

**The formation of new inter-firm relationships: a UK offshore wind sector analysis**

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**1. Introduction**

This study investigates the formation of new inter-firm relationships in the UK offshore wind (OSW) sector. Even though OSW energy is a renewable and secure source of energy (Pregger *et al.*, 2011; Svanberg and Halldórsson, 2013) the OSW sector is still a relatively immature industry (Higgins and Foley, 2014) requiring major cost reduction. It is believed that collaboration within OSW supply chains could yield significant cost savings (Gov.uk, 2012) but there is a lack of study on how the OSW sector achieves supply chain innovation through formation of new inter-firm relationship (Arlbjørn and Paulraj, 2013; Jensen *et al.*, 2013). The OSW sector with typically high market risk and political uncertainty characterises a unique challenge facing the initiation of new inter-firm partnership (Hamel *et al.*, 1989).

This study attempts to answer a research question: ‘How and why new inter-firm relationships are built in nascent industries with highly uncertain business environments?’ This study uses case studies of OSW supply chain companies that operate in the UK OSW sector, a nascent industry operating under high levels of market and political uncertainty. The relative immature UK OSW sector is also characterised by many formations of new relationships between firms with no pre-existing ties. Some of the companies in the case study are new entrants to the OSW market; therefore the research also offers insights into the early formation and development of business relationships for exploring innovative collaborative advantage with firms from different sectors.

The study contributes to the supply chain and energy sector management literature in a number of aspects. Understanding how new inter-firm relationships are born and develop into long-term relationships has been recognised as an important research agenda (Villena *et al.*, 2011; Lumineau and Henderson, 2012; Palmatier *et al.*, 2013). New inter-firm relationships are formed through a selective process where organisational characteristics influence the likelihood of relationship formation (Powell *et al.*, 2005). They are formed during the initial stages of an inter-firm relationship life-cycle from awareness to exploration, expansion, etc. (Ford, 1980; Dwyer *et al.*, 1987; Ring and Van de Ven, 1994). Though the models of inter-firm relationship life-cycle proposed by these scholars help to name the stages of an inter-firm relationship, less is known about how and why the relationship can progress from one stage to another over time (Lewicki *et al.*, 2006). This study reveals how and why inter-firm relationships progress (or fail) from one stage to another. Furthermore, it is common to

improve relationships with pre-existing partners but less is known about how firms form and improve relationships with strangers. By studying the formation of new relationships between a firm and their new and existing partners this study shed lights on their differences.

This study investigates why OSW supply chain companies seek new partnerships and how they benefited from the new relationships despite facing high market risk and political uncertainty. There has been extensive research on why firms enter alliances or partnerships, motivations include the chance to learn from one another (Hamel *et al.*, 1989), enter new markets and technologies (Kogut, 1991), access complimentary assets (Rothaermel, 2001), enhance innovativeness (Shan *et al.*, 1994), share risks (Ohmae, 1989), and improve performance in early stages of the relationship. Further, research has shown that a firms tendency to form relationships depends on firms resources and external environment (Park *et al.*, 2002), strategic and social position (Eisenhardt and Schoonhoven, 1996), and technical, commercial and social capital (Ahuja, 2000). Others attempt to determine what firms do to achieve meaningful and beneficial inter-firm relationships; common behaviours such as trust building, information sharing and commitment have been identified (Palmatier *et al.*, 2013; Wilson, 1998; Anderson *et al.*, 1987; Dwyer *et al.*, 1987). In addition, both resource compatibility and complementarity between firms are also arguably the drivers for such behaviours (Mitsuhashi and Greeve, 2009).

By examining the early-stage relationships between a supplier and multiple new customers this study provide insights into supplier selection in OSW sector. This study argues the ways in which the selective process is being managed is as important as the levels of compatibility and complementarity. To verify this argument, this study identifies production resources as observable criteria and company culture/philosophy as unobservable criteria used to determine match quality, and specify that firms judge match quality as high when these criteria show complementary and compatibility, respectively. Further, the study analyses the selective process of several supplier-buyer dyads in their early stages where suppliers make investments in the relationship to improve match quality and to build trust in order to increase the chances of winning further orders and developing long-term committed relationships with their customers, and customers' efforts in searching for compatibility and complementarities.

## 2. Theoretical background

This section lays down the theoretical foundations underlying the study. The study applies matching theory with a focus on understanding how compatibility and complementarity play a role in forming new inter-firm relationships. The study is grounded on relationship life-cycle theory with a focus to reveal how firms progress from an early-stage of relationship life-cycle to meaningful partnerships under a dynamic and uncertain marketplace.

2.1 Matching theory

Relationships generally provide firms with access to their partner’s resources. As such, firms often search for partners with resources that they lack (Gulati *et al.*, 2000). Matching theory enables potential partners to weigh up the preferences, opportunities and constraints of a relationship based “on the characteristics or resources that each side values in the other” (Logan, 1996, p.117). It is argued that firms that meet specific strategic and social criteria (i.e. better match quality) hold beneficial positions for developing relationship. Compatibility in production resources and complementarity in markets have been found to improve alliance performance (Mitsubishi and Greve, 2009).

2.1.1 Complementarity

Firms form relationships with new partners when there is complementarity. Complementary resources are not identical, yet they simultaneously “complement” each other (Hitt *et al.*, 2001). Complementary resources allow firms to combine acquired resources with their own resource sets, thereby creating a resource bundle that provides unique and difficult-to-imitate value (Harrison *et al.*, 1991). Virtually inimitable value may be the most important criterion or condition for firms to satisfy in efforts to create competitive advantage (Barney, 2001). Additionally, actions to gain access to complementary resources allow firms to learn new and valuable capabilities (Hitt *et al.*, 2000; Hitt *et al.*, 2001). Other studies have defined complementarity as the degree of similarity on certain organisational variables and the convergence of their economic motivations (Park and Ungson, 1997). There are challenges when operationalising this definition since the resources and capabilities of firms typically have multiple dimensions (i.e. products, technology, and markets) and multiple levels of analysis.

