ACCEPTANCE OF AN INNOVATION TOWARDS PERFORMANCE WITHIN CONSTRUCTION INDUSTRY

AINAA FARHANA BINTI ROSLI

BACHELOR OF PROJECT MANAGEMENT
WITH HONORS
UNIVERSITY MALAYSIA PAHANG

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AINAA FARHANA BINTI ROSLI

PB12018

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SUPERVISOR'S DECLARATION

I hereby declare that I have checked this thesis and in my opinion, this thesis is adequate in terms of scope and quality for the award of the Degree of Project Management with Honors.

Signature   :

NAME OF SUPERVISOR   : SITI AIRIN BINTI ABDUL GHANI

POSITION   : LECTURER

DATE   :

STUDENT'S DECLARATION

I hereby declare that the work in this thesis is my own expect for quotation and summaries which have been duly acknowledged. The thesis has not been accepted for any degree and is not concurrently submitted for award of other degree.

Signature   :

NAME   : AINAA FARHANA BINTI ROSLI

ID NUMBER   : PB12018

DATE   :

This thesis is dedicated to my beloved parents
Rosli Mat Salim & Romlah Abu Bakar
my family, for their love,
endless support and encouragement.

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ABSTRACT

This study is to determine acceptance an innovation towards performance in Construction Company and identify an obstacle on acceptance an innovation towards Construction Company. Both of the objectives have huge influence to construction industry. Therefore, acceptance innovation give an impacts towards the construction industry/company. The obstacles can affected the construction industry difficult to accept new technology. The population of this study is 75 of selected contractor under Grade 7 registered with Construction Industry Development Board of Malaysia (CIDB) at Kuantan, Pahang Darul Makmur. The sample size is use as the units of analysis, 63 selected contractors which were from executive position was selected. In conducting this study, random sampling survey method was being used and this questionnaires survey was distributed to respondent by email and face to face. For the data analysing, this data was carried out by using Descriptive statistic is drawn from Statistical Package Social Science (SPSS) outputs. The finding from this study shows that an obstacles cause the construction industry/company towards acceptance an innovation itself.

ABSTRAK

Kajian ini bertujuan untuk menentukan penerimaan satu inovasi ke arah prestasi dalam syarikat pembinaan dan mengenal pasti halangan kepada penerimaan inovasi terhadap syarikat pembinaan. Kedua-dua objektif mempunyai pengaruh yang besar untuk industri pembinaan. Oleh itu, inovasi penerimaan memberi kesan terhadap industri / syarikat pembinaan. Halangan-halangan yang boleh memberi kesan kepada industri pembinaan, sukar untuk menerima teknologi yang baru. Populasi kajian ini adalah 75 kontraktor yang terpilih dalam Kelas 7 yang berdaftar dengan Lembaga Pembangunan Industri Pembinaan Malaysia (CIDB) di Kuantan, Pahang Darul Makmur. Sample saiz yang digunakan sebagai unit analisis. Oleh itu, 63 kontraktor yang terpilih dan yang dari kedudukan eksekutif dari setiap syarikat telah dipilih. Bagi menjalankan kajian ini, borang soal selidik telah digunakan dan kajian soal selidik ini telah diedarkan kepada responden melalui e-mel dan secara bersemuka. Untuk menganalisi data, data ini telah di analisis dengan menggunakan statistik deskriptif yang diambil dalam Pakej Statistik Sains Sosial (SPSS). Hasil daripada kajian ini menunjukkan bahawa halangan terhadap industri/syarikat pembinaan terhadap penerimaan inovasi itu tersendiri.

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CHAPTER 1

INTRODUCTION

1.1   INTRODUCTION

The general summarize for this whole research would be deliver in this chapter. The outline includes background of study, problem statement, research questions, research objectives, the scope of the research, significant of study, and operational definition. This chapter is important as it will be opening synopsis or guide for any reader to understand the flow of research.

1.2   BACKGROUND OF STUDY

Innovation is the new area where the business projects to increase their income with develop new change used the innovation. But to develop new change it will have challenges that the project manager need to overcome. Innovation in construction industry is common technology nowadays, but for accept and implement the new technology is something difficult to organization adopt it. They also need to know their field and their own capability in an organization. According to (Gann and Salter, 2000), the construction company is the set up around projects and produce many task include a services to their clients. Innovation in the construction company is very important and it's interesting because the organization need to manage new management and set up the new system and the new services. On the top of business type of project, company also need new development in their project.

In this global competition, construction industries are the biggest industries in the global economy. A project-based industry includes construction, aerospace industry,

motion picture industry, pharmaceutical industry, oil and gas industry, healthcare industry and defence industries. Almost all this industry already begins to accept the new change whereas using the innovation to increase their performance in their specific industry. All countries like China, Korea and U.S have already implemented innovative. For the area process, nowadays our country also gets support from the governments to implement and use innovation in term of their service or product.

On the other hand, construction industry is industry which plays element that is important in generates national economy. This industry is also generator in economic development of the country through 'effects multiplier' to other industrial like manufacturing, service, finance, education and others. When national economy face slow growth problem, construction sector still can contribute a total of 2.1 percent (RM7.10 billion) to Gross Domestic Product in year 2001 and 2.3 percent (RM7.28 billion) in year 2002 by the average at this industry of development 0.6 percent from year 2000 to 2005.Construction sector is also one of the sectors that capable to help encourage growth when the country's economy facing certain recession crisis and it requires plan framework strengthening the policy in facing challenge that is upcoming.

Like others firms, project-based industry also seems need to promote their new service more actively by De Brentani and Ragot, (1996). Such launching efforts have to be balanced to make sure that human resources can keep up with the demand from the customers. According to (Gann and Salter, 2000), the industry's reputation can get damaged because of small problem where cannot execute properly the orders from the clients and the performance also will be affected. So the project managers and leadership need to make sure the organization accept the new changes and accept the new technologies.

1.3   PROBLEM STATEMENT

Technology innovation rapidly growth, but Malaysia is still lack in applying technology in terms of many aspects of products or services like others countries. As other countries that they already putting into use the technology invention of new things and its get supports from the community. In terms of organizational, the problem

for Malaysia to be in the listed of invention of new thing's country is harder and slow adoption. That because, the organizational itself cannot accept the changes to their company. Malaysia attitude/set of opinions is like when something rules or adding job task, they will argue, not to change their process or services. In the other hand, they didn't appreciate effort that being performed by the government.

A small number of research on the connection involving organization intercultural and innovation, surrounded by construction in Malaysia broad limit accepting on the boldness of change in organisation innovation. How the managers providing the guidelines on how their company manage the innovation to increase their performance. "Whether in project-based company, senior management support, the provision of a clear vision on the outcome of the project" (Brown and Eisenhardt, 1995) that is key point for the performance of development projects than in functionally organized firms. According to The Ministry of Science, Technology and Innovation (MOSTI) they had implement many programs connected to the promotion of science and technology and national research and development activities.(Blindenbach-Driessen & van den Ende 2006)

But when Malaysian society's culture give the opportunities to them, they do not use it the best possible. They rather accept direct rather than developed. Acceptance an innovation in construction need to improve but there are a few factors which caused construction firms difficult to improve, because of the change it's more about perspective, culture, and mind set in organization itself. Innovation in these firms involves developing new or improved services for current or possible/likely customers, or developing new technologies that can be used to solve clients' problems better than existing technologies.

To overcome this problem, Malaysia country needs to encourage usage of the innovation from variety aspects. Malaysia can be the one listed of the countries that developed innovation from building construction such as construction being applied the green-technology, use an eco-friendly products and services that being use by robot. From this we can know how important of new technologies and invention of new things for (wanting to beat others in contest) and growth to our country. This problem also

needs attention from managers or leaders to encourage or accept the new innovation in their company to improve their performance.

The construction company need to accept the new innovation to improve their performance. By right innovation acceptance in nowadays have no problem because everyone use sophistication that have just as use computer system, use application that sophisticated to ease or facilitate client and also constructors (stakeholders) when they use innovation from the aspect of computer or robot, with that, they can facilitate their work and at the same time can enhance performance level their work.

1.4   RESEARCH QUESTIONS

This research will seek to address the questions of:

1) How an innovation being acceptance in construction company?
2) Is there having an obstacle to accept the new technologies?

The main of this research study is to explore the main indicator which leads to the performance within the construction industries in Malaysia. The main indicator being focused on this research is rank of an acceptance level towards an innovation.

1.5   RESEARCH OBJECTIVES

This study proposal to seek whether technological innovation is accepted on construction company or not?

1) To determine acceptance an innovation toward performance in construction company at Kuantan.
2) To identify an obstacle on acceptance an innovation in construction company at Kuantan.

1.6 SCOPE OF THE RESEARCH

The scope of this research is to focus on acceptance an innovation toward performance in construction industry. Nowadays innovation rapidly increases by the development of modern economy, and many technologies innovation products we can get from the import and export, by Bo & Qiuyan, (2012).

The researcher will make a research on acceptance an innovation toward performance in construction industry. Targeted of this study is focus to the construction industry which consists of contractor class G7. Executive position will be selected to answer the questionnaire. The researcher choose the selected contractor in organize and managing in the project.

1.7 SIGNIFICANCE OF STUDY

The importance of research in this study is to give effect to who studies in term of acceptance an innovation in construction industries, which will give impact of the rapidly development particularly in Kuantan. In addition, this research hopes on this study have a value that can affect the implementation and adoption in construction industry area Kuantan to develop better.

In addition, this survey research expects production to be further improved in construction industries on innovation. So, the construction industries can increase in term of their production and quality that will satisfy the clients and will get more benefits. I hope in this research, will be guidelines for those who wish to participate in the construction sector.

1.8   OPERATIONAL DEFINITION

1.8.1   Innovation

The process of translating an idea or invention into a good or service that creates value or for which customers will pay. To be called an innovation, an idea must be replicable at an economical cost and must satisfy a specific need.

1.8.2   Project

A project is temporary that it has a defined beginning and end in time, and therefore defined scope and resources. A project is unique in that it is not a routine operation, but a specific set of operations designed to accomplish a singular goal.

1.8.3   Project Based

In project-based, the organization of company model is developed around completing projects. Most construction companies use a project-based.

1.8.4   Construction industry

"The branch of manufacture and trade based on the building, maintaining, and repairing structures. This includes drilling and solid mineral exploration".

CHAPTER 2

LITERATURE REVIEW

2.1   INTRODUCTION

This chapter will roughly explain regarding the definition of innovation with purpose to make readers understand the main aspect in this research. Further issues will be discussed in this chapter include the acceptance an innovation, obstacle of acceptance innovation, and factors toward high performance. This chapter also to find out what findings previous literature get after they made a researching and theories and methods used.

2.2   DEFINITION OF INNOVATION

The definitions of innovation have different meaning. The list table below shows the meaning of innovation according to different authors.

Table 2.1: Definition table of Innovation

Name	Definition
(Thamhain, 1990)	"Innovation is very important as it puts an organization at a competitive advantage"
(West and Farr, 1990)	Innovation the same as " the intentional introduction and application within a role, group or organization of ideas, processes, products or procedures, new to the relevant unit of adoption, meant to much/a lot advantage the individual, group, organization or wider society"

(Rogers, 1995)	Defines innovation as "any idea practice or object that is perceived to be new by an individual or other unit of adoption".
(Johannessen et al. 2001)	Innovation is viewed as "different from the beginning the new one and improvement that existing the technologies and process, with improving management and also practices"
(Brockman and Morgan, 2003)	Moving forward new product improvement outcomes

Innovation is about new technology products and process with the changes of technological within this global of competitive. The technology of certain product will meet the pitch of obsolescence in term of s-curve in analysis technology process, the products or process need to make the change where it also need implemented of an innovation to improve the performance of construction industry.

2.3   ACCEPTANCE OF THE INNOVATION

Innovation in construction industry aimed to generate economic development of the country and consequently face future challenges in spurring productivity and quality in construction industry chain.

To accept the innovation in construction industry, all company of construction industry needed to improve on method and matter practice as following:

i.   Practices ineffectiveness in contractor registration system, administrative procedure, method and turnover training, get contract, construction method and building plan submission to approval purpose

ii.   Inability intriguing and develop local employee to change image "dirty, difficult, dangerous".

iii. Difficulty in fulfilling completion of project duration, finance to every project construction stage and difficulty in division
profit / dividend

All elements above are challenges that need to be repaired by country's construction industry in increasing productivity and quality industrial linkage towards global level. Acceptance innovation include in the mission of Construction Industry Master Plan (CIMP) at 5th, where it stated "Innovate through research and development and adopt (put into use) new construction methods" just like an innovative could venture on approach and usage the new technologies, apart from planting R&D culture, competitive and practise environmentally friendly method going along with/obeying with society's needs", (Sundaraj 2007) and CIMP also encourage the construction to implement and continuous research on innovation to development that is very important to introduce new and creative methods, materials, tooling and equipment. (Anon 2007).

2.4   OBSTACLES OF ACCEPTANCE AN INNOVATION

2.4.1   Culture

Culture is reflected not only in the visible part of the organization, such as its mission and supported values, but also in the way people act. An innovative project for managing knowledge needs/demands changes in corporate culture because the environment is constantly changing, we argue that person's knowledge developed by guiding the firm through its culture is likely to be time-bound and may lose its relevance and value over time. The argument an extremely important change in customer needs may at first lead design engineers to deny these changes are really needed and to refuse to change original plans to as to avoid the additional stress. This means that for organizational innovation to happen on an organizational level, there are some cultural barriers companies must overcome to make sure that organizational members have enough knowledge and experience to perform their responsibilities. (Hernández-Mogollon et al. 2010)

2.4.2   Cost

"Especially, investments in and the adoption of particular technologies, such as IT, can enable innovations, either by improving processes or by enabling the firm to

offer new products (e.g. digital goods) or services to its customers. Technology investments that do not result in innovations are sunk costs that will not improve corporate performance. The ability of firms to move technology investments into innovation is likely to be influenced by firm-specific useful things/valuable suppliers such as managerial skills, know-how, experience, the presence of technical experts, and prior technological investments". (Koellinger 2008)

2.4.3 Absorptive Capacity

Absorptive capacity states that the level of prior knowledge is one of the ways to identify reputation of firms, by focusing on R&D activities and result measurements like patents. In the construction industry, however, R&D activities are very hard to measure, since many construction firms have no formal resources allocated to R&D (R&D is performed, but is less visible since it is done by people at several levels of the organization). As we can know in construction industry, an innovation comes from project-led problem solving only. They need the specialist staff where advance in using innovations. The specialist staffs' firms applied the knowledge and combined many areas of specialised knowledge to produce their own product (an improved technology). This respect to the ability of both getting/gaining knowledge through specialisation and applying knowledge by combining specialist areas (innovation).(Bosch-sijtsema et al. 2006)

2.5   INNOVATION PERFORMANCE

Using Schumpeter's (1939) classification system, innovation performance measures can be grouped into five different categories: new products, new methods of production, new sources of supply, abuse/mistreatment of new markets and new ways to organize business. However, most of the literature has focused on the first two areas of innovation, product, and process innovations (Avlonitis et al., 1994; Cohen and Klepper, 1996; Fagerberg, 2006). Similarly, Schmookler (1966) argues that understanding the difference between the related terms product technology (product innovation) and production technology (process innovation) is extremely important for understanding innovations. Product innovations represent the invention and

commercialization of entirely new products or services, whereas process innovations describe changing the production process of products and services through the adoption of new technology and innovations (Roberts, 2007). This study focuses on product and process innovations as the measures of innovation performance. Since the share of sales of newly developed products and services is also considered, to be an accurate indicator of innovation performance (Smith, 1992), this third measure is also taken into account.

Another classification of innovations, which is not considered in the following analysis, is the distinction between two extreme types of innovation – incremental and radical innovations. Incremental innovations build on existing smart abilities in companies and are related to minor technological changes. By contrast, radical innovations accompany fundamental technological changes and can therefore be competence destroying (Tushman and Anderson, 1986).

2.6 FACTOR TOWARD HIGH PERFORMANCE AFTER ACCEPT THE INNOVATION

High performance in construction more and more depends on maintaining a balance between centralized efficiency and innovative entrepreneurship. Today's high performers have achieved that balance by combining a highly efficient operating model with an approach to talent management that makes the most of working together/team effort. The independence of their operating groups (help) develop leadership attempts (to begin something new), while group-wide knowledge management ensures that best practices are shared. (Swan et al, 2002). High performances also come from using the innovation.
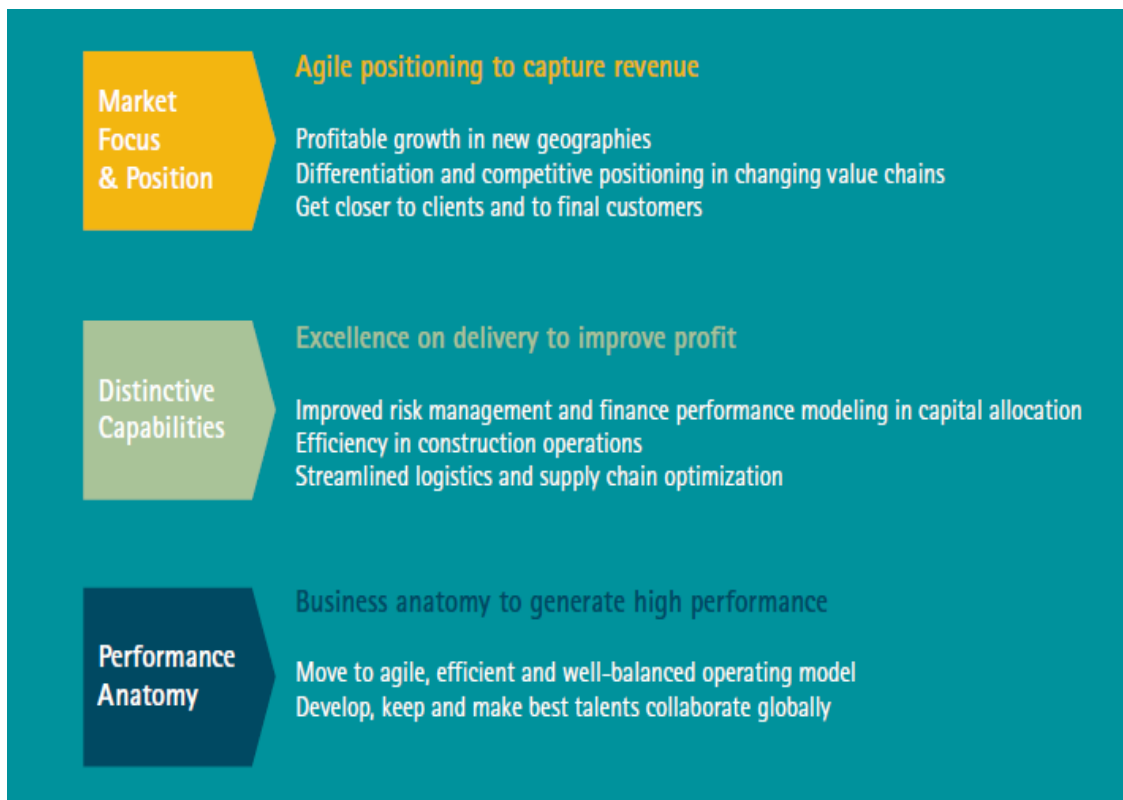
Figure 2.1: Step achieve high performance in Construction Industry
Source: Accenture (2013)

This figures the type or step toward or achieve high performance. The handful of companies that became out/became visible from their research as high performers in construction owe their success to mastery of these building blocks, all of which will assume even greater importance in the future as the market continues to evolve rapidly.

