Sorting Goods from Bads: How Actors Collaborate in Marketing Green Chemistry

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1. Background to the Research

Despite its importance, marketing in industrial sectors seems to be in the state of complexity. Companies are increasingly highly interdependent and interconnected within the networks. The collaboration between chemical companies and oil companies are even more complex due to the regulation influences on the business activities. In the PhD project, we will examine how chemical companies, oil companies, regulators and others acquire and represent the marine ecosystem's services in the North Sea as they go about developing, marketing, exchanging, and using chemical and chemistry services to enhance oil and gas production. The study is conducted on industrial marketing between chemical companies and oil companies under the regulation of chemical used in North Sea under the direction of OSPAR or REACH, etc.

Three issues come to mind, first of all, North Sea oil industry is mature, but with the development of chemical industry, chemical companies and oil companies should be responsible for ecosystem problems coursed by the spills-overs of chemical products. Organizations like OSPAR or REACH is to improve the protection of human health and the environment through identifying the intrinsic properties of chemical products. It has great impact on the market exchanges between chemical companies and oil companies. On one hand these organizations try to enhance the innovation and competitiveness of the chemistry industry, on the other hand they set regulations to help manage the risks from chemical and provide information for the chemical companies.

Secondly, chemical companies and oil companies exchange under the directions of ecosystem services. Market actors and regulators have not designed a single clear market for ecosystem services. We are aiming to address how markets are shaped for chemical products. How value is co-created by oil company customers through representing ecosystem services in a multitude of ways within a network of actors, how chemistry and oil companies exchange the chemical products and services and the extent that the regulators are influencing chemical and oil companies needs to be clarified in this project.

Thirdly, business behaviours become more complex in chemical markets. Chemistry companies and their oil company customers have to cope with the regulations from precautionary principle or the alternative principle of risk assessment. The organizations like ORSPAR or REACH have their strategies take forward through adopting decisions binding on agreements and recommendations. Do chemical companies have impacts or influences on the regulators? We intend to address what role the company plays in the regulation process and how companies shape the regulation.

We will assess how industrial business actors develop their activities of developing, marketing and selling, using chemical and chemistry services coping with the ecosystem's services. The business actors work in commercial, regulatory, scientific and technological activities within networks interact each other and regulators under the precautionary principle or polluter pays principle in order to shape a green chemistry market.

The research is taken in Business-to-Business setting. Chemical companies and their oil company customers are no longer just active sellers and passive buyers. Oil companies have to seek out their suppliers, assess suppliers, have suppliers solve problems and meet their

requirements. Chemical companies interact with the oil company customers' problem and requirements. Such activity is one of interaction rather than just one of action and reaction within a buyer-seller business relationship. Chemical products are produced and provided through interactions and the values of chemical services are co-created (Vargo and Lusch, 2004) through the process of interacting by the oil company customers. Both the producers and users of the chemical products need follow the legislation and a system of labelling and licensing products given some criteria of limited harm to the marine ecosystem. That will help the producer and their products user become developers of green chemistry. Industrial business actors' behaviours, co-created value of products and services, business interactions and relationships are all take into account in this project in order to address how business actors in chemical industrial collaborate and how they cope with regulations.

2. Literature review

We identify how are chemical products and services being exchange based on pragmatism and practice approach (Araujo, 2007; Kjellberg and Helgesson, 2007b). We address from the starting point for pragmatism and a practice approach to introduce consequences relating to market theory. Pragmatists such as Dewey and James put strong emphasis on habit and practices (James 1907). Pragmatism can refer to the thought of practicality and getting things done. It is a theory for a society that doesn't believe that much in theory, which is practical, down to earth. Peirce writes of doubt being parasitic on belief, with belief being something like a practical habit or local practical theory, but includes a higher-level theory too that we adjust, adapt, and learn so that our knowledge is always provision, with truth being okay for the time being, locally, and Truth being possibility but difficult to attain. Pragmatism is interested in technology, in the facts of the world. It is also a philosophy of optimism.

Beliefs are also considered as habits and routines of action by pragmatists. Veblen (1898a) wrote of 'a coherent structure of propensities and habits, which seeks realization and expression in an unfolding activity'. John Dewey (1922) defines habits, as 'The essence of habit is an acquired predisposition to ways or modes of response.' Peirce (1931) proposed, the 'essence of belief is the establishment of habit'. From this point, all thoughts and behaviour within individuals are held in habits. And habits are being adaptable to real practices. Pragmatism has had a clear influence on the modern research drawing upon practice and practices. Schatzki (2001) defines practices as human activities organized and performed around shared practical understanding. While habits are more focusing on individuals, routines are vital to organizations. Routines can be regarded as the capacities or potentiality rather than behaviour, relying on knowledge and memories, working within approved procedures or regulations (Cohen 1996). Cohen (2007) considers routine seems to have come up with the fundamental intellectual difficulties that the development of useful shared understandings and knowledge is inhibited because routines are taken to be rigid in execution, mundane in content, mindless in feeling or reflection, and action explicitly stored. We discover how routines are formed and changed in order to encourage beneficial marketing practices.

A practice approach increments product development in a mature industrial sector, the North Sea's Oil Industry, in which specialist chemical companies commercialize their scientific knowledge and also remain highly dependent on their customers, the oil companies with which they interact intensively, to commission and sanction trials. Our focus on incremental product development and on the interactions of users and producers leaves us focussing on the multiple connections between and across companies, to include markets, as ways of organizing the emerging experimental knowledge characterized by product development.