Normally, relationships are established because firms do not have all of the resources necessary to compete effectively in particular markets (or they do so because of the uncertainty and the desire to share the risks). Business relationships generally provide firms

with access to their partner's resources. As such, firms often search for partners with resources that they lack (Gulati *et al.*, 2000).

The value of complementarity has been widely studied but not in the OSW sector. Complementarity has been described as the differences in skills between two firms (Harrison *et al.*, 1991). Displaying and sharing complementarities, whether being associated with market knowledge, experience or resources increases the chance of partners forming relationships in order to utilise these complementarities. This study defines business complimentary as resources that give competitive advantage to the organisation holding the resource and to the partnerships that it participates (Barney, 2001). Such resources may include those that are tangible, i.e. products, technology, and processes, and intangible, i.e. market knowledge, technical expertise, and reputation.

### 2.1.1 Compatibility

Compatibilities between businesses have been discussed extensively in strategic management literature. "Compatibility gives match quality through similarities—capabilities can be combined to create value because they are similar or share a standard interface" (Mitsuhashi and Greeve, 2009, p. 977). Compatibilities in products, markets and technologies between two firms can be referred to as the level of business relatedness (Koh and Venkatramen, 1991).

This study defines business compatibility as the similarities between partners that create value when combined such as values, culture, and routines. Compatibility can help to reduce uncertainty. Uncertainty and market risk define the formation of any relationship (Hamel *et al.*, 1989). To remove uncertainty when initiating a relationship firms may focus on signals from their potential partners that they feel the relationship venture may work. Examples can be seen in the banking industry where partners with similar social status are sought (Podolny, 1994) or in the technology driven industries where patents are seen as signals of a quality match for a firm.

### 2.2 Inter-firm relationship life cycle theory

Out of much previous academic literature on relationship life-cycle theory there have emerged two prominent schools of thought. One can be addressed as Dwyer, Schurr and Oh's (1987) (DSO) life cycle theory on the relationship development between buyer and supplier

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3 organisations. DSO explains that relationships develop over time where trust and shared  
4 norms are developed according to a predictable series of events happening in a set order.  
5 DSO theory offers simple propositions for each stage of the development of a relationship,  
6 where many relationship properties follow the same paths, rising and then falling  
7 methodically. Relationship properties such as trust and dependence are low in the exploration  
8 stage, rise in the expansion stage, climax in the maturity stage and then fall as the relationship  
9 dissolves. Dwyer *et al.*, (1987) framework identifies five distinct stages in a relationship:  
10 awareness, exploration, expansion, commitment and dissolution.  
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14 The initial stage of a buyer-supplier relationship is noted as the “awareness” stage and is  
15 defined as; “Party A’s recognition that party B is a feasible exchange partner” (Dwyer *et al.*,  
16 1987, p.15). After interaction has taken place, for instance, a transaction, the relationship will  
17 then move into the exploration stage. Once in the exploration stage, trial purchases will take  
18 place in order to test and evaluate a partner’s capabilities, this enables partners to develop  
19 trust in one another as well as be jointly satisfied with each other’s performance. Wilson  
20 (1995) argues that trust, social bonds, mutual goals and power/dependence issues are more  
21 important in the early stages of relationship development. Next, in order to move to the  
22 expansion stage partners need to view the potential rewards as sufficiently large to take the  
23 effort to start negotiating and interacting intensively.  
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27 Another standpoint on relationship development is suggested by Ring and Van de Ven  
28 (1994) (RV) which suggests a theory of relationship development which is applicable to any  
29 inter-organisational relationship and not exclusively buyer-supplier. DSO theory argues that  
30 there are five separate stages that occur one at a time, while RV posits that the three steps  
31 suggested happen within each stage of DSO theory. Unlike DSO the RV approach aims to  
32 understand the relationship from the behaviour of individual managers of both organisations,  
33 furthermore, it is a cyclical process where the four stages can be repeated until the  
34 relationship is terminated.  
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38 Both Dwyer *et al.*, (1987) and Ring and Van de Ven (1994) agree that relationships  
39 move through life-cycle stages at different speeds. For example, Dwyer *et al.*, (1987) state  
40 that the exploration stage may be very brief or include an extended period of testing and  
41 evaluation. Some firms move through relationship stages faster than others. Vanpoucke *et al.*,  
42 (2014) study showed how some relationships took three years to ‘explore’, others stayed for  
43 more than ten years in the exploration stage. Similarly, in the expansion stage some  
44 relationships needed little time to move on to the commitment stage, while other relationships  
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needed a lot of time. As such, all relationships move through the same stages, but at different rates, both Dwyer *et al.*, (1987) and Ring and Van de Ven (1994) suggest that relationships have their own development speed.

Various marketing scholars have emphasised that many of the interactions between buyers and suppliers and their outcomes are contingent on the stage of the buyer-supplier relationship (Dwyer *et al.*, 1987; Jap and Ganesan, 2000; Medlin, 2004; Wilson, 1995). The relationship life-cycle influences the development of relationship marketing constructs such as cooperation, information sharing, and trust (Jap and Ganesan, 2000; Wilson, 1995). Therefore, it can be said that inter-firm relationship progression would be more successful if the buyer-supplier relationship is in a stage where the levels of cooperation, information sharing, commitment and trust etc. are high (maturity) rather than low (initiation or decline).