2.6.1 Market Focus & Position – Agile Positioning

In construction, the essence of market focus and position is targeting the right business at the right moment in the right market. The full-service infrastructure businesses manage projects in their entirety, from the raising and structuring of funding, through program management and design to construction, systems integration, and lifetime operations and maintenance. High performers strike the right balance between competing opportunities. They get in (and out) fast to minimize risk, but without damaging the strategically and (related to a plan to reach goal) partnerships they form or

create. High performing construction companies also maximize their differentiation along new, extended value chains. And by diversifying across the value chain to develop innovative services for end customers—the users of the buildings they erect and manage.

2.6.2 Distinctive Capabilities – Delivery Excellence

There are three types on delivery excellence to achieve the high performance.

     i.   Improved risk management and capital allocation

    ii.   Efficiency in construction operations

   iii.   Streamlined logistics and supply chain optimization

       With ongoing internationalization and (getting involved with different types of things) happening throughout the industry, risk management and financial performance modelling abilities that enable the most efficient setting apart and distributing of capital are assuming an important role. High performers have taken combination (with other things) to a new level, successfully industrializing their construction procedures and processes. These companies also understand the key role of new technologies as an enabler of efficiencies. They have implemented process innovation programs to improve maintenance services and field-engineering activities. In addition, high performers are starting to use Building Information Modelling (BIM) systems in their engineering and construction processes and the quality and sustainability of their business processes set industry standards. Because they have invested in analytics capabilities, high performing companies can measure and monitor the volatility of raw material prices, as well as price differences/different versions among suppliers. Furthermore, their operational excellence programs make sure of that projects come in on time and within budget. (Accenture 2013)

2.7   PREVIOUS STUDY IN ACCEPTANCE AN INNOVATION TOWARD PERFORMANCE IN PROJECT-BASED COMPANY

       From the previous study there have an issue through in depth semi-structured interviews with the managers, project leaders and other members of project based firms.

According to them, innovation is very important to the success of the company. The company operates in a complex, changing market. In fact, now/recently the market changes so quickly that the company must to reorganise itself once every two years. The process of managing innovation projects in certain company was from which they had sample to create blends. They cannot know they have the right blend until they hit on it, although they come together on it by a process of trying things that sometimes did not work (trial and error). The way they manage innovation projects leaves totally from the ways of doing things preferred in other parts of the company for project management. (Of & In 2000)

Second previous study on Integrated Acceptance and Sustainability Assessment Model (IASAM) serves as a self-assessment (but not limited only to the developer) tool for developing technologies or innovations and provides easy to use ways of doing things to carry out test/evaluation at any point of technology development. IASAM consists of four groups of factors that affect combined (with other things) technology acceptance and sustainability – Management, Quality of technology, Acceptance and Domain development. By using system dynamics simulation the model allows its users to monitor the variation of the IASAM index over time. After changing acceptance evaluation criteria from Unified Theory of Acceptance and Use of Technology (UTAUT) to innovation of diffusion approach, the model has become even more comprehensive. Validation process secure/makes sure of that IASAM2 model provides accurate evaluation. This kind of evaluation tool can be useful to idea owners, technology developers, investors, government officials and researchers for estimating the prospects of a new technology. Anyway research could be extended to define whether this methodology can be adjusted to technologies mostly, not only ICTs. (Dace Aizstrauta et al. 2015)
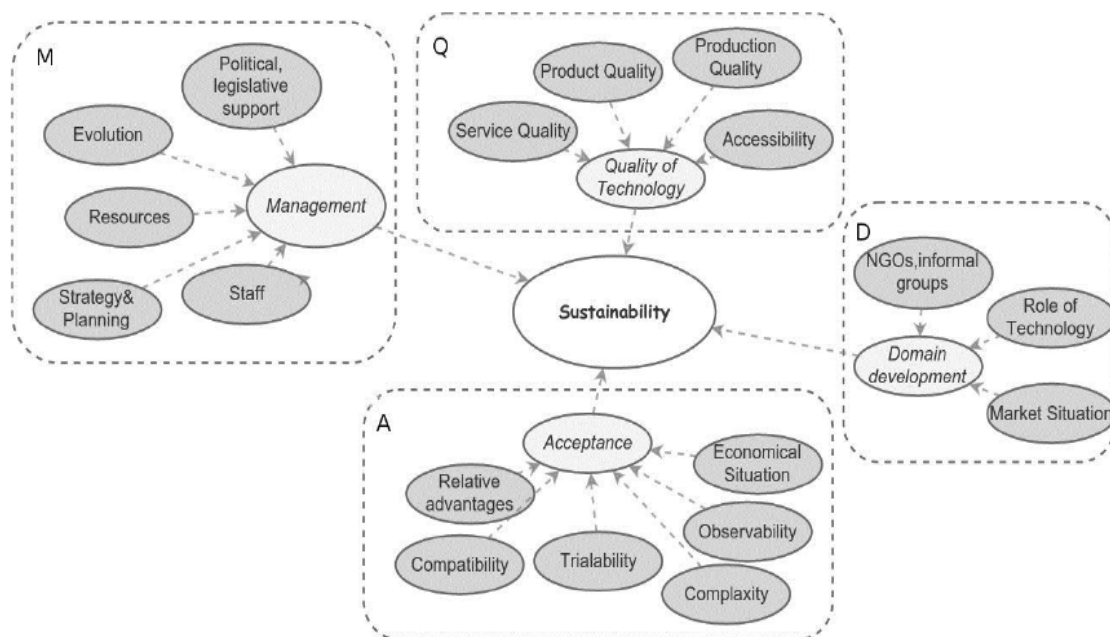
M = Management, **Q** = Quality of technology, **A** = Acceptance, **D** = Domain development

Figure 2.2: IASAM model in System Dynamic notation

Source: Dace Aizstrauta et al. (2015)

Figure above the concept used for evaluation of the set of socio-technical factors that impact the way a technology is developed, implemented and maintained, and analyses whether it is done according to the needs of all stakeholders or not, and how it attracts long-term users and creates positive output and/or outcome according to the purpose of the technology and initial intentions of its developers (financial, social, etc).

Organization also influences to the acceptance the innovation in project based company. Third previous study where stated many researchers have pointed to the underestimated role of knowledge network on organizational performance (Markinkenaite, 2011; Cambra-Fierro et al, 2011; Wang and Zhang, 2009). Tsai (2001) argued that interaction between networks has significant positive effects on organization performance. Buyukozhan (2004) and Morton et al, (2006) have found that managing organizational networks can improve organizational performance. Glatz et al, (2008) showed that organizations with networks learn faster than hierarchical ones. That's the reason for they can improve better and more comfortably.

In order to support a specific business process, job, or knowledge leverage point, firms could use different organizational forms or different knowledge activities. In addition, project manager also must understand the importance of (quality that makes something stand alone or look different) in the drive toward project success in an organization (Peterson, 2007). There is a large volume of published studies describing the role of social capital and relations between project members within project-based organizations (Di Vincenzo and Mascia, 2012; Morton et al, 2006; Kris and Chuah, 2004). Davison and Hyland (2002) argued that project team management and organizational ability have mutual effects. Wang and Ellinger (2011) who contributed to organizational learning stated that project teams have an important role in organizational innovation performance.
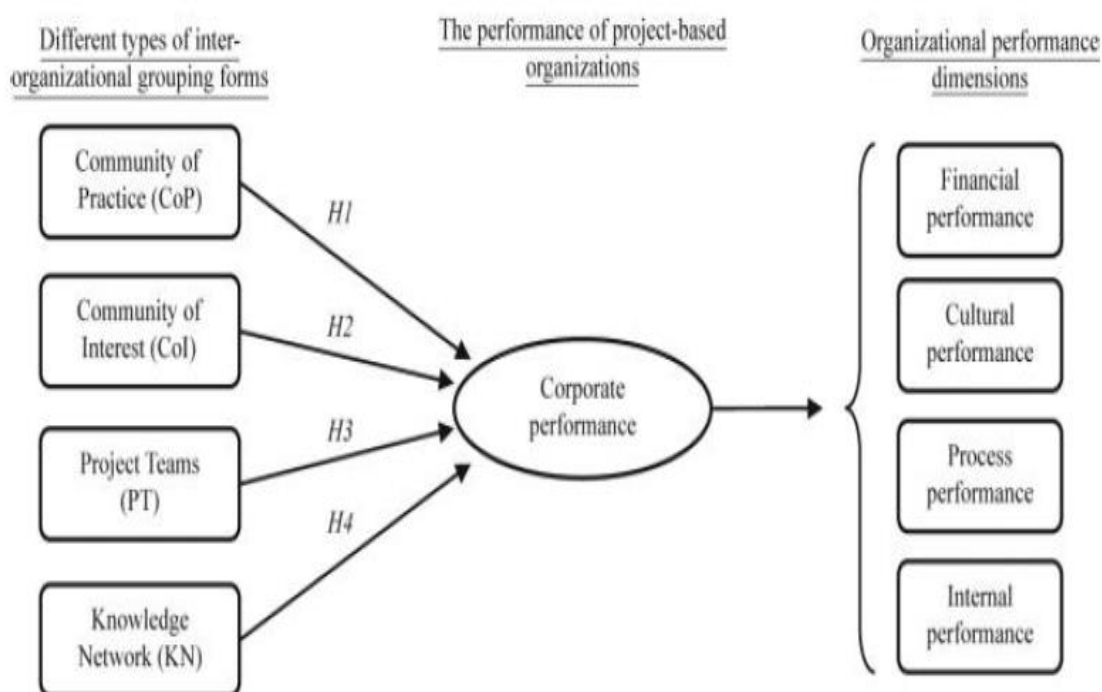
Figure 2.3: The research model will be empirically tested through a survey of worldwide companies.

Source: Atieh Bourouni (2014)

Their study found that both Knowledge Networks and Communities of interest have direct effect on organizational performance. Empirical evidence has been provided

regarding the consequences of communities of interest and knowledge network on performance, developing previous research in the field of organizational forms where the link has been proposed quite often but with rare/not enough (based on actually seeing things) support. Now, academics and companies are aware of the implications that types of organizational networks may have. So, one of the main conclusions of our research is that developing knowledge network and communities of interest have been found as significant mechanisms to improve performance in Project based organizations. Dependence on just project teams would have negative impacts on the performance in Project based organizations.

The findings have important implications for academics and practitioners. Based on the presented results, executives looking for better performance have to consider organizational groupings other than project teams in Project based organizations. It is highlighted that designing and maintaining only project teams does not result in better performance. Furthermore, it would be more appropriate to concentrate on communities of interest and knowledge network. Between these two forms, knowledge network would make stronger contributions to organizational performance. On the other hand, researchers might focus on developing detailed models in different sectors showing further specific behaviour of organizational groupings. Moreover, it is now possible to look into the reasons behind this behaviour in construction organizations.

2.8   SUMMARY

As conclusion, this chapter explained on innovation concept, the issues towards acceptance an innovation towards performance within project-based company and factor an innovation towards company performance. This chapter also tried to make reader understand on relation between acceptances an innovation toward performance in construction industry or project based company.

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CHAPTER 3

RESEARCH METHODOLOGY

3.1   INTRODUCTION

This chapter will explains about the methodology used in this study and be informed my choice of methods is the research methods reading. Research methodology is a way to solve the research problem in a systematic manner.

3.2   RESEARCH OBJECTIVES

As stated earlier in chapter 1, this study proposal to seek whether innovation is accepted on construction company or not?

1) To determine acceptance an innovation toward performance in construction company at Kuantan.
2) To identify an obstacle on acceptance an innovation in construction company at Kuantan.

This research objective study wants to explore about acceptance an innovation toward performance in construction industry at Kuantan. The researcher wants to determine whether there have obstacles on acceptance an innovation in construction company or not. In this research, the researcher will determine whether this issues valid or not through the research flow.

3.3   RESEARCH DESIGN

Research design is the procedure and method to conduct a scientific research. The design of study defines the study type, question, research independent and dependent variable, research question, hypothesis, and data collected method. Typically, research design can be divided into two methods it is the quantitative and qualitative. Quantitative method is an investigation the systematic empirical of social phenomena via computational technique, statistical and mathematical. So, research design that the researcher will use in this study is quantitative method.

Quantitative method means surveying using questionnaires as an instrument. The questionnaire research design is a very helpful tool for evaluate opinions, trends from respondents and understood about the main ideas of this research. Questionnaire is the easier way to collect the data from the population.

In questionnaire, it will contain about the acceptance innovation toward performance within project-based company and what the impact toward the performance of project-based company to accept the new technologies. The questionnaire will develop and design. The questionnaire will distributed to all construction industry around Kuantan, Pahang. By using in this questionnaire, the respondent will be capturing the main idea about the research. The get the collected data the researchers will be collect the data at the construction industry in Pahang.

3.3   POPULATION AND SAMPLING

3.3.1   Population

This study will focus on project-based at Kuantan. The respondents to complete this study are the project manager in construction industry. The targeted respondents are the selected contractors under class Grade 7 registered with Construction Industry Development Board of Malaysia (CIDB). The aim population of this study is in construction industry at Kuantan, Pahang. For this research study; the total populations that will use are the contractor Grade 7 it's around 75 companies.

3.3.2   Sampling

Sampling is about the selection of a subset of individuals from the population statistics to estimate the features the whole population. Sampling is the act, process, or technique of selecting a suitable sample, or a representative part of a population for the purpose of determining parameters or characteristics of the whole population.

For this sampling in the research study, the researcher will use random sampling. Each data will be numbered and the data will be selected using random method and have a chance to be selected. By using random sampling the name of data must be listed and the population must be determining first.

3.3.3   Determining on sample size

The sample saiz of this research, using table from source by Krejcie& Morgan, (1970). The sample for this study for population will be the researcher respondent is 75 and sample size is 63.

Table 3.1: List of number population and sample of Krejcie & Morgan table

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: Kreicie & Morgan. 1970

Table 3.2: The calculation for the population and sample come from this formula

Formula for determining sample size

$$s = X^2 NP(1 - P) \div d^2(N - 1) + X^2 P(1 - P)$$

$s =$ required sample size.

$X^2 =$ the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841).

$N =$ the population size.

$P =$ the population proportion (assumed to be .50 since this would provide the maximum sample size).

$d =$ the degree of accuracy expressed as a proportion (.05).

Source: Krejcie & Morgan, 1970

Table 3.2 shows the number of calculation is needed to determining the sample size. Based on population Krejcie, and Morgan 75 companies were my target for respond to my research.

3.4   QUESTIONNAIRE DESIGN

Based on this research study, the design of research instrument is based on literature review in chapter 2. The questionnaire is designed to assemble view from the contrast of each criterion decider use 4-point Likert scale in this research that is from (1) strongly disagree, (2) disagree, (3) agree, (4) strongly agree.

The format of the questionnaires that will measure by using the Likert scale provided. It also is known as close ended question, close ended question is be used in this research because the time used for answering this questionnaires is more quick and easier that another question design. The respondents involve just need to tick the answer

based on scale from 1 to 4. The questionnaires are straight forward question. So, the time to collecting back the questionnaire will be quickly than an expected.

3.5 DEVELOPMENT OF QUESTIONNAIRE

The research questionnaire from adopt and adapt from this research. (Inauen & Schenker-Wicki 2011). The list of questionnaire attach as appendix A. The questionnaires for this study consist two parts:

Part A: Respondent personal information.

For part A, consist of questions on respondent profile (demographic questions) such as age, gender, race, academic qualification and work experience.

Part B: an innovation toward performance in construction industry.

For part B, the questionnaire will build based on the research objectives transform into specific questions. The questionnaire will consist question about the acceptance an innovation in construction industry. This part will answer the researcher objective 1.

Part C: Obstacle on acceptance innovation in construction industry.

For part C, more focus on the obstacle to the construction industry accepts the innovation in their company. The aim of this section is to know the obstacle during accept, adopt or implement an innovation technology in construction industry. This part will answer the researcher objective 2.

3.6 DATA COLLECTION TECHNIQUES

To conduct this research, it will explain detail on how the data will be collected, what is the method that will be used in this study. Data collection is very important

because it will be an output of the research result. Survey is chosen as data collection techniques to conduct this research.

Besides that, this questionnaire will give to executive position in managing the project personally by researcher. But for the alternative plan, the questionnaire also can give by using the internet which using email. By using this email, all people that involve in construction industry like project manager, quantity surveyor, architects, civil engineer and contractor easy to answer the question when they busy. So, as the result they will not rushing to answer the question because they will respond through the email.