Practice in marketing is frequently used to indicate what kind of marketing activities and behaviours practitioners do. Practices differ from routines in that they are often fragmented, require assembling in contexts and can be augmented. We cannot just bring the practice in previous performance because the remembered or represented practices from some previous performance might not fit a presenting setting, and might be augmented from any number of sources (Orlikowski, 2007). At present, practice approaches to market research have been located mainly within organizations. We seek to extend the organizing scope of product development to include interactions among companies, so including markets as well as organizations as spaces and places in which actors organize product development. Practice in marketing is frequently used to indicate what kind of marketing activities and behaviours practitioners do. Practices differ from routines in that they are often fragmented, require assembling in contexts and can be augmented. We cannot just bring the practice in previous performance because the remembered or represented practices from some previous performance might not fit a presenting setting, and might be augmented from any number of sources (Orlikowski, 2007). *Laws of Markets* (Callon, 1998) has become the most influential practice approach to markets and the practice-based approach to marketing have been developed in recent years (Araujo, 2007; Kjellberg and Helgesson, 2007b).

We review three theoretical approaches to the research project relevant: market studies, service-dominant logic (Vargo and Lusch, 2004) and industrial marketing and purchasing. As well as market studies theory is to explain how chemical products exchanged and how the chemical product market shaped by actors. During the process of the exchanges, the producers deliver the value of the products to their oil company customers. Service dominant logic approach help explain where the value come from and how they are co-created. Both chemical products exchange and the value co-creation process will happen in a certain context. Industrial marketing and purchasing (IMP) is adopted to clarify the business interaction and relationships within networks

2.1 Market Studies-how are things exchanged?

Marketing has an important performative role in shaping markets and explain how things are exchanged. We review market studies theory in order to address why exchange happens, what are exchanged, discover the role that market plays when exchanging, how marketers and marketing concept shape the development of markets(Araujo, 2007; Kjellberg and Helgesson, 2007a, 2007b) as well as how market change to enable exchanges and exchange reshape to fit in the market.

Individuals and organizations are engaged in social and economic exchanges with other people and organizations purposefully. The exchange is to meet and satisfy human needs, which is a conjunction of meaning with action and reaction or a kind of interaction. Utilitarian is the main character of market exchanges (Rechard, 1975). Exchange is the basic human activities in their social lives and the centrality concept in marketing. The market exchange theory roots from economic sociology and sociology of science (Callon, 1998b; Callon and Muniesa, 2005) and has great impact on market theory and marketing practices.

Kjellberg and Helgesson (2006) propose that different actors help shape markets, which is multiple and sometimes even conflicting. Indeed, market studies should be combined with

complex and conflicting set of practices (Araujo, Kjellberg and Spencer, 2008). Marketers do not simple markets against the passive backdrop of a market, but cannot help and change the market by progressing with their marketing activities. Indeed, market studies should be combined with complex market practices. Researchers in market studies have emphasized performance and performativity ahead of practice, implying that actors seek to recruit practices in the actions of shaping the market, and we aware of their accountability in performance. We aware of their accountability in performance. The performativity approach in marketing has been adapted and further developed on the continuous construction of markets (Araujo, 2007). Many theories like accounting, marketing, strategy, organization theory and economics have influences on practices and result in market shaping through market practices (Kjellberg and Helgesson, 2006).

The general concept of a market is any form of structure in the purpose of exchanging goods, services or information. Callon (1998a) extends Granovetter's (1985) perspective on embeddedness in the structure of social relations and modern industry society plays a supporting role to smooth market exchanges, while Callon's approach focuses on the connection between economic sociology and market exchanges and practices constructs exchange. Callon (1998a) defines 'market exchange as a process of defining the price at which exchange can take place given two parties with divergent interests'. Market exchanges show the relationship of products and value. Hodgson (1988) addresses market exchanges match the exchange of property right to the exchanges between products and money. Richard (1975) points out that marketers have regarded exchange as a special case of exchange theory that focuses primarily on direct exchanges of tangible goods between two parties.

Market exchanges and market activities help shape markets (Callon, 1998a) under the necessary conditions. These conditions also help locate parties, units, agents, or actors (Alderson 1965). Kjellberg and Helgesson (2007a) investigate the mode of exchange and how exchanges constituted by agents. Markets are constituted by market practices, three practices are addressed (Kjellberg and Helgesson, 2006, 2007a, 2007b) namely: i) normalizing practices involved in a set of rules by 'issuing standards, codes of conduct, certification criteria' is used to address how the chemical markets is shaped by actors' practices; ii) representational practices dealing with drawing images of the market structure (Araujo, Kjellberg and Spencer, 2008) help describe how chemical markets work; iii) exchange practices telling the relationship and interaction between buyer and seller, which help us to explain how chemical business actors involve in market exchange. They borrow the term 'mode of exchange' from Lie (1992) to indicate and combine practices together to promote market exchanges, which is to help investigate exchange relations (Lie, 1992). Kjellberg and Helgesson (2006) also address that markets are shaped through the facet of innovative solutions. Agents or actors are classified as selling party and buying party and market objects are exchanged between them. During the exchange process, marketers (selling) get profits and the market (buy) gets their needs satisfied (Kotler, 1972) by exchanging goods or services.

