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**DYNAMIC SUPPLY CHAIN CAPABILITIES:
A CASE OF OIL AND GAS INDUSTRY IN MALAYSIA**



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**DOCTOR OF PHILOSOPHY
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**DYNAMIC SUPPLY CHAIN CAPABILITIES:
A CASE OF OIL AND GAS INDUSTRY IN MALAYSIA**



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**Thesis Submitted to
School of Technology Management and Logistics,
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in Fulfilment of the Requirement for the Degree of Doctor of Philosophy**



Kolej Perniagaan
(College of Business)
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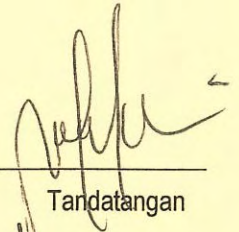
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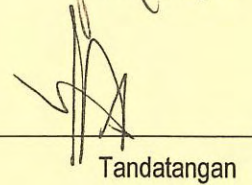
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ABSTRACT

Supply chain (SC) is a dynamic process that entails continuous flow of information, materials and funds across multiple functional areas, within and between chain members to meet customer's requirements and to maximize profit. However, organizations may encounter problems related to the dynamic process in SC. Oil and gas (O&G) industry is one of the SC entities which require dynamic processes of capabilities due to high degree of uncertainties. Motivated by the complexity and uncertainty of SC, this study intends to understand the concept of dynamic supply chain capabilities in the organizations specifically in Malaysia environment. The study focuses on the firm's capabilities dimensions as well as the influence of the environmental uncertainties on dynamic supply chain capabilities dimensions of the O&G industry. Previous literatures related to supply chain management, and dynamic capabilities were reviewed to support the study. The researcher analyzed multiple cases from the perspectives of the O&G players in Malaysia via qualitative research methodology. Nine managers of services contractors and one manager of production sharing contractor were selected for interviews to share experiences on the needs for dynamic supply chain capabilities. Results showed that value chain coordination, client, supplier and operations are important in the SC orientation; knowledge accessing and coevolving are vital to the dynamic supply chain capabilities; finally, ethics and professional values, and technology driven are important in the environmental uncertainties. Such findings are necessary for emergent framework of dynamic supply chain capabilities on how O&G industry can benefit. Hence, the main contributions of the research findings are: (i) contribution to the body of knowledge in developing better understanding on the dimensions of dynamic supply chain capabilities towards strategies; and (ii) contribution to the managerial in understanding and capturing emergent dimensions of dynamic supply chain capabilities by providing a basis for future analysis.

Keywords: dynamic supply chain, dynamic capabilities, supply chain management, oil and gas industry, qualitative research

ABSTRAK

Rantiaian bekalan (SC) ialah satu proses dinamik yang melibatkan aliran maklumat berterusan, bahan dan dana merentasi pelbagai bahagian yang berfungsi di dalam dan di antara pemegang taruh serta rakan-rakan kongsi untuk memenuhi keperluan pelanggan bagi memaksimumkan keuntungan. Bagaimanapun, organisasi berkemungkinan menghadapi masalah berkaitan dengan proses dinamik di dalam rantiaian bekalan. Industri minyak dan gas (O&G) adalah salah satu entiti rantiaian bekalan dan memerlukan proses keupayaan dinamik disebabkan tahap ketidakpastian yang tinggi. Didorong oleh kerumitan dan ketidakpastian rantiaian bekalan bagi industri minyak dan gas, penyelidikan ini bertujuan untuk memahami konsep keupayaan rantiaian bekalan dinamik dalam organisasi bagi persekitaran Malaysia. Penyelidikan ini memfokuskan kepada dimensi keupayaan firma serta pengaruh ketidakpastian alam sekitar kepada dimensi keupayaan rantiaian bekalan dinamik bagi industri minyak dan gas. Ulasan karya yang terdahulu berkaitan dengan pengurusan rantiaian bekalan dan keupayaan dinamik dikaji semula bagi menyokong penyelidikan ini. Penyelidik menganalisa beberapa kes dari perspektif syarikat kontraktor perkhidmatan minyak dan gas di Malaysia melalui kaedah penyelidikan kualitatif. Sembilan orang pengurus kontraktor perkhidmatan dan seorang pengurus kontraktor perkongsian pengeluaran ditemubual bagi berkongsi pengalaman mengenai keperluan keupayaan rantiaian bekalan dinamik. Hasil penyelidikan menunjukkan bahawa nilai koordinasi rantiaian, pelanggan, pembekal dan operasi penting dalam orientasi rantiaian bekalan; pengaksesan pengetahuan dan perkembangan bersama organisasi amat penting kepada keupayaan rantiaian bekalan dinamik; akhirnya, etika dan nilai-nilai professional, dipacu oleh teknologi adalah penting dalam ketidakpastian alam sekitar. Hasil penemuan yang dikenalpasti adalah perlu bagi menghasilkan rangka kerja baru bagi keupayaan rantiaian bekalan dinamik tentang bagaimana industri minyak dan gas boleh memanfaatkannya. Sehubungan dengan itu, sumbangan hasil penyelidikan ini adalah: (i) kepada ilmu pengetahuan dalam membina pemahaman yang lebih baik bagi dimensi keupayaan bekalan dinamik terhadap strategi; dan (ii) sumbangan kepada pengurusan dalam memahami dan menguasai dimensi baru keupayaan rantiaian bekalan dinamik dengan menyediakan asas kepada analisa di masa depan.

Kata kunci: rantiaian bekalan dinamik, keupayaan dinamik, pengurusan rantiaian bekalan, industri minyak dan gas, penyelidikan kualitatif

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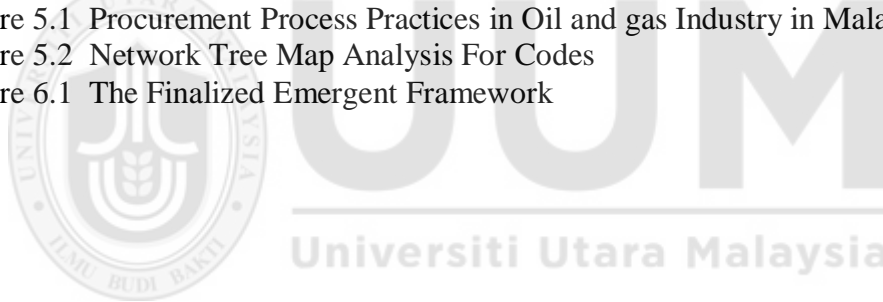
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LIST OF ABBREVIATIONS

3PL	-	Third Party Logistics
CDU	-	Crude Distillation Unit
COGEN	-	Power / Cogeneration
CUF	-	Central Utility Facilities
E&P	-	Exploration and Production
EPCC	-	Engineering Procurement Construction & Commissioning
EPCIC	-	Engineering, Procurement, Construction, Installation, Hook-Up And Commissioning
ETP	-	Economic Transformation Program
FPSO	-	Floating Production, Storage And Offloading Units
FSO	-	Floating Storage And Offloading Units
FSU	-	Floating Storage Units
GDP	-	Gross Domestic Product
GNI	-	Gross National Income
HSSE	-	Health, Safety and Environment
IRM	-	Inspection, Repair and Maintenance
IT	-	Information Technology
LNG	-	Liquid And Gas
MODU	-	Mobile Offshore Drilling Unit
MOPU	-	Mobile Offshore Production Unit
NKEA	-	National Key Economic Areas
O&G	-	Oil And Gas
OIC	-	Offshore Installation Contractor
OPI	-	Offshore Pipeline Installation
OSI	-	Offshore Structural Installation
QHSE	-	Quality, Health, Safety and Environment
R&D	-	Research and Development
RBV	-	Resource-Based View
ROI	-	Return On Investment
SCM	-	Supply Chain Management
ULCC	-	Ultra Large Crude Carrier
VLCC	-	Very Large Crude Carriers

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Supply chain management (SCM) has acknowledged a great deal of interest by researchers and practitioners. SCM has become universal way across industries since it addresses seller-buyer partnerships, shared planning, continuing strategic coalition, control of inventory cross-organizational, information sharing and logistics management. Effective SCM will lead to provide the necessary level of customer service to a specific segment by reduction of the entire amount of resources and enhancing customer services through improved product availability and reduced order cycle time (Banomyong & Supatn, 2011; Crainic & Laporte, 2016; Stevens & Johnson, 2016; Wang, Gunasekaran, Ngai, & Papadopoulos, 2016).

SCM adopts systems perspective across firms and functions as an absolute system by processes of coordination. Thus, the key to the creation of supply chain value are possible, made through collaboration among participating firms. Companies may engage in information exchange and structural collaboration. Information exchange may include the inventory supervision, forecasting techniques and delivery. Meanwhile, the structural collaboration may include vendor-controlled inventory, outsourcing, co-locating factories and just-in-time (Co & Barro, 2009). Whilst, Iyer (2011b) identifies demand chain collaboration can be referred to the lifelong affairs with partners in downstream supply chain to create end-customer value. It is characterized through the information exchange, operations, cross firm forecasting and shared planning with downstream partners. Meanwhile, Raja Mazlan and Ali

(2006a) highlighted that outsourcing also opens the door to practicing SCM as tools and/or plays a beneficial role to make SCM more effective and efficient.

In SCM in order to serve clients, upstream company is directly to suppliers and downstream to distributors. Generally, labor, capital, information, technology, materials, financial assets and other resources through the supply chain. Given that the goal of a company is to capitalize on profits, the companies must reduce costs and exploit benefits along the supply chain (Chima, 2007a). Physical logistics more dependent on information technologies, and these technologies enables of further cooperative arrangements. Power (2005) states that firms faced an inter-dependence and shared fortune when the management of an extended enterprise as a network of processes, relationships and technologies creation. Thus, the environment of supply chain management becomes apparent to participating companies with victorious implementation in the dynamic comprehensive environment of the business world, augmenting with risks, and it greatly affects the processes of the decision-making in business management .

Environmental uncertainties lead to a need for high dependability and flexibility within the the planning and control systems and production systems in the supply chain. Reducing these variability can be achieved by identify the root causes and how they interrelate with each other. Changes in products, technology, competitors and markets are occurring at an increasingly rapid pace (Defee & Fugate, 2010; Iyer, 2011b). Therefore, managers must acquire decisions on quick notice, with high costs, and with lack of information. Hence, a consistent and a flexible system are vitally needed to support the management decision making for their companies whether to be the make-or-break.

Dynamic capabilities refer to the capabilities of higher-level that allow firms to build and reconfigure resources of internal and external to respond or shape rapidly changing business environments. Although, ordinary capabilities are about doing things right, dynamic capabilities are about doing the right things (Teece & Leih, 2016).

According to Jain, Wadhwa and Deshmukh (2009b), a supply chain is a dynamic practice and involves the constant flow of information, materials, and resources across various functional areas both within and between chain associates. Associates in the chain need to cooperate with their business partners in order to meet customer's needs and to maximize their profit. Nonetheless, it is very complicated task in managing the numerous collaborations in a supply chain because there are several firms in the supply chain operates with its own resources and objectives. The interdependence of multistage processes also require decision making across organizational boundaries and concurrent operations, different tasks and functional areas in order to deal with variabilities and problems. The intentional move of focus for high quality service, quick response, and mass customization will not be achievable without more multifaceted cooperation and dynamic structure of supply chains.

In previous study, a dynamic collaboration capability has been identified by Teece, Pisano and Shuen (1997) to how firms respond rapidly to a changing competitive environment. Dynamic collaborations help a company access, influence and change supply chain resources. The firm's processes that uses resources, such as processes to reconfigure, release, gain, and integrate resources to match and even can form changes in market. A dynamic practice also involves the constant re-evaluation

and concurrent acquisition of organizational structures, technologies, and partners. Firms may face the similar problems, but they may have diverse possible solutions and attentiveness due to differences in their stakeholders commitment. The more open and flexible firms to the issues, there is more likely for firm to explore, create, and invest in the dynamic capabilities (Hart & Dowell, 2011b; Jain, Wadhwa, & Deshmukh, 2009a). Hence, firms that acquire capability in dynamic collaboration should be able to continue great levels of performance over time.

Petroleum companies also known as Oil and Gas (O&G) companies, have shaped great contributor of the world economy for the most recent decade since petroleum or crude oil has become the main fuel supply. Petroleum companies are large-scale entities that deal with series of crude oil production facilities all the way to refineries and petrochemical factories. Later, to final product markets through all necessary logistics, including carriers, pipelines, and warehouses. With abundance of business activities in markets and products, it is vital to map the network of total supply chain. The intention is to fulfilling customer demands by minimize the storage, transportation and production costs while maintaining market share and maximizing organization's sales revenues (Al-Othman, Lababidi, Alatiqi, & Al-Shayji, 2008; Pitty, Li, Adhitya, Srinivasan, & Karimi, 2008; Shah, Li, & Ierapetritou, 2011a).

The oil and gas industry is obviously a multifaceted in all perspectives (business; personal; internal policy; geopolitical; and health, safety and environmental) that impacts all aspects of one's lives and involve global business. It is vital that one's tends to take for granted until a crisis emerges such as a hurricane destroyed a refinery, a tanker ran stranded, country revised its energy policies or changed political leaders. A distinctive factors that characterizes supply chain systems in oil and gas

organizations is the high level of uncertainty. Uncertainty proclaims through the oil and gas companies network of supply chain from crude availability and quality at the supplier side, to processing capacities and production yields, and to end with demands and market prices (Al-Othman et al., 2008).

Malaysia is expected to have more energy sector diversification by 2020. Thus, energy sector remains very important to the nation development, that creates the nation's competitive advantages. A main drive is not only to strengthen exploration and increase production from local reserves, but also to enlarge strong regional oil field services, and establish stronger presence in the regional midstream logistics and downstream markets. Malaysia has the potential to raise alternative energy sources such as solar, hydro and nuclear to overcome the decline in local production (Performance Management and Delivery Unit, 2010). Petroleum Nasional Berhad (PETRONAS), as Malaysia's national oil and gas company, was given special ownership rights to all oil and gas exploration and production projects in Malaysia. As Malaysia's maturing oil fields, the government is focused on enhancing output from existing fields and new offshore developments of oil and gas, which are expected to increase total production capacity in the near- to mid-term (Energy Information Administration, December 2010). Amongst other major players in Malaysia oil and gas are Shell Malaysia Limited and Esso Malaysia Berhad.

Performance Management and Delivery Unit (2010) reported in the Economic Transformation Handbook that Economic Transformation Programme (ETP) will change Malaysia economy into a sustainable, comprehensive and high income. Twelve National Key Economic Areas (NKEAs) has been identified as the core of the ETP. The twelve NKEAs are: greater Kuala Lumpur/Klang Valley; oil, gas and

energy; wholesale and retail; financial services; electronics and electrical; palm oil; tourism; business services; education; healthcare; agriculture; communications content and infrastructure. The Oil, Gas, and Energy NKEA targeted to RM241 billion by 2020 from RM110 billion in 2009, hence raise a total gross national income (GNI) contribution. This GNI target will require the NKEA to grow at a striving rate of 5 percent per year with additional 52,300 jobs will be created. Major segment of these jobs will be highly-skilled jobs with a projected of 21,000 jobs for competent professionals such as geologists and engineers, with range of RM5,000 to RM10,000 monthly income. Furthermore, oil, gas and energy are anticipated to contribute the largest amount of incremental in GNI besides wholesale and retail, financial services, and palm oil, which projected to contribute 60 percent of the incremental growth among the eleven NKEA sectors.

In addition, the oil, gas, and energy sector also contributes Malaysia's growth about 20 percent of national gross domestic product (GDP). With declining production from a maturing existing base, the nation also need to venture the sector-wide opportunities and provide a policy in sustainable energy. In 2014, value of gross output for the oil and natural gas mining industry showed a raised of 3.4 per cent to register RM119.1 billion compared to RM115.1 billion in 2013. The value of intermediate input recorded RM15.5 billion, a decrease of 7.8 per cent from a year ago. Subsequently, value added expanded by 5.4 per cent to reach RM103.6 billion as compared to RM98.3 billion in 2013. In March 2016, refined petroleum products and crude petroleum contributed RM3.5 billion (5.3%) and RM1.8 billion (2.6%) to Malaysia's total export commodity respectively (Department of Statistics Malaysia, 2016).

Twelve entry point projects (EPP) have been developed across four areas to raise the oil, gas and energy sector's output in addition to meet the over 10-year timeframe energy demand (Performance Management and Delivery Unit, 2010). The four areas are as follows:

1. *Sustaining oil and gas production*

Three EPPs will rise above the estimated decline of 1 to 2 percent in local oil and gas productions by capturing value from mature fields through enhanced oil recovery, using new solutions to develop small fields and increasing the exploration activities.

2. *Enhancing growth in downstream*

Malaysia can capture the cost shaped from increasing international flows of crude oil and refined products by structuring a regional oil-storage hub and rising a regasification terminal for imported liquefied natural gas.

3. *Making Malaysia the number one Asian hub for oil field services*

Malaysia will be a focus for multinational corporations; combining domestic fabricators to increase their likelihood of winning major contracts and cooperate with each other to establish a presence in the construction and installation portion of the value chain.

4. *Building a sustainable energy platform for growth*

Malaysia will expand its energy sources beyond gas to fuel growth and credit the obligation to lower carbon emissions. Other sources such as

solar and nuclear power will be developed, while at the same time energy efficiency measures will also be undertaken.

Generally Shah, Li, and Ierapetritou (2011b) established that, a typical oil and gas supply chain comprised of an exploration phase at the wellhead; crude procurement and storage logistics; transportation to refineries; refinery operations; finally, distribution and transportation of the final products. The upstream activities comprise of exploration, development and production of crude oil or natural gas, whilst, downstream activities comprise of tankers, pipelines, retailers and consumers, are important activities in the oil and gas industry (Mohd Ali, 2009).

Supply chain management in oil and gas industry requires company to integrate decisions with those within its chain of suppliers and customers. This relationship management process involves the company with their suppliers and customers. Communication between suppliers and customers are based on the contract negotiated that dictate all terms and conditions which everyone is required to comply. A company can develop long-term strategic relationships with suppliers and in most cases there are collaborations processes between the oil and gas company with its suppliers (Chima, 2007b). Making improvements over time allows the firm to rise competitive advantages in the marketplace.

The purpose of this study is to understand the dimensions of dynamic supply chain capabilities in the organizations specifically operating in Malaysia oil and gas industry. The study focuses on the firm's capabilities dimensions as well as the influence of the environmental uncertainty on dynamic supply chain capabilities dimensions of the oil and gas industry. Oil and gas industry cover a huge range in a supply chain continuum, from strategic to tactical then operational level and diverse

roles in the supply chain system (Pitty et al., 2008; Shah et al., 2011b). Therefore, this study is to understand the dimensions of dynamic supply chain capabilities in the oil and gas industry. The dynamic supply chain capabilities dimensions discussed in this study are the firm's capabilities dimensions and are restricted by the environmental uncertainty in the dynamic supply chain of oil and gas industry.

For the purposes of this study, dynamic supply chain is defined as a set of three or more entities directly involved in the upstream and downstream flows of information, services, and products, from a source to a customer in the oil and gas industry. Dynamism, results in improved coordination costs due to costs for company selection, contract negotiation and specification, and increased monitoring. Information technology support and/or enable these activities to influence the dynamic selections and to include many companies through the chain (Kumar & Christiaanse, 1999).

This study utilized four theories namely Industrial or system dynamic, resource based view, dynamic capabilities theory and organizational learning theory. Collaboration between service contractors and oil and gas players is a complex interaction between two entities. Convergence of the mentioned theories are necessary. Industrial dynamic theory forms the fundamental part of the study in assisting the researcher to conceptualize the dimensions of dynamic supply chain capabilities.

1.2 Problem Statement

Supply chain partners need to have relationships and capabilities that require to have each other trust and to have integrity in their business conduct. Without the capabilities and ability to have supply-chain partners trust, any strategy decisions would be very hard. Relationship management is not only about suppliers meeting

customers requirements, but also a mutual agreement which suppliers may benefit. Instead of focusing on negotiating the optimal situations for contracts, suppliers may need to demonstrate capabilities to gain trust of customers (Chima, 2007a).

Players in the oil and gas industry not taken seriously on supply chain since most of their focus on the advancement of technical and the major aims for quick exploration and greater volume of oil and gas production. Mohammad (2008) specified that supply chain in oil and gas was initially well-thought-out as a “soft issue” in the industry until major players realized that 80% of oil and gas operating cost were spent on the supply chain system. They also comprehended that they can succeed or failed the project if less consideration on the supply chain system or procurement was not taken. This is serious especially during exploration and production phase when the business environment was very demanding.

PETRONAS, as the main player in the industry, refers the total production of crude oil comprised of the production and condensate of crude oil, whereas, the total production of natural gas comprised of associated and non-associated natural gas. The crude oil and natural gas production performance for the period 2000 to 2010 is shown as in Figure 1.1.

Production of crude oil pointed to 279 million barrels in 2004 and dropped to 257 (-8.0%) and 243 (-5.2%) million barrels in 2005 and 2006 respectively. Nevertheless, in 2007 and 2008, production of crude oil improved by 2.4 and 1.1 per cent respectively. In 2009, it decreased by 4.8 per cent from 252 million barrels in 2008. In 2010, it continued to decline by 2.9 per cent to 233 million barrels as compared to the previous year (Department of Statistics Malaysia, 2011).

On the other hand, production of natural gas shows a positive upward trend and peaked in 2008. However, in 2009 it decreased by 1.7 per cent and later rose by 1.9 per cent in 2010 to witness a production of 2,159 million standard cubic feet (MMSCF) (Department of Statistics Malaysia, 2011).

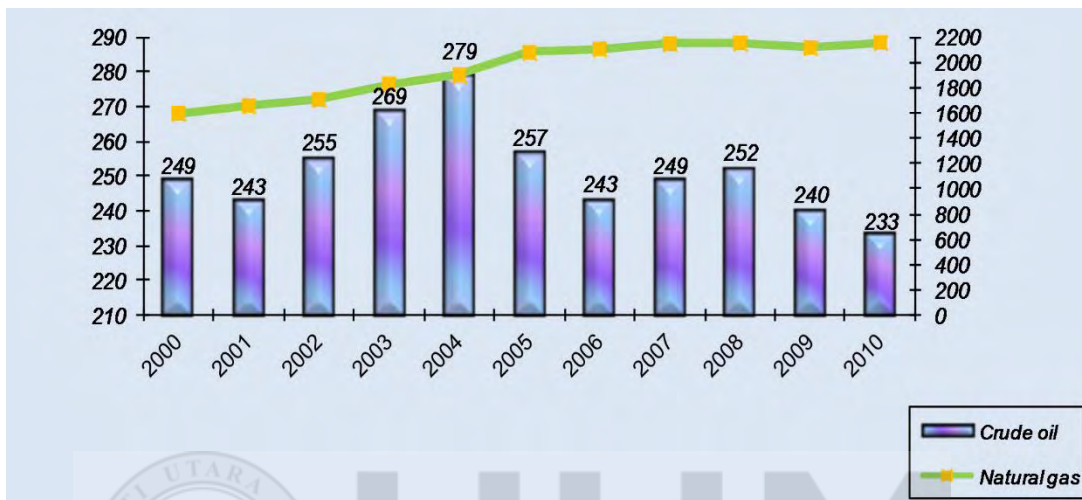


Figure 1.1
Production of crude oil and natural gas
 Source: Department Statistic of Malaysia, 2011.

Furthermore, oil and gas industry can be discovered in different perspectives; the business perspective; personal perspective; internal policy perspective; geopolitical perspective; and health, safety and environmental (HSE) perspective (Petroleum Online, 2011).

There was lack of articles published on dynamic supply chain system specifically in oil and gas industry. Numerous articles found on supply chain in journals articles or other publications have done research on the dynamic supply chains referring to the manufacturing, retailing and incorporated modeling methodology in deliberating the decision (Fawcett, Wallin, Allred, Fawcett, & Magnan, 2011; Henry & Barro, 2009; Jun-jun, Yun, & Xia, 2010a; Wang, Wang, & Liu, 2007).

Based on research conducted in Malaysia, several research focused on the supply chain issues such as: multi cultural complexity and value changes (Mohammad, 2008); collaborative supply chain (Udin, Mohtar, & Othman, 2008); outsourcing (Raja Mazlan & Ali, 2006b) environmental control and sustainability (Mohd Ali, 2009). Even though many new research done on breakthrough in exploration and production technology, there has been insufficient debate in dynamic supply chain capabilities. Many ideas incorporated those in diverse sectors or industry rather than seeing the need of the oil and gas industry.

Absence of definition or dimensions of dynamic capabilities, lead the researcher to select the particular topic for the study. Besides, based on the lack of empirical evidence on existing studies of dynamic capabilities, therefore this makes a case for the need of study on dynamic supply chain capabilities within the contexts of oil and gas industry in Malaysia environment.

This study made focus on the business system perspectives and in depth analysis on dimensions of firm's capabilities and dimensions of dynamic capabilities using data made available from literatures and responds from players within the industry. Focal company such as the production sharing contractor, the upstream service's contractors involves in the upstream activities such as exploration, development and production of crude oil or natural gas, and the downstream service's contractors companies that involves in the downstream activities such as tankers, pipelines, retailers and consumers, identified are the significant activities in the supply chain of oil and gas industry.

The competitive environment in which the firm is embedded can be assessed by identifying the dynamic capability needs (Winter, 2003). For a relatively stable

environment firm, the investment in the creation and maintenance of a capability to change is unlikely to be beneficial, since the cost of maintenance compensates the benefits of change. Nevertheless, in a rapidly fluctuating environment, when adjusting capabilities is beneficial, the investment and maintenance of the dynamic capability may well be valuable. One of Winter's divergence is that external forces affect firms' decisions to embark on dynamic capabilities. Firms in dynamic and complex environments are more likely to challenge and develop dynamic capabilities. Since the capabilities are reliant on the firms' existing resources, structures, and strategies, hence two firms who have similar external environments can develop similar, but not identical capabilities (Aragón-Correa & Sharma, 2003; Eisenhardt & Martin, 2000; Hart & Dowell, 2011a).

1.3 Research Questions

- i) What is the meaning of firm's capabilities dimensions in the context of oil and gas industry in Malaysia?
- ii) What are the dimensions of dynamic supply chain capabilities, as defined in the context of strategic resources in Malaysia?
- iii) What is the relation between firm's capabilities and dynamic supply chain capabilities in oil and gas industry in Malaysia?
- iv) How is an environmental uncertainties factor influence dynamic supply chain capabilities in oil and gas industry in Malaysia?

1.4 Research Objectives

The research general objective is to understand the dimensions of dynamic supply chain capabilities in the organizations specifically operating in oil and gas industry in Malaysia environment. The study focuses on the firm's capabilities dimensions as well as the influence of the environmental uncertainty on dynamic supply chain capabilities dimensions of the oil and gas industry.

The research specific objectives are as follows:

- i) To identify what is firm's capabilities dimensions in the context of oil and gas industry in Malaysia.
- ii) To identify what are dimensions of the dynamic supply chain capabilities, as defined in the context of strategic resources in Malaysia.
- iii) To identify is there any relation between firm's capabilities and dynamic supply chain capabilities in oil and gas industry in Malaysia.
- iv) To explore how environmental uncertainty factor influence dynamic supply chain capabilities in oil and gas industry in Malaysia.

1.5 Significance of the Study

This study contributes to the knowledge on dynamic supply chain of oil and gas industry as it addressed dynamic supply chain capabilities using the dimensions of firm's capabilities. The dimensions of firm's capabilities are supply chain orientation and learning orientation. Meanwhile, the environmental uncertainties are identified as

a control to the dynamic supply chain capabilities of the industry. The contribution of the study comprises theoretical and practical perspectives.

1.5.1 Theoretical Contributions

From the theoretical perspectives, this study utilized industrial system, resource-based view, dynamic capabilities, and organizational learning theory. These theories deliberated for competitive advantage the importance of materials and information as inimitable resources in supply chain management. This research represented an exploratory study on dynamic supply chain capabilities dimensions of oil and gas industry in Malaysia. Additionally, this research provided information to advance understanding on dynamic supply chain capabilities dimensions towards strategies and decision made in the firm's capabilities. The specific contributions of the study to the extension of knowledge by identifying the dimensions of firm's capabilities and dynamic supply chain capabilities dimensions in knowledge accessing and co-evolving among the partners of the oil and gas supply chain.

1.5.2 Practical Contributions

From the managerial perspectives, this study benefited in many ways. Through system perspective, this research developed an industry relevant approaches to understand and to obtain dimensions of dynamic supply chain capabilities by providing as foundation for consequent analysis. This study is relevant to the oil and gas industry strategists and communities in developing decision and operating the business in the oil and gas supply chain. Results from this study projected to show the achievement of dynamic supply chain capabilities in oil and gas industry and

reiterate the companies in the industry to understand the development and upcoming actions that could expand the oil and gas supply chain management competitiveness in Malaysia.

1.6 Scope and Limitations of the Study

This study explore on dimensions of dynamic supply chain capabilities of oil and gas industry only, thus different organizations and industry context operating in Malaysia cannot be made generalization. Generalization in qualitative research served as an inductive reasoning process, thus, to claim that what is the case in one place or time, will be so elsewhere or in another time (Payne & Williams, 2005).

This study assumption identified that major players in oil and gas industry are doing the similar practices in their supply chain management. The product is exactly alike with very narrow product differentiation for all competing firms during the exploration and production phases. Thus, exploration and production companies can only differentiate based upon the ability to economically discover and produced oil and gas more efficiently than their competitors production. Although exploration and production companies are unique, differentiating factors can be beyond the ability to adapt a supply chain management programs.

The research scope for this study is to understand the dimensions of dynamic supply chain capabilities in the oil and gas contractors operating in Malaysia. These contractors providing services over the oil and gas supply chain which comprises of upstream and downstream activities. This study focuses on the firm's capabilities dimensions as well as the influence of the environmental uncertainty on dynamic supply chain capabilities dimensions of the oil and gas industry in Malaysia.

1.7 Organization of the Thesis

The study is organized into six chapters:

Chapter 1 describes the background of the study, problem statement, research questions, and objectives, as well as significant, scope, and limitations of the study.

Chapter 2 discusses the review of supply chain management, dynamic supply chain capabilities, firm's capabilities, and environmental uncertainty. In addition, it also describes the oil and gas industry development in Malaysia.

Chapter 3 describes the related underpinning theories that lead to the understanding of the overall picture of the study. The theories includes industrial dynamics, resource-based view, dynamic capabilities and organizational learning. Besides, the evolving conceptual framework of dynamic supply chain capabilities introduces as a guide for the study.

Chapter 4 explains the methodology of the study. It justifies the research paradigm of the study and the methodology. Additionally, it clarifies the study design, criteria for case selection and number of cases, data collection, and analysis procedures, limitation of the study and its overcoming strategies, and ethical aspect that govern the researcher's action.

Chapter 5 highlights the findings of the study that based on the research questions. It also include excerpts and verbatims from the respondents related to the research questions.

Chapter 6 discusses the conclusion of the study. The references and appendix appear at the end of the chapter.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

A supply chain involve through upstream and downstream linkages in the organizations network. The form of products and services delivered to the ultimate consumer through the different processes and activities that produce value (Christopher, 2005). Hence, a supply chain comprises of many firms, both upstream (i.e., supply) and downstream (i.e., distribution), and the final consumer. Since the present business environment is becoming uncertain, complex and unpredictable, thus, more competition rising. Increased competition means that companies face the challenges of being more responsive to customers while cutting costs of operations. As complexity and competition rising, supply chain management (SCM) has emerged as significant issue for businesses. The challenge of SCM is to identify and execute strategies that maximizing flexibility while minimizing cost in an increasingly complex and competitive market (Mentzer *et al.*, 2001; Wadhwa, Saxena, & Chan, 2008).

The oil and gas industry can be considered as a distinctive supply chain. Management of oil and gas supply chain is a complex task due to the large size of the physical supply network dispersed over vast geography, complex refinery production operations, and crucial uncertainties involved. Shah *et al.* (2011a) stated that uncertainties happen in realistic decision making processes and has huge impact on the activities of refinery planning. Three major uncertainties need to be measured in refinery production planning include: products market demand; crude oil prices and

the products saleable; and crude oil from chemical reactions production yields in the primary crude distillation unit.

Furthermore, Mentzer, *et al.* (2001) identified supply chain complexity into three categories: a direct supply chain, an extended supply chain, and an ultimate supply chain. A direct supply chain comprises of a company, a supplier, and a customer in the upstream and/or downstream flows of services, products, finances, and/or information as in Figure 2.1. Whilst, an extended supply chain includes suppliers of the direct supplier and customers of the direct customer, involved in the upstream and/or downstream flows of services, products, finances, and /or information as in Figure 2.2.

Finally, an ultimate supply chain includes all organizations involved in the upstream and downstream flows of services, products, finances, and information from the ultimate supplier to the ultimate customer as in Figure 2.3.

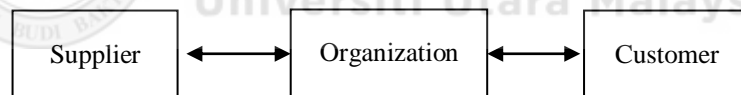


Figure 2.1
Direct Supply Chain
 Source: Mentzer et al. (2001)

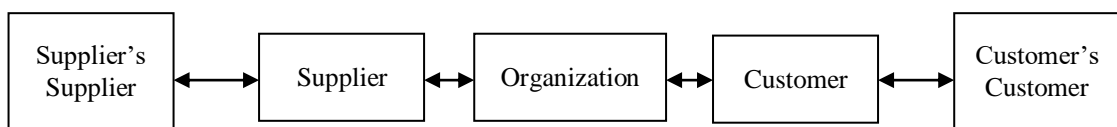


Figure 2.2
Extended Supply Chain
 Source: Mentzer et al. (2001)

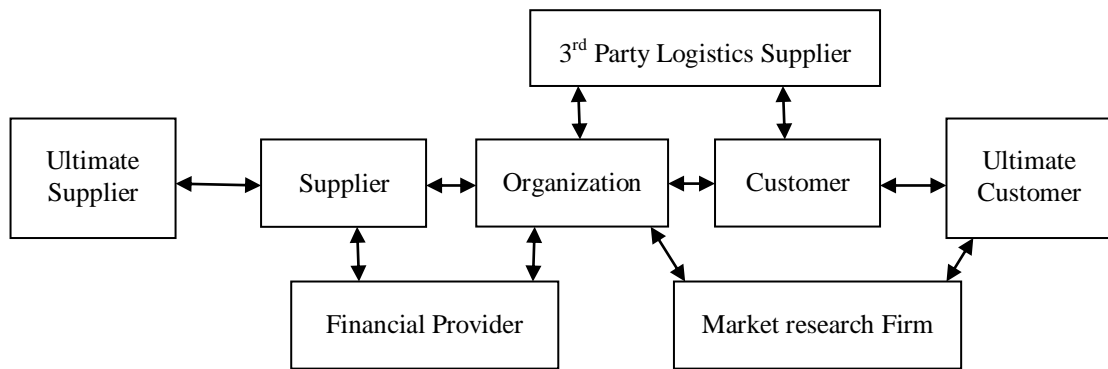


Figure 2.3
Ultimate Supply Chain
 Source: Mentzer et al. (2001)

Further, explanation on the complexity of oil and gas supply chain, and how each entity interacts with other are discussed details in the following section.

2.2 Supply Chain Management

Supply chain management (SCM) field is expanding the importance decision over the last few decades and indicating that the field will continue to grow in terms of research and for practitioners. SCM benefits required necessary conditions to achieve these benefits, such as cross-functionality process management, process orientation, silos breaking down, customer satisfaction focused, and information sharing been discussed for years. However, SCM also has many challenging problems due to the nature of the industry such as specialization of work and the fragmentation of the overall process among supply chain members (Othman & Rahman, 2010); increasing reliance on suppliers performance (Tan, Kannan, Handfield, & Ghosh, 1999); and dynamic changes of suppliers (Jun-jun, Yun, & Xia, 2010b). To compete successfully in the global market economy, firms gradually find themselves dependent on having effective supply chains (Lambert, 2008). As a result, performance can no longer be determined exclusively by the decisions and actions that occur within a firm. That is

due to in competitive global environment, the execution of members in the supply chain contributes to the overall results from the chain (Kannan & Tan, 2005; Naslund & Williamson, 2010).

Moreover, although many scholars agree that SCM embraces certain concepts, such as collaboration and integration or members cooperation, these concepts are still poorly defined with various meanings to both researchers and practitioners. Since the concepts are important to the expansion of SCM, supply chain needs to be further discovered and well-defined. Likewise, other concepts such as supply chain sustainability, for example, will possibly be more important in the future. Globalization will have significant impact on many organizations and thus will have to adapt to the global supply chain conditions. Indicator such as information technology and information systems also are increasingly important (Naslund & Williamson, 2010).

The definition of “supply chain” seems to be shared more across authors than the definition of “supply chain management” (The APICS Dictionary, 2010; La Londe & Masters, 1994; Lambert, Cooper, & Pagh, 1998; Mentzer et al., 2001). Definitions of supply chain management includes as follows in Table 2.1.

Table 2.1
Supply Chain Management Definition

Authors (Year)	Definitions
The APICS Dictionary (2010)	the design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand, and measuring performance globally.
Mentzer, Dewitt, Keebler, Min, Nix, Smith, and Zacharia (2001)	the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole

Table 2.1 (Continued)

Authors (Year)	Definitions
Monczka, Petersen, Handfield and Ragatz (1998)	SCM requires traditionally separate materials functions to report to an executive responsible for coordinating the entire materials process, and also requires joint relationships with suppliers across multiple tiers. SCM is a concept, "whose primary objective is to integrate and manage the sourcing, flow, and control of materials using a total systems perspective across multiple functions and multiple tiers of suppliers"
Cooper, Lambert, and Pagh (1997b)	Supply chain management is "... an integrative philosophy to manage the total flow of a distribution channel from supplier to the ultimate user."
La Londe and Masters (1994)	Supply chain strategy includes: "... two or more firms in a supply chain entering into a long-term agreement; ... the development of trust and commitment to the relationship; ... The integration of logistics activities involving the sharing of demand and sales data; ... the potential for a shift in the locus of control of the logistics process."
Stevens (1989)	"The objective of managing the supply chain is to synchronize the requirements of the customer with the flow of materials from suppliers in order to affect a balance between what are often seen as conflicting goals of high customer service, low inventory management, and low unit cost"
Jones and Riley (1985)	Supply chain management deals with the total flow of materials from suppliers through end users."

Source: Author's Compilation

2.3 Dynamic Supply Chain

The dynamism level depends on the choice of partners in the chain. Relatively established partners in the chain are known as static chains. However, partners in a completely dynamic chain can vary from one market opportunity to another. Dynamism, consequences in increased coordination costs due to costs for suppliers selection, contract negotiation and specification, and increased monitoring. Information technology can influence the dynamic selection and inclusion of various suppliers in the chain (Kumar & Christiaanse, 1999). Economic volatility increases has affected the supply chains of companies across industries. The availability and price of key commodities, fluctuations of major currencies, financial markets disturbance, disruptive geopolitical events and of customer channels development on a global basis have contrived to place unprecedented pressure on the way these companies source, manufacture and distribute products. Research by Accenture

(2009) has found that those with well synchronized and dynamic supply chains can use such volatility to their advantage. Companies that want to do so will face seven imperatives, which are describe as follows.

1. Clear value creation algorithm
2. Value delivery system approach
3. Segmented design, adapted to characteristics
4. Optimize global operating model
5. Selective investment of mastery
6. IT focuses on insight and responsiveness
7. Process execution powered by high performance culture

Four of the imperatives focus on strategic fit of the linkage between supply chain vision and strategy and with the corporate vision and strategy. The remaining three imperatives emphasis on execution based on the ability to turn the strategy into business practices that are performed perfectly on a daily basis. Figure 2.4 shows relations among the seven imperatives.

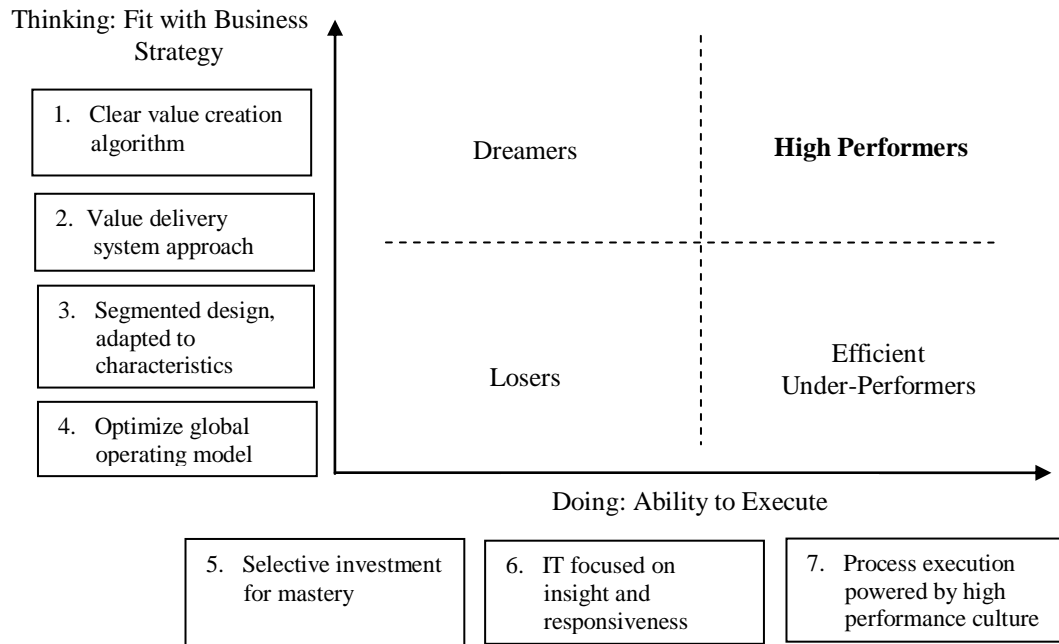


Figure 2.4
The Seven Supply Chain Imperatives Combine to Drive High Performance Dynamic Supply Chain Performance
 Source: Accenture (2009)

Gattorna (2010) identifies the dynamic supply chain as the concepts of supply chain agility and flexibility. The two concepts define people is the most important in delivering the value. One need mindset transformation, from functional specialism, to the belief that the supply chain principles and practices embedded and thinking of value networks. It should become a philosophy that saturates the company owned and contributed by all functions.

Supply chain collaboration translates the partnership from narrower perspective of intra-organizational level to wider perspective of inter-organizational level (Barratt, 2004). This also integrates many people in strategic- tactical- and operational level. Long-term business plan is generally decided at strategic level, short-term planning and forecasting is made at tactical level and day-to-day operations are planned and executed in operational level. (Gunasekaran *et al.*, 2001, 2004).

2.4 Dynamic Supply Chain Capabilities

Dynamic capabilities are routines used to refresh existing, static capabilities, and/or develop new capabilities (Teece, Pisano, & Shuen, 1997). According to Zahra, Sapienza and Davidsson (2006), dynamic capabilities contrast from substantive or static capabilities since they offer ways to update and utilize existing capabilities and/or generate new capabilities. They implies that the concept of competitive advantage must move beyond the static view that presumes sustainability is the goal. Dynamic capabilities view considers constant improvement for short-term advantage to be the only attainable goal. Effective dynamic capabilities support this goal by permitting the firm to create a series of temporary advantages; thus, staying one step ahead of players to maintain a long-term and achieve competitive advantage (Eisenhardt & Martin, 2000; Teece et al., 1997).

Referring to Defee and Fugate (2010), the conceptualization of dynamic supply chain capabilities are embedded within the collaborative routines formed between numerous supply chain partners. Therefore, numerous partners may together develop and use dynamic supply chain capabilities to reactivate and update present capabilities or create entirely new capabilities.

The dynamic capability viewpoint has a significant impact on strategic management research research regarding organizations and particularly the natural situation. It offers the potential to spread and balance the Resource-based view (RBV) to create thorough understanding of processes by which firms undertake sustainable development strategies. The dynamic capabilities perspective is particularly well suited to the study of supply chain management strategies because its emphasis on variation within uncertain and dynamic markets,. This is due to the firms develop

capabilities dealing with these issues are highly complex and unclear (Hart & Dowell, 2011a).

The benefit of a firm dynamic capability needs to be assessed in the context of how competitive environment is embedded (Winter, 2003). The investment in the creation and maintenance of a capability to change is unlikely to be beneficial for a relatively stable environment firm, as the cost of maintenance offsets the benefit of change. However, in a rapidly shifting environment, the investment and upkeep of the dynamic capability may well be worthwhile when adapting capabilities. The dynamic and complex environments firms are more likely to build and attempt dynamic capabilities. Since the capabilities are dependent upon the firms' existing strategies, structures and resources, firms met similar external environments can create not identical, but similar capabilities (Aragón-Correa & Sharma, 2003; Eisenhardt & Martin, 2000; Hart & Dowell, 2011a).

2.4.1 Knowledge Accessing

Grant and Baden-Fuller (2004) defined knowledge accessing as a dynamic capability held by minimum of two or more parties that added an understanding of the present knowledge possessions by each party. Each party must realize the capabilities and breadth of skills possessed by the other, but not attaining detailed knowledge of how to develop the other's skill or capability. A knowledge accessing dynamic supply chain capabilities creates by extending the concept to a supply chain context. Rather than determined to acquire and absorb more knowledge, supply chain members will benefit from accessing and understanding the capabilities possessed by other supply chain members. The objective is to understand the range of capabilities that exist

across the supply chain and comprehend when and where each may be best put to use. With this knowledge, each partner can effectively apply their own capabilities and knowledge for the benefit of the whole supply chain.

Since knowledge gained is explicit and can be easily shared, this knowledge-accessing dynamic supply chain capabilities can be learned by all members of the firms. Nonaka and Takeuchi (1995) referred tacit knowledge to knowledge that is difficult to articulate and longer times needed to learn as contrasting to explicit knowledge, which is knowledge that can be easily transferred and quickly codified. Meanwhile, Levin and Cross (2004) stated that the tacitness is related with the capabilities that stay inside the limits of the originating organization. However, the applicable areas can be understood over knowledge-accessing dynamic supply chain capabilities.

2.4.2 Co-evolving

Eisenhardt and Martin (2000) defined co-evolving as the set of routines businesses use to reconnect webs of collaborations within and across companies to generate new and synergistic capabilities. The notion of reconnecting collaborative webs implied collaboration cannot be viewed as a static exercise. Eisenhardt and Galunic (2000) stated each link between organizations or collaboration needs a definite goal of performance improvement through the creation of a new capability.

In a supply chain context, Defee and Fugate (2010) defined co-evolving as dynamic supply chain capabilities held by two or more supply chain members that facilitate the joint development of new capabilities between supply chain-oriented firms that aspire to compete on the basis of superior supply chain capabilities.

2.5 Firm's Internal and External Capabilities

Many empirical studies have identified companies create both internal (inter-organizational) and external (cross-organizational) capabilities (Sirmon, Hitt, Arregle, & Campbell, 2010; Teece, 2007; Zahra et al., 2006; Zott, 2003). The popular internal capabilities described was characterized by top management support and willingness to invest known as supply chain orientation; and the other was characterized by learning and continuous improvement known as agility. The foundation for top performance were formed by these internal capabilities. However, the best organizations was found to possess one or more capability(ies) that involved multiple organizations working together as the external capabilities to maintain and create a competitive advantage.

2.5.1 Supply Chain Orientation

Implementation of SCM at companies must first have a supply chain orientation. Mentzer, *et. al* (2001) identified that the idea of viewing the coordination of a supply chain from an overall system perspective, with each of the tactical activities of distribution flows seen within a broader strategic context (what has been called SCM as a management philosophy) is more accurately called a Supply Chain Orientation. The actual implementation of this orientation, across various companies in the supply chain, is more appropriately called supply chain management. Hult, Ketchen Jr, Adams and Mena (2008) stated that since dynamic supply chain capabilities occur as sub-routines in inter-firm, multiple supply chain-oriented organizations can establish their development. Defee and Stank (2005) highlighted that supply chain orientation firms make the strategic choice to compete on the basis of superior supply chain

capabilities. In addition, according to Mentzer *et al.* (2001), supply chain orientation can be defined as the recognition of the systemic, strategic implications of the activities involved in managing the multiple flows in a supply chain of organizations. These firms:

- have an embedded culture of systems approach and viewing the supply chain holistically,
- have an cooperative efforts to synchronize intra- and inter-firm capabilities,
- focus on customer to create unique sources of customer value.