3.7   DATA ANALYSIS TECHNIQUES

Data collection method that will be used is descriptive statistic using Statistic Package for Social Science (SPSS). This method will be use after the entire questionnaire is collected from the respondent. SPSS is used because it was more flexible than another method for data analysis.

The descriptive statistical analysis will be used to analyse the data. All this information will be analyse through the frequency, mean, and standard deviation. The result from the SPSS is detail and easy to make the conclusion for the research study.

3.8   SUMMARY

The conclusion of this chapter, to summaries all, the way research methodology being designed is very important. On this chapter clearly showed how the research is conducted. Research methodology will help and guide the process of the research by applying the SPSS. SPSS are used in this research study because it more suitable for quantitative analysis. Furthermore, this chapter also will cover on how the research design was formulated and how the data will be analysed after the questionnaires is collected.

CHAPTER 4

DATA ANALYSIS

4.1   INTRODUCTION

In this chapter it will show the data which were analysed by using Statistical Package for the Social Science (SPSS). At the beginning of this chapter, demographic analysis of respondent is highlighted. Using design includes frequency and percentage that be highlighted. Data collection were obtained from questionnaire distribute under registered CIDB in Kuantan area were my target respondents for this research. As the population being 75 contractors G7 as the unit of analysis, 63 data more collected as the research sample size.

The total questioners were distributed to the respondent by hand and by Google Drive are 80. From the entire 80 questioner distribute to the respondent, that just 65 answering successfully the questioner that consists of by selected contractors. Based on the questionnaires that were successfully collected, the response rate achieves 52.0% out of 80. This satisfied and fulfilled the requirement needed to proceed with the data analysis, in line with what was stated by Chatman (2007) that if the response rate achieved is 30% or higher, the result can be used as it is considered as 25 sufficient. Besides that, Sekaran (2003) also states that for the purpose of statistical analysis, a minimum sample size of 30 is considered as admissible.

4.2   DEMOGRAPHIC ANALYSIS

Demographic analysis was to introduce the profile of respondent. For example is mean of gender, age, race, academic qualification and work experience. It also distribute

frequency, mean and standard deviation and percentage each item. It also had shown the pie chart to understand when read.

Table 4.1: Statistic of Demographic Data

	Gender	Age	Race	Academic Qualification	Work Experience
N Valid	64	64	64	64	64
Missing	0	0	0	0	0
Mean	1.5938	1.6094	1.3906	1.8438	1.6406
Median	2.0000	1.0000	1.0000	2.0000	1.0000
Mode	2.00	1.00	1.00	2.00	1.00
Std. Deviation	.49501	.78916	.68120	.64780	.78411
Range	1.00	2.00	2.00	3.00	2.00

Table 4.1 shows about the descriptive statistic of respondent demographic data. It have 64 questionnaire are valid for further analysis. Basically the value of the Mean, Median, Mode and Standard Deviation can be referred to the valid responses. The means of each demographic item are gender 1.59, age 1.61, race 1.39, academic qualification 1.84, and work experience 1.64. Future to this table each demographic item is explained individual.

Table 4.2: Frequency Analysis on Gender Respondent

Gender		Frequency	Percent	Cumulative Percent
Valid	Male	26	40.6	40.6
	Female	38	59.4	100.0
	Total	64	100.0	

Table 4.2 shows the frequency analysis of respondent gender. The respondent in this study mostly from female with the percentage of 59.4%, and male with the percentage 40.6%. Mostly gender that answered this questionnaires were female. It will reflect in figure 4.1.
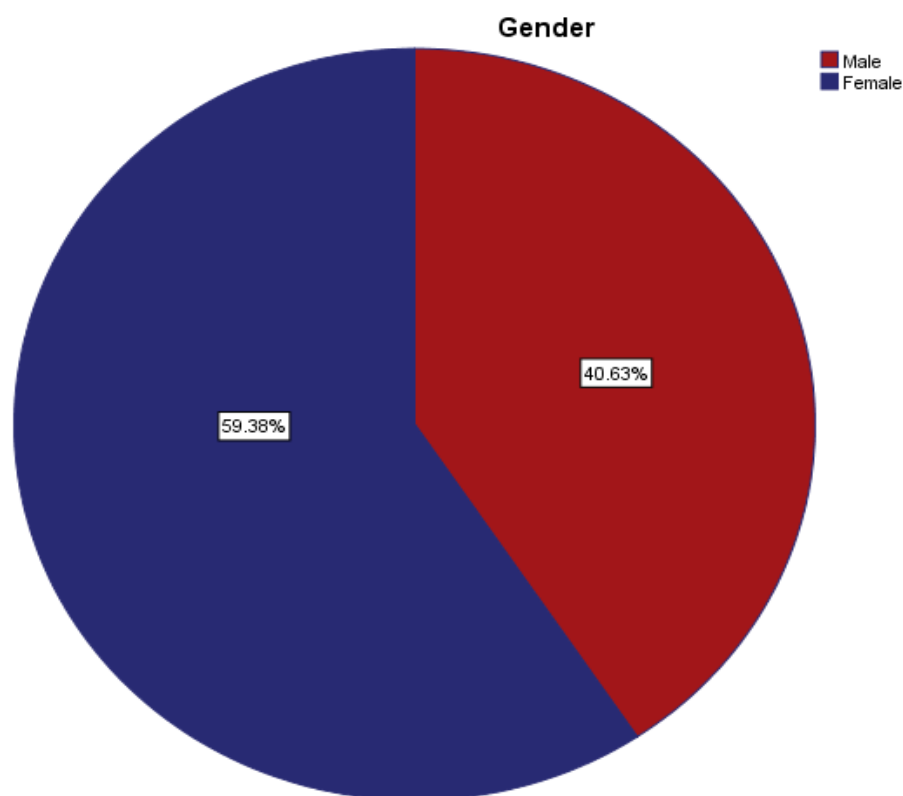
Figure 4.1: Gender of Respondent

Table 4.3: Frequency Analysis on Age of Respondent

Age		Frequency	Percent	Cumulative Percent
Valid	26-35	37	57.8	57.8
	36-45	15	23.4	81.3
	46-55	12	18.8	100.0
	Total	64	100.0	

Table 4.3 shows the frequency analysis of respondent age. The respondent in this study mostly range from 26-35 years old (37 people) with the percentage of 57.8%, 36-45 years old (15 people) with percentage 23.4%, 46-55 years old (12 people) with percentage 18.8%. Mostly age that answered this questionnaires were around 26-35. It will reflect in figure 4.2.
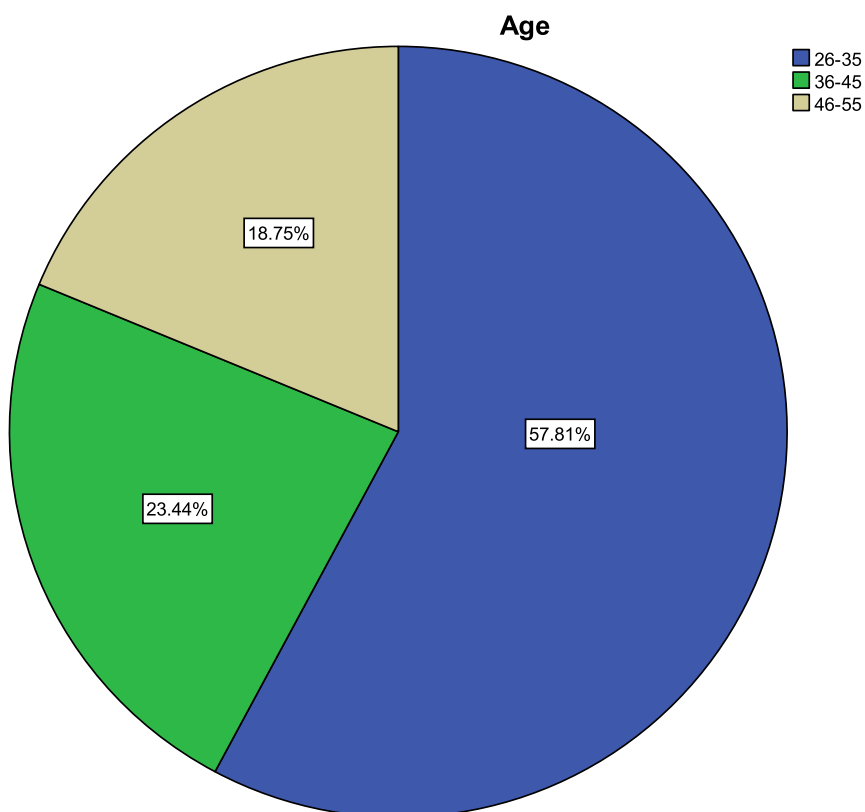
Figure 4.2: Age of Respondent

Table 4.4: Frequency Analysis on Race

Race		Frequency	Percent	Cumulative Percent
Valid	Malay	46	71.9	71.9
	Chinese	11	17.2	89.1
	Indian	7	10.9	100.0
	Total	64	100.0	

Table 4.4: shows the percentage of race of the questionnaire which collected through the survey consisted by Malay respondent at 46 and the percentage 71.9%. For Chinese at 11 and the percentage 17.2%. The Indian respondent frequency is 7 and percentage 10.9%. The mean for race of respondent is 1.39 and the standard deviation is 0.681. Mostly race that answered this questionnaires were from Malay race. It will be reflect in figure 4.3.
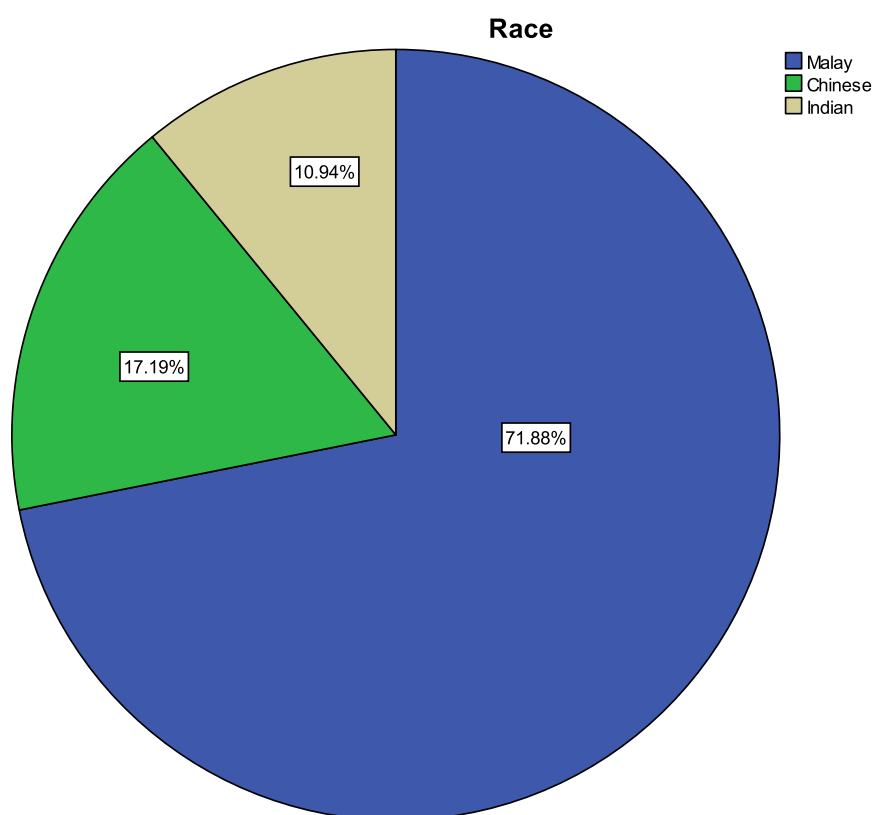
Figure 4.3: Race of Respondent

Table 4.5: Frequency Analysis on Academic Qualification

Academic Qualification		Frequency	Percent	Cumulative Percent
Valid	Diploma	18	28.1	28.1
	Degree	39	60.9	89.1
	Master	6	9.4	98.4
	Phd	1	1.6	100.0
	Total	64	100.0	

Table 4.5 shows about Bachelor of degree. It has the highest respondent with a number of 60.9% at 39 respondents. While, the second highest is diploma with 28.1% at 18 respondents. Respondent that had master and PHD is 6 (9.4%) and 1 (1.6%). Furthermore the mean for academic qualification of respondent is 1.84 and the standard deviation is 0.648. Mostly from degree certificate academic qualification that answered these questionnaires. It will be reflect in figure 4.4.
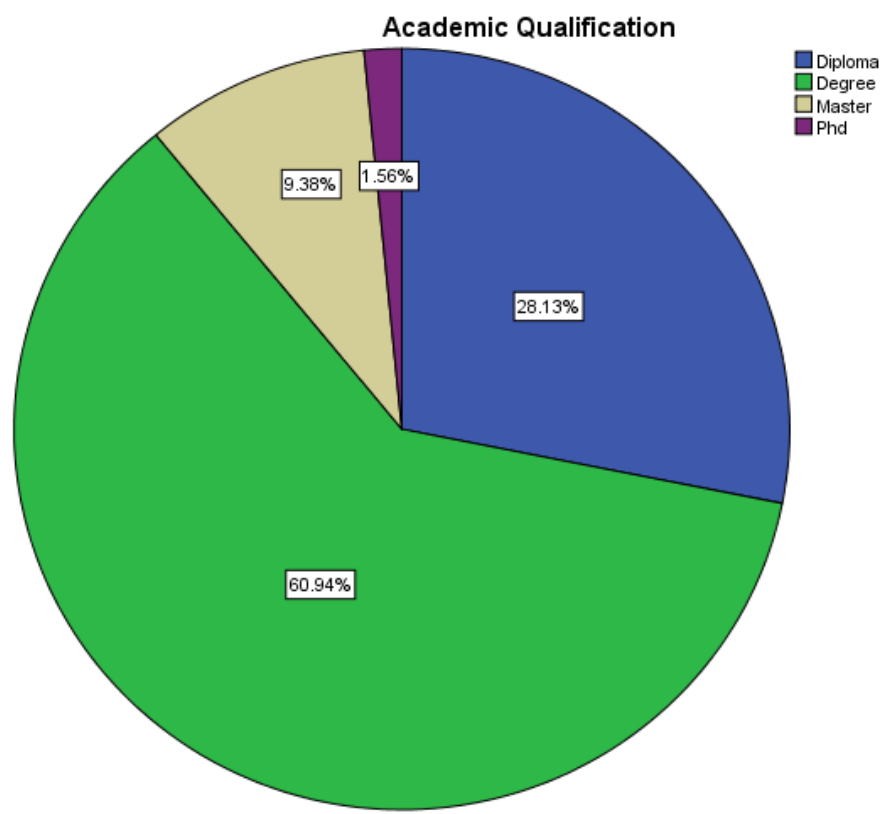
Figure 4.4: Academic Qualification of Respondent

Table 4.6: Frequency Analysis on Work Experience

Work Experience		Frequency	Percent	Cumulative Percent
Valid	1-5 years	35	54.7	54.7
	6-10 years	17	26.6	81.3
	More than 10 years	12	18.8	100.0
	Total	64	100.0	

Table 4.6 had shows the work experience. Most of respondent have worked for 1-5 years (35 people) with 54.7%, while 6-10 years (17 people) with 26.6%, followed by more than 10 years (12 people) with 18.8%. In addition, the mean for work experience is 1.64 and the standard deviation is 1.000. Mostly who that answered these questionnaires were around 1-5 years of experience. It will be reflect in figure 4.5.
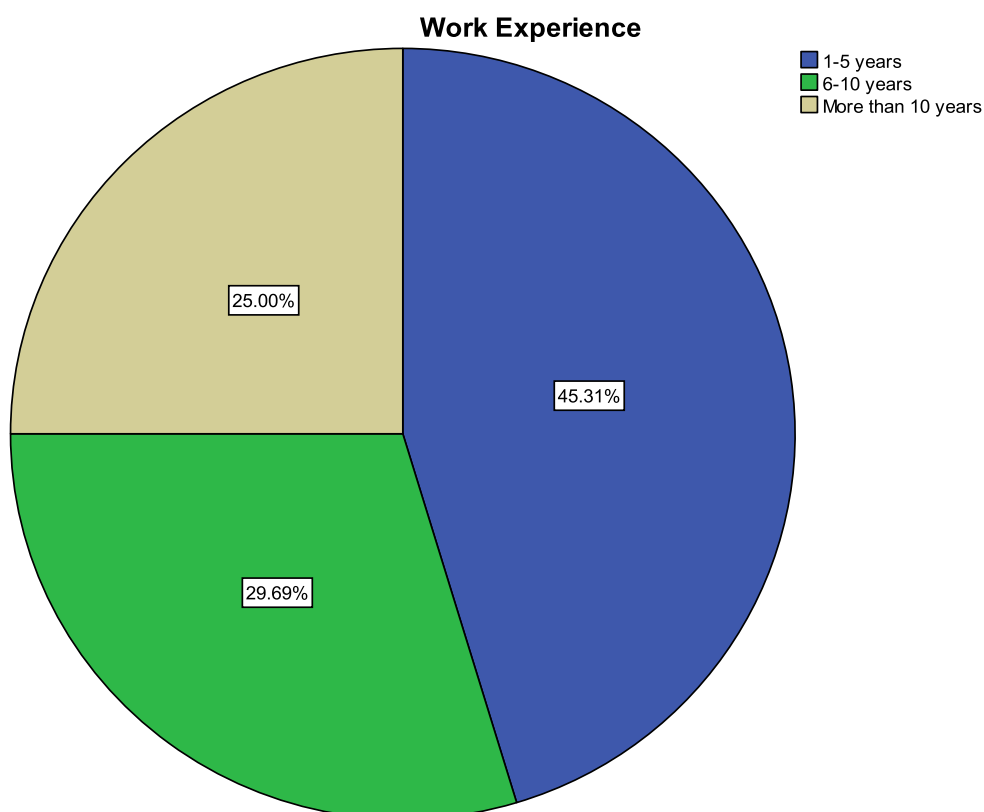
Figure 4.5: Work Experience of Respondent

4.3   NORMALITY TEST

For this research, the normality analysis was carried out to define whether the data is normally distributed or not. The normality analysis consists of two tests that are Komogorov-Smirnov and Shapiro-Wilk, depending on the sample size. Kolmogorov-Smirnov test is suitable when the sample size exceed 50, while Shapiro-Wilk test is suitable for the normality of distribution test when the sample size is smaller than 50 (SPSS 14, 2007)

In this research had acquired 64 respondents and it will follow the Kolmogorov-Smirnov test as it full fills the requirement needed. In order to determine whether the data distributed is normally distributed or not, it depends on the significant value (sig.). If the significant value are greater than 0.05, it will be considered as normal distributed.

