

Absorptive Capacity in Joint Project Teams

Evidence from Nigerian Upstream Oil Industry

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Abstract: This study advances the multidimensional concept of absorptive capacity (ACAP) by theorizing the individual and collective capabilities underpinning knowledge acquisition and utilization in joint project teams in Nigerian upstream oil industry. By assuming the lowest form of engagement as the joint project teams constituted by local employees and competent expatriate, this study demonstrates the relationship among the dimensions of ACAP. Survey was administered to local team members of joint project teams. The collected data (n=248) was analysed with the aid of structural equation modelling (SEM). As hypothesized, individual ability to recognize the value of partner knowledge was significantly related to their ability to assimilate the knowledge. The positive relationship between individual ability to assimilate knowledge and team shared cognition was supported. Furthermore, the individual ability to assimilate partner knowledge was found to be indirectly related to team ability to utilize the knowledge, through the team shared cognition.

1 INTRODUCTION

Cohen and Levinthal (1990) posit absorptive capacity (ACAP) as the internal capability ensuing from firm engagement in R&D, which facilitates the acquisition and utilization of external knowledge. ACAP is simply the link between an organisation and the external knowledge (Zhao and Anand, 2009; Schleimer and Pedersen, 2014). Consequently, studies have demonstrated the significance of ACAP in inter-organisational learning through strategic alliance (Lyles and Salk, 1996; Lane and Lubatkin, 1998; Park, 2010) and intra-organisational learning within multinational corporations' network (Schleimer and Pedersen, 2014; Chang *et al.*, 2012). Although, the original notion on ACAP acknowledges its multidimensional nature, however, most of the subsequent attempts have overlooked the underlying assumptions (Lane *et al.*, 2006; Volberda *et al.*, 2010). Specifically, by equating ACAP to prior knowledge, extant conceptualization amplifies the knowledge asset, without recourse to the underlying capability and process (Lewin *et al.*, 2011). Aside few exceptions, recent expositions on the multi-dimensions of ACAP have been theoretical (Zahra and George, 2002; Lane *et al.*, 2006;

Todorova and Durusin, 2007) and most of the empirical attempts have downplayed the significance of individual differences, by aggregating the phenomenon to the collective level (Jansen *et al.*, 2005; Lichtenthaler, 2009; Nemanich *et al.*, 2010). For example, Nemanich *et al.* (2010) investigation on R&D project teams in the US, delineated ACAP into the individual and collective levels; however the underlying data originated from the key informant. However, as noted by Volberda *et al.* (2010) attempt at clarifying the micro-origin of ACAP should emphasize the differences at the individual level. Accordingly, there is need for clarification on the individual perspective to ACAP dimensions, most especially in asymmetric project team, set up to facilitate knowledge transfer. This study aims to address this gap by examining the pertinent dimensions of ACAP within the joint project team constituted by local employees and expatriate.

2 THEORETICAL BACKGROUND

This study considers external knowledge as the expertise embedded in the foreign partner

employees, but accessible to the local employees through their engagement in joint project team. Thus, for learning to occur the former must demonstrate the capability to acquire the knowledge embedded in the latter. Consistent with the dynamic capability view, ACAP has been delineated into potential and realized components, underpinned by individual and their collective engagement, respectively (Zahra and George, 2002). Furthermore, Lane *et al.* (2006) expose the reification of ACAP and posit its rejuvenation on theorization from the original notion. To this end, they re-conceptualize ACAP as learning capability distinct to individual and collective levels.

Thus, we define ACAP as the ability to recognize the value of partner's knowledge and assimilate it, and the shared cognition underpinning the team ability to utilize this knowledge in the joint project team (Nemanich *et al.*, 2010; Ojo *et al.*, 2014). The ensuing dimensions are individual abilities to (i) recognize the value of knowledge, which is the capability to search for, identify, and accurately evaluate the value of the knowledge and (ii) assimilate, which is the capability to learn, interpret and develop a deep understanding on it the knowledge. The other two dimensions are team (iii) shared cognition, which is the mechanism through which the team reaches a common understanding on the individually acquired and embedded knowledge and (iv) ability to utilize knowledge, which is the capability of the team to apply the knowledge embedded in the foreign partner practice in the execution of the joint project. The pertinent hypotheses are presented as follow.

2.1 Individual Absorptive Capacity

Lane *et al.* (2006) describe exploratory learning as individual's ability to recognize and assimilate knowledge. An individual develops awareness on the value of new knowledge from his extant mental model. Thus, the ability to recognize the value of external knowledge is the precursor to the extent to which an individual can explore the related cognitive map for assimilation (Huber, 1991; Todorova and Durisin, 2007). With the aid of such map, an individual is more likely to incline his knowledge search effort to the areas that are most valuable to the project (Tripsas and Gavetti, 2000), thereby making assimilation easier. An individual, who is competent in evaluating the value of new knowledge, is expected to have substantial ability for assimilating such knowledge in that his/her attention will be directed to deepening

understanding on the specific valuable knowledge (Lettl *et al.*, 2008). Recent empirical investigation on US-based research teams, found that members ability to evaluate external knowledge is predictor of the ability to assimilate the knowledge (Nemanich *et al.*, 2010). Thus, it is hypothesized that;

- H1. Individual ability to recognize the value of foreign partner knowledge is positively related to individual ability to assimilate the knowledge in the joint project team.