Mentzer, *et al.* (2001) also recognized that a supply chain orientation firm builds and preserves numerous behavioural elements that enhance relations with strategic supply chain partners, including, commitment, trust, dependence, cooperative norms, top management support, and organizational compatibility. Each supply chain member possess a supply chain orientation places the foundation for the progress of dynamic supply chains capabilities. Supply chain partners with supply chain orientation are more likely together in the development of dynamic supply chain capabilities because they emphasis a systemic view of collaboration with other members of the supply chain for purposes of creating a strategic advantage based on end-customer value distribution (Stank, Davis, & Fugate, 2005).

Supply chain partners must possess a culture of viewing the supply chain as a whole and of recognizing the need for cooperative efforts. According to Lambert, Knemeyer and Gardner (2004), without this perspective, the partners may exhibit low trust, not be committed to the improvement of new cross-organizational capabilities, and/or not receive sufficient top management support. Supply chain oriented firms' display

cooperative norms that previous research has shown to produce new, innovative concepts (Eppinger & Chitkara, 2006; Sawhney, Wolcott, & Arroniz, 2006). Thus, supply chain orientation partners will foster the relational climate and behaviours needed to develop co-evolving routines and successfully collaborate on the creation of new innovative capabilities.

Christopher (2005) stated that, leading-edge companies have realized the real competition is not company against company, but rather supply chain against supply chain. Cooper, Lambert, and Pagh (1997) argue that organizational relationships tie firms to each other and may tie their success to the supply chain as a whole. In this context, a supply chain as a whole may have its own identity and function like an independent firm. However, to accomplish this ultimate supply chain, all companies in the supply chain must have a supply chain orientation. The outcome is a fully managed supply chain (Mentzer et al., 2001).

2.5.2 Learning Orientation

For a firm to learn, it must be able to rebuild and adapt its knowledge base, by creatively devastate obsolete attitudes and practices. The concepts of exploration and exploitation learning (March, 1991) underpin organizational adaptation research (Gupta *et al.*, 2006). Exploration learning includes discovery, risk taking, search, play, variation, flexibility, experimentation and innovation; whilst exploitation learning comprises choice, refinement, selection, production efficiency, execution and implementation (March, 1991). Exploration learning develops entirely new organizational routines, while exploitation learning leads to improvements of present routines (Dixon, Meyer, & Day, 2007). Winter (2003) suggested that firms invest in

the creation of dynamic capabilities in order to solve some problem with which they are faced. Thus, the capabilities themselves arise out of a perceived need and an intentional investment.

Zollo and Winter (2002) stated that dynamic capabilities arise from learning and comprise the firm's methods for modifying existing operating routines. Learning orientation is needed to develop dynamic supply chain capabilities that continuously re-tooling the obsolete cross-organizational capabilities and develop novel capabilities. Meanwhile, Sinkula, Baker and Noordewier (1997) defined learning orientation as the set of organizational values that influence the tendency of the firm to create and use knowledge. It is observed by a set of knowledge-questioning norms, including commitment to learning, open mindedness, and shared vision. Therefore, learning orientation impacts what kind of information is gathered and how it is evaluated, interpreted, and shared (Calantone, Cavusgil, & Zhao, 2002).

Learning is a resource-intensive activity. According to Akbar (2003), organization must dedicate people and time to the effort for learning. Efforts to learn explicit knowledge are typically straightforward and the effort required is easily estimated since explicit knowledge is already codified, formalized, and structured. Supply chain members can easily share and learn processes that have been documented by the focal firm. Alternatively, tacit knowledge is path dependent and developed over time through the accumulation of experiences and is therefore difficult or impossible to formalize (Berman, Down, & Hill, 2002; Zahra et al., 2006).

Zahra, *et al.* (2006) highlighted that learning orientation firms recognize the risks associated with knowledge imbalance between supply chain members leading to instability in supply chain relationships. This will limit to the learning capacity of any

single firm because of the difficulty in transferring tacit knowledge between organizations. This recognition breeds the desire to understand the supply chain partner's distinctive existing capabilities, instead of pursuing a costly, and potentially ineffective, strategy of attempting to imitate the partner's tacitly held capabilities.

Co-evolving also demands supply chain partners display an awareness of the need to change, and the perceived capacity to change effectively. Referring to Zahra, *et al.*, (2006), learning theory contends that there are risks inherent in exercising the same, static capabilities, without exploring new ones.

Learning occurs largely through observation of the environment and organizational interaction. With regard to customer demand uncertainty, innovation, competitive uncertainty, and technological turbulence are crucial environmental factors (Calantone et al., 2002).

According to Defee and Fugate (2010), jointly developing new capabilities required supply chain partners to scan and process the environment within which they operate.

Without learning from and about their external environment, it is difficult for firms to recognize the inflection point when existing capabilities become outdated, or which new capabilities offer the potential for competitive advantage. According to Baker and Sinkula (1999) the learning-oriented firms proactively question long-held routines, assumptions, and beliefs about existing capabilities to foster the development of new ideas for competitive capabilities.

2.6 Environmental Uncertainty

Defee and Fugate (2010) referred environmental turbulence is not a direct antecedent to knowledge accessing and co-evolving, but rather a moderator of the impact of the

two strategic orientations on the two dynamic supply chain capabilities. A highly volatile environment alone will not lead supply chain members to increase their understanding of each other's static, firm-centric capabilities which is knowledge accessing, nor will it foster the joint development of new capabilities which is co-evolving. The need for a reconfiguration of inter-organizational routines results from multiple supply chain members having a tendency toward inter-organizational collaboration and learning. According to Defee and Fugate (2010), in turbulent environments, supply chain- and learning-oriented supply chain partners will be more tending to recognize the need for knowledge accessing and co-evolving dynamic supply chain capabilities. When supply chain members have common strategic orientations for knowledge accessing and co-evolving, their desire to develop and drive those dynamic capabilities will be enhanced in environments that are unstable.

Whilst, Iyer (2011a) identified environmental uncertainty are market turbulence and technological turbulence expected to influence firm behaviours as they relate to information technology (IT) collaborative behaviours, and generate desirable outcomes. The two uncertainty dimensions, however, may influence the IT analytic capability-collaboration relationship differently. As the demand chain becomes aware of the situation arising out of dynamism in processes such as technological turbulence, firms develop more sensitivity to such external cues and may develop IT analytic capability to deal with the new unpredictable situation. Since technological turbulence implies high rates of change in process, production and service technologies, there is an undesirable impact on operations in the form of increased process unpredictability or greater fluctuations in customer delivery schedules and efficiencies, leading to lower customer service levels (Iyer, Germain, & Frankwick, 2007). Referring to Melville, Kraemer and Gurbaxani (2004), to overcome the

negative impact of organizational performance, IT analytic capabilities maybe developed by firms. This contributes to improve collaborative efforts between downstream partners to streamline operations and optimally leverage pooled resources, thus reducing variations. High technological turbulence drives partners towards increased IT-facilitated collaborative efforts so that operations are more predictable internally in the supply chain. Thus, technological turbulence can enhance the positive association between IT analytic capability and demand chain collaboration.

The design of a new supply chain, the retrofitting of an existing supply chain through the addition or deletion of products and expansion or shut-down of production facilities, or the planning of the operation of the chain to meet ever-changing market conditions can all be posed as a large scale dynamic decision problem. In the context of chemical industry applications, the technical challenges posed by such problems arise from three dimensions:

- physical scale;
- temporal scale and;
- degree of uncertainty.

The broad ranges of physical scales are due to the need to consider the system at several physical aggregation levels: globally dispersed entities, production lines within a manufacturing site, and even individual equipment items. The wide temporal scale arises because of the different dynamics of the entities and operations such as distribution/logistics which may involve weeks, equipment residence times which involve hours, and individual processing steps which may involve minutes. The high

degree of uncertainty is due to the fact that key factors such as the market parameters of product demands, feed stock availability, and their prices, technical parameters such as product yields, product qualities, and processing times/rates, and facilities parameters such as reliability/availability, all have significant stochastic components. (Appelquist, Pekny, & Reklaitis, 2000).

2.7 Oil and Gas Industry

In the oil and gas industry, the supply-chain network is composed of shipping via vessel, oil tankers, and pipelines that may run across various countries. This network is used to transport crude from wellhead to refinery for processing, to transport intermediates between multisite refining facilities, and to transport finished products from product storage tanks to distribution centres and finally to the customers. Any disruptions arising in the global supply chain can have tremendous adverse effects in achieving operational efficiency, maintaining quality, profitability, and customer satisfaction. The adverse events may happen due to uncertainty in supply of crude, demand, transportation, market volatility, and political climate. Hence, Shah *et al.* (2011b) identify that to effectively model a supply-chain design problem, the dynamics of the supply chain ought to be considered and data aggregation techniques for the extensive data set should be employed. Figure 2.5, shows the overview of supply chain in the petroleum industry.



Figure 2.5
Supply Chain In The Petroleum
 Source: Shah *et al.* (2011)

A supply chain network for a typical petroleum company is shown schematically in Figure 2.6. It includes all activities related to oil production and processing, in addition to storage and transportation to demand sources. Crude oil is produced from a number of locations. Produced crude may be categorized into different grades, and each grade has specific processing requirements and market demands. Major quantities of the crude oil are exported to the international markets, while some quantities are processed in local refineries. Each refinery processes a specific mix of different grades of crude oil. A number of refinery products are produced, and can be either exported to demand sources, used locally, or fed to local petrochemical plants. In turn, Petrochemical products are exported or used further by the downstream chemical industry. Obviously, demand sources (markets) for crude oil as well as refinery, petrochemical and downstream products are different, and each may be characterized by specific economic condition and geographical location. For any petroleum organization, the business is usually based on a monthly plan that is based on pre-selling, or to sell before producing the product. In this case, the sales department will be able to determine the production volume for the following period. Such a plan can be considered in most cases as a partial implementation of a longer-term plan, which is usually for a 12-months period. Obviously, planning for 12-months is more difficult and involves forecasting and uncertainties. The quality of this plan determines the overall profitability of the manufacturing organization. Hence, it is important to propose a doable plan and to execute the plan well (Al-Othman et al., 2008).

Crude oil is one of the most valuable commodities in the world, but only after it has been refined into petroleum products. Crude oil refining is a key transformation step

in the Midstream Sector of the oil and gas value chain because it adds commercial value to the oil by transforming it into many different marketable products.

Unfortunately, year 2016 in a state of uncertainty for oil and gas industry. The sustained low prices of 2015 had not resulted in the collapse of the industry that many expected; and, 2015 was a year underscored more by what did not happen such as massive bankruptcies and widespread mergers & acquisitions (M&A) (England, 2017).

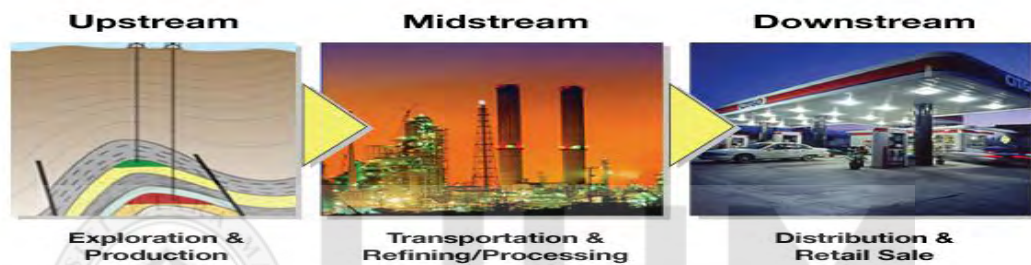


Figure 2.6
Supply Chain Network
Source: www.thedrillingpeople.com

There are 659 worldwide refineries, located in 115 countries that collectively have a daily capacity of about 88 million barrels per day (b/d). Their annual throughput is about 75 million b/d, for an average capacity utilization of 86%. Some countries including the United States, however, have exceeded this utilization level in recent years (NNR Global, 2010).

For both economic and flexibility reasons, the bulk of the world's refining takes place near downstream product markets, with major refinery capacity located in the United States, Western Europe and key countries in the Asia Pacific region as in Figure 2.7. The crude oils for these refineries are transported, often over long distances, by pipeline or in crude tankers from major producing fields, mainly in the Middle East, Russia, South America and Africa. Many other refineries are located in

producing countries, where domestic crudes are refined into petroleum products for local or regional markets. In some cases, the refined products are transported to distant markets. For example, Venezuelan-refined products are shipped to PDVSA's Citgo affiliate in the United States. The products, once refined, are then distributed to commercial and retail markets via clean cargo ships, barges, pipelines, trains and/or trucks (NNR Global, 2010; Petroleum Online, 2011).

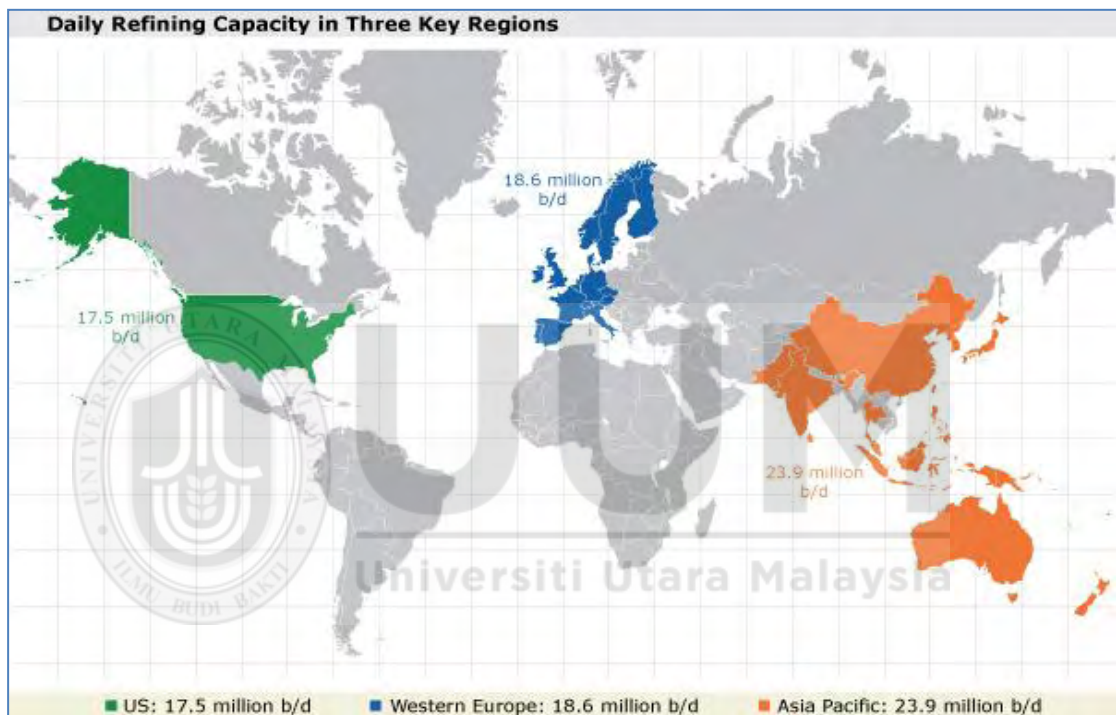


Figure 2.7
Refining Capacity Location
Source: NNR Global (2010)

Determining which products to produce from a barrel of crude is based on daily and weekly market projections of the demand and market-clearing price for each petroleum product that a refinery could possibly make. Refineries must produce products which meet a variety of quality specifications and must respond to seasonal swings in both product demand and quality. The refinery manager must respond appropriately to all these changes in market demand, quality and economics.

The relative quantities of petroleum products produced by a refinery depend on the complexity of the refinery processes, the market demand and the properties of the crude being refined. The complexity is related to the many operating units that are used to separate the crude into fractions, improve their quality and increase the production of higher-valued products like gasoline, jet fuel, diesel oil and home heating oil. These processes range from the relatively simple crude oil distillation to the more complex ones: vacuum distillation, catalytic reforming, catalytic cracking, alkylation, isomerization and hydrotreating. In general, refineries can be classified as hydroskimming, cracking and deep conversion, in order of both increasing complexity and cost (Petroleum Online, 2011).

The most complex, deep conversion refineries are able to transform a wide variety of crudes, including the lower quality heavy sour crudes into the higher value products (e.g., gasoline, diesel). The ability to meet stringent product specifications, notably ultra low sulfur gasoline and diesel fuel, is also a characteristic of high complexity refineries. Historically, the very complex refineries have been most often located in the United States, where gasolines are in greatest demand. Highly complex refineries, however, are not restricted to the U.S. They are becoming more common in Europe and Asia (NNR Global, 2010).

The design of a new refinery, then, must consider the chemical properties of the crude oils to be refined, the market demand and expected selling price of the refined products, the environmental limits on the byproducts of combustion, especially sulfur and nitrogen oxides, and long-term project economics. Environmental regulations seeking to improve product quality are today a key driver of refinery process configuration and economics.

In a regulated business environment, the refinery margin is likely set by the regulatory agency; however, in open market environments like the US and Europe, the Refining Margins are set on a competitive market basis. In the latter case, the refining margin can range from a negative number in competitive times, say $-\$2/\text{bbl}$, up to $\$20/\text{bbl}$ or more in refinery markets that have very limited spare capacity (NNR Global, 2010).

In competitive markets the refinery margins change daily as the market prices of both crude oil and products change. Under such conditions the refinery revenues over the course of a year must be equal to or exceed its operating costs, depreciation and taxes, plus a fair return on investment. In order to realize the highest refining margins the refinery manager seeks to pay the lowest price for crude oil, maximize the yield of the higher value products, control operating costs and receive the highest price for its refined products on a sustained basis.

Outside the US, and especially outside OECD regions, there has been a growing list of refinery expansions. By some counts these additions total 12 - 19 million bpd worldwide of new capacity. However, uncertainty exists over many of these. Some are currently little more than announcements and all will be impacted by the new construction environment of high capital costs that are driven by increases in costs of steel and other basic commodities and of restrictions in the availability of engineering capacity (Petroleum Online, 2011).

Like other sectors of the oil and gas business, the marketing and distribution of petroleum products takes place on a vast, global scale. Every day, hundreds of millions of companies and individuals buy these products at wholesale or directly from retail outlets that number in the hundreds of thousands worldwide. It includes

the indirect users of petroleum products, the number of consumers may runs into the billions.

Refined product markets are different from crude oil markets in a number of ways. The scale is much smaller: a typical crude oil transaction involves 500,000 or even one million barrels of oil, while a typical refined product sale may involve only 5,000 to 10,000 bbls. Product quality is more stringent as well – crude oils, by nature, have a wide variation in quality, while refined products must meet stringent specifications or else be considered off-spec and a breach of contract or a regulator violation. Finally, there are many opportunities for arbitrage in the products market, because price differentials between grades of refined products are constantly changing at a given location or between locations many miles apart. This offers traders the opportunity to blend grades at one location or move cargoes around the world to achieve better prices or margins (NNR Global, 2010).

No refinery or marketer has a fully balanced product system so a major aspect of the product markets is to redistribute surpluses and deficits that arise at each location. Although patterns change over time, there are regular flows of products from one region to another and price levels are set according to this trade. Clearly the marketing and distribution of petroleum products is a complex and wide-ranging sector of the international petroleum industry.

2.7.1 Malaysia Oil and Gas Industry

The contribution of oil in Malaysia energy mix was once up to 87.9% before the Four-Fuel Diversification Strategy was implemented in 1981. After the international oil crisis in 1973 and 1979, the government had called for the diversification of

energy resources to prevent over-dependency on oil. Malaysia has proven oil reserves of 5.46 billion barrels as of January 2008. The majority of the country's reserves are located off the east coast of Peninsular Malaysia and tend to be of high quality. Several new oil production projects have come online during the last few years, although Malaysia's oil output declined somewhat in 2006. Average production for 2006 stood at 798,000 barrels/day (bbl/d), down 7% from 2005 levels. In 2006, Malaysia consumed an estimated 515,000 bbl/d of oil, with net exports of about 283,000 bbl/d. According to Oil and Gas Journal, Malaysia had about 545,000 bbl/d of refining capacity at six facilities as of January 2007. Malaysia's state-owned national oil company, Petroleam Nasional Berhad (PETRONAS), dominates upstream and downstream activities in the country's oil sector. PETRONAS operates three refineries (259,000 bbl/d total capacity), while Shell operates two plants (200,000 bbl/d), and ExxonMobil one (86,000 bbl/d). Malaysia has invested heavily in refining activities during the last two decades, and is now able to meet the country's demand for petroleum products domestically, after relying on the refining industry in Singapore for many years. Despite growth in exploration activities and several new projects that are set to come on-stream in the next several years, Malaysia's proven oil reserves have declined in recent years and the oil production fell to 693,000 bbl/d in 2008, a 13% decrease from 2006 level (Energy Information Administration, December 2010). Provided that the production rate is consistent at around 700,000 bbl/d, Malaysia's oil reserves will be exhausted in around 20 years. (Oh, Pang, & Chua, 2010; Ong, Mahlia, & Masjuki, 2011)

In Malaysia, this natural source which can be found in abundant has become the main energy contributor since early 2000s. Since its discovery in 1983, its contribution in the energy mix has grown significantly since, replacing oil as the main

source. As in Jan 2008, Malaysia held 88 trillion cubic feet (Tcf) of proven the natural gas reserves. While much of the oil reserves are found off Peninsular Malaysia, most of the natural gas production comes from East Malaysia, especially offshore Sarawak. Malaysia has three LNG processing plants, all located in a massive complex at Bintulu (East Malaysia) and supplied by the offshore natural gas fields at Sarawak. The Bintulu facility is the largest LNG complex in the world, with a total liquefaction capacity of 22.7 million metric tons (MMt), or equivalent to 1.1 Tcf per year. Natural gas reserves in Malaysia is the second largest in South East Asia after Indonesia and its production has risen steadily in recent years, reaching 2.2 Tcf in 2004, up 47% since year 2000. Domestic natural gas consumption has also increased substantially, with 2004 consumption at about 1.2 Tcf, which is 61% higher than year 2000 level. Malaysia is a significant net exporter of natural gas, primarily in the form of liquefied natural gas (LNG). In 2005, Malaysia exported 21.2 MMt of LNG, which accounted for 15% of the total world LNG export (Oh et al., 2010).

Malaysia has the multi-phased Peninsular Gas Utilization (PGU) project completed in 1998. one of the most extensive natural gas pipeline networks in Asia. The goal of the PGU is to expand natural gas transmission infrastructure on Peninsular Malaysia. The PGU system spans more than 880 miles and has the capacity to transport 2 billion cubic feet/day (Bcf/d) of natural gas. Not only has the PGU initiative helped boost domestic natural gas consumption, it has also expanded regional natural gas trade. Malaysia already trades small amounts of piped natural gas with Singapore and Indonesia, and PETRONAS reported that in 2006 construction was completed on the Trans-Thailand–Malaysia Gas Pipeline System, which allows Malaysia to pipe natural gas from the Malaysia-Thailand JDA to its domestic pipeline system. This linkage marks a significant step toward the realization of the proposed “Trans-ASEAN Gas

Pipeline'' (TAGP) system, which envisions the establishment of a transnational pipeline network linking the major natural gas producers and consumers in South East Asia. On account of Malaysia's extensive natural gas infrastructure and its location, the country is a natural candidate to serve as a hub in the proposed TAGP project. Based on the ratio between the reserves and production rate (assume that it has remained about the same up to now), it indicates that the natural gas could still contribute to the energy mix as the main source of energy for the next 36 years compared to oil which is only around 20 years. At the moment, almost 80% of the energy mix in Malaysia is contributed by natural gas. As in the oil sector, PETRONAS dominates the natural gas sector as well (Oh et al., 2010).

However, with falling prices over 60% from highs in 2014 and remaining range-bound between USD 35-45 per barrel, maintaining the momentum of upstream growth will be challenging. To contend with the prolonged downturn, in line with the efforts of its international peers PETRONAS announced earlier this year that it would aim to reduce both its capital expenditures (CAPEX) and operational expenditures (OPEX) undertakings by RM50 billion, with upwards of RM16 billion savings targeted to be realized in 2016 alone (Abdul Latif, Fong, Sandragasu, & Taufik, 2016).

CHAPTER THREE

CONCEPTUAL FRAMEWORK

3.1 Introduction

Various theories are used in discussing dynamic supply chain capabilities and performance. This study utilized four theories namely Industrial or system dynamic, resource based view, dynamic capabilities theory and organizational learning theory.

3.2 The Related Underpinning Theories

This section begins with the industrial or system dynamics theory as foundation, which is followed by discussion of the resource based theory, dynamic capability theory and learning organization theory as the complimentary theories.

3.2.1 Industrial or System Dynamics

Industrial or system dynamic has its origins in control engineering and management (Angerhofer & Angelides, 2000). The approach uses a perspective based on information feedback and delays to understand the dynamic behaviour of complex physical, biological, and social systems. Forrester (1961) defined Industrial Dynamics as the study of the information feedback characteristics of industrial activity to show how organizational structure, amplification (in policies), and time delays (in decision and actions) interact to influence the success of the enterprise. It treats the interactions between the flows of information, money, orders, materials, personnel, and capital equipment in a company, an industry, or a national economy.

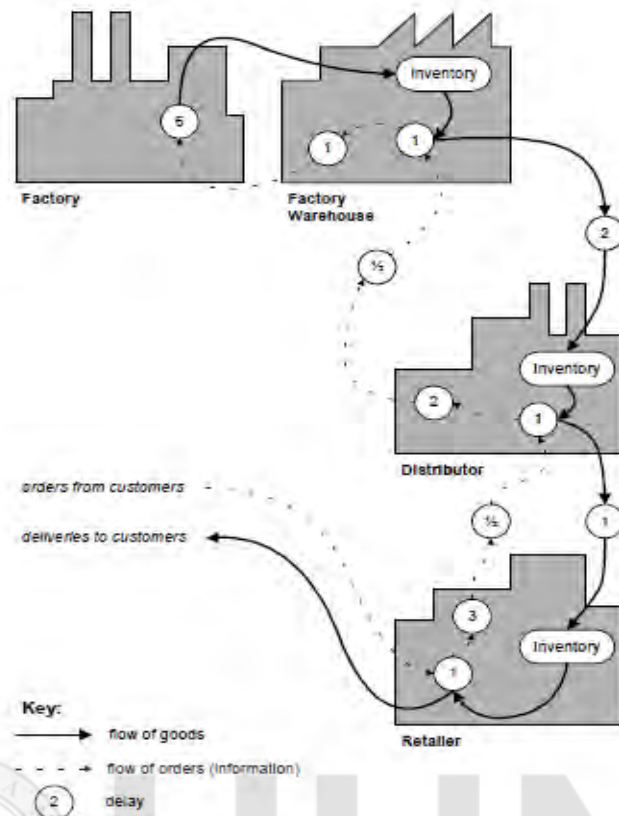


Figure 3.1
The Forrester Supply Chain
 Source: Angerhofer & Angelides (2000)

Mentzer, *et al.* (2001) cited Forrester (1968) proposed that after a period of research and development involving basic analytic techniques, “there will come general recognition of the advantage enjoyed by the pioneering management who have been the first to improve their understanding of the interrelationships between separate company functions and between the company and its markets, its industry, and the national economy”. Though the article is more than fifty years old, it appears that Forrester identified key management issues and illustrated the dynamics of factors associated with the phenomenon referred to in contemporary business literature as in SCM.

3.2.2 Resource-based View

The Resource-based view (RBV) emphasizes the role of resources and capabilities in forming the basis of competitive advantage. Broadly stated, a resource is something that a firm possesses, which can include physical and financial assets as well as employees' skills and organizational (social) processes. A capability, in contrast, is something a firm is able to perform, which stems from resources and routines upon which the firm can draw. The key element of RBV is its focus on factors internal to the firm that lead to sustained competitive advantage. Given this focus, it marked a distinct departure from analysis at the industry or strategic group level, which had dominated strategy research and teaching prior to the emergence of RBV (Barney, 1991; Hart & Dowell, 2011a).

RBV proposes that firms with rare, valuable, inimitable and non-substitutable resources have the ability to achieve a superior performance (Eisenhardt & Martin, 2000). These RBV attributes are called the VRIN (valuable, rare, inimitable and non-substitutable). The inputs into organizations are considered as the resources. Resources could either be knowledge-based resources or property-based resources. The property based resources referred to tangible input resources such as materials. The knowledge based resources are the ways firms combine the tangible inputs. Between these resources, the knowledge-based resources are particularly important in creating the sustainable competitive advantage as it is difficult to imitate. As the theory suggests that firms with rare and inimitable resources are better able to achieve its sustainable competitive advantage, firms that have better knowledge resources are able to have a superior performance.

3.2.3 Dynamic Capabilities Theory

Teece *et al.* (1997) defined dynamic capabilities as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. Dynamic capabilities thus reflect an organization's ability to achieve new and innovative forms of competitive advantage given path dependencies and market positions (Leonard-Barton, 1992).

The dimensions of dynamic capabilities arose from a key shortcoming of the resource-based view of the firm. The RBV has been criticized for ignoring factors surrounding resources, instead assuming that they simply exist. Considerations such as how resources are developed, how they are integrated within the firm and how they are released have been under-explored in the literature. Dynamic capabilities attempt to bridge these gaps by adopting a process approach: by acting as a buffer between firm resources and the changing business environment, dynamic resources help a firm adjust its resource mix and thereby maintain the sustainability of the firm's competitive advantage, which otherwise might be quickly eroded. So, while the RBV emphasizes resource choice or the selecting of appropriate resources, dynamic capabilities emphasize resource development and renewal.

3.2.4 Organizational Learning Theory

Organizational learning theory states that, in order to be competitive in a changing environment, organizations must change their goals and actions to reach those goals. In order for learning to occur, the firm must make mindful decision to change actions in response to a change in circumstances, must consciously link action to outcome, and must remember the outcome. It does not become organizational learning until the

information is shared, stored in organizational memory in such a way that it may be transmitted and accessed, and used for organizational goals (Huber, 1991).

3.2.5 Convergence of Theories

At this junction, it is worthwhile explaining the rationale of deploying the four theories in this study. The four theories are industrial dynamic theory, resource based view theory, dynamic capability theory and organizational theory. In a nutshell, collaboration between service contractors and oil and gas players is a complex interaction between two entities. Convergence of the above mentioned theories are necessary. Industrial dynamic theory forms the fundamental part of the study in assisting the researcher to conceptualize the dynamic and complex supply chain management.

3.3 Conceptual Framework

In this section, the development of conceptual framework were discussed. In a qualitative research, conceptual framework serves as a guide for constructing study's instruments and providing explanations to study's findings of this study. The most significant about conceptual framework is that it is primarily a conception or model of what to study and a tentative theory of the phenomena that are investigating. The function of this conceptual framework is to help in assessing and refining the goals, developing realistic and relevant research questions, selecting appropriate methods, and identifying potential validity conclusions (Creswell, 2012).

3.3.1 Evolving Conceptual Framework of Dynamic Supply Chain Capabilities

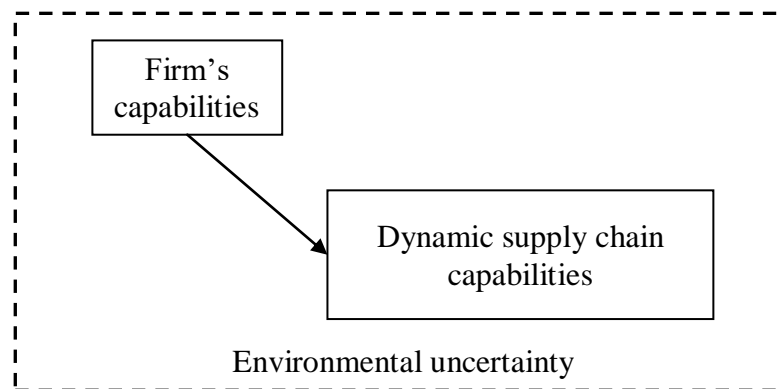


Figure 3.2
Evolving Conceptual Framework of Dynamic Supply Chain Capabilities

With the evolving conceptual framework on hand, propositions for this study are developed. Propositions are derived from the evolving conceptual framework and it formed a guidance for research methods to be deployed to best answer the research problem.

3.4 Summary of the Chapter

This chapter discussed an overview and the theoretical aspects of dynamic supply chain on oil and gas industry. Due to its complexities, many facets need to be detailed out before it could materialize into the desired result. Moreover, due to complex processes, a multidisciplinary approach should be taken in selecting the models in dynamic supply chain. There is no one model or theory that fits all. If one works well before, it does not mean that it will work again in other situations. Thus, the theories above provide only the basic guidelines in understanding dynamic supply chain capabilities and performance in oil and gas industry.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Introduction

This study was an exploratory study since not much is known about the situation of dynamic supply chain capabilities in oil and gas industry in Malaysia environment. Exploratory study was undertaken to better comprehend the nature of the problem, since very few studies have been conducted in the dynamic supply chain capabilities (Easterby-Smith, Thorpe, Jackson, & Lowe, 2008; Kumar, 2011; Sekaran, 2000).

An inductive case study approach was selected to explore how companies manage their dynamic supply chain capabilities in this oil and gas industry. This approach appeared to be adequate for the several reasons. Research on how firms account for dynamic supply chain in oil and gas organization was still in an exploratory stage (Foerstl, Reuter, Hartmann, & Blome, 2010) and case study research was well-suited for investigating complex phenomena, which cannot be illuminated by surveys alone, since it allows the researcher to interact with the informant and to draw on multiple sources of information, leading to information rich cases (Brand & Slater, 2003; Yin, 2009; Zikmund, Babin, Carr, & Griffin, 2010). Since the business environment in supply chain increasingly complex and less variable by using just a quantitative approach, research stream should include more studies using qualitative methods (Kotzab, Seuring, Muller, & Reiner, 2005).

Quantitative research methods optimize control and generalizability (external validity), while qualitative research maximizes realism (internal validity) (Easterby-Smith et al., 2008; McGrath, 1982). A case study methodology was needed to

explore the complex what, why and how questions associated with organization capabilities and performance outcomes (McCutcheon & Meredith, 1993; Meredith, Raturi, Amoako-Gyampah, & Kaplan, 1989). Following the preliminary stages of the survey data collection, a series of detailed interviews were conducted to complement and contextualize the survey findings (Pettigrew, 1990). Therefore, there was a need for “a more balanced approach to research using inductive research methods in addition to deductive methods in supply chain management (Kotzab et al., 2005).

In addition, when the subject area of interest is new, dynamic or complex, relevant variables were not easily identified and extant theories were not available to explain the subject area. In this situation, a qualitative approach was preferred in order to build understanding grounded in a detailed description of the subject area generated by collecting field data. It provided researchers with access to deeper level of understanding of new or complex subject by yielding a high level of details (Creswell, 2007; Eisenhardt, 1989).

4.2 Justifications of the Research Paradigm

Due to influence of entirely different paradigms, many researchers had shown their concern towards research methods in supply chain management, either by giving suggestion on quantitative side (positivist paradigm or analytical school) or on the qualitative side (interpretive paradigm or behavioral school). In order to accurately describe, truly understand and begin to explain these complex phenomena, research streams trend has been increasingly towards employing qualitative research to gain a greater depth and breadth of knowledge of the subject area (Carter & Rogers, 2008; Milliken, 2001; Sachan & Datta, 2005). Feasibility recognition of different

qualitative approaches and their identification were important to determine the relevancy in practice. Furthermore, it was also significant to consider different philosophical positions underlying different research methods and designs, as research problems can often compromise the adopted designs (Towers & Chen, 2008).

Kuhn (1996) stated that paradigm can be defined in its broadest sense. It can be more than just a collection of theoretical assumptions, laws and techniques that members of a scientific community adopts. It was not only the scientific achievements but also include beliefs and values in what types of investigation and explanation was important.

The concept of the paradigm for scientific endeavour was central to the research process in all areas of study (Mangan, Lalwani, & Gardner, 2004). Within social science history there had been a long-standing epistemological debate about the most appropriate philosophical position from which research methods should be derived. This debate had centred on the relative value of two fundamentally philosophical paradigms viewed by two main opposing viewpoints (Easterby-Smith et al., 2008).

The two contrasting views of how social science research should be conducted from two traditions of deductive positivism and the inductive phenomenological paradigms. These two philosophies have developed into distinctive paradigms over the last one and half centuries. This division was accepted by many authors (Amaratunga & Baldry, 2001; Mangan et al., 2004; Milliken, 2001). The deductive paradigm seeks to predict which predominantly quantitative methodology such as statistical and mathematical techniques, whilst; the inductive paradigm seeks to gain a greater understanding and meaning of the subject area under investigation which

predominantly qualitative methodology such as case study, questionnaire and interview (Towers & Chen, 2008).

Creswell (2007) identified four shape for practice of research, namely: postpositivism, social constructivism, advocacy/participatory and pragmatism. Postpositivism took a scientific approach to research based on the priori theories. Practically, postpositivist researchers viewed inquiry as a series of logically related steps, believed in multiple perspectives from participants rather than a single reality, and adopted rigorous methods of qualitative data collection and analysis. Whilst, social constructivist seeks for the understanding in which they live and work. Since these meanings were varied and multiple, it leads the researcher to look for the complexity of views rather than narrow the meanings into a few categories or ideas. The goal of research was to rely on the participants views of the situation and often negotiated socially and historically. Meanwhile, advocacy/participatory viewed research should contain an action agenda to reform that may change the lives of participants, the institutions which they live and work, or even the researchers' lives. Advocacy/participatory inquirers collaborated with research participants to help with designing the questions, collecting the data, analyzing it and shaping the final report. Finally, pragmatism focused on the outcomes of the research rather than the antecedent conditions as in postpositivism. Practically, pragmatist used multiple methods of data collection to best answer the research question and employing both quantitative and qualitative sources of data collection.

4.3 Justification of the Methodology

The business environment in supply chain subject areas were increasingly complex and less agreeable by using just one type of research approach. To accurately

describe, truly understand and explain these complex subject area, many researches include more studies using qualitative approach. A few examples can be found where real supply chains capturing at least three stages are described and analyzed in empirical research. The term stage is used to comprise focal companies as well as tiers of suppliers and/or tiers of customers. Case studies allowed direct observation of the field, which would be particularly suitable for approaching several stages of a supply chain. Case study research also often been criticized for its lack of rigor (Ellram, 1996). Still, if the research process was carried out in a structured way and was well documented then case study research allowed the in-depth analysis of existing subject area. For ensuring rigor, quality criteria have been put forward which should be obeyed. These comprise, for example, case selection, data collection, validity and reliability. By identifying clearly the research process and related quality criteria, case study research was useful in supply chain management (Gimenez, 2005).

Exploratory study was undertaken to understand the nature of the problem, since very few studies have been conducted in the dynamic supply chain capabilities. Since this study was an exploratory and not much was known about the situation of dynamic supply chain capabilities in oil and gas industry in Malaysia environment, it motivates the qualitative approach to be undertaken. (Easterby-Smith et al., 2008; Kumar, 2011; Sekaran, 2000).

Inductive case study approach was suitable in order to explore how companies manage their dynamic supply chain in this oil and gas industry. The aims of this study was to identify what are firm's capabilities dimensions in the context of oil and gas industry in Malaysia; to identify what are dimensions of the dynamic supply chain

capabilities, as defined in the context of strategic resources in Malaysia; to identify is there any relation between firm's capabilities and dynamic supply chain capabilities in oil and gas industry in Malaysia; and, to explore how environmental uncertainty factor influence dynamic supply chain capabilities in oil and gas industry in Malaysia.

When the observable fact of interest was new, dynamic or complex, relevant variables were not easily identified and present theories were not available to explain the phenomena (Creswell, Hanson, Clark Plano, & Morales, 2007). Therefore, in the case study, complete information can be obtained about the subject of study. It also leads to new and creative insights while the researcher is able to explore relationships (Gimenez, 2005).

However, case study also described some disadvantages since the researcher was not able to generalize the results because of the reduced sample size. The case study method also was criticized for its subjectivity. Besides, it was very timely and money intensive due to the need for travelling and conducting personal interviews (Gimenez, 2005).

4.4 Study Design, Criteria for Case Selection and Their Numbers

This section began with the sampling strategies, unit of analysis and the number of case studies that are undertaken for this research.

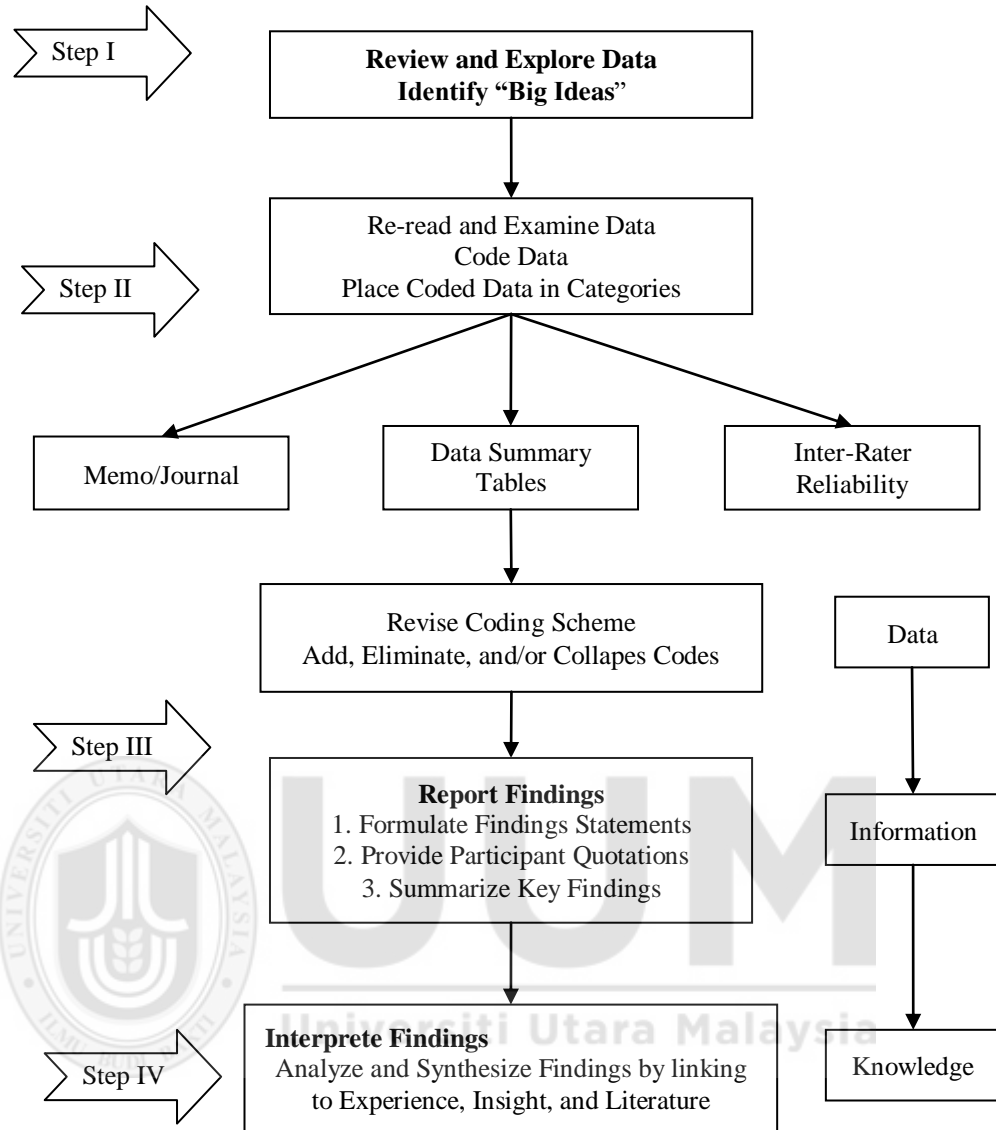


Figure 4.1
Road Map for the Process of Qualitative Data Analysis: An Outline
 Source: Bloomberg & Volpe (2012)

4.4.1 Sampling Strategies

The concept of purposive sampling was employed for the study because the researcher selected individuals and sites for the study. The decision needed to be made about who and what will be sampled, what form the sampling will take and how many people or sites need to be sampled (Creswell, 2007; Kumar, 2011; Zikmund et al., 2010). Since this study was conducted on the oil and gas industry, gaining in-

depth insights into advanced practices which will later set the ground for the generation of proposition (Foerstl et al., 2010). The population was taken from the MOGSEC (Malaysia Oil and gas Services Exhibition & Conference 2012) Directory. The snowball or chain case selection technique were employed with the procurement and supply chain function as the unit of analysis (Creswell, 2007).

4.4.2 Unit of Analysis

The uniqueness and difficulty of processes in a SCM suggested the used of an interpretive approach, which was appropriate where the subject area to be investigated are complex and not well understood (Ritchie & Brindley, 2007). The objective were to identify what is firm's capabilities dimensions in the context of oil and gas industry in Malaysia; to identify what are dimensions of the dynamic supply chain capabilities, as defined in the context of strategic resources in Malaysia; to identify is there any relation between firm's capabilities and dynamic supply chain capabilities in oil and gas industry in Malaysia; and, to explore how environmental uncertainty factor influence dynamic supply chain capabilities in oil and gas industry in Malaysia.

In the oil and gas industry, supply chain comprised the upstream activities (exploration, development and production of crude oil or natural gas) and downstream activities (tankers, pipelines, retailers and consumers) which were two significant activities in the petroleum industry.

Four service's contractors companies were selected on the basis that they seemed to be changing most rapidly towards upstream supply chain. This permitted literal replication between the four cases (where similar results are predicted) (Yin, 2009). The other two service's contractors companies demonstrated the downstream supply

chain would thus permit theoretical replication, where different results were obtained but for predictable reasons. The next three service's contractors companies were selected since they represented prima facie two extremes of downstream and upstream supply chain of the focal organization (Dixon et al., 2007). Finally, one production sharing's contractor demonstrated as the focal organization. Table 4.1 details the profile of informants.

Table 4.1
Table Details of the Informants

No.	Informants	Job Title	Experience	Company	Nature of Company Supply Chain
1.	Mrs. Weda	Managing Director	18 year	1	SC – Upstream & Downstream
2.	Mr. Nicky	Chief Executive Officer	25 year	2	SC – Upstream
3.	Mr. Man	Chief Executive Officer	25 year	3	SC – Upstream & Downstream
4.	Mr. Jay	SCM Manager	15 year	4	SC – Upstream & Downstream
5.	Mr. Khay	SCM Executive	15 year	5	SC – Upstream
6.	Mrs. Hally	General Manager	30 year	6	PSC – Upstream
7.	Mr. Nizal	SCM Executive	15 year	7	SC – Upstream
8.	Mr. One	SCM Manager	22 year	8	SC – Upstream
9.	Mr. Daus	SCM Manager	12 year	9	SC – Downstream
10.	Mr. Shah	Managing Director	10 year	10	SC – Downstream

Note: SC = Service Contractor; PSC = Production Sharing Contractor

4.4.3 Number of Cases

In order to better utilize a variety of research paradigms, many aspired to expand and grow their experiences and knowledge with qualitative design. Qualitative and quantitative research design differs in several aspects but they do have commonalities.

One of the common aspects is the need to collect data. Data collection can be derived from a number of methods, which include interviews, focus groups, surveys, telephone interviews, field notes, taped social interaction or questionnaires (Heaton,

2004). Yin (2009) referred to six forms: documents, archival records, interviews, direct observation, participation observation and physical artefacts'. Data can be gathered from a number of sources including written documents, records, workplaces, the Internet, surveys, or interviews. In order to collect data, the researcher should be able to access the data that needs to be collected for the study.

The interview was probably the most widely employed method in qualitative research (Creswell, 2007; Kajornboon, 2008; Turner III, 2010). Ethnography usually involved a substantial amount of interviewing and this factor undoubtedly contributed to the widespread use of the interview by qualitative researchers. However, it was the flexibility of the interview that makes it so attractive. Since ethnography required an extended period of participant observation, research based more or less exclusively on interviews was a highly attractive alternative for the collection of qualitative data. Like ethnography, case study data collection involved a wide array of procedures as the researcher builds an in-depth picture of the case (Creswell, 2007). Of all the data collection, interviewing and observation deserved special interest because they are commonly used (Creswell, 2007).

4.5 Collection Procedures

Kvale (1996) defined the qualitative research interview as an interview, whose purpose is to gather descriptions of the life-world of the interviewee with respect to interpretation of the meaning of the described phenomena. Collecting these descriptions can be done in several ways, of which face-to-face interview is the most common. Besides face-to-face interview, interviewing by telephone is popular too. Meanwhile, interviewing using the Internet is rising due to developments in computer technology and the development of computer mediated communication (CMC) tools.

With CMC, messages are electronically transferred from a sender to one or more recipient(s), both in synchronous (in real time) and in asynchronous (independent from time and place) setting. Examples of tools used for CMC are e-mail and chat boxes, which also can be used for interviews (Opdenakker, 2006).

Interviews are a systematic way of talking and listening to people and are another way to collect data from individuals through conversations. The researcher or the interviewer often uses open questions. The interviewee or respondent is the primary data for the study. Interviewing is a way to collect data as well as to gain knowledge from individuals on a topic of mutual interest, sees the centrality of human interaction for knowledge production, and emphasizes the social situations of research data. Interviews are ways for participants to get involved and talk about their views. In addition, the interviewees are able to discuss their perception and interpretation in regards to a given situation (Kajornboon, 2008; Kvale, 1996).