Table 4.7: Test of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Section_B	.222	64	.000	.875	64	.000
Section_C	.202	64	.000	.882	64	.000

a. Lilliefors Significance Correction
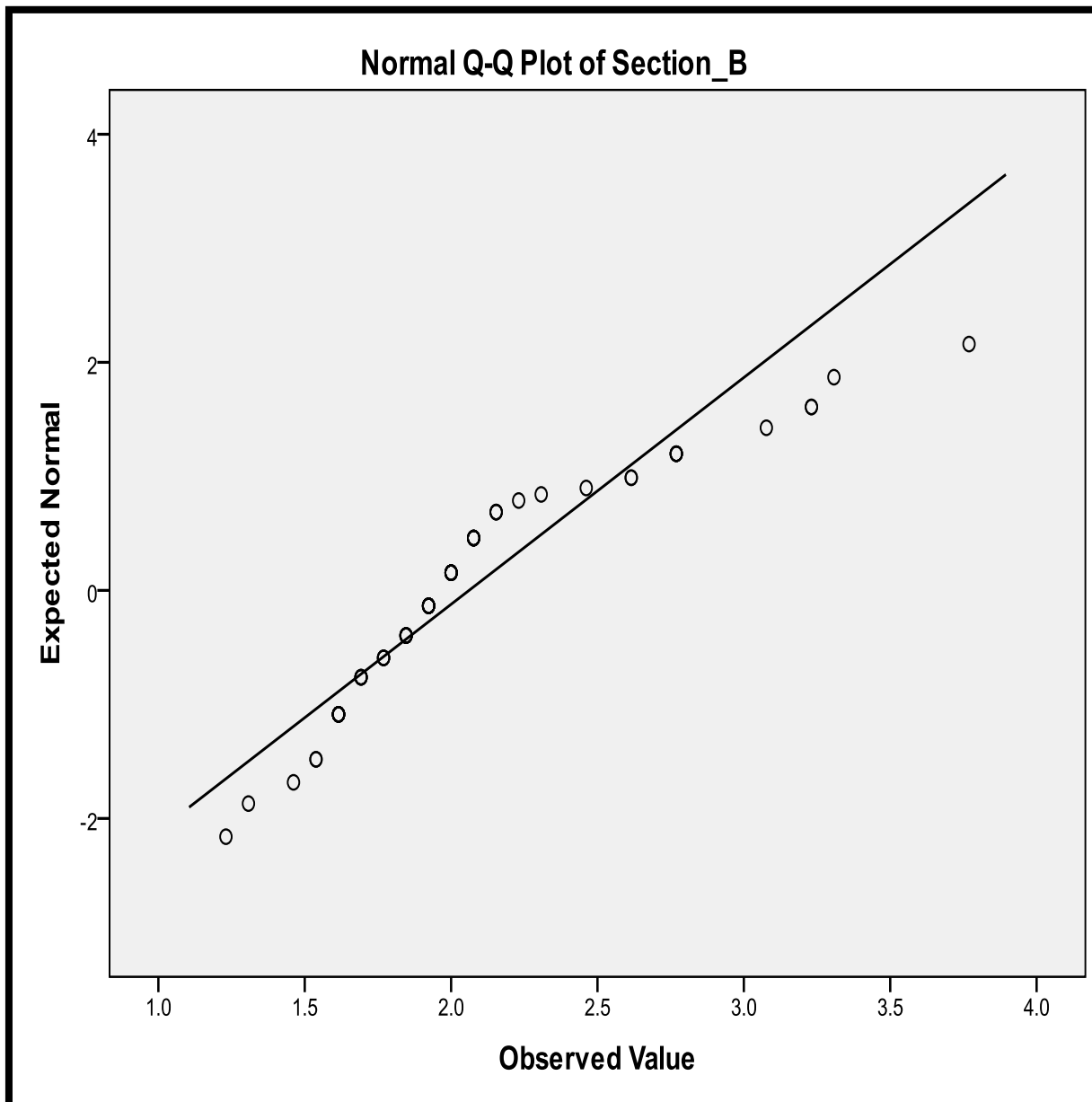
Graph 4.1: Normality graph for section B

The graph 4.1 shows the normality plot for the section b. The graph indicates that the data is not normally distributed since it achieves the significant value of 0.000.
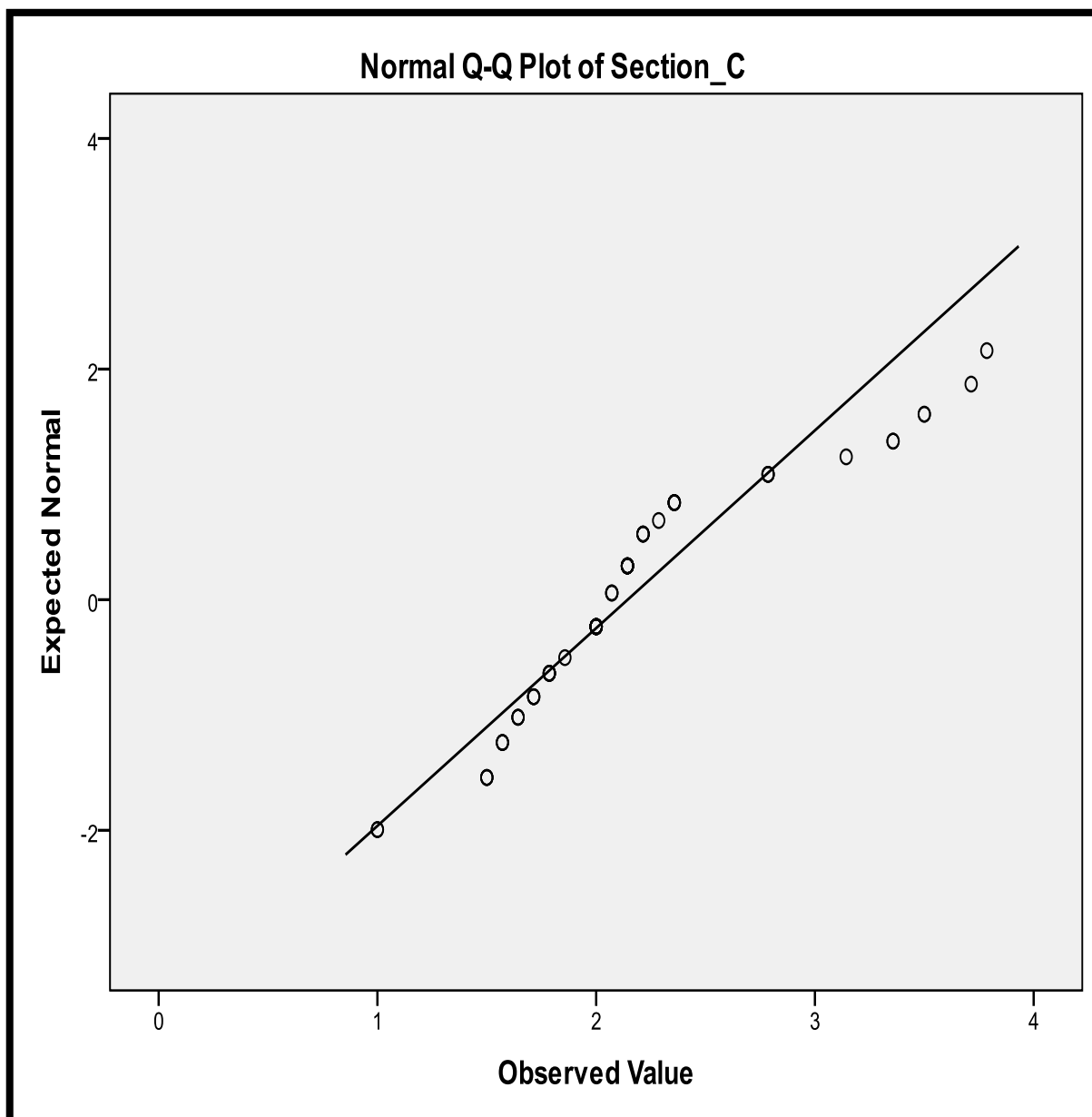
Graph 4.2: Normality graph for section C

The graph 4.2 indicates the normality plot for the section c. According to the graph above, the data is not normally distributed since the significant is 0.000.

4.4   DESCRIPTIVE ANALYSIS

As for the descriptive statistic, the data of the research were analysed by using mean. The purpose of using the descriptive statistic is that to answer the researcher objectives. The result of the descriptive statistic will show the highest rank compared to all questionnaires.

Table 4.8: Likert-scale ranking

Strongly Disagree	Disagree	Agree	Strongly Agree
1	2	3	4

Through the use of the Likert scale ranking, it helps in identify the acceptance an innovation. The finding of mean will indicates the value of average for the data set. Elsewhere, the standard deviation is a measure of the dispersion of a set of data from its mean. The smaller value of standard deviation is better because it means that the dispersion of data does not have much different indicating that the data is more accurate. As for standard deviation range, it can be range as follow:

1. Very good ($x \leq 0.50$)
2. Good ($0.51 \leq x \leq 0.70$)
3. Bad ($0.71 \leq x \leq 0.90$)
4. Very bad ($0.91 \leq x \leq 1.10$)

4.5   SCALE ANALYSIS OF ACCEPTANCE INNOVATION AND OBSTACLES

Following are the scale analysis of polytomous item that are reflected in the part B.

Table 4.9: The dynamic firm culture exists, which promotes creativity

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	7	10.9	10.9
	Agree	45	70.3	81.3
	Disagree	8	12.5	93.8
	Strongly disagree	4	6.3	100.0
	Total	64	100.0	

Table 4.9 show the result of the dynamic firm culture exists, which promotes creativity in the project-based industry. The highest score is "agree" with 70.3% is 45 respondents. The second highest is "disagree" with 12.5% with 8 respondents. Strongly agree and strongly disagree are the lowest score with 10.9% (7 respondents) and 6.3% with 4 respondents. For the mean and standard deviation of this question is 2.14 and 0.687. It will reflect in figure 4.6
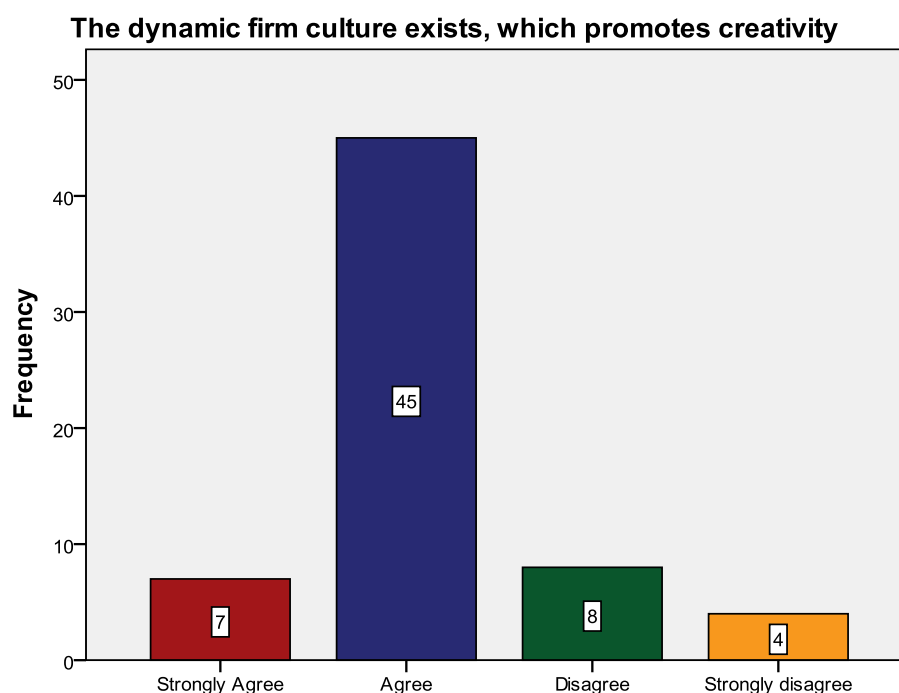
Figure 4.6: The dynamic firm culture exists, which promotes creativity

Table 4.10: An open firm, which promotes learning

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	17	26.6	26.6
	Agree	39	60.9	87.5
	Disagree	4	6.3	93.8
	Strongly disagree	4	6.3	100.0
	Total	64	100.0	

Table 4.10 shows that the result an open firm, which promotes learning. "Agree" is the higher with 60.9% is 39 respondents. Second highest is "Strongly Agree" with 26.6% is 17 respondents and lowest are "disagree and strongly disagree" with 6.3% is 4 respondents. For the mean and standard deviation of this question is 1.92 and 0.762. It will be reflect in figure 4.7.
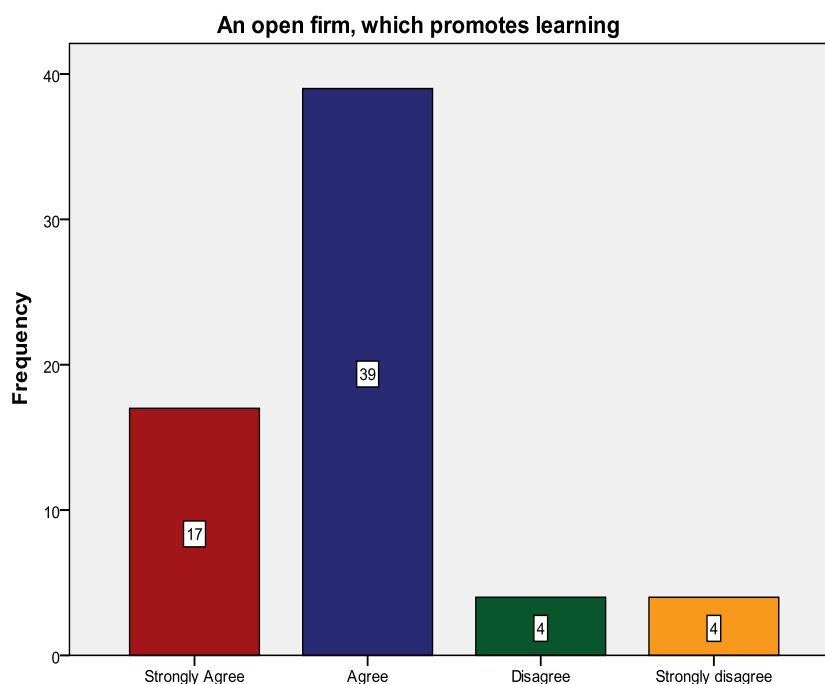
Figure 4.7: An open firm, which promotes learning

Table 4.11: Knowledge is passed on automatically to new employees in the firm

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	15	23.4	23.4
	Agree	35	54.7	78.1
	Disagree	10	15.6	93.8
	Strongly disagree	4	6.3	100.0
	Total	64	100.0	

Table 4.11 shows the result of knowledge is passed on automatically to new employees in the firm on project based company. The highest score "agree" with 54.7% is 35 respondents. The second highest is "strongly agree" with 23.4% is 15 respondents. Third highest score is "disagree" with 15.6% is 10 respondents. Strongly disagree is a lowest score with 6.3% is 4 respondents. For the mean and standard deviation of this question is 2.05 and 0.805. It will reflect in figure 4.8
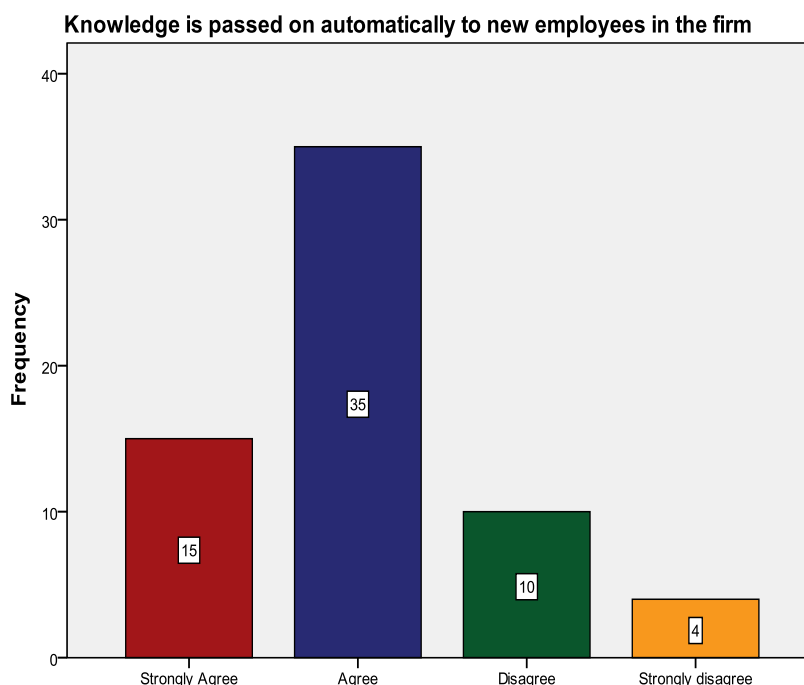
**Figure 4.8: Knowledge is passed on automatically to new employees in the firm**

Table 4.12: In your firm, it is very important for employees to have an open mind

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	27	42.2	42.2
	Agree	29	45.3	87.5
	Disagree	5	7.8	95.3
	Strongly disagree	3	4.7	100.0
	Total	64	100.0	

