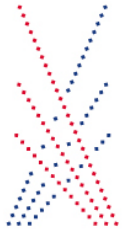

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Offshore outsourcing innovation in SMEs: A 4F perspective of Governance

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ABSTRACT

This study examines the effect of contractual and relational governance alternatives on offshore outsourcing innovation (OOI) performance in SMEs. We develop four governance types involving contract complexity and relational trust - *fit*, *firm*, *flexible*, and *fragile (4F*). Each type has different capacity of outsourcing efficiency and innovation adaptability. Our analysis of 200 dyadic OOI relationships among SMEs in Germany, Italy, United Kingdom (UK) and France suggests that, in practice, SMEs choose to maximise and balance both contract complexity and relational trust to enhance OOI outcomes. Findings from this research inform that detailed and complex contracts and extensive relational trust are more than necessary conditions for the establishment, continuation and success of OOI relationships. In addition, our results indicate that the robustness of governance mechanisms of interfirm OOI can be strengthened through partnering factors (e.g. formal knowledge routines, supplier joint actions), which can significantly contribute to shaping OOI performance.

Keywords: SMEs, Outsourcing innovation, Offshoring, Contract complexity, Relational trust, Governance Types

Introduction

Firms of all sizes are increasingly engaging in outsourcing relationships as a strategic source of collaborative innovation (Whitley and Willcocks, 2011). In light of these domestic as well as offshore outsourcing innovation activities, firms are gaining access to suppliers' know-how, competitive advantages and tapping into global markets of knowledge and talents (Bertrand and Mol, 2013, Lewin et al., 2009, Sartor and Beamish, 2014). The strong trend towards adopting offshore outsourcing innovation (OOI) strategies has gained its momentum since the early 2000s (Lewin et al., 2009). However, the phenomenon has received more research attention in the context of large firms than in the case of SMEs (Gusenbauer et al., 2015, Musteen and Ahsan, 2013). The limited number of studies that have researched SMEs have documented a growing shift in SMEs' innovation strategies towards involving offshore suppliers in their innovation processes (Lee et al., 2010, Musteen and Ahsan, 2013, Rodriguez and Nieto, 2016, van de Vrande et al., 2009). Further, OOI has been proven to improve SMEs' innovation capabilities (van de Vrande et al., 2009); enhance their international competitiveness (Di Gregorio et al., 2009); and stimulate greater sales growth for SMEs when compared to in-country outsourcing innovation activities (Rodriguez and Nieto, 2016).

Despite the growing benefits for SMEs from OOI, managing such innovation activities through offshore outsourcing relationships presents SMEs with some trade-offs between improving innovation performance and reducing costs (Bengtsson et al., 2009). Also, while accessing suppliers' tacit knowledge via outsourcing innovation can improve SMEs' innovation speed to market, it involves a significant risk of sensitive knowledge spill over and loss of competitive advantage (Aubert et al., 2015, Gooroochurn and Hanley, 2007, Hoecht and Trott, 2006). Accordingly, governance of OOI relationships is of paramount importance to outsourcing SMEs given that (1) outsourced innovations are unpredictable and uncertain (Stanko and Calantone, 2011), (2) offshore suppliers' pose higher behavioural risks (Huq et al., 2014, Mykhaylenko et al., 2015), and (3) offshore countries have different business and institutional environments (Huq and Stevenson, 2018, Martı´nez-Noya and Garcı´a-Canal, 2011, Sartor and Beamish, 2014).

The underlying logic in OOI relationships is that firms pursuing innovation through outsourcing must devise useful interfirm governance structures to mitigate outsourcing innovation risks and improve outsourcing innovation outcomes (Kulangara et al., 2016, Oshri et al., 2015, Sumo et al., 2016, van der Valk et al., 2016, Wang et al., 2011). Within the context of medium and large firms, van der Valk et al. (2016) document that contracts and trust are necessary to achieve medium or high levels of innovation in buyer-supplier relationships. Additionally, Pittino and Mazzurana (2013) conclude that SMEs tend to rely on relational governance in innovation exploitation alliances, but they use both contractual and relational governance in case of exploration innovation alliances. Our study extends this line of research by specifically investigating how SMEs implement different types of contractual and relational governance to enhance innovation performance of offshore outsourcing relationships. Accordingly, for this study, we conceptualise OOI performance concerning product and process innovations delivered as a result of the SME-offshore supplier dyadic exchange including new or enhanced products and processes and new product speed to market (Jane, Kim and Sinkovics, 2012).

We specifically chose the context of buyer-supplier OOI relationships in manufacturing SMEs. Since offshore manufacturing outsourcing relationships are adequately studied as productive outsourcing structures, they do provide a rich medium to explore how such relationships are governed to enhance co-value creation, and subsequently deliver innovations at the dyadic level (Laursen and Salter, 2006). We envision OOI as an act of

transferring part or all product and process innovation activities to a foreign supplier (Gusenbauer et al., 2015). In line with previous interfirm governance research, we operationalise contract complexity as our proxy for contractual governance (Poppo and Zenger, 2002). We operationalise relational trust as our criterion for relational governance (Gulati, 1995, Saparito et al., 2004, Zaheer et al., 1998). Also, with the belief that the effect of these governance mechanisms could be contingent on other factors, we examine the moderating effect of two partnering norms – formal knowledge routines and supplier joint actions. Furthermore, we test for complementarity between contract complexity and relational trust.

Our study makes significant contributions to research on OOI in the context of SMEs. First, SMEs are not simply small versions of large firms (Gusenbauer et al., 2015). Therefore, results from outsourcing innovation studies that have examined governance types in large firms might not apply to SMEs. With this in mind, the present study contributes to the literature of OOI in SMEs by revealing alternative governance types of OOI relationships in SMEs. Specifically, the 4F governance scenarios – *fit, firm, flexible*, and *fragile* – introduced in this study emphasise the need for a combination of contract complexity and relational trust mechanisms. Second, our results highlight the importance of adopting both contractual and relational governance mechanisms to enable outsourcing innovation strategies in accessing external suppliers' key innovation resources and competencies. Despite SMEs' small size characteristics and lack of sufficient resources, this finding showcases that majority of the SMEs follow large firms in devising dual interfirm governance that mitigates suppliers' opportunism while simultaneously ensuring their positive engagement in delivering product and process innovations.

Nevertheless, SMEs tend to maximise and balance contract complexity and relational trust leveraging their high propensity to trust without falling into blind trust traps. Moreover, though SMEs will control the costs of crafting, enforcing and adjusting OOI complex contracts, they will not venture unguarded into risky OOI relationships. Hence, this study also adds to our understanding of the differences between SMEs and large firms.

Theory and Hypotheses

Transaction cost economics and relational view perspectives

Drawing upon the underlying complexity of outsourcing innovation, extant literature advanced that firms outsourcing innovation are usually confronted with two contrasting approaches. The first approach is in favour of limiting suppliers' involvement in the innovation process to non-core and low-cost innovative activities. This approach is a common practice during the transformation of innovation knowledge into real innovation (e.g. outsourcing design and prototyping services) (Roper et al., 2008) and is consistent with transaction cost economics (TCE). The second approach, however, values supplier's early involvement in the innovation process due to supplier's specific and strategic competencies as in the case of specialised first-tier suppliers in the automotive industries (Dyer, 1996, Sako, 1994). With this approach – which structurally and systematically integrates the suppliers in the buyers' innovation process – prohibitive transaction costs are looming. Therefore, firms adopting this approach are motivated by survival or growth considerations that are stronger than transaction cost economics (Gooroochurn and Hanley, 2007, Lavie, 2006).