It is necessary for the researcher to prepare before the actual interview. The interview starts before the interview actually begins. Once the interview is conducted the researcher needs to make sure that the respondents have: a clear idea of why they have been asked; basic information about the purpose of the interview and the research project of which it is a part; some idea of the probable length of the interview and to record it (explaining why); and a clear idea of precisely where and when the interview takes place (Gillham, 2000). In addition, the researcher must have the skills and abilities to listen, to be non-judgmental, good memory and to think of his/her own. There are many types of interviews, which include structured interview, semi-structured interview, and the unstructured interview.

A structured interview also called a standardized interview. The same questions are asked of all respondents. Structured interviews are interviews in which all respondents were been asked the same questions with the same wording and in the same sequence. It would be best if questions can be read out in the same tone of voice so that the respondents would not be influenced by the tone of the interviewer (Corbetta, 2003; Kajornboon, 2008). The goal of this style of interview is to ensure that interviewees' replies can be aggregated and questions are usually very specific and very often the interviewee were given a fixed range of answers. The strengths of structured interviews are that the researcher has control over the topics and the format of the interview because a detailed interview guide is used. Consequently, there is a common format, which makes it easier to analyze code and compare data.

However, structured interview introduces some rigidity to the interview due to probing can be a problem. Respondents may not understand the question and unable to answer it. Moreover, respondents may not have received sufficient information to answer the question (Corbetta, 2003).

On the other hand, semi-structured interview is non-standardized and frequently used in qualitative analysis. The researcher may have a list of key themes, issues, and questions to be covered. In this type of interview, the order of the questions can be changed depending on the direction of the interview. Corbetta (2003) stated that an interview guide can be used, but additional questions also can be asked. The order in which the various topics is dealt with and the wording of the questions is left to the interviewer's discretion. The interviewer is free to conduct the conversation, to give explanation and ask for clarification if the answer is not clear, to prompt the respondent to clarify further if necessary, and to establish own style of conversation.

This type of interview gives the researcher opportunities to probe for views and opinions of the interviewee.

Meanwhile, unstructured interview is non-directed and a flexible method. It is more casual than the earlier type of interviews. Interviewees are encouraged to speak openly, frankly, and give as much detail as possible (Kajornboon, 2008). The interviewers may ask questions that respondents would be able to express their opinions, knowledge and share their experience. This can create some problems because the interviewer may not know what to look for or what direction to take the interview. The researcher may not obtain data that is relevant to the question of the study and needs to think about what to ask and to ask questions carefully and phrase them properly and know when to probe and prompt. Background data was collected from unstructured interviews because the flexibility and the researcher can investigate underlying motives. However, the drawbacks of unstructured interviews are that they can be unsuitable for inexperienced interviewers. The interviewers may be bias and ask unsuitable questions. In addition, respondents may talk about irrelevant and inconsequential issues. Consequently, it may be difficult to code and analyze the data (Kajornboon, 2008).

In order to account for reliability, the data file of the respondent are stored in a matrix that resembles a common spreadsheet file (Zikmund et al., 2010). The interview procedure and situation will be recorded in a protocol, for example, quoting dates of the interviews and information about interviewees, idiosyncratic settings of each interview, and where and how archival data was collected (Foerstl et al., 2010). Furthermore, a case database stored idiosyncratic notes, transcripts from the

interviews, the questionnaires, content from the companies' websites, sustainability and annual reports, as well as data retrieved from third parties.

4.6 Researcher's Action During the Interview

An interview is one of the evident sources for study. Yin (2008) has listed two strengths and weaknesses of interviews. The strengths are (i) targeted (focuses directly on study topic), and (ii) insightful (provides perceived causal inferences), and the weaknesses are (i) bias due to poorly constructed questions, (ii) response bias, (iii) inaccuracy due to poor recall, and (iv) reflexivity (informant gives what the researcher wants to hear).

Due to the weaknesses that exist during the case interview, the study took precautionary actions in effort to minimize and eliminate (if possible) them. In order to overcome the bias due to poorly constructed questions, the researcher has constructed the questions based on priori theory and discussed with the academic experts and practitioners. Then, to overcome response bias, the researcher has verified the response with other evident sources such as performance evaluation reports, part improvement sheet report, and other internal documents.

4.6.1 Study Protocol

Development and refinement of the case study protocol in the research design phase can be achieved by conducting several pilot studies testing the way of questioning and its structure (Reige, 2003). Moreover, synthesis across studies also can help to build a more generalisable understanding of organisational strategies to support improvement (Baker, 2011).

The case study protocol includes an overview of the case study project (i.e. research questions and case study design), data collection procedures particularly for interviews and field visits, data analysis and the outline of the case study report, and the case study questions (Yin, 2009). The main purpose of the protocol is to keep investigators focused on the research topic, even as different researchers conduct different single case studies. The protocol is used by all investigators on as a guideline for conducting interviews with different informants, which substantially increase the reliability of the case study. Both the questions guideline and protocol are developed earlier in the research process, which help to avoid mismatches and conflicts in the long run (Lin & Zhou, 2011).

Reliability of this case study is enhanced and achieved mainly from the development of a case study protocol (Yin, 2009), which helps guide the researcher as she carry out the data collection. Case study protocol defined for this case study is in below lists. Lin and Zhou (2011) elaborated contents of case study protocol for a supply chain management studies are as follows:

1. Introduction to the case study and purpose of protocol

- case study research questions;
- evolving conceptual framework for the case study; and
- role of protocol in guiding the case study investigator.

2. Case study design

- multiple case is designed following the replication logic;
- each case designed following the conceptual framework; and
- each case study covers a whole supply chain, including main suppliers, focal company, and main customer.

3. Data collection procedures

- multiple source of evidence/cases;
- semi-structured interview with observation; and
- preparation prior to field visit.

4. Data analysis

- follow the conceptual framework to analyze the cases;
- pattern matching: compares the empirically pattern; emergence pattern
- explanation building: develop a rich and full explanation of the cases, and link it to prior related research or theory;
- use qualitative data together with quantitative data; and
- use Atlas.ti software to code and categorize data

5. Outline of case study report

- introduction: study objective and background;
- summary of the case study method;
- the general process mapping of the supply chain;
- the dynamic supply chain capabilities dimensions identified;
- the recommendations of dynamic supply chain capabilities;
- conclusions and discussions of the research results; and
- implications for theory and practice, future research directions.

6. Case study questions

- specific questions that the case investigator must keep in mind in collecting data; and
- the potential sources of information for answering each question.

4.7 Phases of the Study

The researcher has divided this study into seven phases. The phases and their activities are shown in Table 4.2.

Table 4.2
Phases of the Study

Phase	Activities
Phase 1: Planning	<ul style="list-style-type: none">• Prepare the schedule of the study• Collecting information of the oil and gas companies operating in Kuala Lumpur• Looking for individuals who can assist in approaching the company
Phase 2: Preparation of Material	<ul style="list-style-type: none">• Prepare application letter to be presented to the companies• Develop case study questions• Develop probing questions• Prepare presentation slide of the study, cover letter of the study, and letter of agreement for the informant to participate in the case study
Phase 3: Approaching Participants	<ul style="list-style-type: none">• Called and visited the companies presented the application letter, and briefed the CEO or COO of the companies about the study• Presented the detail of the study to the managers in the companies after received commitment from the companies to participate in the study
Phase 4: Conducting Interview	<ul style="list-style-type: none">• The informants were called to set for the interview date• The interviews were started with the person in charge in supply chain• All interviews were tape recorded
Phase 5: Interview Transcription	<ul style="list-style-type: none">• The interview transcription was done in two formats
Phase 6: Data Analysis and Interpretation	<ul style="list-style-type: none">• The data was analyzed and interpreted
Phase 7: Preparation of Study Report	<ul style="list-style-type: none">• Preparing the study report

Source: Author's Compilation

4.8 Validity and Reliability of the Findings

Qualitative researches are often criticized for failing to develop an operational set of measures and using “subjective” judgments, which are bias during data collection (Herritt & Firestone, 1983). This criticism can be overcome by designing the research design tests, taking into consideration the construct, internal and external validity, and

proving the reliability of data collection and analysis. The remaining of this section explained the tactics carried out by researcher to test the four research design as listed in Table 4.3.

Table 4.3
Research Tactics for Four Design Tests

Tests	Research Tactic	Phase of research in which tactics occurs
Construct validity	<ul style="list-style-type: none"> • Use multiple source of evidence • Establish chain of evidences 	<ul style="list-style-type: none"> • Data collection • Data collection
Internal validity	<ul style="list-style-type: none"> • Do pattern matching • Do explanation building 	<ul style="list-style-type: none"> • Data analysis • Data analysis
External validity	<ul style="list-style-type: none"> • Use replication logic in multiple case studies 	<ul style="list-style-type: none"> • Research design
Reliability	<ul style="list-style-type: none"> • Use interview protocol • Develop database 	<ul style="list-style-type: none"> • Data collection • Data collection

Source: Yin (2003)

This study relied on multiple sources and cases of evidence (Corbin & Strauss, 2008; Yin, 2003), namely: document inspection inclusive of secondary data analysis, semi-structures face-to-face interviews and multiple cases where data converge in a triangulating fashion to confirm the construct validity. In this study, the researcher attempted to have the respondents confirm and response the final findings.

According to Yin (2003), internal validity is of concern to most researchers in explanatory qualitative study and in the situation when an inference to some earlier occurrences is required every time an event cannot be directly observed. In the efforts of explaining how and what are the dynamic supply chain capabilities in oil and gas industry, pattern matching was been used by coding the transcripts and documentation using Atlas.ti software as a tool. Next, explanation building are used in this study.

External validity is important in ensuring that findings are generalizable beyond the immediate individual case by using the replication logic (Yin, 2003). This study

followed a set of systematic procedures developed from two pilot case studies and then uses other cases to test the revised procedures in efforts to replicate the same procedures in gathering of data and information.

The objective and goal of reliability is to allow later investigators to arrive at the same findings and conclusions following the same described procedures and to minimize the errors and biases in a study, respectively (Yin, 2003). The data collection protocol been developed to allow later investigators to arrive at the same findings and conclusions. In short, all four researches design tests were applied in this study.

4.9 Interview protocol

Protocol increased the reliability of research and guides the investigators in collecting data from cases systematically to add rigor to the whole research process and help to reduce the potential biases of researchers (Yin, 2003). A set of protocol have been established by researcher as procedures, rules or instruments in collecting data. The purpose of the established protocol is to guide the researcher in the data collection process systematically and to ensure smooth access and gain cooperation from people within the institutions and organization to ensure success of the study. As mentioned earlier, the interview questions and propositions have been developed constructively. This study was carried out in an attempt to answer the research questions and propositions developed. As guidance, a theoretical framework has been developed using the knowledge from literature and adapted in to Malaysia oil and gas industry environment.

Researcher identified the dynamic supply chain capabilities that fit into the definition of dynamic capabilities through interviewing the management and understanding the

description of in the listing given. Researcher contacted the person in the oil and gas industry service contractors for interviews and filled-up of the questionnaires.

Thereafter, the researcher went through the listing provided by respective participating service contractors and make appointment to meet the key project leaders of each company. In occasion, a Non-Disclosure Agreement was signed to refrain from disclosing the details of the collaborations and projects of the third party. However, the name of services contractors was not disclosed due to private and confidential information.

Contact point was crucial in this study. The success of this study relied on the cooperation of other people and whether the person is willing to allocate time and assist in making the research study a success. Rapport was important to allow researcher to develop and to ensure the participating institutions, organizations, and individuals of the understanding of non-glory and non-threatening situation. Confidentiality was communicated and assured to all participating parties that no names (person name, entity, etc.) will be mentioned in the final report. All audio tapes, paperwork's, and documentation were strictly kept in safe and locked area.

In term documentation inspection, researcher had difficulty to access into the documents such as Memorandums of Understanding, Memorandum of Agreements, policies and guidelines which are relevant to the due to the confidentiality clause as stipulated in the Official Secrets Act 1972. Inspection of memorandums prohibited under the Official Secrets Act 1972. Hence, researchers were un-allowed to view some of the content of the service contractors and the focal organization documents.

Other relevant documentations either obtained from internet sources through websites or purchased through the bookshops or the publisher. Researcher also obtained a

copy of the annual report or research reports for analysis. These reports were obtained with not much constraint. Furthermore, researcher also collected and evaluated information from brochures, policies, etc. These information was publicly available and not infringing the Official Secret Acts 1972.

For interview process, the researcher firstly introduced herself and briefly explain the research topic to develop the understanding of the meaning of dynamic supply chain capabilities. Key project leaders identified first before making appointment by determination of the service contractors. Researcher then evaluates and analyzes the data collected using the suggested methods by Miles and Huberman (1994) and Corbin and Strauss (2008) systematically. The theoretical framework is the basis of the constructions of the conceptual framework developed which serves as the guide for explaining the data gathered.

4.10 Analysis Procedure of the Study

Analysis of data is one of the crucial parts in qualitative research. The process is challenging, time consuming, and complex because it has to deal with abundant evidence that usually begins as dialogue (Clarke, 1999). Hence, a researcher must engage right data analysis method in order to ensure trustworthiness of a study. In the case of this study, the data typically came from an in-depth interview. Therefore, a hermeneutics focused on interpreting something of interest, traditionally a text or work of art, but in a larger context of qualitative inquiry, it has also come to include interpreting interviews and observed action” (Patton, 2002). Moreover, it explores “how an interpreter engaging the other through a reading that is grounded in, but not determined solely by the interpreter’s (pre-)understanding may bridge the subject-object dichotomy (Arnold & Fischer, 1994).

The analysis and interpretations of the data were carried out manually and using computer –assisted qualitative software Atlas.ti version 7.1.6. The researcher decided to conduct these manually and using the software because it helped the researcher to gather in depth understanding of the whole picture of the subject matter which reflected the true meaning of the data. The data were gathered via interview and they were in the form of the informants’ narration of their experience. The researcher has developed a standard format table for the analysis purposes. Researcher conducted an analysis to identify the significant statements based on interview transcripts uses the first table (Appendix 4). Next, the significant statements together with the interview excerpts were transferred to the second table (Appendix 5) where they are grouped based on their relatedness. Then, the first level themes were established. The process continues with the verification and validation of the first level themes and start with the process of developing the second level themes. Consequently, the individual and major group categories were established by using the third level table (Appendix 6) and fourth table (Appendix 7) respectively. Data from interviews were later analyzed and codes were given to identify the themes.

4.11 Data Analysis Strategy

This study uses data analysis strategy as suggested by Miles and Huberman (1994) in counting preliminary data through determining the frequency of the codes and noting of patterns and themes. The scholars further emphasized that data analysis strategy used in drawing and verifying valid conclusions are much greater than for extended text, because the display is arranged coherently to permit careful comparisons, detection of differences, noting of patterns and themes and seeing trends (Miles & Huberman, 1994). The categories that related with the analytic frameworks were

developed and this process may lead to generation of a new framework. The analytical abstraction strategy illustrated in Figure 4.2.

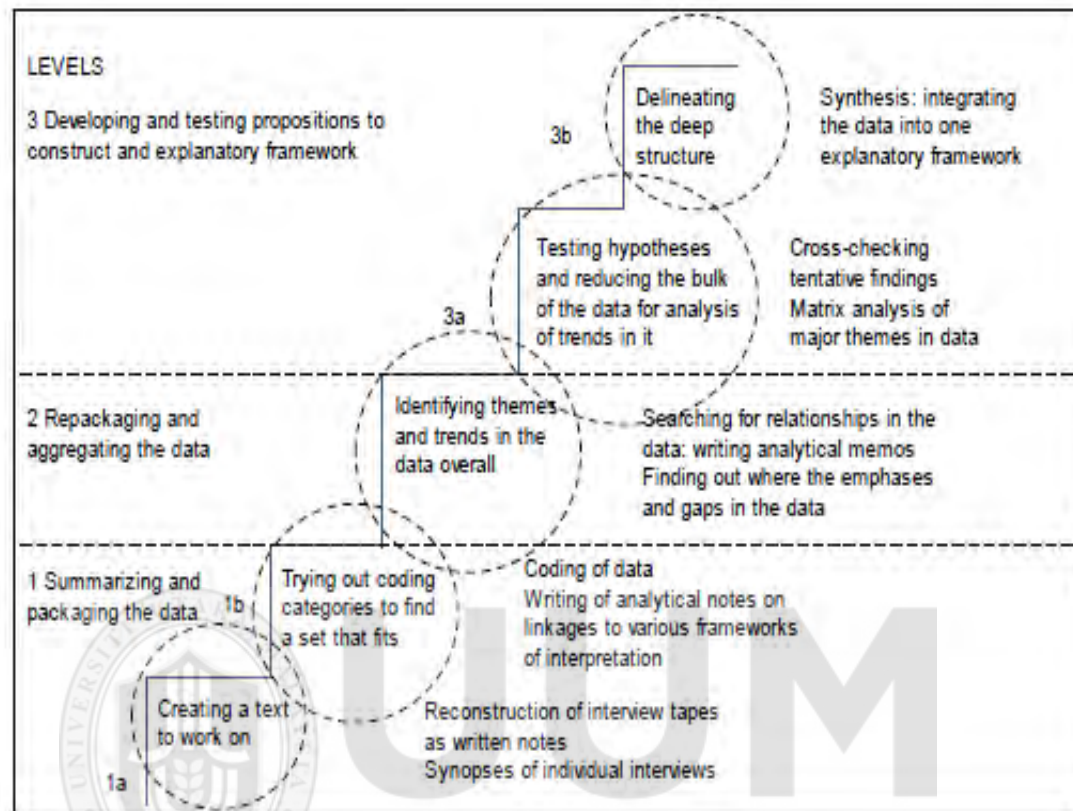


Figure 4.2
The Ladder of Analytical Abstraction
 Source: Miles & Huberman (1994)

Creswell (1998) on the other hand suggested data analysis strategy using a spiral manner as Figure 4.3. The researcher engages in the process of moving in analytic circles rather than using a fixed linear approach supports Creswell’s data analysis strategy, referring to it as an ongoing process of continuous reflection of the data collected. Confidential information such as names of participants, institutions, organizations, and projects were not named or mentioned in a way identifiable in the transcripts, analysis, reports, and any other materials. Seidman (2006) further suggested keeping the original records such as forms, letters, and audiotapes in a secure place. This is to endure safekeeping of confidential information collected from the fieldwork. The data analysis spiral was in line with the research process during

preliminary study and reflected in research finding at subsection 4.17 and chapter 5 respectively.

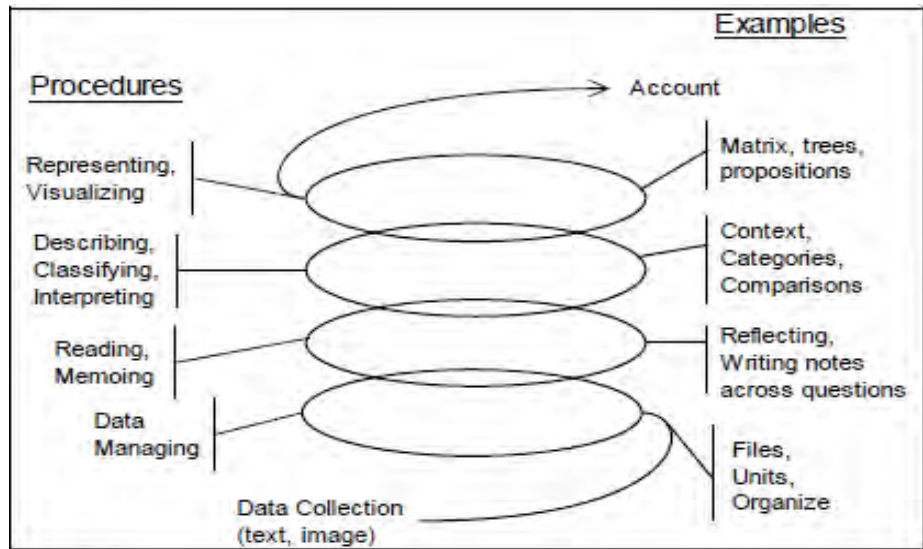


Figure 4.3
The Data Analysis Spiral
 Source: Creswell (1998)

The unit of analysis in this study is the service contractors' oil and gas industry in Malaysia. Hence, the services contractors from the MOGSC (Malaysian Oil and gas Services Contractors) members who willing to participate been interviewed to gather data. Please refer to Table 4.1. This section explained the data analysis strategy adopted by the researcher. In the subsequent section, the research explains the execution of the strategy.

4.12 Data Analysis Method

Miller (1981) suggested using multivariate techniques like cluster and pattern analysis to test multiple contingencies. The researcher used the pattern matching techniques suggested by Yin (2003), Miles and Huberman (1994) and Stake (as cited in Creswell, 1998) to look for correspondence between categories or matching of patterns of independent variables that is mutually exclusive with the rival theoretical propositions

developed. If the researcher obtained identical results from multiple cases, literal replication objectives would have been achieved (Miles & Huberman, 1994; Yin, 2003). Therefore, the researcher needed to understand the context when analyzing the within-site/single case analysis. Miles and Huberman (1994) further suggested eight methods that been used in undertaking cross-site or multiple-cases analysis.

The researcher used unordered meta-matrix in this study by comparing the various dynamic capabilities that contributed to dynamic supply chain performance from several cases into one big chart. In summary, the above-mentioned data analysis method was applied to systematically analyze the data collected via documentation and interviews.

4.13 Transcription and Translation

Qualitative researchers generally perform analytic coding to develop a theory (Richards & Morse, 2007) or generation of a new framework (Creswell, 1998). In this study, the researcher converted the narrative data (audio) to partially processed data (transcripts) and then coded by themes of analysis established using typical content analysis procedure/analytic abstraction method (Corbin & Strauss, 2008; Lincoln & Guba, 1985; Merriam, 2009; Miles & Huberman, 1994) within a case basis. The researcher independently coded the interviews. Cross-cases themes have been established as a priori too before coding and analysis of multiple cases.

The qualitative data transformed into numerical form by indicating the frequency of certain themes using Atlas.ti software, a theory-building program. The software also used for ease of data retrieval, data coding and analysis (Creswell, 1998). However, the user needs to be aware not to allow substitution of close reading of the material by

computer software and the re-labelling of information to the correct categories in the process of analysis (Creswell, 1998). Hence, the researcher followed the step-by-step process suggested by Gibbs (2002) in the development of analytic schemes and coding using themes and visualizing the data. The researcher also used the tree diagram for case study with the help of Atlas.ti program as indicated by Creswell (2003) in Figure 4.4. The transcripts were analyzed to determine if the proposition, research questions and objectives are addressed.

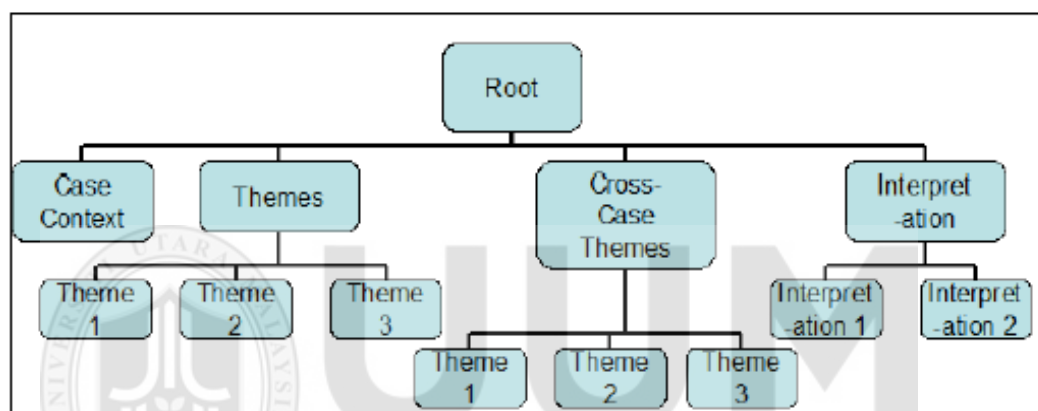


Figure 4.4
 Tree Diagram for Case Study Using Atlas.ti Program
 Source: Creswell (1998)

4.14 Systematic Codification Themes

There were three types of codes, which are reason codes, descriptive codes and inferential or explanatory codes (Miles & Huberman, 1994). The author further indicated the different types of codes been used at different levels of analysis. Codes been created and used at different times during analysis and codes are astringent. Codes driven ongoing data collection and should not be completed at the end of the data collection process but as suggested to code the previous set of field notes before the next trip to the site (Miles & Huberman, 1994)

The researcher adopted the systematic coding process as Miles and Huberman (1994) recommendation. The researcher then created a list of initial codes in the beginning of the data collection process from the conceptual framework developed, problem statements, research questions and propositions. Presetting of codes helped and forced the researcher to tie the research questions and conceptual framework is used only as a guide, to the data directly. The codes were given short descriptive labels and developed coherently, listed according to importance and are part of the governing conceptual structure. The researcher then carried out two preliminary case studies to test the codes developed and make necessary adjustments to have a set of evolved codes for testing of other cases. However, the researcher does not restricted the emerging of new critical factors that might affect the success of dynamic supply chain capabilities in oil and gas industry.

4.15 Secondary Data Analysis

The researcher also uses secondary data via Internet through the websites of the service contractors of oil and gas in Malaysia. A checklist been established to capture the information gathered in tabular format for case of reference and in an effort to determine the population of collaborations in the Malaysia context. The researcher also analyzed the annual reports obtained from the companies or related entities established for the handling of supply chain management in oil and gas industry. As a summary, the documents and information, which obtained via various sources later were used by the researcher for further analysis.

4.16 Limitations of the Study and Strategies to Overcome

Even though the phenomenological paradigm engulfed with arguments that support this study, Easterby-Smith *et al.* (1991) reminds that this paradigm also has some weaknesses. There are: (i) the data collection can take up a great deal of time and resources, (ii) the analysis and interpretation of data may be very difficult, (iii) very untidy because it is hard to control the pace, progress, and end-points, and (iv) the studies may lose their credibility. Thus, this section discusses how these weaknesses have been overcome. The weaknesses and the strategies used to overcome them are shown in Table 4.4.

Table 4.4

Strategies to Overcome Phenomenological Paradigm Weaknesses

Weaknesses	Strategies to Overcome
Data collection can take up a great deal of time and resources	<ul style="list-style-type: none"> • Proper planning and arrangement of appointment to avoid a cancellation of the appointment • Ready in advance all the materials needed before, and during interview which can ensure the smoothness of the interview as well as minimize or eliminate collecting unwanted data • Always have back up files to avoid lost of data due to unexpected circumstances • Self discipline, patient, and passion with the work done
The analysis and interpretation of data may be very difficult	<ul style="list-style-type: none"> • Read various books on data analysis and interpretation • Study previous Phd theses on how data analysis and interpretation were done • Attend data analysis and interpretation workshop (i.e. Atlas.ti workshop) • Consult the supervisor and the experts
Very untidy because it is harder to control the pace, progress, and end-points Many people may give low credibility to the studies	<ul style="list-style-type: none"> • Prepare a flexible study chart • Always alert to the unavoidable delay of events, and react fast to avoid time wasting • Use valid and reliable tools in the data collection • Unearth new knowledge

Source: Easterby-Smith *et al.* (1991)

Furthermore, Eisenhardt (1991); Easterby-Smith *et al.* (1991); and Yin (2003) highlight the weaknesses of study. Table 4.5 shows the weaknesses and how the study faced then.

Table 4.5
Strategies to Overcome The Study Weaknesses

Weaknesses	Strategies to Overcome
Lack of rigor and bias	<ul style="list-style-type: none"> • Use multiple cases • Conduct the study systematically by identifying the research issues, questions, and objectives correctly; justify the need to use study, and conduct a pilot study before starting the actual study • Avoid or minimize the use of leading questions • Verify and validate all the data gathered with the informants • Avoid guessing the vague data, unless they are verified by the informants
Not easily open to generalization	<ul style="list-style-type: none"> • Use multiple cases • Continue the study until the data reach the saturation stage
Potential logistical and operational problem	<ul style="list-style-type: none"> • Flexible planning • Location proximity of the participating companies

Source: Easterby-Smith *et al.* (1991); Yin (2003)

4.17 Ethical Considerations

The ethical issue is an issue that needs to be considered vigilantly in a qualitative inquiry. The eithical considerations began right from the first contacted with the participating companies until the report preparation. The researcher has written an application letter to the CEO/Managing Director of the participating companies for their approval to participate in this study. A follow up visit been made to the companies to collect the approval letter and the managers have been briefed about this study. During briefing, the researcher highlighted the purpose of the study, the data collection process, the benefits of this research to the participating companies, and they have been assured of the confidentiality of the information gathered.

In the data collection process, the informants based on their convenience set the date and location of the interviews. The researcher made it a point to be at the location of the interview about ten to fifteen minutes earlier than the appointment time. This is to avoid the informants from waiting for the researcher. Before the interview began, the researcher explained through the study to the informants. They were also encouraged to ask questions to clear any doubts. The researcher informed the informants that all the information given would be kept as confidential and be used for the study purpose only. Their names and identities as well as the company's name and identity would not be disclosed. After they had understood the researcher's explanation, they were asked to sign a consent letter to show their willingness in participating in the study. The informants' permission to tape-record the interview was also obtained.

After each interview, the interview were transcribed. There were cases where the answers from the informants could not be captured from the tape recording. These unobtainable responses were considered as missing data. Finally, the interview transcriptions were shown to the informants for the purpose of verification and validation of the gathered data.

4.18 Case Study Analysis

The researcher has carried out two preliminary case studies of service contractors during the MOGSEC 2012 in Kuala Lumpur to identify dimension of dynamic supply chain capabilities as guided by conceptual framework developed. The service contractors perceived that collaborations with the industry relate to supply chain orientation, learning orientations, knowledge accessing and co-evolving. In the informal interviews with the personnel from the industry too, the same perception

applies and hence, an understanding of strategic dynamic supply chain efforts that fit the scope of dynamic supply chain.

The researcher interviews two companies from the industry. The researcher found that the performance measures are on the attainment of agreed deliverables, timeline and budget. However, as the interview progress, the researcher generate other emergent performances measures, which are are trust, commitment, resources, flexibility, and safety and risk management. With that on hand, the researcher carried out more interviews.

4.19 Chapter Summary

This chapter described the methodology of the study. It justified the research paradigm and methodology for the study. Then it explained the criteria for the case selection and the number of the cases. After that, the data collection and analysis procedures were elaborated. Finally, this chapter ends with the discussion on the methodology limitation of the study and the ethics that govern the researcher's conduct during the preparation of the study.

Case study methodologies were selected for this research given the need to address the in-depth understanding the dimensions of dynamic supply chain capabilities in the organizations specifically operating in oil and gas industry in Malaysia environment. The unit of analysis is the organizational level for the focal company and the upstream and downstream companies. For case study, case study protocol and interview protocol are developed to ensure the reliability and validity of the data.

CHAPTER FIVE

RESEARCH FINDINGS

5.1 Introduction

This chapter begins by describing the demographic characteristics of the ten respondents and reviewing the themes and significant statements that emerged from the data. The next section presents individual and composite textural descriptions of respondents' experience. A compound structural description, which provides insight on the dynamics capabilities dimensions during the session were collected; and a composite textural-structural description for the group that describes the essence of the collective experience were gathered.

The study paradigm, procedures of data collection and analysis has been described and justified in Chapter 4. This chapter enlightens the findings of the study by answering the research questions as outlined in chapter 1. The research questions constitute four questions that include: 1) What is the meaning of firm's capabilities dimensions in the context of oil and gas industry in Malaysia? 2) What are dimensions of the dynamic supply chain capabilities, as defined in the context of strategic resources in Malaysia? 3) What is the relation between firm's capabilities and dynamic supply chain capabilities in oil and gas industry in Malaysia? And 4) How is an environmental uncertainty factor influence dynamic supply chain capabilities in oil and gas industry in Malaysia Chapter 6 discussed in detail the findings. Therefore, the subsequent sections will describe the empirical findings of this study.

5.2 Embarking on the Case Study

The study took place after a pilot study was completed. The researcher visited the selected service contractors during the Malaysia Oil and Gas Services Exhibition and Conference 2012 (MOGSEC). The selected service contractors were asked to select representatives who were in the best positions to explain supply chain management practices at their respective organization. After that, the researcher visited the selected service contractors to obtain their consent to participate in the study. There were also who turned down the invitation, thus, other service contractors were selected. The interviews were carried out once the service contractors agreed to participate in the study. The interviews were with the selected service contractors' representative who had a direct interaction with supply chain management such as procurement, logistic, material management, and so forth. The details of the informants can be referred to Table 4.1 in Research Methodology chapter.

5.3 Describing the Case Study

The research general objective is to understand the dimensions of dynamic supply chain capabilities in the organizations specifically operating in oil and gas industry in Malaysia environment. The study focuses on the firm's capabilities as well as the influence of the environmental uncertainty on dynamic supply chain capabilities of the oil and gas industry. Ten companies including nine service contractors namely piping manufacturer, maintenance installation, and one production-sharing contract (PSC) have participated in this study. The details of the participating companies are as follows:

Company 1

This company operationally commenced in the year 2008 and is a Malaysian company located in Ampang. The company's aim is to supply state of the art and niche equipment and specialized services for oil and gas industry especially for pipeline either to downstream or upstream sector. This is possible with the key management personnel accumulated years of experience in oil and gas combined with strategic and reputable foreign and local principals and technology partners. The company vision is ultimately to localize the foreign technology and customized services to suit clients' requirement. Moreover, the company commitment is to provide an innovative, quality and cost effective solutions to their clients.

Their mission is to provide innovative, efficient, and cost effective pipeline inspection and niche maintenance solutions to the oil and gas industry without compromising quality and health, safety and environment. They also inculcate several values in the company. First, by providing innovative, quality, and cost effective solutions that exceed clients' requirements and resolve clients' operational issues. Second, is to create long-term relationship with clients by providing excellent after sales service. Third, is to take on reputable technology through strategic partnerships. Finally, is to customize and localize in-house expertise and capabilities through technology transfer and training and to create a healthy and friendly working environment for all employees to instill loyalty and ownership.

Company 2

This company is a leading offshore and marine services provider in Malaysia, focused primarily on the oil and gas sector. It offers a wide spectrum of offshore construction, offshore conversion, and marine repair services at two yards in Pasir

Gudang, Malaysia. Over the span of 40 years, the company has grown organically while enhancing its capabilities and service offering through strategic partnerships with global leaders. Currently, the company has a record of accomplishment of delivering integrated and complex services, including deepwater oil and gas structures and support services, to local and international oil and gas clients. It is also recognized for its expertise in LNG carrier repair and dry-docking, and as a one-stop centre for offshore conversion. This company also offers a full range of construction and engineering services for the offshore and onshore oil and gas industry, from detailed engineering design and procurement to construction, installation, hook-up and commissioning (EPCIC). Projects include the construction of production topsides, process modules, turrets, floating production systems, mooring buoy systems and mobile offshore storage units.

The company vision is to become “*A Leading Marine and Heavy Engineering Organization of Choice*”. Their missions are to be a high performance company that delivers engineering solutions to help their customers stay ahead. “*Take pride in what their do, working as a team and always make a difference*” . Committed to nurture their people who make them great and never compromising on well being at all times. The values shared are “*Passion to Excel, Responsible at Work, Integrity – the Power of Trust, Dedicated to our Customers’ Success and Enterprising as a Team*”.

Company 3

This company was incorporated as a Private Limited Company in 2010. The Company aims to involve in the business of providing high quality services for the oil and gas industry, locally and globally. It is focusing on fabrication and rental of

“weld safe habitat.” The office is located in Kuala Lumpur and the factory located in Kemaman, Terengganu. The company vision is “to become a competent and reliable contractor and supplier. As an old player in the services industry and being a recognize contractor, boosting up the confidence in the market is the prime necessity. The company believes that to broaden their capabilities and competencies in today competitive market, partnership and joint venture effort is the key to achieve and enhance their scope of business.

It began business in the mechanical and electric field, the company with its proven capabilities has developed the company is now. Their highly trained staff with various engineering skills and expertise is well equipped and thus the companies are confident in delivering the high standard of service quality. To materialize the company missions and visions, substantial supports ranging from manufacturers, suppliers and sub-contractors have shown their commitment in a few of projects undertaken by the company before.

Moreover, the company management team comprising more than 20 years of experience and with less than five engineers is capable to provide the highest quality of services to their customers.

Company 4

This company is a local Malaysian incorporated company and established in the year 1990. It has establish itself very well focusing primarily on providing quality products and services to the oil and gas, petrochemical, chemical and power industries here in Malaysia. The company sets on their in-house and partners' experience to build in-house capabilities for the organizational growth of the company. Through strong partnership with various reputable and established manufacturers in the

industries served, the company managed to continue to innovate, expanding the offers and solutions into some niche areas of application. With very strong records of accomplishment, the company is fortunate to continue successfully.

The company head office is located in Kuala Lumpur and two other offices in Miri, Sarawak and Kertih, Terengganu. The company vision is being one of the major solutions and technology provider for the industries served in Malaysia. Together with their partners and combination of strong technical expertise, the company experience and in-house research activities in developing niche capabilities and solutions with value added products and services. The company sole mission is to meet their customer's demand in all aspects of the solutions they are offering. They are also committed to *"Total Customer Satisfaction - Your Goal is our objective"* through on-time delivery, quality products & services, and local innovative solutions.

The company also devoted to the Quality Policy to ensure that its products and services fully meets the requirements of its customers at all times. The goal is to achieve a high level of customer satisfaction at all time with the full management and business objective support. This portrayed by ongoing continuing process towards quality improvement, product reliability, and customer satisfaction. Furthermore, the company also received recognition with the continuing trust given by means of continuing opportunities from major key customers in Malaysia such as SHELL, PETRONAS, BASF, ExxonMobil and others.

Company 5

This company was renowned for its highly dedicated group of professionals. From the top management to all highly trained on-site personnel were in a full array of oil

and gas industry-wide services. The company also provides skilled personnel to the oil and gas industry for both onshore and offshore projects and facilities, from engineering and design, fabrication and construction, installation and commissioning, through to complete inspection and maintenance. Established in the year 1990, the company evolved to become one of the pioneer Bumiputera companies providing technical and engineering support services in the oil and gas industry in Malaysia. Among the services offers are specialize in engineering, scheduled/work pack development, procurement, structural/piping fabrication, electrical/instrumentation installation, pre-commissioning and commissioning activities. This includes the deployment of marine vessels such as work barges, accommodation vessels, crew boats, anchor handling tugs, etc. The business for the company grew steadily over the past decade from being a work force service provider to a dynamic and emerging contractor in integrated maintenance, rejuvenation, hook-up, and commissioning of onshore/offshore for the oil and gas support industries.

Their competency lies in offering unique and feasible solutions to achieve the desired results in accordance with the client's expectations. To date, the company has cumulative and completed projects valued more than RM1 billion since its inception and among their notable portfolio of clients include oil giants PETRONAS Carigali, Shell, Murphy Oil, Talisman, Exxon Mobil, New Field, Petrofac, HESS and Nippon Oil. The company also offers a broad array of expert services ranging from resource management, construction, and project maintenance to specialist technical advisory services. This includes a comprehensive range of consultancy from client's initial strategy formulation and project design to fabrication, construction, installation, implementation and control, as well as maintenance and technical support. The

company factory is located in Kuala Lumpur corporate office and the yard is in Kemaman, Terengganu, Miri, Sarawak, and Labuan, Sabah offices.

Company 6

The company is an independent exploration and production company with a strong portfolio of global offshore and onshore assets delivering oil-weighted growth. The Company is engaged in crude oil and natural gas production activities in the United States, Canada, and Malaysia and conducts exploration activities worldwide. The company headquartered in United States and conduct business from a number of offices with over 1,500 employees around the world.

The company has successful history of exploration, and a consistent record of accomplishment operating in a smart cost-efficient manner. The Company utilizing dynamic, small and lively teams capable of adapting whenever necessary and have demonstrated the ability to proceed quickly from discovery to first oil. All of which has enabled the company to accumulate an enormous portfolio and a high acreage position for a company size.

At the Company, they are committed to exploration of new plays, new technologies and new talent. From their steady, efficient North American Onshore oil and natural gas production, to the strategic, innovative approach to Global offshore efforts, they continue to pursue new horizons and to grow their reserves.

Their success offshore is in large part due to ability to appraise and develop discoveries quickly and cost-effectively. Operational expertise is certainly a factor. The Company maximizes production, minimize downtime, and manage to produce

without sacrificing safety. That is why they are able to go from discovery to first oil so expediently for a significant deepwater play like the Kikeh field in Malaysia.

The local knowledge they have accumulated and the strong relationships they have fostered in the regions of operation have been invaluable. All these factors have given the Company reputation as a preferred partner, as well as exposure to significant, impactful reserves with high margin and value potential.

Company 7

This company began as a trading company in 1988 and over the years, it becomes a reputable integrated brown field services provider for the oil and gas industry. The company is recognized for its high-quality and timely deliverables of manufactured parts and components, maintenance of mechanical and rotating equipment, operations and maintenance services, and integrated brown field services provider for the upstream oil and gas industry. The company also leveraging on their company's strengths in project accomplishments, efficient asset management and logistics, highly capable core and support services, competent workforce, quality assurance or quality control deliverables. Furthermore, by emphasizing health, safety, social, and environment (HSSE) procedures the company has evolved into a reputable group that is able to undertake any project, irrespective of size or complexity. The proven record of accomplishment with oil majors bears testament to their continued trust and confidence in the firm's capabilities.

In 2007, the company listed on the Main Market of the Malaysian Securities Exchange (Bursa Malaysia). Since the listing, the market presence increased with the award of more integrated brown field contracts with a single point of responsibility

and accountability by oil and gas majors like PETRONAS Carigali, SHELL Malaysia, among others.

The company ensures that all contracts, irrespective of size and complexity are according to the highest level of priority in terms of operating standards, HSSE procedures, and quality control. Moreover, the successes achieved attributed to the ability to consolidate and optimize their assets to ensure quality service and timely delivery. Additionally, the close proximity of support facilities and project offices to client's oil and gas facilities is also an advantage.

Company 8

This company is a well known as an Offshore Installation Contractor (OIC) company with a reputable experience of well over 20 years in transportation and installation since 1991. The company provides several services and known as leading solutions provider for offshore construction engineering project management and support services including pipeline installation and construction, platform installation and removal, deepwater/ SURF installations, Inspection, Repair and Maintenance (IRM), and diving to the oil and gas industry.

The company vision is to be a leading regional integrated water, wastewater, and environmental solution provider and to emerge as a significant player in the oil and gas sector. Their mission is to invest proactively in exploration and production in areas with large upside potential. In addition, they want to leverage on oil and gas integrated services and to develop competent, dynamic, and professional workforce. Finally, is to sustain highest ethical standards in their relationships with clients, providers, and stakeholders.

The company also offers complete operations and management services for oil majors, offshore operators, and ship owners worldwide. They provide vessels, equipment, and support to commercial clients within the oil and gas industry.

Additionally, onshore construction is one of the key areas of interest to the company. They prepare and carry out construction projects for onshore and offshore facilities in the oil, gas, and utilities industries, around the globe. Besides, they also concentrate on the construction of Central Utility Facilities (CUF) such as Power/ Cogeneration (COGEN) Plant, LNG Regasification Facility, Other Utilities Facility, Offsite Storage and Facility.

Company 9

This company is incorporated under Malaysia Companies Act 1956 in April 2004 as Bumiputera status company and registered with the Ministry of Finance and a holder of PETRONAS License. The company is a service provider with an integrated engineering solution, vast marine and oil field operational experience, training, and consultation capabilities in the areas of Waste Management Services, Integrated Water Injection Services, Engineering Procurement Construction and Commissioning (EPCC), Laboratory Services, Laboratory Testing and Analysis, Technical Training, HSE Training, Trading and Equipment Rental Services manufactures. The factory is located in Kemaman, Terengganu. The production system of the company focused on the “One stop center for integrated engineering services for oil, gas, and petrochemical industries.

The company vision is to be the leading specialty integrated engineering and services solution provider of choice to the industry. Their mission is to commit and provide client with cost effective, safe, and professionally engineered solution. They believe

that customer and supplier satisfaction is paramount and committed in meeting specification and expectation. They also optimize engineering performance and product improvement using the best technologies.

The company has established work force, which consists of a pool of personnel having 10 to 20 years experience in the oil and gas industry. The combination of the experts and the drivers from various disciplines makes the company a truly Malaysian company with expertise meets the world standard of integrated services. The company also has integrated both the marine and oil field capabilities along with the chemicals and engineering capabilities to be the leader.

Company 10

This company was 100% Bumiputra Status Company, founded by a team that has collectively 20 years' experience in engineering industries. It delivers products and services exactly as the industry needs specializing in oil and gas industry. Supported with expertise in zone rated hazardous area equipment, their main goal is to provide solutions for their clients' requirement. The company target is to ensure all delivered products and equipments are fully compliant with the international standard and directive, mainly IECEx and ATEX, which has global acceptance. Together with that, equipment reliability and manufactures with quick support also are firmly ensured.

The company strives to be the source of choice, offering high integrity technical support, excellent quality products, and exceptional customers satisfaction. Moreover, they also offer unique rental packages to suit their client's requirement. The company also been appointed as an authorized distributor to provide unique

rental packages and the products below such as explosion proof and industrial LED lightings, hydraulic components and pipe-work equipments and drilling lines.

Table 5.1 summarizes the profiles of companies that are included in the study.

Table 5.1
Profiles of Companies

Co.	Year Established	Location	Nature of Business
1	2008	Ampang, Selangor	Supply state of the art and niche equipment and specialized services for oil and gas industry especially for pipeline either to downstream or upstream sector
2	1973	Pasir Gudang, Johor	Offers a full range of construction and engineering services for the offshore and onshore oil and gas industry, from detailed engineering design and procurement to construction, installation, hook-up and commissioning
3	2010	Kuala Lumpur & Kemaman, Terengganu	Focusing on fabrication and rental of “weld safe habitat.”
4	1990	Kuala Lumpur, Miri, Sarawak & Kertih, Terengganu	Focusing primarily on providing quality products and services to the oil and gas, petrochemical, chemical and power industries here in Malaysia
5	1990	Kuala Lumpur, Kemaman, Terengganu, Miri, Sarawak, & Labuan, Sabah	Offers are specialize in engineering, scheduled/work pack development, procurement, structural/piping fabrication, electrical/instrumentation installation, pre-commissioning and commissioning activities
6	1999	United States and conduct business from a number of offices	Engaged in crude oil and natural gas production activities in the United States, Canada, and Malaysia and conducts exploration activities worldwide
7	1988	Petaling Jaya, Selangor	Recognized for its high-quality and timely deliverables of manufactured parts and components, maintenance of mechanical and rotating equipment, operations and maintenance services, and integrated brown field services provider for the upstream oil and gas industry

Table 5.1 (Continued)

Co.	Year Established	Location	Nature of Business
8	1991	Kuala Lumpur	Well known as an Offshore Installation Contractor (OIC) company with a reputable experience of well over 20 years in transportation and installation
9	2004	factory is located in Kemaman, Terengganu	a service provider with an integrated engineering solution, vast marine and oil field operational experience, training, and consultation capabilities in the areas of Waste Management Services, Integrated Water Injection Services, Engineering Procurement Construction and Commissioning (EPCC), Laboratory Services, Laboratory Testing and Analysis, Technical Training, HSE Training, Trading and Equipment Rental Services manufactures
10	2010	Kuala Lumpur	delivers products and services exactly as the industry needs specializing in oil and gas industry

Source: Author's Compilation

5.3.1 Data Collection and Analysis

Conducting a qualitative inquiry is, as doing any other research, where it requires scientifically, systematically, and academically. In fact, it is more challenging because there is possibility of unforeseen events occurring. This requires the researchers to be more receptive and creative in facing or turning the unfavorable events into opportunities that benefit the study. Nevertheless, the challenges still existed especially: 1) to obtain the consent from some of the service contractors who been selected but unfortunately, they were reluctant to participate in this study, and 2) to find a suitable interview time for the informants to interview.

The data for this study were gathered via interview and it was in the form of experience narrated by the informants. Most of the interviews were conducted at the informants' workplace; however, there were also interviews were conducted at the

restaurants and the informants' house. This was due to the informants request because they could not find the time for the interview during working hours. All the interviews were arranged by prior appointment with the informants. These interviews were conducted at different dates according to the convenient of the informants. The informants were briefed about the study, its objectives, contributions to the participating companies, and their role in the study. The informants had to sign a consent letter indicating that they had understood about the study and willing to participate. The consent letter is attached in Appendix 2. The interview duration varied depending on the individual informant. It took about fifty minutes to one and half hours for each interview. The interview were recorded and transcribed before the data were analyzed. The analysis started with the identification of the significant statements made by the informants. Then, the first level themes were developed from the significant statements using the ATLAS.ti software. The process was continued by verifying and validating the first level themes via a second round interview and starts the process of establishing significant statements and developing the second themes. The validation process stopped at the second level themes because there was no input emerging from the second round interviews. Finally, the individual categories, and the major group categories were developed.