Table 4.12 shows the result for important the employees to have an open mind. The frequencies of responses show that the score of "agree" is higher with 29 respondents at 45.3%. "Strongly agree" is the second highest with 27 respondents at 42.2%. "Disagree" is the third higher with 5 respondents at 7.8% and the lastly is 3 respondents at 4.7% for "strongly disagree". From this question the mean is 1.75 and for the standard deviation is 0.797. It will be reflect in figure 4.9.
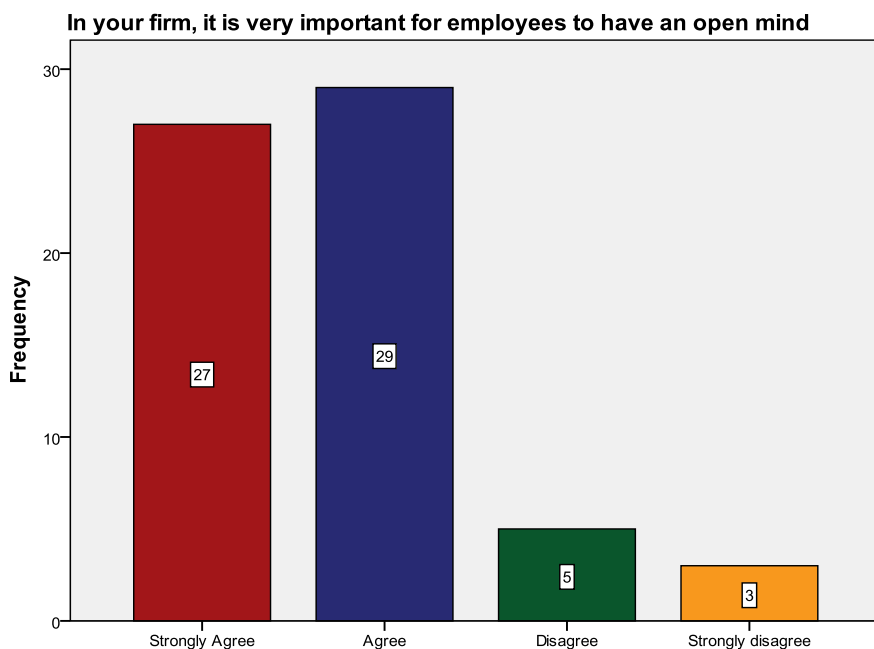
Figure 4.9: Important for employees to have an open mind

Table 4.13: The firm's managers encourage employees to develop their creativity, away from stereotypes and conventions

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	22	34.4	34.4
	Agree	31	48.4	82.8
	Disagree	6	9.4	92.2
	Strongly disagree	5	7.8	100.0
	Total	64	100.0	

Table 4.13 shows about the firm's managers encourage employees to develop their creativity, away from stereotypes and conventions. From the question the highest value is "agree" with 31 respondents at 48.4%. Then the second highest for this value is "strongly agree" with 22 respondents at 34.4% and the third highest value is "disagree" with 6 respondents at 9.4%. The lowest score is "strongly disagree" with 5 respondents at 7.8%. The mean of this question is 1.91 and for the standard deviation is 0.868. It will be reflect in figure 4.10.

Figure 4.10: The firm's managers encourage employees to develop their creativity, away from stereotypes and conventions.

Table 4.14: Original ideas are very valuable in your organization

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	21	32.8	32.8
	Agree	34	53.1	85.9
	Disagree	3	4.7	90.6
	Strongly disagree	6	9.4	100.0
	Total	64	100.0	

Table 4.14 shows that the original ideas are very valuable in your organization. So, from the data gathering, frequencies of responses show that the score of "agree" is higher with 34 respondents at 53.1%. "Strongly agree" is the second highest with 21 respondents at 32.8%. "Strongly disagree" is the third highest with 6 respondents at 9.4% and the lastly is 3 respondents at 4.7% for "disagree". From this question the mean is 1.91 and for the standard deviation is 0.868. It will be reflect in figure 4.11
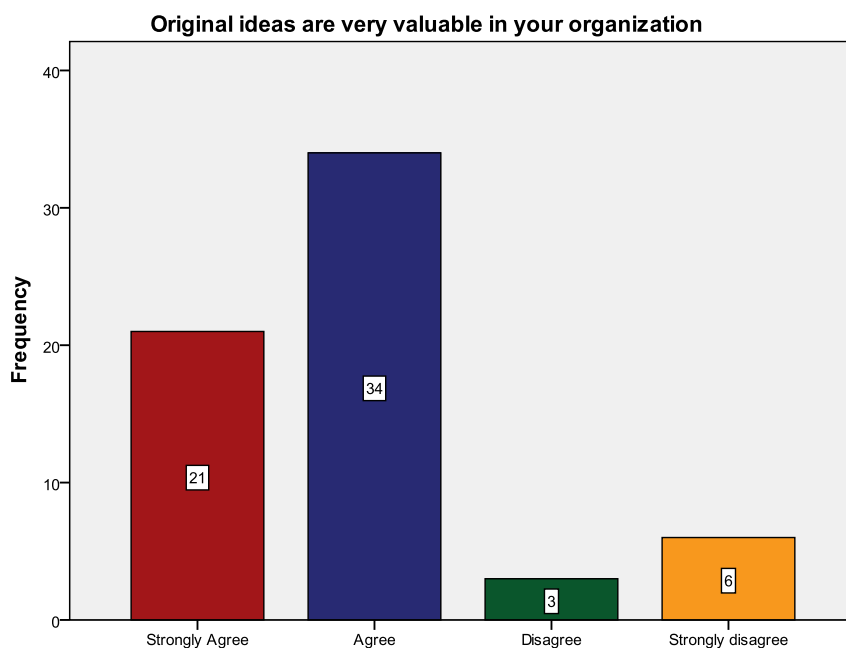
**Figure 4.11: Original ideas are very valuable in your organization**

Table 4.15: Company possesses a clearly formulated innovation strategy towards company performance

	Frequency	Percent	Cumulative Percent
Valid Strongly Agree	7	10.9	10.9
Agree	41	64.1	75.0
Disagree	12	18.8	93.8
Strongly disagree	4	6.3	100.0
Total	64	100.0	

Table 4.15 shows that company possesses a clearly formulated innovation strategy. The highest score is "agree" with 64.1% or 41 respondents. The second highest is "disagree" with 18.8% is 12 respondents. Third highest score is "strongly agree" with 10.9% or 7 respondents. For mean and standard deviation of this question is 2.20 and 0.717. It will be reflect in figure 4.12.

Your company possesses a clearly formulated innovation strategy towards company performance
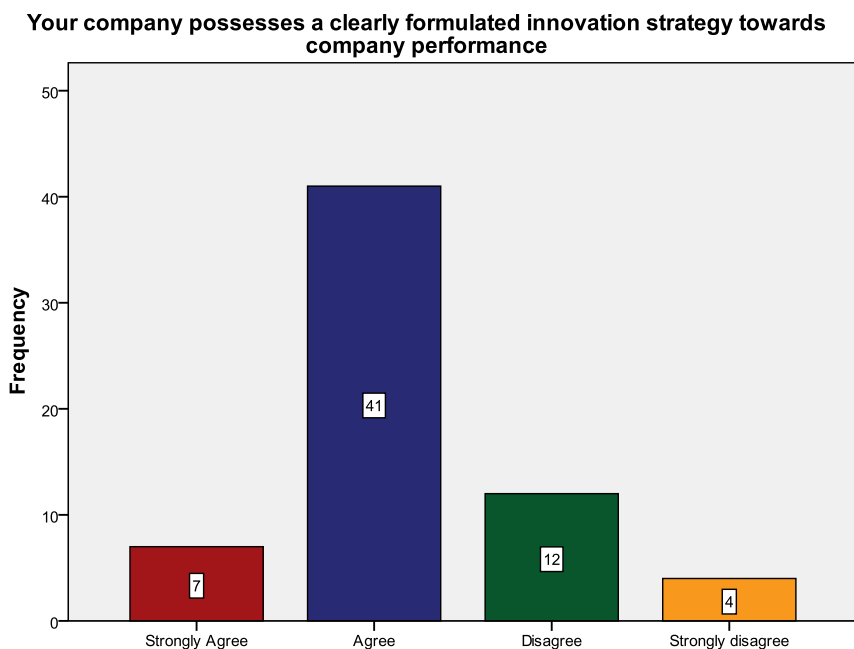
Figure 4.12: Company possesses a clearly formulated innovation strategy towards company performance

Table 4.16: The organization possesses a fault-tolerant culture

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	6	9.4	9.4
	Agree	44	68.8	78.1
	Disagree	9	14.1	92.2
	Strongly disagree	5	7.8	100.0
	Total	64	100.0	

Table 4.16 shows the result about organization possesses a fault-tolerant culture. "Agree" is the highest with 68.8% is 44 respondents. Second highest is "disagree" with 14.1% is 9 respondents. Third highest is "strongly agree" with 9.4% is 6 respondents. Lowest score is "strongly disagree" with 5 respondents at 7.8%. For the mean and standard deviation of this question is 2.20 and 0.717. It will be reflect in figure 4.13.
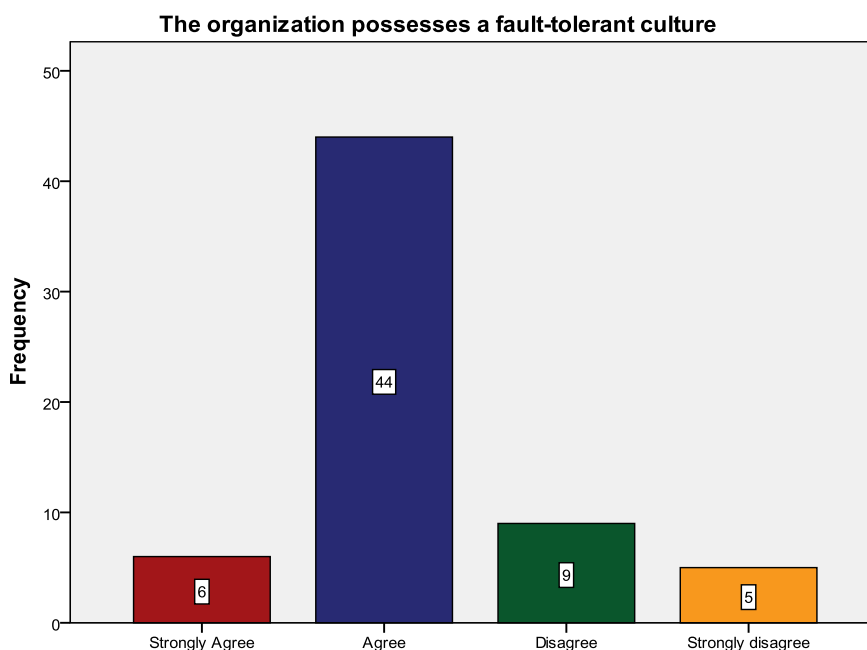
Figure 4.13: The organization possesses a fault-tolerant culture

Table 4.17: Your own R&D department can successfully satisfy all (technologies) demands

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	6	9.4	9.4
	Agree	44	68.8	78.1
	Disagree	10	15.6	93.8
	Strongly disagree	4	6.3	100.0
	Total	64	100.0	

Table 4.17 shows the result R&D department can successfully satisfy all (technologies) demands. The highest score is "agree" with 44 respondents at 68.8%, second highest score is "disagree" 10 respondents at 15.6%, and third highest score is "strongly agree" with 6 respondents at 9.4%. Lowest score is "strongly agree" with 4 respondents at 6.3%. For the mean and standard deviation of this question is 2.19 and 0.687. It will reflect in figure 4.14.
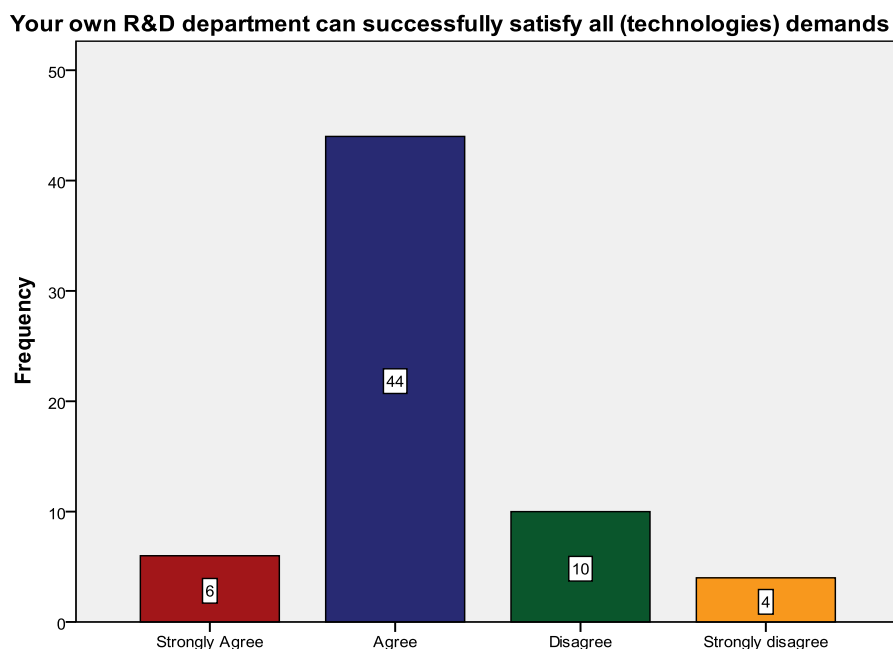
Figure 4.14: R&D department can successfully satisfy all (technologies) demands

Table 4.18: Open innovation is major concern for your company

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	12	18.8	18.8
	Agree	36	56.3	75.0
	Disagree	12	18.8	93.8
	Strongly disagree	4	6.3	100.0
	Total	64	100.0	

This table 4.18 shows the result open innovation is major concern for your company. "Agree" is the highest score with 56.3% at 36 respondents. "Strongly agree" & "disagree" are the second highest score with 18.8% at 12 respondents. The lowest score "strongly disagree" with 6.3% at 4 respondents. For the mean and standard deviation of this question is 2.13 and 0.787. It will be reflect in figure 4.15
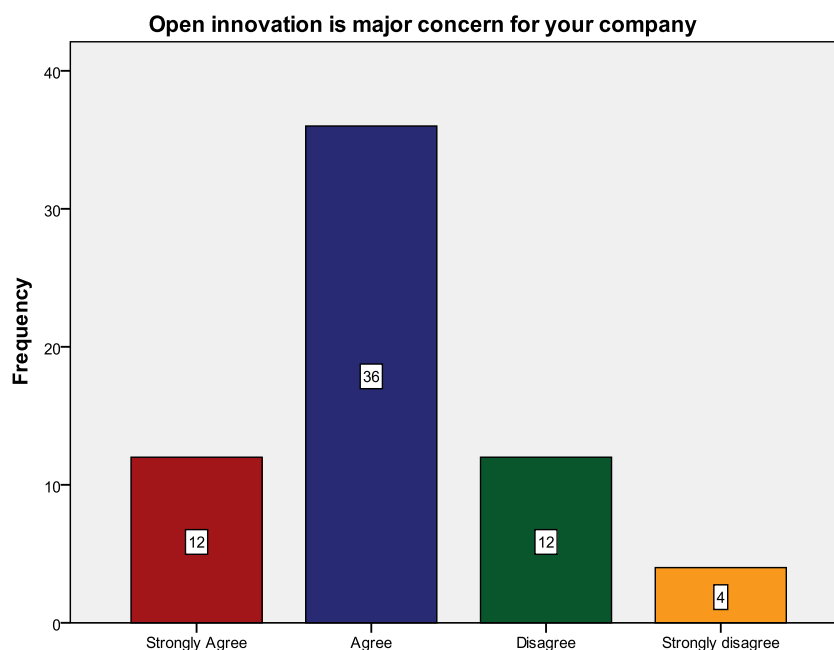

Figure 4.15: Open innovation is major concern for your company

Table 4.19: Adoption innovation would improve task performance

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	17	26.6	26.6
	Agree	41	64.1	90.6
	Disagree	1	1.6	92.2
	Strongly disagree	5	7.8	100.0
	Total	64	100.0	

This table 4.19 shows the result an adoption innovation would improve task performance. So, from the data gathering, the frequencies of responses show that the score of "agree" is highest with 41 respondents at 64.1%. "Strongly agree" is the second highest with 17 respondent at 26.6% and the third highest with 5 respondents at 7.8% is "strongly disagree". The lowest score is "disagree" with one respondent at 1.6%. From this question the mean is 1.91 and for the standard deviation is 0.771. It will reflect in figure 4.16.
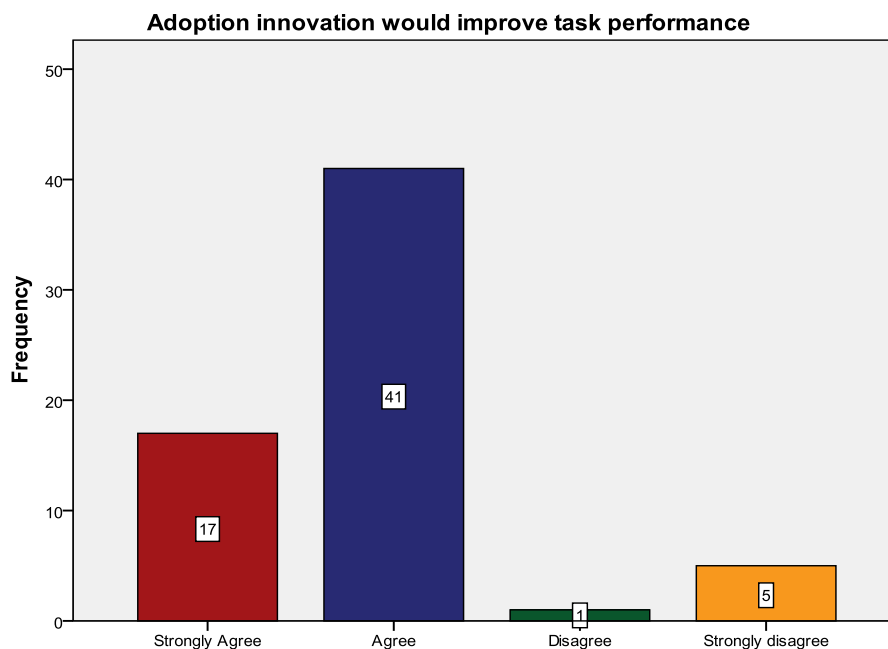
Figure 4.16: Adoption innovation would improve task performance