Williamson (1991) proposed that with outsourcing innovation a variety of disturbances are co-occurring thus timely, coordinated and efficient responses are needed. The relational view of Dyer and Singh (1998) offers an alternative conceptual foundation for such outsourcing innovation relationships. Dyer (1996) documented that firms are continually using collaboration to expand their competencies. In OOI, the buyer firm gains access to suppliers' expertise, tacit knowledge and intangible assets which are usually difficult to produce internally and not readily available to buy through arm's length ties (Dyer and Singh,

1998). Consequently, trust centred approach in managing inter-organisational relationships is vital in situations characterised with uncertainty and ambiguity such as in the case of OOI (Madhok, 2006).

Through the lenses of these theories, we focus on examining SMEs choices and application of effective contract complexity and relational trust governance to render their OOI relationships more conducive to innovation. Accordingly, the proposed theoretical model of the study, as shown in Figure 1, postulates that OOI performance is enhanced through effective dual governance of contract complexity and relational trust. Moreover, the research model incorporates the potential effects of formal knowledge routines and supplier joint actions as partnering routines on the strength of governance mechanisms in generating product and process innovations as a result of the OOI relationship.

[Insert Figure 1 about here]

Contract complexity

Contracts are unavoidably complex in case of OOI given the higher degrees of asset specificity, behavioural uncertainty, performance ambiguity and risks of outcome (Bidault and Castello, 2010, Poppo and Zenger, 2002, Stanko and Calantone, 2011). In this research, we define contract complexity as the formal buyer-supplier contract which details parties' "roles and responsibilities, specifies procedures for monitoring and penalties for noncompliance, and, most importantly, determine outcomes or outputs to be delivered" (Poppo and Zenger, 2002 p708). Previous studies suggested that complex contracts scoping outsourcing relationships for new product development (NPD) can enhance the performance of these relationships. For example, contracts are useful instruments to measure the performance output of the offshore supplier (Stanko and Calantone, 2011). Moreover, contracts can enhance outsourcing innovation performance by setting ex-ante objectives which in turn help to keep suppliers motivated and focused on meeting the OOI goals (Carson, 2007). Furthermore, complex contracts of strategic outsourcing act as an insurance policy since they serve as legal safeguards against wrongdoing (Hoecht and Trott, 2006). In a recent study, van der Valk et al. (2016) found that detailed contracts not only safeguard against ex-post performance issues but also are good facilitators of knowledge transfer and can improve innovation outcomes in buyer-supplier relationships. Moreover, SMEs could employ formal contracts in exploration innovation alliances as a necessary control mechanism to compensate for their small scale vulnerability in foreign markets and dependencies on external suppliers (Pittino and Mazzurana, 2013). Therefore,

> *H1: Contract complexity in OOI relationships positively affects OOI performance in SMEs.*

Relational trust

In this research, we define relational trust as the trusting party's (i.e. SME outsourcing firm) faith that the other party (i.e. offshore supplier) in the OOI relationship will act in favour of the outsourcing firm's welfare (Saparito et al., 2004, Ring and Van de Ven, 1994). To that extent, relational trust is a measure of benevolence or the non-calculative component of trust (Mayer and Davis, 1995). It reflects the level of an SME's confidence that its offshore supplier will choose collective-gains over self-gains when the possibility for opportunistic behaviour is present (Gulati and Sytch, 2008, Zaheer et al., 1998).

The relational trust provides an effective means to manage the interdependence between the two firms, allowing effective pooling of complementary tacit knowledge resources under reduced fears from opportunism (Dyer and Singh, 1998). The relational trust also explains firms' behaviour in making business decisions that impact their interfirm

relationship outcomes beyond their contractual obligations (Saparito et al., 2004). For example, Bidault and Castello (2010) proposed that the interpersonal nature of relational trust highlights the role played by executives involved in managing interfirm innovation projects in how they adapt their decision-making process to accommodate various contingencies and risks of OOI activities. Moreover, SMEs benefit more than large firms from relational trust-based interfirm relationships given the dominant role of SMEs' entrepreneurs in managing these relationships. Consistently, Pittino and Mazzurana (2013) found that trust, among other relational governance norms, is increasingly adopted by SME managers to control and coordinate innovation alliances, primarily due to their resource disadvantage in crafting and monitoring complex contracts. Thus, we propose the following hypothesis:

H2: Relational trust in OOI relationships positively affects OOI performance in SMEs.

The interaction between Contract Complexity and Relational Trust

Interfirm research has concluded that in managing buyer-supplier cooperative relationships firms cannot in practice rely exclusively on either contract complexity or relational trust (Poppo and Zenger, 2002, Ring and Van de Ven, 1994, Ring and Van de Ven, 1992). Also, the added complexity of managing OOI relationships related to both behavioural and outcome risks seems to call for a purposeful combination of contract complexity and relational trust (Carson, 2007, Hoecht and Trott, 2006). It is well known that innovation requires tacit knowledge disclosure and highly specific investments with significant hold-up risks (Gooroochurn and Hanley, 2007). Therefore, there is a greater need for contract complexity to motivate tacit knowledge exchange and innovation investment decisions, as well as mitigate their inevitable risks (Gooroochurn and Hanley, 2007, Poppo and Zenger, 2002). At the same time since innovation is expensive, risky and uncertain, increased levels of relational trust emerge as a necessary condition to promote non-calculative investment behaviour and overcome adaptability limits of complex contracts (Kulangara et al., 2016, Poppo and Zenger, 2002).

Contract complexity employs legal means in the specification of contingencies, adaptation, and mitigation of opportunistic behaviour (Williamson, 1979, Williamson, 1991). On the other hand, relational trust utilises personality traits to guarantee the intent of mutuality, bilateralism, and continuation in the face of unforeseen contingencies (Bradach and Eccles, 1989, Zaheer et al., 1998). Therefore, combining both mechanisms, not only compensates for contract incompleteness and avoids the dark side of relational trust (i.e. distrust), but also captures both mechanisms' synergetic value through reduced control and coordination costs and improved OOI performance (Poppo and Zenger, 2002). Thus, we advance:

H3: Contract complexity and relational trust act as complements in SMEs OOI relationships.

The moderating role of formal knowledge routines

Accessing the offshore supplier's tacit knowledge and pooling them with the outsourcing SME's tacit knowledge is a central premise of OOI (Hoecht and Trott, 2006). This is especially true in case of OOI in SMEs since it grants SMEs access to skills and resources that reside with offshore suppliers but strategically essential for their survival and growth (Rodriguez and Nieto, 2016). However, accessing the offshore suppliers' tacit knowledge come at the risk of the buyers' tacit knowledge leakage, which is often a source of tension between governance efficiency and innovation performance in OOI relationships (Aubert et al., 2015, Lai et al., 2009). The contract theories established that while contract complexity deploys contractual control to protect both parties) from self-interested behaviour of

exploiting each other's tacit knowledge (Williamson, 1979, Poppo and Zenger, 2002, Lai et al., 2009), complex contracts can, however, discourage suppliers from sharing their tacit knowledge and hence derail OOI performance (Cui et al., 2009, Hoecht and Trott, 2006). In a similar vein, the relational trust literature documented that trusting interfirm relationships is characterised with high levels of tacit knowledge exchange (Hansen, 1999, Levin and Cross, 2004). Nevertheless, cultivating and maintaining trusting relationships require dedicated top management resources, substantial relationship-specific investments, close links and long-time (Levin and Cross, 2004, Paulraj et al., 2008, Cui et al., 2009, Bidault and Castello, 2010).