5.3.2 Themes and Significant Statements

The researcher adopted the systematic coding process as Miles and Huberman (1994) recommendation. The researcher created a list of initial codes in the beginning of the data collection process from the evolving conceptual framework developed, problem statements, and research questions. Presetting of codes helped and forced the researcher to tie the research questions and conceptual framework is used only as a

guide, to the data directly. The codes were given short descriptive labels and themes were developed coherently, listed according to importance and are part of the governing conceptual structure.

The case study specified the researcher to provide examples of the data analysis at each step in the process. As discussed in chapter 4, the first step was bracketing, or “epoché,” which was addressed by taking 15 minutes before each interview to reflect on assumptions and experience that may influence the research and by considering how the questions could be of service to participants in helping them explicate their understanding of their learning and leadership. The second step was reading the transcripts; each was read at least twice to gain familiarity with the words and the intent before any coding began. This section includes the results of the next two steps: significant statements or horizontalization (third step) and development of formulated meanings (fourth step). The next section of this chapter presents the results for Step 6, situated descriptions, and the themes or axial codes (fifth step) that were developed are discussed within the context of the findings related to the action learning process, learning, and leadership.

The experiences of each individual emerged because of one in-depth interview that asked open-ended questions. An inductive approach was used to construct the meaning from the statements. Each participant’s significant statements or horizon contributed to the overall meaning of the collective experience. To provide an example of the horizontalization process, two examples are provided in Table 5.2 and Table 5.3. The significant statements for the other eight participants are located in Appendix 4.

Table 5.2

Mrs. Weda's Interview: Significant Statements and Formulated Meanings

Significant statements	Formulated meaning
In many other industries Oil and gas supply chain is more organized	Structured SC; SC environment
It is quite high-level integrity. They have structural process. Meaning you deal directly with oil company very difficult for someone try to breach, delay, and maneuvers even for simple things like e.g. your prices – even though you have close good relationship or know your client and client can help you – your price per lot will enter once only – no way to change or to adjust – no way – cannot	Company control by government; as monitoring body
My company is relatively small. Less than 10 people including free-lancer. I think quite good to understand supply chain depends on the total companies. Service too is part of the chain. During MOGSEC this is the good space for us as the chain players.	Service provider; value chain
You cannot run away. Audited account must update and every year auditor will come and audit. Depends on when the financial year will end. License was given with condition letter. Everything has its own due date, if you did not do it your license will be expired and drop from the system. Like Sapura, they appoint one-person to take care of that task. Once drop out it so difficult to join backed.	Regular monitoring; license retention; renewal; regular audit
We also provide training.	Competency development
PETRONAS allows sole sourcing but it happen when technical solution only. Even though technical to invite they will fight but we cannot meet the requirement. Report verification due to technical but we are not qualified. Chances are very rare to get during the pre-qualification. Everything is control by PETRONAS. Eventually, all contractors follow the standard process. “recondition thinking & process”	Single sourcing; technical specification; company control by government; monitoring body
PETRONAS really to take care their strategic services. At the beginning, apply the simple jobs not the main. Once sustain apply for the license. 1 year after operations and have, the audited account then submits for the license. There are load of works for O&G. A lots... Networking is not only clients but also contractors. You need their help at the earlier stage supply to others. Client still offer even though you do not have license but once you got license you will got more clients. For urgent just ask for the big one from the clients.	License application; categories; monitoring institution; Operations pre-requirement; anchor company
When all need urgent such as ROB, vessel, list the ROB I come with mine and other company come also but with verification production loss and risk further. Need to plan & structural maintenance is not there. Something happen unexpected then we go and during that time price is not the main issue.	Urgent orders; price uncertainty; negotiation; co-evolving;

Table 5.2 (Continued)

Significant statements	Formulated meaning
MOGSE is for those companies provide service. MOJEC is for engineering consultant or more consultancies to another group. OSFAM is for fabricators. MOGSE really helps their members. End of the day every day we use services. Let say, supply pump always need service such as maintenance.	Joining specific society in the industry; society; support association
Even same service I did not go marketing but I still got invitation. End of the day who will get the preferences is one that meet the specification and comfortable. Previously, I have been award for project. I just submitted, and awarded. However, main thing once registered then you still be invited.	Fair opportunities for bidding; open mindedness
Upfront marketing might know and offer solution. Read and interact slightly different. Marketing still required having said without marketing still project could be awarded	Marketing; building relationship; collaboration
Corruption in PETRONAS is there but still not proof way of getting business. The committee consists of 10 members and cannot buy out all. Some did not like so no way... End of the day still fight for it but still need to do basic marketing function. More else cash involved does not work... not a pool proof thing. It is very strict. PETRONAS did up to extend removed all those people corrupted. When you go to group supply chain all are women.	Integrity; ethics & professionalism
In this industry, we cannot play with certain level of quality. I know other industry inspect under the ship, call ROB contractors – but due to high level it was awarded to wrong company. If you give to company that is not involves with technical company, then you realize the ship damage. In O&G cannot take the chance for that.	High risk & safety; HSE
Petrochemicals supplies to cosmetics industry and at the end in Malaysia GDP contributing is from O&G. That volume also shows how big the industry. Surrounding KLCC most are O&G companies. Tan&Tan, G Tower. For me if I rental here just waste of time, my staff will be burden, so expensive to eat & to do anything. My office now is in Pandan Indah. It is near yet so far. If client call for meeting just take half an hour only to reach the place. I am not going to move the office to Damansara. Just a waste of time. Now ok still close to KLCC.	Location; Close proximity to supply and demand
O&G has may office in KL. They spent hundred thousand & millions for exhibition. During that exhibition, many visitors come and they spent for hotel, flights, foods & others. Wait you see the incoming exhibition. OGA2013 is expensive & usually nothing below RM2000/3000 plus for the cost fee. MOGSCE exhibition is small. Wait the OGA. It is 5/6 times huge. It takes out whole KLCC hall & external tent. The exhibition is worldwide with all clients & whoever will come.	Building relationship; participating in exhibition; collaboration; strategic partnership; potential customer & suppliers

Table 5.2 (Continued)

Significant statements	Formulated meaning
<p>Now PETRONAS business model go into downstream. All this while, they focus more on exploration and upstream. Now focusing at the downstream, we will sell to by-products and can sell to others too. If the hydrocarbon finish, then no more to explore for hydrocarbon but now move to petrochemicals. Many now in Kerteh, Bintulu now have massive petrochemical.</p>	<p>Potential business opportunities; value chain; sustainability</p>
<p>People do not understand what I am doing. We do have system not the online and real time line courier system & must have tracking & we cannot assume everything is okay. Our company is ISO 9001 as we need to comply to the standard. We have shipment tracking but no software use. We serviced to individual client or project based. Process control at our place is to very great extent and integrated quality info. We do share PETRONAS system hence all contractors online,</p>	<p>Community understanding; perception; ISO; information sharing; SC environment; knowledge accessing; standard recognition; information shared</p>
<p>Challenge dealing with PETRONAS is the terms and conditions. PETRONAS can engage with their lawyers to discuss contract with us but they did not. They just said remove the clause. If acceptable reason okay but if otherwise especially involves monetary and huge commercial impact term services such as 5 million. Anything happen needs to consider the unlimited liability. If anything happens, not only affect the business but also our lives. The business also will go. Now I only accept up to the contract value only. There is insurance but it will cover only related tasks.</p>	<p>Terms & condition in contract; mutual agreement; negotiation; knowledge accessing; co-evolving</p>
<p>PETRONAS is good in managing contractors. From time to time, they will call us. Introduce new system, strategy, new vision. They will call us and they will organize in hotel. E.g. PETRONAS vision being forward zero tolerance on safety that shall be in the criteria of the evaluation in your project, so they will roll out to us their direction.</p>	<p>Managing contractors; information sharing; update information; knowledge accessed suppliers' relationship;</p>
<p>The challenge is market situation as you know client expect prices go lower & lower whereas cannot. In order to get high-income country but with the process is difficult due to cost. Operations costs are difficult to strengthen unless if we can control.</p>	<p>Market uncertainty; challenges</p>
<p>Our key management personnel accumulated years of experience in oil and gas combined with strategic and reputable foreign and local principals and technology partners.</p>	<p>Competence workers; supplier relationship; HR; strategic partnership</p>
<p>We also inculcate several values in the company. We provide innovative, quality, and cost effective solutions that exceed clients' requirements and resolve clients' operational issues.</p>	<p>Values; customer oriented; HSE</p>

Table 5.3

Mr. Jay's Interview: Significant Statements and Formulated Meanings

Significant statements	Formulated meaning
Our company is just a small company. One person will do everything. We are more towards distributor. We sell the existing product. If we can manufacture, we can source from material & manufacture it.	Competence workers; service provider; HR
We are the one who treat the consumer. Even though it is small but it is so critical.	Acknowledge client; Customer oriented
SCM is important exactly in what area who are in..	Understand role of SCM; Knowledgeable in SCM
Dalam o&g ada upstream & downstream & sometimes midstream.. including distribution & people only assume setakat isi minyak ajer.	Collaboration in value chain
PETRONAS banyak award marginal field so company kecil2 yang dulu dah operate tapi ada balance sikit2 so dia bagi project pada company lain.. kalau confident boleh buat duit then dia ambil..	Business opportunities; Potential clients
difficult to get the lisen.. macam2 kena ada.. product @ & services sendiri.. kalau product kena dapat lantikan sole agent..	Difficulties for license; Challenges to startup the business
barang ni tapi brand lain.. kalau korea barang stuck kat evaluation.. then dah disqualified.. ada technical evaluation... susah bila delivery nak urgent kita deliver 20 minggu dia nak 10 minggu.. manufacturer kat 20 minggu jugak.. so kita disqualified awal lagi..	Manage supply; Supplier assessment
The company sets on their in-house and partners' experience to build in house capabilities for the organizational growth of the company.	Internal capabilities / sharing experience; Competency development
Through strong partnership with various reputable and established manufacturers in the industries served, the company managed to continue to innovate, expanding the offers and solutions into some niche areas of application.	Collaboration / potential clients; Strategic partnership / competitive advantage
The head office is located in Kuala Lumpur and two other offices in Miri, Sarawak and Kertih, Terengganu	Location; Proximity to supply & demand
The company also devoted to the Quality Policy to ensure that its products and services fully meets the requirements of its customers at all times.	Quality focus /customer oriented
The goal is to achieve a high level of customer satisfaction at all time with the full management and business objective support.	Top mgmt support; Customer oriented / sustainability

The aforementioned discussions have explained that this study wanted to explore the dynamic supply chain capabilities of the oil and gas industry. In addition, the study also wanted to understand the effect of supply chain orientation and learning orientation of firm's capabilities with the dynamic supply chain capabilities on oil and gas industry in Malaysia. The views of participants were collected. The subsequent sections will describe the case study findings based on the research questions.

5.4 Findings: Research Question 1:

What is the meaning of firm's capabilities dimensions in the context of oil and gas industry in Malaysia?

As mentioned in Chapter 1, the first research question of the study is "What is the meaning of firm's capabilities dimensions in the context of oil and gas industry in Malaysia?" The informants shared their experience of what they perceived as the firm's capabilities in oil and gas companies. Several informants were very passionate in sharing their experience. Yet, there were also informants who had difficulty in recalling their experience, nevertheless, the researcher managed to trigger their thoughts by posing and probing questions such as comparing the work of the particular companies with other companies, how the companies reacted when problem occurred, and to describe the strengths of the companies. Finally, six supply chain orientation items and four learning orientation items were unearthed from the interviews. They were explained in a sequence from the most to the least highlighted by the informants.

A sub question asked about the meaning of firm's capabilities in the context of oil and gas industry. To address this question, Table 5.4 identifies the family codes or the different contextual conditions that influenced the participants' experience; the

structural themes or axial codes, which identified major aspects of the program; and the elements that explained the structural themes.

Two family codes—supply chain orientation and learning orientation—created the firm’s capabilities that fostered whether dynamic supply chain capabilities took place or not. Linked to these codes were the overall findings:

Table 5.4
Codes, Themes, and Elements Related to the Firm's Capabilities

Family code / Findings	Axial Codes / Structural theme	Sub Coded / Elements
Supply chain orientation	<ul style="list-style-type: none"> • Customer • Competitor • Supplier • Logistic • Operations • Value chain coordination 	<ul style="list-style-type: none"> • Local & Foreign • Local & Foreign • Local & Foreign • Local & Foreign • Local & Foreign • Local & Foreign
Learning orientation	<ul style="list-style-type: none"> • Commitment to learning • Shared vision • Open mindedness • Intra organizational knowledge sharing 	<ul style="list-style-type: none"> • Internal & External • Internal & External • Internal & External • Internal & External

5.4.1 Finding 1: Supply Chain Orientation

Aspects of the supply chain orientation, such as customer, competitors, supplier, logistics, operations and value chain coordination, acted as a catalyst for firm’s capabilities. This finding had six axial or structural themes.

Theme 1a: Supply Chain Orientation-Customer.

The supply chain orientation of clients included two elements related to participants’ company that propelled their need to firm’s capabilities: (1) local, and (2) foreign customer.

This element involved seven participants who addressed the customer as part of their supply chain orientation in their company. For instance, Mr. Jay’s case in company 4

is specializing in oil and gas industry, with expertise in the zone rated hazardous area equipment. Their main goal is to provide solutions for their clients' requirement and quick supports for their clients are firmly ensured. The company strives to be the source of choice by offering high integrity technical support with excellent quality products and exceptional customer's satisfaction. As Mr. Jay stated, PETRONAS gives lots of awards for marginal field so small companies are encouraged to bid. If they are confident and feasible, then they will bid. Marginal fields are very technical and economically challenging to explore and extract oil due to their complexity on geology and petro physics analysis. Local and foreign companies were encouraged to develop new technical skills in order to value and maintain petroleum production. Excerpt of the statements from Mr. Jay's as shown below:

P 4: Analysis Case 4 Jay ST.docx - 4:7 [PETRONAS banyak award marginal..] (47:47) (Super)

"Furthermore, the company also received recognition with the continuing trust given by means of continuing opportunities from major key customers in Malaysia such as Shell, PETRONAS, BASF, ExxonMobil and others."

Likewise, Mr. Man's from company 3 is focusing on fabrication and rental of "weld safe habitat" in the red-zone hazardous area. Most of their clients are the major players who have the platform wells. However, according to Mr. Man, "Downstream chain also starting to use this method, but it is still new in some places." Among other main clients, which are using their services include PETRONAS Carigali, Talisman and Murphy Oil. Excerpt of the statements from Mr. Man's as shown below:

P 3: Analysis Case 3 En Man.docx - 3:7 [. downstream pun nak start usi..] (48:49) (Super)

“...downstream starting using this method but it still new in some places.. at export terminal such as at carigali.. same philosophy applied. There are many clients and all of them have platforms.. they use this method and guide new business & niche market also.”

According to Mrs. Weda from Company 1, there are many oil and gas companies located surrounding in Kuala Lumpur especially near to KLCC where PETRONAS located. These companies are willing to spend millions for exhibitions due to the huge crowd of clients that may visit their booth during the event/exhibition. Eventhough, huge amount of budget needed they are willing to spend that much due to the networking and marketing. Excerpt of the statements from Ms. Weda’s as shown below:

P 1: Analysis Case 1 Weda.docx - 1:49 [O&G banyak office in KL. They ..] (278:280) (Super)

“O&G have many offices in KL. They spent more than thousands & millions for exhibition. During that exhibition many visitors come and they spent for hotel, flights, foods & others”. If you don’t attend the conference you will be surprised how many company exist covering all activities in the O&G industry.. area of KLCC will have massive traffic jammed.. the event is 2 years once.. Wait until you see the incoming exhibition which is OGA2013. It is expensive & usually nothing RM2000/3000 below for the cost fee. MOGSCE exhibition is small and you shall wait the OGA. It is 5/6 times huge. It take out whole KLCC hall & external tent.. the exhibition is worldwide.. all clients & whoever will come. Usually most O&G company will set the marketing budget goes to the exhibition. Myself also will be participating during OGA & I spent RM50 thousand for the empty space.”

In different view. Mrs Hally from company 6, emphasized that they do not need to find the buyer because they are the trader of the business. They supply the crude oil to their customer and the agreement has been made much earlier. Excerpt of the statements from Mrs. Hally’s as shown below:

P 6: Analysis Case 6 Pn Hally MP.docx - 6:33 [.. once we have crude oil then..] (206:206) (Super)

“Once we have crude oil then we open it. We are the traders. We don’t have to find the buyer coz we setup the PSC. There is buyer & seller agreement. Before we setup we have a buyer already. We entered Malaysia in 1999 and today, it is a core asset based producing more than 40% of our total 2013 net production. We hold majority interests in seven separate production sharing contracts (PSCs).”

Mr. Nizal from company 7 shared that the company provides a comprehensive range of integrated brown field services for the upstream oil and gas industry and specialist products and services for the petrochemical industry. They also involved in development and production activities of small field cluster. Guided by a set of strong core values; Integrity has and will always remain an important part of their business culture. It is the principle how they built a strong relationship with all stakeholders, throughout every feature of the operations, through strong adherence to ethical business practices and good governance. With that everyone is accountable for the way it approaches and conduct business; and always focus on anticipating thier customers’ needs, by providing quality services and meeting their expectations.

Excerpt of the statements from Mr. Nizal’s as shown below:

P 7: Analysis Case 7 Nizal PE.docx - 7:18 [We have managed projects utili..] (120:120) (Super)

“Through our multi-discipline expertise with that of our clients and by our rapidly expanding international clientele base, which includes many of the major principals worldwide.”

In addition, Mr. One from Company 8 agrees that every contractor have their own vision to be as a main player in the marginal field. Since the company focusing in the commission and installation the clients may come from other marginal field players.

Excerpt of the statements from Mr. One’s as shown below:

P 8: Analysis Case 8 En One GM.docx - 8:26 [. having shared vision, missio..] (166:166) (Super)

“Our company having shared vision and mission. Every contractors have their vision. Our company also would like to venture to marginal field. Not to match exactly. PETRONAS has open to many contractors and now some contractors such as Sapura Kencana has marginal field. They did with Petropack so our company also moving towards it. Additionally, onshore construction is one of the key areas of interest to the company.”

In the case of company 10, Mr Shah shares that their company has been appointed as an authorized distributor to provide unique rental packages and the products below such as explosion proof and industrial LED lightings, hydraulic components and pipework equipments and drilling lines. Excerpt of the statements from Mr. Shah’s as shown below:

P10: Analysis Case 10 Shah Rotor niaga.docx - 10:13 [.. we also have hardware compo..] (84:84) (Super)

“We also have hardware components & distribute in Malaysia. It looks so advanced & with all certification since we doing this if we have the normal generator. Earlier we have zone 2 so why not we have the general one. This is very portable and battery operated. We don’t sell it & we have very bad support from supplier & we need to do the maintenance ourself. We can installed & use it. We can customized the frame too. This are the clients [showing the brocures]PETRONAS Carigali & PETRONAS Gas.”

Theme 1b: Supply Chain Orientation-Competitor

The supply chain orientation of competitor included two elements related to participants’ company that propelled their need to firm’s capabilities: (1) local, and (2) foreign competitor.

This element involved two participants who highlighted the competitor as part of their supply chain orientation in their company. For instance, Mr Jay from company 4 emphasized that across the board, the oil players must adapt to the competition and differentiate themselves. Either through technological achievements or experience that allow them to stand out as best in class for certain types of frontier reserves, or through their ability to develop and bring to market recently discovered reserves. Nevertheless, technical and business skills are not all that is needed: human resources and development will be important selection criteria for many producers.

“There are almost 500-600 manufacturers and all those people are trying to get to cross the bid according to their categories,” stated Mr. Jay. He also agreed the industry could not rely upon outsourcing only from India or China because it can be very competitive and challenging.

However, Mr. Man from Company 3 has a different perspective in competitor of the supply chain orientation. Since their service offered is very specialized, so no other company has been involved in the service yet. “So it [the service] can be in the business involves since 2004/2005 however, there is no standard so that ours become the benchmark. It guides new business and niche market also.” As for Mr. Man, their competitor is referring to his human capital for further training and development.

Theme 1c: Supply Chain Orientation-Supplier

The supply chain orientation of supplier included two elements related to participants' company that propelled their need to firm's capabilities: (1) local, and (2) foreign supplier.

This element involved nine participants who addressed the supplier as part of their supply chain orientation in their company. For instance, Mrs. Weda from Company 1 stated that finding strategic partners in the oil and gas industry could be a painful process. However, Malaysia is fortunate because PETRONAS really concerns about their contractors. Any changes or new information updates will be disseminated and share with all the contractors. Excerpt of the statements from Mrs. Weda's as shown below:

P 1: Analysis Case 1 Weda.docx - 1:47 [PETRONAS good in managing cont..] (379:380) (Super)

“PETRONAS good in managing contractors. From time to time they will call us and introduce new system, strategy, or new vision. They will call us and they will organized in hotel. Such as an eg. like PETRONAS vision being forward zero tolerance on safety, to be in the criteria in the evaluation in your project, so PETRONAS will roll out for us too.”

Interesting case in Company 2 when Mr. Nicky shared their practice and recognition to their suppliers. According to Mr Nicky the company will have a yearly event in appreciation of the vendors. As a token of appreciation, the company also presented awards to companies which showed good performance in the yards and as a motivation to others. Besides the yearly event, the company also provide a platform for a dialogue with their suppliers to share their views on the innovative actions/strategies that they had implemented and how the contractor community would support the company through the transformation journey. The company believed that their vendors and subcontractors play a crucial part in contributing to their success. Therefore, they value their vendors and subcontractors as partners in their business. To enhance the relationship with their partners, a number of initiatives also were implemented throughout the year. Excerpt of the statements from Mr. Nicky's as shown below:

P 2: Analysis Case 2 Nicky MH.docx - 2:13 [This event will be held yearly..] (243:243) (Super)

“Subsequent to the previous event, on 8 July 2013, SCM hosted its Vendor Dialogue 2013 titled “Hand in Hand in Delivering Projects on Time and at Cost.”

Mr. Jay from Company 4 mentioned that they penetrated the market by having a partnership with a supplier from Singapore. It is very challenging to get the supply from Republic China, India, or Korea. The company needs to anticipate risk of disqualified at the screening stage of tendering if the company wants a lower cost but not meeting the precise specification. Excerpt of the statements from Mr. Jay’s as shown below:

P 4: Analysis Case 4 Jay ST.docx - 4:16 [. barang ni tapi brand lain..] (107:107) (Super)

“This is the product but different brand. If in Korea product will be hold at evaluation stage. Then it will be disqualified. There will be a technical evaluation. It is difficult for delivery if it is urgent order. Normally we deliver within 20 weeks but our customer wants it within 10 weeks. Mnufacturer still emphasized for 20 weeks for production so we are disqualified from beginning. One manufactured for made-to-stocks. Made-to-stocks should be okay but for custom made it will take longer time.”

In case of Company 3, Mr. Man mentioned, that they learned from their supplier and transfered the technology to Malaysia. Before this, most of the technology is from UK now they can fabricate using the same technology in Malaysia. He also reported the company really appreciated their suppliers and partners to share their opinions and views. Later, the suggestions were taken into consideration for further continuous improvement. Excerpt of the statements from Mr. Man’s as shown below:

P 3: Analysis Case 3 En Man.docx - 3:16 [equipment memang our own after..] (105:105) (Super)

“The equipments are our own after 2004. Most of it from UK & this people bring the technology. Now we transfer the technology here to local specifically in Kemaman.”

In company 5, Mr Khay stated that the supplier guarantees that the supply shall meet the performance described in the order. If the performances not be met in whole or in part, the supplier promptly proceed with any replacement, repair, change or adjustment necessary in order to meet the requirements of the order. Parts replacements may involve as much as the supply of new complete equipment conforming to the order. Besides, the company warrants that goods supplied and incorporated into the supply and services are new, unused; comply with the specifications, free from defects in materials and workmanship, fit and suitable for the purpose for which they are intended for a period of twelve months after the goods have been put into commercial operation or proper use “Warranty period”. The scope of warranty also covers all expenses to replace all goods found to be defective during the warranty period and all supply and services provided for making good any defective goods.” Excerpt of the statements from Mr. Khay’s as shown below:

P 5: Analysis Case 5 Khay CM.docx - 5:21 [The SELLER guarantees that the..] (140:140) (Super)

“Any replacement for the defective goods during the warranty period shall be warranted under the same terms and conditions for a period of time as stipulated or for another a period of twelve (12) months from the date of replacement whichever is later.”

For the case in Company 7, Mr. Nizal mentioned that their supplier is the reputable group by emphasizing the HSSE procedures. Excerpt of the statements from Mr. Nizal’s as shown below:

P 7: Analysis Case 7 Nizal.docx - 7:4 [Furthermore, by emphasizing HS..] (29:29) (Super)

“Furthermore, by emphasizing HSSE procedures the company has evolved into a reputable group that is able to undertake any project, irrespective of size or complexity. The proven record of accomplishment with oil majors bears testament to their continued trust and confidence in the firm’s capabilities.”

Company 8, Company 9 and Company 10 agreed that to sustain in the industry they need to build a good relationship with clients, providers, and stakeholders. Excerpt of the statements from Mr. One, Mr Daus and Mr Shah as shown below:

P 8: Analysis Case 8 En One GM.docx - 8:38 [Finally, is to sustain highest..] (220:220) (Super)

“Finally, is to sustain highest ethical standards in their relationships with clients, providers, and stakeholders.”

P 9: Analysis Case 9 Daus UD.docx - 9:7 [Believe that customer & suppli..] (47:47) (Super)

“Believe that customer & supplier satisfaction is paramount and committed in meeting specification and expectation.”

P10: Analysis Case 10 Shah RT.docx - 10:29 [Started to serve them and wish..] (133:133) (Super)

“Started to serve them and wish to lock good relationship with them. Sustain good relationship & make friends with everyone is so important.”

Theme 1d: Supply Chain Orientation-Logistics

The supply chain orientation of logistics included two elements related to participants’ company that propelled their need to firm’s capabilities: (1) local, and (2) foreign logistic provider.

This element involved two participants who addressed the logistics as part of their supply chain orientation in their company. For instance, Mr. Jay from Company 4 emphasized that on-time delivery is so vital in this industry. “It is difficult when

urgent delivery. We need to have 20 weeks but the client request 10 weeks only. Manufacturer insists 20 weeks, so we will be disqualified."

In Mr. Man's case in Company 3, the logistic happen when they relocate the workers to respective platforms that required their services. "Our trained worker is only 15 people and they will move from platform to another platform based on the required contract."

Theme 1e: Supply Chain Orientation-Operations

The supply chain orientation of operations included two elements related to participants' company that propelled their need to firm's capabilities: (1) local, and (2) foreign operations.

This element involved seven participants who addressed the operations as part of their supply chain orientation in their company. All seven participants agree that they need to follow the procedures strictly. They need to register and received the specified license from PETRONAS before they can run and operate in the oil and gas industry.

Figure 5.1 shows the procurement process practices in oil and gas industry in Malaysia.

In Mr. Jay's organization case, even though they are just a small company and new to the market, but they support the supply chain operations as a distributor to other players in the industry. "We are the one who treats the client. Even though [our company] is small, but it is so critical."

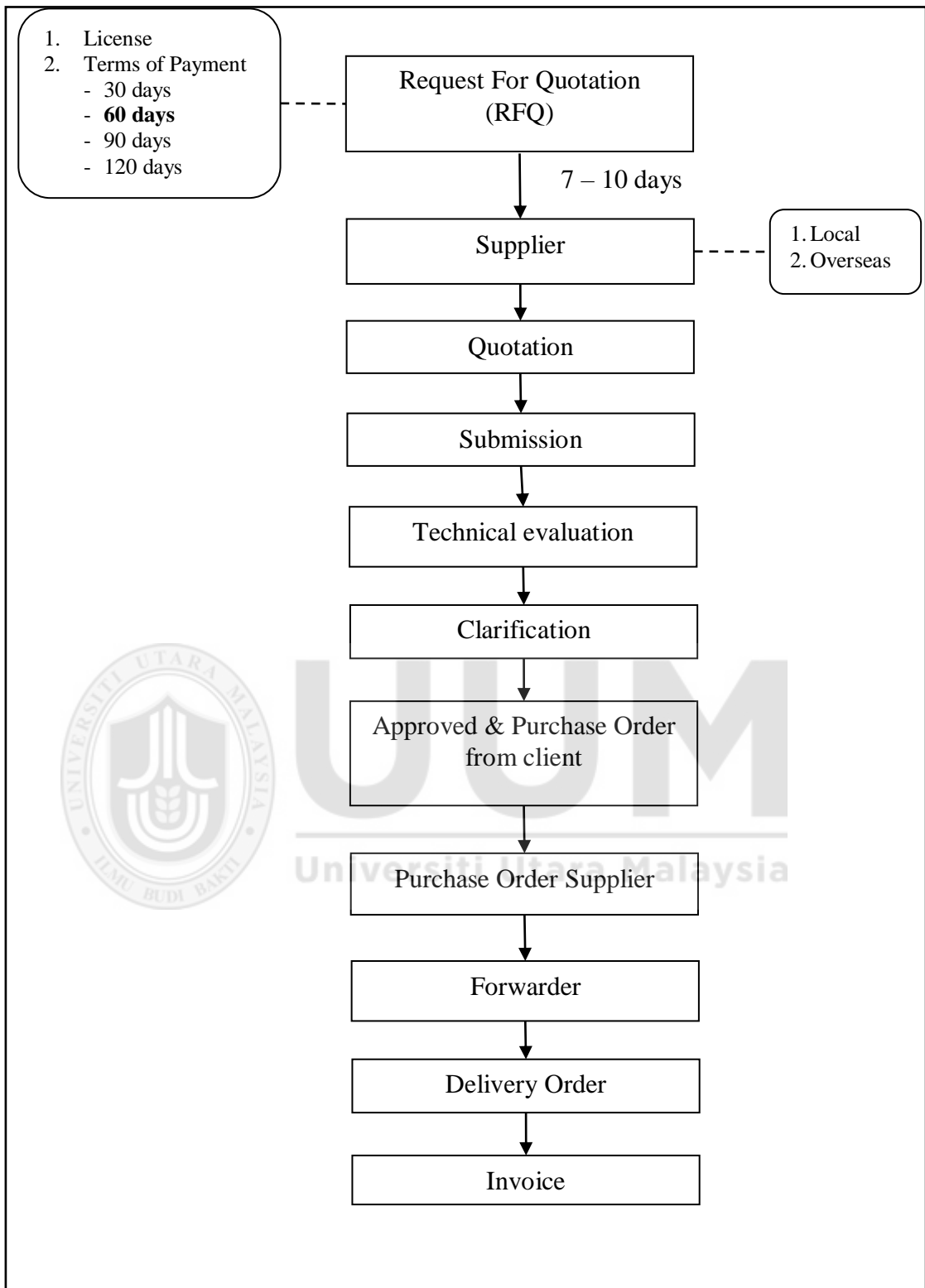


Figure 5.1
Procurement Process Practices in Oil and gas Industry in Malaysia
 Source: Compiled by the author from the interviews.

According to Mr. Man's, although Company 3 are new setup company but their service is made available to those needed. "The job is along the year. They will call on and off according to contract normally everyday.". Excerpt of the statements from Mr. Man's as shown below:

P 3: Analysis Case 3 En Man.docx - 3:2 [. SC PETRONAS very complex] (17:17) (Super)

"SC PETRONAS very complex. Once SC failed other will failed. O&G business has two streams. Upstream & downstream. In my previous experienced upstream & downstream also needs this service. Basically this business involved at platform which is very small area. So when we need to do welding & cutting then we need to use this habitat. It will isolate walking environment in the hazardous area. Several contracts can run simultaneously. Usually based on unit and a minimum one person needed for monitoring. The job nature is to monitor technician he will monitor from the job start until ends. Later will do inspection, and monitoring come in. This company provide people and equipment. It is focusing on fabrication and rental of "weld safe habitat."

Mrs. Weda shared her experienced in managing her Company 1. As Managing Director, she need to apply different license for each of the service the company offered to the industry from PETRONAS as the governing body. The license required details description with different categories/subcategories. Even though the company is small size but since the company is running in the oil and gas industry, they need to comply with the licensing procedure. PETRONAS can come anytime to audit whether the company apply to the operating procedures. Therefore, even though the company is small but it is very structured operations.

At the earlier stage it is quite challenge for the company to get the license. However, they overcome the challenge by creating the network in the oil& gas players. They started off by becoming the subcontractors to the main contractor. Until they are

sustained then the company apply license for other categories of services. Excerpt of the statements from Mrs. Weda's as shown below:

*P 1: Analysis Case 1 Weda.docx - 1:10 [Sample lisencc.. 1st time 1 ye..]
(75:84) (Super)*

"This is the sample lisencc [showing the lisencc]. 1st time 1 year then renew 3 years. Need to follow the terms with special conditions. Principal agreement with foreign company must have letter of approach.. there is categories to determine how we operate, build it our own or outsource.. Each lisencc cost RM500/each. Six services require individual lisencc. If there is subcategories then additional RM500 for 5 subcategories. If you want to add more subcategories then need to add RM100 untuk each. Sample categories such as production chemical wil have subcategories that requires very detail. Eg. In a container container, there are curtain, & others. Drilling, later will take a look which one is applicable, talk to client and you will be in the pooling category. For new lisencc it requires 3 months to process & 6 weeks needed for renewal. My company lisencc will expire in January, therefore this year October I need to submit for renewal."

"My company small & structured.. Tender from PETRONAS can anytime come and they can audit anytime too. It requires Sdn Bhd. Company with minimum requirement. No enterprise or sole proprietorship allowed for the lisencc. RM100 thousand paid up capital needed and operation obtain 1 year audited account. We need to prove to them first. What we can do is we starts by subcontracting to main contractors only certain things only. Its been a little bit tricky. PETRONAS monitor the strategic services. Fisrt apply the simple tasks not the main but once sustain apply for the lisencc. 1 year after operations & there is new audited account then you can submit."

"Process involve 2 tier. 1st is the technical. If need further clarification nee to be done in writing. No phone call is allowed. If you realy insist to call they will not entertain you. Even you have genuine reason. Ethics is very strong in this industry. Before bidding you still can meet but during bidding are not allowed. Bidding can take as short as a week to 120 days. Sometimes 3 months. For very complex and required clarification

on technical sometimes it takes 1 and half month. There is time where 10 companies submitted but after technical only 4 left then the offer open commercial to the four companies. Terms and condition will clarify the price. It also depends how complex the service. It can be a week such a simple technical can resolved within 1 day settle. The technical review involved PETRONAS committee too.”

According to Mr Nicky, Company 2 has a record of accomplishment of delivering integrated and complex services, including deepwater oil and gas structures and support services, to local and international oil and gas clients. The company built upon its core capabilities in general vessel repairs to focus on more complex and higher value repair and refurbishment projects such as those for LNG carriers and offshore oilrigs. Excerpt of the statements from Mr. Nicky’s as shown below:

*P 2: Analysis Case 2 MH.docx - 2:4 [Currently, the Group has a rec..]
(29:29) (Super)*

“Its marine repair services include repair, refit and refurbishment of a wide range of vessels, with a focus on energy-related vessels such as ULCCs, VLCCs, petroleum tankers, chemical tankers, offshore oil rigs, gas carriers and other offshore support vessels. Other services include the construction of new built structures such as tender barges, and ‘jumboisation’ works, which are complex engineering operations to increase the size of a vessel.”

Similar to Company 5, Mr Khay mentioned that the company include the deployment of marine vessels such as work barges, accommodation vessels, crew boats, anchor handling tugs, etc. in their operations. The company also offers provision of facilities installation with hook-up and commissioning services and support. Excerpt of the statements from Mr. Khay’s as shown below:

P 5: Analysis Case 5 Khay CM.docx - 5:4 [Include the deployment of mari..] (29:29) (Super)

“We also includes the engineering procurement, fabrication, and construction of marine structures and other oil and gas amenities that cover electrical and instrumentation of offshore facilities.”

Mrs Hally highlighted that there is different requirement when operating in this oil and gas industry. She mentioned that it is easier to deals with the petroleum rather than the gas. This is because petroleum production can easily be moves but gas production need to install the pipeline as required in the contract. Excerpt of the statements from Mrs. Hally’s as shown below:

P 6: Analysis Case 6 Pn Siti Murphy.docx - 6:34 [.. gas ada gas agreement so ad..] (212:212) (Super)

“Gas will need gas agreement because it requires pipeline. However, oil easier because it can be transported.”

Finally, Mr. Shah from Company 10 stated that they fabricate their own generators to their customers. They only buy the components and fabricated at their own factory. Excerpt of the statements from Mr. Shah’s as shown below:

P10: Analysis Case 9 Shah RT.docx - 10:5 [..what we do is supplying gene..] (35:35) (Super)

“What we do is supplying generators and so called cabin. This we buy the lights then we fabricate the frames as portable lights then we rented it. At the same 200kw requirement a generator for offshore need to meet the standard.”

Theme 1f: Supply Chain Orientation-Value Chain Coordination

The supply chain orientation of value chain coordination included two elements related to participants’ company that propelled their need to firm’s capabilities: (1) local, and (2) foreign value chain coordination.

This element involved seven participants who addressed the value chain coordination as part of their supply chain orientation in their company. For example, Mr. Jay and Mr. One mentioned that oil and gas required the upstream and downstream through the value chain. Sometime distribution is also known as midstream. Excerpt of the statements from Mr. Jay and Mr. One as shown below:

P 4: Analysis Case 4 Jay ST.docx - 4:5 [Dalam o&g ada upstream & downs..] (35:35) (Super)

“In Oil and gas there is upstream & downstream & sometimes midstream. Including distribution & people only assume they only need to fillup their cars to move.”

P 8: Analysis Case 8 En One GM.docx - 8:8 [.. kita as part with the suppl..] (61:61) (Super)

“Oil and gas business has two stages. Upstream and downstream and I involved in my previous experience [in] both streams.”

In company 1, Mrs Weda only have 10 workers to coordinate with all the value chain. Since her company is providing as maintenance service most of her workers are the free lancer. She also mentioned that PETRONAS also focusing on gas and also focusing to the downstream for more byproducts value chain. Excerpt of the statements from Mrs. Weda's as shown below:

P 1: Analysis Case 1 Weda.docx - 1:5 [My company is relatively small..] (39:39) (Super)

“My company is relatively small. Less than 10 people and few free lancer. I think it is quite good and it depends on the companies. During MOGSEC, this is the good platform too meet the chain and maintenance service too is part of the chain.”

“People don't know much when we drill the oil at the platform. Actually by the time geologist study the area to drill that process itself costs billion & millions & many subcontractors involved. That is onlu during exploring to find the crude oil and many more involves at the upstream.

Now PETRONAS business model go into downstream. All this while they focus more on exploration and upstream and now they starts focusing at the downstream and we will sell to byproducts. Our company can sell to other too. If oil depleted then we can now move to petrochemicals. Many Many in Kerteh, Bintulu and now have massive Petrochemical industry.”

Different views from Mrs. Hally in Company 6. According to Mrs. Hally her company focus more on the tender procedure since they are the trader in the industry. Their focus is on the exploration, development and production phase. The value chain in oil and gas is complicated and complex. It requires details coordination at the beginning of the tender procedure until it reach to the refinaeries. There are many uncertainties at the exploration phase but the company is fortunate to have enough reserved for their production. Excerpt of the statements from Mrs. Hally as shown below:

P 6: Analysis Case 6 Pn Hally MP.docx - 6:4 [. during exploration because i..] (29:29) (Super)

“SC is about how you tender procedure, follow the approval, procurement, vendor we use, etc..The plan to do slowly for SC sometimes still contract & procurement some company do. Others still have procurement in contract & tender. SC not many do it and really a full SC requires the procurement and logistic as well. O&G is lots on SC not like manufacturing so you can see. Under PSC, it delivered to the partner which later will take it, so we don't see the end item. The biggest item is the strike for the production. When you do exploration, during exploration it is called a knowledge.”

“O&G once it reached production then its okay. Lots of uncertainty during exploration. Production stabil because we know we have reserves but again how much researves that we have.”

Company 7 has firmly established itself as an integrated provider for Topside major maintenance hook-up construction and commissioning of offshore and onshore oil and gas installations. The scope encompasses all surface engineering capabilities that

include design, engineering, procurement, fabrication, installation, hook-up, construction, commissioning including offshore marine services. Excerpt of the statements from Mr. Nizal's as shown below:

P 7: Analysis Case 7 Nizal PT.docx - 7:2 [The company is recognized for ..] (17:17) (Super)

“The company is recognized for its high-quality and timely deliverables of manufactured parts and components, maintenance of mechanical & rotating equipment, operations & maintenance services, and integrated brown field services provider for the upstream oil and gas industry. Moreover, the successes achieved attributed to the ability to consolidate and optimize their assets to ensure quality service and timely delivery. The company works as a fully integrated brown field service provider for the upstream oil and gas industry, and fully supported by their assets in offshore marine services.”

Mr. Daus from Company 9 mentioned that the company integrate both the Marine and oil field capabilities in their value chain coordination. Excerpt of the statements from Mr. Daus's as shown below:

P 9: Analysis Case 9 Daus UD.docx - 9:10 [The company also has integrate..] (65:65) (Super)

“The company also has integrated both the Marine and Oil Field capabilities along with the chemicals and engineering capabilities to be the leader.”

Finally, Mr. Shah only stated that Company 10 only focus on the supply of the components important in the value chain coordination.

5.4.2 Finding 2: Learning Orientation

Aspects of the learning orientation, such as commitment to learning, shared vision, open-mindedness, and intra-organizational knowledge sharing, acted as a catalyst for firm's capabilities. This finding had four axial or structural themes.

Theme 2a: Learning Orientation - Commitment to Learning

The learning orientation of commitment to learning included two elements related to participants' company that propelled their need to firm's capabilities: (1) internal, and (2) external commitment to learning.

This element involved two participants who addressed the commitment to learning as part of their learning orientation in their company. The informants reported that commitment to learning is important as firm's capabilities of the dynamic supply chain capabilities in oil and gas industry. In Mr. One's organization case, it was then stated in the vision of the organization. The vision stated as "*We are committed to nurturing our people who make us great, never compromising on their well being at all times.*"

For Mrs. Weda, a business woman in men dominated field, even though with small team members, she emphasized her ten permanent staff and the free lancers to gain new insight and learn from others. For example, she encourages her staff to further studies in their own preference and supports them morally to upgrade their qualification. Mrs. Weda also completed her MBA as part-time in one of the public universities, and she believes that everyone should learn new things every day.

Theme 2b: Learning Orientation - Shared Vision

The learning orientation of shared vision included two elements related to participants' company that propelled their need to firm's capabilities: (1) internal, and (2) external shared vision.

This element involved seven participants who addressed the shared vision as part of their learning orientation in their company. Shared vision in oil and gas supply chain players goes beyond. The informants reported that supply chain was really complex, structured, and governed by PETRONAS and other stakeholders.

For instance, Mrs. Weda from Company 1 declared the company vision, mission and values were shared among the staff. The company vision commitment is to provide an innovative, quality and cost effective solutions to their clients. As she said, the mission is "We aspire to provide innovative, efficient, and cost effective pipeline inspection and niche maintenance solutions to the oil and gas industry without compromising quality and health, safety and environment."

For Mr. One, the Company 8 emphasized "*The values shared are Passion to Excel, Responsible at Work, Integrity – the Power of Trust, Dedicated to our Customers' Success and Enterprising as a Team.*" Since the company vision is to become "*A Leading Marine and Heavy Engineering Organization of Choice,*" their mission is to be a high performance company that delivers engineering solutions to help their customers stay ahead. Excerpt of the statements from Mr. One's as shown below:

P 8: Analysis Case 8 En One GM.docx - 8:6 [ada mutually shared vision, sp..] (48:48) (Super)

"There is mutually shared vision, spirit that anyone understand. Having shared vision, mission and every contractors have their own vision. Our

company also would like to venture the marginal field. Not to match exactly but we are moving towards it.”

Differently with Mr. Man, the company vision is to become a competent and reliable contractor and supplier. As Mr. Man mentioned, even though the company considered newly registered, but they are an old player in the services industry and intentionally being a recognize contractor. They fabricate their own product for their client. Boosting up the confidence in the market is the prime necessity. Excerpt of the statements from Mr. One’s as shown below:

P 3: Analysis Case 3 En Man.docx - 3:20 [..linkage & relationship must ..] (129:129) (Super)

“Linkage & relationship must be global. In O&G they want the goal & cheap price. Commitment of learning, shared vision & more on the learning of SC performance. In Kemaman there are many involves but at head quarters not many. How often training is subject to the demand. Anytime we will do it or when new employees come we will do it. Most of the time those who have offshore experience and use to work at the platform.”

Finally, in Mr. Jay Company 4, quick supports firmly ensured. They strive to be the source of choice, offering high integrity technical support, excellent quality products, and exceptional customer’s satisfaction.

Company 2 also share similar vision with their stakeholders. According to Mr. Nicky, the company vision focus to become as a leading marine and heavy engineering organization of choice. It will also help in building trust, subsequently ensure superiority in quality, timeliness, wastage control, and ultimately cost reduction. Excerpt of the statements from Mr. Nicky’s as shown below:

*P 2: Analysis Case 2 MH.docx - 2:19 [The company vision is to becom..]
(83:83) (Super)*

“The company vision is to become “A Leading Marine and Heavy Engineering Organization of Choice”. Their mission are 1) We aim to be a high performance company that delivers engineering solutions to help our customers stay ahead, 2) We take PRIDE in what we do, working as a team to always make a difference, 3) We are committed to nurturing our people who make us great, never compromising on their well-being at all times. The values shared are “Passion to Excel, Responsible at Work, Integrity – the Power of Trust, Dedicated to our Customers’ Success and Enterprising as a Team”.

According to Mr. Nizal, company 7 accomplishments in the industry are built on a strong group culture which promotes high productivity. Grounded on core values that remain the pillars of strong and stable foundation of *“Innovation, Teamwork, Integrity, Quality, customer focus, Accountable, and Sustainable”*. Excerpt of the statements from Mr. Nizal’s as shown below:

P 7: Analysis Case 7 Nizal PT.docx - 7:42 [Core Values: Recognition Our ..] (290:291) (Super)

“Our achievements in the industry are premised on a strong group culture that promotes high Productivity, and is grounded on core values that remain the pillars of our strong and stable Foundation. Innovation, Teamwork, Integrity, Quality, customer focus, Accountable, and Sustainable.”

Company 9 committed in protecting the occupational health, safety and environmental of everybody whether within their own operations and throughout thier business activities. According to Mr. Daus, all employees is strictly prohibited from directly or indirectly soliciting, attempting or accepting to such bribes and corruption from any party or person for himself or for any other person’s behalf. It is the company policy to conduct all of its business in an honest, ethical and lawful manner. This policy applies to all business dealings and transaction and all individual’s at all

levels and grade working with the company branches, subsidiaries, associates, consultants and contractors. Excerpt of the statements from Mr. Daus's as shown below:

P 9: Analysis Case 9 Daus UD.docx - 9:13 [Is committed to protect protec..] (83:83) (Super)

“To accomplish this company shall: Meet legal and other requirement: to comply with the applicable occupational health, safety and environmental legislations. Cooperating fully with relevant statutory bodies to establish occupational health, safety and environmental performance standards. Company also seek continual safety improvement in the performance of all company's activities. Company take a zero-tolerance approach to bribery and corruption and are committed to acting professionally, fairly and with integrity in all our dealings wherever we operate.”

“Bribery is the offering, promising, giving, solicitation to the receipt or agreement to receive any financial or any other advantage or inducement from any person, company, or any other person acting on another's behalf including of such gift and entertainment as a reward for doing or for bearing to do any act in relation to company's affairs or business. Corruption is the abuse or wrong doing of entrusted power for a private gain and typically associated with bribery. All employees have a responsibility to raise concerns to his immediate manager about any issue or suspicious of malpractice at the earliest possible stage. No employee will suffer any detriment as a result of raising genuine concerns about bribery, even if they turn out to be mistaken.”

Theme 2c: Learning Orientation - Open-Mindedness

The learning orientation of open-mindedness included two elements related to participants' company that propelled their need to firm's capabilities: (1) internal, and (2) external open mindedness.