Markets are regarded as collective devices that calculate and compromise on the value of goods (Callon and Muniesa, 2005). Markets are shaped and performed by multiple calculative agencies (Azimont and Araujo, 2007). Calculative agencies help perform and shape markets (Callon and Muniesa, 2005), and have markets perform (Callon 1998). Calculative agencies and calculable goods construct markets exchanges.

Markets are shaped by reconciling conflicting versions co-existing within itself (Kjellberg and Helgesson, 2006). Chemical companies and regulators conflict and adjust to shape the markets. Our project is an examination of different actors' activities, interactions and exchanges situated at the interface of the North Sea's marine ecosystem and the socio-technical-economic system of administering chemical and chemistry services to support oil and gas production in the North Sea's oil industry. We address how are chemical products and services being exchanged by answering 'the character of the market exchanges for green chemistry?'; 'What constitutes market exchange in chemical industrial markets?' and 'the actors' calculative behaviour shape chemical market'.

2.2 Service-dominant (S-D) logic-Value is co-created by customers

The paradigm of market exchange built upon the idea of tangible goods being embedded with value and exchanged for other goods that are also embedded. In the development of this paradigm, a new logic evolved to explain how intangible goods exchange from the perspective of services. Service-dominant (S-D) logic expands from the classic ways of market theories from a service perspective focusing on the exchange of goods and services represented a special case of goods. In this section we are aiming to briefly review the development of service-dominant logic. Service (Vargo and Lusch, 2004) is defined as 'the application of specialized competences (knowledge and skills) through deeds, processes, and performances for the benefit of another entity or the entity itself'. Service-dominant logic a fundamental shift from the exchange of tangible goods to the exchange of intangible goods. Service-dominant logic concerns more about customers and develops from the marketing management school (Drucker, 1954). Thus 'the service-centred dominant logic represents a reoriented philosophy that is applicable to all marketing offerings, including those that involve tangible output (goods) in the process of service provision' (Vargo and Lusch, 2004). Araujo and Spring (2006) demonstrate the relationships between buying and a selling companies are embedded with product and services exchanges. In service dominant logic, goods are still important but are considered as vehicles to provide service (Vargo and Lusch, 2010).

The term 'Service-dominant logic' first appeared in the paper 'Evolving to a New Dominant Logic for Marketing' of the Journal of Marketing (January 2004 issue) with controversy. Since then, 'Intangible' evolution started from goods-dominant (G-D) logic to service-dominant logic. G-D logic is grounded in the economic philosophy that is marked by Adam Smith (1776/1937) who addresses that exchange is provided by mental and physical skills (Vargo and Lusch, 2008). Smith (1776/1937) also proposes the distinction between 'productive' (goods) and 'unproductive' (services) activities as their values. Good dominant logic focuses on tangible resources, (good) embedded value and transactions, while the service dominant logic focused on intangible resource, the co-creation of value (Vargo and Lusch, 2004). S-D logic represents a shift in logic of exchange (Vargo and Lusch, 2008a). The exchange purpose for S-D logic is 'service is exchange for service'. Vargo and Lusch (2004) propose S-D logic by initially addressing eight foundational premises (FPs). Vargo and Lusch added 'All social and economic actors are resource integrators (FT9)' (Vargo and Lusch, 2006) and 'value is always uniquely and phenomenologically determined by the beneficiary (FP10)' (Vargo and Lusch 2008).

According to service literatures, service has four commonly cited differences as intangibility, heterogeneity, inseparability and perishability. Compared with G-D logic, S-D logic focuses more on helping their own value-creation processes rather than producing or delivering products; S-D involves in more concept as 'value is co-created' rather than 'value is produced';

S-D regards more on the network of customers rather than isolated customers; S-D considers customers as important resources rather than targets (Vargo and Lusch, 2008a).

Vargo and Lusch (2008) propose that operand resources are tangible, which require action to make valuable, but operant resources are intangible, dynamic, which are capable to produce value. Service is regarded as a process to deliver something to another party. Exchanges make services reciprocal and mutual to both parties (providing and receiving) (Vargo and Lusch, 2008). Value is co-created through the process of 'value in use'. The customer value is defined as 'an interactive relativistic preference experience' (Holbrook, 1996). The significant contribution of service-dominant logic is that value defined and co-created by customer rather than just embedded in output (Vargo and Lusch, 2004). Vargo and Lusch (2004) regard customers as value co-creators during the process of purchasing (Vargo and Lusch 2004). Service value is set when customers use it, which is a process of experiencing. The role of customer is changing from receiving value into a co-creator of that value. A significant contribution of service-dominant logic is value co-creation process of customers during which all business actors collaborate in markets (Vargo and Lusch 2011). In business-to-business setting, actors collaborate in business relationships within networks through interaction. Payne et al. (2008) examine the three key components of value co-creation, such as customer value-creating process, supplier value-creating process and encounter process. From this perspective, we can find both customers and goods transformed into new functions. The roles of customers and goods are both transformed in S-D logic. Customers are no longer 'passive audiences' but become 'active players' (Prahalad and Ramaswamy 2000) and goods become valuable service appliances to customers. From the perspective of S-D logic, value is embedded in the experiences of the customers. These experiences include pre-sale service, selling process service and post-sale value-in-use. The core concept of the value co-creation process is interaction and business relationships. It is the key theoretical connection with industrial marketing and purchasing (IMP), which will be discussed in the next part. The relationship provides structure to value co-creating activities (Ballantyne and Varey, 2006). The value co-creation process is a continuous one especially in business-to-business long-term relationship. Value is relational that extended to each business parties interactively to be co-created (Vargo and Lusch, 2010).