### 3. Methodology

Longitudinal case studies are suitable for revealing the unfolding events and relationship developments over time (Ruspini, 2002). The research involves three longitudinal case studies (three pairs of supplier-customer relationships) of three OSW suppliers and their relationships with several customers in a highly uncertain market and political context. One supplier (MOCO) manufactures gearbox applications that are supplied to OSW original equipment manufacturers (OEMs). Another supplier is a major UK-based reinforcement steel supplier (BRCO); its customers manufacture concrete gravity foundations for the UK OSW market. The third supplier is a major structural steel producer (TACO), its customers include OEMs and turbine tower manufacturers in onshore and offshore wind markets. In each case, the unit of analysis is the buyer-supplier relationship and not the individual companies. Therefore, paired retrospective data from multiple managers of both the supplier and buyer sides of the relationship are collected to capture the relationship evolution over time (Pettigrew, 1990; Pentland, 1999).

The three case companies are selected for the following reasons. Each case involves a dyad in its early stages of relationship development and is described from a suppliers' perspective. In most cases one partner is an experienced player in the OSW sector while the other is a new entrant to the market, making it more interesting because this will allow us to compare the ways partners with and without OSW experience invested in new relationships. The cases aim to analyse the formation of buyer-supplier relationships and study the effects of complimentary and compatible resources and relational dynamics on relationship



development. All three suppliers have experienced dynamic relationship developments with their new and existing customers, some of which successful others failing, making them suitable for this study. Some of the relationships involved partners from different sectors and countries, allowing us to study conditions whereby compatibility could be rare.

Information on relationship development process is collected in a retrospective and inductive way, enabling a focused data gathering process (Leonard-Barton, 1990). Unstructured and semi-structured interviews are conducted with respondents who have been in a company for a relatively long time to reveal the relationships in depth. Interviews were recorded and transcripts of the interviews were written up. To avoid respondent bias that can lead to confusion about cause and effect relationships (Leonard-Barton, 1990), triangulation of the data was carried out by collecting multiple data via multiple interviews and review of documents (Jick, 1979).

Unstructured interviews with the key informants as well as a review of relevant documents (i.e. contracts, reports, presentations and publicly available data) are conducted. The key informants are mostly key account managers from the supplier firms personally involved in the relationship under study. All together six informants were involved in unstructured interviews lasting approximately one to two hours each (three for MOCO, two for TACO and one for BRCO). The data provides a graphical representation of the chronology of events that have taken part within each buyer-supplier relationship. Then, six follow-up face-to-face semi-structured interviews (approximately one hour in length) are conducted with the same managers involved in the relationship according to the chronology of major events, where the available documents are re-examined to check whether the information given in the interviews are supported by the documents.

The data collected consisted of new relationships that were initiated during the research period, i.e. no previous ties existed between the partners. The case study analysis focuses on two main concepts – complementarity and compatibility. Interview data and other sources of data are analysed based on the following coding scheme. Complementarity provides match quality through differences, where tangible and intangible resources such as products, process technologies, technical expertise or market knowledge can be combined to create greater value. On the other hand, compatibility provides match quality through similarities, where capabilities in, for example, knowledge sharing routines, can be joined to create value as they are similar or share a similar standard. The study also analyses the selective process with a focus on the efforts invested by both the suppliers and the customers in sharing information,



building trust, investing in the new relationship and making longer-term commitment. To find evidence of complementarity and compatibility in the selective process, semi-structured interviews with key informants of the supplier firms were undertaken. To investigate the matching rules used by the firms, the analyses compared the matches that did happen with the ones that did not happen. Relevant quotes from the interviews are extracted, some of which are presented in this paper.

## 4. Findings

### 4.1 Single case analysis

#### Case 1: MOCO-SACO

This case study involves MOCO, a gearbox manufacturer, and its potential customer SACO, an OSW turbine OEM, from a supplier perspective. MOCO is based in the UK known for its ability to design and make industrial gearboxes. MOCO intended to enter the market through product specialisation. In order to custom design a gearbox application to suit the customer's needs unlike the other suppliers in the OSW market, MOCO invested in research in train studies and investigated different turbine layouts in search of an optimised solution. SACO, an Asian company, was new to the OSW sector. They had a lot of design and technical experience in numerous industries and were a well-known brand in electronics with over 270,000 employees worldwide. Figure 1 illustrates the unfolding relationship development between MOCO and SACO.