This element involved four participants who addressed the open mindedness as part of their learning orientation in their company. Frequently stated reason of firm's capabilities was the open-mindedness of the service contractors. All service contractors will be invited for the tendering process and given fair chance to submit a tender of a project proposal before being awarded.

Mrs. Weda reported that even for similar service and did not involve with marketing, but she still received an invitation for networking. The preferences are given to those who met the technical requirement and commit approval. Excerpt of the statements from Mrs. Weda's as shown below:

*P 1: Analysis Case 1 Weda.docx - 1:23 [Even same service I didn't go ..]
(186:188) (Super)*

"Even same to service. Even though, I did not go marketing but I still received invitation. End of the day who will get the preferences are those comfortable. I also been awarded for project, submitted and awarded but main thing once registered you can be invited."

In Company 8, they continuously improve the management of supply chain processes to ensure that the Company is operating responsibly at all times. Their vendors and subcontractors play a crucial part in contributing to the Company's success. They value their vendors and subcontractors as partners in their business. To enhance the relationship with their partners' number of initiatives was implemented throughout the year. Mr. One reported the company seriously appreciated their vendors and subcontractors to share their opinions and views. The suggestions were taken into consideration for further continuous improvement. Excerpt of the statements from Mr. One's as shown below:

P 8: Analysis Case 8 En One GM.docx - 8:7 [open minded they don't want to..] (54:55) (Super)

“Open minded and they don’t want to be questioned. Manager needs to solve problem and if anything happen we need to do report.”

Different with Company 2 practices where the Company Group provide an internal channel for their employees and members. Based on Mr. Nicky statement, the company provide an online page, which serves as a guide for their employees and members of the public to disclose any improper conduct committed or about to be committed within the company group. The company strives to continuously improve the management of supply chain processes to ensure that the Company is operating responsibly at all times. Excerpt of the statements from Mr. Nicky’s as shown below:

P 2: Analysis Case 2 MH.docx - 2:23 [MHB practices a strong code of..] (95:95) (Super)

“The company practices a strong code of conduct and business ethics. If you would like to disclose any improper conduct committed or about to be committed within the Company Group, you may report via the online form.”

For Mrs. Hally, since the company is a PSC, therefore bidding procedure ws really important to comply strictly. Excerpt of the statements from Mrs. Hally’s as shown below:

P 6: Analysis Case 6 Pn Hally MP.docx - 6:38 [let say 10 company dalam bidan..] (236:236) (Super)

“Let say 10 company in that area. We have to invite for bidding but bidding process requires more time. There is technical assessment then later we prepare the PQ (purchase quotation).”

Theme 2d: Learning Orientation - Intra-Organizational Knowledge Sharing

The learning orientation of intra organizational knowledge sharing included two elements related to participants' company that propelled their need to firm's capabilities: (1) internal, and (2) external intra organizational knowledge sharing.

This element involved three participants who addressed the intra organizational knowledge sharing as part of their learning orientation in their company. According to Mr. Nicky from Company 2, in order to ensure the partnership can be sustained; the company's SCM division successfully organized a Contractors Dialogue Day. It was attended by selected companies operating in offshore, marine repair, yard optimization and administrative services. During this occasion, the contractors were briefed on their key performance index (KPI) evaluation and assessment as well as the process flow of the vendors' improvement initiative. The also invited several contractors to share their views on the innovative actions/strategies that they had implemented. Subsequent from the event, the company also hosted its Vendor Dialogue. The high performing suppliers and contractors who participated were updated on the Company's transformation initiatives to deliver engineering, procurement and construction (EPC) projects on time and at cost, as well as to strengthen and develop strategic partnerships between the Company and its vendor's community. Excerpt of the statements from Mr. Nicky's as shown below:

*P 2: Analysis Case 2 MH.docx - 2:16 [The 219 high performing suppli..]
(219:219) (Super)*

"The 219 high performing suppliers and contractors who participated were updated on the Company's transformation initiatives to deliver engineering, procurement and construction (EPC) projects on time and at cost, as well as to strengthen and develop strategic partnerships

between MHB and its vendor's community. The partnership forged between MHB and the key subcontractors have enabled both parties to realize the value of better cost control."

There were informants who reported partnering with foreign companies. Mrs. Weda was one of them: "We are lucky since we are small. This is possible with the key management personnel that accumulated years of experience in oil & gas. We also have strategic and reputable foreign and local principals and technology partners. Ultimately, we target to localize the foreign technology and customized our services to suit clients' requirement." Excerpt of the statements from Mrs. Weda's as shown below:

P 1: Analysis Case 1 Weda.docx - 1:46 [Kalau pi offshore dapat waiver..] (386:387) (Super)

"If go to offshore then will get waiver, so now need to have passport and we are aware. This is shared vision by PETRONAS. PETRONAS rolled out to us, and later we disseminate to our staff. PETRONAS is good in managing contractors. From time to time they will call us such as introduce new system, strategy, new vision. PETRONAS will call us and they will organized at any hotel. E.g. PETRONAS vision being forward zero tolerance on safety, to be in the criteria in the evaluation in your project, so they will roll out to everyone."

"People don't understand what I'm doing. We do have system, not the online and real time line courier system but we must have tracking cannot ignored. Our company is ISO 9001, hence, we need to comply to the standard. We did not use any software for shipment tracking but we do have shipment tracking for individual client or project. We apply process control to very great extent with integrated quality information shared. With PETRONAS, the quality information are shared online through system with all contractors such as invoice online. Anybody can be in the industry O&G more or else no need to know someone in the industry before you join it."

Evidence from the study shows that intra-organizational knowledge sharing happening in the oil and gas supply chain. Several informants reported that they attended training by PETRONAS and later share the information with their staff. Mr. Man believes that to broaden their capabilities and competencies in today competitive market, partnership and joint venture effort is the key to achieve and enhance their scope of business.

Evidence in Company 5 can be identified by the approval of drawings, calculations and other documents shall not affect the sole responsibility of the supplier for the goods/services sold. This shall also be applicable to proposals, recommendations and other contributions by the client. According to Mr. Khay, drawings and vendor data are submitted in strict compliance with the specification. If for any reason, the transmission of drawings and vendor data are delayed, client will be informed immediately in writing, with reason for such delay. All drawings and vendor data were delivered to client by hand or through courier service. All preliminary, intermediate and final drawings and vendor data to be furnished are subject to expediting by client or its Appointed Contractor.

P 5: Analysis Case 5 Khay CM.docx - 5:46 [Drawings and vendor data are t..] (310:310) (Super)

“Regarding all figures, drawings, models, samples, calculations, design drawings and other documents which have been made available or paid by buyer for the performance of the order, his property and/or copyright and/or other industrial rights shall be reserved. Said documents shall only be used for work required for the performance of the order and, without the express written approval of buyer, shall neither be reproduced nor disclosed to third parties. On execution of the order they shall be returned to buyer without special request and free of charge. seller shall be liable to buyer for any damage caused by culpable contravention.”

5.4.3 Section Summary

Table 5.5 displays the axial codes about the meaning of firm's capabilities in the context of oil and gas industry and whether or not each participant experienced the code across the supply chain orientation and learning orientation. As stated earlier, it was difficult to isolate one contextual condition as directly supporting or hindering the supply chain orientation and learning orientation. Nevertheless, most participants experienced most firm's capabilities as supplier and value chain coordination in supply chain orientation; and shared vision as the learning orientation. The least firm's capabilities participants experience is competitor and logistics in supply chain orientation; and commitment to learning in learning orientation.

Table 5.5
Summary of Codes for Firm's Capabilities

Family code / Findings	Axial Codes / Structural theme	Companies									
		1	2	3	4	5	6	7	8	9	10
Supply chain orientation	- Customer	☺	X	☺	☺	X	☺	☺	☺	X	☺
	- Competitor	X	X	☺	☺	X	X	X	X	X	X
	- Supplier	☺	☺	☺	☺	☺	X	☺	☺	☺	☺
	- Logistic	X	X	☺	☺	X	X	X	X	X	X
	- Operations	☺	☺	☺	☺	☺	☺	X	X	X	☺
	- Value chain coordination	☺	X	X	☺	X	☺	☺	☺	☺	☺
Learning orientation	- Commitment to learning	☺	X	X	X	X	X	X	☺	X	X
	- Shared vision	☺	☺	☺	☺	X	X	☺	☺	☺	X
	- Open mindedness	☺	☺	X	X	X	☺	X	☺	X	X
	- Intra organizational knowledge sharing	☺	☺	X	X	☺	X	X	X	X	X

Note: ☺ = Indicates code was experienced by participant
X = Indicates code was not experienced by participant

5.5 Findings: Research Question 2:

What are the dynamic supply chain capabilities, as defined in the context of strategic resources in Malaysia?

As mentioned in Chapter 1, the second research question of the study is “What are the dynamic supply chain capabilities, as defined in the context of strategic resources in Malaysia?” The informants shared their experience of what they perceived as the dynamic supply chain capabilities in the context of strategic resources in Malaysia. Several informants were very passionate in sharing their experience. Yet, there were also informants who had difficulty in recalling their experience. Nevertheless, the researcher managed to trigger their thoughts by posing and probing questions such as comparing the work of the particular companies with other companies, how the companies reacted when problem occurred, and to describe the strengths of the companies. Finally, two dynamic supply chain capabilities were unearthed from the interviews. They were explained in a sequence from the most to the least highlighted by the informants.

A sub question asked about what they perceived as the dynamic supply chain capabilities in the context of strategic resources. To address this question, Table 5.6 identifies the family codes or the different contextual conditions that influenced the participants’ experience; the structural themes or axial codes, which identified major aspects of the program; and the elements that explained the structural themes.

Two axial codes—knowledge accessing and co-evolving—created and fostered whether dynamic supply chain capabilities took place or not. Linked to these codes were the overall findings:

Table 5.6

Codes, Themes, and Elements Related to the Dynamic Supply Chain Capabilities

Family code / Findings	Axial Codes / Structural theme	Sub Coded / Elements
Dynamic supply chain capabilities	- Knowledge accessing	<ul style="list-style-type: none"> • Local & Foreign • Internal & External
	- Co-evolving	<ul style="list-style-type: none"> • Local & Foreign • Internal & External

5.5.1 Finding 3: Dynamic Supply chain capabilities

Knowledge accessing and co-evolving, acted as a catalyst for of the dynamic supply chain capabilities. This finding had two axial or structural themes.

Theme 3a: Dynamic Supply Chain Capabilities - Knowledge Accessing

The dynamic supply chain capabilities of knowledge accessing included four elements related to participants' company that propelled their need to firm's capabilities: (1) local, (2) foreign, (3) internal and (4) external knowledge accessing.

This element involved seven participants who addressed the knowledge accessing as dynamic supply chain capabilities in their company. The informants reported that knowledge accessing is part of the catalyst of dynamic supply chain capabilities in oil and gas industry.

For Company 1, Mrs. Weda said that she constantly checks the latest technology in the industry and later proposed to client. In addition to that, PETRONAS also good in managing their contractors by notify those contractors from time to time for any new information such as example by introducing new system, strategy, new vision and other. Excerpt of the statements from Mrs. Weda's as shown below:

*P 1: Analysis Case 1 Weda.docx - 1:45 [constantly check the latest in..]
(393:394) (Super)*

“E.g. PETRONAS vision being forward zero tolerance on safety, to be in the criteria in the evaluation in your project, so they will roll out for everyone. Technology developer is coming from Norway. Latest coming from there and we proposed to client. What PETRONAS acquire from us, then we acquire same thing from our subcontractor. Then its comply. If we go offshore, thei it can have waiver, so now need to have passport, so we are aware. This is shared vision. Anything that PETRONAS rolled out to us, later we disseminate to our staff.”

Knowledge accessing in the industry also is open widely to anyone. This is supported by Mrs. Weda statement that anyone can be in the market and not necessary only for those who has technical background only. People always perceived that those involves with oil and gas are those the exclusive and elite income level too. It is very challenging for her to become as the industry player in the industry since not many people understand about the crude oil exploration and the supply chain. The people cannot value the importance of becoming the contractors throughout the supply chain in oil and gas because they do not understand the whole chain. This happen due to they cannot value it and they did not even realize that electricity that they consumed everyday also supplied by oil & gas. Excerpt of the statements from Mrs. Weda’s as shown below:

*P 1: Analysis Case 1 Weda.docx - 1:45 [constantly check the latest in..]
(393:394) (Super)*

“There are so many by products from O&G. A lots and nobody would like to study it. O&G is one of the last thing that people will think about. People always thought it only for the elite and rich people and only technical savvy whereas no. Anyone can involve in the industry. I never think about it but O&G not necessary for technical people only. O&G more or else anybody can be in the industry. No need to know someone in the industry before you join it.”

The university also is another platform in accessing the knowledge. Many new findings from researches and collaborations done by the universities also been disseminated to all contractors. Most of the new findings are focusing on developing technology and exploration technical. Only few studies done in the behavioral or social science in oil and gas industry. Excerpt of the statements from Mrs. Weda's as shown below:

*P 1: Analysis Case 1 Weda.docx - 1:45 [constantly check the latest in..]
(393:394) (Super)*

“UTP also has many collaboration and involvement in PETRONAS but most is on developing technology & exploration technical.”

In controlling and monitoring the data and information, Mrs. Weda mentioned that they do have tracking system. Since the company is ISO 9001 certified. Therefore, they need to ensure the documentation and all procedures need to be adhered to the standard. They also believed that having integrated quality information is very critical in managing operation in oil and gas industry. Excerpt of the statements from Mrs. Weda's as shown below:

*P 1: Analysis Case 1 Weda.docx - 1:45 [constantly check the latest in..]
(393:394) (Super)*

“People don't understand what I'm doing. We do have system not the online and real time line courier system but must have tracking & cannot ignored only. Our company is ISO 9001 therefore, we need to comply to the standard. We don't have shipment tracking using software but we do monitor tracking for individual client or project. We monitor process control to very great extent with integrated quality information shared.”

Mrs. Weda mentioned that the biggest challenge in this knowledge accessing to her company is dealing with PETRONAS in the terms and conditions of the contracts. PETRONAS can engage with their lawyers to discuss contract with the contractors

but sometimes they did not. They just remove the clause without informing the contractors. The challenge to contractors is if the changes is within the acceptable reason then it can be accepted. However, if it impacts with huge commercial impact or monetary value then the contractors need to reject the tender. Therefore, the company need to ensure that all information stated in the contract covers all the necessary information and within the contract value only to reduce the risk of uncertainties. Excerpt of the statements from Mrs. Weda's as shown below:

*P 1: Analysis Case 1 Weda.docx - 1:45 [constantly check the latest in..]
(393:394) (Super)*

“Challenge dealing with PETRONAS is the terms and conditions. PETRONAS can engaged with their lawyers to discuss contract with us but they didn't. They just said remove the clause. If acceptable reason okay but it cannot apply especially to monetary and huge commercial impact term services. 5 million and if anything happen need to take unlimited liability. If anything happen not only affect the business but also our lives. The business will gone and now I only accept up to the contract value only. There is insurance but it will cover only the relevant and related clause.”

As in Company 4, Mr Jay agreed that knowledge accessing is very important in dynamic supply chain capabilities regardless in what area and who involved. Regardless in oil & gas, automotive or electronic & electronic industry, supply chain management need to access the knowledge from the data and information received. Therefore, everyone in any industry need to understand the importance of SCM. Excerpt of the statements from Mr. Jay's as shown below:

P 4: Analysis Case 4 Jay Sedia Teguh.docx - 4:3 [.. SCM is important exactly in..] (23:23) (Super)

“SCM is important exactly in what area who are in. Its common in automotive and E&E. Eventhough our company is small but it is so important to understand SCM.”

According to Mr. Khay, in Company 5 the most important in knowledge accessing is from drawings and vendor data. The drawings and data need to be submitted in strict compliance with the specification. If for any reason, the transmission of drawings and vendor data are delayed, the client will be informed immediately in writing with reason for such delay. In order to ensure the confidentiality, all drawings and vendor data are delivered to buyer by hand or through courier service. Proposals, recommendations and other contributions by client approval of drawings, calculations and other documents should not affect the sole responsibility of supplier for the goods/services sold. Hence, accessing knowledge for these data is critical in Company 5. Excerpt of the statements from Mr. Khay's as shown below:

P 5: Analysis Case 5 Khay CM.docx - 5:46 [Drawings and vendor data are t..] (310:310) (Super)

“Drawings and vendor data are to be submitted in strict compliance with the specification. If for any reason, the transmission of drawings and vendor data are delayed, buyer is to be informed immediately in writing, giving reason for such delay. All drawings and vendor data shall be delivered to buyer by hand or through courier service. all preliminary, intermediate and final drawings and vendor data to be furnished shall be subject to expediting by buyER or its Appointed Contractor.”

Different interpretation given by Mrs. Hally on knowledge accessing. According to her, the most important stage that the company need the knowledge is during the exploration stage. During exploration stage data and analysis needed to ensure that cost can be controlled. Since the company involves in the exploration and production of crude oil then lots of analysis need to be done in order to find new hole. If they have committed based on the analysis done & strike the crude oil, then they will move to the next stage which is development stage. Excerpt of the statements from Mrs. Hally's as shown below:

P 6: Analysis Case 6 Pn Hally MP.docx - 6:6 [. if dry hole complete, commit..] (41:41) (Super)

“When you do exploration, during exploration it is called a knowledge. If dry hole complete, commitment finish when we signed the contract is not only duration but also commitment involves seismic study, geologist specific in PSC. We need to fulfill that. Then when you do the data from the seismic the data belong to PETRONAS & let say dry hole then contract finish. Anything spent during the exploration phase we call it undercost recovery. Let say they strike all then go to development phase (PSC specify how many years) then go for FSO or platform. All cost PETRONAS not come in single cent, so the company will spent but we put in full recovery.”

Data and information from the seismic analysis is critical during the exploration stage.

According to Mrs. Hally during exploration seismic study need to be done two or three time in a year. Since the company is PSC company they also need to take care the number of manpower needed and cost of production need to be low as possible.

Excerpt of the statements from Mrs. Hally’s as shown below:

P 6: Analysis Case 6 Pn Hally MP.docx - 6:11 [. that all PETRONAS well take ..] (71:71) (Super)

“All PETRONAS well take care manpower & my side how many manpower needed. PETRONAS more on monitoring units, vendor & technical. The 3D seismic need to share the date. They need to be involves from beginning coz they need to know the cost per barrel so that the cost we produce as low as possible. Seismic study sharing 2 timer or 3 timer per year. Then duration you give me let say 3 years. Vendors only do services but we are the owner of the block. Then we need to give budget every year so let say for 5 years then we need to do at least seismic 4 times a year. So all is costs involves. So every year they will approve our budget based on cost recovery.”

Knowledge accessing in risk management also needed to ensure that the project exploration is viable to the company. According to Mrs. Hally, PETRONAS will monitor and govern block/section for the exploration. Once license been given then

the company need to build good relationship with PETRONAS. This also applies to the vendors/contrators selection. A very complex and complicated tender preparation, evaluation with technical review needed in order to reduce the risk. Excerpt of the statements from Mrs. Hally's as shown below:

P 6: Analysis Case 6 Pn Hally MP.docx - 6:11 [. that all PETRONAS well take ..] (71:71) (Super)

“Once we signed the block with PETRONAS then we need to follow them. PSC lisenace is when to get the block. All PSC will have one each such as Hess, Murphy, Talisman. So we need to build good relationship with PETRONAS. Sometimes that block viable to us but not to others. Then need to negotiate but basic terms PSC are the same. If gas will need to an agreement on gas procedures first. Oil is different because it trade based on term 70%. Company need to sign company commitment during the tenure signed as PSC. Usually it takes around 36 months.”

“Same as procurement procedures. If we award the tender individually then PETRONAS will approved the vendors. Because not all will be approved. It is not an easy tasks. Need to prepare tender plan, tender evaluation, make reason why eliminate the company, why not this company. So SC will approve 1 million for some reason. If it does not comply then will be blacklisted.”

In Company 7, knowledge accessing can be found by providing reports to their clients. According to Mr. Nizal, the company provide Full Field Review and Field Development Plan of ageing assets and reservoirs to enable thier clients to make informed decisions on operating onshore and offshore oil and gas facilities.

In the case of Company 8, Mr. One informed that the knowledge accessing is based from the work order contract received from PETRONAS. Once received, the whole process of supply chain will start. The purchase requisition, what type of service needed, how long needed and the most important is when to deliver. Excerpt of the statements from Mr. One's as shown below:

“Process like this PETRONAS give more work order contract then we will execute. From the process we will know what product we need to use. how long, what type during meeting with project manager. For SCM it starts from the services, material & most important the delivery. From there SCM will start. Once we received PR (purchase requisition), we will know what to purchase and from that point procurement will start. Then offer to the bidder. Bidder will evaluate and then make all improvement.”

Case in Company 9 focus more on accessing knowledge on the company to comply with the applicable occupational health, safety and environmental legislations. Besides that, they also focus on integrity policy such as no bribery and corruption. To accomplish this Company 9 team shall: Meet legal and other requirement: to comply with the applicable occupational health, safety and environmental legislations. Cooperating fully with relevant statutory bodies to establish occupational health, safety and environmental performance standards. Bribery is the offering, promising, giving, solicitation to the receipt or agreement to receive any financial or any other advantage or inducement from any person, company, or any other person acting on another’s behalf including of such gift and entertainment as a reward for doing or for bearing to do any act in relation to company’s affairs or business. Corruption is the abuse or wrong doing of entrusted power for a private gain and typically associated with bribery.

In Company 9, Mr. Shah also mentioned that they share the knowledge about the zone categories with their clients. The different zone categories and descriptions can be seen as Table 5.7.

Table 5.7
Description of Different Zone Categories

Zone	Description
0	Explosive or flammable gas/vapor is present all of the time. The ANSI/NEC classification method consider this environment a Division 1 area. As a guide for Zone 0, this can be defined as over 1000 hours/year or >10% of the time.
1	Explosive or flammable gas/vapor will be present or expected to be present for long periods of time under normal operating conditions. As a guide for Zone 1, this can be defined as 10–1000 hours/year or 0.1–10% of the time
2	In this zone, the explosive or flammable gas/vapor would only be present under abnormal conditions. As a general guide for Zone 2, unwanted substances should only be present under 10 hours/year or 0–0.1% of the time
Safe Area	An area where the only risk of a release of explosive or flammable gas would be such things as the propellant in an aerosol spray. This is classed as very low risk of causing an explosion and are more of a fire risk

Source: Compiled by the author from the interviews.

Theme 3b: Dynamic Supply Chain Capabilities - Co-Evolving

The dynamic supply chain capabilities of co-evolving included four elements related to participants' company that propelled their need to firm's capabilities: (1) local, (2) foreign, (3) internal and (4) external co-evolving.

This element involved six participants who addressed the co-evolving as dynamic supply chain capabilities in their company. The informants reported that co-evolving is part of the catalyst of dynamic supply chain capabilities in oil and gas industry.

Mrs. Weda mentioned that the biggest challenge in this co-evolving to her company is dealing with PETRONAS in the terms and conditions of the contracts. PETRONAS can engage with their lawyers to discuss contract with the contractors but sometimes they did not. They just remove the clause without informing the contractors. The challenge to contractors is if the changes is within the acceptable reason then it can be accepted. However, if it impacts with huge commercial impact or monetary value then the contractors need to reject the tender. Therefore, the company need to ensure that all information stated in the contract covers all the necessary information and

within the contract value only to reduce the risk of uncertainties. Excerpt of the statements from Mrs. Weda's as shown below:

P 1: Analysis Case 1 Weda.docx - 1:62 [Challenge dealing with Petrona..] (373:373) (Super)

“Challenge dealing with PETRONAS is the terms and conditions. PETRONAS can engaged with their lawyers to discuss contract with us but they didn't.. they just said remove the clause. If acceptable reason okay tapi yang tak boleh especially monetary and huge commercial impact term services. 5 million and if anything happen need to unlimited liability. If anything happen not only affect the business but also our lives. The business will gone and now I only accept up to the contract value only. There is insurance but it will cover only the relevant and related clause.”

In Case Company 5, the co-evolving involved by having a comprehensive range of consultancy from client's initial strategy formulation and project design to fabrication, construction, installation, implementation and control, as well as maintenance and technical support. In this respect, the supplier's scope was jointly defined with client. The supplier shall bear all the costs incurred in connection with such operations, transportation expenses, cost of dismantling and reassembly of the supply. Excerpt of the statements from Mrs. Khay's as shown below:

P 5: Analysis Case 5 Khay CM.docx - 5:8 [This includes a comprehensive ..] (59:59) (Super)

“The seller guarantees that the supply shall meet the performance described in the order. Should the said performances not be met in whole or in part, the seller shall promptly proceed with any replacement, repair, change or adjustment necessary in order to meet the requirements of the order. Parts replacements may involve as much as the supply of new complete equipment conforming to the order.”

Co-evolving between Company 6 and PETRONAS also needed to ensure that the negotiation is viable to the company. According to Mrs. Hally, PETRONAS will

monitor and govern block/section for the exploration. Once license been given then the company need to build good relationship with PETRONAS. This also applies to the vendors/contractors' selection. A very complex and complicated tender preparation, evaluation with technical review needed in order to reduce the risk. Excerpt of the statements from Mrs. Hally's as shown below:

P 6: Analysis Case 6 Pn Hally MP.docx - 6:5 [. if dry hole then.... there i..] (35:35) (Super)

“If dry hole then there is a commitment that you need to do within 5 years. If you are not fine and not agree to monetary will need to negotiate. Then when you do the data from the seismic, the data belong to PETRONAS & let say dry hole then contract finish. Anything spent during the exploration phase we call it under cost recovery. That all PETRONAS will take care manpower & my side how many manpower needed. PETRONAS more on monitoring units, vendor & technical. The 3D seismic need to share the date and they need to be involves from beginning because they need to know the cost per barrel so that the cost we produce as low as possible.”

According to Mrs. Hally, co-evolving happen during exploration stage especially for PSC license. Sometime several companies may joint as a partner by sharing the seismic study and technologies needed during the exploration stage. The majority holders will become the operator of the exploration. The hindrance of having many partners means more audits the company need to faced. Once company be given as PSC license, they need to comply the requirement that been stipulated by PETRONAS. Excerpt of the statements from Mrs. Hally's as shown below:

P 6: Analysis Case 6 Pn Hally MP.docx - 6:5 [. if dry hole then.... there i..] (35:35) (Super)

“As PSC usually 30 – 70 sometimes 3 partners but majority will be the operator. If you have 3 partners there will be many audits. PSC audit, partners audit & others. Once we signed the block with PETRONAS then

need to follow them. PSC licence is when to get the block for each such as Hess, Murphy, Talisman. So we need to build good relationship with PETRONAS. Sometimes that block viable to us but not to others. Then need to negotiate but basic terms PSC are same. If gas need to agree to gas procedure. Different with oil because trade is based on term 70%. Company need to signed company commitment during signed PSC usually 36 months.”

“Seismic study sharing 2 times or 3 times per year. Then duration you give me let say 3 years. Vendors will do the services but we are the owner of the block. Then we need to give budget every year. Let say 5 years then we need to make seismic 4 times a year, so all involve costs. So every year they will approve our budget based on cost recovery.”

According to Mrs. Hally, PETRONAS will monitor and govern block/section for the exploration. Once license been given then the company need to build good relationship with PETRONAS. This also applies to the vendors/contrators selection. A very complex and complicated tender preparation, evaluation with technical review needed in order to reduce the risk.

In case of Company 7, the co-evolving depend on the Field Development Plan recommendations. Clients have the option to decide on how to operate. According to Mr. Nizal, clients may operate as normal basis, redevelop or abandon the wells and facilities. Excerpt of the statements from Mr. Nizal’s as shown below:

P 7: Analysis Case 7 Petra.docx - 7:17 [From the FDP recommendations, ..] (109:114) (Super)

“From the FDP recommendations, clients have the option to decide on the whether to operate as is basis; redevelop for maximum immediate recovery; redevelop for long-term reservoir recovery; redevelop to arrest production decline; or abandon/decommission wells and facilities.”

In case Company 8, co-evolving also happen as the catalyst of dynamic supply chain capabilities. It can be seen by the contract given to the other operator. Since Company 8 involved domestic upstream oil and gas offshore Transportation and Installation (T&I) activities, therefore they also received the project through as contractor. Excerpt of the statements from Mr. One's as shown below:

P 8: Analysis Case 8 En One GM.docx - 8:14 [.. TNI ni PETRONAS bagi satu c..] (99:99) (Super)

“For T&I PETRONAS will award the contract. Our company were awarded anything to do with contract T&I. It will be stated in simple terms.”

Interesting case in Company 2 on how they identified the co-evolving as catalyst in dynamic supply chain capabilities. According to Mr. Nicky the company will have a yearly event in appreciation of the vendors. As a token of appreciation, the company also presented awards to companies which showed good performance in the yards and as a motivation to others. Besides the yearly event, the company also provide a platform for a dialogue with their suppliers to share their views on the innovative actions/strategies that they had implemented and how the contractor community would support the company through the transformation journey. The company believed that their vendors and subcontractors play a crucial part in contributing to their success. Therefore, they value their vendors and subcontractors as partners in their business. To enhance the relationship with their partners, a number of initiatives also were implemented throughout the year. Excerpt of the statements from Mr. Nicky's as shown below:

P 2: Analysis Case 2 Nicky MH.docx - 2:13 [This event will be held yearly..] (243:243) (Super)

“As a continuation of the SCM journey, SCM also organized a Vendor Recognition Day on 12 December 2013 to recognize the contribution of

the subcontractors and suppliers towards the growth of the Company. There were 73 high performing suppliers and subcontractors invited for this event. The 219 high performing suppliers and contractors who participated were updated on the Company's transformation initiatives to deliver engineering, procurement and construction (EPC) projects on time and at cost, as well as to strengthen and develop strategic partnerships between our company and its vendors' community. Subsequent to the previous event, on 8 July 2013, SCM hosted its Vendor Dialogue 2013 titled "Hand in Hand in Delivering Projects on Time and at Cost".

5.5.2 Section Summary

Table 5.8 displays the axial codes and whether or not each participant experienced the code across about the meaning of dynamic supply chain capabilities in the context of strategic resources in Malaysia. As stated earlier, it was difficult to isolate one contextual condition as directly supporting or hindering the meaning of dynamic supply chain capabilities. Nevertheless, most participants experienced most dynamic supply chain capabilities as knowledge accessing and co-evolving.

Table 5.8
Summary of Codes for Dynamic Supply Chain Capabilities

Family code / Findings	Axial Codes / Structural theme	Companies									
		1	2	3	4	5	6	7	8	9	10
Dynamic supply chain capabilities	- Knowledge accessing	☺	X	X	☺	☺	☺	☺	☺	☺	X
	- Co-evolving	☺	☺	X	X	☺	☺	☺	☺	X	X

Note: ☺ = Indicates code was experienced by participant
X = Indicates code was not experienced by participant

5.6 Findings: Research Question 3:

What is the relation between firm's capabilities and dynamic supply chain capabilities in oil and gas industry in Malaysia?

As mentioned in Chapter 1, the third research question of the study is “What is the relation between firm's capabilities and dynamic supply chain capabilities in oil and gas industry in Malaysia?” The informants shared their experience of what they perceived as the relation between firm's capabilities and dynamic supply chain capabilities in oil and gas companies. Several informants were very passionate in sharing their experience. Yet, there were also informants who had difficulty in recalling their experience, nevertheless, the researcher managed to trigger their thoughts by posing and probing questions such as comparing the work of the particular companies with other companies, how the companies reacted when problem occurred, and to describe the strengths of the companies. Finally, three relations between firm's capabilities and dynamic supply chain capabilities were unearthed from the interviews. They were explained in a sequence from the most to the least highlighted by the informants.

A sub question asked about the relation between firm's capabilities and dynamic supply chain capabilities in oil and gas companies. To address this question, Table 5.9 identifies the family codes or the different contextual conditions that influenced the participants' experience; the structural themes or axial codes, which identified major aspects of the program; and the elements that explained the structural themes.

Three axial codes—human resource, competency development and strategic partnership—identify the relations between firm's capabilities and dynamic supply chain capabilities that fostered whether dynamic supply chain capabilities in oil and gas industry took place or not. Linked to these codes were the overall findings.

Table 5.9

Codes, Themes, and Elements Related to the Relations between Firm's Capabilities and Dynamic Supply Chain Capabilities

Family code / Findings	Axial Codes / Structural theme	Sub Coded / Elements
Relations between Firm's Capabilities and dynamic Supply chain capabilities	Human Resource	<ul style="list-style-type: none"> • Local & Foreign • Internal & External
	Competency development	<ul style="list-style-type: none"> • Local & Foreign • Internal & External
	Strategic Partnership	<ul style="list-style-type: none"> • Local & Foreign

5.6.1 Finding 4: Relations between Firm's Capabilities and dynamic Supply chain capabilities

Human resource, competency development and strategic management values acted as a catalyst for the relation between firm's capabilities and dynamic supply chain capabilities. This finding had three axial or structural themes.

Theme 4a: Human Resources

Relations between firm's capabilities and dynamic supply chain capabilities of human resource included four elements related to participants' company that propelled their need to firm's capabilities: (1) local, (2) foreign, (3) internal and (4) external human resource.

This element involved all participants addressed that there are relations between firm's capabilities and dynamic supply chain capabilities from the aspect of human resource in their company.

In Company 1 case, the managing director has vast experience in the industry. According to Mrs. Weda, most of their key personnel have been working years with reputable foreign and local players in oil and gas industry. Therefore, the human resource is really the one who are capable and credible to the tasks given. Excerpt of the statements from Mrs. Weda's as shown below:

*P 1: Analysis Case 1 Weda.docx - 1:40 [This is possible with the key ..]
(425:425) (Super)*

“This is possible with the key management personnel accumulated years of experience in oil and gas combined with strategic and reputable foreign and local principals and technology partners.”

Over the span of 40 years, Company 2 has grown organically while enhancing its capabilities and service offering through strategic partnerships with global leaders. The slogan also stated in the vision and mission of the company. Excerpt of the statements from Mr. Nicky’s as shown below:

*P 2: Analysis Case 2 MH.docx - 2:3 [Over the span of 40 years, the..]
(23:23) (Super)*

“Over the span of 40 years, the company has grown organically while enhancing its capabilities and service offering through strategic partnerships with global leaders. Furthermore, the company built upon its core capabilities in general vessel repairs to focus on more complex and higher value repair and refurbishment projects such as those for LNG carriers and offshore oilrigs.”

“The company vision is to become “A Leading Marine and Heavy Engineering Organization of Choice”. Their mission are 1) We aim to be a high performance company that delivers engineering solutions to help our customers stay ahead, 2) We take PRIDE in what we do, working as a team to always make a difference, 3) We are committed to nurturing our people who make us great, never compromising on their well being at all times.”

Similar justification from Mr. Man from Company 3. The company management team comprising more than 20 years of experience is capable to provide the highest quality of services to their customers. There are less than five people Engineer(s) in the company He mentioned that even though he just startup Company 2 but he has wide experience in the industry with upstream and downstream value chain. Currently he has more than 15 trained technicians who are moving from platform based on the

required contract. Their highly trained staff with various engineering skills and expertise is well equipped and thus the companies are confident in delivering the high standard of service quality. Excerpt of the statements from Mr. Man's as shown below:

P 3: Analysis Case 3 En Man.docx - 3:3 [syarikat kami baru setting up ..] (23:23) (Super)

"We just setup this company early of the year but I'm involves in this industry more than 20 years and I'm doing on the business offshore. O&G business divided into two which are the upstream & downstream. In my previous experience both upstream & downstream I'm involved. Basically this business involved at the platform which very limited and small area. So when we need to do welding & cutting then we need to use this habitat, so it will isolate walking environment in the hazardous area. We have many trained workers in previous company, around 100 technicians. With this new company we only have 15 technicians. They will be moving from any platform based on the required contract. Request coming all the year depends on the contract and the job is along the year. They will call on and off according to contract normally everyday and sometimes there is a break 2/3 days but job must be continue."

According to Mr. Man also, sometime they received several jobs at the same time. Usually a minimum of two technicians needed where one technician needed for monitoring from the job start until it stop and another needed for the inspection. Company 3 also emphasize on the commitment of learning, shared vision and support in enhancing the skills. Excerpt of the statements from Mr. Man's as shown below:

P 3: Analysis Case 3 En Man.docx - 3:3 [syarikat kami baru setting up ..] (23:23) (Super)

"Several contracts run simultaneously. Usually based on unit with minimum one for monitoring. A normal procedure nature is monitoring. The technician will monitor from the job start until end and will do inspection too. This company provides people and equipment."

Commitment of learning, shared vision & more on the learning are encourage here. For SC performance there are many technicians in Kemaman but in head quarters not many. How often training is subject to the demand. We will do anytime such as for new employees. Most on the time involves those who have experience offshore and been working at the platform.”

Company 4 shared different perspective of the relations between firm’s capabilities and dynamic supply chain capabilities. Together with their partners and combination of strong technical expertise, the company experience and in-house research activities in developing niche capabilities and solutions with value added products and services. Excerpt of the statements from Mr. Jay’s as shown below:

P 4: Analysis Case 4 Jay ST.docx - 4:1 [. company kami kecil ajer.. se..] (11:11) (Super)

“Our company is small and everyone is doing multiple tasks. Our company is more towards distributor. We sell existing products and if we manufacture we source the materials & manufacture.”

Company 5 was renowned for its highly dedicated group of professionals. Among the services offers are specialize in engineering, scheduled/work pack development, procurement, structural/piping fabrication, electrical/instrumentation installation, pre-commissioning and commissioning activities. Excerpt of the statements from Mr. Khay’s as shown below:

P 5: Analysis Case 5 Khay CM.docx - 5:1 [This company was renowned for ..] (11:11) (Super)

“The company also offers a broad array of expert services ranging from resource management, construction, and project maintenance to specialist technical advisory services. Included provision of trained, highly skilled, and experienced personnel to execute or implement a wide range of services and systems.”

According to Mr. Khay, the company highlighted that as supplier, they guarantee that the supply and services will be performed in a professional manner.

According to Mrs. Hally, Company 6 practice differently when it comes to human resource. In other industry like communication and manufacturing, may focus on the organizational behavior and the people. Nevertheless, in oil and gas little effort done in the area. The focus is more on the people with the technical expertise where they recruited and assigned the right person to the right job. According to Mrs. Hally as a human resource person it is easy for her because previously she has a technical background. Nowadays, there are limited pool of technical person and brain drained can be expected sooner or later. Excerpt of the statements from Mrs. Hally's as shown below:

P 6: Analysis Case 5 Pn Hally.docx - 6:26 [Even in Shell itself.. they do..] (163:163) (Super)

“Even in Shell itself they don't go for OB & development. They just employ the right person to right job. Not like communication & manufacturing who focus on OB & most important people. Very little effort done in O&G which need more technical expertise. Therefore, we put our energy to technical person rather than SC. Although I HR because easy for me but again because I do have technical background. If manpower we given RMI million then they did a system and must be selected from the same pool and choosing the similar person. Now it is a limited pool. Once brain drained so it can be manipulated the money and company willing to pay too.”

Company 7 provides a spectrum of fabrication services for the upstream oil and gas industry. Excerpt of the statements from Mr. Nizal's from company 7 as shown below:

P 7: Analysis Case 7 Nizal PT.docx - 7:10 [Supported with minor fabricati..] (66:66) (Super)

“Our track record includes successes in new technologies application for rejuvenating mature oil and gas fields through our multi-discipline expertise with that of our clients and by our rapidly expanding international clientele base, which includes many of the major principals worldwide. In addition, our team of specialists provides technical support for site installation, commissioning, and training on equipment use, on-going/scheduled maintenance and breakdown repair services. Supported with minor fabrication yards and highly competent professional and technical workforce, they are able to tap on the growing opportunities in the domestic and regional markets.”

Company 7 manufacturing plant occupying approximately 5,669 square meters of covered work area besides supported by a team of highly trained and experienced personnel from various engineering disciplines.. Excerpt of the statements from Mr. Nizal’s as shown below:

P 7: Analysis Case 7 Nizal PT.docx - 7:10 [Supported with minor fabricati..] (66:66) (Super)

“For a particular project, company clocked approximately 23 million man hours over a six-year period, whilst operating a fleet of four work barges, three workboats, anchor handling tugs, fast crew boats, material supply boats and more than 1,000 construction personnel offshore. Our Marine Spread of work barges and work boats accommodate approximately 1,600 construction crew for offshore integrated brown field work. Over 3,000 strong competent professional and technical workforces drive our business operations today.”

Excerpt of the statements from Mr. Nizal’s as shown below:

P 7: Analysis Case 7 Nizal PT.docx - 7:10 [Supported with minor fabricati..] (66:66) (Super)

“Our Miri operations in East Malaysia (Miri & Labuan) are supported by a highly competent team of professionals and technical personnel, comprising specialists, senior technicians, supervisors, technicians and machinists. Combined, they possess extensive experience in maintenance and operations of a wide range of rotating and static equipment of the oil

and gas industry. We also provide project management services in compliance with QA/QC Standards (ISO9001/2000 Certified) and HSSE procedures and guidelines, with over two million incident free man hours for completed contracts and service provisions.”

According to Mr. One in Company 8, SCM covers a very wide perspective in oil and gas industry. From activities of tug the barge, maintenance, welding and others need to go through the department of SCM. Mr. One said that not many who attached in procurement department having the technical background because majority having business background. The constraints of that is the purchaser takes some time to understand the technical term used in the industry. Excerpt of the statements from Mr. One's as shown below:

P 8: Analysis Case 8 En One GM.docx - 8:15 [. job ambik barge do all weldi..] (105:106) (Super)

“Our company job beside barge include do all welding and production. There are many processes onboard, services, procurement, barge items, all must go through SCM process. If you talk about maintenance is different, project too different, anybody can enter. Usually for maintenance end user will stick to the same one. Since I am from engineering and its not related to supply chain but in O&G SCM need the basic in technical. O&G if need to recruit people, I prefer someone having the engineering discipline or one who know basic technical from other degree but again it is difficult to find one. Not many having procurement background in engineering and most SCM from business discipline.

Excerpt of the statements from Mr. One's as shown below:

P 8: Analysis Case 8 En One GM.docx - 8:15 [. job ambik barge do all weldi..] (105:106) (Super)

“The company also offers complete operations and management services for oil majors, offshore operators, and ship owners worldwide. Offshore Structural Installation (OSI) includes lift capabilities up to 1,100 ST, by extensive experience in the installation of Platforms, subsea components,

and all other types of offshore structures. Expertise in operation & maintenance will further optimize maintenance strategies cost, prolong the time required between maintenance, as well as enhance unit reliability & availability.”

Company 9 has an established work force, which consists of a pool of personnel having 10 to 20 years’ experience in the oil and gas industry. Company 9 institute good occupational health and safety practices by taking proactive approach towards creating safe working environments and promote employee health and well-being. Besides, the company also provides necessary training and support to employees to ensure they are able to fulfill company’s occupational health, safety and environmental commitments. Excerpt of the statements from Mr. Daus’s as shown below:

P 9: Analysis Case 9 Daus UD.docx - 9:9 [The company has an established..] (59:59) (Super)

“Our company recognizes the employees’ contributions towards its success. It also recognizes that to maintain a committed and competent workforce, it needs to ensure that there is adequate training and development provided for all employees.”

P 9: Analysis Case 9 Daus UD.docx - 9:9 [The company has an established..] (59:59) (Super)

“Our company is committed to making the most effective use of the talents, skills and abilities of its workforce and to helping all employees maximizing their contributions towards the company’s success and sustainability. To demonstrate its commitment, the company has formalized its training through the allocation of specific budget resources.”

Company 10 is 100% Bumiputra Status Company, founded by a team that has collectively 20 years’ experience in engineering industries. Supported with expertise in zone rated hazardous area equipment, their main goal is to provide solutions for

their clients' requirement. According to Mr. Shah, the company fabricates their own products and provides service maintenance too. Excerpt of the statements from Mr. Shah's as shown below:

P10: Analysis Case 9 Shah Rotor niaga.docx - 10:5 [..what we do is supplying gene..] (35:35) (Super)

“What we do is supplying generators and so called cabin. We buy the lights then we fabricate the frames as portable lights then we rented it. At the same 200kw requirement a generator for offshore need to meet the standard. This is very portable and battery operated and we don't sell it. We received bad support from supplier & we need to do the maintenance ours self. It wa a good experience and therefore maintenance we do it ourselves. We do self maintenance and what we did before this we giving service on our own equipment. Our finance team control ourselves.”

Theme 4b: Competency Development

Relations between firm's capabilities and dynamic supply chain capabilities of competency development included four elements related to participants' company that propelled their need to firm's capabilities: (1) local, (2) foreign, (3) internal and (4) external competency development.

This element involved nine participants addressed that there are relations between firm's capabilities and dynamic supply chain capabilities from the aspect of competency development in their company.

According to Mrs. Weda, Company 1 provides training to their staff in order to enhanced the competency development. Company 2 also committed to nurture their people who make them great and never compromising on their well-being at all times. They were selected based on their capabilities, proven record of accomplishment and

experience in their respective areas. Excerpt of the statements from Mr. Nicky's as shown below:

P 2: Analysis Case 2 MH.docx - 2:19 [The company vision is to becom..] (83:83) (Super)

“The company vision is to become “A Leading Marine and Heavy Engineering Organization of Choice”. Our mission is 1) We aim to be a high performance company that delivers engineering solutions to help our customers stay ahead, 2) We take pride in what we do, working as a team to always make a difference, 3) We are committed to nurturing our people who make us great, never compromising on their well-being at all times.”

Mr. Man from Company 3 mentioned that the company provide training to their workers in order to comply the in-house standards procedure. Excerpt of the statements from Mr. Man's as shown below:

P 3: Analysis Case 3 En Man.docx - 3:8 [required skilled & trained wor..] (55:55) (Super)

“We required skilled & trained workers. We give training to meet the standards to the technician and to comply the standards. For this service PETRONAS did not set any standards to the workers but the company did set.”

The company believes that to broaden their capabilities and competencies in today competitive market, partnership and joint venture effort is the key to achieve and enhance the scope of business. Their highly trained staff with various engineering skills and expertise is well equipped and thus the companies are confident in delivering the high standard of service quality. Excerpt of the statements from Mr. Man's as shown below:

P 3: Analysis Case 3 En Man.docx - 3:8 [required skilled & trained wor..] (55:55) (Super)

“SC performance can be define in many ways. In Kemaman there are many workers but not in head quarters. How often training are subject for the demand. We will do it anytime such as if we have new employees. Most of the time those have experienced offshore and familiar with platform operations.”

Company 4 sets on their in-house and partners' experience to build in house capabilities for the organizational growth of the company. Excerpt of the statements from Mr. Jay's as shown below:

P 4: Analysis Case 4 Jay ST.docx - 4:23 [They draw an in-house and part..] (149:149) (Super)

“They draw an in-house and partners' experience to build in-house capabilities for the company.”

Company 5 deployed competency development directly from companies in the PETRONAS' Vendor Development Program (VDP) or Restricted Category (RC) and from Malaysian contractors and manufacturer licensed and registered by PETRONAS. Through that network Company 5 can identified and developed the local competency levels of their staff. Excerpt of the statements from Mrs. Weda's as shown below:

P 5: Analysis Case 5 Khay CM.docx - 5:49 [To the extent that it is techn..] (328:328) (Super)

“To the extent that it is technically and economically practicable, the supplier procures all equipment, materials and supply and services for the performance of this order directly from companies in the PETRONAS' Vendor Development Program (VDP) or Restricted Category (RC) and from Malaysian contractors and manufacturer licensed and registered by PETRONAS. The supplier shall make use of supply and services and research facilities which are rendered by Malaysians or firms or companies incorporated or licensed in Malaysia.”

According to Mrs. Hally, Company 6 have their own internal training for their workers. Budget been allocated for the training and to develop competency of their workers. Excerpt of the statements from Mrs. Hally's as shown below:

P 6: Analysis Case 6 Pn Hally MP.docx - 6:50 [dapat orang then kena trained ..] (286:286) (Super)

"Once we recruit then need to train them. At the same time we allocate some budget to train our own people."

Company 7 develop the competency development by providing multi-disciplinary exploration and reservoir management consulting services for the oil and gas industry. According to Mr. Nizal, this competency development can be seen through the provision of sub-surface geological & geophysical, reservoir, and production engineering and well engineering services experts. Excerpt of the statements from Mrs. Weda's as shown below:

P 7: Analysis Case 7 Nizal PT.docx - 7:15 [Petra Energy provides multi-di..] (97:97) (Super)

"Our company provides multi-disciplinary exploration and reservoir management consulting services for the oil and gas industry through the provision of sub-surface geological & geophysical, reservoir, and production engineering and well engineering services."