To address these opposing alternatives, Noordhoff et al. (2011) and Roy and Sivakumar (2011) suggested the introduction of formal knowledge exchange routines to explicitly manage the process of interfirm tacit knowledge exchange including: (1) knowledge accessing, (2) knowledge exploiting, and (3) knowledge protection. For example, Noordhoff et al. (2011) added that the formalisation of knowledge exchange conveys a higher level of commitment in the relationship and reduces dyadic parties' worries about opportunism. Furthermore, Roy proposed that firms pursuing innovation through offshore outsourcing need to be aware of the implications of their formal OOI contracts on intellectual property (IP) management. Also, Kloyer and Scholderer (2012) concluded that contractual allocation of IP rights to suppliers who contributed the most to an innovation generation has a strong positive influence on the collaboration output.

Similarly, formal knowledge routines can quantify the value of parties' trustworthy behaviour through structural tacit knowledge exchange which institutionalises transparency and alleviates perceived risks of tacit knowledge misappropriation or "free riding" behaviour (Mayer and Davis, 1995, Hansen, 1999, Levin and Cross, 2004). Moreover, managing cross-border relationship is difficult due to the physical, institutional and cultural distances with the foreign markets (Jane et al., 2012, Pawar et al., 2018). Consequently, formal knowledge routines are likely to stimulate the role of relational trust in SMEs' OOI relationships by levelling the tacit knowledge sharing and protection playfield with offshore suppliers (Baker et al., 2015). Formal knowledge routines can moderate the positive relationship between relational trust and OOI performance in the absence of a long history of exchange (Lai et al., 2016). Summing up, it is likely that in the context of OOI in SMEs, formal knowledge routines can act as a useful tool in managing contract complexity and relational trust by delivering high OOI performance from implementing these governance mechanisms under conditions of structural knowledge exchange. The above discussion provides the foundation for the following hypotheses:

> ***H4a:*** *Formal knowledge routines positively moderate the effect of contract complexity on OOI performance in SME.*
>
> *H**4b**: Formal knowledge routines positively moderate the effect of relational trust on OOI performance in SME.*

The moderating role of supplier joint actions

As we discussed earlier, given the underlying complexity of OOI transactions, the use of dual governance of contract complexity and relational trust is unavoidable (Poppo and Zenger, 2002). However, while these governance mechanisms act as devices for the control and coordination of buyer-supplier relationships, partnering norms such as joint actions act as strong incentives for buyers and suppliers to exercise control and coordination (Heide and John, 1990, Whipple et al., 2010, Flynn et al., 2010, Kloyer et al., 2018). Specifically, supplier joint actions are likely to add greater value to the alignment and effectiveness of governance mechanisms in OOI relationships (Mooi and Ghosh, 2010). Offshore suppliers perceive such actions as strong indications of the buyer SMEs willingness to "give and take"

and their consideration of the suppliers' interests (Nyaga et al., 2010, Whipple et al., 2010, Liu et al., 2010).

Previous studies documented that rewarding suppliers for improved performance and outcomes are thought to have a positive effect on the suppliers' efforts and behaviour towards the buyers' interests (Krause et al., 2000, Shepherd and DeTienne, 2005). In OOI, such rewards can include the SME-supplier joint activities aimed at suppler development such as working with the supplier to reduce its costs, improve its quality and train its personnel. Specifically, SMEs' focused efforts to improve the offshore supplier profit and performance in the OOI relationship can be more effective given the difficulty of performance measurement and the uncertainty of OOI outcomes (Felin and Zenger, 2014, Lai et al., 2016, Mooi and Ghosh, 2010). Therefore, the incentivising nature of supplier joint actions can ensure the supplier efforts to fulfil complex contracts and encourage its contributions to OOI performance (Mooi and Ghosh, 2010, Lui et al., 2010). In contrast, in the absence of such incentivising actions, suppliers are likely to fear SMEs' wrong behaviour and consequently avoid contractual compliance and provide less than expected OOI performance (Mooi and Ghosh, 2010).

Similarly, as supplier joint actions in OOI become increasingly oriented towards securing economic gains for the offshore supplier, such interactions will moderate the impact of socialisation on OOI performance (Lui et al., 2010). For example, working jointly with the offshore supplier innovation team during site visits, joint training programs and frequent technical meetings will encourage the offshore supplier desirable contributions to OOI and can further enhance the effect of relational trust on innovation (Jane et al., 2012, Kulangara et al., 2016). Also, following the rationale of trust research, intense and formalised social interactions through supplier joint actions increase the offshore supplier willingness to contribute to OOI success even before building relational trust through long exchange history (Mayer and Davis, 1995, Levin and Cross, 2004). Moreover, through supplier joint actions, SMEs claim an attractive partnering stance which signifies the effect of the offshore suppliers' perceptions about the SMEs trustworthiness and boost the degree of the offshore suppliers' commitment towards achieving OOI success (Liu et al., 2012, Koufteros et al., 2012). In contrast, the lack of supplier joint actions will challenge the quality of relational capital in OOI relationships and hinders the latter chances of continuation and success (Lui et al., 2010). Following this reasoning, we forward the following hypotheses:

H5a: *Supplier joint actions positively moderate the effect of contract complexity on OOI performance in SME.*

H5b: *Supplier joint actions positively moderate the effect of relational trust on OOI performance in SME.*

Methodology

The empirical context of the present study is OOI relationships between a developed European country SME buyer and an offshore supplier. For data collection, we used a cross-sectional survey in line with previous studies with similar sampling populations and context (e.g. Van de Vrande et al. (2009) which studied open innovation trends in SMEs in the Netherlands). Our unit of analysis is the SME-offshore supplier dyad.

Sampling and data collection

We designed and administered the study's survey using online survey tools that allowed us to collect data in a shorter time as well as at less cost. The survey targeted manufacturing SMEs in four developed European countries - Germany, Italy, United Kingdom (UK) and France. According to the European economic statistics, the SMEs manufacturing sector in Europe

included more than 2 million enterprises and generated € 725 billion or 44.5% of the manufacturing sector value added in 2013 (Eurostat, 2016). Moreover, in 2014, SMEs contributed 26.3% to the manufacturing sector value added in Germany, and from 10.5-14.5% in Italy, UK and France (Eurostat, 2017). Furthermore, the European innovation data stated that 49.1% of all European enterprises had reported some form of innovation activity between 2012 and 2014 (Eurostat, 2017). The report added that the same percentage was consistent among the SMEs population.

To ensure that all respondents and firms are qualified in accordance with the study context, only firms that fit the European Union (EU) definition of SMEs (i.e., having a total number of employees between 10-249 and an annual turnover of more than €2 to €50 million) were included (European Commission, 2016). Additionally, the survey excluded SMEs with captive or equity-based OOI relationships, as the main aim of the research is to examine OOI in a buyer-supplier context. The buyer-supplier context is more relevant to SMEs given their limited resources, as well as their higher sensitivity to risks of foreign direct investments (FDIs) compared to large firms (Rodriguez and Nieto, 2016, Gusenbauer et al., 2015). We involved top management respondents from SMEs buyer firms. Key executives, especially in case of SMEs, are usually in charge of establishing and managing strategic relationships given the tight scale of management in SMEs and the complexity surrounding OOI (Gusenbauer et al., 2015, Bidault and Castello, 2010).

Furthermore, using key informants from the buyer side is a widely adopted practice in strategic management and operations research (Carr and Pearson, 1999, Paulraj et al., 2008). Our initial sampling frame included 2,384 firms. A total of 1,466 firms were screened out since they did not meet the SME size criteria or the study criteria for non-equity OOI governance mode, resulting in a final sampling frame of 918 firms. We instructed respondents to select a significant offshore supplier with whom they have ongoing outsourcing innovation relationship to increase the validity of the respondents' perceptional views about their offshore suppliers. After screening out incomplete responses and responses that failed quality checks, the final sample contained 200 firms, giving an effective response rate of 21.8%. The characteristics of the SMEs sample are listed in Table 1.

