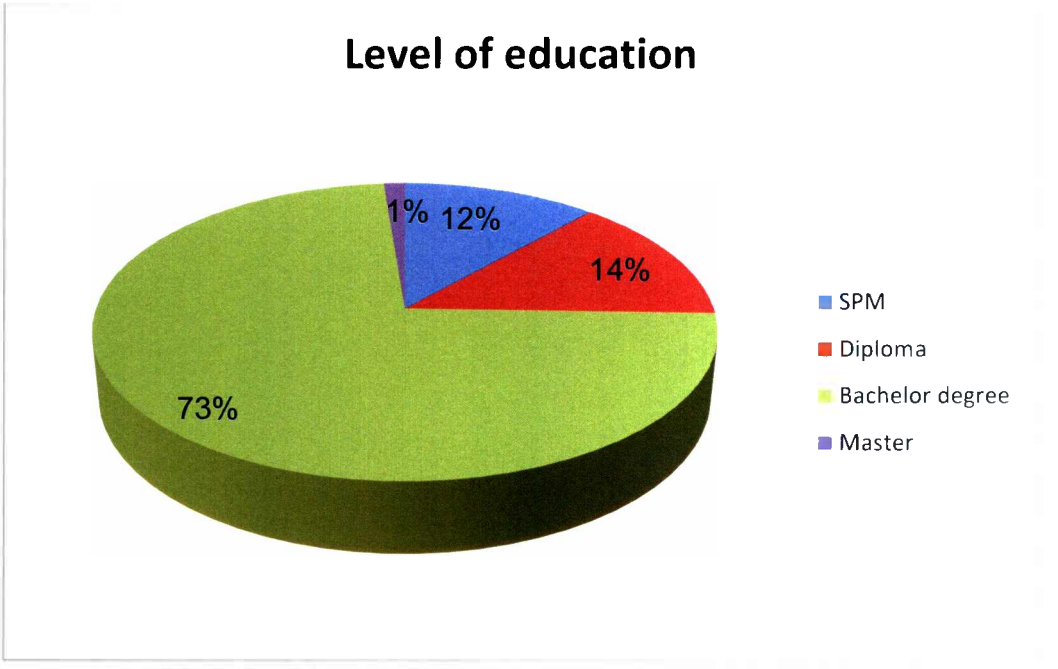

Figure 4.2.5.1 Pie chart of respondent's level of education

4.2.6 Monthly income level

Monthly income level of respondents is also included in the questionnaire. It consisted of the range from RM2,000 to RM3,000, RM3,001 to RM5,000, RM5,001 to RM7,000, and RM7,001 and above. Firstly respondents who earn monthly income level from RM2,000 to RM3,000 consisted of 24.0% which represented 24 respondents. Secondly, respondents who earn monthly income level from RM3,001 to RM5,000 consisted of 34.0% which represented 34 respondents. Thirdly, respondents who earn monthly income level fromRM5,001 to RM7,000 consisted of 25.0% which represented 25 respondents. While respondents with the monthly income level from RM7,001 and above consisted of 17.0% which represented 17 respondents. Therefore, the highest monthly income level is from RM3,001 to RM5,000 with 34.0%.