Company 8 develop the competency by having a competent, dynamic, and professional workforce through the ongoing training. Excerpt of the statements from Mr. One's as shown below:

P 8: Analysis Case 8 En One GM.docx - 8:5 [training customer kita tapi cu..] (42:42) (Super)

"Sometimes we trained our customer and sometime the vice versa, customer can train us. In O&G we can learn new technology. Previously I studied engineering and major in instrumentation, but once I'm in this O&G then I understand what I have learned before."

Company 9 is committed to make the most effective use of the talents, skills and abilities of its workforce and helping all employees to maximize their contributions towards the company's success and sustainability. In order to demonstrate its commitment, the company has formalized its training through the allocation of specific budget resources. It is written and shared among the employees as part of the company mission. According to Mr. Daus, the company recognizes the employees' contributions towards its success. It also recognizes that to maintain a committed and competent workforce, it needs to ensure that there is adequate training and development provided for all employees. Excerpt of the statements from Mr. Daus's as shown below:

P 9: Analysis Case 9 Daus UD.docx - 9:17 [3) Provide training and support..] (107:107) (Super)

"We provide training and support: to provide necessary training and support to employees to ensure they are able to fulfill company's occupational health, safety and environmental commitments."

"Our company at its best capability shall ensure that: Employee are properly trained in the skills they need to carry out their present jobs at a standard acceptable to the company and its customers; Employees are provided with the skills they may need for future changes in their jobs; As far as possible, employees are encouraged to develop their skills and talents to enable them to progress within the company and reach their full potential."

Theme 4c: Strategic Partnership

Relations between firm's capabilities and dynamic supply chain capabilities of strategic partnership included two elements related to participants' company that propelled their need to firm's capabilities: (1) local, and (2) foreign strategic partnership.

This element involved six participants addressed that there are relations between firm's capabilities and dynamic supply chain capabilities from the aspect of strategic partnership in their company.

Company 1 shares that strategic partnership is possible by creating long-term relationship with clients by providing excellent after sales service. Company 1 also with the key management personnel accumulated years of experience in oil and gas combined with strategic and reputable foreign and local principals and technology partners. is to take on reputable technology through strategic partnerships. Excerpt of the statements from Mrs. Weda's as shown below:

*P 1: Analysis Case 1 Weda.docx - 1:36 [Second, is to create long-term..]
(451:452) (Super)*

"There are many O&G offices in KL. They will spend several hundred thousands or million for exhibition. During that exhibition many visitors come and visitors spent for hotel, flights, foods & others. Wait and see the incoming exhibition which is OGA2013 or Oil and gas Asia Exhibition. It is very expensive & usually nothing than RM2000/3000 below for the participating cost fee only. MOGSCE exhibition is small compared to OGA which is five or six times huge. It will take out whole KLCC halls & the external tent. The exhibition is worldwide, thus all clients & whoever will come from all over the world. Usually most O&G company will set the marketing budget that goes to the exhibition. Myself also will be participating during OGA & I spent RM50 thousand for the empty space only. Usually it will be officiating by the Prime Minister or Deputy Prime Minister. Former Prome Minister, Tun Mahadhir always come and he never failed to attend even though he is no longer as Prime Minister. If you don't attend the conference you will be surprised how many company exist covering all activities in the O&G industry. Area of KLCC will have massive traffic jammed and the the event is 2 years once."

Company 2 involves the suppliers and contractors in their company transformation initiatives. The company also has an agreement signified the establishment of a mutually benefit partnership for overall sustainability of the offshore fabrication industry. Excerpt of the statements from Mr. Nicky's as shown below:

*P 2: Analysis Case 2 MH.docx - 2:16 [The 219 high performing suppli..]
(219:219) (Super)*

“The 219 high performing suppliers and contractors who participated were updated on the Company's transformation initiatives to deliver engineering, procurement and construction (EPC) projects on time and at cost, as well as to strengthen and develop strategic partnerships between MHB and its vendors community. We invited four contractors to share their views on the innovative actions/strategies that they had implemented and how the contractor community would support our company through the transformation journey. A number of contractors awarded work packages for the fabrication projects in our company. Fifty three selected companies operating in offshore, marine repair, yard optimization, and administrative services attended the Dialogue Day”.

Company 4 emphasized through strong partnership with various reputable and established manufacturers in the industries served, the company managed to continue to innovate, expanding the offers and solutions into some niche areas of application. Excerpt of the statements from Mr. Jay's as shown below:

P 4: Analysis Case 4 Jay ST.docx - 4:25 [Through strong partnership wit..] (161:161) (Super)

“Together with our partners and combination of strong technical expertise, the company experience and in-house research activities in developing niche capabilities and solutions with value added products and services.”

Strategic partnership in Company 5 focused at comprehensive range of consultancy from beginning until the end. Excerpt of the statements from Mrs. Weda's as shown below:

P 5: Analysis Case 5 Khay CM.docx - 5:8 [This includes a comprehensive ..] (59:59) (Super)

“This includes a comprehensive range of consultancy from client’s initial strategy formulation and project design to fabrication, construction, installation, implementation and control, as well as maintenance and technical support.

Mrs Hally share that in company 6 practiced audit among the partners. Several audits will be done to ensure the operations is complying and meet the standard. Excerpt of the statements from Mrs. Hally’s as shown below:

P 6: Analysis Case 6 Pn Hally MP.docx - 6:16 [. 30 – 70 sometimes 3 partners..] (101:101) (Super)

“Partners usually have agreement which is 30 : 70. Sometimes 3 partners involved then the majority share will be the operator. If you have 3 partners there will be many audits such as PSC audit, partners audit & others.”

Company 7 also provides a spectrum of fabrication services for the upstream oil and gas industry. The scope of work covers fabrication, assembly, erection, inspection, testing, load out, planning including non-destructive testing services for the completion of fabrication works. The yard is strategically located in close proximity to clients’ oil and gas facilities, the Asean Supply Base (ASB) and has easy access to the Group’s offshore marine fleet in the Federal Territory of W. P. Labuan – a growing oil and gas hub in East Malaysia. Company 7 also managed projects utilizing field optimization techniques and new technologies on behalf of both operators and lead contractors in numerous locations throughout the world.

Mr Nizal mentioned that the company experienced track record includes successes in new technologies application for rejuvenating mature oil and gas fields through their multi-discipline expertise, which includes many of the major principals worldwide. In

maintaining its competitive edge, the Process Equipment unit has established strategic alliances with world-renowned process designers to create greater value for its customers. Excerpt of the statements from Mr. Nizal's as shown below:

P 7: Analysis Case 7 Nizal PT.docx - 7:18 [We have managed projects utili..] (120:120) (Super)

“Our end-users include EPC contractors, offshore structure fabricators, process package specialists, etc. in the oil and gas, petrochemical and other industries of the domestic and international markets Today, our's Process Equipment unit caters to the international markets in Angola, Australia, Brazil, Brunei Darussalam, and others.”

5.6.2 Section Summary

Table 5.10 displays the axial codes and whether or not each participant experienced the code across the relations between firm's capabilities and dynamic supply chain capabilities. As stated earlier, it was difficult to isolate one contextual condition as directly supporting or hindering the relations between firm's capabilities and dynamic supply chain capabilities. Nevertheless, most participants experienced most relations between firm's capabilities and dynamic supply chain capabilities as human resource, competency development and strategic partnership.

Table 5.10
Summary of Codes for Relations between Firm's Capabilities and Dynamic Supply Chain Capabilities

Family code / Findings	Axial Codes / Structural theme	Companies									
		1	2	3	4	5	6	7	8	9	10
Relations between Firm's Capabilities and dynamic Supply chain capabilities	- Human Resource	☺	☺	☺	☺	☺	☺	☺	☺	☺	☺
	- Competency development	☺	☺	☺	☺	☺	☺	☺	☺	☺	X
	- Strategic Partnership	☺	☺	X	☺	☺	☺	☺	X	X	X

Note: ☺ = Indicates code was experienced by participant
X = Indicates code was not experienced by participant

5.7 Findings: Research Question 4:

How is an environmental uncertainty factor influence dynamic supply chain capabilities in oil and gas industry in Malaysia?

As mentioned in Chapter 1, the fourth research question of the study is “How is an environmental uncertainty factor influence dynamic supply chain capability in oil and gas industry in Malaysia?” The informants shared their experience of what they perceived as the environmental uncertainty in oil and gas companies. Several informants were very passionate in sharing their experience. Yet, there were also informants who had difficulty in recalling their experience, nevertheless, the researcher managed to trigger their thoughts by posing and probing questions such as comparing the work of the particular companies with other companies, how the companies reacted when problem occurred, and to describe the strengths of the companies. Finally, four environmental uncertainty factors were unearthed from the interviews. They were explained in a sequence from the most to the least highlighted by the informants.

A sub question asked how an environmental uncertainty factor influence dynamic supply chain capability in oil and gas industry. To address this question, Table 5.11 identifies the family codes or the different contextual conditions that influenced the participants’ experience; the structural themes or axial codes, which identified major aspects of the program; and the elements that explained the structural themes.

Four axial codes—market driven, Technological Driven, Governing and Monitoring Body and Ethics and Professional Values—created the environmental uncertainty factor that influence dynamic supply chain capability in oil and gas industry took place or not. Linked to these codes were the overall findings.

Table 5.11

Codes, Themes, and Elements Related to Environmental uncertainty

Family code / Findings	Axial Codes / Structural theme	Sub Coded / Elements
Environmental Uncertainty	Market Driven	<ul style="list-style-type: none"> • Local & Foreign • Internal & External
	Technological Driven	<ul style="list-style-type: none"> • Local & Foreign • Internal & External
	Governing and Monitoring Body	<ul style="list-style-type: none"> • Local & Foreign • Internal & External
	Ethics and Professional Values	<ul style="list-style-type: none"> • Local & Foreign • Internal & External

5.7.1 Finding 5: Environmental Uncertainty

Market driven, technological driven, governing and monitoring body, and ethics and professional values acted as a catalyst on how an environmental uncertainty factor influence dynamic supply chain capability of oil and gas industry in Malaysia. This finding had four axial or structural themes.

Theme 5a: Environmental Uncertainty - Market driven

Market driven included four elements related to participants' company that propelled their need to environmental uncertainty: (1) local, (2) foreign, (3) internal and (4) external market driven.

This element involved three participants addressed that environmental uncertainty factor from the aspect of market driven of their company.

Mr. Man from company 3 stated that there is no problem of getting the components. Therefore, market driven uncertainty does not affect much for Company 3. Whilst Mr. One from Company 8 stated that market driven based on competitors and goes with the cost.

It is different from Mrs. Hally's from Company 6. Since Company 6 is PSC the market uncertainty on the cost really affected during the exploration and development stage. Excerpt of the statements from Mrs. Hally's as shown below:

P 6: Analysis Case 6 Pn Hally MP.docx - 6:12 [. after development /explorati..] (77:77) (Super)

"After development/exploration next is production. Just let say production for one barrel is RM10 then they look at how much the cost is for 1 barrel, let say RM4. That is why any company like us we want to get that RM4 but for PETRONAS they want to see is it true we spent RM4 for that production. If the cost is RM4 and they said "no" and they insist "RM3 only". That is the problem for the cost recovery for PSC in Malaysia. PSC is production sharing, therefore, in order to share profit so we need to identify the cost. Cost recovery will hit our profit, so we want to recover our cost soonest possible. When you do drilling it cost as almost RM100 million per day. Usually it cost us RM98 million minimum and it is high cost. If there is a block when the company notice there is an oil, then we have to identify vendors, tender process and discuss with PETRONAS. Later, we need to have data from geologist where to drill not only to know the layer that you will not understand at all. Our company is very fast when it comes to drilling and usually it can take up by 30 days minimum."

Mrs. Hally also stated that the market uncertainty happened during the development stage. It is all about how fortunate the company can produce and make profit with it.

Excerpt of the statements from Mrs. Hally's as shown below:

P 6: Analysis Case 6 Pn Hally MP.docx - 6:12 [. after development /explorati..] (77:77) (Super)

"Our competitor like some other company took 15 years to strike the crude oil. Even though they strike very small but it is then economically viable. Our competitor are still in production but if their profitability is very small then they might sell it. When they come back in 1998 our company are almost 120 thousand barrel per day. It is about luck also

because at this exploration stage lots of uncertainty on how to make sure it happen.”

Market uncertainty is high during the exploration stage. Once it moves to development stage the uncertainty reduce due to the company have reserves. The buyer has been identified earlier in the contract and different agreement needed if it involves with liquefied gas production.

P 6: Analysis Case 6 Pn Hally MP.docx - 6:12 [. after development /explorati..] (77:77) (Super)

“O&G is more steady when it reached the production phase. There are many uncertainties during exploration. During production phase it is more stabil because we know we have reserves and how much researves available. Like one of this exploration company XX. There are available buyers and actually available intermedicator that will send the information to the center. Actually the exploration company will do the drilling and PETRONAS will buyback. There is a mutual agreement available and it varies between oil and gas production. The buyer also been included in the agreement.”

Theme 5b: Environmental Uncertainty - Technological Driven

Technological driven included four elements related to participants' company that propelled their need to environmental uncertainty: (1) local, (2) foreign, (3) internal and (4) external technological driven.

This element involved five participants addressed that environmental uncertainty factor from the aspect of technological driven of their company.

According to Mrs. Hally, Company 6 really focused on the latest technology in the market for exploration stage. Excerpt of the statements from Mrs. Hally's as shown below:

P 6: Analysis Case 6 Pn Hally MP.docx - 6:25 [. that 3D, system software ver..] (157:157) (Super)

“We use that 3D, system software which is very good & all about technical. Most O&G company don’t put so much energy or effort to the behavioral. In some company they use SAP system or any other system.”

Mr. Daus from Company 9 also use technology driven for their engineering performance and product improvement. Excerpt of the statements from Mr. Daus’s as shown below:

P 9: Analysis Case 9 Daus UD.docx - 9:8 [They also optimize engineering..] (53:53) (Super)

“Our company also optimize engineering performance and product improvement using the best technologies.”

In Company 1, Mrs. Weda mentioned that their vision is to localized the foreign technology and customized the services to suit the clients’ requirement. This again supported that the company really focus on the latest technology in the global market.

Excerpt of the statements from Mrs. Weda’s as shown below:

P 1: Analysis Case 1 Weda.docx - 1:39 [The company vision is ultimate..] (431:432) (Super)

“The company vision is ultimately to localize the foreign technology and customized services to suit clients’ requirement. Moreover, the company commitment is to provide an innovative, quality and cost effective solutions to our clients.”

Mr. Man from Company 3 also agreed that technology transfer needed in this industry. The company starts to produce locally since 2004 after the technology been transferred from UK. Excerpt of the statements from Mr. Nicky’s as shown below:

P 3: Analysis Case 3 En Man.docx - 3:16 [equipment memang our own after..] (105:105) (Super)

“ We provide our own equipment now after 2004. Before, most of it are from UK & this people bring the technology. Now we transfer the technology here to local specifically in Kemaman.”

Mr. Shah from company 10 also agreed that technology transfer needed in this industry. Excerpt of the statements from Mr. Shah’s as shown below:

P10: Analysis Case 10 Shah RT.docx - 10:19 [.. stuff from Germany to compl..] (120:120) (Super)

“The stuff are from Germany in order to complement our self. Germany O&G players are most from USA & Europe. There are lots of technology in hydraulic.”

Theme 5c: Environmental Uncertainty - Governing and Monitoring Body

Governing and monitoring body included four elements related to participants’ company that propelled their need to environmental uncertainty.: (1) local, (2) foreign, (3) internal and (4) external governing and monitoring body.

This element involved three participants addressed that environmental uncertainty factor from the aspect of governing and monitoring body of their company.

In Malaysia, applicants were advised to have full understanding of PETRONAS Licensing and Registration General Guidelines and to ensure compliance with the general requirements before submitting application for license or registration.

Table 5.12
Definition of Application Type

Type of Application	Products/Services Applicability	Users of Products/Services
License	Company with a valid license is allowed to supply goods/services to both the upstream sector of the oil and gas industry in Malaysia and the downstream activities of PETRONAS including maritime activities.	For example : PCSB, Production Sharing Contractors (PSCs), Fabrication Contractors, MISC, PETRONAS subsidiaries and associate companies (<i>where applicable</i>).
Registration	Company with a valid registration is allowed to supply goods/services to the downstream activities of PETRONAS, including maritime activities.	For example : PETRONAS subsidiaries such as PP(T)SB, PP(M)SB, ABF, PFK, PDB, PGB, MISC and other applicable companies, etc

Source : PETRONAS (2013)

Oil and gas supply chain in Malaysia is structured, focused at reliability, safety and security. Looking back, PETRONAS started in 1974 but actually not too much for the first six/seven years before because they are not performing well. The drastic changes happen 1980s when they found the first well in Miri. Most of PETRONAS system inherited from Shell. Shell is the first operator in Malaysia and most operators follow Shell system since Shell has become major player for quite sometimes. Overall, Mrs. Weda agreed that that supply chain is quite matured in oil and gas industry.

According to Mrs. Weda, oil and gas in Malaysia has a governing body that monitor and control. There is an act 1964 so all other oil operators in Malaysia are governed under this act. PETRONAS is their monitoring under jurisdiction of department known as PMU (petroleum management unit). Excerpt of the statements from Mrs. Weda's as shown below:

*P 1: Analysis Case 1 Weda.docx - 1:3 [not really in oil and gas petron..]
 (26:26) (Super)*

“In Malaysia oil and gas industry PETRONAS is the governing. There is an act 1964 so all other oil operators in Malaysia like Exxon, Shell

governed under this act. So PETRONAS is their monitoring. That is why in PETRONAS there is a department known as PMU (Petroleum Management Unit). This department will govern all these companies. If there any problem arise then they have the right to come in and just do the audit. The reason because each of these oil companies PETRONAS has the stake. That is why they have PSC (production sharing contract). PETRONAS as partners must acquire 30 or 40% shares.”

According to Mrs. Weda, all oil and gas operators regardless local or foreign need to comply to the governing body in Malaysia. Final approval needed from PETRONAS and PMU if the operating level reach more than RM10 million. Excerpt of the statements from Mrs. Weda’s as shown below:

*P 1: Analysis Case 1 Weda.docx - 1:3 [not really in oil and gas petron..]
(26:26) (Super)*

“That is why they have the right to govern. You take the oil from my country so PETRONAS did same thing. Like any other company too it happen whereby you have certain level of PO (Purchase order) eg. RM5000 and the manager can sign off without the MD (Managing Director) approval. Same as how PETRONAS govern all these operators. Each operator can sign off up to RM10 million but any more than RM10 million all these company need to get the final approval from PETRONAS and PMU. And if next exit threshold then have the MOF (Ministry of Finance) for final approval.”

Malaysia oil and gas supply chain is very structured and thorough. According to Mrs. Weda, even though a company can operate on their own but technical person represented from the governing body still be in a meeting as member. Excerpt of the statements from Mrs. Weda’s as shown below:

*P 1: Analysis Case 1 Weda.docx - 1:3 [not really in oil and gas petron..]
(26:26) (Super)*

“Whole chain is very structured in O&G supply chain. Like one of the player, SK willing to spend billions for the project and 100 millions to subcontract to others. They must have PETRONAS license because

registered PETRONAS license is one of the requirement. You cannot simply give to your uncle unless your uncle have the valid license. Certain packages even though the company offers the tender proposal, PETRONAS will sit in as the committee member. Strategic key services such as technical committee also acquired PETRONAS to sit in the meeting. After the technical meeting then they will perform platform who will do final review.”

The governing body also control and monitor the approval of licensing. There are special terms and conditions if the contractors having technology or strategic alliance with principal company. Different categories/subcategories need to be identified before a license given the operators/contractors. The rate of license also different based on the complexity of the service offered. It takes about 3 months to process for renewal license and the validity of license from 1 to 3 years. Excerpt of the statements from Mrs. Weda’s as shown below:

*P 1: Analysis Case 1 Weda.docx - 1:3 [not really in oil and gas petron..]
(26:26) (Super)*

“This is the sample license [show the license]. 1st time is for 1 year and once renewed is for 3 years. There will be special terms and conditions too. Principal agreement with foreign company need to provide letter of approach. There are several categories whether we operate ourselves or outsource. Each lisencc fees is RM500 and our company has six services. There are also sub categories and for our company the fees is RM500 for 5 sub. If one need to add more subcategories then need to pay RM100 for each subcategoies. As a sample categories such as production chemical will have subcategories then very detail. Such as fo0r a container will need curtain and others. Drilling too & will relate which are more relevant and applicable. We will talk to client and the company name will be in pooling of that category. So for new license it took us 3 months to process & 6 weeks for renewal. Since my company license will expire in January, therefore this year [2013] October I need to submit for renewal”

According to Mrs. Weda, uncertainty also happened when the urgency requirement needed. Even though PETRONAS practices sole sourcing but when technical solution needed, PETRONAS will invite other contractors to submit the tender. Sometimes the tender rejected because the contractors did not qualify and meet their requirement. Excerpt of the statements from Mrs. Weda's as shown below:

*P 1: Analysis Case 1 Weda.docx - 1:3 [not really in oil and gas petron..]
(26:26) (Super)*

“PETRONAS allows sole sourcing but it happen only when it involves with specialized technical specification solution. Usually, they will be invited to fight for a bid even though it involves with technical specification. If we cannot meet the requirement and the report verification incomplete due to technical then we are unqualified. Chances is very rare especially during the pre qualification. Everything is control by PETRONAS. Eventually, all contractors must follow the standard process with recondition thinking & process.”

According to Mrs. Weda, her company also faced some challenges in getting the license at the earlier stage. At the beginning, company 1 start off by becoming as subcontractor to the main contractors. Once the operation sustained, then, Company 1 apply for the main contractor license. There is massive load of works related in oil and gas industry. From very simple such as purchasing stationaries to very complex such as installation of the steels need to be stated in the license given. Excerpt of the statements from Mrs. Weda's as shown below:

*P 1: Analysis Case 1 Weda.docx - 1:3 [not really in oil and gas petron..]
(26:26) (Super)*

“Our company is small but structured. Tender from PETRONAS can be available anytime and audit too. We meet the minimum requirement for Sdn Bhd company.in O&G industry no enterprise or sole proprietorship is allowed. Our company is registered Licence with RM100 thousand paid up capital. Once we operate and obtain 1 year audited account,

then we prove to them. As a start we become as subcontractor to main contractor only certain for certain things. It is a bit tricky because strategic services are controlled and monitored by PETRONAS. At first we just offer the simple tasks not as the main contractor. Once we sustain then apply for the license and after 1 year operations with audited account then we submit for new license.”

“There are load of works for O&G. Lots of works with great networking. Not only clients or contractors, but also you need their help in order supply to others. Previously, even though I do not have the I still receive client offer. And, once you got license you still got client too. For urgent order usually we will ask for the big one from the clients. From the biggest point as huge as a vessel until the smallest one such as food on the table, paper, computers all are indirect cost in this O&G industry including logistic too. Usually PETRONAS will purchase steel as bulk item. PETRONAS Mitco is responsible to chose for installation spare part and later when need other subsidiaries will purchase.”

However, in Company 5, according to Mr. Khay uncertainties are through the disputes or disagreement that happen. All disputes or disagreement arising from contract terms and conditions may be referred to arbitration. Excerpt of the statements from Mr. Khay’s as shown below:

P 5: Analysis Case 5 Khay CM.docx - 5:41 [All disputes or disagreement a..] (352:352) (Super)

“All disputes or disagreement arising from these terms and conditions may be referred to arbitration following the ICC Rules of Arbitration in Malaysia or to any Courts of competent jurisdiction in Malaysia. The proceedings shall be conducted at Kuala Lumpur, Malaysia. The Governing Law shall be the Law of Malaysia.”

Mrs. Hally agreed that uncertainties can be monitor through the audit done by the governing body. PETRONAS as the governing body ensure the audit take place to check the lost whether it is a compliance or not. Excerpt of the statements from Mrs. Hally’s as shown below:

P 6: Analysis Case 6 Pn Hally MP.docx - 6:9 [.. PETRONAS will setup the aud..] (59:59) (Super)

“ PETRONAS will setup the audit to check the lost whether it is a compliance or not. There is appliance that we need to follow as percentage expatriate that we have for ownership.”

Theme 5d: Environmental Uncertainty - Ethics and Professional Values

Ethics and professional values included four elements related to participants' company that propelled their need to environmental uncertainty: (1) local, (2) foreign, (3) internal and (4) external ethics and professional values.

This element involved six participants addressed that environmental uncertainty factor from the aspect of ethics and professional values of their company.

According to Mrs. Weda, in the aspect of ethics and professional values for oil and gas quite high level integrity needed. When dealing directly with oil and gas company, it is very difficult for someone try to breach, delay, and maneuvers even for simple things. Mrs. Weda confirmed that it requires structural process with high level integrity. Excerpt of the statements from Mr. Nicky's as shown below:

P 1: Analysis Case 1 Weda.docx - 1:2 [quite high level integrity. Th..] (17:17) (Super)

“O&G industry need quite high level integrity. They have rather structural process. Meaning you deal directly with oil company and it is very difficult for someone try to breach, delay, and maneuvers even for simple things. As example, your prices – even though you have close good relationship or know your client and client can help you – your price will enter once and no way to change.”

According to Mrs. Weda, all contractors need to follow the policy requirement for the integrity as part of Corporate Integrity Advocacy Programme. The programme named “PETRONAS Vendor Integrity Programme” (PETRONAS VIP) is designed to cater to

all PETRONAS' vendors as part of PETRONAS initiative in creating zero tolerance to bribery & corruption in business operations. This program developed the vendors' commitment to embrace the integrity culture and compliance knowledge among its employees, which carries higher esteem in future business dealings.

*P 1: Analysis Case 1 Weda.docx - 1:2 [quite high level integrity. Th..]
(17:17) (Super)*

"Bribery at PETRONAS is not allowed. If it happen, it is still not proof way of getting business. There is a committee with 10 members and cannot buy out all. Some will like but it is difficult. So no way and end of the day still fight for it. Anyway, we still need to do basic marketing function. More else, cash involved doesn't work at all because it is very strict. PETRONAS may up to remove all those people corrupted. You may surprise when you go to group supply chain all are women. Group supply chain all ladies because ladies are more ethical."

The values shared in Company 2 are *"Passion to Excel, Responsible at Work, Integrity – the Power of Trust, Dedicated to our Customers' Success and Enterprising as a Team"*. Company 2 strives to continuously improve the management of supply chain processes to ensure that the Company is operating responsibly at all times through the internal channel of communication. Excerpt of the statements from Mr. Nicky's as shown below:

*P 2: Analysis Case 2 MH.docx - 2:22 [The values shared are "Passion..]
(89:89) (Super)*

"Our Company practices a strong code of conduct and business ethics. If you would like to disclose any improper conduct committed or about to be committed within the Group, anyone may report via the online form. This page serves as a guide for the company employees and members of the public to disclose any improper conduct committed or about to be committed within the Group through the company internal channel."

Company 5 offers a broad array of expert services ranging from resource management, construction, and project maintenance to specialist technical advisory services. Supplier warrants and guarantees that the supply and services were performed in a professional manner in accordance with competent and sound engineering, craft and construction practices and with the requirements and conditions of this order and that the supply and services will be free from defects for a period minimum of twelve months. Excerpt of the statements from Mr. Khay's as shown below:

P 5: Analysis Case 5 Khay CM.docx - 5:7 [The company also offers a broa..] (53:53) (Super)

“Supplier shall obtain from its sub-contractor, for assignment to client, the best possible warranties and guarantees with respect to materials, goods and workmanship incorporated or installed into the order by the supplier. In the event that the supplier obtains more favorable warranties and guarantees from its sub-contractors than those in this article, such warranties and guarantees shall be assigned to the client. Upon the expiration of the Warranty Period, the supplier undertakes to make available to the client the required technical support including the spare/replacement parts of the goods to ensure that the goods supplied is in working condition, functional and operational at all times. The supplier and its sub-contractor shall not violate, breach or act in any matter which is inconsistent with any provision under the Malaysia Anti-Corruption Commission Act 2009 (Act 964).”

According to Mr Nizal, Company 7 executed on a singlepoint of responsibility and accountability to ensure consistency in quality of services. Excerpt of the statements from Mr. Nizal's as shown below:

P 7: Analysis Case 7 Nizal PT.docx - 7:21 [For maximum benefits to client..] (138:138) (Super)

“For maximum benefits to clients, our services are executed on a “singlepoint of responsibility and accountability” or integrated basis

that ensures operations efficiency, reduced costs and faster project turnaround.”

Finally, company 8 believed that to sustain highest ethical standards in their relationships with clients, providers, and stakeholders, one must have an integrity.

Excerpt of the statements from Mr. One’s as shown below:

P 8: Analysis Case 8 En One GM.docx - 8:3 [. tak boleh kalau tak ada inte..] (30:30) (Super)

“In O&G industry cannot ignore the integrity.”

Company 9 policy to conduct all of its business in an honest, ethical and lawful manner. The company take a zero-tolerance approach to bribery and corruption and are committed to acting professionally, fairly and with integrity in all our dealings wherever we operate. This policy applies to all business dealings and transaction and all individual’s at all levels and grade working with company branches, subsidiaries, associates, consultants and contractors. Excerpt of the statements from Mr. Daus’s as shown below:

P 9: Analysis Case 9 Daus UD.docx - 9:6 [Their mission is commitment an..] (41:41) (Super)

“Their mission is commitment and provides client with cost effective, safe, and professionally engineered solution. All employees are strictly prohibited from directly or indirectly soliciting, attempting or accepting to such bribes and corruption from any party or person for himself or for any other person’s behalf. All employees have a responsibility to raise concerns to his immediate manager about any issue or suspicious of malpractice at the earliest possible stage. No employee will suffer any detriment as a result of raising genuine concerns about bribery, even if they turn out to be mistaken.”

5.7.2 Section Summary

Table 5.13 displays the axial codes and whether or not each participant experienced on how an environmental uncertainty factor influence dynamic supply chain capability of oil and gas industry in Malaysia. As stated earlier, it was difficult to isolate one contextual condition as directly supporting or hindering on how an environmental uncertainty factor influence dynamic supply chain capability of oil and gas industry in Malaysia. Nevertheless, most participants experienced most on how an environmental uncertainty factor influence dynamic supply chain capability of oil and gas industry as market driven, technological driven, governing and monitoring body, and ethics and professional values.

Table 5.13
Summary of Codes for Environmental Uncertainty

Family code / Findings	Axial Codes / Structural theme	Companies									
		1	2	3	4	5	6	7	8	9	10
Environmental Uncertainty	- Market Driven	X	X	☺	X	X	☺	X	☺	X	X
	- Technological Driven	☺	X	☺	X	X	☺	X	X	☺	☺
	- Governing and Monitoring Body	☺	X	X	X	☺	☺	X	X	X	X
	- Ethics and Professional Values	☺	☺	X	X	☺	X	☺	☺	☺	X

Note: ☺ = Indicates code was experienced by participant
X = Indicates code was not experienced by participant

5.8 Atlas.ti Analysis

In this section the responses from ten respondents are examined based on analysis using Atlas.ti version 7.1.6. The first part of the analysis focuses on frequency of dynamic supply chain capabilities coded during interviews. This is followed by tree map analysis where dynamic supply chain capabilities are analyzed based on function identified during the research.

5.8.1 Frequency of dynamic supply chain capabilities coded

Table 5.14
Frequency of Codes and Primary Documents Table

	P 1: Analysis Case 1 Weda.docx	P 2: Analysis Case 2 MH.docx	P 3: Analysis Case 3 En Man.docx	P 4: Analysis Case 3 Jay ST.docx	P 5: Analysis Case 5 Khay CM.docx	P 6: Analysis Case 6 Pn Hally MP.docx	P 7: Analysis Case 7 PT.docx	P 8: Analysis Case 8 En One GM.docx	P 9: Analysis Case 9 UD.docx	P10: Analysis Case 10 Shah RT.docx	TOTALS:
Firm's Capabilities (FC)											
customer oriented	3	1	0	4	1	0	4	1	2	3	19
Health Safety & Environment	3	0	4	1	1	0	2	1	4	6	22
operations pre requirement	4	3	5	0	3	1	0	0	0	1	17
procurement procedure	0	0	0	0	3	0	0	1	0	0	4
supplier database system	1	0	0	0	0	0	0	0	0	0	1
supplier evaluation	0	1	0	5	0	1	0	0	0	0	7
suppliers relationship	1	10	0	0	20	0	1	1	1	1	35
sustainability	3	6	0	4	0	0	15	2	1	2	33
flexibility	0	0	0	0	1	0	0	4	0	0	5
multiple sourcing	1	0	0	0	0	0	0	0	0	0	1
open mindedness	1	3	0	0	0	1	0	1	0	0	6
SC environment	7	0	0	0	0	0	0	1	0	1	9
shared vision	0	3	3	0	0	0	1	2	9	0	18
standard recognition	1	0	1	0	0	0	5	0	2	4	13
value chain	4	0	0	1	0	8	4	4	1	1	23
Dynamic Supply Chain Capabilities (DSCC)											
co-evolving	1	0	0	0	23	10	1	1	0	0	36
collaboration	4	3	3	1	22	4	6	2	1	1	47
information shared	3	2	0	0	3	0	0	0	0	0	8
knowledge accessing	9	0	0	2	3	10	1	1	3	0	29
recognition	0	6	0	0	1	0	1	0	0	0	8

Table 5.14 (continued)

	P 1: Analysis Case 1 Weda.docx	P 2: Analysis Case 2 MH.docx	P 3: Analysis Case 3 En Man.docx	P 4: Analysis Case 3 Jay ST.docx	P 5: Analysis Case 5 Khay CM.docx	P 6: Analysis Case 6 Pn Hally MP.docx	P 7: Analysis Case 7 PT.docx	P 8: Analysis Case 8 En One GM.docx	P 9: Analysis Case 9 UD.docx	P10: Analysis Case 10 Shah RT.docx	TOTALS:
Relations between FC & DSCC											
competency development	1	2	5	2	1	1	1	3	5	0	21
HR	1	4	11	2	7	4	14	7	7	8	65
talent management	0	0	0	0	0	0	0	0	2	0	2
strategic alliance	0	5	0	0	0	9	0	0	0	0	14
strategic partnership	5	5	0	2	1	1	6	0	0	0	20
Environmental uncertainties											
approval & verification	0	0	0	0	1	0	0	2	0	0	3
authority	4	0	0	0	0	0	0	0	0	0	4
environmental uncertainty	1	0	0	0	0	0	0	0	0	0	1
governing & monitoring	9	0	0	0	1	1	0	0	0	0	11
license & categories	0	0	0	0	2	1	0	1	0	0	4
market uncertainty	0	0	1	0	0	9	0	1	0	0	11
technology application	0	0	0	0	0	2	0	0	1	0	3
technology transfered	1	0	1	0	0	0	0	0	0	1	3
regular audit	1	0	0	0	9	2	0	2	0	0	14
rules & regulation	0	0	0	0	3	0	0	0	0	0	3
technical specification	0	0	0	0	18	0	0	2	0	0	20
risk control	0	0	0	0	5	1	0	1	0	2	9
registered supplier	1	0	0	0	0	0	0	0	0	0	1
TOTALS:	70	54	34	24	129	66	62	41	39	31	550

5.8.2 Tree map analysis

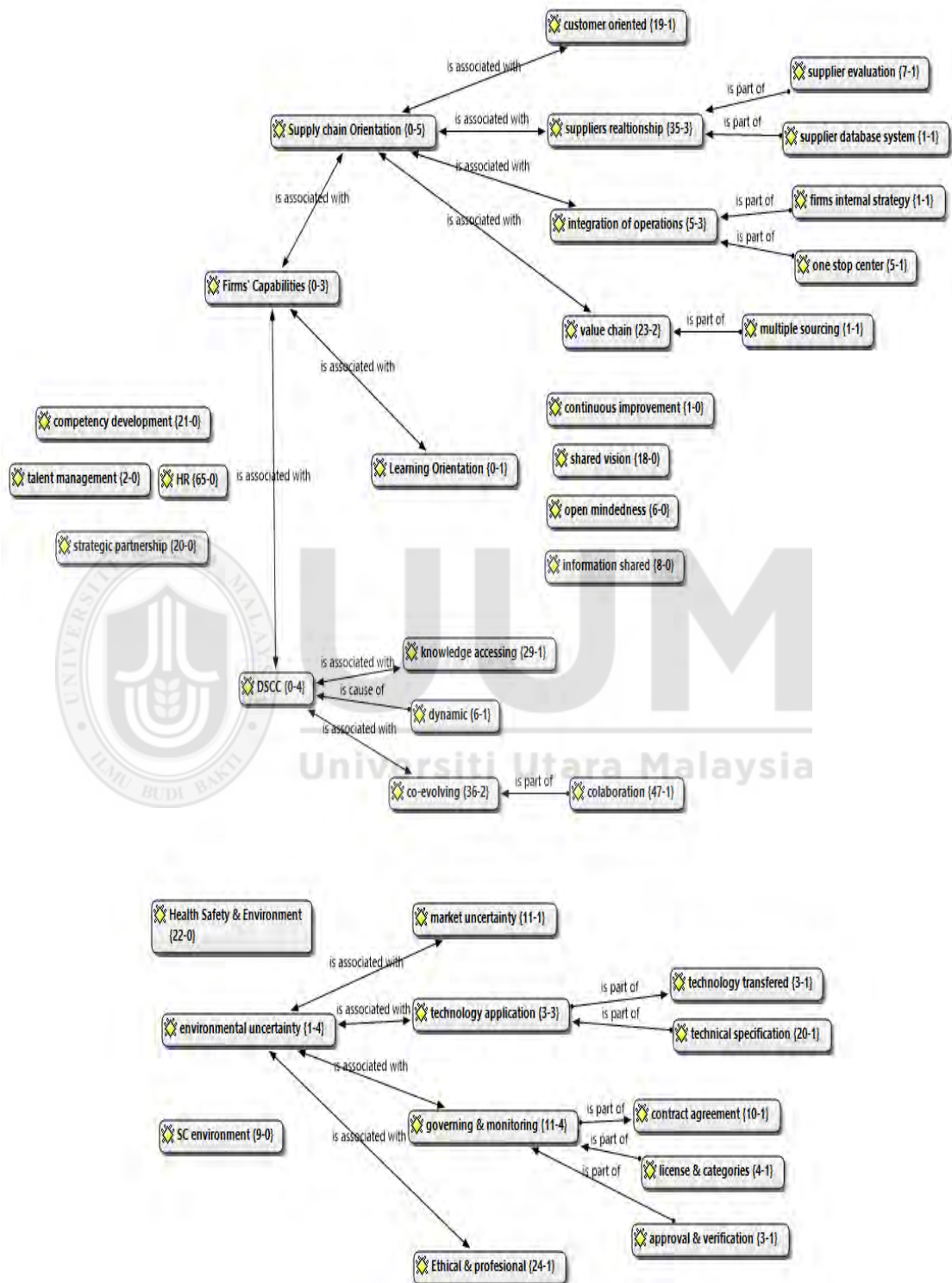


Figure 5.2
Network Tree Map Analysis For Codes

5.9 Chapter Summary

This chapter has presented the findings of the study, which comprises four research questions. The first research question elaborates the meaning of firm's capabilities from ten companies' practices. The practices are divided into supply chain orientation and learning orientation. The supply chain orientations later were divided into customer, competitor, supplier, logistics, operations and value chain coordination. Meanwhile, learning orientations were divided into commitment to learning, shared vision, open mindedness and intra-organizational knowledge sharing.

The second research question elaborates the meaning of dynamic supply chain capabilities in the context of strategic resources. Briefly, this piece of evidence has enlightened understanding on the dynamic supply chain capabilities in knowledge accessing and co-evolving within oil and gas industry.

The third research question is to find the relations between firm's capabilities and the dynamic supply chain capabilities. The findings also strengthen the understanding about the role of human resource, competency development and strategic partnership as practiced by the ten companies' practices.

Finally, the last research question is to identify how environmental uncertainty influence the dynamic supply chain capabilities in oil and gas industry. Briefly, this piece of evidence has enlightened understanding on the environmental uncertainties factors in market drive, technological driven, governing and monitoring body, and ethics and professional values influence dynamic supply chain capabilities of oil and gas industry in Malaysia.

CHAPTER SIX

DISCUSSION AND CONCLUSION

6.1 Introduction

The previous four chapters have led us to the findings that are discussed in chapter 5. As to recall, there are ten firm's capabilities dimensions, which have unearthed from the empirical data. In this chapter, the researcher link and discuss the findings with other dynamic capabilities reported in past studies. Apart from that, this chapter also discusses the relation between the firm's capabilities and the dynamic supply chain capabilities. In addition, it also describes on how environmental uncertainties influence the dynamic supply chain capabilities in oil and gas industry. Finally, the conclusions and recommendations of this study are also discussed.

6.2 Overview of the study

This study is to understand the dimensions of dynamic supply chain capabilities in the organizations specifically operating in oil and gas industry in Malaysia environment. In addition, the dynamic supply chain is observed from the practices of upstream and downstream contractors. This is because the study attempted to discover the effect on the dynamic capabilities on the dynamic supply chain performance. The study also tries to understand the role of dynamic capabilities as a supporting feature to an industrial market quality of service practices. Finally, the study explores the outcome of an industrial market quality of service practices from relationship quality. Interestingly, the study is conducted by interviewing oil and gas contractors.

Ten contractors participated in the study including nine service contractors namely piping manufacturer, maintenance installation, and one production-sharing contract (PSC). In-depth interview was conducted to explore the subject matter that felt to be crucial to this study. A hermeneutics analysis procedure was employed in analyzing the data in order to answer the research questions of the study.

6.3 Discussions

As mentioned in Chapter 1, this study aims to answer four research questions that are:

1) What is the meaning of firm's capabilities in the context of oil and gas industry in Malaysia?, 2) What are the dynamic supply chain capabilities, as defined in the context of strategic resources in Malaysia?, 3) What is the relation between firm's capabilities and dynamic supply chain capabilities in oil and gas industry in Malaysia?, and 4) How is an environmental uncertainty factor influence dynamic supply chain capabilities in oil and gas industry in Malaysia? The following sections discuss the findings for each for each of the research questions.

6.3.1 Research Question 1: What is the meaning of firm's capabilities dimensions in the context of oil and gas industry in Malaysia?

The first research questions intends to explore the meaning of firm's capabilities dimensions in the context of oil and gas industry. In this respect, this research question explores the meaning of firm's capabilities as practices by the oil and gas contractors including the upstream and downstream contractors in serving their clients. These practices are analyze within the scope of supply chain orientation and learning orientation from the oil and gas contractors' perspective.

Supply Chain Orientation

Findings from the study were discussed according to the motives identified: (1) client, (2) competitor, (3) supplier, (4) logistic, (5) operations, and (6) value chain coordination, in oil and gas dynamic supply chain capabilities.

The results show that value chain coordination, client, supplier and operations are important in the supply chain orientation respectively. However, competitor and logistics shows least important by the respondents.

Value chain coordination justification is supported by Arshinder, Kanda, and Deshmukh (2011). Supply chain members coordinate by using contracts for better management of supplier buyer relationship and risk management. The contracts specify the parameters such as quantity, price, time, and quality, within which a buyer places orders and a supplier fulfills them.

The findings of this study confirm that supply chain orientation could be a way to obtain better business performance via integration of other practices beyond the limits of the firm, as in the case of dynamic supply chain capabilities. The generation of information in supply chain oriented and market orientation favors the integration of firms with their clients and suppliers and the integration of internal functions associated with the flow of products (Didonet, Frega, Toaldo, & Díaz, 2014). This is in line with the perspective of market orientation as a strategic orientation that help firms to understand clients' needs (Lamberti & Paladino, 2013). The understanding of these needs implies to share information among supply chain partners - including the clients - which is one of the most important aspects of supply chain management (Hsu, Kannan, Tan, & Keong Leong, 2008).

Learning Orientation

Findings from the study were discussed according to the motives identified: (1) commitment to learning, (2) shared vision, (3) open mindedness, and (4) intra organizational knowledge sharing, in oil and gas dynamic supply chain capabilities.

By culture, Malaysian's oil and gas company are dominated by those who have technical and engineering background. This is due to in oil and gas industry required those who possess and understand technical documents for decision making. Nonetheless, the learning orientation as firm's capabilities cannot be ignored in the dynamic supply chain capabilities. Commitment to learn for everyone in the chain to improve is highly expected. Due to vigorous of technology in oil and gas industry, everyone in the chain needs to be at par with the technology advances. They can gain new insight by attending courses or any exhibition prearranged within or outside the country.

Since oil and gas industry in Malaysia is governed and monitored by PETRONAS, the service contractors also have to allocate the related vision all through the supply chain. Thus, everyone in the chain understands that little mistakes can generate nation issues. A little mistake during the service installation can affect the whole chain and tarnish the image of the company and the country in the global market. Therefore, understanding of the shared vision needs to be inculcating to everyone in the supply chain.

The firm's capabilities also identified open-mindedness as one of the dynamic supply chain capabilities. Most of the oil and gas companies know each other's since they have been in the industry for so long. All contractors registered with licensed were invited for the new or existing project tendering process. Although they know each

other, the awards of a project are only being given to those who meet the required specification as approved by the technical committee. Everyone in the oil and gas supply chain instill the high level values of professionalism and honesty during the processes.

Oil and gas industry also emphasize the intra-organizational knowledge sharing among the supply chain. Sharing experience and capability throughout the chain emerged outcome and consequently, new insights and knowledge to the dynamic supply chain capabilities. The study suggested that well-planned and structured supply chain will reduce the uncertainties in the dynamic supply chain capabilities. Thus, the oil and gas firms need to ensure that people in the chain acquire all capabilities in learning orientation.

The study contributed to the industrial system by exploring the meaning of firm's capabilities. The results emerged that value chain coordination, client, supplier and operations are important in the supply chain orientation respectively. However, competitor and logistics showed least important by the respondents. The oil and gas firms also need to ensure that people in the chain acquire all capabilities in learning orientation.

6.3.2 Research Question 2: What are dimensions of the dynamic supply chain capabilities, as defined in the context of strategic resources in Malaysia?

The second research intends to explore what are dimensions of the dynamic supply chain capabilities as defined in the context of strategic resources in Malaysia. In this respect, this research question explores the meaning of dynamic supply chain capabilities as practices by the oil and gas contractors including the upstream and

downstream contractors in serving their clients. These practices are analyzed within the scope of knowledge accessing and co-evolving from the oil and gas contractors' perspective.

The findings shows that knowledge accessing and coevolving are important to the dynamic supply chain capabilities in oil and gas industry in Malaysia. Building a new offshore oil platform or rebuilding an existing one is a rather complex type of procurement involving several contractors, subcontractors and vendors. Such procurements consist usually of four phases: engineering, fabrication, installation and commissioning. Plans and specifications are first worked out in the engineering phase, followed by procurement or production of the different parts in the fabrication phase. The different parts are then installed on the platform in the installation phase, and finally, the platform is moved to its specific location offshore in the commissioning phase. Furthermore, extensive coordination is required between the different phases (engineering, fabrication, installation and commissioning) and between the different work processes. The different phases and coordination between phases and between work processes is a rather complex type of procurement involving several contractors, subcontractors and vendors.

By virtue of the Petroleum Development Act 1974 (PDA), PETRONAS has the exclusive right of exploring, winning and producing petroleum in Malaysia and any person who intends to carry out upstream operations (i.e. the exploration, development and production of oil and gas) must conclude a production sharing contract (PSC) with PETRONAS. Under the PSC, all such expenditure incurred in developing the field shall only be recoverable upon commercial production in accordance with the PSC subject to the payment of royalties. The excess oil and/or

gas available after cost recovery is treated as profit oil and/or profit gas to be shared accordingly between PETRONAS and the Contractors subject to petroleum income taxes and other payments due under the PSC. Various other obligations such as research and abandonment programmes are also imposed on the Contractors.

However, times have changed as Malaysia is now facing the risk of the depletion of its natural oil and gas resources. As exploration for more petroleum reserves continues due to the ever increasing energy demand for domestic consumption, Malaysia cannot afford to neglect and ignore the need for developing its existing marginal fields. Sources estimated that Malaysia has identified more than 100 marginal fields but most of them have not yet been fully developed. The cost required in developing these marginal fields are somewhat similar to those required for large fields. Thus, the PSC may not be attractive to investors as there may not be enough balance of oil or gas for profit sharing purposes. As part of the efforts to be more dynamic, PETRONAS has recently come up with a new strategy to attract international oil and gas companies to invest in the the country's oil and gas industry, such as the risk service contract (RSC). The RSC is a service contract whereby the Contractors provide services to PETRONAS in developing marginal oil fields in return for fees. Like the PSC, all development expenditures are advanced by the Contractors upfront in accordance with the agreed participating interests and most of these expenditures are monitored and approved by PETRONAS throughout the operations. Under the RSC strategy, PETRONAS retains ownership of the petroleum and the contractor is only entitled to remuneration fees for the services provided upon commercial production. Under this strategy, such remuneration fees are not subject to petroleum tax but are only subject to tax applicable to corporations in Malaysia.