[Insert Table 1 about here]

Measures

We developed our cross-sectional survey using multiple item measures based on extant research. The study's cross-sectional survey used a 7-point Likert scale with endpoints "1= strongly disagree" and "7= strongly agree". Prior to data collection, we sent the survey link to eight SMEs manufacturing executives and asked them to complete the survey. We then contacted them and requested their feedback about the survey language, structure and coverage of the examined constructs. The final survey incorporated some changes based on the feedback we received from the expert practitioners.

"Contract complexity" was operationalised by four items. Two items from (Poppo and Zenger, 2002) measuring the extent of contract length and customisation, and two items from (Ferguson et al., 2005) measuring the number of rules and regulations included in the contract and the contract's degree of adaptability. We operationalised "relational trust" through four items measuring the outsourcing SME perceptions on whether the offshore supplier keeps its promises, is sincere, is concerned about the outsourcing SME's welfare (Kwon and Suh, 2004), and has been evenhanded in its negotiations with the outsourcing SME (Zaheer et al., 1998). We measured "formal knowledge routines" with four items examining the extent to which the outsourcing SME relies extensively on contractual knowledge exchange rules, follows written procedures in most aspects of knowledge sharing (Noordhoff et al., 2011),

establishes ground rules about knowledge exchange (Smeltzer, 1997), and uses a common information technology (IT) software to control knowledge sharing (Kwon and Suh, 2004). We operationalised "supplier joint actions" using a three-item scale measuring the extent to which the outsourcing SME is working with the offshore supplier to reduce its costs, improve its quality, and train its people (Joshi and Stump, 1999).

Finally, we measured OOI as our performance variable using four-item scale measuring OOI performance concerning new or enhanced products and processes, new product speed to market, and rate of patent applications (Rindfleisch and Moorman, 2001, Roy and Sivakumar, 2011, Jane et al., 2012).

Control variables

OOI relationships are cooperative in nature, and hence they can evolve and grow from transactional (short term) to collaborative (long term) relationships through accumulation of relational trust and reduction of fears from opportunism (Vivek et al., 2009, Ring and Van de Ven, 1994, Ring and Van de Ven, 1992). Therefore, we identified relationship longevity and respondent's length of experience (manager tenure) with the SME outsourcing firm as our first two control variables (Gulati and Sytch, 2008, Poppo and Zenger, 2002). We measured longevity and manager tenure as the natural logarithm (Lincoln and Guba, 1985) of years of dyadic relationship and manager's years of experience respectively (Gulati and Sytch, 2008, Poppo and Zenger, 2002). Also, we controlled for three categorical variables of firm size (small or medium), SMEs' country, and industry technology intensity following OECD technology intensity and industry classifications (OECD, 2011).

Common method bias

Since we collected data from a single respondent within each of the surveyed SMEs, we wanted to ensure that common method variance was not a concern. First, we conducted Harman's one-factor test (Podsakoff et al., 2003). If common method variance is substantial, then either a single factor will emerge from the factor analysis or many factors will emerge, but with only one factor accounting for the majority of the variance. The un-rotated factor analysis resulted in four distinct factors with Eigenvalue greater than one; while these four factors accounted for 64.3% of the variance, the first factor accounted for only 38.4% of the variance. As a second test, we ran a single factor confirmatory factor analysis (CFA). The resulted model fit indices for the single factor model – comparative fit index (CFI) = 0.762, Tucker-Lewis index (TLI) =0.722, and root mean square error of approximation index (RMSEA) = 0.124 – were significantly worse than our proposed model (CFI = 0.949, TLI =0.933 and RMSEA = 0.061). Based on these two tests, we can safely conclude that common method bias might not be an issue (Sanchez and Brock, 1996). Furthermore, in a recent study, Kull et al. (2018) argued that while single respondent survey is usually susceptible to biases, they are not very problematic in the case of SMEs, as the narrow management bandwidth in case of SMEs can help single-key respondent research to capture a wider picture of what is happening in these firms.

Confirmatory factor analysis

To establish constructs unidimensionality, reliability, and validity, we conducted CFA using AMOS 20.0. One of the loadings within each latent construct was constrained to a value of one, and an estimation output using maximum likelihood was produced with standardised estimates, residual moments and modification indices. The fit of the CFA for the data was satisfactory with values for model fit indices; normed $X^2 = 1.75$ (≤ 2.0), $p<0.001$, goodness of fit (GFI) = 0.914, adjusted goodness of fit (AGFI) = 0.870, CFI = 0.949, TLI =0.933, standardised root mean square residuals (SRMR) = 0.053; and RMSEA = 0.061.

We established the constructs discriminant validity by comparing the squared correlation between each pair of the constructs in our model to their average variance extracted (AVE) (Fornell and Larcker, 1981). According to this test, the AVE of any two constructs should be higher than the squared correlation between them. As evident from Table 2 and Appendix A, the correlation coefficients of all pairs of constructs are lower than the AVE values of the corresponding constructs. The highest squared correlation of 0.38 (correlation = 0.615) between relational trust and supplier joint actions is lower than their AVE values (i.e., 0.52 and 0.60 respectively). These results sufficiently establish that the theoretical constructs have discriminant validity.

To assess the reliability of the study's constructs, we computed the composite reliability (CR) for all the constructs and found that it was more than 0.70, confirming that items within each construct captured more variance than the variance explained by the error components, and therefore, items are significantly related to their theoretical constructs (Bagozzi and Yi, 2012). Also, with Cronbach's alpha for all constructs ≥ 0.7, constructs' reliability is re-confirmed. Also, computed AVE for all constructs as shown in Appendix A is ≥ 0.50. Taken together we can conclude that the constructs of the study exhibit acceptable convergent validity (Fornell and Larcker, 1981). Table 2 presents descriptive statistics, correlations among the constructs and variable inflation factors (VIFs). During the CFA process, we dropped one item each from contract complexity, formal knowledge routines, relational trust and OOI scales.

[Insert Table 2 about here]

Results

Hypotheses testing

We tested our hypotheses using multiple ordinary least square (OLS) regression analysis in SPSS Statistics 23 (IBM SPSS Version 23.0, IBM Corp. NY, USA). Before creating the interaction terms, we mean centred the variables to reduce multicollinearity (Lee and Cavusgil, 2006). Table 3 contains the results for models 1–5. As shown in table 3, the results of model 1 indicate a significant positive relationship between contract complexity and OOI performance (Beta = 0.168, $p<0.05$), hence supporting hypothesis 1. Also, the results of model 1 support hypothesis 2 by showing that relational trust is significantly and positively associated with OOI performance (Beta = 0.295, $p<0.001$). Furthermore, our results in model 3 show significant and positive moderation effect of formal knowledge routines on the impact of contract complexity on OOI performance. The introduction of formal knowledge routines causes a stronger influence of contract complexity on OOI performance (Beta =0.299, $P<0.01$) when compared to the direct effect of contract complexity (Beta = 0.168, $p<0.05$), providing support for hypothesis H4a. However, the results do not support H4b which predicted a positive moderating effect of formal knowledge routines on the relationship between relational trust and OOI performance. Instead, we found an insignificant negative effect.

[Insert Table 3 about here]

Besides, the results in model 4 support the predicted positive moderation effect of supplier joint actions on the relationship between contract complexity and OOI performance. The implementation of a supplier joint actions seems to strengthen the influence of contract complexity on OOI performance (Beta = 0.189, $P<0.05$) when compared to the direct effect of contract complexity (Beta = 0.168, $p<0.05$), providing support for hypothesis H5a. The results in model 4 however, reject H5b by finding negative insignificant moderation effect of supplier joint actions on the relationship between relational trust and OOI performance.