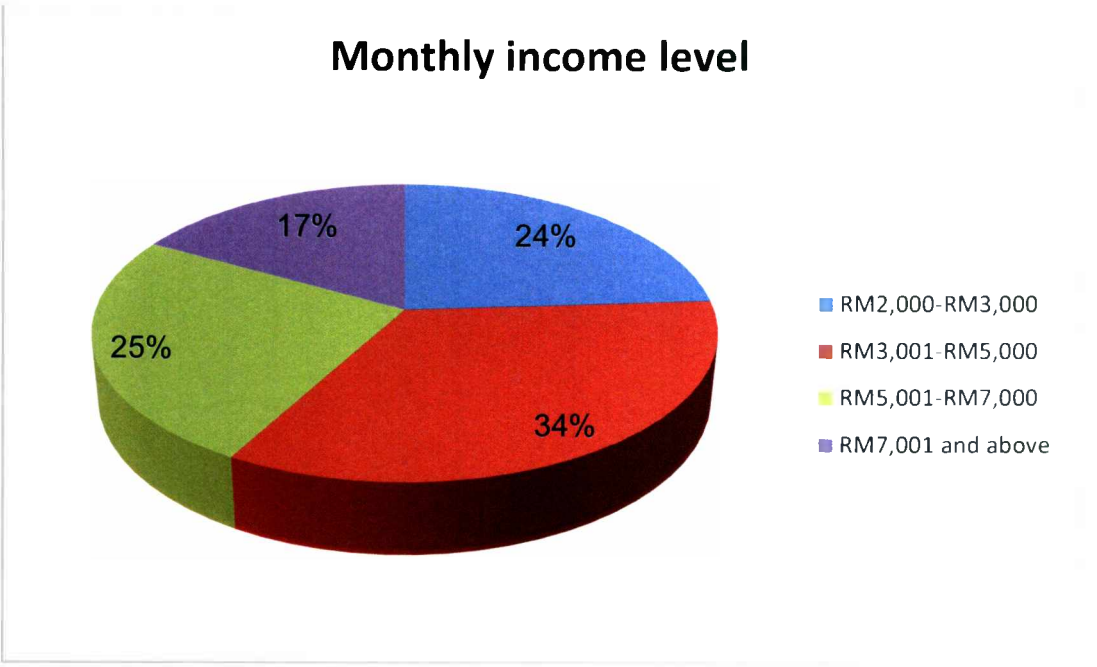

Figure 4.2.6.1 Pie chart of respondent's monthly income level

4.2.7 Position

Position of employees is also included in the questionnaire. It consisted of three types of position which are non-executive, executive and manager. Firstly, the non-executive position consisted of 29.0% of the total percentage which represented by 29 respondents. Secondly, the executive position consisted of 66.0% of the total percentage which represented by 66 respondents. While the other 5.0% of the total percentage represented by 5 respondents. Thus, it shows that the highest percentage is contributed by executive position with 66.0%.

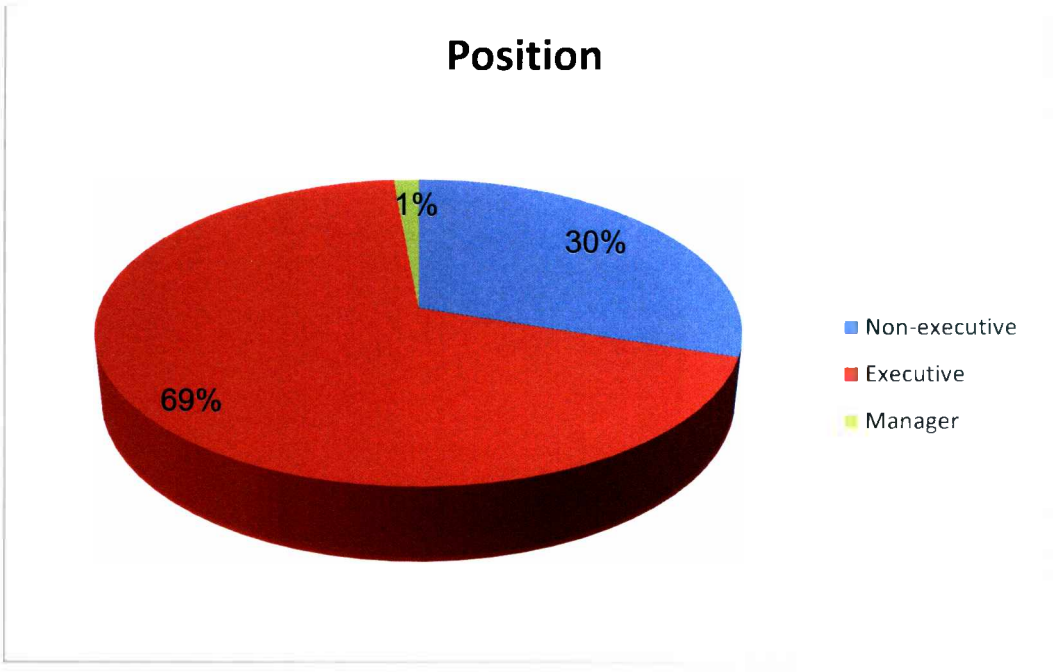

Figure 4.2.7.1 Pie chart of respondent's position

4.2.8 Service duration

Service durations served by each employee can be categorized into five which are below 1 year, 1 year to 3 years, 3 years to 5 years, 5 years to 7 years, and 7 years and above. Firstly, service duration of below 1 year consisted of 13.0% which represented 13 respondents. Secondly, service duration from 1 year to 3 years consisted of 23.0% which represented 23 respondents. Thirdly, service duration from 3 years to 5 years consisted of 48.0% which represented 48 respondents. Fourthly, service duration from 5 years to 7 years consisted of 9.0% which represented 9 respondents. Finally, service duration from 7 years and above consisted of 7.0% which represented 7 respondents. As a result, the highest service duration is from 3 years to 5 years consisted of 48.0% which is served by 48 of PETRONAS supply chain management employees.