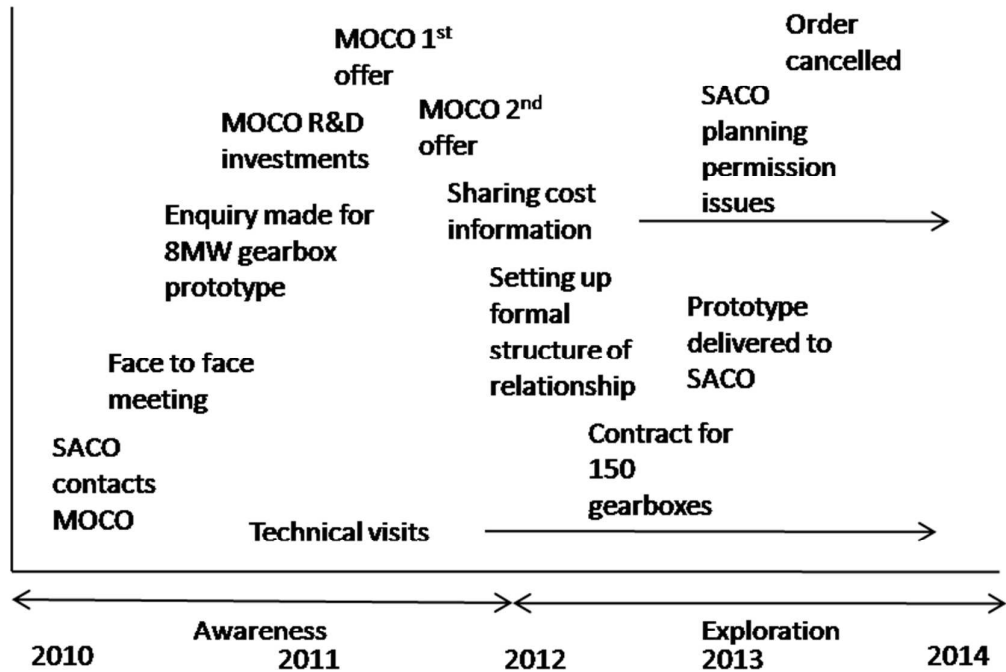


Figure 1: Relationship life-cycle of MOCO-SACO

*Awareness stage*

There were no previous ties between MOCO and SACO. SACO had choice of many gearbox suppliers in the market and was looking for a feasible UK supplier. MOCO knew SACO were entering the UK market and had made enquiries to a number of potential suppliers in Europe to build a new, innovative gearbox for their larger turbine prototype. MOCO did not have a proven track record in manufacturing gearboxes for wind turbines. They acquired a UK gearbox manufacturer with a long track record in military, oil and gas and other high torque low speed applications going back 100 years. Gearbox applications in the OSW sector have strong tolerances and high cleanliness standards. This posed a challenge for MOCO as they needed to find suppliers who could provide them with products meeting OSW standards; “It is very difficult to find the right suppliers” stated MOKAM1.

*Exploration stage*

Building up new relationships with OSW OEMs is time consuming and costly. There are many hurdles. MOKAM1: “the wind industry is a very strange industry, it likes turbine specific applications and so it took a long time to persuade our customers to work with us”. To mitigate this factor, MOCO employed an independent specialist to undertake verification

work on their calculations and design work, MOKAM1 commented: *“that was one hurdle”*. Another challenge facing MOCO was other large competitors (Bosch Rexroth) in the market with track records in manufacturing and installing experience with thousands already installed. For example, MOCO’s competitors had already built an 8MW gearbox that they were making for a major turbine OEM and so they could easily provide SACO with a working, tested product. Designing the gearbox from scratch and customising it to their customer’s requirements was a crucial step to demonstrate unique complementarities. MOCO was able to provide a design that could be lighter, smaller and more innovative than what was currently available on the market. This argument strengthened MOCO’s position as it allowed SACO to differentiate their product against their competitors. But the design had not been tested.

The next hurdle was investment in research and development (R&D). MOCO’s first offer on the table included the cost to develop the prototype and the price of each unit after the prototype. SACO refused the first offer as they were talking to other suppliers that didn’t have R&D costs to incur. MOCO then decided it would undertake the R&D and testing free of charge if SACO would commit to purchasing 150 units, which would help MOCO recoup their R&D costs. Investment in R&D did not necessarily guarantee orders. MOCO found it very hard to get the customer to commit to an order of 150 units. However, MOCO offered market complementarities as they already had strong relationships with Local and National Governments, suppliers and customers in the UK. A lot of time and investment was made by MOCO developing relationships with organisations such as the Department of Energy and Climate Change, Department for Business, Innovation and Skills, UK Trade and Investment and arranging tours of numerous UK ports, MOKAM2: *“this worked in our favour, we were advisor to the customer”*. This enabled SACO to sail through all the complexities of UK and Scottish governments and helped them secure the permission to build a prototype of their product in Scotland. The effort made by MOCO triggered the strengthening of their relationship with SACO.

MOCO had to convince the company board of directors to invest in all the equipment that was needed to build the prototypes and test rig for SACO, 20% of the investment in capital equipment came from funding from the UK government. The investment in the test rig did help move the relationship forward, during several meetings with key staff from both firms MOCO would share all cost information with SACO to show how much of their investment

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3 was dedicated to their project, managing director of MOCO (MODD1): *“this was one of the*  
4 *key decision makers for the agreement”*.

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6 When setting out the modus operandi for the relationship, MOCO had received a generic  
7 business contract to sign; however, being new to OSW MOCO requested a meeting with  
8 SACO to set out the structure of how they were going to work with SACO. MOCO invested  
9 in lawyers to draft the conditions of the contract and sent these to SACO, who returned them  
10 with the original terms and conditions (T&Cs). This then involved a long two-month process  
11 of sending the edited T&Cs back and forth until the T&Cs were finally agreed.  
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15 On reflection, the 150-unit contract relied heavily on the complementarity between  
16 technical capabilities of MOCO and market entry strategy of SACO. MOCO transferred  
17 technical complementarities by offering SACO a royalty free license to build their own  
18 gearboxes after the 150 units were delivered. MOKAM2: *“it’s a difficult balance between*  
19 *giving the customer what you think is right and giving them enough information for them to*  
20 *go away and do it for themselves if they chose to”*.  
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24 During the early-stage relationship building several incompatibilities were discovered,  
25 SACOs culture of high expectations on responsiveness was the first challenge for MOCO. On  
26 many occasions MOCO staff would be required to sacrifice their weekends off in order to  
27 satisfy SACOs requests, this was something very unusual to the British staff at MOCO as  
28 MOKAM2 commented: *“this was difficult for our guys as that’s not the British way”*.  
29 MOCO found it very difficult to adapt to the differences in expectations in responsiveness  
30 and timescales, MOKAM1: *“their expecting you to turn up to their factory (in Asia) with the*  
31 *drop of a hat ... you will receive an email on Thursday reading that they will be visiting our*  
32 *facility on Monday for an audit, then we are like, oh shit”*. SACO recognised the problems  
33 owing to distance and responded. Due to the difficulties in distance between the firms SACO  
34 decided to open an office in Hamburg to make communication easier and travelling times  
35 shorter for the two firms, but also to be closer to the market and poach experienced staff from  
36 the offshore wind industry in Europe.  
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40 A hierarchical organisational structure was another challenge that MOCO were not used to  
41 dealing with. MOKAM1: *“The [SACO people] are quite difficult people to deal with, they are*  
42 *hierarchical, so the guy you’re talking to can only make certain decisions, if he can’t he has*  
43 *to defer to his boss, so he has to go away and come back”*. On many occasions MOKAM1  
44 would fly to Asia for a three day meeting with SACO staff but end up having to delay the  
45 plane and stay for a further three days, only to return again a couple of weeks later. The  
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3 differences in hierarchical structures between the two companies made doing business a lot  
4 harder according to MOCO.  
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6 From the ongoing visits and regular communication throughout the relationship, the  
7 customer built the suppliers trust: *“when they say they are going to do something they do it,*  
8 *they won’t lie to you ... Some things they said they would do, we never thought they would do,*  
9 *but they did!”*. MOCO also found that SACO’s culture was one of honor, which was an  
10 important factor in terms of trust in their relationship, MOKAM2: *“they don’t deceive you”*.  
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13 Due to the radical design of SACOs turbine, MOCO realised it would be hard to replace  
14 SACO as a customer, as other potential customers had already invested in turbine designs  
15 with well-designed gearboxes. MOCO’s gearboxes were not interchangeable and so they did  
16 not have another potential customer to serve. Despite the incompatibilities between them both  
17 parties invested heavily in relationship specific assets, SACO then placed an order with  
18 MOCO, however, due to planning permission issues SACO had to cancel the order and  
19 decided to exit the UK market. The relationship could not reach expansion stage and ended  
20 despite high levels of trust and investment. Now MOCO is approaching other customers in  
21 the market.  
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### 32 Case 2: TACO – MACO