Finally, in model 5 we include all latent variables and moderators in the regression model. The results of model 5 confirm the prominent effect of formal knowledge routines as an active, positive moderator of the relationship between contract complexity and OOI performance.

To shed further light on this contradictory result, Figure 2 displays a summary of the interaction results, as three-dimensional (3D) surface plots of the second-degree polynomial (non-linear) interaction models of the moderator variables with contract complexity, relational trust and the suggested impact on OOI performance. As shown from the positive and increasing slopes in Figure 2- (a) and (c), between contract complexity and OOI performance at conditions of high formal knowledge routines and high supplier joint actions, the two moderators positively impact the relationship between contract complexity and OOI performance. However, the negative and decreasing slopes in Figure 2 – (b) and (d) under conditions of high formal knowledge routines and high supplier joint actions indicate a negative moderation effect in case of relational trust as the independent variable.

[Insert Figure 2 about here]

The relationship between contract complexity and relational trust

To test for the complementarity relationship between contract complexity and relational trust we used two different tests. The first test shown in Table 3 (model 2), follows the approach of Poppo and Zenger (2002), Lee and Cavusgil (2006) and Pittino and Mazzurana (2013) by introducing an interaction term (contract complexity x relational trust) in an OLS regression analysis after we mean centre the variables in the model to reduce multicollinearity (Lee and Cavusgil, 2006). The test evaluates the effect of the interaction term on OOI performance; it also observes the effect of the marginal increase in contract complexity or relational trust on the direct effect of contract complexity and relational trust on OOI performance. As shown in Table 3 (model 2) the interaction effect of contract complexity and relational trust is significant with (Beta = 0.183, $p< 0.05$). The introduction of the governance interaction term caused a change in R square of 1.7% and $p<0.05$. Also, it has a positive and significant effect on the strength of the effect of contract complexity (Beta = 0.234, $p< 0.01$) and relational trust (Beta = 0.378, $p< 0.001$) on OOI performance, and hence, supports the complementarity of contract complexity and relational trust (H3).

We conducted a second test of complementarity following the approach of Cassiman and Veugelers (2006) and Pittino and Mazzurana (2013). This approach is following the productivity approach in determining the effect of complementary practices on productivity performance. For example, Ichniowski et al. (1997) adopt this approach to study the impact of complementary human resources management and employment practices on productivity outcomes in steel finishing lines. Also, Cassiman and Veugelers (2006) follow the same model to analyse complementarity among innovation activities, focusing on internal R&D (make) and external knowledge acquisition (buy). To conduct this test, we first divided our sample into four sub-groups of governance types a) high contract complexity / high relational trust, b) high contract complexity / low relational trust, c) low contract complexity / high relational trust, and d) low contract complexity / low relational trust (Pittino and Mazzurana, 2013).

Moreover, to establish the four sub-groups, we created a dummy variable for each sub-group with value 1 for firms within the sample that rely strongly on contract

complexity/relational trust and 0 for firms that depend less on contract complexity/relational trust. First, we gave 1 for values above the mean and 0 to equal or less than the mean. Second, we tested for the effect of contract complexity and relational trust complementarity in the measure of OOI performance by running an equality test of means between sub-groups and within groups (Cassiman and Veugelers, 2006, Pittino and Mazzurana, 2013). The one way ANOVA resulted in significant F statistics (3,196) = 15.890, P<0.001), suggesting that the complementarity condition between contract complexity and relational trust is met. Table 4 presents results for the second complementarity test.

[Insert Table 4 about here]

In Figure 3, we map our results of the four groups of different governance types (Table 4) using MATLAB (Mathwork version R2018a) with OOI outcomes. We plotted OOI results in relation to the means of contract complexity and relational trust. The x-axis used to plot the mean of contract complexity and the y-axis utilised to plot the mean of relational trust and the distribution of OOI results. As shown in Figure 3, a total of 84.4% of the SMEs' managers who implemented high contract complexity and high relational trust reported high OOI performance (above the mean of OOI in all results). Moreover, 78% of the SMEs in our study who exhibited a general propensity towards adopting a governance type with low contract complexity and low relational trust reported low OOI performance (below the mean of OOI in all results).

[Insert Figure 3 about here]

Discussion

Governance types in SMEs offshore outsourcing innovation relationships

Our results indicate that majority of the SMEs' managers employ detailed and complex contracts and rely on strong relational trust to enhance OOI performance. Although this result is broadly consistent with Poppo and Zenger (2002), it is less compatible with recent SMEs studies. For example, Pittino and Mazzurana (2013) concluded that SMEs are more inclined to rely only on relational governance in exploiting innovation alliances. (Pittino and Mazzurana, 2013). Alternatively, SMEs tend to use a combination of both contract and trust in case of pursuing medium-high innovation levels in buyer-supplier relationships (van der Valk et al., 2016). Our results (See Figure 3) indicate that a combination that maximises and balances both contract complexity and relational trust mechanisms may represent the most effective governance type for the control and coordination of SMEs OOI relationships. Additionally, this result informs us that when pursuing innovation through offshore outsourcing, SMEs behave consistently with large firms. In other words, SMEs implement a dual mode of interfirm contract complexity and relational trust to curb opportunism through formal ex-ante control (Carson, 2007), as well as enable better tacit knowledge disclosure and mutual learning through relational trust (Kulangara et al., 2016, Wang et al., 2011). Our two complementarity tests provide support to this conclusion by revealing that SME managers may complement the use of contract complexity with the use of relational trust to benefit from the synergetic advantages of both governance mechanisms in driving higher OOI outcomes, while simultaneously promoting long term continuation of the relationship and safeguarding specific investments from premature and costly termination (Poppo and Zenger, 2002).

Drawing upon these results we develop a 4F matrix of four different governance types as a) *fit* for high contract complexity/high relational trust, b) *firm* for high contract complexity/low relational trust, c) *flexible* for low contract complexity/high relational trust, and d) *fragile* for low contract complexity/low relational trust (Figure 4). In Figure 4 we

display the 4F governance matrix in four quadrants each with different capacity of *outsourcing efficiency* (e.g. reducing costs, controlling opportunism, and achieving innovation targets) and *innovation adaptability* (e.g. navigating technological risks and market uncertainties of innovation outcomes).

[Insert Figure 4 about here]

The *fit* governance type represents the most efficient and adaptive alternative. Through high levels of contract complexity, *fit* governance keeps tight control over transactions cost by detailing each party's roles and responsibilities, specifying procedures to ensure compliance, and determining expected outcomes (Poppo and Zenger, 2002); moreover, contract complexity controls for suppliers' opportunism through detailed legal consequences in case of protected IP violations (Kloyer and Scholderer, 2012). Similarly, through maximising relational trust, *fit* governance emphasises parties' willingness to rely on trust to adapt with uncertainties and perceived risks of future outsourcing innovation outcomes (Dyer and Singh, 1998, Mayer and Davis, 1995).

In contrast, *fragile* governance type is characterised by lack of adequate contract complexity and relational trust. Consequently, *fragile* governance has weak capacities of interfirm formal and informal systems to measure parties' contractual compliance, performance efficiency and levels of commitment in the relationships. Also, *fragile* governance suffers from the absence of necessary adaptive responses to navigate uncertainties and risks of innovation. Our results support this conclusion since only 9 SMEs (4.5% of the 200 SMEs in our sample) reported achieving high OOI performance though adopting *fragile* governance of low contract complexity and low relational trust. The other 69 SMEs (34.5% of the 200 SMEs in our sample) in the *fragile* group reported low OOI performance. The question this result poses though is why an SME firm would select a *fragile* governance structure in managing an OOI relationship? A possible answer could be that in their haste to exploit significant opportunities offered by fast technologies and emerging markets, SMEs might try to follow the steps of large firms in OOI without having sufficient organisational resources to vet selected suppliers or control them.