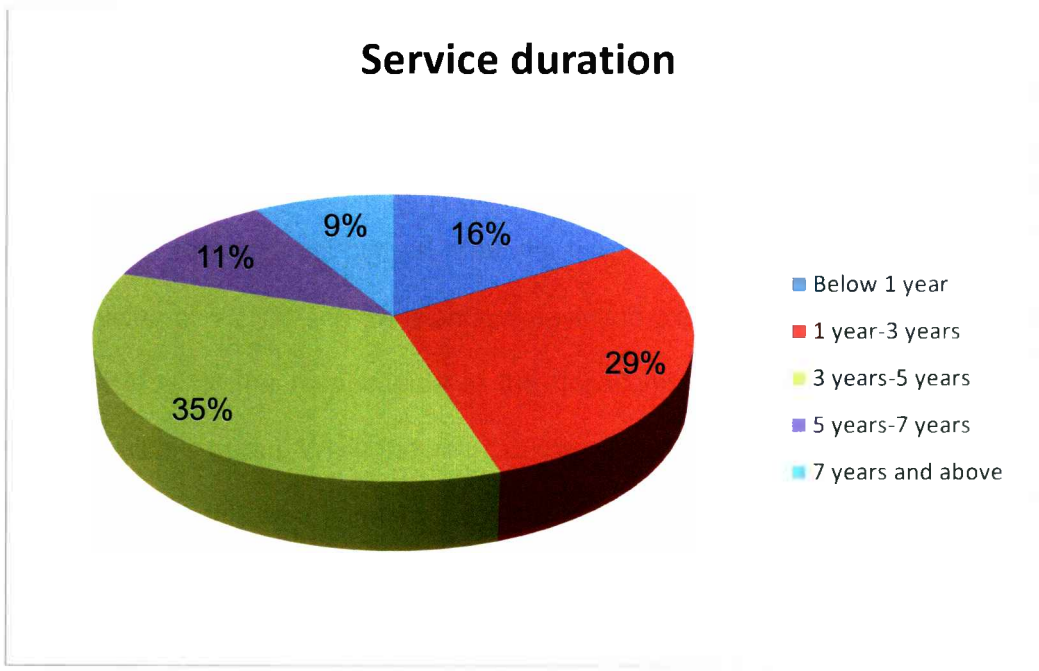

Figure 4.2.8.1 Pie chart of respondent's service duration

4.3 Item analysis

The item analysis has been made and the results have been obtained. From the result obtained, the highest and the lowest result of mean will be analyzed for the three (3) independent variables which are training, leadership and work process and also for dependent variable which is the open innovation.

From the result obtained, the highest mean for training is item number one (1) with the mean value of 4.3800 and the standard deviation p>.5. The value of mean obtained shows that most of the respondents of the questionnaire provided answers with the scale of 4 which is agree. While the value of standard deviation is not closer to zero which means this item is nearly exposed to error while the respondents answering the question. Meanwhile, the lowest mean for training is item number ten (10) with the mean value of 3.7800 and the standard deviation value p>.5 which mean that most of the

respondents provided and answer that item near to the scale 4 which is agree. Meanwhile, the value of standard deviation is not closer to zero and it can explain that this item is nearly exposed to error while the respondents answering the question.

From the result obtained, the highest mean for leadership is item number seven (7) with the mean value of 4.2700 and the standard deviation p>.5. The value of mean obtained shows that most of the respondents of the questionnaire provided answers with the scale of 4 which is agree. While the value of standard deviation is not closer to zero and it can explain that this item is nearly exposed to error while the respondents answering the question. Meanwhile, the lowest mean for leadership is item number nine (9) with the mean value of 3.7000 and the standard deviation p>.5. The value of mean obtained shows that most of the respondents of the questionnaire provided answers near to the scale of 4 which is agree. Meanwhile, the value of standard deviation is not closer to zero and it can explain that this item is nearly exposed to error while respondents answering the question.

From the result obtained, the highest mean for work process is item number seven (7) with the mean value of 4.3200 and the standard deviation p>.5. The value of mean obtained shows that most of the respondents of the questionnaire provided answers with the scale of 4 which is agree. While the value of standard deviation is not closer to zero and it can explain that this item is nearly exposed to error while the respondents answering the question. Meanwhile, the lowest mean for leadership is item number four (4) with the mean value of 3.4600 and the standard deviation is not closer to zero and it can explain that this item is nearly exposed to error while respondents answering the question.

From the result obtained, the highest mean for open innovation is item number five (5) with the mean value of 4.1400 and the standard deviation p>.5. The value of mean obtained shows that most of the respondents of the questionnaire provided answers with the scale of 4 which is agree. While the valued of standard deviation is not closer to zero and it can explain that this item is nearly exposed to error while respondents answering it. Meanwhile, the lowest mean for open innovation is item number three (3) with the mean value of 3.9500 and the standard deviation is not closer to zero and it can explain that this item is nearly exposed to error while respondents answering question.