More recently, service dominant logic has broadened the perspective into the exchanges in business-to-business setting. Vargo and Lusch (2011) address all parties involved in economic exchange are similarly, resource-integrating, service providing enterprises that have the common purpose of value co-creation rather than just the 'producer' who creates value. They propose an abstract designation 'Actor-to-actor' (A2A) (Vargo, 2009) by adopting the generic term of 'actor' which is commonly used by Industrial Marketing and Purchasing (IMP) Group scholars. We expect to evaluate the value of the chemical products co-created by customers (oil companies) based on service-dominant logic. The oil companies do not only receive the value created by chemistry companies but are co-creators of that value.

Co-creating process happens between the relationships and interactions of market actors. We will trace the different representations of ecosystem services as actors deploy these as part of their activities in the established market and socio-technical-economic system by which chemical services are produced, exchanged and used. We adopt "service-dominant" (S-D) logic (Vargo and Lusch, 2004) to help examine the value of the chemical products that sells to oil companies. We are aiming to find out where and when the values are created during the process, where is the co-creation and what it looks like, as well as the roles oil companies play when the co-create value of the chemical products. In our project, the value is created through

interaction and resource integration within a complex network of value co-creation relationships.

2.3 IMP-Interaction and relationship in networks

Both tangible goods and intangible services will be exchange within a certain context of relationship in industrial markets. The IMP was founded in mid 1970s, started by a group of researchers of five European countries and universities, which concerns the importance of the relationships (Håkansson, 1982) between business actors in business-to-business settings. The business markets have fewer and larger buyers than consumer markets. Industrial markets buyers are individually insignificant. They have to find out proper suppliers and have the suppliers meet their particular requirements. Araujo (2007) applies market exchange is formalised and abstracted from social relations. In this section, our starting point is to review interaction theory; and further discuss the relationships between actors and resources, activities and actors. We adopt interaction approach and network theory from IMP approach to the study of business relationships between chemical companies and oil companies. We explain the actors' behaviors involving in the close, complex, and long term relationships and how the business relationships help develop economic exchanges (Araujo, 2007) and also examine the business interaction and relationship, industrial business network, and the marketing strategy of chemical companies.

In industrial markets, the customers are vary in type, size and needs. No company is independent in business markets. Industrial buying process may be developed by taking relationship between focusing organizations (Håkansson, 1982). Both buyers and sellers are participating in market exchange rather than just selling and buying. Companies have to find suitable customers or suppliers in order satisfy their own requirements. Both buyers and sellers expect to maintain the relationship between them because the cost of searching for proper partner is high. Holmlund and Törnroos (1997) define relationship as "an interdependent process of continuous interaction and exchange between at least two actors in a business network context". Business relationships are not only conflicting because of the purpose of the market exchange but also co-operative because the mutual dependence on others and they need to develop the offerings to satisfy their customers' needs (Håkansson and Ford 2002). They regard relationship as the outcome of previous interactions between the business units and relationships, which are also connected to each other. From the perspective of IMP, companies are benefit from the long-term nature of relationship between suppliers and customers rather than 'shopping around'.

The study of interaction (Håkansson, 1982) and relationships between companies helps to uncover the business behaviors of buying and selling companies in industrial markets. Interaction is a kind of extension of business exchange. Business interaction explains both parties (seller and buyer) act and react rather than just transfer products, services or money. Companies involve in interaction in the purpose of exchanging information, skills, goods, services, money, technology, etc. The interaction model is focusing on two party relationships but can be extended to a several party relationship, which emphasizes the buyer-seller relationships and interactions. The model explains the basic concept of marketing and purchasing industrial goods as an interaction process that happens between two parties within a certain setting. The two parties (a buyer and a seller) of the model, the two companies are influenced by the relationships between the two parties, the factors existing between them, and the business environment (Ford 1990). Håkansson and Johanson

(1992) propose Activity-Resource-Actor (ARA) model to identify the interaction process between companies. This model suggests that the three layers' (resources, activities and actors) interaction are influenced by resources constellation, activities patterns and networks of actors. Actor bonds connect actors and influence how actors perceive each other and form their identities in relation with each other. Resource ties connect various resource elements as products or services. Activities links connect business activities of the companies together.

Companies develop relationship and get benefits by reducing the cost of market development. Companies can be more efficient in doing marketing exchanges within relationships. Once the business relationship sets up, benefits can be obtained through tailoring resources to dealing with specific sellers or seller. Companies evaluate the costs, the benefits and advantages before establishing relationship with other companies (Blois, 1972). Ford (1990) also addresses five stages of establishing and developing buyer and seller relationships over time concerning the variables of experience, uncertainty, distance, commitment and adaptation. Sellers adjust their products to satisfy their customers' requirements and get benefit from the relationships in order to maintain their key competitive advantage. As for the customers, Flint et al (1997) address three forms of value (values, desired value, and value judgment) change over time in industrial relationship. Wilson et al. (2010) research on 'social partnerships' development and relationship dynamics and address the relationship types by examine economic scope, structure, interdependence, and relationship outcomes. 'Compound relationships' consist of multiple simple relationships, which propose to explain how focal company may interact with another companies as a different role at the same time (Ross and Robertson, 2007).