Unlike the PSC management, no research or abandonment commitment is imposed on the contractor.

From the dynamic capabilities theoretical perspective, this study contributed by discovering the meaning of dynamic supply chain capabilities. The findings affirmed that knowledge accessing and co-evolving are important to the dynamic supply chain capabilities.

6.3.3 Research Question 3: What is the relation between firm's capabilities and dynamic supply chain capabilities in oil and gas industry in Malaysia?

The third research intends to explore the relations between firm's capabilities and dynamic supply chain capabilities in the context of oil and gas industry. In this respect, this research question explore the relations between firm's capabilities and dynamic supply chain capabilities as practices by the oil and gas contractors including the upstream and downstream contractors in serving their clients. These practices are analyzed within the scope of human resources, competency development, and strategic partnership from the oil and gas contractors' perspective.

The results show that human resources, competency development, and strategic partnership support the the relations between firm's capabilities and dynamic supply chain capabilities in the context of oil and gas industry.

The findings seem to support the notion that relational characteristics of human resource, competency development and strategic partnership that lead to greater collaboration among supply chain partners. This also lead to greater learning and supportive of those structures and processes that encourage and support learning.

Supply chain learning requires a level of trust that allows partners to openly share sensitive information with the knowledge and comfort that it will be used for the betterment of the supply chain enterprises. Trust brings buyer and seller together for joint work and a sense of commitment carries the relationship to the level at which they can combine resources to achieve mutual gain. Partners can share decision making and establish areas of mutual gain. This finding consistent with study by Spekman, Spear, and Kamauff (2002) who argue that successful partnerships are a function of three distinct, yet mutually supportive categories: management capability, a supportive and compatible culture and relational factors such as trust and commitment.

From the resource based view perspective, this study contributed by supporting the relations between firm's capabilities and dynamic supply chain capabilities. The results showed that human resources, competency development, and strategic partnership supported the relations between firm's capabilities and dynamic supply chain capabilities in the context of oil and gas industry.

6.3.4 Research Question 4: How is an environmental uncertainty factor influence dynamic supply chain capabilities in oil and gas industry in Malaysia?

The fourth research intends to explore how environmental uncertainties factors influence dynamic supply chain capabilities in context of oil and gas industry. In this respect, this research question explore how environmental uncertainties factors influence dynamic supply chain capabilities as practices by the oil and gas contractors including the upstream and downstream contractors in serving their clients. These practices are analyzed within the scope of market drivem, technological driven,

governing and monitoring body and ethics and professional values from the oil and gas contractors' perspective.

The results show that ethics and professional values, and technology driven are important in the environmental in the context of oil and gas industry. Whereas, market uncertainties and governing and monitoring body is less important in the environmental uncertainties in the context of oil and gas industry.

The use of contracts and governance mechanisms for handling complex supply chain was one area the industry investigated for possible improvements. Building a new oil platform or rebuilding an existing one requires the involvement of several contractors, subcontractors and vendors, and it is rather difficult to fully specify such procurement in advance. Such procurements are therefore associated with a high level of transaction or governance costs, as extensive coordination between several players is required (Olsen, Haugland, Karlsen, & Husøy, 2005). Furthermore, the use of contracts and governance mechanisms also has an effect on production costs and production time. Traditionally, the oil companies (operators) have entered into a number of individual contracts with each contractor.

From the point of view of both the oil company and the contractors, such an exchange setting can be labeled hazardous. Such exchanges cannot be fully described ex ante due to technological complexity and the fact the each new oil platform is more or less unique. As a result it is difficult to estimate costs, or whether the platform can be delivered on time, and the players do not know how well the platform will function before production offshore is started. Such exchanges are thus often associated with specialized investments, it is difficult to measure performance, and a high degree of uncertainty is present (Olsen et al., 2005).

Complex procurements involve a large number of players, they are often associated with a high degree of uncertainty and technological complexity, and will often last for several years. Within the procurement and supply chain literature, complex procurements have been studied in relation to construction projects, defense procurements, information technology and public–private partnerships (Olsen et al., 2005).

The emergent findings from on how environmental uncertainties factors influenced dynamic supply chain capabilities The results show that ethics and professional values, and technology driven are important in the environmental in the context of oil and gas.

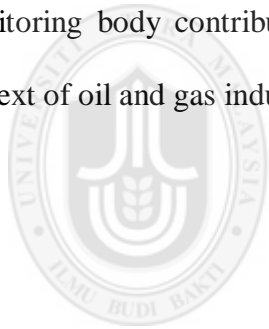
6.4 The Finalized Emergent Framework

The initial conceptual framework in Chapter Two is finalized in this section. After the data collection and analysis, it is important to note the meaning of firm's capabilities and the dynamic supply chain capabilities as defined in the context of strategic resources. The cooccurrence between the firm's capabilities and dynamic supply chain capabilities explains what the contractors understand about dynamic supply chain in oil and gas industry.

From the cases studied, the dynamic supply chain capabilities are captured as knowledge accessing & co-evolving in the internal firm's capabilities. Later the firm's capabilities are subset of external firm's capabilities. Environmental uncertainty created the overall of the relations, which amend the proposed conceptual framework as stated in Figure 6.1.

Dynamic supply chain capabilities that captured through the knowledge accessing and coevolving of the organization been identified in the firms's capabilities. Firms capabilities can be identified as the internal and external through the supply chain orientation and learning orientation of the firms. The relations between the internal firm's capabilities and dynamic supply chain capabilities include the human resources and the competency development. Whereas, the relations between the firm's capabilities and dynamic supply chain capabilities for the external firm's capabilities is the strategic partnership.

Environmental uncertainties which include the emerging findings on ethics and professional value, technological driven, market driven and governing and monitoring body contribute to the outer layer of the dynamic supply chain in the context of oil and gas industry.



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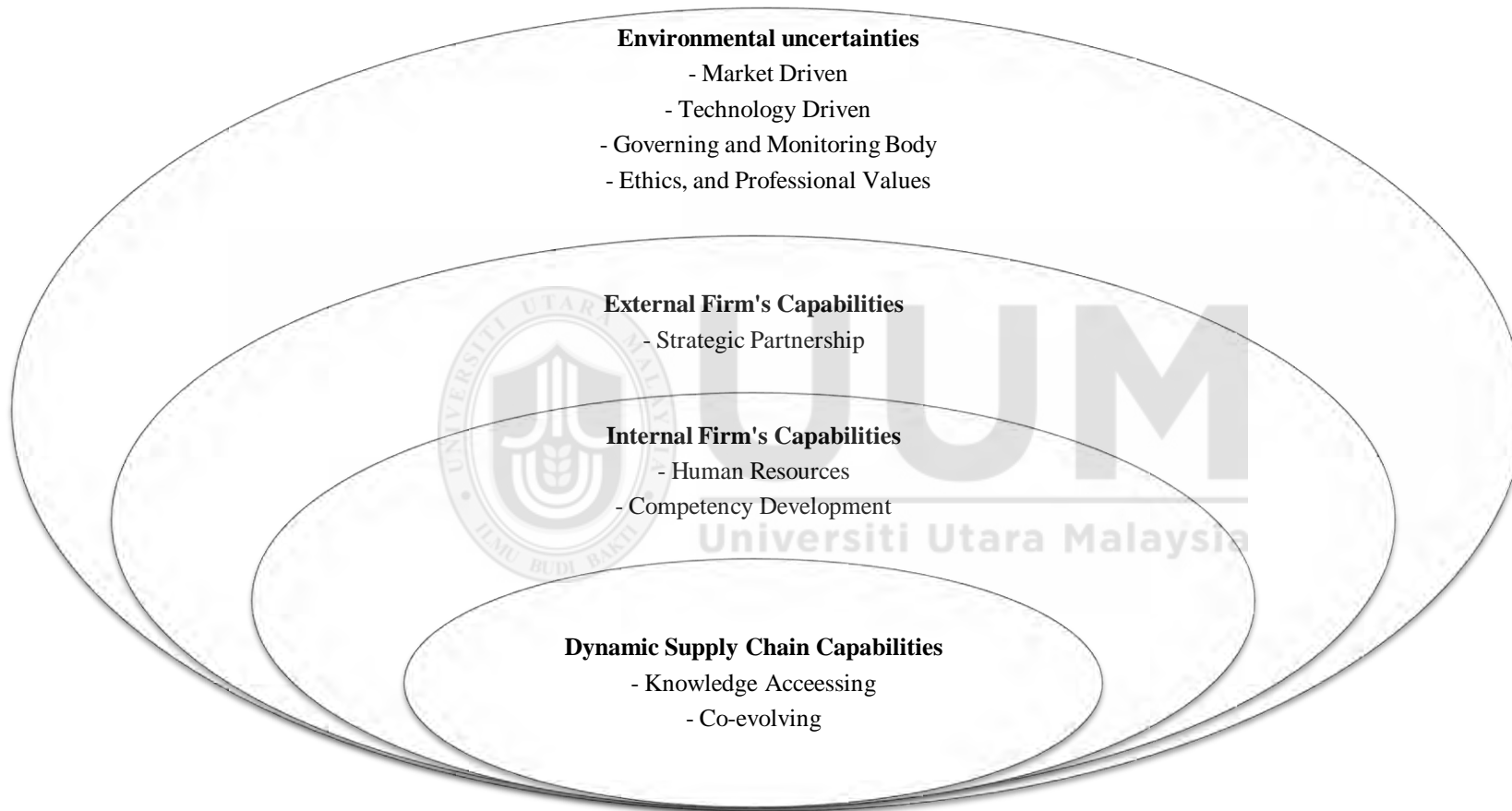


Figure 6.1
The Finalized Emergent Framework

6.5 Conclusions

Dynamism of supply chain capabilities is all about trust and sets of competencies. The set of competencies of management and soft skills includes the technical, decisional, human, and conceptual skills. Even though, in oil and gas industry technical competencies are highly required nevertheless the human competencies shall not be ignore. The general managers shall acquire the certain competencies in managerial, technical, and human too in order to ensure the dynamic supply chain capabilities exist.

The Government and PETRONAS have worked hard as custodians of the country's energy resources, from exploring hard-to-reach oil fields and building up reserves to extracting more value from marginal oil fields. They have also gone on to build on an extensive petrochemicals industry with integrated complexes in Johor and Sabah which will add tremendous value to Malaysia's energy supply chain and transform the country into an oil and gas hub in its own right.

Rethinking on how Malaysia uses energy to power export-orientated industries leads for energy efficiency, rationalising subsidies and using renewable sources of energy such as solar power and biomass. Thus, collectively it have the potential to generate cost savings for both industries and the Government while expanding technological know-how and innovation. Proactive steps to encourage investment in marginal fields offshore Malaysia also resulted in local firms forging valuable partnerships with global companies, a boost in domestic production and a vibrant culture of technology transfer.

6.6 Contributions of the study

The aim for the study is to understand the dynamic supply chain capabilities in the context of oil and gas industry in Malaysia. In addition, it also explores the role of dynamic capabilities as an underlying principle to the dynamic supply chain management practices. Furthermore, the study explores the firm's capabilities, which is derived from the dynamic supply chain capabilities in oil and gas industry. As a result, several implications have appeared from the study. These implications can be divided into theoretical and managerial implications. The study's specific contributions to theory were discussed specifically. which construct affirm existing study and which are emergent findings were identified.

6.6.1 Theoretical Contributions

From the theoretical perspectives, this study utilized dynamic capabilities, industrial system, resource-based view and organizational learning theory. These theories discussed the importance of information and materials as unique resources in supply chain management for the competitive advantage. It represented an exploratory study on dynamic supply chain capabilities in the context of oil and gas industry in Malaysia. Furthermore, it provided information to develop a better understanding on dynamic supply chain capabilities towards strategies and decision made in the firm internal and firm external capabilities. The specific contributions to the extension of knowledge in dynamic capabilities through the dimensions of firm's capabilities and dynamic supply chain capabilities among the partners of the oil and gas supply chain. Moreover, the dimension of learning orientation in firm's capabilities contributed to the organizational learning theory.

First, the study contributed to the industrial system by exploring the meaning of firm's capabilities as practiced by the oil and gas contractors including the upstream and downstream contractors in serving their clients. The results emerged that value chain coordination, client, supplier and operations are important in the supply chain orientation respectively. However, competitor and logistics showed least important by the respondents. The oil and gas firms also need to ensure that people in the chain acquire all capabilities in learning orientation.

Second, from the dynamic capabilities theoretical perspective, this study contributed by discovering the meaning of dynamic supply chain capabilities as practiced by the oil and gas contractors including the upstream and downstream contractors in serving their clients. These practiced were analyzed within the scope of knowledge accessing and co-evolving from the oil and gas contractors' perspective. The findings showed that knowledge accessing and co-evolving are important to the dynamic supply chain capabilities in oil and gas industry in Malaysia.

Third, from the resource based view perspective, this study contributed by supporting the relations between firm's capabilities and dynamic supply chain capabilities as practiced by the oil and gas contractors including the upstream and downstream contractors in serving their clients. These practiced were analyzed within the scope of human resources, competency development, and strategic partnership from the oil and gas contractors' perspective. The results showed that human resources, competency development, and strategic partnership supported the relations between firm's capabilities and dynamic supply chain capabilities in the context of oil and gas industry.

Finally, the emergent findings from on how environmental uncertainties factors influenced dynamic supply chain capabilities as practiced by the oil and gas contractors including the upstream and downstream contractors in serving their clients. These practiced are analyzed within the scope of market driven, technological driven, governing and monitoring body and ethics and professional values from the oil and gas contractors' perspective. The results show that ethics and professional values, and technology driven are important in the environmental in the context of oil and gas industry. Whereas, market uncertainties and governing and monitoring body is less important in the environmental uncertainties in the context of oil and gas industry.

6.6.2 Practical Contributions

From the managerial point of view, this study benefited in several ways. Using system perspective, this research developed an industry relevant approach to understand and obtain dimensions of dynamic supply chain capabilities by providing as basis for subsequent analysis. The study is relevant to the oil and gas industry communities and strategists in developing decision and operating the business in the supply chain. Results of this study projected to show the attainment of dynamic supply chain capabilities in oil and gas industry and reiterate the companies in the industry to understand the progress and future actions that could improve the oil and gas supply chain management competitiveness in Malaysia.

6.7 Recommendations

This study recommends as the following to industrial buyers and vendors especially the oil and gas contractors.

A finalized emergent framework as in Figure 6.1 need to be introduce to the oil and gas to enhance the collaboration in oil and gas supply chain. Integrating these improvement solutions together with dynamic supply chain capabilities concepts into this cohesive framework will provide the oil and gas supply chain with new efficiency and cost reduction for the industry. This analysis demonstrated how the different dimensions should be considered in relation to each other, and made it clear that a big impact on the dimensions can be made when the following concepts are merged and implemented:

Collaborate in areas where companies have solid footing. Companies are often tempted to use collaboration as a way to fill gaps in their own capabilities. In practice, the most successful collaborations build on strengths rather than compensating for weaknesses.

Turn win-lose situations into win-win opportunities with the right benefit-sharing model. Benefit sharing can help to overcome differences in strategic priorities. Smart companies can make them work by agreeing on more sophisticated benefit-sharing models. These can come in the form of discounts or price increases to more fairly share increased margins or cost reductions, or they can involve compensation in other parts of the relationship.

Select partners based on capability, strategic goals, and value potential. A better approach is one that assess current customers or suppliers across three key dimensions. First, is there enough potential value in collaborating with this partner to merit the effort? Second, do both partners have sufficiently common strategic interests to support the collaboration? Third, does the partner have the right infrastructure and processes in place to provide a basis for the collaboration? Collaborating to improve

forecasting and demand planning is likely to be frustrating if one partner's existing planning processes, systems, or performance are inadequate.

Invest in the right infrastructure and people. Best-practice companies devote extra resources to their collaborations, particularly in the early stages of a new relationship. Appropriate infrastructure for a successful collaboration begins at the top of the organization, with a steering committee of senior leaders who can set the defining vision for the collaborative effort and allocate resources to support it. The detailed design of the collaboration program is then completed by a team comprising members of all relevant functions from both partners in the collaboration. This team will also be responsible for the day-to-day monitoring of the effort once it is up and running.

Establish a robust, joint performance-management system. An effective performance-management system helps a company to ensure that any long-term project is on track and delivering the results it should. In supply chain collaboration efforts, both participants should use the same performance-management system. By building common metrics and targets—and jointly monitoring progress—companies avoid the misaligned incentives that damage so many collaboration efforts.

Collaborate for the long term. When companies take a long-term perspective, their collaborative efforts can become a virtuous circle. A greater understanding of each other's capabilities, knowledge, and costs will often reveal new potential sources of value, while the experience of working closely together means that later initiatives will take less time and be easier to execute than early ones.

Finally, a unique vision of the total value chain need to be defined which include a broad-based supply chain perspective that starts with exploration, transportation, refinery operations, then through distribution to the local distributor and

petrochemicals manufacturing. The overarching goal is to reduce the lead-time from source to the consumer by treating the value chain as a whole, not as a sequence of separated silos. Real-time, flexible, and standardized information sharing along the value chain is foundational for this, with consumer-driven demand data as the starting point.

6.8 Future Research

This study unveils the dynamic supply chain management within an industrial market namely an oil and gas industry. It also explores the role of dynamic capabilities practices as an underlying principle to the dynamic supply chain capabilities. Furthermore, the study uncovers the dimensions of firm's capabilities that has created the dynamic supply chain capabilities among the contractors in oil and gas industry.

The research methodology is a case study to be able to broaden knowledge in this area. The execution of the research was according the described process and well executed. Since the interviewee was not connected to either of the parties involved, an objective view could be maintained. One of the aspects that appeared challenging was that the project was so complex and extensive, that only very few people had a complete overview of what has happened, if even. The total respondents together, when combining all the answers, gave a complete overview of the project. New empirical knowledge is needed in dynamic supply chain capabilities dimensions to confirm the existing findings. Environment uncertainties in different industry also can be explored or research empirically. Further research is needed to extent the dimensions in dynamic supply chain capabilities and the emergent of the environment uncertainties in this field and other industries.

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APPENDICES

Appendix 1: Summary of Paper Presentations and Publications

Shatina Saad and Zulkifli Mohamed Udin (2012, 4 – 6 July), *Dynamic Supply Chain: a Study in Oil and Gas Industry*. Paper presented at The 3rd International Conference on Technology and Operations Management (ICTOM 2012), Bandung, Indonesia. pp 271-277. ISBN: 978-979-15458-4-6.

Shatina Saad, Zulkifli Mohamed Udin and Norlena Hasnan (2012, 4 – 7 November), *Dynamic Supply Chain Capabilities and Performance: A Case Study in Oil and Gas Industry*. Paper presented at The 1st Qualitative Research Conference Colloquium, Kuala Lumpur, Malaysia.

Shatina Saad, Zulkifli Mohamed Udin and Norlena Hasnan (2013, 25 – 26 February), *Dynamic Supply Chain in Oil and Gas Industry*. Paper presented at The 3rd Asia-Pacific Business Research Conference (APBRC 2013), Kuala Lumpur, Malaysia. ISBN: 978-1-922069-19-1.

Shatina Saad, Zulkifli Mohamed Udin and Norlena Hasnan (2014, 26 – 27 March), *Supply Chain Practices in Malaysia Oil and Gas Industry*. Paper presented at The International Conference on Innovation Driven Supply Chain (ICIDSC 2014), AIMST University Kedah, Malaysia.

Shatina Saad, Zulkifli Mohamed Udin and Norlena Hasnan (2014, 27 – 29 May), *Dynamic Supply Chain Practices in Malaysia: A Case Study in Oil and Gas Company*. Paper presented at The IEEE International Symposium on Technology Management and Emerging Technologies (ISTMET 2014), Bandung, Indonesia. pp 224-229. ISBN: 978-1-4799-3703-5.

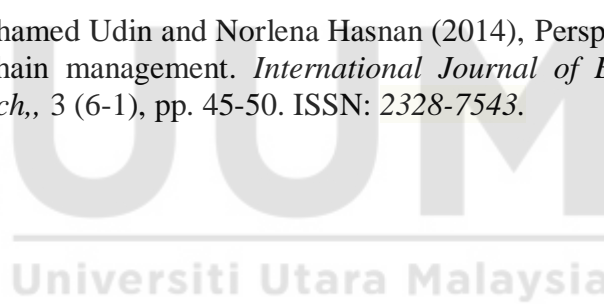
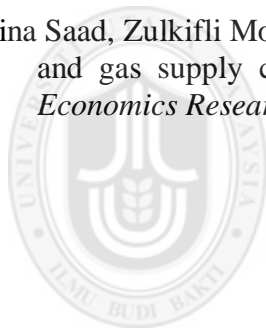
Shatina Saad, Zulkifli Mohamed Udin and Norlena Hasnan (2014, 18 – 19 August), *Dynamic Supply Chain Management: Applying the Qualitative Data Analysis Software*. Paper presented at The 4th International Conference of Technology and Operations Management (ICTOM 2014), Kuala Lumpur, Malaysia.

Shatina Saad, Zulkifli Mohamed Udin and Norlena Hasnan (2014, 15 – 16 November), *Oil and Gas Supply Chain Management: A case study in Malaysia*. Paper presented at The 1st National Conference of Management and Communication (NCCMC 2014), Kuala Lumpur, Malaysia.

Shatina Saad, Zulkifli Mohamed Udin and Norlena Hasnan (2014, 17 – 18 Disember), *Oil and Gas Supply Chain Management Practices in Malaysia*. Poster presented at The 6th International Conference on Postgraduate Education (ICPE-6 2014), UTeM Melaka, Malaysia.

Shatina Saad, Zulkifli Mohamed Udin and Norlena Hasnan (2014), Dynamic supply chain capabilities: a case study in oil and gas industry. *International Journal of Supply Chain Management*, 3 (2), pp. 70-76. ISSN: 2050-7399.

Shatina Saad, Zulkifli Mohamed Udin and Norlena Hasnan (2014), Perspectives in oil and gas supply chain management. *International Journal of Business and Economics Research*, 3 (6-1), pp. 45-50. ISSN: 2328-7543.



Appendix 2: Ethical Consent



Dynamic Supply Chain Management Capabilities: A Case Study in Oil and Gas Industry in Malaysia

Researchers:

Shatina Saad (012-4919521)

Associate Prof. Dr. Zulkifli Mohamed Udin

Associate Prof. Dr. Norlena Hasnan

Thank you for agreeing to this interview. As previously discussed, these questions relate to a dynamic supply chain management in oil and gas industry at your organization. The dissertation investigates the dynamic supply chain capabilities and performances specifically the supply chain orientation, learning orientation, knowledge assessing, co-evolving and business performance.

Your responses will be treated with the appropriate levels of confidentiality i.e. anonymous unless prior permission granted to be named; interviewees have access to the dissertation if they so choose to have one.

The material gained from the interviews will be used specifically in relation to the aforementioned dissertation topic only.

Signed : _____

Participant name : _____

Date : _____

Thank you for your participation.

Sincerely,
The researchers,

.....
Shatina Saad
Doctoral Student

.....
A.P. Dr. Zulkifli Mohamed Udin
Main Supervisor

.....
A.P. Dr. Norlena Hasnan
Co Supervisor

Dear Mr/Ms,

I am a student working on my dissertation at Universiti Utara Malaysia on the topic of dynamic supply chain in oil and gas industry. As you have been a key person in supply chain management, I would like to talk to you about how you judge feasibility of dynamic supply chain capabilities and performances and how you think others judge on it. Further explanation is as in next section.

Supply chain (SC) is a dynamic process that entails constant flow of information, materials and funds across multiple functional areas, within and between chain members in order to meet customer's needs and to maximize their profit. Such dynamic process requires simultaneous acquisition and continuous re-evaluation of partners, technologies and organizational structures. However, firms may encounter problems related to the dynamic process. But, the more flexible the firms deal with the problems in their engagement of stakeholders, the more likely for them to explore, create, and invest in the dynamic capabilities, hence higher performance level over time.

Petroleum companies, in this globalization era are one of the dynamic supply chain entities which require dynamic process of capabilities and performance. Due to their high degree of uncertainties propagate through the SC network of petroleum; petroleum companies require dynamic SC capabilities. Motivated by the complexity of uncertainty in the petroleum companies and its typical characteristic of SC, this study intends to understand the process of dynamic SC management. Supports is a conceptual exploration with the resource based view and organizational learning theory as a basis for developing the framework of the study, this study aimed to identify and understand the process of dynamic SC capabilities and SC performance.

Due to the subjectivity of the study that requires understanding process of SC, this study proposes to employ interpretivist paradigm where it would guide towards rigour qualitative methodology. This study will provide rich and thick description of the dynamic of SC where the outcome will contribute to the managerial and theoretical perspective of SC management.

Appendix 3: Interview Questions

The research general objective is to examine and understand the *dynamic supply chain capabilities* in the organizations specifically on oil and gas industry in Malaysia environment. The focus will be *at the firm's capabilities* of dynamic supply chain capabilities and influence of *environmental uncertainty* on the dynamic supply chain capabilities in the oil and gas industry.

- | <u>No.</u> | <u>Interview Questions</u> |
|------------|---|
| 1. | Please describe your industry sector and the role of your company in it |
| 2. | Please describe the following processes in your company: purchasing planning, purchasing, production, delivery, supply base management, distribution management (or related processes) |
| 3. | Please indicate the uncertainties in the management of your supply chain. Which ones concern you most? |
| 4. | How do you describe the relationship between your company and your suppliers? |
| 5. | What measures have been taken to deal with sourcing uncertainties? What are the effects of these measures? Will your company cooperate with your suppliers to deal with those uncertainties? How? |
| 6. | How do you describe the relationship between your company and your distributors or clients? |
| 7. | What measures have been taken to deal with uncertainties in your operating system? Will the different operations departments in your company cooperate to deal with these uncertainties? How? |
| 8. | What are the constraints within your existing supply chain management? What kinds of changes would you suggest to make your supply chain run more smoothly? |
| 9. | How would you perceive the effect of the introduction of a flexibility strategy on supply chain performance |
| 10. | How important is supply flexibility for you firm, compared to other purchasing performance dimensions (cost, quality, reliability)? |
| 11. | How do you measure supply flexibility? |
| 12. | Please describe the extent of supply chain integration in your organization. How does supply chain integration enable supply chain in your organization? |

13. Please describe the extent of supply chain flexibility in your organization. How does supply chain flexibility enable supply chain in your organization?
14. Please describe the supply chain learning orientation in your organization. How does supply chain learning orientation enable supply chain agility in your organization?
15. Please describe the top management's role and vision toward supply chain in your organization. How does top management's role and vision enable supply chain in your organization?
16. Please describe the extent of employee's supply chain-related competence in your organization. How does employee's supply chain-related competence enable supply chain agility in your organization?
17. How does the supply chain associate with firm performance?
18. How does inter-organizational collaboration support supply chain?



Appendix 4: Interview Transcription (First Level)

Research title	Dynamic Supply Chain Management Capabilities: A Case Study in Oil and Gas Industry in Malaysia		
Researcher	Shatina Saad		
Research Questions	<ol style="list-style-type: none"> 1. How is firm's capabilities associate with dynamic supply chain capabilities in oil and gas industry in Malaysia? 2. How is an environmental uncertainty factor influence dynamic supply chain capability in oil and gas industry in Malaysia? 3. What are the dynamic supply chain capabilities, as defined in the context of strategic resources in Malaysia? 		
Interviewee	Name (initial)	:	Weda
	Gender	:	Female
	Position	:	Managing Director
	Company Name	:	EE
	Working life	:	
Interview	Day/Date	:	
	Time	:	
	Venue	:	
Transcribing	Day/Date	:	
	Time	:	
File			

Preamble:

SS: Several companies sebab one of the reasons kita nak tengok through out the chain aje.. This is main supervisor Dr Zulkifli. He is quite famous juga. If you google his name dalam supply chain. And Dr Norlena ini memang prominent and very comparative. Sebenarnya this area I buat not in oil & gas. He suggested why not tengok oil & gas. Kita bukannya nak masuk specific nak masuk company tuh. Supply chain in oil and gas orang tak perasan. MOGSEC exhibition that is where semua berkumpul and the importance of supply chain in oil & gas.

AA: *dalam banyak-banyak industry Oil and gas punya supply chain agak organized*

SS: Yeah agak organized

AA: *quite high level integrity. They have quite structural process. Meaning you deal directly with oil company very difficult for someone nak try to breach, delay, maneuvers even for simple things like eg. your prices – even though you have close good*

relationship or know your client and client can help you – your price a lot masuk sekali aje – no way to change.. nak tukar or selit selit masuk – no way – cannot

SS: We take PETRONAS as focal now in this chain study

AA: *not really in oil and gas PETRONAS is the governing. There is an act 1964 so all other oil operators in Malaysia like Exxon shell governed under this act. So PETRONAS is their monitoring. That's why in PETRONAS there is a department known as PMU (petroleum management unit). This department yang govern all this companies. Kalau salah satu buat problem they have the right to come in and just do the audit. The reason is each of this oil companies PETRONAS has the stake. That's why they have PSC (production sharing contrac). PETRONAS as partners mesti ada dalam 30 or 40%. That's why they have the right to govern. You take oil from my country so PETRONAS did same thing.*

Macam selalunya sama jgak any other company it happen whereby you have certain level of PO eg. RM5000 manager boleh signoff without MD. Same jgak PETRONAS govern all these operators. Each operator can sign off up to RM10 million but any more than 10 million all these company need to get the final approval from PETRONAS and PMU. And next exit threshold then go to MOF for final approval

SS: ok that's clear. how about your company in this supply chain

AA: My company is relatively small. < then 10 people and free lancer I think quite good jgak depends on the total companies tulis apa. Service too part of the chain. During MOGSEC this is the good chain. Barang tak sampai..

My company is doing maintenance.

SS: Doesn't matter coz your part is part of the whole supply chain

AA: Yeah whole chain. Very structural sc

Sampai Sapura kencana billion project 100 million to subcontract to oothers must have PETRONAS lisenca... PETRONAS lisenca one requirement.... Cannot give to uncle unless your uncle got valid lisenca.. certain packages eventhough Sapura kencana keluat ITP PETRONAS will sit in the committee meeting.. strategic key services eg technical PETRONAS will sit the meeting... technical, perform platform will do final review..

... 3000 plus registered suppliers

... PETRONAS hence curtain pun ada categories .. stationaries, paper, item as indirect involvement

... direct .. curtain pretty much straight forward... pplatform

.. certain categories ada level requirement..

..You cannot audited account mesti update.. every year auditor akan dating.. financial year habis bila..

Licence ada condition letter apa-apa by due date... date kalu tak buat akan drop..

Sapura.. one person jaga benda tu ajer..

Once drop out susah.. nak masuk balik leceh..

Provide training ..

Sample lisenca.. 1st time 1 year.. renew 3 tahun... terms.. syarat2 khas..

Principla agreement with foreign company kena ada letter of approach.. ada categories.. how we operate buat sendiri & outsource..

Each lisenca RM500/each

Six services.. satu lisenca.. ada sub categories.. Rm500 utk 5 sub.. nak add RM100 untuk each sub

Sample categories... production chemical.. ada sub.. then very detail..

Eg.. container.. ada curtain.. dll..

Drilling..

Nanti akan take a look mana yang applicable.. talk to client.. u akan puling di category name

.. so new lisenca 3 bulan & 6 weeks.. nak renew 6 weeks...

.. my company expire January, this year oct dah submit for renewal...

.. not take risk the changes being drop out.. client wont see your name.. client yang kenal kenapa nama tak ada.. ada yang PETRONAS tak puas hati ker..

System PETRONAS ada.. Exxon shell pakai system sama.. key in keluar nama registered lisenca

.. each category as many as one very niche.. 3, 4 jugak...

.. PETRONAS sole sourcing but it happen when technical solution only technical to invite pun they will fight.. we cannot meet the requirement

.. report verification due to technical.. tak layak.. chances very rare.. masa pre qualification..

Control by PETRONAS.. eventually.. all contractors follow the standard process.. “recondition thinking & process”

.. company kecil structured..

Tender PETRONAS can anytime come and audit anytime..

.. sdn bhd.. minimum requirement.. no enterprise or sole proprietorship.. licence RM100 k paid up capital.. operate obtain 1 year audited account..

Prove to them.. subcontract to main con only certain things only.. tricky sikit..

.. strategic services PETRONAS jaga.. minta kerja biasa2 dulu not the main.. one sustain apply for licence.. 1 year after operations ada audited account baru submit..

There are load of works for o&g.. banyak...

.. networking.. not only clients, contractors.. you need their help... awal supply to others..

Masa tak ada licence still ada client offer.. you got licence you still got client .. for urgent.. ask with for the big one from the clients...

.. time bila semua urgent.. ROB, vessel, list the ROB I datang dengan then dia bagi 1 tapi verification production loss.. risk further...

.. plan & structural maintenance tak ada..

Something happen unexpected then we go masa tu price tolak tepi jalan ajer...

.. contractors pun cost akan increase.. our side pun siapa2 boleh bagi yang cepat cost increase..

.. sebesar besar kapal sampai ke kecik2 kuih atas meja dia..

Paper, computers, semua indirect cost.. logistic lagi..

Steel bulk item PETRONAS beli semua.. PETRONAS mitco responsible to chose for installation spare part then.. bila nak beli banyak anak syarikat yang belikan..

Beli part outsource & solution... bg pada Sapura, then buat.. steel structure beli sekali.. beli banyak dapat cheaper.. platform on structure the steel..

Steel bulk item diaorg beli..

Mogse ni those companies provide service.. MOJEC engineering consultant more consultancy another group.. OSFAM fabricators.. untuk fabricates saja..

MOGSE banyak members.. end of the day everyday use services.. supply pump always ada service.. eg maintenance..

Eg company focus pipeline maintenance.. lepas install pipeline not only jabatan air.. kalau bocor sikit boleh korek..

O&g requires routine maintenance, preventive maintenance, every year program, all year program.. contractors will do..

Bocor sikit exposure to the whole nation.. represent the country image.. national image.. minyak split sikit ikan mati yang lain nak makan apa..

Orang namapk minyak ada di petrol station that's it..

Down time delay tak boleh..

PETRONAS pun ada challenges .. let say tahun depan we need to do hand maintenance program due to supply chain 2013 new maintenance to do comment to start jan 2013.. tendering processes, test available, provide evaluation..

Mis maintenance bocor production throughput kurang..

Supply chain is so important in PETRONAS.. In terms of money, safety.. especially meletup orang mati siapa nak answer to the country..

Mcm I quite senang jgak coz the companies owner 2 orang saja (with husband)

.. on ourside when it comes to distinctive first buat marketing establish contract buat design, when time for bidding coz registered..

Even same service I didn't go marketing still dapat invitation end of the day who will get the preferences.. those yang comfortable

.. pernah jgak get awarded for project , masuk and dapt..

But main thing once registered dapat invited..

Upfront marketing might know and offer solutuion.. baca and interact slightly different.. baca lain..

Marketing still required having said without marketing stil dapat project...

Process involve 2 tier..

1st technical dulu.. tak faham clarification done in writing.. no phone call.. call guling2 pun tak akan jumpa.. walau kita genuine might ada yang buat..

Ethics very strong.. before that can see but during bidding tak boleh..

.. bidding as short as a week to 120 days.. lama 3 months.. very complex clarification technical 1 and half month.. 10 company masuk after technical tinggal 4 baru buka commercial utk four companies ajer... terms and condition clarify price.. depends how complex.. can be a week.. technical simple within 1 day settle.. technical PETRONAS committee yang involved..

Corruption per se PETRONAS ada but still not proof way of getting business.. committee ada 10 orang and cannot buy out all.. setengah tak suka.. so no way..... end of the day still fight for it la.. but still need to do basic marketing function.. more else cash involved doesn't work.. not a pool proof things.. very strict.. PETRONAS up to extend removed all those people corrupted .. when you go to group supply chain all are women..

.. group supply chain all ladies.. why.. because lady more ethical.. PETRONAS people gold hard cash but of course ada gift... contoh baik .. “ eh minggu depan nak pi london.. client nak pesan bag.. nanti beli. Dah balik bagi .. tak apalah you ambil la.. hadiah..” furthest lady can go for gift..

I ada ramai kawan buddy2.. pergi rumah selalu nut still follow..

Ma go & minta tender plan.. when the tender, what criteria but with the “price” tapi kawan2 I how close no way they will give that..

“ Aida, ITP ni nak cakap ajer .. nothing.. no additional anything..” perempuan lain perassan takut .. integrity higher.. frens tetap frens.. when time.. borak2 “company ni dpt tak?.. tak boleh bagitau.. aha laa.. “ ask wrong person.. lupa position .. high level integrity..

So bila system structured insha Allah PETRONAS benefit they will get certain level of services..

Cannot play with certain level of quality..

I know other industry inspect bawah kapal call ROB contractors – due to high level dapat pada stationary company.. stationary company you bagi technical company sedar2 kapal dah bocor..

In O&g cannot take the chance for that..

PETRONAS officer cunning2 nak tolong kawan pun kalau tak qualified tak akan bagi..proof baru bagi confident nak supported..

Nak dapat recommendation and strong support.. dia understand and confident.. look team this is the best thing to do..

Bagi buta buta tak akan bagi.. eventhough nak bayar dia bukan kecik2.. huge industry..

I bet bila gali minyak atas platform tak ada apa sgt sedangkan banayk sangat.. by the time geologist stdy that process itself billion & millions & subcontractors involve banayk sangat..tu tak ada minyak lagi.. more upstream..

Petrochemicals yang supplies to cosmetics at the end in Malaysia GDP contributing is from o&g..that volume also shows how big the industry..

Keliling KLCC penuh o&g companies.. tan&Tan.. G tuner..

I rental buang masa nanti staff susah.. makan expensive makan expensive.. my office now in Pandah Indah ok.. near yet so far..

If client call for meeting just take half an hour only to reach the place.. I'm not going to move the office to Damansara.. just a waste of time.. now ok la.. dekat dengan KLCC..

MOGSE office dekat Setiawangsa.. dekat la juga.. not much invoves directly tapi more towards networking..

Time to time they will do dialogue sediton with PETRONAS.. usually contractors got problem with license.. then they talk to MOGSC as member then MOGSC will have a dialue or forum & MOGSC as an association will arrange place, refreshments during the dialogue..

.. when members express unhappy.. banayk vendor have problems as small company nobody will listen the complaint.. uou are nobody.. hence via MOGSC your view will be heard by the client..

It really helps..to become members of MOGSC only need to pay RM1200 annually and the benefits are lots..

O&G banayk office in KL. They spent ratus2 ribu & million for exhibition.. during that exhibition many visitors come and they spent for hotel, flights, foods & others..

Wait you see the incoming exhibition.. OGA2013.. mahal & usually nohing RM2000/3000 below for the cost fee..

MOGSCE exhibition is small.. wait the OGA.. it is 5/6 timmes huge.. take out whole KLCC hall & external tent.. the exhibition is worldwide.. all clients & whoever will come..

.. usually most o&g company will set the marketing budget goes to the exhibition.. myself also will be participating during OGA & I spent RM50 thousand for the empty space..

Usually it will be officiating by the prime minister or deputy prime minister.. Tun Mahadhir always come.. never failed even he is no longer as prime minister..

.. if you don't attend the conference you will be surprised how many company exist covering all activities in the o&g industry.. area of KLCC will have massive traffic jammed.. the event is 2 years once..

.. O&g is structured, reliability, safety & security..

.. look back PETRONAS started in 1974 but actually not too much for the first 6/7 years not so perform.. really strong in 1980s.. it start working when they found the first well in Miri..

PETRONAS system inherit from Shell.. Shell is the first operator in Malaysia.. banyak follow Shell systemsince Shell has been as player long time already..

Overall.. I can say that SC is quite matured in o&g..

When you talk to people.. people don't really understand what you are doing in o&g.. org Tanya kerja man?? Kerja o&g.. kerja pam minyak ker?? When people always think when o&g means that you work at the petrol station only.. or on the platform only..even in my family my uncles & uncles also do not understand.. in my family I am the first one involves with o&g since 1997 some still thinking I am still working at the petrol station.. hahahhhahhha...

.. people failed to see it.. not many people understand crude oil, what will happen next.. just like when study science during our school time..

Some people just ignored it.. they did not even realized that electricity that they consumed also supplies by o&G..

There are so many byproducts from o&g.. a lots..

and nobody would like to study it.. o&g is one of the last thing that people will think about.. orang ingat some and some people rasa people tertlampau elite and rich people.. and only technical savvy whereas no.. anyone can involve in the industry.. never think about it but o&g not necessary for technical people

environmentalist always say save energy but o&g becoming scarce.. even now PETRONAS dulu exporter of o&g, we consume less but soon we will be approaching to the importer..

Now PETRONAS business model go into downstream.. all this while they focus more on exploration and upstream.. now focusing at the downstream we will sell to byproducts.. can sell to other too.. so habis minyak habis.. but now move to petrochemicals.. banyak dah now di Kerteh, Bintulu now have massive Petrochemical..

PETRONAS also focusing on gas.. we are the 2ns largest LNG producer.. recent new development banyak gas found.. from all now focus on regasification.. eventually Malaysia need ot discover gas.. we supply to Japan for nuclear power plant.. nuclear is cheap..

People always thought so elite & so exclusive so o&g orang takut nak study..

UTP pun banyak involvement in PETRONAS .. but banyak on developing technology & exploration technical..

People don't understand what I'm doing.. we do have system not the online and real time line courier system.. & mesti ada tracking & tak boleh buat tak tau ajer..

Our company is ISO 9001 s we need to comply to the standard....

Shipment tracking no software use but ada..

Individual client or project..

Process control to very great extent..

Integrated quality info..

..share PETRONAS hence system all contractors online, invoice online..

O&g more or else anybody can be in the industry.. no need to know someone in the industry before you join it...

.. reduce product development costs if have SC then will reduce the cost..

.. the most we fear if got blacklisted.. simple ajer.. moment PETRONAS know appear Bumi but haunted by China man.. nama ajer terus blacklisted.. once blacklisted need to clear your name for few years than you lose few years..

Challenge dealing with PETRONAS is the terms and conditions.. PETRONAS can engage with their lawyers to discuss contract with us but they didn't.. they just cakap remove the clause.. if acceptable reason okay tapi yang tak boleh especially monetary and

huge commercial impact term services.. 5 million.. if anything happen kena ambil unlimited liability.. if anything happen... not only affect the business but also our lives.. the business will gone.... now I only accept up to the contract value only.. insurance ada but it will cover betul2 related..

PETRONAS good in managing contractors.. time to time they will call us.. introduce new system, strategy, new vision.. they will call us.. they will organized in hotel..

Eg macam PETRONAS vision bbeing forward zero tolerance on safety, to be in the criteria in the evaluation in your project, so dia akan roll out untuk kita orang.. then so PETRONAS..

Kalau pi offshore dapat waiver so now kena ada passport so we are aware .. this is shared vision..

... PETRONAS rolled out to us, later we disseminate to our staff

.. constantly check the latest in the industry.. technology developer dating dari Norway.. latest coming from there and kita proposed to client..

Apa PETRONAS buat pada kita , kita buat buat balaik pada subcontractor..

.. comply

.. challenges market situation as you know client expect process go lower & lower whereas cannot.. to get high income country but with the process its difficult due to cost.. operations costs is difficult.. to strengthen if we can control..

Contractors.. challenges is to compensate the staff..

client nak murah eg.. 100 thousand now nak discount.. inflation & cost increase is uncontrollable...