The other two types of governance, *firm* and *flexible*, although exhibit high capacity of adaptability or high position of efficiency respectively, they both are vulnerable to falling in the trap of excessive reliance on contract complexity or relational trust. In the context of SMEs, overly cooked OOI contracts are prone to failure more than success in delivering high OOI performance, given the scarcity of time that SMEs owners/managers can devote to interpret, maintain and adjust complex contracts (Pittino and Mazzurana, 2013). Moreover, it is expected that the cost to legally enforce excessively complex OOI contracts will exceed the means and resources of SMEs especially if the legal systems in the selected offshore country was weaker than the SME domestic legal system (Dickson et al., 2006).

Likewise, too much trust in *flexible* governance type can harm the outsourcing SMEs as well as the OOI relationship. Too much trust can block healthy criticism, build up group thinking and consequently lead to missing innovation and efficiency targets (Bidault and Castello, 2010). Moreover, despite the SMEs' mastery of relational governance, SMEs must be aware of their vulnerability while pursuing OOI in terms of the potential negative consequences of the offshore supplier misappropriation of their tacit knowledge (O'Dwyer and O'Flynn, 2005). Therefore, conducting OOI in offshore countries exposes the outsourcing SMEs to foreign social complexity (Pawar et al., 2018); and venturing in contractually unguarded might not be a good choice of governance (Dickson and Weaver, 2011). Finally, both *firm* and *flexible* governance types fail to benefit from the complementarity advantage and synergetic value of combining contract complexity with

relational trust. For example, complex contracts enhance trust building through legal and economic commitments, while relational trust allows contractual disputes resolution in the face of unforeseen contingencies (Poppo and Zenger, 2002).

The effects of formal knowledge routines and supplier joint actions

Our results show that engaging formal knowledge routines and supplier joint actions as part of a portfolio of explicit partnering and cooperative norms can help in solving for the opposing tension between contract complexity and innovation performance in outsourcing innovation relationships (Aubert et al., 2015, Mooi and Ghosh, 2010, Kloyer et al., 2018). By addressing IP access, use and protection; formal knowledge routines can add value to contract complexity by explicitly addressing the SMEs concerns of IP potential leakage. Also, Formal knowledge routines expand knowledge protection to include a two-way knowledge accessing, application and protection at the same time (Hoecht and Trott, 2006, Kloyer and Scholderer, 2012, Lai et al., 2009, Stanko and Calantone, 2011). This finding supports calls for investing in formal knowledge exchange and financial incentives for suppliers (Lai et al., 2009, Henke Jr. and Zhang, 2010, Roy and Sivakumar, 2011, Kloyer and Scholderer, 2012, Felin and Zenger, 2014, Sumo et al., 2016). Moreover, implementing partnering tools such as supplier joint actions; can render complex contracts more efficient in driving increased suppliers' compliance towards achieving higher innovation outcomes.

Contrary to our prediction, our results do not support positive significant moderating effects of formal knowledge routines or supplier joint actions on the strength of the impact of relational trust on OOI performance. Instead, negative insignificant moderating effects are found. So, what are some of the possible justifications that may help to explain this counter-intuitive finding? First, we purposefully measured the non-calculative component of trust (benevolence) to separate its contributions in OOI outcomes from the calculative trust (e.g. a trustee's competence and integrity) which may arguably overlap with contact complexity contributions (Saparito et al., 2004). However, calculative trust which concerns with the SME buyer's confidence expectations of the offshore supplier abilities to perform the OOI tasks and its integrity to behave in accordance with acceptable principles, might have responded differently to the implementation of formal knowledge routines and supplier joint actions (Mayer and Davis, 1995, Levin and Cross, 2004). Second, despite parties' high commitment to a win-win mentality via formal knowledge routines and supplier joint actions, the two factors might not be sufficient for strengthening the relationship between relational trust and OOI performance (Prahinski and Bentonb, 2004). Other factors such as extensive exchange history in OOI might also be required to enable the moderating influence of formal knowledge routines and supplier joint actions on relational trust (Gulati and Sytch, 2008, Noordhoff et al., 2011). Third, the level of tacitness of the exchanged knowledge and the extent and terms of supplier rewards in a given OOI relationship may alter the aggregate level of interaction between formal knowledge routines and supplier joint actions with relational trust (Hansen, 1999, Levin and Cross, 2004, Cao and Zhang, 2011, Sumo et al., 2016).

Managerial Implications

Findings from this research inform SMEs managers that in practice, SMEs exhibit propensity toward adopting *fit* governance of detailed contractual safeguards (contract complexity) and extensive socialisation (relational trust) in managing their OOI relationships. Additionally, although *fit* governance type is ideal and hence will be difficult to achieve and sustain, it is worthwhile for SMEs managers to invest in the relationship with the offshore supplier to emulate *fit* governance. Furthermore, governance mechanisms can become more conducive to outsourcing innovation through partnering norms such as formal knowledge routines and supplier joint actions since they can substantially shape the exchange outcomes.

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Table 1. SMEs Sample Characteristics

Industry	Frequency	Technology Intensity*	%
Plastic, paper and rubber	32	Low	16.0
Textile and wearing apparel	32	Low	16.0
Food and beverages	23	Low	11.5
Machinery and mechanical equipment	24	Medium - High	12.0
Pharmaceutical and chemicals	20	High	10.0
Wood and furniture	20	Low	10.0
Metal and minerals	18	Low-Medium	9.0
Electrical and electronics	16	Medium - High	8.0
Coke and petroleum	10	Low-Medium	5.0
Other manufacturing	5	Low	2.5
Title of respondents	Frequency		%
Chief executive officer	8		4.0
Managing director	69		34.5
Managing partner	94		47.0
General manager	25		12.5
Others (top management position)	4		2.0
Country	Frequency		%
Germany	50		25.0
Italy	50		25.0
United Kingdom (UK)	50		25.0
France	50		25.0
Size	Frequency		%
Small	91		45.5
Medium	109		54.5

* In accordance with OECD OECD Directorate for Science, Technology and Industry, OECD Directorate for Science, Technology and Industry. Available at: https://www.oecd.org/sti/ind/48 350231.pdf

Table 2 Descriptive statistics and correlations

Construct	1.	2.	3.	4.	5	VIF
1. Contract complexity	1.000					1.632
2. Relational trust	0.465**	1.000				1.901
3. Formal knowledge routines	0.581**	0.571**	1.000			1.867
4. Supplier joint actions	0.476**	0.615**	0.507**	1.000		1.773
5. Offshore outsourcing innovation	0.322**	0.345**	0.302**	0.316*	1.000	
Mean	5.437	5.557	5.662	5.527	5.598	
Standard deviation	0.811	0.735	0.627	0.816	0.658	

** Correlation is significant at ($p \leq 0.01$)

Table 3. Models contract complexity & relational trust direct effect, interaction effect and moderation effect on offshore outsourcing innovation performance