2.2 Individual and Team Absorptive Capacity

On the demarcation between potential and realized absorptive capacity, Zahra and George (2002) argue that an organisation will only be able to exploit the knowledge which has been absorbed. The absorption of knowledge requires that the individual members demonstrate the ability for its acquisition and assimilation. Thus, a link is suggested from the capability to assimilate knowledge to the capability to utilize knowledge, thereby the integration of individually assimilated knowledge is expected to facilitate the collective utilization of the knowledge. Highly intuitive individuals are likely to possess the ability to assimilate knowledge, because they would be able to engage in the collective interpretation process (Crossan *et al.*, 1999). Group learning scholars (Laughlin, 1978; McGrath and Kravitz, 1982) suggest that the aggregation of individually embedded knowledge is a necessary precondition for team effectiveness in knowledge intensive work domain, especially when creativity and problem solving skills are required. Lane *et al.* (2006) assert that the extent of knowledge assimilated by individual is likely to impact on team's outcome in knowledge utilization. Accordingly, the team offers the platform to facilitate the identification, retrieval and exploitation of individually embedded knowledge. Thus a positive relationship is suggested between individual ability to assimilate knowledge and the ability to collectively utilize the knowledge at the joint team level. Therefore, it is hypothesized that:

- H2. Individual ability to assimilate foreign partner knowledge is positively related to the team ability to utilize the knowledge in the joint project team.

2.3 The Role of Shared Cognition in Absorptive Capacity

Consistent with the dominance of boundary

spanning behaviour in few individuals, not every member of the joint project would possess the ability to recognize the value of partner's knowledge and assimilate it (Rogers, 1976; Cohen and Levinthal, 1990). According to Rogers the absorption of external knowledge through boundary spanners' depends on their cognitive abilities, while their influencing skills determine the spread of such knowledge across the organisational level. To buttress the need for shared understanding among team members, Lane and Lubatkin (1998) suggest relative absorptive capacity as the extent to which partnering firms are similar in terms of knowledge base, dominant logic, and organisational structure.

On situated context, Walsh and Ungson (1991) argue the need for shared understanding, which is facilitated by the creation of common language and continuous social engagement. Klimoski and Mohammed (1994) acknowledge the influence of shared mental models on collective cognition and behavioural action underlying the utilization of external knowledge. Theorists (Weick, 1995; Senge, 2006) in sense-making posit that individual action within a group is conditioned on others actions. According to Hollingshead (2001) team-level cognitive system pulls together individuals cognitive abilities to enhance collective task performance. Thus, the collective capability is critical to the application of individually assimilated knowledge, whereby project is executed as individuals' knowledge are interpreted and integrated in reaching consensus decision and solving relevant problem at the team level (Knight *et al.*, 1999).

The main determinants of effective learning interaction within the group are the extent of similarity in individual representation, interpretation of knowledge and the mechanisms through which meanings are construed (Nahapiet and Ghoshal, 1998). Through shared understanding, the learners are able to connect with the sources and their embedded knowledge (Kankanhalli *et al.*, 2012). Nemanich *et al.* (2010) consider shared cognition as the collective assimilating capability, through which individually assimilated knowledge are integrated to generate shared understanding. Like shared cognition, the ability to apply knowledge is also team level capability, which is the extent to which the team can utilize the absorbed knowledge in enhancing collective performance. Based on the above, the following hypotheses are suggested:

- H3. Individual ability to assimilate foreign partner knowledge is positively related to shared cognition in joint project team.
- H4. Shared cognition mediates the effect of

individual ability to assimilate foreign partner knowledge on team ability to utilize the knowledge in joint project team.

- H5. Shared cognition is positively related to the team ability to utilize foreign partner knowledge in the joint project team.

3 METHOD

The data was collected between October, 2012 and February, 2013, from local team members engaged in joint projects with expatriate from competent foreign partners in Nigerian upstream oil and gas industry. In order to reduce dependence and facilitate capability building, the Nigerian content act of 2010 mandates foreign firms in the industry to engage substantial locals' through direct recruitment or joint ventures. Thus, the lowest unit of engagement is assumed as the joint project teams, constituted by both local and foreign experts. The managements' consent on employees' participations in the survey was obtained from 35, out of a total of 52 companies identified from the department of petroleum resources (DPR) database. Accordingly, with the assistance of the human resources departments in the former, the lead local team members and two (2) other members suggested by the lead were selected as respondents. The purposeful selection of respondents is essential, given that ACAP is theoretically associated with boundary spanning behaviour, which is dominant in few individuals (Cohen and Levinthal, 1990; Zahra and George, 2002). Thus, the selected respondents were involved in the coordination of other team members and interface with members from foreign partners (Cross and Prusak, 2002). The final analysis was based on 248 questionnaires, which represents 62% of the total administered 400 questionnaires.