33 Figure 2 illustrates the major events took place along the relationship life-cycle between  
34 TACO and their customer MACO.  
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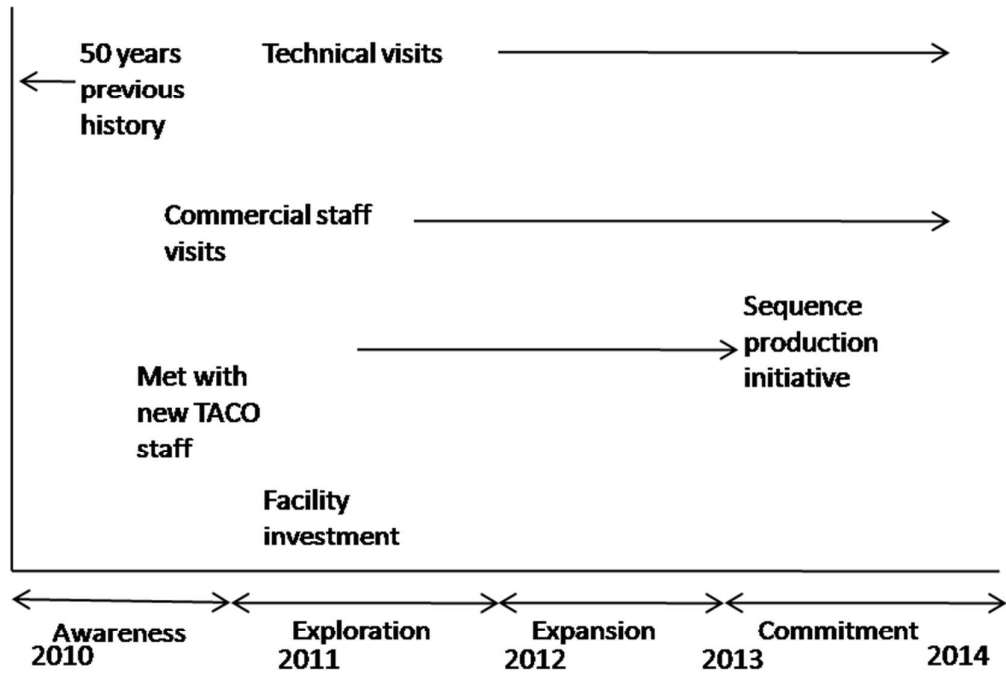


Figure 2: Relationship life-cycle of TACO-MACO

*Awareness stage*

The relationship between TACO and MACO spanned over 50 years. Before supplying towers to MACO, TACO would supply steel to MACO for their bridge business. A new opportunity for MACO to enter the OSW market arose which required MACO to procure steel to manufacture turbine towers for OSW projects.

*Exploration stage*

In 2010, MACO started working with TACO on onshore turbine towers. At this point, MACO were new to the onshore tower industry whilst TACO already had 10 years' experience. From the start of the relationship TACO and MACO conducted quarterly commercial and technical visits to each other's headquarters. Something they had been doing for years previously when working on projects in other industries. The ongoing meetings on how to develop the supply chain enabled both companies to build common ground and build

compatible working practices on top of the informal structures and personal relationships that had already existed.

Social bonds between TACOs sales team and MACOs procurement team grew stronger. From a customer's perspective TACO would talk to MACOs procurement team on a day-to-day basis. Furthermore, on a higher level, communication between commercial managers of both organisations would take place once a week. TAKAM1: *"we are well engaged throughout the whole of their organisation"*. Whilst working with MACO for over four years on towers TACO were able to tailor their service to MACOs requirements. Despite TACOs product being commoditised and in its mature stage, TACO have been able to create value through up-selling their services to MACO as well as creating joint initiatives identifying solutions to cut cost together.

#### *Expansion stage*

An opportunity to strengthen the relationship arose in 2013. After several technical visits by TACO production staff explaining the benefits of a tailor-made approach to their services MACO suggested the two partners start what was known as the sequence production initiative.