	Model 1	Model 2	Model 3	Model 4	Model 5
	Controls and Direct effect of contract complexity and relational trust	Interaction Effect between Contract Complexity and Relational Trust	Moderation effects of formal knowledge routines	Moderation effects of supplier joint actions	All Variables and Moderators
Hypothesis	(H1,H2)	(H3)	(H4a,H4b)	(H5a,H5b)	
Variable / Standardised Coefficients	Beta	Beta	Beta	Beta	Beta
Manager tenure	0.045	0.048	0.042	0.051	0.048
Relationship Longevity	0.133	0.139	0.125	0.100	0.110
Firm size	-0.126	-0.129	-0.125	-0.133	-0.123
Italy	-0.192*	-0.161	-0.163*	-0.168*	-0.158
France	0.103	0.100	0.084	0.076	0.075
United Kingdom	0.037	0.053	0.052	0.039	0.050
Low-medium technology	-0.104	-0.095	-0.106	-0.100	-0.107
Medium-high technology	-0.118	-0.127	-0.159*	-0.139*	-0.166*
High technology	0.036	0.019	0.018	0.020	0.015
Contract Complexity	0.168*	0.234**	0.299**	0.189*	0.287**
Relational Trust	0.295***	0.378***	0.247**	0.227*	0.193
Contract complexity x Relational Trust		0.183*			0.049
Formal knowledge routines			0.141		0.143
Contract complexity x formal knowledge routines			0.543***		0.072
Relational trust x formal knowledge routines			-0.288		0.476*
supplier joint actions				0.147	-0.010
Contract complexity x supplier joint actions				0.342**	-0.098
Relational trust x supplier joint actions				-0.218	-0.180
Number of observations (N)	200	200	200	200	200
Adjusted (R^2)	0.218	0.233	0.276	0.243	0.268
F-stat	6.050***	6.024***	5.366***	5.572***	5.045***

*P< 0.05, **p < 0.01, ***p < 0.001

Table 4. Second test for complementary between contract complexity and relational trust

Sub-group	Frequency / (%)
High contract complexity/ high relational trust	96 (48%)
High contract complexity/low relational trust	26 (13%)
Low contract complexity/ high relational trust	37 (18.5%)
Low contract complexity/ low relational trust	41 (20.5%)
Total	200 (100%)
One way ANOVA	
F (3,196)	15.89***

*P< 0.05, **p < 0.01, ***p < 0.001

Fig.1. Governance of offshore outsourcing innovation in SMEs.

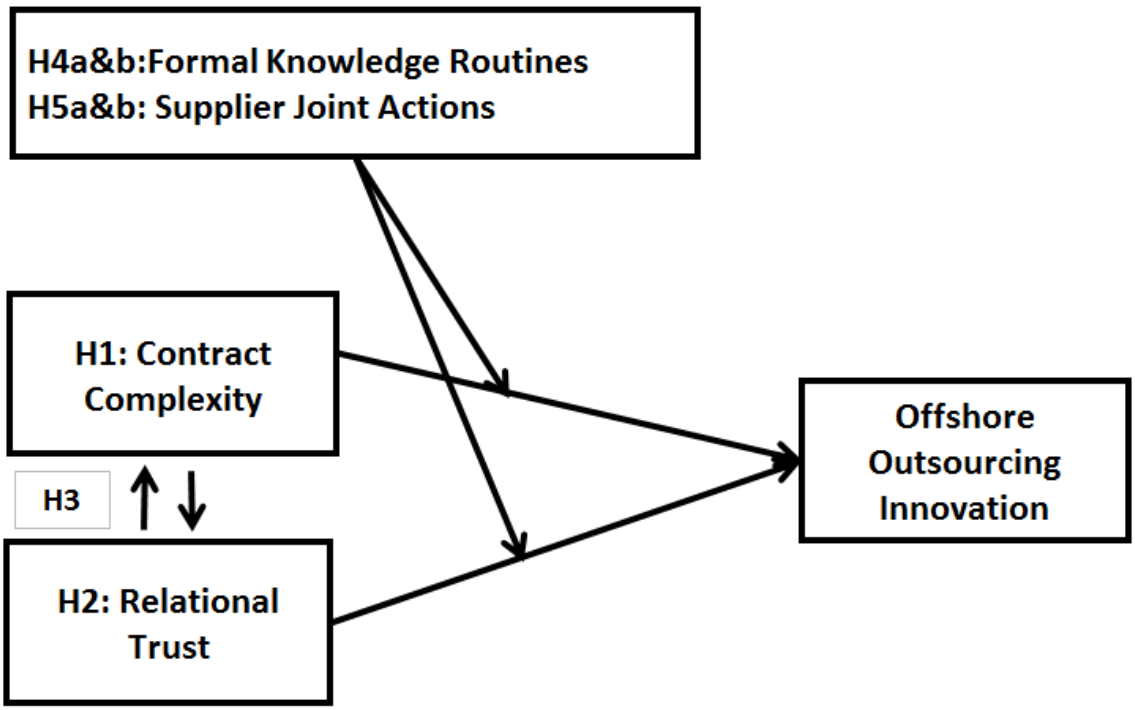


Fig. 2. 3D surface interaction plots of moderator variables with contract complexity, relational trust and offshore outsourcing innovation (OOI)

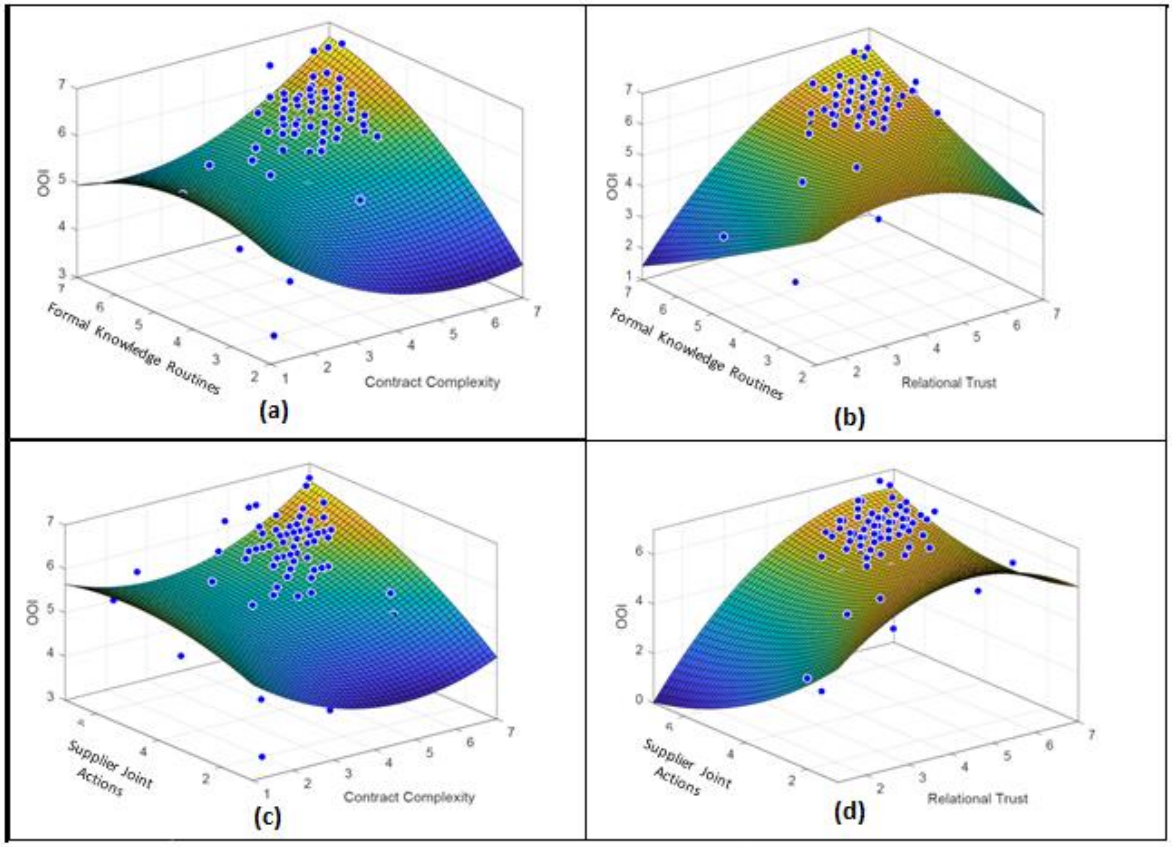


Fig.3. Mapping offshore outsourcing innovation performance with means of contract complexity and relational trust