There are many factors that influence relationships, such as activities in the past, what each of the two parties learned in its relationships, and companies expectations, and the relationships and the indirect relationship existing within networks (Håkansson and Ford 2002). Relationships are examined to emphasize the business activities between companies and help to recognize the their business environment. There are connections between relationships (Hakansson and Johanson, 1993). Håkansson and Ford (2002) addresses the relationships are connected to each other, which can be illustrated by the example of three companies have two relationships. Relationships and the business environment are discussed (Anderson, Håkansson and Johanson, 1994) to show the role the relationship plays, which give specific faces of the environment of companies.

Relationships exist across a network. Business networks are considered as structures because of the interdependence of the companies, which can be seen as the result of history (Håkansson and Johanson, 1993). Ford et al. (2006) identify three types of network as supplier network, distribution networks and product development networks. Business network constructs from the perspective of a focal company and its partner in a focal relation that is connected with other relationships (Anderson, Håkansson and Johanson, 1994). Companies intend to maintain stable within their networks and relationships, but the networks change the companies that involving in them (Håkansson and Snehota, 1995). 'Network picture' (Ford et al., 2003) is used to investigate the interconnection between a company and the environment, in which interactions provide an important analytical instrument for both researchers and market actors (Ford and Redwood, 2005).

In chemical markets, sellers (chemical companies) and buyers (oil companies) collaborate to maintain their relationships. We start from analyzing the relationship between oil companies and chemical companies. Are there any factors influence the relationships between chemical

companies and oil companies? And what are they? How do the relationships between chemical companies and oil companies change over time? We will also examine the three interaction layers (resources, activities and actors) to develop the structure of how oil companies and chemical companies co-developing in business networks.

3. The Research Problem: How companies cope with regulation.

We are convinced that the business activities in chemical products markets are influenced by ecosystem regulations, which provide a particular context for the business collaborating for both chemical companies and their oil company customers. Our aiming is to examine the arrangements by which actors represent and acquire the marine ecosystems' services among their commercial activities of developing, marketing and selling, and using chemical and chemistry services. We ask how the companies involving in chemical industrial markets behave, collaborate and cope with the regulations. We will examine how business actors participate in market exchange as well as in helping shape regulation. To address these questions, we draw on market studies approach, service-dominant logic approach, and IMP approach. Those three theoretical approaches works and overlaps within the research context.

4. Research Objectives

Combining our theoretical choices and the research problem. The Phd research project is mainly about the market exchanging, evaluating value during the marketing process, and the examining relationships and interactions between market actors. To identify the research problems, we propose the following research objectives.

Our research objectives are to assess:
(1) How companies involve in developing, marketing and selling, and using chemistry services combine and organize their activities in connection with acquiring and representing ecosystem services;
(2) How actors involve in chemistry market behaviour and collaborate within business network under the regulation of the use of chemical in offshore oil and gas production;
(3) How chemistry and oil companies are affected by the regime that regulators go about using risk assessment, as the alternative principle of representing ecosystem services in developing, marketing and selling and using chemical and chemistry services.
(4) What is the value (co)creating process and the value added process? And how to assess the value?
(5) The value of chemical product is co-created by oil companies in the process of exchanging.
(6) How chemistry market actors interact, connect with, define and stabilize the markets;
(7) How the networks influence business behaviours.

We classify the seven questions above and connect the empirical research to the theoretical choices reviewed in the second section. These objectives interconnect and overlap with each other. We divide them into questions in the three tables listed below to uncover the research objectives.

4.1 Market actors exchange and shape the markets under the regulation

Different actors represent and acquire ecosystem services in the specialist market for chemical services and chemical products. Exchanges do not only exist in chemical products but also chemical services. We expect to see how chemical markets work in the perspective of

practice and performativity. Chemical companies' business behaviors and market habits will be discussed to identify the how they behave to collaborate in market exchanges and other market shaping activities. We will also examine the processes of how market actors translate regulation in market exchanges.

In regard our first research objectives (1), (2) and (3), we ask question and relate them to our theoretical choices (See table 1)

Question to be answered	Theory Choices		
	Market Studies	S-D logic	IMP
How do chemical companies and regulators conflict? And how they contribute to market shaping?	✔		✔
What constitutes the chemical market exchanges? How the actors and resources layout?	✔		✔
How do the actors involve in collaboration in green chemical product exchanges?	✔	✔	✔
How are chemical products and services being exchanged under the direction of ecosystem services?	✔	✔	✔
What's the companies' perspective of the regulation?	✔		
How do chemical companies cope with the precautionary principle?	✔		✔
Do company's behaviours influence regulations? If so, what role the company plays in regulation process?	✔		✔
How chemistry and oil companies are affected by the regime that regulators go about using risk assessment? And how actors translate risk assessment into practice?	✔		✔
How can oil companies and chemistry companies evaluate and calculate prospective commercial projects?	✔	✔	✔

Table 1

4.2 Value co-creation process through collaboration of market actors

Oil companies do not only receive value of products from the chemical companies but also co-create that value by the process of using their products. Co-creation value is also discussed in this project. We will discuss the value co-creation and co-production process through interaction, how both oil companies and chemical companies benefit from value co-creation process and activities. The purpose to examine co-creation value is to identify the relationships and business activities behind that value.