Previously, MACO would order steel in quantity from TACO and once received, store it in bulk at their facility, which would then need to be managed for sequenced production of towers. The sequence production initiative enabled TACO to shorten their lead times through reserving their rolling plan, giving MACO up to the last minute to place an order on a project. This enabled MACO to hold less stock as they wouldn't need to order in bulk quantity, store the product outside and then manage the product sequence once ready to be processed. Instead, the steel plate could be delivered to MACO via in-can sequence or section sequence. This improved MACOs cash-flow immediately as they would hold less stock, it also improved production efficiency and reduced lead-times of MACOs operations. TAKAM1: *"it works very well"*.

The relationship between TACO and MACO was at a mature stage due to both parties fully understanding each other's requirements and offerings, as well as capabilities. There was a strong bond and feeling of mutual trust, the relationship was said to be *"very supportive"* and *"two-way"*.



Case 3: BRCO- GRCO

Figure 3 illustrates the major events took place along the relationship life-cycle between BRCO and their customer GRCO.

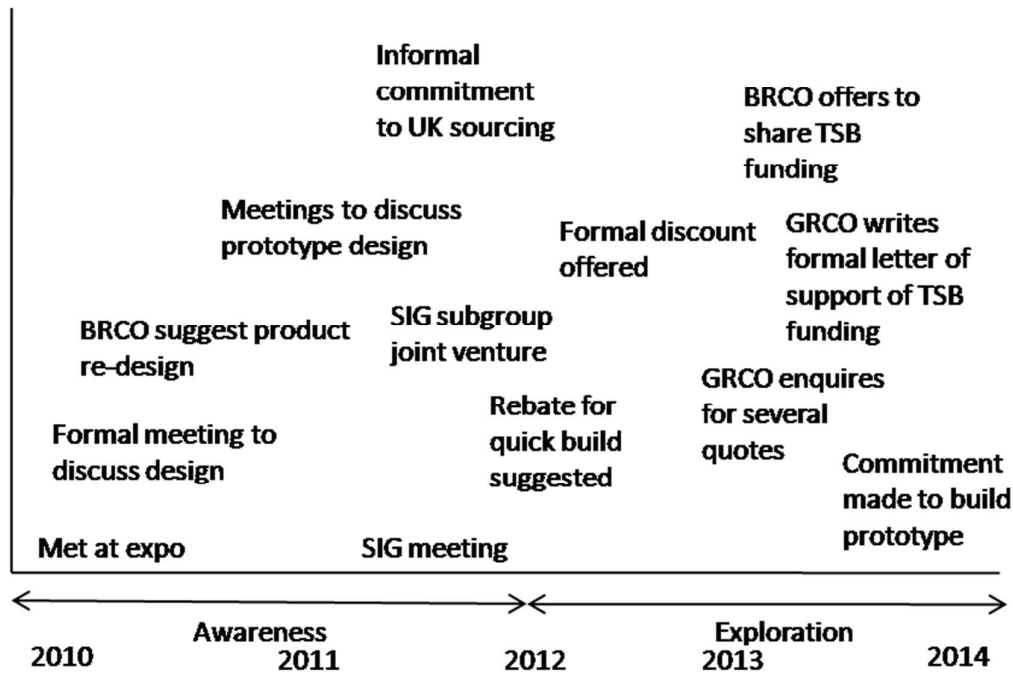


Figure 3: Relationship life-cycle of BRCO-GRCO

Awareness stage

GRCO was an experienced market leading construction company but had never undertaken a project in the OSW industry. Both BRCO and GRCO had been *aware* of each other years previously as they worked on initiatives in other industries such as construction, rail, and road industries. These initiatives involved staff in other departments of the organisations while the OSW departments were newly developed teams in both organisations. GRCO were attempting to enter the OSW industry as a concrete gravity solution (CGS) provider, their customers would be the developers also known as the big energy companies. GRCO were looking to develop a supply chain for CGS that involved relationships with UK ports, steel manufacturers, aggregate and concrete suppliers and fabricators. When it came to identifying steel suppliers GRCO had a choice of two main suppliers in the UK as well as suppliers based in China, Turkey and Poland.

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3 BRCO staff first met GRCO at a conference in early 2010, contact information was  
4 exchanged and BRCO staff felt they had left a good first impression with GRCO. After the  
5 conference BRCO contacted GRCO and suggested a formal meeting take place for BRCO to  
6 give a presentation on their product and to explore possibilities of working together to supply  
7 concrete gravity solutions for the UK's Round 3 OSW projects.  
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12 GRCO had vast knowledge repositories and experience in design work. They had a  
13 partnership with a worldwide reputed construction designer who had thousands of extremely  
14 qualified engineers at their disposal. BRKAM1 was already aware of GRCO impressive  
15 technical capabilities commenting: *"they can design gravity bases without the need for*  
16 *prototyping"*. GRCO agreed and invited BRCO to their offices in London, the key account  
17 manager and two technical team members gave a presentation on BRCO's history,  
18 experience and key capabilities. During the meeting GRCO shared the design specifications  
19 of the current design of their CGS.  
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24 When staff from each company met face to face at GRCO headquarters a close social bond  
25 began immediately. During the meeting GRCO shared information on the design  
26 specifications of the CGS they were going to propose to their potential customers, the  
27 developers. BRCO explained that they had a lot of knowledge and experience in the steel  
28 industry, especially in the reinforcement sector, they had strong technical and design  
29 knowledge, knowing the best time to buy in the market, also the ability to offer low risk  
30 supply chain solutions and being UK based were key complementarities to bring to the  
31 relationship. BRKAM1 convinced GRCO to share their CGS design specifications in order to  
32 attempt improving the design in terms of cost and speed to manufacture. A presentation was  
33 given on BRCO's new product that was suggested to be used for GRCO's prototype due to its  
34 benefits of needing less rebar and being able to be produced at a faster rate, shaving  
35 approximately 10% of the cost of the customer's original design. BRKAM1: *"we are not*  
36 *trying to sell them a product, we are trying to sell them less of it, unlike our competitors who*  
37 *may add on more rebar to the design to make more money"*.  
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42 After several months BRCO created a new CGS design that resulted in using 10% less  
43 rebar which not only saved costs in terms of less rebar but also reduced the build time of the  
44 CGS. This gave GRCO confidence in the capabilities of BRCO and identified common  
45 ground between the two companies, where they both offered mutual benefits to each other.  
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Meetings between key account managers, technical staff, and logistics managers carried on throughout 2011 developing relationship specific routines and bonding socially until senior management from both companies decided to meet to discuss discounts regarding the building of a prototype; *“This escalated the relationship to a higher level”* commented BRKAM1. GRCO saw the ability of BRCO to add value to the relationship and decided to arrange several meetings to discuss the building of a prototype CGS together. This started the *exploration* stage.