4.3.1 Training

	N	Mean	Std. Deviation
My working skills improve after I join the training program	100	4.3800	.78855
I believe that training helps me to enhance my skills and knowledge	100	4.1500	.78335
Training helps me to promote my self-confidence	100	3.9700	.78438
Training educates me to perform my task better	100	4.0000	.93203
Training enables me to set objectives that are relevant to my job	100	4.0900	.77973

I improve my networking during training program	100	4.1900	.73437
Training motivates me to be more committed	100	4.1400	.84112
Training helps me to grow my career path	100	4.2100	.82014
Training program includes all aspect of quality needed by employees	100	3.8700	.94980
Job practice encourages me to seek more knowledge	100	3.7800	1.03064

Table 4.3.1.1 Item analysis of training (overall)

4.3.2 Leadership

	N	Mean	Std. Deviation
I work with my colleague to stimulate new ideas	100	4.1600	.80050
My manager regularly acknowledges me when I initiate new ideas	100	4.1800	.74373
I establish trust in my relationship with my colleagues	100	4.1200	.84423
I set specific goals for my performance	100	4.1300	.83672

I believe that everyone has rights to participate in decision-making	100	4.2400	.83024
I believe that a leader able to inculcate the culture of innovation in the organization	100	4.1600	.92899
I believe that a leader should have a collaborative mindset with others	100	4.2700	.78951
I seek to preserve bond and harmony in the organization	100	4.2000	.89893
I always volunteer myself to lead given task/project	100	3.7000	1.01005
I can visualize myself as a good team player	100	4.0100	.97954

Table 4.3.2.1 Item analysis of leadership (overall)

4.3.3 Work process

	N	Mean	Std. Deviation
All given tasks are relevant to my job scope	100	4.2400	.76700
I start my new task right after I finished the old ones efficiently	100	4.1500	.83333
I closely monitor the time taken to complete one task	100	4.1000	.97959

I have several troubles in setting priorities of my work	100	3.4600	1.21788
I and others share similar values	100	4.0100	.90448
I review with others on negative aspects of my work	100	4.0800	.96064
I am determinant to improve my performance efficiently	100	4.3200	.66485
I and others always ensure the working environment remains safe	100	4.1300	.92829
It is important to fully understand the task before we begin	100	4.0100	.89324
It is essential for my team to check on each other's work to avoid errors	100	4.0000	.99494

Table 4.3.3.1 Item analysis of work process (overall)

4.3.4 Open innovation

	N	Mean	Std. Deviation
I able to collect external ideas to be implemented in my job scope	100	4.0700	.93479
I am encouraged to propose my own ideas which may help in accomplishing my company's goals	100	3.9500	.99874

My organization believes it is good to use the external sources as inputs (eg: knowledge, idea, etc)	100	3.9800	.93182
My organization appreciates positive teamwork between internal and external parties	100	4.1000	.88192
I receive adequate information of organization's long-term strategies	100	4.1400	.92135

Table 4.3.4.1 Item analysis of open innovation (overall)

4.4 Descriptive analysis

Based on the table below, it shows that the lowest mean amongst four variables including the independent variable and dependent variable is work process with the mean value which is 3.8450 and it shows that most of answers provided by respondents are practically more to scale 4 which is agree. Therefore, most of respondents believe that they agree with the questions under work process variable and they agree that work process does affect the innovativeness performance among PETRONAS supply chain management employees. Other than that, the result of mean for leadership variable is the second lowest with the mean value of 3.9520 and the result is referring more to scale 4 which is agree. Thus, it shows that most of respondents agree with the fact that leadership does affect the innovativeness performance among PETRONAS supply chain management employees.

In addition, the result of mean value for the open innovation variable is the second highest with the mean value of 4.0480 and it shows that most of respondents agree with the questions of the open innovation. Meanwhile, the result of mean value for training

variable is the highest with the mean value of 4.0780 and it shows that most of respondents answered on the scale of 4 which is agree.

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Training	100	3.30	4.90	4.0780	.35748
Leadership	100	3.00	4.90	4.1170	.33426
Work process	100	3.30	4.70	4.0500	.33318
Open innovation	100	2.40	5.00	4.0480	.57638

Table 4.4.1 Descriptive analysis

4.5 Reliability analysis

Based on the table below, the Cronbach's Alpha for dependent variable, which is the open innovation is .593 or 59.3% which is acceptable. It means that the questionnaire is reliable and can be understood by respondents.

Based on the table below, it shows that by using reliability test via Cronbach's Alpha, the researcher would be able to measure the Likert measurement. The first independent variable which is training has shown its result of the reliability test. After all the calculations have been done, the result of reliability test for training is .484 or 48.4%. Thus, it shows that the result is almost average.

The next variable that needs to be tested by the reliability test is leadership. Based on the result gathered, the reliability test for leadership is .358 or 35.8%. It shows that the result is fairly low. After that, the next variable is work process. The result of reliability test for work process is .255 or 25.5% which is low.