In regard of our second research objectives (4)and (5), we address the following question (See table 2)**:**

Question to be answered	Theory Choices		
	Market Studies	S-D logic	IMP
How are intangible goods exchanged between chemical companies and oil companies?	✔	✔	✔
How do chemical companies and oil companies collaborate when exchanging 'service'?	✔	✔	✔
How is value co-created by oil companies and chemical companies?		✔	✔
What is the role that oil company (buyer) plays during the value co-created process?	✔	✔	✔
What is the role that chemical company (seller) plays during the value co-created process?	✔	✔	✔
What are the relationships behind the value co-creation process? How do they work?		✔	✔
How value is added by adding service within a long-term relationship?		✔	✔
How to assess that co-created value?	✔	✔	
What influences the value co-creation relationship?		✔	✔

Table 2

4.3 Actors collaborate within networks

The research is developed within IMP setting due to the interdependence between chemical companies and oil companies. We will analyze the business interaction between chemical companies and oil companies to find out how these companies act and collaborate to achieve their business objectives within networks.

In regard of our third research objectives (6) and (7), we will address the following question (see table 3)

Question to be answered	Theory Choices		
	Market Studies	S-D logic	IMP
What is the relationship between oil company and chemical company like?	✔		✔
What are the factors affect the interactions and relationships between oil companies and chemical companies?	✔	✔	✔
How do relationships change over time?	✔	✔	✔
How do companies cope with the change of relationships?	✔		✔
What are the value and meaning relationships to oil companies and chemical companies?		✔	✔
What is the relationship like between market actors and regulars? How the influence each other?	✔		✔
How do the layers of the interaction develop the structure of networks?	✔	✔	✔
How do oil companies and chemical companies active in the co-development context?	✔	✔	✔

Table 3

5. Methods to be used

We have briefly examined the nature and uses of theory in our project – abduction can be a third reasoning process besides deduction and induction. Pierce (1931) regards that "abduction is the process of forming an explanatory hypothesis. It is the only logical operation which introduces any new ideas; for induction does nothing but determine a value, and deduction merely evolves the necessary consequences of a pure hypothesis". The important role of abduction is shown in representation and reasoning. Abduction can be considered the essence of his pragmatism. The approach of abduction is from 'effect' to 'cause', which is embodied in appealing to a kind of deductive process of finding explanations. Abduction must be capable of experimental verification. In this respect it has a close and significant connection with pragmatism. The studies relying on abduction, the original framework is modified and the theoretical insights are gained during the process (Dubois& Gadde 2002). We adopt abduction in order to help explain the interplay between theory, method and empirical phenomena, and theoretical structures and empirical observation develop concomitantly and interactively in an abductive approach (Dubois& Gibbert 2010).

In the marketing research, when we refer to the question of products, brands, services, and the business relationship with products and services, we are focusing on the ontology of marketing. Dubois (2010) points out that the different stages of a research can vary in characteristics because abduction just shows that theoretical approaches develop simultaneously with empirical observation. We consider the business-to-business marketing as an abductive process. Not only do the marketing theories turn towards real practice, but also the habits of marketing practitioners are discovered and regulated during the process.

We adopt process research to the research. Rescher (1996) defines a process is 'a coordinated group of changes in the complexion of reality, an organized family of occurrences that are systematically linked to one another, either causally or functionally'. Process data is collected in real organizational contexts. Langley (1999) points out process data have the following characteristics: dealing with sequence of events; involving multiple levels and units of analysis; embeddednesss varies from precision, duration and relevant; and eclectic. Process research is used to involve change and unfold what happens over time. Process research enables see how every human action constitutes in the process of temporal structuring (Orlikowski and Yates, 2002). We use process research to study originations and their people's engagement in business activities. The process research is undertaken by developing research narratives (Pentland and Feldman, 2007). Narratives address how knowledge in organizations is gathered to cope with the world and emphasize the nature of knowing and organizing (Patriotta, 2003).

Time and place play important roles when we do the process research. It is difficult for the researchers to observe how the events happen in the right place and right time. Researchers have to develop process research empirically and with reference to narratives, coping with time. We seek to address this potential area of contention in research methods by examining how researchers cope with time, because the events we are interested in may happen at some other time. And we are not able to judge an event whether it is important to us or not when it is happening. We can review analyze it by developing research narratives. Researchers need to screen out representational practices from marketing and exchanging process, which are based on the narrative data. Market actors benefit from that to envisage what the future could be like. We expect to observe through meetings, conversations, and events to create research

narrative. Data are also collected from memories of the business actors and their interpretations through interviews, working diaries, their experience, or other working documents. Markets and exchanges are process. Market actors' exchange activities, value co-creation activities and their interactions and relationships construct process and the narrative context. We also examine how chemical companies behave and cope with time in market practices.