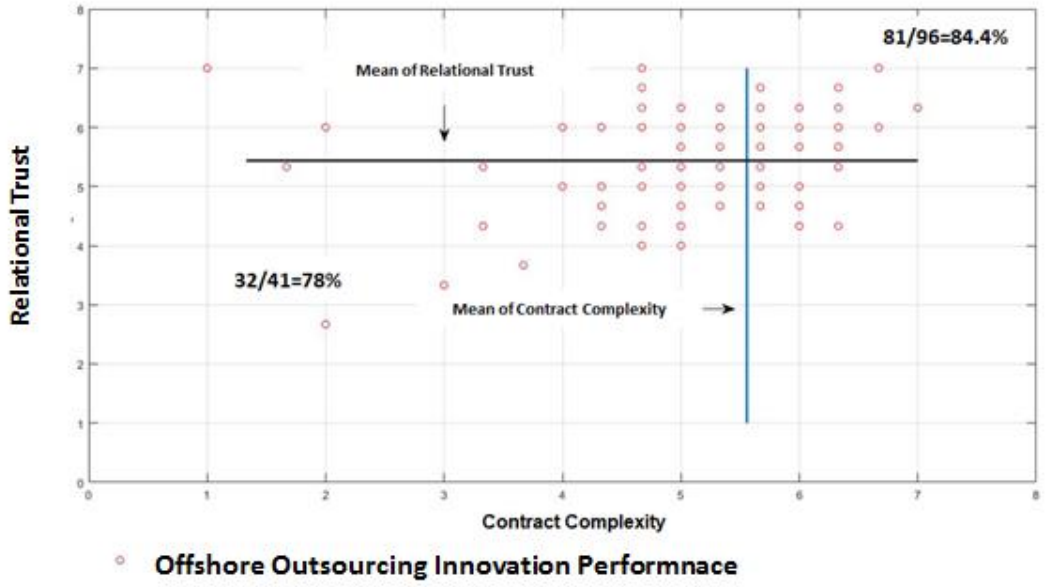
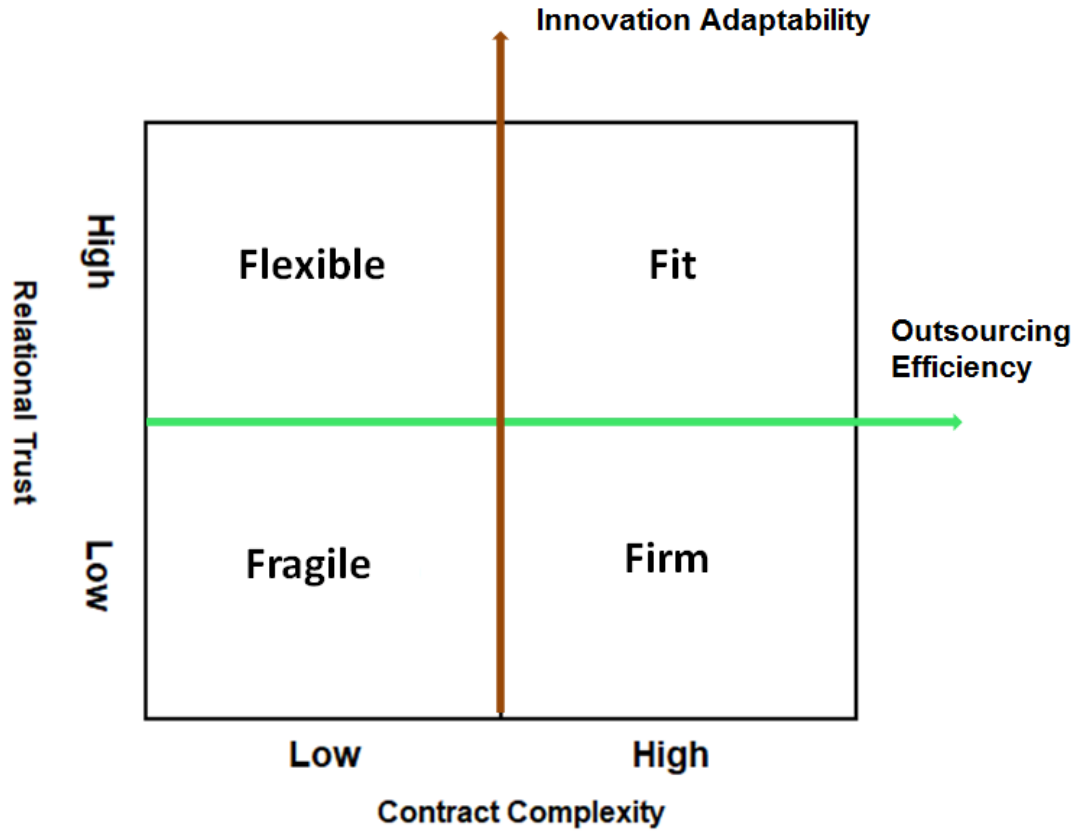


Fig.4. The Four Governance Type Matrix for offshore outsourcing innovation relationships in SMEs



Appendix A

Construct (Cronbach's alpha , composite reliability (CR), average varaince extracted (AVE))	AMOS item loading
Contract complexity (α = 0.78 ; CR = 0.79 ; AVE = 0.56)	
a) Our formal contract with the offshore supplier is long and extensive.	0.86
b) Our formal contract with the offshore supplier Is highly customized and required considerable legal work.	0.62
c) Our formal contract includes rules and regulations to govern our relationship.	0.75
d) Our formal contract with the offshore supplier is adapted to our firm's specific needs.*	
Relational trust (α = 0.73; CR = 0.77 ; AVE = 0.53)	
a) The offshore supplier usually keeps the promises that it makes to our firm.	0.92
b) We can count on the offshore supplier to be sincere.	0.62
c) When making important decisions, the offshore supplier is concerned about our welfare.	0.61
d) The offshore supplier has always been evenhanded in its negotiations with our firm.*	
Formal knowledge routines (α = 0.73; CR = 0.74 ; AVE = 0.50)	
a) We rely extensively on contractual rules in controlling day-to-day knowledge sharing with the offshore supplier.	0.82
b) We follow written procedures in most aspects of knowledge sharing with the offshore supplier.*	
c) Our relationship with the offshore supplier has well established ground rules about knowledge sharing.	0.65
d) We use a common IT (software) to control and coordinate innovation knowledge sharing with the offshore supplier.	0.62
Supplier joint actions (α = 0.74; CR = 0.76 ; AVE = 0.52)	
a) We work jointly with the offshore supplier to reduce its costs	0.90
b) We work jointly with the offshore supplier to improve its quality	0.60
c) We work jointly with the offshore supplier on training its people	0.63
Offshore outsourcing innovation (α = 0.70; CR = 0.75; AVE = 0.51)	
a) As result of our relationship with the offshore supplier, we have created new products and/or enhanced our current products.	0.94
b) As aresult of our relationship with the offshore supplier, we have Created new processes and/or improved our current processes.	0.63
c) As a result of our relationship with the offshore supplier, we havelncreased our new product speed to market.	0.50
d) As a result of our relationship with the offshore supplier, we have Increased our patent application rate.*	
Model fit indicies: Normed X^2 = 1.75 (≤2.0), p <0.001, goodness of fit (GFI) = 0.914, adjusted goodness of fit (AGFI) = 0.870, comparative fit index (CFI) = 0.949, Tucker-Lewis index (TLI) =0.933, standardised root mean square residuals (SRMR)= 0.053, and root mean square error of approximation index (RMSEA) = 0.061. *Note** Item dropped after CFA	