Variable	Number of Items	Cronbach's Alpha
Training	10	.484
Leadership	10	.358
Work process	10	.255
Open innovation	5	.593
Total	35	.639

Table 4.5.1 Reliability analysis

4.6 Pearson Correlation Analysis

The Pearson correlation analysis is to indicate the relationship between the independent variable and the dependent variable. This research acquires three independent variables which are training, leadership and work process, and the dependent variable which is open innovation.

For the first correlation is between training and open innovation. The finding shows that r-value is .296 or 29.6% at 99% confident interval. On the other hands, the p-value shows that the probability of .003 which it indicates that it is highly significant because the p-value is less than .01.

The second correlation is between leadership and open innovation. The finding shows that r-value is.205 or 20.5% at 99% confident interval. The p-value shows that the probability of .040 which it indicates that it is not significant because the p-value is more than .01.

The third correlation is between work process and open innovation. The finding shows that r-value is.340 or 34.0% at 99% confident interval. The p-value shows that the probability of .001 which it indicates that it is highly significant because the p-value is less than .01.

For the significant correlation, there is a significant relationship between training and work process with the open innovation. The value of significant relationship is .003 for training and .001 for work process with the open innovation.

	Training		Leadership	Work process	Open innovation
Training	Pearson Correlation	1	.292**	.481**	.296**
	Sig. (2-tailed)		.003	.000	.003
	N		100	100	100
Leadership	Pearson Correlation		1	.314**	.205*
	Sig. (2-tailed)			.001	.040
	N			100	100
Work process	Pearson Correlation			1	.340**
	Sig. (2-tailed)				.001
	N				100
Open innovation	Pearson Correlation				1
	Sig. (2-tailed)				
	N				

Table 4.6.1 Pearson correlation

4.7 Multiple Regression Analysis

Regression is one of the linear measuring techniques used for the association between independent variable and dependent variable for this research. The regression analysis allows the researcher to indicate on how well those variables to predict the value of dependent variable. F value shows the model is statistically significant because the significant value is.000 which may refer to the significant value $p<.01$ and $p<.05$.

Based on the table below, R square is equal to .145 or 14.5% of dependent variable that explained by independent variable. Hence, the result is considered as low linear relationship between dependent variable and independent variable. In fact, there will be no variable in this research that has significant effect to the factors that influence the open innovation.

Other than that, the result for the adjusted R square with only .118 or 11.8% which it shows that the continuance intention is explained by the independent variable while the balance of .882 or 88.2% has been categorized as unexplained. Perhaps, there would be other variable that may influence the open innovation.

In addition, based on the table below, the result of Durbin-Watson is 1.745, thus it shows that the distribution is non-error. It is due to the fact that the result of Durbin-Watson is free with the range from 1.5 to 2.5.

It is crucial for the researcher to conduct multiple regression analysis in order to test the hypothesis and also to determine the variance of influenced factors that could be explained by three variables which are training, leadership and work process. The main objective of multiple regression is to identify all hypothesis that have been generated at earlier stage either it is significant or not.

Based on the result, work process is positively significant with the value of ($\beta = 0.411$, $p<.05$). Therefore, it supported hypothesis 3. Meanwhile, the rest of the two variables which are training and leadership are not significant. Thus, the hypothesis 1 and hypothesis 2 are rejected.

Variable	B	Significant
Work process	0.411	0.033
F value 5.416 R square .145 Adjusted R square .118 Durbin-Watson 1.745		

Table 4.7.1 Multiple regression

Hypothesis	Result
Training has a positive relationship with the open innovation	Rejected
Leadership has a positive relationship with open innovation	Rejected
Work process has a positive relationship with open innovation	Supported

Table 4.7.2 Hypothesis testing

CHAPTER 5

CONLUSION AND RECOMMENDATION

5.1 Introduction

This chapter discusses about the conclusion, recommendation and conclusion based on the findings derived from the study. Thus, the conclusions and recommendations are based on the interpretation of data collected and analyzed. Also, this chapter represents the main finding of the study.

5.2 Discussion

This study is to show the relationship between training, leadership and work process with the open innovation. Based on the theoretical framework that has been constructed, it has supported the research hypothesis of this study. The researcher has found that work process is the factor that is significant towards influencing the open innovation.

Based on the result of descriptive analysis, there were 100 respondents that have been responded to the questionnaire. Thus, it shows that the likert scale for all variables is average of scale 4 The highest mean among all four variables which is training, leadership, work process and open innovation is training and the lowest mean is work process. Meanwhile, the highest standard deviation amongst all variables is open innovation whereas the lowest standard deviation is training.