We also adopt ethnography and multi-sited ethnography in this project. Ethnography is a way to understand social life and makes use of the 'site' in which small groups of people shares a common culture rather than just a research method. It is empirically based upon participant-description and interpretation and focused more on culture and phenomenology. Ethnography is adopted to help researcher join in a group of actors dealing with business and services in chemical markets, observe their lives (watch their behaviours, listen to what is said, asking questions), keep diaries or records, summarize, and write them up. This essay is aiming to discuss why ethnography and multi-sited ethnography can be suitably used to improve our project and how ethnography overlaps with other research methods in this project such as 'process research', 'case study', 'fieldwork', etc. And how they are used to study business people of the way they work and the way they organize themselves.

Conklin (1968) defined ethnographic research as "a long period of intimate study and residence in a well-defined community employing a wide range of observational techniques including prolonged face-to-face contact with member of local groups, direct participation in some of the group's activities, and a greater emphasis on intensive work with informants than on the use of documentary or survey data." Ethnography is a way to understand social life and makes use of the 'site' in which small groups of people shares a common culture rather than just a research method. It is empirically based upon participant-description and interpretation and focused more on culture and phenomenology. Researchers doing ethnography are concerned with the lives of the people in the everyday context rather than the context created by the researcher. Their working habits and routines are studied. Routines can be regarded as the capacities or potentiality rather than behaviour, relying on knowledge and memories, working within approved procedures or regulations (Cohen 1996), which is practice-based approach lying on the standpoint of pragmatism. In Business-to-business marketing, the ethnography research will be characterized by a much smaller scale of people rather than the large number in consumer market research. We hope to address the chemical companies' behaviours during the process of developing, marketing and selling, using chemistry services under the directions of ecosystem services. We use ethnography method to study a group of business people in the context of buying and selling chemical products and services across time and people, which can help us to find the ways of business people dealing with chemical product and services by watching what happens, listening what is said, asking questions through informal and formal interviews, and collecting documents.

Marketers are regarded as boundary spanner between buying and selling companies and the market boundaries and market exchanges turns out to be more multifaceted (Geiger and Finch, 2009). We also adopt multi-sited ethnography (Marcus, 1995) tracks a subject across boundaries and follow the actors in different locations, which discuss on the one hand the ethnographies involving more than one field-site, and on the other hand that the ethnographer in the role of moving through and between different field-sites, which is aiming at identifying and transcending the limits of existing theory (Vallas, 2003). It is used in this project to study business behaviors in the context of location movement of business people. We can change our

perspectives on things that we study and multi-sited ethnography also provides us a lot of different perspectives on things (Hovland, 2005).

Marcus (1995) sets out six ways engaging with doing ethnographic research between and across field-sites, such as 'follow the people', 'follow the thing', 'follow the metaphor', 'follow the plot, story, or allegory', 'follow the life/ biography' and 'follow the conflict' and some of them can be adopted in the research.

We 'follow the people' in order to identify the roles of the actors. We select a group of business people involving in particular cases dealing with chemical products and services in their moves across places and analyzing their moves in different locations and how these contribute the observation of people moving through and between different field-sites.

Because the movement involving in 'the thing' cannot talk for itself, we gain information by following people through conversation, discussion, and opinions, etc. One of the 'things' that we will follow is the chemical product they buy and sell. We follow the product from buyers issuing the problems they meet, move from the lab experimenting and finally to the selling department and after selling services. This process provides us a means by which the 'thing' is studied. It helps to understand the process of development of the product.

'Follow the metaphor' supports the ethnography by getting the discourse and modes of thought. We will follow a particular form of discourse, which is practiced in different departments with in the same chemical company. We will adopt this approach to analyze different forms of discourse of chemists, which they explain to different audience, such as customers, colleagues, regulatory association and media, etc.

We 'follow the plot, story, or allegory' to develop narratives (Patriotta, 2003; Cunliffe, et, al., 2004) and document process (Van de ven and Poole, 2005). We read plot, gather and analyse participants' narratives. 'The conflict' forms multi-sites of ethnography.

'Follow the conflict' of different parties in a setting can provide us different perspectives of a same phenomenon. We will follow the conflict between the regulators and chemical company to update the information of policy changing and find out the impact of the regulation to the chemical company and how the company response or adjust under the ecosystem services.

The circumscription between single-sited ethnography and multi-sited ethnography is sometimes vague. And the approaches of multi-sited ethnography can overlap. An ethnographic research based on a single site may also draw in or move on to other field-sites.

Observation and interview are used to collect primary data. Observation is a set of complex arrangements of feelings and perception rather than of just looking at something and then searching into the facts. Observation will take place where market actors are involved in behaviors under study. It comes back to the question about how to choose the right time, the right places and the right participants. Observation provides an opportunity to get beyond people's opinion and self-interpretations of their attitudes and behaviors towards an evaluation of their actions in practice.

Compared with observation, interviews are usually held in the absence of close observation (Watson, 2011). Watson made a notion of what distinguishes the ethnographic interview from other type of interview is that in which the subject feels confident to challenge the researcher

and contribute to shape of the conversation, avoiding falling into line with the interviewer's priorities and preconception. Interviewees of ethnographic interview are normally made up with people of a particular culture, or who share particular experience. Although a set of questions is usually designed structurally before the interview, it will be adjusted during the interview because of human interaction between the researcher and the interviewees. Observation and interviews help to understand practices of actors and develop research narratives. Data analysis in ethnography focuses on significant or important events. And the bottom line is attempting to create a narrative illuminating.