*Exploration stage*

To show their commitment and views of a long term partnership with GRCO, BRCO suggested a rebate system, where if they were able to reduce the amount of time taken to build a CGS, the cost savings would be quantified and for each CGS built within that specified time both companies would share the costs saved. BRKAM1 commented: *“it is an incentive for everybody to get it right”*. In their tender to the energy companies GRCO included their quote for rebar but explained they would be able to reduce it by 10% using BRCOs new product.

In early 2013 BRCO offered a formal discount to GRCO for building their prototype. *“BRCO has offered support to these key players in terms of giving discount on their rebar for demonstration projects ... We want anyone of these companies to build one and stick it in the water and say that it works”*, commented BRKAM1. BRCO then asked GRCO to write a formal letter of support for their funding application to the Technology Strategy Board. GRCO signed the letter of support for BRCO’s new product funding application, a commitment to involve them in the project. BRKAM1: *“he is older than me but has a young outlook, he is a reluctant collaborator but knows that he has to collaborate for the projects to work ... [GRCO] were the proactive company who offered to give BRCOs product a letter of support, unlike the other companies”*.

There were strong compatibilities between the partners. A major factor contributing to the signing of the agreement was the close personal relationship that existed between the director of GRCO and key account manager of BRCO. BRKAM1: *“The best relationship we have is with GRCO, me and the director are good friends ... He is a very difficult individual but we*

are similar people so we get on well ... The UK director of [GRCO] is the reason why [GRCO] has written a letter of support for the development and testing of BRCOs product". The trust was reciprocated when BRCO said they would share any further funding they received with GRCO. BRKAM1: *"I said to the director of GRCO that if we get another £300,000 funding and you do want to build a prototype, you can have some of the funding"*.

A month later the funding application was submitted by four companies, CECO (steel mill), BRCO (fabricator), ARCO (material testing facility), and the welding institute to test BRCO's new product. All four companies submitted a joint funding application for BRCOs new product. GRCO had made a commitment to sourcing the majority of their steel from the UK market, which aligned with the supplier's strategy of increasing UK content and ensuring sustainable sourcing of steel. They recognised that BRCO also shared the same values and goals and was able to support their strategy.

GRCO was a tougher negotiator compared to BRCO's other customer's, even with close personal relationships negotiations would be a challenge. GRCO demanded all the sustainability features that BRCO offered but wanted them at a lower price than what was offered. BRKAM1 commented: *"[GRCO] are more maverick, they will choose to take the sustainability route with BRCO however they are likely to squeeze the price down"*. Nevertheless, the relationship between the two companies was not able to grow due to uncertainty in the industry. As a result of political uncertainty, GRCO put their operations on hold; GRCO's commercial director commented; *"we are not doing anything until we get an order for a reasonable number of CGS, 300 at least"*. GRCO has committed to sourcing the majority of steel from the UK market, which fits with BRCO's strategy of increasing UK content and ensuring the sustainable and responsible sourcing of steel.

#### 4.2 Cross-case analysis

This study discovers that all three suppliers hoping to enter new markets undertook vast investment in the exploration stage to build up trust of their customers and remove uncertainty; however, this doesn't always guarantee a long-term committed relationship. There were similarities between the cases in terms of efforts made to reduce uncertainty during the exploration stage. This study discovers the importance of updating orders and sharing cost information to make the initial relationships more stable. The repeated

interactions between two firms enhanced the effectiveness and efficiency of the interaction by creating mutual understanding of routines and processes (Dyer and Singh, 1998). Dealing regularly with each other enabled the teams of staff to develop efficiency-enhancing routines that helped organise the partnership and develop methods for joint problem solving and conflict resolution. Two firms overcame incompatibility and developed relational-specific absorptive capacity where regular knowledge transfer routines would take place, facilitating the learning process, which increased the level of compatibility and trust in the dyad.

During the exploration stage the customers who were new to the OSW sector were more willing to make investments in their relationships with suppliers, especially to gain knowledge and expertise from the supplier and build up their capabilities. The suppliers could offer the customer their knowledge and expertise in the sector as well as leverage their relationships with UK government OSW bodies and UK ports. Despite the differences in culture and organisational hierarchies, both the supplier and customer worked closely together to remove any uncertainties in their relationship which built a strong bond of trust between them. The MOCO-SACO relationship is a good example with incompatibility in culture but technological and market complementarity drove efforts to overcome incompatibility. The willingness to invest and create this specific “lock-in” relationship is partly due to the complementarity effect as well as the fact that both MOCO and SACO needed to demonstrate to the market that they had capability in developing newer and larger turbines. Product and process innovations created in the exploration stage and started the expansion stage. In summary, this suggests that the exploration stage requires the building of trust by increasing compatibility in order to assess the knowledge of a partner and evaluating complementary resources and longer-term intentions.