Based on the result of reliability analysis, it has found that the training has shown a result that is average. On the other hand, the open innovation also has shown the result that is on average value. According to (Sims, 1990), training innovativeness must be able to build a learning process. In fact, training process is suggested to provide all employees with the right objectives, sufficient information and exciting environment that

may enhance the commitment by all employees. According to (Valentina Lazzarotti, 2010), open innovation may be affected by company's competency and performance. In addition, the collaboration between partners may lead to the creative outcomes and knowledge sharing that may be beneficial to everyone involved (Marco Greco, 2015). Also, the open innovation acquires external knowledge sources to be accelerated with internal sources (Lord-Tarte E. , 2013).

After that, the correlation relationship was found between training and open innovation. It shows that employees would be able to receive adequate information from internal and external sources when they join training program. Besides that, it was found that there is a correlation relationship between work process and open innovation. According to (Fernandes B. , 2012), the difficult work process supports the open innovation which employees are urged to seek more suggestions and ideas to improve their tasks.

However, leadership has no correlation relationship with open innovation. According to (Denti, 2012), at earlier stage, a leader should provide a useful structure for the innovation process. In addition, a leader who is more transaction-oriented tends to be more successful in promoting new ideas. A leadership that insists in changing the structure that related to Laissez-faire shows that a leader is not interested in improving the innovation. According to this study, perhaps the demographic profile could affect the relationship between leadership and open innovation. Due to various positions of employees, they tend to have different perception towards leadership either its by themselves or by their manager. As for the non-executives, their job scope is more on helping the other executives in assisting one task rather than executing a specific task by themselves. Therefore, they would not be able to fully extend their ideas while performing their task. Thus, it affects the element of leadership in them.

5.3 Conclusion

After presenting and analyzing this study, PETRONAS supply chain management should be able to indicate factors that could influence the innovativeness performance among all employees. The variable that is positively significant is work process influences the innovativeness performance. There are some conclusions that have been made by referring to the research question in Chapter 1.

For the research question 1, is there any relationship between training and open innovation? Based on the Multiple Regression Analysis, there is a relationship between training and open innovation.

For the research question 2, is there any relationship between leadership and open innovation? Based on the Multiple Regression Analysis, there is no relationship between leadership and open innovation.

For the research question 3, is there any relationship between work process and open innovation? Based on the Multiple Regression Analysis, there is a relationship between work process and open innovation.

5.4 Recommendations

There are two areas that the researcher would like to provide recommendations and suggestion on which are for the future research and for the company.

The researcher hopes that there will be a deeper research will be done towards this study in order to gain a various results and fresh ideas. The innovativeness performance among employees of one particular organization is important because a good innovativeness performance among employees able to generate new ideas form internal

and external parties. Thus, it will lead employees towards performing a better job and ace any tasks given to them.

The researcher also hopes that there will be more variables that can be used to investigate the future study towards the innovativeness performance among PETRONAS supply chain management employees.

5.4.1 Training

The researcher hopes that more training programs can be provided by the management of PETRONAS. Not only to the permanent employees, also to execute training program to contract employees or non-executives employees in order to gain a standardized performance from all employees regardless what type of position they are in. According to (Bowley, 2007), a well-communicated objective and goals of training program help participants to gain sufficient knowledge and information that can be implemented in their present job. In addition, training program may enhance its effectiveness by screening out employees' strengths and weaknesses before executing the program clearly because this may help the training program to work more effectively and efficiently (Sims, 1990).

5.4.2 Leadership

It is found that the element of leadership under PETRONAS supply chain management department is fairly low. A leadership is not only being implemented by he top management such as manager or head of department. It is a sense that has to be implied into each of employee's self. A sense of leadership may reflects to the way employees performing their job. For example, when there is an element of leadeship in them, it would help employees to understand their job better and have the urge to be determinant to complete one tast according to the given deadline. Also, a sense of

leadership could reflects how employees promote their ideas and knowledge sharing to others. in addition, a sense of leadership may reflects how employees lead one specific project. According to (Wong, 2011), a good leader has the courage to build self-efficiency as well as competency. Also, a leader who shows recognition towards employee's contributions might be a platform of motivation for the employee to be more effective in performing the next task. In fact, a positive support from a leader also would help the employee to enhance a higher level of creativity. Therefore, the elemnt of leadership has to be implemented by each of employee of PETRONAS supply chain managemnet in order to improve the innovativeness performance of their daily job.

5.4.3 Work process

The researcher has suggested the work process under PETRONAS supply chain management department has to be more specific according to the position or designation of the each employee. For example, the non-executives should understand and should be given specific task according to their work scope. When this idea is being implemented, non-executives will tend to be more focus and more encouraged to perform their task. The manager or executives may help them in creating a deeper understanding of their work scope and help them in learning new things. Other than that, executives also are encouraged to explore new ideas that can be gained, not only form internal parties but also from external parties such as clients of PETRONAS Carigali Sdn. Bhd. By executing this effort, it may expose employees to a new exposure and will indirectly create a psoitive relationship with clients. Also, the improvement of work procee helps a high knowledge of employees to be exposed to unfamiliar ideas and remove blocks of communication among them (Wang, 2009).