We will gather data to address all three research objectives through a combination of research interviews, ethnographic observation, attending industry seminars and trade shows, for instance as organized by the Society of Petroleum Engineers, and collating industry and company reports and documents. We will organize and analyze our data using QSR NVivo8, which we have extensive experience in using.

6. Empirical Research Plan

- Overview

For the empirical research, we will gather information on our object of research through ethnographic observation and interviews. We will also develop a qualitative case study from chemical company. Case study methods are used for a wide variety of issues such as organizational performance, project design, policy making and analysis, business relationships and behaviours. Case studies are trying to attribute casual relations rather than just describing a situation. We use case studies are uncover relations of theory, method and empirical phenomena as well as get a 'deep understanding of the actors, interactions, sentiments, and behaviours occurring for a specific process through time' (Borghini, Caru and Cova 2010), which fit in the data sources of ethnography, interviews, observations, archival data and survey data (Eisenhardt, 2007). A single case study is use to assess companies in oil and gas field that help better understand the market actors activities and examine how they collaborate in networks when market exchanging.

Our research context is conducting study on chemical companies, oil companies, regulators under the regulation of chemical used in North Sea under the direction of OSPAR, REACH, etc. We adopt descriptive approach initially to gather knowledge about the objects of the research. The target is to find out how things are (i.e., how market actors behave). Normative approach will also be adopted to define how things should be (i.e. how market actors help shape markets). Intensive and extensive study will also be used for case study and generate theory of practice. Data collection is carried out through observation, interview and discussion.

- Objectives

We got an access to Champion Technologies, a specialty chemical company offering innovative and environmentally acceptable solutions to oil & gas production problems and also got some people to follow. We intend to start empirical study there and also are trying to look for accesses to other companies in the same industrial field and decide a case study research.

We recall our initial fieldwork trip to Champion Technologies:

Our initial fieldwork trip to Aberdeen on January 14, 2011 was to do an orientation observation and interview. We had done basic documentary work from our previous research and their website days ago before we left. When we arrived there, we saw piles of pipes in the barnyard away their main office building. Their labs were installed in building as well. They got several lecture rooms for holding seminars for customer education. The customer education seminar is one of their marketing activities classified into three tracks to help their customer better understand of their products focusing on the facility and general information on the chemical programs. The company's notification stuff and poster of the mission and values were posted the walls of in each office.

The interview was held among the interviewers of John (Professor and supervisor of the project), Rachel (Post-doc research assistant on this project), Shiming (PhD student on this project), and the interviewees of Ian (Product Stewardship Manager of Champion Technologies) and Graham (Executive Secretary of European Offshore Speciality Chemical Producers Association). The interview was focusing on the two main research domains: (1) the one is a high level of regulation level, how does technical regulation work? What are the impacts of OSPAR convention to the chemical companies? (2) The other is the company level about the chemical product development, information exchanging to users, as well as the chemical company's response to the regulations. The interview was conducted in the office of Ian lasted for 120 minutes, and started with the introduction of REACH (European Community Regulation on chemical, deals with the Registration, Evaluation, Authorization and Restriction of Chemical substances.) regulation and it's impact on chemical companies. We got information about the REACH's influence chemical companies and the companies' reaction to the regulations and agreements. REACH regulation came out in 2006. It sets registration based on people' attention, pre-register intention through registration and create a regulatory system for dealing with new and existing chemical substances. A certain registration deeds are regarded as a milestone was November 30, 2010. These are all the high volume in the substance that had to be registered. They share the annual data. Every company who does chemical business needs to get registered. From general chemical industry, the direct impact on the oil and gas companies has not been agreed for that simple reason that a lot of chemical will be used until 2013. All the main chemical products have to be registered before 2013. For the smaller production volumes, the requirement will happen in 2013. All the substances will be registered in 2018. Besides REACH, EOSCA also has great influences to the chemical companies for last twenty years by addressing issues with the chemical regulations proved. The EU is also a member as contractive in ORSPA. EU has to attend the ORSPA meeting to make sure ORSPA come accordance with EU regulations. That will be a direct impact on Champion Technologies. There are two substances they have to register for 2010. For 2013 they get fifteen substances registered. For the whole chemical industry, a lot of the substances are very high concerned as get identified affecting the end users. That requires restriction for chemical companies to use. The reaction of the chemical companies will be adjusting and not making it anymore or replacing them. REACH provides guidance to chemical industry. One of the concerns with the whole REACH registration process is that chemical companies registered under the same substance compete each other.

- Empirical research time plan

Empirical Research Planning		
Stages	Activities	Time
Preparation	Check and choose relevant chemical companies for empirical fieldwork	3 weeks
	Establish preliminary hypotheses	
	Write and polish literature review and reading relevant theory	
	Write proposal and have it approved	
	Discussion with supervisors	
Early development	Contact and get permission for access and empirical research	2 weeks
	Acquire documentary information of the fieldwork company	
	Confirm questions and methods	
	Comfirming key sources and what the company can help and provide	
	Design observation and interviews	
Involvement	Make revision to hypotheses and to the choice of research methods	8 weeks
	Futher develop designing observation and interviews and contacts	
	Choose a pilot	
	Final addjestment of hypotheses and research methods based on pilot	
	Data collection through observation and interview (record or video)	
Writing up	Organise collected data	4 weeks
	Write draft	
Production	Revise chapters and present	2 weeks

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