Table 4.20: Company introducing a new source of supply for innovation

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	12	18.8	18.8
	Agree	39	60.9	79.7
	Disagree	13	20.3	100.0
	Total	64	100.0	

Table 4.20 shows that about company introducing a new source of supply for innovation. So, from the data gathering, the frequencies of responses show that the score of "agree" is highest with 39 respondents at 60.9%. "Disagree" is the second highest with 13 respondents at 20.3% and the lastly is 12 respondents at 18.8% for "strongly agree". From this question the mean is 2.02 and for the standard deviation is 0.630. It will be reflect in figure 4.17
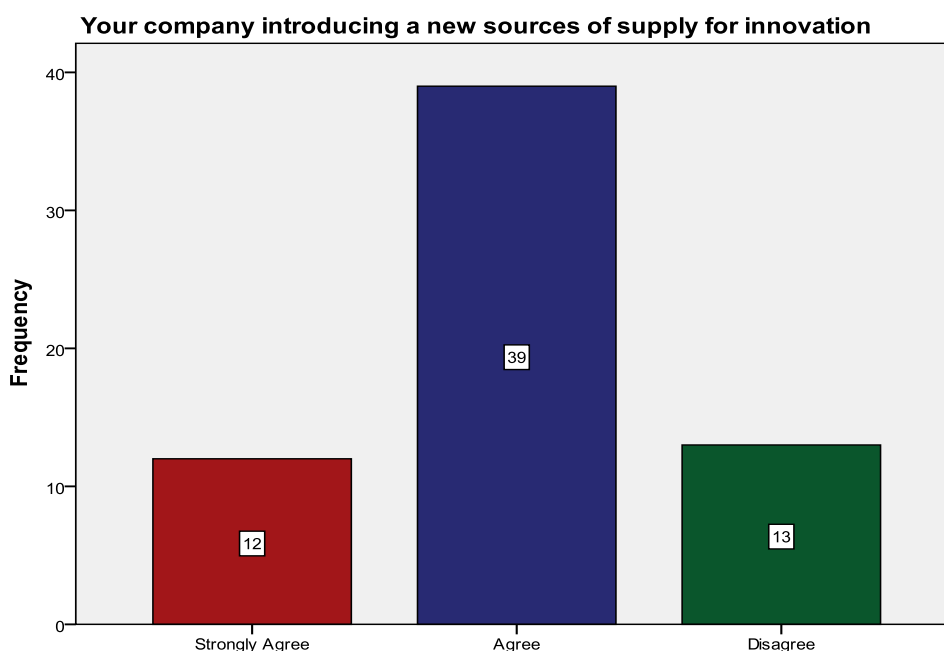
Figure 4.17: Company introducing a new source of supply for innovation

Table 4.21: Organization produces a new product or new methods of production related with innovation towards company performance

		Frequency	Percent	Cumulative Percent
Valid	Agree	33	51.6	51.6
	Disagree	31	48.4	100.0
	Total	64	100.0	

Table 4.21 shows that about an organization produce a new product or new methods of production related with innovation. So, from the data gathering, the frequencies of responses show the score of "agree" is highest with 33 respondents at 51.6%. The lowest score is 31 respondents at 48.4%. From this question the mean is 2.48 and for the standard deviation is 0.504. It will be reflect in figure 4.18.
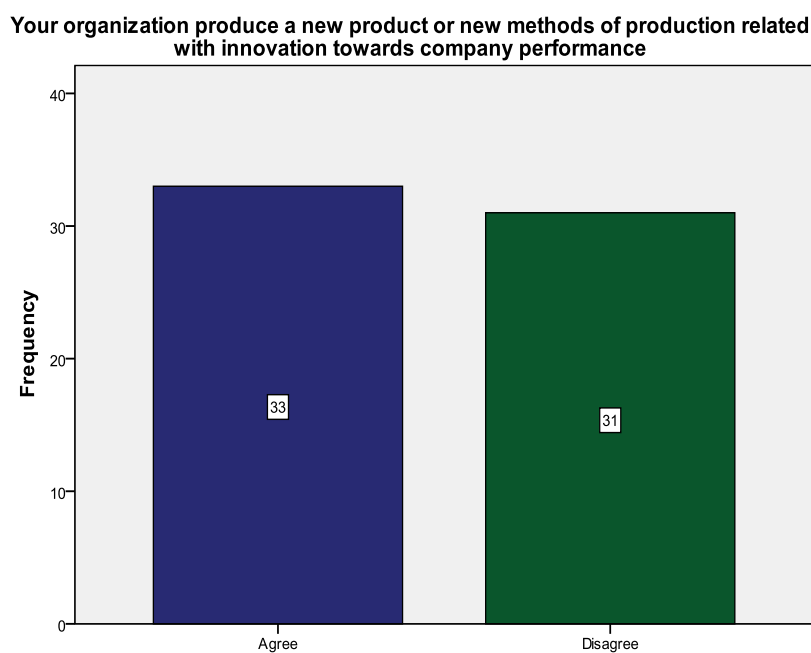
Figure 4.18: Organization produces a new product or new methods of production related with innovation towards company performance

Table 4.22: Stress climate due to power dispute can be barrier to innovation

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	6	9.4	9.4
	Agree	44	68.8	78.1
	Disagree	10	15.6	93.8
	Strongly disagree	4	6.3	100.0
	Total	64	100.0	

Table 4.22 shows about the stress climate due to power dispute can be barrier to innovation. "Agree" is the highest score with 68.8% or 44 respondents. The second highest is "disagree" with 15.6% or 10 respondents. The third highest is "strongly agree" with 9.4% or 6 respondents. Lastly for the lowest is "strongly disagree" is 6.3% or four respondents. For the mean and standard deviation is 2.19 and 0.687. It will be reflect in figure 4.19.
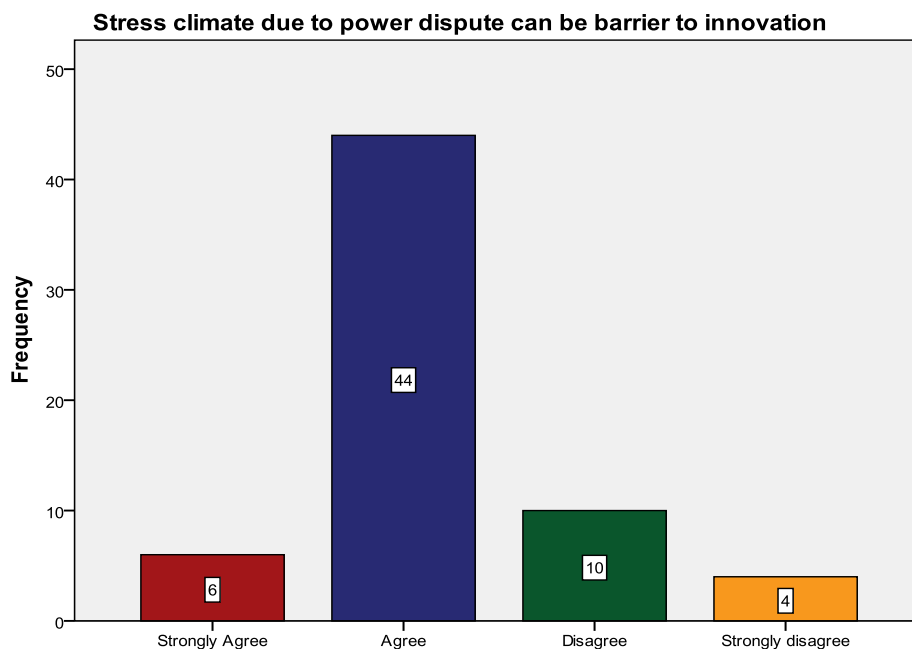
**Figure 4.19: Stress climate due to power dispute can be barrier to innovation**

Table 4.23: The low level of error tolerance

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	5	7.8	7.8
	Agree	44	68.8	76.6
	Disagree	13	20.3	96.9
	Strongly disagree	2	3.1	100.0
	Total	64	100.0	

Table 4.23 above explain about the low level of error tolerance. So, from the data gathering, the frequencies of responses show that the score of "agree" is highest with 44 respondents at 68.8%. "Disagree" is the second highest with 13 respondents at 20.3% and the "strongly agree" is third highest with five respondents at 7.8%. The lastly is two respondents is 3.1% for "strongly disagree". From this question the mean is 2.19 and for the standard deviation is 0.614. It will be reflect in figure 4.20.
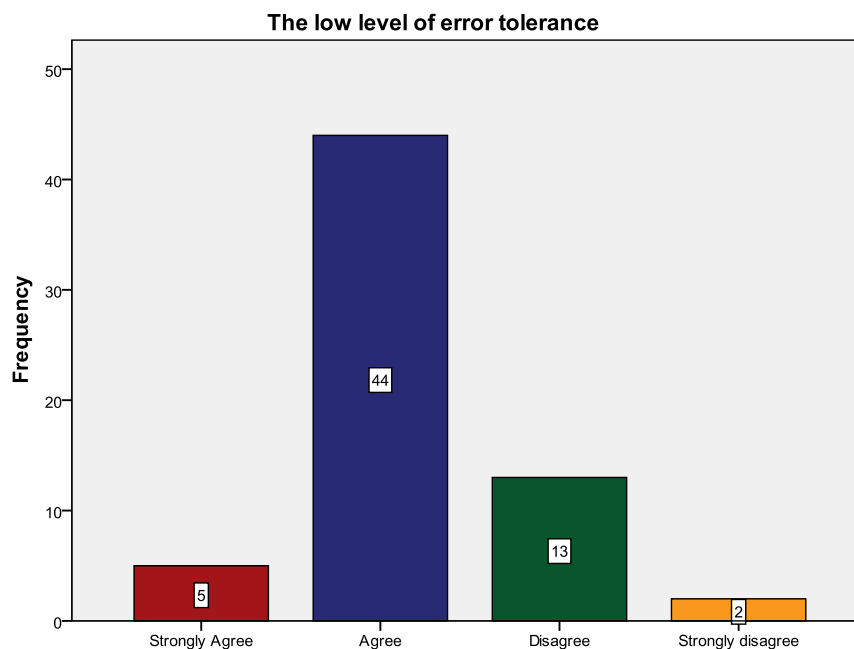
**Figure 4.20: The low level of error tolerance**

Table 4.24: Not have systematic monitoring of external source of information regarding technological trends

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	10	15.6	15.6
	Agree	43	67.2	82.8
	Disagree	7	10.9	93.8
	Strongly disagree	4	6.3	100.0
	Total	64	100.0	

Table 4.24 interpret about the result for not have systematic monitoring of external source of information regarding technologies trends. The highest score collected is "agree" (43 respondents at 67.2%). The second highest is "strongly agree" (10 respondents at 15.6%). "Disagree" is the third highest (7 respondents at 10.9%) and the lowest is "strongly disagree" (4 respondents at 6.3%). The mean is 2.08 and standard deviation is 0.719. It will be reflect in figure 4.21.
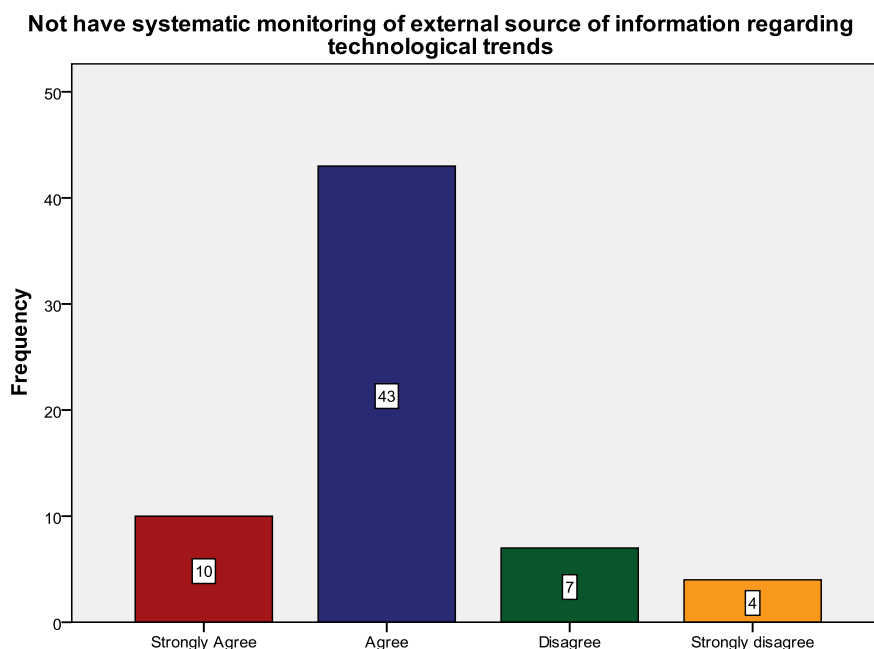
Figure 4.21: Not have systematic monitoring of external source of information regarding technological trends

Table 4.25: New products and services are a challenge to existing ideas in the industry

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	16	25.0	25.0
	Agree	29	45.3	70.3
	Disagree	14	21.9	92.2
	Strongly disagree	5	7.8	100.0
	Total	64	100.0	

Table 4.25 shows about the result of new products and services are a challenge to existing ideas in the industry. "Agree" is highest score with 45.3% at 29 respondents. The second highest is "strongly agree" with 25.0% at 16 respondents. The third highest is "disagree" with 21.9% at 14 respondents. The lowest score is "strongly disagree" at 5 respondents with 7.8%. For the mean and standard deviation of this question is 2.13 and 0.882. It will be reflect in figure 4.22.
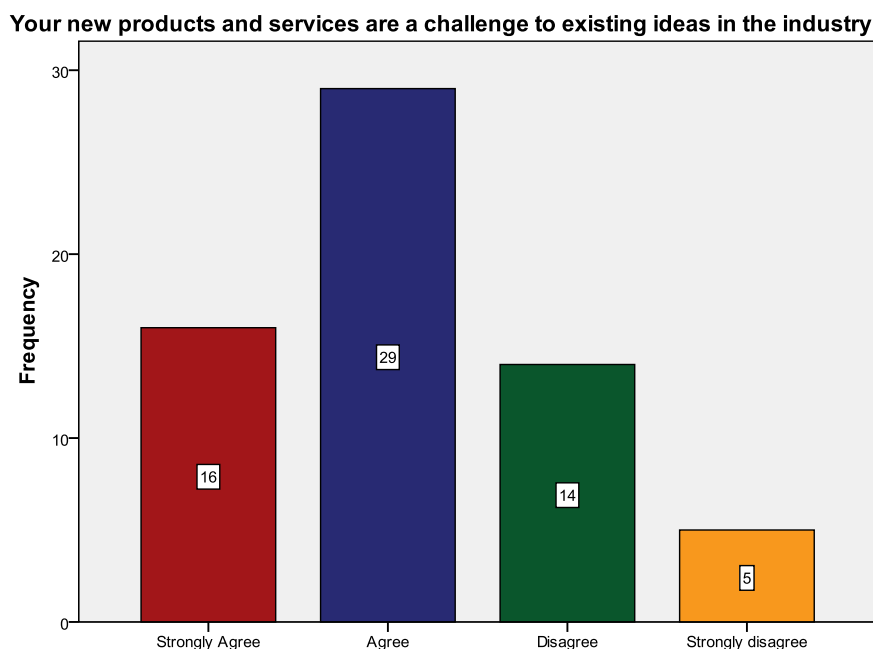
Figure 4.22: New products and services are a challenge to existing ideas in the industry

Table 4.26: Company possesses the ability (competences) to generate innovations itself

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	6	9.4	9.4
	Agree	44	68.8	78.1
	Disagree	9	14.1	92.2
	Strongly disagree	5	7.8	100.0
	Total	64	100.0	

Table 4.26 shows about the result company possess the ability (competences) to generate innovation itself. The highest score collected is "agree" (44 respondents at 68.8%). The second highest is "disagree" (9 respondents at 14.1%). "Strongly agree" is the third highest (6 respondents at 9.4%) and the lowest is "strongly disagree" (5 respondents at 7.8%). The mean is 2.20 and standard deviation 0.717. It will be reflect in figure 4.23.
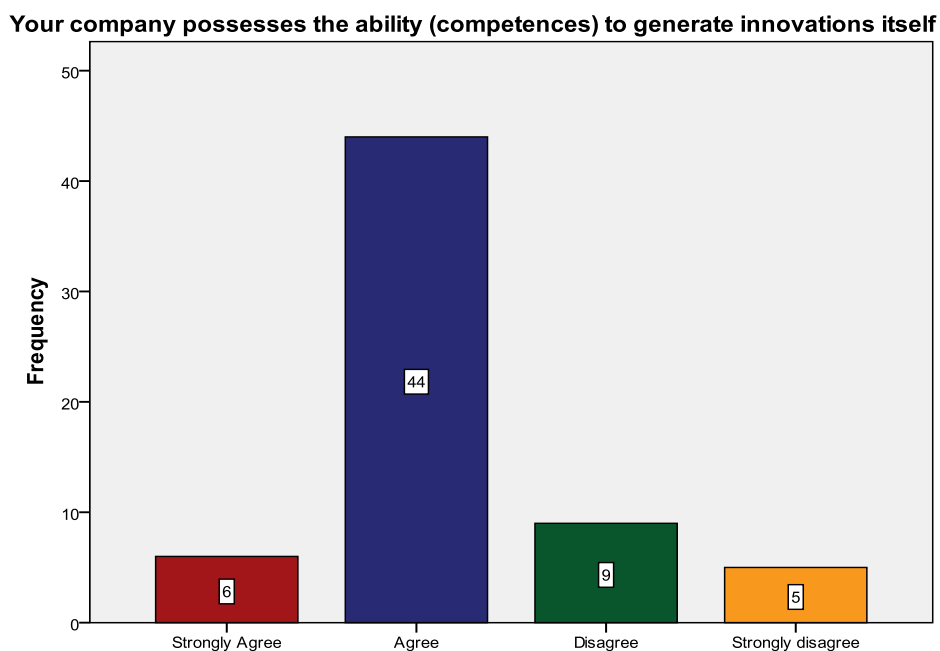
Figure 4.23: Company possesses the ability (competences) to generate innovations itself