The two key enablers of relationship development in the exploration stage were trust and willingness to take risk and overcome incompatibilities. Incompatibilities in culture and value could deter relationship formation. However, when the market and technological complementarity levels were high suppliers and customers worked together to overcome incompatibilities during the selective process by sharing information and providing support to each other. For example, two customers, SACO and GRACO, had to take more risk by investing in the relationships while hoping to get new OSW projects in the UK. TACO introduced joint initiatives that would help to improve MACOs lead times, reduce the amount

of stock held and improve MACOs cash flow (a process innovation). MACO trusted TACOs complementary product and process knowledge helped improve MACOs product quality and reduce their costs and so MACO were always open to suggestions to work on future joint initiatives with TACO and expected their relationship to be long-running into the future. High levels of cultural compatibility as well as technological complementarities (technical product and process knowledge) between GRCO and BRGO increased the level of information sharing and built trust, and led to a formal letter of support for funding BRGOs new product and further discounts, yet due to political situation an order was not made.

In all cases complementarity in product and technology as well as willingness to invest, especially by the suppliers from the outset helped build the necessary foundation of trust to the exploration stage. Conversely, for all cases the opportunity to enter the expansion stage was curtailed by political uncertainty faced by their customers. Further, partly due to the uncertainty faced in the UK OSW market, knowledge and resource sharing initiatives between partners began earlier in the exploration stage, unlike in the commitment stage suggested by Vanpoucke *et al.*, (2014). Albeit the exploration stage usually focuses on contract and price negotiations, this study found that collaborative activities also began earlier in this stage rather than in the expansion or commitment stage. The results of this study support Palmatier *et al.*, (2013) that relationship age does not provide a clear indication of relationship development stage and that relationships move through stages at different rates. Hence, the role of the manager is not only negotiator but also 'relationship' manager in the exploration stage.

## 5. Discussion and conclusion

There are abundant studies of inter-firm relationship formation using concepts such as compatibility, complementarity, and relationship life-cycle. This study is unique because it involves formation of new inter-firm relationships facing the high market risk and political uncertainty in OSW sector where customers seeking innovative solutions from new (and existing) suppliers. Previous studies often only compare compatibility and complementarity using cross-sectional studies but the use of longitudinal case studies has allowed us to understand how compatibility and complementarity could be enhanced (or decreased) along relationship cycle. In addition, this study extends previous studies of inter-firm relationship life-cycle by revealing how compatibility and complementarity being managed (or mis-



managed) could have an effect on trust, information sharing, and relationship development, and vice versa.

Particularly, we discover some insights into trust during the early stage of an inter-firm relationship. Since customers attempted to find suppliers who could develop new innovative solutions that are more effective and economic, the progression of the relationship from awareness stage to the exploration stage required a lot of trust through risk taking. Although the relationship expansion stage is characterised by trust building and expectation of realising benefits through joint initiatives (Vanpoucke *et al.*, 2014) and discovering and testing described by Jap and Anderson (2007), this paper found that these activities start much earlier in the life-cycle, where potential partners undertake trust-building exercises and give expectations on shared benefits in the exploration stage. Instead, developing trust earlier enabled them to be more prepared for when the political situation becomes clear, this is supported by Narayandas and Rangan (2004) who found trust should be created first “to enable the parties to proceed to executing the informal commitments implicit in their psychological contract, which then set the stage for the establishment of formal commitments” (p.72).

Our analysis agrees with the existing literature that time spent during one stage of the inter-firm relationship varies greatly and it cannot be used as an accurate proxy for the success of the relationship. Despite all the relationships discussed in this case being in their very early stages, there was significant variation in the duration of stages for different relationships. While some relationships took three years to reach near the start of the expansion stage, others spent the same amount of time but remained in the awareness or exploration stages, implying that different relationships have different growth speeds, even though many of the customers were equally unable to place an official order owing to political uncertainty in the OSW market. We discover that innovation complementarity is one of the main reasons customers invest in new relationships, where they can explore innovative solutions from new suppliers as well as to learn new capabilities from other sectors. Suppliers seek to form relationships with a longer-term goal in mind and so make more efforts to reduce incompatibilities and develop joint complementary innovations. When both compatibility and complementarity levels are high trust is built allowing firms to pass through relationship development stages at a faster rate.



The study provides some implications to existing theories. Although the study shows favour to the RV relationship life-cycle theory that relationship stages may go back and forth we also find that the life-cycle could be terminated (and re-ignited) at the exploration and expansion stage, for example, owing to market and political uncertainty. Furthermore, the search for innovation complementarity requires a lot more trust at the early stage of a relationship than previously thought. Such a trust, which is also essential for a lock-in situation for longer-term alliance, could be increased by working together to enhance compatibility and complementarity and showing willingness to take risk. Matching theory provides interesting concepts for analysing compatibility and complementarity where this study shows that firms attempting to seek complementary innovation should be prepared to invest in building the relationship by sharing more risk, information and showing more willingness to address incompatibility issues at the very beginning. These steps could also reduce risk. The study shows that a nascent industry such as OSW can generate innovations by allowing new entrants to form new inter-firm relationships. These insights inform energy sector policy particularly for the OSW sector to encourage new entrants and inter-firm alliances.

Whilst research should aim for generalisability, this study focused on early stage inter-organisational relationships and did not analyse relationships in the committed or decline stage. Another limitation is that the study uses retrospective data collection. Even as reliability was improved through multiple data collection techniques, the study restricted the ability to gain a micro-level understanding of events and processes. To further elaborate on this study, real-time research is suggested. One more limitation is that the study uses retrospective data collection.

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