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APPENDICES

Raw data

Demographic section

Gender		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	41	40.6	41.0	41.0
	Female	59	58.4	59.0	100.0
	Total	100	99.0	100.0	
Missing	System	1	1.0		
Total		101	100.0		

Age		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	21-30 years old	41	40.6	41.0	41.0
	31-40 years old	45	44.6	45.0	86.0
	41-50 years old	14	13.9	14.0	100.0
	Total	100	99.0	100.0	
Missing	System	1	1.0		
Total		101	100.0		

Race		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Malay	64	63.4	64.0	64.0
	Chinese	23	22.8	23.0	87.0
	Indian	13	12.9	13.0	100.0
	Total	100	99.0	100.0	
Missing	System	1	1.0		
Total		101	100.0		

Religion		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Islam	65	64.4	65.0	65.0
	Christian	14	13.9	14.0	79.0
	Buddha	10	9.9	10.0	89.0
	Hindhu	11	10.9	11.0	100.0
	Total	100	99.0	100.0	
Missing	System	1	1.0		
Total		101	100.0		

Level of education		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SPM	11	10.9	11.0	11.0
	Diploma	13	12.9	13.0	24.0
	Bachelor degree	69	68.3	69.0	93.0
	Master	7	6.9	7.0	100.0
	Total	100	99.0	100.0	
Missing	System	1	1.0		
Total		101	100.0		

Monthly income level		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	RM2,000-RM3,000	24	23.8	24.0	24.0
	RM3,001-RM5,000	34	33.7	34.0	58.0
	RM5,001-RM7,000	25	24.8	25.0	83.0
	RM7,001 and above	17	16.8	17.0	100.0
	Total	100	99.0	100.0	
Missing	System	1	1.0		
Total		101	100.0		

Position		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Non-executive	29	28.7	29.0	29.0
	Executive	66	65.3	66.0	95.0
	Manager	5	5.0	5.0	100.0
	Total	100	99.0	100.0	
Missing	System	1	1.0		
Total		101	100.0		

Service duration		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<1year	13	12.9	13.0	13.0
	1 year-3 years	23	22.8	23.0	36.0
	3 years-5 years	48	47.5	48.0	84.0
	5 years-7 years	9	8.9	9.0	93.0
	7 years and above	7	6.9	7.0	100.0
	Total	100	99.0	100.0	
Missing	System	1	1.0		
Total		101	100.0		

Indepdenent variable 1- Training

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.484	.475	10

Item Statistics			
	Mean	Std. Deviation	N
My working skills improve after I join the training program	4.3800	.78855	100
I believe that training helps me to enhance my skills and knowledge	4.1500	.78335	100
Training helps me to promote my self-confidence	3.9700	.78438	100
Training educates me to perform my task better	4.0000	.93203	100
Training enables me to set objectives that are relevant to my job	4.0900	.77973	100
I improve my networking during training program	4.1900	.73437	100

Training motivates me to be more committed	4.1400	.84112	100
Training helps me to grow my career path	4.2100	.82014	100
Training program includes all aspect of quality needed by employees	3.8700	.94980	100
Job practice encourages me to seek more knowledge	3.7800	1.03064	100

Independent variable 2- Leadership

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.358	.352	10

Item Statistics			
	Mean	Std. Deviation	N
I work with my colleague to stimulate new ideas	4.1600	.80050	100
My manager regularly acknowledges me when I initiate new ideas	4.1800	.74373	100
I establish trust in my relationship with my colleagues	4.1200	.84423	100
I set specific goals for my performance	4.1300	.83672	100
I believe that everyone has rights to participate in decision-making	4.2400	.83024	100

I believe that a leader able to inculcate the culture of innovation in the organization	4.1600	.92899	100
I believe that a leader shold have a collaborative mindset with others	4.2700	.78951	100
I seek to preserve bond and harmony in the organization	4.2000	.89893	100
I always volunteer myself to lead given task/project	3.7000	1.01005	100
I can visualize myself as a good team player	4.0100	.97954	100

Independent variable 3- Work process

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.255	.287	10

Item Statistics			
	Mean	Std. Deviation	N
All given tasks are relevant to my job scope	4.2400	.76700	100
I start my new task right after I finished the old ones efficiently	4.1500	.83333	100
I closely monitor the time taken to complete one task	4.1000	.97959	100
I have several troubles in setting priorities of my work	3.4600	1.21788	100
I and others share similar values	4.0100	.90448	100
I review with others on negative aspects of my work	4.0800	.96064	100
I am determinant to improve my performance efficiently	4.3200	.66485	100

I and others always ensure the working environment remains safe	4.1300	.92829	100
It is important to fully understand the task before we begin	4.0100	.89324	100
It is essential for my team to check on each other's work to avoid errors	4.0000	.99494	100