Table 4.27: Company possesses the ability (competences) to acquire innovations

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	14	21.9	21.9
	Agree	40	62.5	84.4
	Disagree	5	7.8	92.2
	Strongly disagree	5	7.8	100.0
	Total	64	100.0	

Table 4.27 shows the result about company possesses the ability (competences) to acquire innovations. The highest score is "agree" with 40 respondents at 62.5%. The second highest is "strongly agree" with 14 respondents at 21.9%. The lowest score are "disagree" and "strongly disagree" with 5 respondents at 7.8%. The mean is 2.02 and standard deviation is 0.787. It will be reflect in figure 4.24.
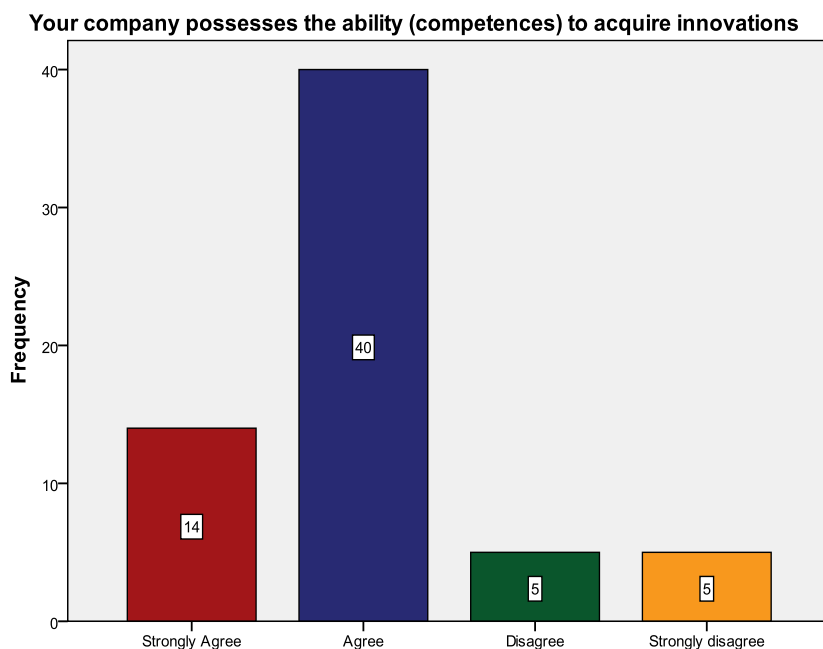
**Figure 4.24: Company possesses the ability (competences) to acquire innovations**

Table 4.28: Company really know the market and your customer needs

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	17	26.6	26.6
	Agree	35	54.7	81.3
	Disagree	7	10.9	92.2
	Strongly disagree	5	7.8	100.0
	Total	64	100.0	

Table 4.28 shows that about company really know the market and your customer needs. So, from the data gathering, the frequencies of responses show that the score of "agree" is highest with 35 respondents at 54.7%. "Strongly agree" is the second highest with 17 respondents at 26.6% and the third highest is "disagree" with 7 respondents at 10.9%. The lastly is 5 respondents at 7.8% for "strongly disagree". From this question the mean is 2.00 and for the standard deviation is 0.836. It will be reflect in figure 4.25.
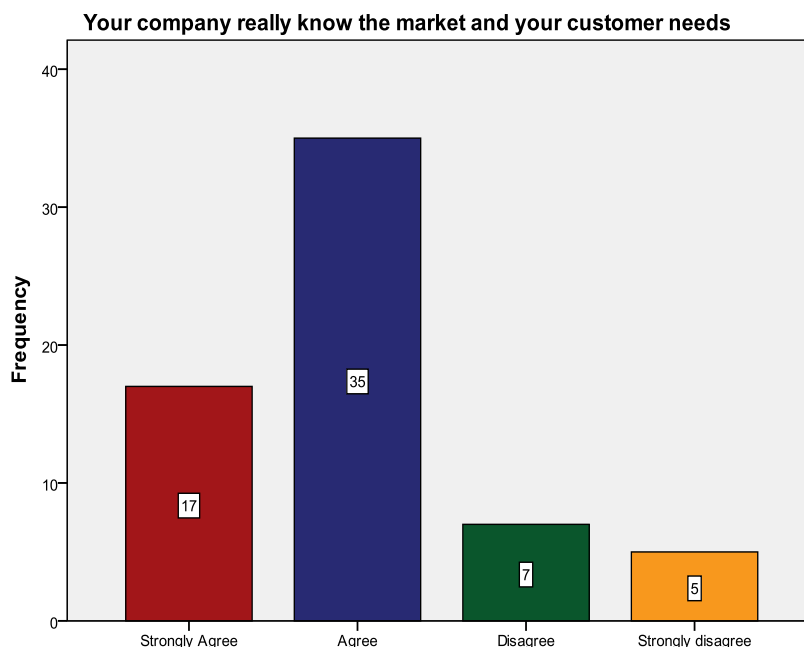
Figure 4.25: Company really know the market and your customer needs

Table 4.29: Company stuck too much in tradition (old style)

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	3	4.7	4.7
	Agree	27	42.2	46.9
	Disagree	28	43.8	90.6
	Strongly disagree	6	9.4	100.0
	Total	64	100.0	

Table 4.29 shows that about company stuck too much in tradition (old style). So, form the data gathering, the frequencies of responses show that the score of "disagree" is highest with 28 respondents at 43.8%. "Agree" is the second highest with 27 respondents with 42.2%. The third highest is "strongly disagree" with 6 respondents at 9.4%. The lowest frequency is 3 respondents with 4.7%. From this question the mean is 2.58 and for the standard deviation is 0.730. It will be reflect in figure 4.26.
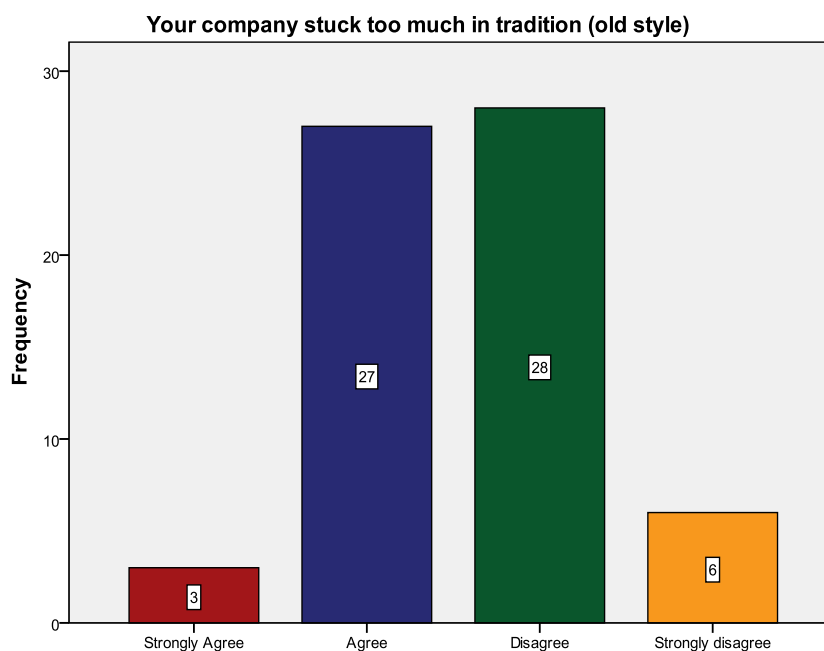
Figure 4.26: Company stuck too much in tradition (old style)

Table 4.30: Company avoids taking risk in order to protect current business

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	12	18.8	18.8
	Agree	27	42.2	60.9
	Disagree	20	31.3	92.2
	Strongly disagree	5	7.8	100.0
	Total	64	100.0	

Table 4.30 shows the result about company avoids taking risk in order to protect current business. "Agree" is the highest at 42.2% with 27 respondents. The second highest is "disagree" at 31.3% with 20 respondents. The third highest is "strongly agree" at 18.8% with 12 respondents. The lowest is "strongly disagree" at 7.8% with 5 respondents. From this question the mean is 2.28 and standard deviation is 0.863. It will be reflect in figure 4.27.
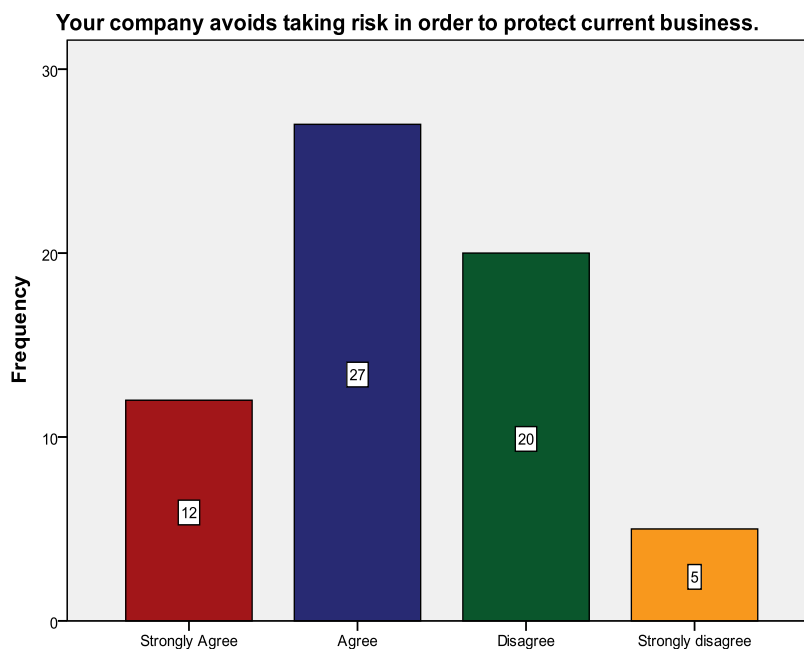
Figure 4.27: Company avoids taking risk in order to protect current business

Table 4.31: Company accepts failures and learns from past experiences

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	20	31.3	31.3
	Agree	34	53.1	84.4
	Disagree	4	6.3	90.6
	Strongly disagree	6	9.4	100.0
	Total	64	100.0	

Table 4.31 shows about the result about company accepts failures and learns from past experiences. "Agree" is the highest score with 53.1% or 34 respondents. The second highest is "strongly agree" with 31.3% or 20 respondents. The third highest is "strongly disagree" at 9.4% with 6 respondents. The lowest score is "disagree" at 6.3% with 4 respondents. For the mean and standard deviation are 1.94 and 0.871. It will be reflect in figure 4.28.

Figure 4.28: Company accepts failures and learns from past experiences

Table 4.32: Company has the right strategy to support continuous innovation.

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	17	26.6	26.6
	Agree	34	53.1	79.7
	Disagree	6	9.4	89.1
	Strongly disagree	7	10.9	100.0
	Total	64	100.0	

Table 4.32 above explain about company has a right strategy to support continuous innovation. So, from the data gathering, the frequencies of responses show that the score of "agree" is highest with 34 respondents at 53.1%. "Strongly agree" is the second highest with 17 respondents at 26.6% and the third highest is "strongly disagree" with 7 respondents or 10.9%. The lowest is "disagree" where it has 6 respondents with 9.4%. From this question the mean is 2.05 and for the standard deviation is 0.898. It will be reflect in figure 4.29.

Your company has the right strategy to support continuous innovation.
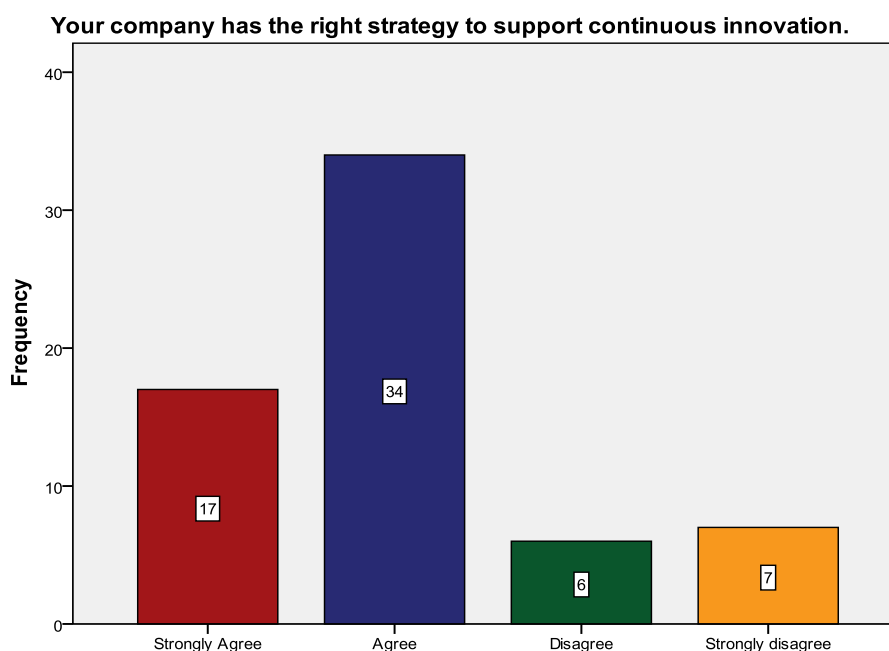
Figure 4.29: Company has the right strategy to support continuous innovation.

Table 4.33: Clear guidelines for choosing between buying ready, developing internally, recruiting development services, or developing in partnership with another institution.

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	9	14.1	14.1
	Agree	36	56.3	70.3
	Disagree	14	21.9	92.2
	Strongly disagree	5	7.8	100.0
	Total	64	100.0	

Table 4.33 interpret about result of the clear guidelines for choosing between buying ready, developing internally, recruiting development services, or developing in partnership with another institution. The highest score collected is "Agree" (36 respondents at 56.3%). The second highest is "disagree" (14 respondents at 21.9%). "Strongly agree" is the third highest (9 respondents at 14.1%) and the lowest is "strongly disagree" (5 respondents at 7.8%). The mean is 2.23 and the standard deviation is 0.792. It will be reflect in figure 4.30

Clear guidelines for choosing between buying ready, developing internally, recruiting development services, or developing in partnership with another institution.
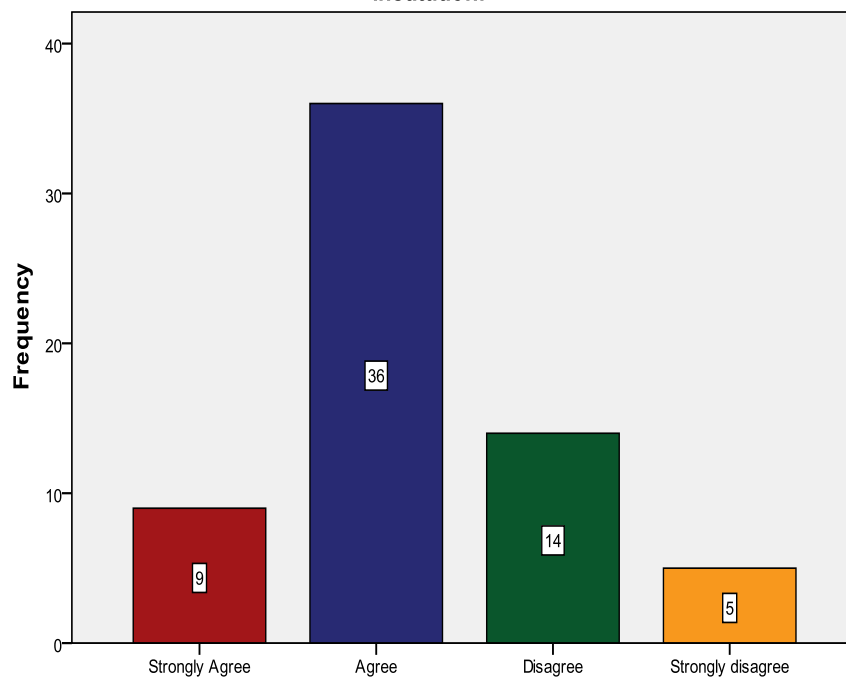
Figure 4.30: Clear guidelines for choosing between buying ready, developing internally, recruiting development services, or developing in partnership with another institution.

Table 4.34: The barriers comes from environmental policy and costs

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	15	23.4	23.4
	Agree	32	50.0	73.4
	Disagree	10	15.6	89.1
	Strongly disagree	7	10.9	100.0
	Total	64	100.0	

Table 4.34 interpret about the barriers comes from environment policy and cost. The highest level of distribution is "agree" with the 50.0% or 32 respondents; the second level of this distribution is "strongly agree" with 23.4% or 15 respondents, the third level of this distribution is "disagree" with 15.6% or 10 respondents. The lastly level with 7 respondents or 10.9% is "strongly disagree". The mean and standard deviation of this distribution is 2.14 and 0.906. It will be reflect in figure 4.31.
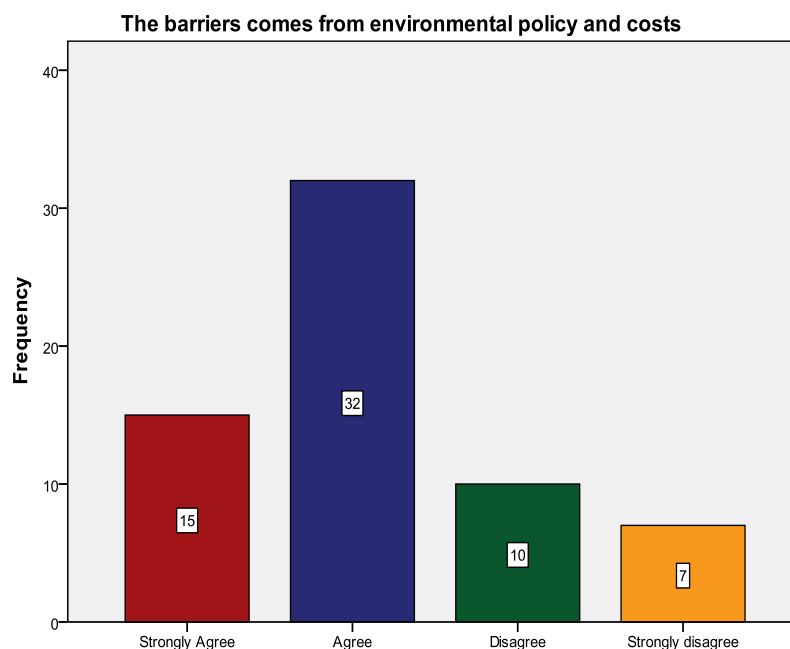
Figure 4.31: The barriers comes from environmental policy and costs

Table 4.35: Company face with abuse / mistreatment of new markets.