Appendix 5: Interview Transcription (Second Level)

Case Name: Weda (

Overall Themes & Categories

No.	Evidence	Themes	Categories
1.	Dalam banyak-banyak industry Oil and gas punya supply chain agak organized	Structured SC	SC environment
2.	quite high level integrity. They have quite structural process. Meaning you deal directly with oil company very difficult for someone nak try to breach, delay, and maneuvers even for simple things like eg. your prices – even though you have close good relationship or know your client and client can help you – your price a lot masuk sekali aje – no way to change.. nak tukar or selit selit masuk – no way – cannot	High integrity / ethical / structural process	Ethical & professional
3.	not really in oil and gas PETRONAS is the governing. There is an act 1964 so all other oil operators in Malaysia like Exxon shell governed under this act. So PETRONAS is their monitoring. That's why in PETRONAS there is a department known as PMU (petroleum management unit). This department yang govern all this companies. Kalau	Company control by government / as monitoring body	Anchor company / authority / governing & monitoring

	salah satu buat problem they have the right to come in and just do the audit. The reason is each of this oil companies PETRONAS has the stake. That's why they have PSC (production sharing contrac). PETRONAS as partners mesti ada dalam 30 or 40%.		
4.	<p>That's why they have the right to govern. You take oil from my country so PETRONAS did same thing.</p> <p>Macam selalunya sama jgak any other company it happen whereby you have certain level of PO eg. RM5000 manager boleh signoff without MD. Same jgak PETRONAS govern all these operators. Each operator can sign off up to RM10 million but any more than 10 million all these company need to get the final approval from PETRONAS and PMU. And next exit threshold then go to MOF for final approval</p>	Company control by government / as monitoring body	Anchor company / authority / governing & monitoring
5.	My company is relatively small. < then 10 people and free lancer I think quite good jgak depends on the total companies tulis apa. Service too part of the chain. During MOGSEC this is the good chain. Barang tak sampai.. My company is doing maintenance	Service provider	Value chain
6.	<p>Yeah whole chain. Very structural sc..</p> <p>Sampai Sapura kencana billion project 100 million to subcontract to others must have PETRONAS lisencc... PETRONAS lisencc one requirement....</p>	Company control by government / as monitoring body / license according to categories / assessment committee / PSC	Anchor company / authority / governing & monitoring /

	Cannot give to uncle unless your uncle got valid lisenca.. certain packages eventhough Sapura kencana keluar ITP PETRONAS will sit in the committee meeting.. Strategic key services eg technical PETRONAS will sit the meeting... technical, perform platform will do final review..		
7.	<p>... 3000 plus registered suppliers</p> <p>... PETRONAS hence curtain pun ada categories .. stationaries, paper, item as indirect involvement</p> <p>... direct .. curtain pretty much straight forward... platform.... certain categories ada level requirement..</p>	Various categories / license registered	Registered suppliers
8.	<p>..You cannot audited account mesti update.. every year auditor akan dating.. financial year habis bila..</p> <p>Licence ada condition letter apa-apa by due date... date kalu tak buat akan drop..</p> <p>Sapura.. one person jaga benda tu ajer..</p> <p>Once drop out susah.. nak masuk balik lech..</p>	Regular monitoring / license retention / renewal	Regular audit
9.	Provide training ..	competency	Competency development
10.	<p>Sample lisenca.. 1st time 1 year.. renew 3 tahun... terms.. syarat2 khas..</p> <p>Principal agreement with foreign company kena ada</p>	License application / categories / from monitoring institution	Operations pre-requirement / approval from anchor company / monitoring institution

	<p>letter of approach.. ada categories.. how we operate buat sendiri & outsource..</p> <p>Each lisenca RM500/each</p> <p>Six services.. satu lisenca.. ada sub categories.. Rm500 utk 5 sub.. nak add RM100 untuk each sub</p> <p>Sample categories... production chemical.. ada sub.. then very detail..</p> <p>Eg.. container.. ada curtain.. dll..</p> <p>Drilling..</p> <p>Nanti akan take a look mana yang applicable.. talk to client.. u akan puling di category name</p> <p>.. so new lisenca 3 bulan & 6 weeks.. nak renew 6 weeks...</p> <p>.. my company expire January, this year oct dah submit for renewal</p>		
11.	<p>.. not take risk the changes being drop out.. client won't see your name.. client yang kenal kenapa nama tak ada.. ada yang PETRONAS tak puas hati ker..</p> <p>System PETRONAS ada.. Exxon shell pakai system sama.. key in keluar nama registered license</p>	Monitoring the expiry license date	Suppliers Database system

12.	.. each category as many as one very niche.. 3, 4 jugak...	many suppliers	Multiple sourcing
13.	.. PETRONAS sole sourcing but it happen when technical solution only technical to invite pun they will fight.. we cannot meet the requirement .. report verification due to technical.. tak layak.. chances very rare.. masa pre qualification.. Control by PETRONAS.. eventually.. all contractors follow the standard process.. “recondition thinking & process”	Allow single sourcing but still look for technical specification	Company control by government / as monitoring body
14.	.. company kecil structured.. Tender PETRONAS can anytime come and audit anytime.. .. sdn bhd.. minimum requirement.. no enterprise or sole proprietorship..licence RM100 k paid up capital.. operate obtain 1 year audited account.. Prove to them.. subcontract to main con only certain things only.. tricky sikit..	License application / categories / from monitoring institution	Operations pre-requirement / approval from anchor company / monitoring institution
15.	.. strategic services PETRONAS jaga.. minta kerja biasa2 dulu not the main.. one sustain apply for licence.. 1 year after operations ada audited account baru submit..	License application / categories / from monitoring institution	Operations pre-requirement / approval from anchor company / monitoring institution

	<p>There are load of works for o&g.. banayak...</p> <p>.. networking.. not only clients, contractors.. you need their help... awal supply to others..</p> <p>Masa tak ada lisenca still ada client offer.. you got license you still got client .. for urgent.. ask with for the big one from the clients...</p>		
16.	<p>.. time bila semua urgent.. ROB, vessel, list the ROB I datang dengan then dia bagi 1 tapi verification production loss.. risk further...</p> <p>.. plan & structural maintenance tak ada..</p> <p>Something happen unexpected then we go masa tu price tolak tepi jalan ajer...</p> <p>.. contractors pun cost akan increase.. our side pun siapa2 boleh bagi yang cepat cost increase..</p>	Urgent orders / price uncertainty	Negotiation / co-evolving / environmental uncertainty
17.	<p>.. sebesar besar kapal sampai ke kecik2 kuih atas meja dia..</p> <p>Paper, computers, semua indirect cost.. logistic lagi..</p> <p>Steel bulk item PETRONAS beli semua.. PETRONAS mitco responsible to chose for installation spare part then.. bila nak beli banayak anak syarikat yang belikan..</p> <p>Beli part outsource & solution... bg pada Sapura, then buat.. steel structure beli sekali.. beli banayk</p>	Company control by government / as monitoring body / license according to categories / assessment committee / PSC	Anchor company / authority / governing & monitoring /

	<p>dapat cheaper.. platform on structure the steel..</p> <p>Steel bulk item diaorg beli..</p>		
18.	<p>Mogse ni those companies provide service.. MOJEC engineering consultant more consultancy another group.. OSFAM fabricators.. untuk fabricates saja..</p> <p>MOGSE banyak members.. end of the day everyday use services.. supply pump always ada service.. eg maintenance..</p>	Joining specific society in the industry	Society / support association
19.	<p>Eg company focus pipeline maintenance.. lepas install pipeline not only jabatan air.. kalau bocor sikit boleh korek..</p> <p>O&g requires routine maintenance, preventive maintenance, every year program, all year program.. contractors will do..</p> <p>Bocor sikit exposure to the whole nation.. represent the country image.. national image.. minyak split sikit ikan mati yang lain nak makan apa..</p> <p>Orang namapk minyak ada di petrol station that's it.. Down time delay tak boleh..</p>	Importance of the activities / operations	Justification importance maintenance / nation interest
20.	<p>PETRONAS pun ada challenges .. let say tahun depan we need to do hand maintenance program due to supply chain 2013 new maintenance to do comment to start jan 2013.. tendering processes, test</p>	Challenges / procedures	Time management / scheduling

	<p>available, provide evaluation..</p> <p>Mis maintenance bocor production throughput kurang..</p>		
21.	<p>Supply chain is so important in PETRONAS.. In terms of money, safety.. especially meletup orang mati siapa nak answer to the country..</p>	<p>Importance of the activities / operations</p>	<p>Justification importance maintenance / nation interest</p>
22.	<p>Mcm I quite senang jgak coz the companies owner 2 orang saja (with husband)</p> <p>.. on our side when it comes to distinctive first buat marketing establish contract buat design, when time for bidding coz registered..</p>	<p>Marketing strategies /</p>	<p>Firm's internal strategies</p>
23.	<p>Even same service I didn't go marketing still dapat invitation end of the day who will get the preferences.. those yang comfortable</p> <p>.. pernah jgak get awarded for project , masuk and dapat..</p> <p>But main thing once registered dapat invited..</p>	<p>Fair opportunities for bidding</p>	<p>Open mindedness</p>
24.	<p>Upfront marketing might know and offer solution.. baca and interact slightly different.. baca lain..</p> <p>Marketing still required having said without marketing still dapat project...</p>	<p>Marketing / building relationship</p>	<p>Collaboration / entrusting trust / relationship</p>

25.	<p>Process involve 2 tier..</p> <p>1st technical dulu.. tak faham clarification done in writing.. no phone call.. call guling2 pun tak akan jumpa.. walau kita genuine might ada yang buat..</p> <p>Ethics very strong.. before that can see but during bidding tak boleh..</p> <p>.. bidding as short as a week to 120 days.. lama 3 months.. very complex clarification technical 1 and half month.. 10 company masuk after technical tinggal 4 baru buka commercial utk four companies ajer... terms and condition clarify price.. depends how complex.. can be a week.. technical simple within 1 day settle.. technical PETRONAS committee yang involved..</p>	Procurement process	
26.	<p>Corruption per se PETRONAS ada but still not proof way of getting business.. committee ada 10 orang and cannot buy out all.. setengah tak suka.. so no way..... end of the day still fight for it la.. but still need to do basic marketing function.. more else cash involved doesn't work.. not a pool proof things.. very strict.. PETRONAS up to extend removed all those people corrupted .. when you go to group supply chain all are women..</p>	integrity	Ethics & professionalism
27.	<p>.. group supply chain all ladies.. why.. because lady more ethical.. PETRONAS people gold hard cash but of course ada gift... contoh baik .. “ eh minggu</p>	integrity	Ethics & professionalism / gender

	<p>depan nak pi london.. client nak pesan bag.. nanti beli. Dah balik bagi .. tak apalah you ambil la.. hadiah..” furthest lady can go for gift..</p> <p>I ada ramai kawan buddy2.. pergi rumah selalu nut still follow..</p>		
28.	<p>Me go & minta tender plan.. when the tender, what criteria but with the “price” tapi kawan2 I how close no way they will give that..</p> <p>“ Aida, ITP ni nak cakap ajer .. nothing.. no additional anything..” perempuan lain perassan takut .. integrity higher.. frens tetap frens.. when time.. borak2 “company ni dpt tak?.. tak boleh bagitau.. aha laa.. “ask wrong person.. lupa position .. high level integrity..</p> <p>So bila system structured insha Allah PETRONAS benefit they will get certain level of services..</p>	integrity	Ethics & professionalism / gender
29.	<p>Cannot play with certain level of quality..</p> <p>I know other industry inspect bawah kapal call ROB contractors – due to high level dapat pada stationary company.. stationary company you bagi technical company sedar2 kapal dah bocor..</p> <p>In O&g cannot take the chance for that..</p>	High risk & safety	HSE /
30.	<p>PETRONAS officer cunning2 nak tolong kawan pun kalau tak qualified tak akan bagi..proof baru bagi</p>	Integrity / qualified for bidding	Ethics & professionalism /

	<p>confident nak supported..</p> <p>Nak dapat recommendation and strong support.. dia understand and confident.. look team this is the best thing to do..</p> <p>Bagi buta buta tak akan bagi.. eventhough nak bayar dia bukan kecil2.. huge industry.</p>		gender
31.	<p>I bet bila gali minyak atas platform tak ada apa sgt sedangkan banyak sangat.. by the time geologist study that process itself billion & millions & subcontractors involve banyak sangat..tu tak ada minyak lagi.. more upstream..</p>	Supply chain o&g	Exploration stage / value chain
32.	<p>Petrochemicals yang supplies to cosmetics at the end in Malaysia GDP contributing is from o&g..that volume also shows how big the industry..</p> <p>Keliling KLCC penuh o&g companies.. tan&Tan.. G tuner..</p> <p>I rental buang masa nanti staff susah.. makan expensive makan expensive.. my office now in Pandah Indah ok.. near yet so far..</p> <p>If client call for meeting just take half an hour only to reach the place.. I'm not going to move the office to Damansara.. just a waste of time.. now ok la.. dekat dengan KLCC..</p>	location	Close proximity to supply and demand

33.	<p>MOGSE office dekat Setiawangsa.. dekat la juga.. not much invoves directly tapi more towards networking..</p> <p>Time to time they will do dialogue seccion with PETRONAS.. usually contractors got problem with license.. then they talk to MOGSC as member then MOGSC will have a dialogue or forum & MOGSC as an association will arrange place, refreshments during the dialogue..</p>	Joining specific society in the industry / dialogue /feedback	Society / support association
34.	<p>.. when members express unhappy.. banyak vendor have problems as small company nobody will listen the complaint.. uou are nobody.. hence via MOGSC your view will be heard by the client..</p> <p>It really helps..to become members of MOGSC only need to pay RM1200 annually and the benefits are lots..</p>	Joining specific society in the industry	Society / support association
35.	<p>O&G banayk office in KL. They spent ratus2 ribu & million for exhibition.. during that exhibition many visitors come and they spent for hotel, flights, foods & others..</p> <p>Wait you see the incoming exhibition.. OGA2013.. mahal & usually nothing RM2000/3000 below for the cost fee..</p> <p>MOGSCE exhibition is small.. wait the OGA.. it is 5/6 times huge.. take out whole KLCC hall &</p>	Building relationship / participating in exhibition	Collaboration / strategic partnership / potential customer & suppliers

	external tent.. the exhibition is worldwide.. all clients & whoever will come..		
36.	<p>.. usually most o&g company will set the marketing budget goes to the exhibition.. myself also will be participating during OGA & I spent RM50 thousand for the empty space..</p> <p>Usually it will be officiating by the prime minister or deputy prime minister.. Tun Mahadhir always come.. never failed even he is no longer as prime minister..</p>	Building relationship / participating in exhibition / allocating budget	Collaboration / strategic partnership / potential customer & suppliers
37.	.. if you don't attend the conference you will be surprised how many company exist covering all activities in the o&g industry.. area of KLCC will have massive traffic jammed.. the event is 2 years once..	Building relationship / participating in exhibition / allocating budget	Collaboration / strategic partnership / potential customer & suppliers
38.	<p>.. O&g sc is structured, reliability, safety & security..</p> <p>.. look back PETRONAS started in 1974 but actually not too much for the first 6/7 years not so perform.. really strong in 1980s.. it start working when they found the first well in Miri..</p> <p>PETRONAS system inherit from Shell.. Shell is the first operator in Malaysia.. banyak follow Shell system since Shell has been as player long time already..</p> <p>Overall.. I can say that SC is quite matured in o&g.</p>	Structured SC / policy / governing by anchor company	SC environment / Ethics & professionalism / Anchor company / authority / governing & monitoring

39.	<p>When you talk to people.. people don't really understand what you are doing in o&g.. org Tanya kerja mana?? Kerja o&g.. kerja pam minyak ker?? When people always think when o&g means that you work at the petrol station only.. or on the platform only..even in my family my uncles & uncles also do not understand.. in my family I am the first one involves with o&g since 1997 some still thinking I am still working at the petrol station.. hahahhhahha...</p>	Community understanding	SC environment / knowledge accessing
40.	<p>.. people failed to see it.. not many people understand crude oil, what will happen next.. just like when study science during our school time..</p> <p>Some people just ignored it.. they did not even realized that electricity that they consumed also supplies by o&G..</p>	Community understanding	SC environment / knowledge accessing
41.	<p>There are so many by products from o&g.. a lots..</p> <p>and nobody would like to study it.. o&g is one of the last thing that people will think about.. orang ingat some and some people rasa people terlampau elite and rich people.. and only technical savvy whereas no.. anyone can involve in the industry.. never think about it but o&g not necessary for technical people</p>	Community understanding / perception	SC environment / knowledge accessing
42.	<p>environmentalist always say save energy but o&g becoming scarce.. even now PETRONAS dulu</p>	Scarcity / natural resources	Sustainability

	exporter of o&g, we consume less but soon we will be approaching to the importer..		
43.	Now PETRONAS business model go into downstream.. all this while they focus more on exploration and upstream.. now focusing at the downstream we will sell to byproducts.. can sell to other too.. so habis minyak habis.. but now move to petrochemicals.. banyak dah now di Kerteh, Bintulu now have massive Petrochemical..	Potential business opportunities	Value chain / sustainability
44.	PETRONAS also focusing on gas.. we are the 2ns largest LNG producer.. recent new development banayak gas found.. from all now focus on regasification.. eventually Malaysia need ot discover gas.. we supply to Japan for nuclear power plant.. nuclear is cheap..	Potential business opportunities	Value chain / sustainability
45.	People always thought so elite & so exclusive so o&g orang takut nak study.. UTP pun banyak involvement in PETRONAS .. but banyak on developing technology & exploration technical..	Community understanding / perception	SC environment / knowledge accessing
46.	People don't understand what I'm doing.. we do have system not the online and real time line courier system.. & mesti ada tracking & tak boleh buat tak tau ajer.. Our company is ISO 9001 s we need to comply to	Community understanding / perception / ISO / information sharing	SC environment / knowledge accessing / standard recognition / information shared

	<p>the standard....</p> <p>Shipment tracking no software use but ada..</p> <p>Individual client or project..</p> <p>Process control to very great extent..</p> <p>Integrated quality info..</p> <p>..share PETRONAS hence system all contractors online, invoice online..</p> <p>O&g more or else anybody can be in the industry.. no need to know someone in the industry before you join it...</p>		
47.	<p>.. reduce product development costs if have SC then will reduce the cost..</p> <p>.. the most we fear if got blacklisted.. simple ajer.. moment PETRONAS know appear Bumi but haunted by China man.. nama ajer terus blacklisted.. once blacklisted need to clear your name for few years than you lose few years..</p>	Problem to avoid	Threat if blacklisted
48.	<p>Challenge dealing with PETRONAS is the terms and conditions.. PETRONAS can engaged with their lawyers to discuss contract with us but they didn't.. they just cakap remove the clause.. if acceptable reason okay tapi yang tak boleh especially monetary and huge commercial impact term services.. 5 million.. if anything happen kena ambil unlimited</p>	Terms & condition in contract / mutual agreement	Negotiation / knowledge accessing / co-evolving

	liability.. if anything happen... not only affect the business but also our lives.. the business will gone.... now I only accept up to the contract value only.. insurance ada but it will cover betul2 related..		
49.	<p>PETRONAS good in managing contractors.. time to time they will call us.. introduce new system, strategy, new vision.. they will call us.. they will organized in hotel..</p> <p>Eg macam PETRONAS vision being forward zero tolerance on safety, to be in the criteria in the evaluation in your project, so dia akan roll out untuk kita orang.. then so PETRONAS..</p>	Managing contractors / assessment / information sharing / update information	Suppliers relationship / information shared / knowledge accessed
50.	<p>Kalau pi offshore dapat waiver so now kena ada passport so we are aware .. this is shared vision..</p> <p>... PETRONAS rolled out to us, later we disseminate to our staff</p>	Managing contractors / assessment / information sharing / update information	Suppliers relationship / information shared / knowledge accessed
51.	<p>.. constantly check the latest in the industry.. technology developer datang dari Norway.. latest coming from there and kita proposed to client..</p> <p>Apa PETRONAS buat pada kita , kita buat buat balik pada subcontractor.... comply</p>	Information sharing among staff	Knowledge accessing
52.	.. challenges market situation as you know client expect process go lower & lower whereas cannot.. to get high income country but with the process its	Market uncertainty	challenges

	difficult due to cost.. operations costs is difficult.. to strengthen if we can control..		
53.	Contractors.. challenges is to compensate the staff.. client nak murah eg.. 100 thousand now nak discount.. inflation & cost increase is uncontrollable...	Market uncertainty	challenges
54.	This company operationally commenced in the year 2008 and is a Malaysian company located in Ampang.	location	Close proximity to supply & demand
55.	The company aim is to supply state of the art and niche equipment and specialized services for oil and gas industry especially for pipeline either to downstream or upstream sector.	Service provider	Specialized service
56.	This is possible with the key management personnel accumulated years of experience in oil and gas combined with strategic and reputable foreign and local principals and technology partners.	Competence workers / supplier relationship	HR / strategic partnership
57.	The company vision is ultimately to localize the foreign technology and customized services to suit clients' requirement. Moreover, the company commitment is to provide an innovative, quality and cost effective solutions to	Transfer technology / high quality	Technology transferred / high quality

	their clients.		
58.	Their mission is to provide innovative, efficient, and cost effective pipeline inspection and niche maintenance solutions to the oil and gas industry without compromising quality and health, safety and environment.	mission	Customer oriented / HSE
59.	They also inculcate several values in the company. First, by providing innovative, quality, and cost effective solutions that exceed clients' requirements and resolve clients' operational issues.	values	Customer oriented / HSE
60.	Second, is to create long-term relationship with clients by providing excellent after sales service. Third, is to take on reputable technology through strategic partnerships.	Long term relationship / technology transfer	Strategic partnership
61.	Finally, is to customize and localize in-house expertise and capabilities through technology transfer and training and to create a healthy and friendly working environment for all employees to instill loyalty and ownership.	Customize / competence worker / technology transfer	Customer oriented / HR

Appendix 6: Individual Categories (Third level)

Codes-quotations list

Code-Filter: All

HU: Interview all

File: [G:\Analysis Atlas Shat\Interview all.hpr7]

Edited by: Super

Date/Time: 2014-12-04 22:39:51

SCO Operations

**P 4: Interview Transcription @ Jay.docx - 4:3 [people only assume setakat isi..] (89:90)
(Super)**

Codes:[SCO Operations - Family: Firms capacities]

No memos

people only assume setakat isi minyak ajer..

.. how much it cost untuk setitik minyak, barang2 mahal, geology masuk, pre well tengok2 dry well.. cost dah habis..

**P 4: Interview Transcription @ Jay.docx - 4:11 [.. company kami kecil ajer.. s..] (85:87)
(Super)**

Codes:[SCO Operations - Family: Firms capacities]

No memos

.. company kami kecil ajer.. seorang akan semua buat macam2.. satu lagi kita lebih kepada distributor.. sell product yang dah ada.. kalau dapat manufacture kita boleh source daripada material & manufacture..

.. kita yang the one who treat the consumer.. eventhough it is small but it is so critical..

.. SCM is important exactly in what area who are in..

**P 5: Interview Transcription @ Man.docx - 5:5 [This company basically caturan..]
(93:93) (Super)**

Codes:[SCO Operations - Family: Firms capacities]

No memos

This company basically caturan alpha get involve pursuing services provider.. kita buat involve on business habitat.. involve service in the extreme zone ventilation.. zone 1, 2, expose to harzard.. expose on .. move on safety offered..

**P 5: Interview Transcription @ Man.docx - 5:7 [basically business ni involved..] (95:95)
(Super)**

Codes:[SCO Operations - Family: Firms capacities]

No memos

basically business ni involved di platform very small area.. so bila nak buat welding & cutting so kita kena guna this habitat,, so dia isolate walking environment in the hazardous area..

**P 5: Interview Transcription @ Man.docx - 5:11 [guide new business & niche mar..]
(100:100) (Super)**

Codes:[SCO Competitor - Family: Firms capacities] [SCO Operations - Family: Firms capacities]

No memos

guide new business & niche market also..

**P 5: Interview Transcription @ Man.docx - 5:16 [. Requirement all the year dep..]
(107:107) (Super)**

Codes:[SCO Operations - Family: Firms capacities]

No memos

Requirement all the year depends on the contract.. the job is along the year.. they will call on and off according to contract normally everyday.. sometimes ada break 2/3 hari but job must be continue..

**P 5: Interview Transcription @ Man.docx - 5:17 [Usually based on unit.. minimu..]
(108:109) (Super)**

Codes:[SCO Operations - Family: Firms capacities]

No memos

Usually based on unit.. minimum seorang untuk monitoring.. nature is monitor technician akan monitor from the job start until stop.. .. will do inspection, monitoring come in..

**P 5: Interview Transcription @ Man.docx - 5:18 [for this company provide peopl..]
(110:110) (Super)**

Codes:[SCO Operations - Family: Firms capacities]

No memos

for this company provide people and equipment..

**P 5: Interview Transcription @ Man.docx - 5:23 [results based on Kemamn product..]
(114:114) (Super)**

Codes:[SCO Operations - Family: Firms capacities]

No memos

Results based on Kemamn production standard fabricated..
international business

**P 5: Interview Transcription @ Man.docx - 5:1 [PETRONAS banyak country procid..]
(84:84) (Super)**

Codes:[international business - Family: emergence]

No memos

PETRONAS banyak country provide services suppliers follow them to Vietnam, Turkmenistan, Pakistan .. international business

SCO Client

P 4: Interview Transcription @ Jay.docx - 4:4 [PETRONAS banyak award marginal..] (91:92) (Super)

Codes:

[SC

O Client - Family: Firms capacities]
No memos

PETRONAS banyak award marginal field so company kecil2 yang dulu dah operate tapi ada balance sikit2 so dia bagi project pada company lain.. kalau confident boleh buat duit then dia ambil..
.. company macam semut.. kami ni berebut akan pergi..

P 5: Interview Transcription @ Man.docx - 5:8 [downstream pun nak start using..] (96:97) (Super)

Codes:[SCO Client - Family: Firms capacities]

No memos

downstream pun nak start using this method tapi baru in some places.. di export terminal macam di carigali.. same philosophy..
.. many clients.. semua yang ada platforms la.. they use this method..

P 5: Interview Transcription @ Man.docx - 5:25 [customer or client is PETRONAS..] (116:117) (Super)

Codes:[SCO Client - Family: Firms capacities]

No memos

customer or client is PETRONAS carigali.. talisman.. Murphy oil..
.. we treat all client the same of good proce lagi bagus..

SCO Value chain coordination

P 4: Interview Transcription @ Jay.docx - 4:6 [setakat outsource China & Indi..] (96:97) (Super)

Codes:[SCO Competitor - Family: Firms capacities]

No memos

setakat outsource China & India very competitive tapi challenging..
.. 500/600 pengilang & all those people trying to get cross the border..

P 4: Interview Transcription @ Jay.docx - 4:9 [susah bila delivery nak urgent..] (105:106) (Super)

Codes:[SCO Logistics - Family: Firms capacities]

No memos

susah bila delivery nak urgent kita deliver 20 minggu dia nak 10 minggu.. manufacturer kat 20 minggu jugak.. so kita disqualified awal lagi..
.. satu manufac satu stocks.. stocks ok lah.. tapi bila custom made lama la sikit..

P 4: Interview Transcription @ Jay.docx - 4:12 [eventhough kecil it is so impo..] (88:89) (Super)

Codes:[SCO Value chain coordination - Family: Firms capacities]

No memos

eventhough kecil it is so important to understand SCM..
Dalam o&g ada upstream & downstream & sometimes midstream.. including distribution & people only assume setakat isi minyak ajer..

P 4: Interview Transcription @ Jay.docx - 4:13 [we penetrate dapat dari Singap..] (101:101) (Super)

Codes:[SCO Supplier - Family: Firms capacities]

No memos

we penetrate dapat dari Singapore..

P 5: Interview Transcription @ Man.docx - 5:4 [O&g business ni ada dua.. upst..] (92:92) (Super)

Codes:[SCO Value chain coordination - Family: Firms capacities]

Memos:[RQ1]

O&g business ni ada dua.. upstream & downstream.. in my previous experience pun upstream & downstream pun dah involves..

Memos:

MEMO: RQ1 (Super, 2014-11-10 21:15:58)

Type:Commentary

P 5: Interview Transcription @ Man.docx - 5:11 [guide new business & niche mar..] (100:100) (Super)

Codes:[SCO Competitor - Family: Firms capacities] [SCO Operations - Family: Firms capacities]

No memos

guide new business & niche market also..

P 5: Interview Transcription @ Man.docx - 5:12 [So it can be the business invo..] (101:101) (Super)

Codes:[SCO Competitor - Family: Firms capacities]

No memos

So it can be the business involves since 2004/2005.. so there is no standard so our's become benchmark..

P 5: Interview Transcription @ Man.docx - 5:15 [.. they will moving from platf..] (106:106) (Super)

Codes:[SCO Logistics - Family: Firms capacities]

No memos

.. they will moving from platform based on the required contract..

**P 5: Interview Transcription @ Man.docx - 5:19 [equipment memang our own after..]
(111:111) (Super)**

Codes:[SCO Supplier - Family: Firms capacities]

No memos

equipment memang our own after 2004 most of it from UK & this people bring the technology.. now we transfer the technology here to local.. in Kemaman..

**P 5: Interview Transcription @ Man.docx - 5:20 [intergrationsome components we..]
(112:112) (Super)**

Codes:[LO intraorganizational KS - Family: Firms capacities] [SCO Supplier - Family: Firms capacities]

No memos

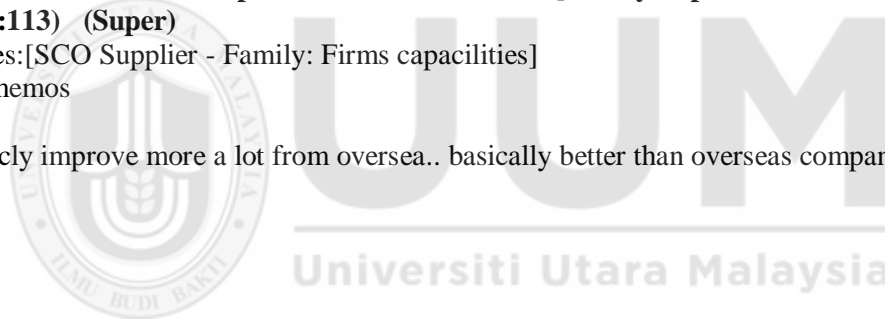
intergrationsome components we import to meet the international standard safety in hazardous .

**P 5: Interview Transcription @ Man.docx - 5:22 [basicly improve more a lot fro..]
(113:113) (Super)**

Codes:[SCO Supplier - Family: Firms capacities]

No memos

basicly improve more a lot from oversea.. basically better than overseas company..



Appendix 7: Group Categories (Fourth Level)

CODES-PRIMARY-DOCUMENTS-TABLE														
Report created by Super - 12/04/2014 11:38:31 PM														
HU: [G:\Analysis Atlas Shat\Interview all.hpr7]														
Code-Filter: All [75]														
PD-Filter: All [10]														
Quotation-Filter: All [435]														
RQ	Categories	Themes	Codes	P 1: Analysis Case 1 Weda.docx	P 2: Analysis Case 2 MH.docx	P 3: Analysis Case 3 En Man.docx	P 4: Analysis Case 4 Jay ST.docx	P 5: Analysis Case 5 Khay CM.docx	P 6: Analysis Case 6 Pn Hally MP.docx	P 7: Analysis Case 7 Nizal PT.docx	P 8: Analysis Case 8 En One GM.docx	P 9: Analysis Case 9 Daus UD.docx	P10: Analysis Case 10 Shah RT.docx	TOTALS:
1	SCO	Customer	potential customers & suppliers	3	0	2	6	0	8	6	3	0	6	34
			customer oriented	3	1	0	4	1	0	4	1	2	3	19
		Competitor	champion leader	0	5	4	1	1	0	5	3	2	0	21
			standard recognition	1	0	1	0	0	0	5	0	2	4	13
		Supplier	close proximity to supply & dema	2	1	1	1	1	0	2	0	1	2	11
			multiple sourcing	1	0	0	0	0	0	0	0	0	0	1
			registered supplier	1	0	0	0	0	0	0	0	0	0	1
		Operations	integration of operations	0	0	0	0	0	0	2	2	1	0	5
			operations pre requirement	4	3	5	0	3	1	0	0	0	1	17
			exploration stage	1	0	0	1	0	0	0	2	0	0	4
			speacilized service	1	0	1	1	7	0	3	0	1	1	15
			procurement procedure	0	0	0	0	3	0	0	1	0	0	4
			technical specification	0	0	0	0	18	0	0	2	0	0	20
		Value Chain Coordination	value chain	4	0	0	1	0	8	4	4	1	1	23
			SC environment	7	0	0	0	0	0	0	1	0	1	9
			international business	0	1	2	0	0	1	0	0	0	1	5

RQ	Categories	Themes	Codes	P 1: Analysis Case 1 Weda.docx	P 2: Analysis Case 2 MH.docx	P 3: Analysis Case 3 En Man.docx	P 4: Analysis Case 4 Jay ST.docx	P 5: Analysis Case 5 Khay CM.docx	P 6: Analysis Case 6 Pn Hally MP.docx	P 7: Analysis Case 7 Nizal PT.docx	P 8: Analysis Case 8 En One GM.docx	P 9: Analysis Case 9 Daus UD.docx	P10: Analysis Case 10 Shah RT.docx	TOTALS:
1	LO	commitment to learning												
			continuous improvement	0	1	0	0	0	0	0	0	0	0	1
			preventive management	0	0	0	0	0	0	0	0	3	0	3
		Shared Vision												
			shared vision	0	3	3	0	0	0	1	2	9	0	18
			Health Safety & Environment	3	0	4	1	1	0	2	1	4	6	22
		Open mindedness												
			open mindedness	1	3	0	0	0	1	0	1	0	0	6
			flexibility	0	0	0	0	1	0	0	4	0	0	5
			challenges	2	0	0	3	0	0	0	0	0	0	5
		intra organizational KS												
			information shared	3	2	0	0	3	0	0	0	0	0	8
			supplier database system	1	0	0	0	0	0	0	0	0	0	1
2	DSCC	knowledge accessing												
			knowledge accessing	9	0	0	2	3	10	1	1	3	0	29
			society	3	0	0	0	0	0	0	0	0	0	3
			support association	3	0	0	0	0	0	0	0	0	0	3
		coevolving												
			co-evolving	1	0	0	0	23	10	1	1	0	0	36
			colaboration	4	3	3	1	22	4	6	2	1	1	47

RQ	Categories	Themes	Codes	P 1: Analysis Case 1 Weda.docx	P 2: Analysis Case 2 MH.docx	P 3: Analysis Case 3 En Man.docx	P 4: Analysis Case 4 Jay ST.docx	P 5: Analysis Case 5 Khay CM.docx	P 6: Analysis Case 6 Pn Hally MP.docx	P 7: Analysis Case 7 Nizal PT.docx	P 8: Analysis Case 8 En One GM.docx	P 9: Analysis Case 9 Daus UD.docx	P10: Analysis Case 10 Shah RT.docx	TOTALS:
3	relationship	human resources												
			HR	1	4	11	2	7	4	14	7	7	8	65
			gender preferences	3	0	0	0	0	0	0	0	0	0	3
		competency development												
			competency development	1	2	5	2	1	1	1	3	5	0	21
			job specialization	0	0	2	0	0	0	0	1	0	0	3
			motivation	0	4	0	0	0	0	0	0	4	0	8
			recognition	0	6	0	0	1	0	1	0	0	0	8
			talent management	0	0	0	0	0	0	0	0	2	0	2
		strategic partnership												
			suppliers relationship	1	10	0	0	20	0	1	1	1	1	35
			strategic alliance	0	5	0	0	0	9	0	0	0	0	14
			strategic partnership	5	5	0	2	1	1	6	0	0	0	20
4	EU	Market drivem												
			market uncertainty	0	0	1	0	0	9	0	1	0	0	11
			environmental uncertainty	1	0	0	0	0	0	0	0	0	0	1
		technological driven												
			technology application	0	0	0	0	0	2	0	0	1	0	3
			technology transfered	1	0	1	0	0	0	0	0	0	1	3

RQ	Categories	Themes	Codes	P 1: Analysis Case 1 Weda.docx	P 2: Analysis Case 2 MH.docx	P 3: Analysis Case 3 En Man.docx	P 4: Analysis Case 4 Jay ST.docx	P 5: Analysis Case 5 Khay CM.docx	P 6: Analysis Case 6 Pn Hally MP.docx	P 7: Analysis Case 7 Nizal PT.docx	P 8: Analysis Case 8 En One GM.docx	P 9: Analysis Case 9 Daus UD.docx	P10: Analysis Case 10 Shah RT.docx	TOTALS:
4		governing & Monitoring body												
			authority	4	0	0	0	0	0	0	0	0	0	4
			anchor company	8	0	0	0	0	1	0	3	0	0	12
			approval & verification	0	0	0	0	1	0	0	2	0	0	3
			governing & monitoring	9	0	0	0	1	1	0	0	0	0	11
			regular audit	1	0	0	0	9	2	0	2	0	0	14
			risk control	0	0	0	0	5	1	0	1	0	2	9
			rules & regulation	0	0	0	0	3	0	0	0	0	0	3
			license & categories	0	0	0	0	2	1	0	1	0	0	4
		Ethics & professionalism												
			accountability	0	0	0	0	4	0	0	0	0	0	4
			Ethical & profesional	7	4	0	0	5	0	1	2	5	0	24
			contract agreement	0	0	0	0	1	9	0	0	0	0	10
		Emerging												
			costing	0	0	0	0	13	8	0	0	0	0	21
			documentation	0	0	0	0	0	0	0	1	0	0	1
			dynamic	0	0	0	0	0	0	0	6	0	0	6
			firms internal strategy	1	0	0	0	0	0	0	0	0	0	1
			guarantee	0	0	0	0	13	0	0	0	0	0	13
			high quality	0	0	4	3	3	0	0	0	2	1	13
			importance of maintenance	1	0	0	0	0	0	0	0	0	0	1
			local ownership	0	0	0	0	0	0	0	0	1	0	1
			nationa interest	2	0	0	0	0	0	0	0	0	0	2
			negotiaiton	2	0	0	0	0	1	0	0	0	0	3
			nonperforming	0	0	0	0	0	1	0	0	0	0	1
			one stop center	0	4	0	0	0	0	0	0	1	0	5
			performance appraisal	0	1	0	0	0	0	0	0	0	0	1
			scheduling	1	0	0	0	0	0	0	0	0	0	1
			supplier evaluation	0	1	0	5	0	1	0	0	0	0	7
			sustainability	3	6	0	4	0	0	15	2	1	2	33
			taxation	0	0	0	0	2	0	0	0	0	0	2
			threat if blacklisted	1	0	0	0	0	0	0	0	0	0	1
			time management	1	0	0	0	0	0	0	0	0	0	1
			TOTALS:	112	75	50	40	179	95	81	64	60	42	798

Appendix 8: ATLAS.ti Cooccurring Codes

HU: Interview all
File: [G:\Analysis Atlas Shat\Interview all.hpr7]
Edited by: Super
Date/Time: 2014-12-05 22:46:17

accountability {4-0} [3]

information shared {8-0} [1]
5:48 The BUYER approval of drawings.. (322:322):
knowledge accessing {29-0} [1]
5:48 The BUYER approval of drawings.. (322:322):
procurement procedure {4-0} [3]
5:17 The delivery of the GOODS must.. (113:113):
5:18 Time stipulated for delivery o.. (120:120):
5:19 This Purchase Order shall be a.. (127:127):

anchor company {12-0} [6]

authority {4-0} [4]
1:3 not really in oil and gas petron.. (26:26):
1:4 That's why they have the right.. (32:33):
1:6 Yeah whole chain. Very structu.. (45:46):
1:17 .. sebesar besar kapal sampai .. (139:143):
Ethical & profesional {24-0} [1]
1:52 .. O&g sc is structured, relia.. (299:302):
governing & monitoring {11-0} [8]
1:3 not really in oil and gas petron.. (26:26):
1:4 That's why they have the right.. (32:33):
1:6 Yeah whole chain. Very structu.. (45:46):
1:10 Sample lisen.. 1st time 1 ye.. (75:84):
1:14 .. company kecil structured.. .. (112:115):
1:15 .. strategic services PETRONAS.. (121:124):
1:17 .. sebesar besar kapal sampai .. (139:143):
1:52 .. O&g sc is structured, relia.. (299:302):
operations pre requirement {17-0} [3]
1:10 Sample lisen.. 1st time 1 ye.. (75:84):
1:14 .. company kecil structured.. .. (112:115):
1:15 .. strategic services PETRONAS.. (121:124):
regular audit {14-0} [2]
6:39 ..audit akan datang.. PETRONAS.. (242:242):
8:20 .. system GOM own SOP.. got co.. (130:130):
SC environment {9-0} [1]
1:52 .. O&g sc is structured, relia.. (299:302):

approval & verification {3-0} [3]

colaboration {47-0} [2]
8:17 . process macam ni PETRONAS gi.. (118:118):
8:19 .. process macam ni PETRONAS g.. (118:118):
knowledge accessing {29-0} [2]
8:17 . process macam ni PETRONAS gi.. (118:118):
8:19 .. process macam ni PETRONAS g.. (118:118):

technical specification {20-0} [2]
8:17 . process macam ni PETRONAS gi.. (118:118):
8:19 .. process macam ni PETRONAS g.. (118:118):

authority {4-0} [2]

anchor company {12-0} [4]
1:3 not really in oil and gas petron.. (26:26):
1:4 That's why they have the right.. (32:33):
1:6 Yeah whole chain. Very structu.. (45:46):
1:17 .. sebesar besar kapal sampai .. (139:143):
governing & monitoring {11-0} [4]
1:3 not really in oil and gas petron.. (26:26):
1:4 That's why they have the right.. (32:33):
1:6 Yeah whole chain. Very structu.. (45:46):
1:17 .. sebesar besar kapal sampai .. (139:143):

challenges {5-0} [0]

champion leader {21-0} [10]

competency development {21-0} [1]
2:19 The company vision is to becom.. (83:83):
Health Safety & Environment {22-0} [2]
3:12 service offered tentu ada.. be.. (79:79):
7:4 Furthermore, by emphasizing HS.. (29:29):
high quality {13-0} [2]
3:19 basicly improve more a lot fro.. (123:123):
3:24 The Company aims to involve in.. (153:153):
HR {65-0} [1]
2:19 The company vision is to becom.. (83:83):
international business {5-0} [1]
3:24 The Company aims to involve in.. (153:153):
shared vision {18-0} [1]
2:19 The company vision is to becom.. (83:83):
standard recognition {13-0} [1]
7:32 Coupled with our state-of-the-.. (209:212):
suppliers reationship {35-0} [1]
7:4 Furthermore, by emphasizing HS.. (29:29):
sustainability {33-0} [2]
7:5 In 2007, the company listed on.. (35:36):
8:36 Furthermore, the company known.. (226:226):
value chain {23-0} [1]
9:10 The company also has integrate.. (65:65):

close proximity to supply & demand {11-0} [2]

standard recognition {13-0} [1]
10:3 . lets go through .. the compa.. (23:23):
sustainability {33-0} [2]
7:8 Additionally, the close proxim.. (54:54):
7:13 Our, fully equipped fabricatio.. (84:85):

co-evolving {36-0} [11]

colaboration {47-0} [21]

5:21 The SELLER guarantees that the.. (140:140):
5:22 In this respect, the SELLER's .. (146:146):
5:23 The SELLER warrants that goods.. (152:152):
5:24 Any replacement for the defect.. (158:158):
5:25 For work orders, in the event .. (164:164):
5:29 SELLER shall provide a guarant.. (188:188):
5:30 Without prejudice to any other.. (194:194):
5:31 SELLER shall warrant that the .. (200:200):
5:50 SELLER shall warrant that the .. (206:206):
5:51 The scope of SELLER's warranty.. (212:212):
5:52 Notwithstanding anything contr.. (218:218):
5:54 SELLER shall submit a progress.. (298:298):
5:57 NOTWITHSTANDING anything conta.. (278:278):
5:58 BUYER and/or its Appointed Con.. (272:272):
5:62 SELLER shall, within fourteen .. (224:224):
5:63 The SELLER shall ensure that B.. (230:230):
5:64 SELLER is required to provide .. (248:248):
5:65 BUYER or its Appointed Contrac.. (242:242):
5:66 The SELLER shall permit at its.. (236:236):
6:5 . if dry hole then.... there i.. (35:35):
8:14 .. TNI ni PETRONAS bagi satu c.. (99:99):

competency development {21-0} [1]

5:49 To the extent that it is techn.. (328:328):
contract agreement {10-0} [8]
6:7 Then when you do the data from.. (47:47):
6:8 .. let say they strike all the.. (53:53):
6:11 . that all PETRONAS well take .. (71:71):
6:40 . once we signed the block wit.. (248:248):
6:41 sometimes that block viable to.. (254:255):
6:42 Seismic study sharing 2 timers.. (261:261):
6:47 . sama procurement .. kalau ki.. (267:268):
6:49 company kena signed company co.. (280:280):

costing {21-0} [12]

5:22 In this respect, the SELLER's .. (146:146):
5:23 The SELLER warrants that goods.. (152:152):
5:29 SELLER shall provide a guarant.. (188:188):
5:30 Without prejudice to any other.. (194:194):
5:31 SELLER shall warrant that the .. (200:200):
5:50 SELLER shall warrant that the .. (206:206):
5:52 Notwithstanding anything contr.. (218:218):
5:54 SELLER shall submit a progress.. (298:298):
5:57 NOTWITHSTANDING anything conta.. (278:278):
5:62 SELLER shall, within fourteen .. (224:224):
5:64 SELLER is required to provide .. (248:248):
5:66 The SELLER shall permit at its.. (236:236):

guarantee {13-0} [12]

5:21 The SELLER guarantees that the.. (140:140):
5:22 In this respect, the SELLER's .. (146:146):
5:23 The SELLER warrants that goods.. (152:152):
5:24 Any replacement for the defect.. (158:158):
5:25 For work orders, in the event .. (164:164):
5:29 SELLER shall provide a guarant.. (188:188):
5:30 Without prejudice to any other.. (194:194):
5:31 SELLER shall warrant that the .. (200:200):

5:50 SELLER shall warrant that the .. (206:206):
 5:52 Notwithstanding anything contr.. (218:218):
 5:54 SELLER shall submit a progress.. (298:298):
 5:66 The SELLER shall permit at its.. (236:236):
 knowledge accessing {29-0} [9]
 1:62 Challenge dealing with Petrona.. (373:373):
 6:7 Then when you do the data from.. (47:47):
 6:8 .. let say they strike all the.. (53:53):
 6:11 . that all PETRONAS well take .. (71:71):
 6:40 . once we signed the block wit.. (248:248):
 6:41 sometimes that block viable to.. (254:255):
 6:42 Seismic study sharing 2 timers.. (261:261):
 6:47 . sama procurement .. kalau ki.. (267:268):
 6:49 company kena signed company co.. (280:280):
 negotiaiton {3-0} [1]
 1:62 Challenge dealing with Petrona.. (373:373):
 regular audit {14-0} [7]
 5:54 SELLER shall submit a progress.. (298:298):
 5:57 NOTWITHSTANDING anything conta.. (278:278):
 5:58 BUYER and/or its Appointed Con.. (272:272):
 5:61 SELLER shall include in all or.. (254:254):
 5:63 The SELLER shall ensure that B.. (230:230):
 5:65 BUYER or its Appointed Contrac.. (242:242):
 6:16 . 30 – 70 sometimes 3 partners.. (101:101):
 strategic partnership {20-0} [2]
 5:8 This includes a comprehensive .. (59:59):
 6:16 . 30 – 70 sometimes 3 partners.. (101:101):
 suppliers reationship {35-0} [17]
 5:21 The SELLER guarantees that the.. (140:140):
 5:22 In this respect, the SELLER's .. (146:146):
 5:23 The SELLER warrants that goods.. (152:152):
 5:24 Any replacement for the defect.. (158:158):
 5:25 For work orders, in the event .. (164:164):
 5:29 SELLER shall provide a guarant.. (188:188):
 5:30 Without prejudice to any other.. (194:194):
 5:31 SELLER shall warrant that the .. (200:200):
 5:50 SELLER shall warrant that the .. (206:206):
 5:52 Notwithstanding anything contr.. (218:218):
 5:54 SELLER shall submit a progress.. (298:298):
 5:57 NOTWITHSTANDING anything conta.. (278:278):
 5:58 BUYER and/or its Appointed Con.. (272:272):
 5:62 SELLER shall, within fourteen .. (224:224):
 5:63 The SELLER shall ensure that B.. (230:230):
 5:64 SELLER is required to provide .. (248:248):
 5:66 The SELLER shall permit at its.. (236:236):
 technical specification {20-0} [14]
 5:31 SELLER shall warrant that the .. (200:200):
 5:50 SELLER shall warrant that the .. (206:206):
 5:51 The scope of SELLER's warranty.. (212:212):
 5:52 Notwithstanding anything contr.. (218:218):
 5:54 SELLER shall submit a progress.. (298:298):
 5:55 SELLER and its sub-contractor .. (291:291):
 5:57 NOTWITHSTANDING anything conta.. (278:278):
 5:58 BUYER and/or its Appointed Con.. (272:272):
 5:61 SELLER shall include in all or.. (254:254):

5:62 SELLER shall, within fourteen .. (224:224):
5:63 The SELLER shall ensure that B.. (230:230):
5:64 SELLER is required to provide .. (248:248):
5:65 BUYER or its Appointed Contrac.. (242:242):
5:66 The SELLER shall permit at its.. (236:236):

collaboration {47-0} [15]

approval & verification {3-0} [2]
8:17 . process macam ni PETRONAS gi.. (118:118):
8:19 .. process macam ni PETRONAS g.. (118:118):
co-evolving {36-0} [21]
5:21 The SELLER guarantees that the.. (140:140):
5:22 In this respect, the SELLER's .. (146:146):
5:23 The SELLER warrants that goods.. (152:152):
5:24 Any replacement for the defect.. (158:158):
5:25 For work orders, in the event .. (164:164):
5:29 SELLER shall provide a guarant.. (188:188):
5:30 Without prejudice to any other.. (194:194):
5:31 SELLER shall warrant that the .. (200:200):
5:50 SELLER shall warrant that the .. (206:206):
5:51 The scope of SELLER's warranty.. (212:212):
5:52 Notwithstanding anything contr.. (218:218):
5:54 SELLER shall submit a progress.. (298:298):
5:57 NOTWITHSTANDING anything conta.. (278:278):
5:58 BUYER and/or its Appointed Con.. (272:272):
5:62 SELLER shall, within fourteen .. (224:224):
5:63 The SELLER shall ensure that B.. (230:230):
5:64 SELLER is required to provide .. (248:248):
5:65 BUYER or its Appointed Contrac.. (242:242):
5:66 The SELLER shall permit at its.. (236:236):
6:5 . if dry hole then.... there i.. (35:35):
8:14 .. TNI ni PETRONAS bagi satu c.. (99:99):
costing {21-0} [13]
5:22 In this respect, the SELLER's .. (146:146):
5:23 The SELLER warrants that goods.. (152:152):
5:29 SELLER shall provide a guarant.. (188:188):
5:30 Without prejudice to any other.. (194:194):
5:31 SELLER shall warrant that the .. (200:200):
5:50 SELLER shall warrant that the .. (206:206):
5:52 Notwithstanding anything contr.. (218:218):
5:54 SELLER shall submit a progress.. (298:298):
5:57 NOTWITHSTANDING anything conta.. (278:278):
5:59 Listed below are various stage.. (266:266):
5:62 SELLER shall, within fourteen .. (224:224):
5:64 SELLER is required to provide .. (248:248):
5:66 The SELLER shall permit at its.. (236:236):
guarantee {13-0} [12]
5:21 The SELLER guarantees that the.. (140:140):
5:22 In this respect, the SELLER's .. (146:146):
5:23 The SELLER warrants that goods.. (152:152):
5:24 Any replacement for the defect.. (158:158):
5:25 For work orders, in the event .. (164:164):
5:29 SELLER shall provide a guarant.. (188:188):
5:30 Without prejudice to any other.. (194:194):

5:31 SELLER shall warrant that the .. (200:200):
 5:50 SELLER shall warrant that the .. (206:206):
 5:52 Notwithstanding anything contr.. (218:218):
 5:54 SELLER shall submit a progress.. (298:298):
 5:66 The SELLER shall permit at its.. (236:236):
 HR {65-0} [6]
 2:3 Over the span of 40 years, the.. (23:23):
 7:19 Our track record includes succ.. (126:126):
 7:37 Our end-users include EPCC con.. (242:242):
 7:38 In maintaining its competitive.. (248:248):
 7:39 Petra Energy provides a host o.. (254:255):
 7:40 The unit's warehouse carries a.. (262:272):
 knowledge accessing {29-0} [1]
 8:17 . process macam ni PETRONAS gi.. (118:118):
 negotiaton {3-0} [1]
 6:3 .. let say with this block the.. (23:23):
 potential customers & suppliers {34-0} [10]
 1:49 O&G banayk office in KL. They .. (278:280):
 1:50 .. usually most o&g company wi.. (286:287):
 1:51 . if you don't attend the conf.. (293:293):
 4:34 Furthermore, the company also .. (215:215):
 7:18 We have managed projects utili.. (120:120):
 7:19 Our track record includes succ.. (126:126):
 7:37 Our end-users include EPCC con.. (242:242):
 7:38 In maintaining its competitive.. (248:248):
 7:39 Petra Energy provides a host o.. (254:255):
 7:40 The unit's warehouse carries a.. (262:272):
 regular audit {14-0} [6]
 5:53 Expediting of this order and S.. (304:304):
 5:54 SELLER shall submit a progress.. (298:298):
 5:57 NOTWITHSTANDING anything conta.. (278:278):
 5:58 BUYER and/or its Appointed Con.. (272:272):
 5:63 The SELLER shall ensure that B.. (230:230):
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