Dependent variable-open innovation

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.593	.596	5

Item Statistics

	Mean	Std. Deviation	N
I able to collect external ideas to be implemented in my job scope	4.0700	.93479	100
I am encouraged to propose my own ideas which may help in accomplishing my company's goals	3.9500	.99874	100
My organization believes it is good to use the external sources as inputs (eg: knowledge, idea,etc)	3.9800	.93182	100
My organization appreciates positive teamwork between internal and external parties	4.1000	.88192	100

I receive adequate information of organization's long-term strategies	4.1400	.92135	100

Questionnaire

UNIVERSITI TEKNOLOGI MARA (UiTM)

Dear respondent,

I am a final year student from Universiti Teknologi MARA (UiTM) Kota Samarahan, Sarawak and taking Bachelor (Hons) Business Administration major in Marketing. I am conducting a survey on the innovativeness performance among PETRONAS Supply Chain Management Division (SCMD) employees.

This survey will be divided into three sections. Please note that all information gathered will be kept confidential and for academic purposes only. Do not hesitate to contact me, Nurul Mahiera Sharifuddin at 012-216 5750 for any inquiry. Kindly read the questions carefully. Your kind cooperation and time are much appreciated.

Section A: Demographic Profile

Instruction: Please read the following questions carefully and provide your answer with a **TICK (√)** on the boxes provided.

1. Gender	2 .Age	3. Race
☐ Male ☐ Female	☐ 21-30 years old ☐ 31- 40years old ☐ 41-50 years old ☐ 51 years old and above	☐ Malay ☐ Chinese ☐ Indian ☐ Others (Please specify: _____)
4. Religion	5. Level of education	6. Monthly income level
☐ Islam ☐ Christian ☐ Buddha ☐ Hindu ☐ Others(Please specify: _____)	☐ SPM ☐ Diploma ☐ Bachelor degree ☐ Master ☐ PhD	☐ RM2,000-3,000 ☐ RM3,001-5,000 ☐ RM5,001-7,000 ☐ RM7,001 and above
7. Position	8. Service duration	
☐ Non-executive ☐ Executive ☐ Manager ☐ Others (Please specify: _____)	☐ <1 year ☐ 1 year-3 years ☐ 3 years-5 years ☐ 5 years-7 years ☐ 7 years and above	

Section B

Instruction: Based the statement, which factors that influence you as PETRONAS employee towards the innovativeness performance. Please **TICK** (√) on the most suitable answer to indicate the importance rating of attribute with the statement on a scale of 1 to 5.

Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	2	3	4	5

No.	Question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	My working skills improve after I join the training program					
2	I believe that training helps me to enhance my skills and knowledge					
3	I work with my colleague to stimulate new ideas					
4	My manager regularly acknowledges me when I initiate new ideas					
5	All given tasks are relevant to my job scope					

6	I start my new task right after I finished the old ones efficiently					
7	Training helps me to promote my self-confidence					
8	Training educates me to perform my task better					
9	I establish trust in my relationship with my colleagues					
10	I set specific goals for my performance					
11	I closely monitor the time taken to complete one task					
12	I have several troubles in setting priorities of my work					
13	Training enables me to set objectives that are relevant to my job					
14	I improve my networking during training program					
15	I believe that everyone has rights to participate in decision-making					

16	I believe that a leader able to inculcate the culture of innovation in the organization					
17	I and others share similar values					
18	I review with others on negative aspects of my work					
19	Training motivates me to be more committed					
20	Training helps me to grow my career path					
21	I believe that a leader should have a collaborative mindset with others					
22	I seek to preserve bond and harmony in the organization					
23	I am determinant to improve my performance efficiently					
24	I and others always ensure the working environment remains safe					
25	Training program includes all aspect of quality needed by employees					

26	Job practices encourage me to seek more knowledge					
27	I always volunteer myself to lead the given task/project					
28	I can visualize myself as a good team player					
29	It is important to fully understand the task before we begin					
30	It is essential for my team to check on each other's work to avoid errors					

26	Job practices encourage me to seek more knowledge					
27	I always volunteer myself to lead the given task/project					
28	I can visualize myself as a good team player					
29	It is important to fully understand the task before we begin					
30	It is essential for my team to check on each other's work to avoid errors					

SECTION C:

Please **TICK** (√) on the most suitable answer to indicate the importance rating of attribute with the statement on a scale of 1 to 5.

No.	Question	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	I able to collect external ideas to be implemented in my job scope					
2	I am encouraged to propose my own ideas which may help in accomplishing my company's goals					
3	My organization believes it is good to use the external sources as inputs (eg: knowledge, idea, etc.)					
4	My organization appreciates a positive teamwork between the internal and external parties					
5	I receive adequate information of organization's long-term strategies					