		Frequency	Percent	Cumulative Percent
Valid	Strongly Agree	17	26.6	26.6
	Agree	35	54.7	81.3
	Disagree	7	10.9	92.2
	Strongly disagree	5	7.8	100.0
	Total	64	100.0	

Table 4.35 interpret about result of company face with abuse / mistreatment of new markets. The highest score collected is "agree" (35 respondents at 54.7%). The second highest is "strongly agree" (17 respondents at 26.6%). The third highest score is "disagree" (7 respondents at 10.9%). The lowest score is "strongly disagree" (5 respondents at 7.8%). The mean is 2.00 and standard deviation is 0.836. It will be reflect in figure 4.32.
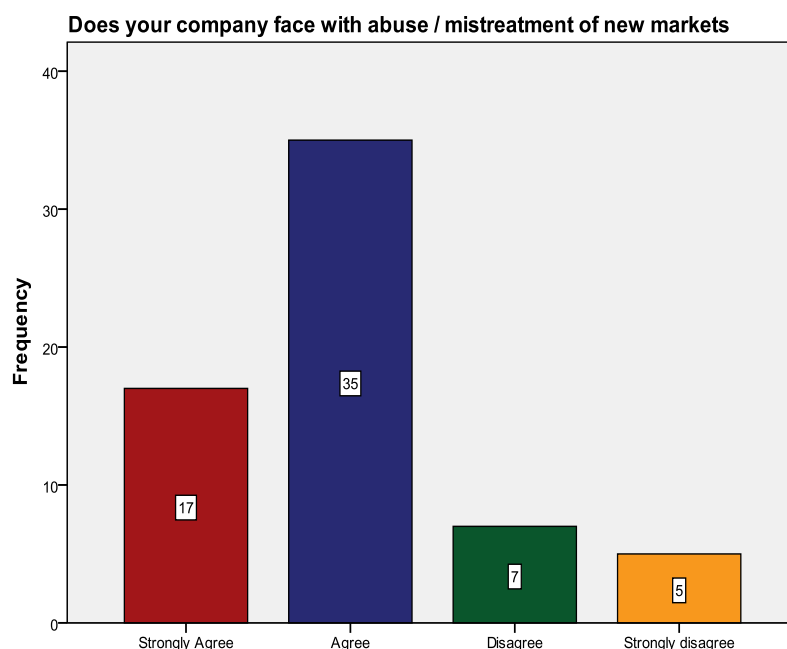
Figure 4.32: Company face with abuse / mistreatment of new markets.

4.6   SUMMARY OF FINDING

4.6.1   Acceptance and obstacles of an innovation towards performance in construction industry

Table 4.36: Summarize of acceptance an innovation in section B

Factors	Mean	Rank
Your organization produce a new product or new methods of production related with innovation	2.48	1
Your company possesses a clearly formulated innovation strategy	2.20	2
The organization possesses a fault-tolerant culture	2.20	2
Your own R&D department can successfully satisfy all (technologies) demands	2.19	3
The dynamic firm culture exists, which promotes creativity	2.14	4
Open innovation is major concern for your company	2.13	5
Knowledge is passed on automatically to new employees in the firm	2.05	6
Your company introducing a new sources of supply for innovation	2.02	7
An open firm, which promotes learning	1.92	8
The firm's managers encourage employees to develop their creativity, away from stereotypes and conventions	1.91	9
Original ideas are very valuable in your organization	1.91	9
Adoption innovation would improve task performance	1.91	9
In your firm, it is very important for employees to have an open mind	1.75	10

Table 4.36 shows the summaries of acceptance an innovation towards performance in construction industry. The rank content 13 follow the highest and lowest ranking. These rank follow Majid & Mccaffer, 1997 table refer appendix c, where it shows your organization produce a new product or new methods of production related

with innovation was the highest rank with mean 2.48. Second highest was your company possesses a clearly formulated innovation strategy; and the organization possesses a fault-tolerant culture with mean 2.20. The third highest was your own R&D department can successfully satisfy all (technologies) demands with mean 2.19. All these three highest ranks were less agree according to to Majid & Mccaffer. For the three lowest are the first was in your firm, it is very important for employees to have an open mind. (1.75). Second was the firm's managers encourage employees to develop their creativity, away from stereotypes and conventions; original ideas are very valuable in your organization; and adoption innovation would improve task performance, (1.91), third was an open firm, which promotes learning (1.92). All these three lowest ranks were less agree according to Majid & Mccaffer. Conclusion based on rank by mean all the contents have same of average index where state as less agree. Finally, between 65 respondents they still not sure about an innovation and not implement an innovation in their company. They cannot accept the innovation fully in their own companies.

Table 4.37 : Summarize of obstacles in section C

| Factors	Mean	Rank
Your company stuck too much in tradition (old style)	2.58	1
Your company avoids taking risk in order to protect current business	2.28	2
Clear guidelines for choosing between buying ready, developing internally, recruiting development services, or developing in partnership with another institution.	2.23	3
Your company possesses the ability (competences) to generate innovations itself	2.20	4
Stress climate due to power dispute can be barrier to innovation	2.19	5
The low level of error tolerance	2.19	5
The barriers comes from environmental policy and costs	2.14	6
Your new products and services are a challenge to existing ideas in the industry	2.13	7
Not have systematic monitoring of external source of information regarding technological trends	2.08	8

Your company has the right strategy to support continuous innovation.	2.05	9
Your company possesses the ability (competences) to acquire innovations	2.02	10
Your company really know the market and your customer needs	2.00	11
Does your company face with abuse / mistreatment of new markets	2.00	11
Your company accepts failures and learns from past experiences	1.94	12

Table 4.36 shows the summaries of obstacles innovation towards performance in project-based industry. The highest rank was your company stuck too much in tradition (old style) with mean 2.58. This rank was fair according to Majid & Mccaffer. The second highest was your company avoids taking risk in order to protect current business with mean 2.28. Third highest was clear guidelines for choosing between buying ready, developing internally, recruiting development services, or developing in partnership with another institution with mean 2.23. All these two highest ranks were less agree according to to Majid & Mccaffer. For the three lowest are the first was your company accepts failures and learns from past experiences (1.94), second were Does your company face with abuse / mistreatment of new markets; and your company really know the market and your customer needs (2.00), and third lowest was your company possesses the ability (competences) to acquire innovations (2.02). All these three lowest ranks were less agree according to Majid & Mccaffer. Conclusion based on rank by mean all the contents had fair and less agree in average index. So the respondents opinions that the company stuck too much in tradition (old style) was the same level, where some respondents gave opinion that an innovation cannot fully accept in their companies because they stuck too much in tradition style (old style) but some companies agree and can accept the innovation come to their company. Finally it's fair. Some agree and some not agree.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1   INTRODUCTION

For this chapter, it will provide an overall summary of the research. During this research was carry out, these were many obstacles was occur. This will be highlighted in limitation paragraph. From chapter 4, it will clarify the result of the acceptance an innovation toward performance in construction industry and identify an obstacle on acceptance an innovation in construction industry. The conclusion and recommendation would be drawn based on view of this study.

5.2   CONCLUSION

In conclusion, for this study is acceptance of an innovation toward performance within construction industry. These research content two sections which section B is to answers the first objective which will determine acceptance innovation toward performance in construction industry. From the findings, the factor is ranked based on mean. For these sections, 33 out 64 companies were agree that an organization produce a new products or new methods of production related with innovation towards company performance. Other than that, for the second high ranking is company possesses a clearly formulated innovation strategy towards company performance and also the organization possesses a fault-tolerant culture. There are three reason for accept innovation in the construction industry, that can cause the performance of that industry not growth very well or update with the new technology or innovation that can make

easier things and also the all phase for project being not to complex. The objective is answer by ranking the mean of the section B and an acceptance of an innovation toward performance in construction industry has be identify.

For section C, the questionnaire was focus on the ranking an obstacle towards acceptance of an innovation in construction industry. There are the top 3 of obstacle acceptance of an innovation and it was calculated and ranking based on the mean. By ranking the obstacle on mean analysis the higher obstacle is company stuck too much in tradition (old style). Second obstacle that influences accept innovation is company avoids taking risk in order to protect current business. Then, the third high obstacle rather than other out of 14 ranking is clear guidelines for choosing between buying ready, developing internally, recruiting development services, or developing in partnership with another institution. The result support or achieve second objective where there have an obstacles on acceptance of an innovation in construction industry. The researcher can conclude that some companies cannot accept the innovation because of the certain obstacles but some companies can accept it.

5.3   LIMITATION

Throughout conducting this research, there are few Hurdles that limit that the researcher faced. Among the obstacles researcher faced, the sample size of my research population is 66 companies grade 7 registered under Construction Industry Development Board of Malaysia (CIDB) at Kuantan, Pahang. The thing that affects mostly when collecting the data is inaccessibility and unapproachability company personnel. The distribution of the questionnaire also took quite a lot of time this is because the respondent does not directly provide feedback to researcher. This causes researcher need the lengthy waiting time to get back the feedback from respondent.

Besides that, the content of the questionnaire seems to be hard to understand for certain respondents. Although the use of wording is simplified enough, but the difference in thought and thinking makes certain respondent did not seems to understand. This will hence lead that particular respondent to answer with dishonest. Other than that, the limitation researcher faced is difficult to obtain validity. This is

because the questions submitted in the questionnaire survey are slightly and it would require too many respondent to achieve validity and if the respondent slightly, this research cannot achieve the validity.

5.4   RECOMMENDATIONS

The researchers need to prepare the recommendation to improve the researchers in further research. Firstly, researchers or young generation need to continue to do this research with the new knowledge or aspect of innovation itself with technologies usage and new style presentation. The researcher better need to send questionnaire by hand because if the questionnaire sent by hand to the respondent, the answer will quickly respond onward. Compared the questionnaire sent using email because that it will take time.

Second, for management practice, they need to apply new innovation that can attract the customers or can cause the project become successful with high impact in term of short duration, but high quality of their products and services. To human capital, they need to create more ideas and knowledge to uplifting the quality human resources to the nation economic development.

Third, for future research, need to know why they cannot accept the innovation in project-based company. Therefore, in this era, all business or project-based company need to use or apply new innovation that can attract the customers or can cause the project become short duration, but high quality of their products.

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APPENDICES

APPENDIX A: QUESTIONNAIRE

Survey Form

ACCEPTANCE OF AN INNOVATION TOWARD PERFORMANCE WITHIN CONSTRUCTION INDUSTRY

PART A: DEMOGRAPHIC DATA

Please tick in the box about your personal information's

Gender	☐ Male ☐ Female	Academic Qualification	☐ Diploma ☐ Degree ☐ Master ☐ PHD ☐ Other……….
Age	☐ 26-35 ☐ 36-45 ☐ 46-55 ☐ 56-65	Work Experience	☐ 1-5 years ☐ 6-10 years ☐ More than 10 years
Race	☐ Malay ☐ Chinese ☐ Indian ☐ Others		

PART B: ACCEPTANCE AN INNOVATION TOWARD PERFORMANCE IN CONSTRUCTION INDUSTRY

For the statement below, please tick only one that indicates your opinion

1	2	3	4
Strongly disagree	**Disagree**	**Agree**	**Strongly agree**

No	Questions	1	2	3	4
1	The dynamic firm culture exists, which promotes creativity	1	2	3	4
2	An open firm, which promotes learning	1	2	3	4
3	Knowledge is passed on automatically to new employees in the firm	1	2	3	4
4	In your firm, it is very important for employees to have an open mind	1	2	3	4
5	The firm's managers encourage employees to develop their creativity, away from stereotypes and conventions	1	2	3	4
6	Original ideas are very valuable in your organization	1	2	3	4
7	Your company possesses a clearly formulated innovation strategy to your company performance	1	2	3	4
8	The organization possesses a fault-tolerant culture	1	2	3	4
9	Your own R&D department can successfully satisfy all (technologies) demands	1	2	3	4
10	Open innovation is major concern for your company	1	2	3	4
11	Adoption innovation would improve task performance	1	2	3	4
12	Your company introducing a new sources of supply for innovation	1	2	3	4
13	Your organization produce a new product or new methods of production related with innovation towards company performance	1	2	3	4

PART C: OBSTACLE ON ACCEPTANCE INNOVATION IN CONSTRUCTION INDUSTRY

For the statement below, please tick only one that indicates your opinion

1	2	3	4
Strongly disagree	**Disagree**	**Agree**	**Strongly agree**

No	Questions	1	2	3	4
1	Stress climate due to power dispute can be barrier to innovation	1	2	3	4
2	The low level of error tolerance	1	2	3	4
3	Not have systematic monitoring of external source of information regarding technological trends	1	2	3	4
4	Your new products and services are a challenge to existing ideas in the industry	1	2	3	4
5	Your company possesses the ability (competences) to generate innovations itself	1	2	3	4
6	Your company possesses the ability (competences) to acquire innovations	1	2	3	4
7	Your company really know the market and your customer needs	1	2	3	4
8	Your company stuck too much in tradition (old style)	1	2	3	4
9	Your company avoids taking risk in order to protect current business.	1	2	3	4
10	Your company accepts failures and learns from past experiences.	1	2	3	4
11	Your company has the right strategy to support continuous innovation.	1	2	3	4
12	Clear guidelines for choosing between buying ready, developing internally, recruiting development services, or developing in partnership with another institution.	1	2	3	4
13	The barriers comes from environmental policy and costs	1	2	3	4
14	Does your company face with abuse / mistreatment of new markets	1	2	3	4

APPENDIX B: GRANT CHART

GANTT CHART

The progression of research: <u>Final Year Project 1</u>

ACTIVITY	DURATION	START	FINISH	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FINAL YEAR PROJECT 1																	
Identify research issues	1 wk	Mon 23/2/2015	Wed 25/2/2015	■													
Deciding the topic and research objectives	1 wk	Thu 26/2/2015	Mon 2/3/2015		■												
Approval of topic and research objectives	1 wk	Tue 3/3/2015	Sun 15/3/2015			■											
Preparation of project research proposal	1 wk	Wed 4/3/2015	Sun 15/3/2015			■											
Operational definition	1 wk	Thu 5/3/2015	Sun 15/3/2015			■											
Chapter 1																	
Introduction	2 wks	Mon 9/4/2015	Sun 22/4/2015			■	■										
Background of study	2 wks	Mon 16/4/2015	Sun 29/4/2015				■	■									
Problem statement	2 wks	Mon 16/4/2016	Sun 29/4/2016				■	■									
Research questions	2 wks	Mon 23/4/2015	Sun 5/4/2015					■	■								
Research objectives	2 wks	Mon 23/4/2015	Sun 5/4/2016					■	■								
Scope of the research	1 wk	Mon 30/3/2015	Sun 5/4/2017						■								
Significant of study	1 wk	Mon 30/3/2016	Sun 5/4/2018						■								
Chapter 2																	
Literature Review	14 wks	Mon 23/2/2015	Sun 7/6/2015	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Chapter 3																	
Research methodology	4 wks	Wed 1/4/2015	Wed 22/4/2015						■	■	■	■					
Design questionnaire	4 wks	Wed 15/4/2015	Sun 26/4/2015							■	■	■	■				
Submit draft proposal	2 wks	Mon 27/4/2015	Fri 8/5/2015											■	■		
Presentation	1 wk	Wed 13/5/2015	Wed 13/5/2015													■	

GANTT CHART

The progression of research: Final Year Project 2

FINAL YEAR PROJECT 2			
Distribute questionnaires	2 wks	Mon 7/9/2015	Sun 20/9/2015
Collect data	1 wk	Mon 21/9/2015	Sun 27/9/2015
Chapter 4			
Introduction	1 wk	Mon 28/9/2015	Sun 4/10/2015
Demographic analysis	2 wks	Mon 5/10/2015	Tue 13/10/2015
Normality test	1 wk	Wed 14/10/2015	Sat 17/10/2015
Descriptive analysis	3 wks	Sun 18/10/2015	Sun 1/11/2015
Scale analysis of acceptance innovation and obstacles	2 wks	Mon 8/11/2015	Tue 17/11/2015
Summary of findings	2 wks	Wed 18/11/2015	Thu 26/11/2015
Chapter 5			
Introduction	1 wk	Fri 27/11/2015	Sun 29/11/2015
Conclusion	1 wk	Mon 30/11/2015	Wed 2/12/2015
Limitation	1 wk	Thu 3/12/2015	Fri 4/12/2015
Recommendation	1 wk	Sat 5/12/2015	Sun 6/12/2015
Correcting and editing of full report	1 wk	Mon 7/12/2015	Tue 8/12/2015
Preparing poster and oral presentation	1 wk	Tue 8/12/2015	Wed 9/12/2015
Presentation	1 wk	Thu 10/12/2015	Thu 10/12/2015

APPENDIX C: SCALE FOR AVERAGE INDEX

Rating Scale for Average Index

Rating Scale (5-Pts Scale)	Average Index Range	Attributes Of Indexes	
		Average Index (Muhd Zaimi Abd. Majid & Mccaffer, 1997)	
1	$0.00 \leq Ai < 1.50$	Very Not Agree	Least Frequent/Not Ever
2	$1.50 \leq Ai < 2.50$	Less Agree	Less Frequent/Ever
3	$2.50 \leq Ai < 3.50$	Fair	Fair/Sometimes
4	$3.50 \leq Ai < 4.50$	Agree	Frequent
5	$4.50 \leq Ai < 5.00$	Very Agree	Very Frequent