All the constructs were measured with scales adopted/adapted from extant literature, and assessment based on the five-point Likert scale (ranging from 1 = strongly disagreed to 5 = strongly agreed). The preliminary questionnaire was pilot tested with 35 respondents. Based on their comments, the relevant questions were rephrased in order to improve clarity. The ability to recognize knowledge was measured with three items ($\alpha = .77$) and ability to assimilate knowledge with three items ($\alpha = .85$) adapted from Nemanich *et al.* (2010) and Pedrosa and Jasmand (2011). Furthermore, shared cognition ($\alpha = .79$) was measured with four items and ability to utilize knowledge ($\alpha = .81$) was measured with three items, all adapted from

Nemanich *et al.* (2010). The final sentence of a caption must end with a period.

Table 1: CFA on Latent Variables.

Constructs and items	Std. Est.
Ability to Recognize (CR = 0.80; AVE = 0.58)	
I was able to develop awareness on partner tools, practice, and knowledge.	0.67
I was able to keep track of partner tools, practice, or knowledge by consulting other sources of information.	0.74
I was able to identify partner tools or practice with the most significant value to the project performance.	0.75
Ability to Assimilate (CR = 0.87, AVE=0.68)	
I was able to learn the use of partner tools or practice.	0.89
I was capable at understanding the tools, practice, or knowledge embedded in the partner.	0.89
I was adept at interpreting the use of tools, practice, or knowledge embedded in the partner.	0.67
Shared Cognition (CR = 0.77, AVE=0.46)	
Our team was very competent in integrating different views.	0.69
Our team was able to achieve an amicable resolution of conflict and disagreement.	0.65
Our team was able to communicate collective view across members.	0.65
Our team was able to take appropriate action based on the collective view.	0.79
Ability to Utilize (CR = 0.78, AVE=0.54)	
Our team had the capability to effectively apply partner knowledge.	0.67
Our team was able to enhance project delivery by applying partner knowledge.	0.81
Our team had the capability to maximally exploit partner knowledge.	0.72

4 ANALYSES AND RESULTS

Following Anderson and Gerbing's (1988) two step technique, the overall measurement model for the 4 factors was assessed in a single CFA procedure. All the items loaded on their specified factors. Accordingly, the second step of the technique was initiated. This involved the transposition of the measurement model into the structural model, by replacing the covariance paths (i.e. double edged arrows) associated with the endogenous variable with the hypothesized structural paths (i.e. single edged arrows). The cut-off criterion for the selected goodness of fit indices are $\chi^2 / d.f. < 3$; CFI $> .90$;

TLI $> .90$; RMSEA $< .08$ (Joreskog and Sorbom, 1986; Kline, 2005). The computed goodness-of-fit indices from the AMOS 18 package revealed a good fit to data (i.e. $\chi^2 / d.f. = 1.944$; RMSEA = .062; CFI = .957, TLI = .942). Therefore, the model was employed in testing the hypothesized effects.

A significant path was obtained from individual ability to recognize the value of partner knowledge to individual ability to assimilate the knowledge ($\beta = .612$, $p < 0.001$), thus H1 was supported. The relationship between individual ability to assimilate partner knowledge and team ability to utilize the knowledge was not significant ($\beta = 0.119$; $p = ns$), thus H2 was not supported. The individual ability to assimilate partner knowledge was found to be significantly related to shared cognition ($\beta = 0.275$; $p < 0.001$), thus H3 was supported. The outcome of bootstrapping supported the significant mediating (i.e. indirect) effect of shared cognition ($\beta = 0.184$; $p < 0.001$). Thus, as hypothesized in H4, there is no direct relationship between individual ability to assimilate and team ability to utilize knowledge, but both are indirectly linked through shared cognition. Furthermore, in support of H5, shared cognition was found to be significantly related to team ability to utilize knowledge ($\beta = 0.668$; $p < 0.001$).

5 DISCUSSION

Following Zahra and George (2002) notion on potential and realized ACAP, the abilities to recognize value and assimilate knowledge were found to be dominant at the individual level, while the hypotheses on team's shared cognition and ability to utilize knowledge were supported. However, contrary to Nemanich *et al.* (2010) individual ability to assimilate knowledge was found not to be directly associated with team ability to utilize knowledge. Rather the indirect effect through shared cognition was supported. Thus, the present findings affirm shared cognition as the mechanism through which individual potential are aggregated to be collectively realized at the team level. Zahra and George (2002) posited that the organisation is better positioned to exploit the knowledge, which has been assimilated by the members. Thus, the development of deeper understanding on new concept is underscored by individual assimilating ability, which could impact on interaction with others. Individuals with good awareness on a concept are most likely to engage with others in deliberating within the area of competency, thereby better equipped to contribute in project execution. Crossan

et al. (1999) contend that the assimilating ability of individual is predicated on intuitive skills, which could also facilitate engagement in collective interpretation process. Accordingly, acquisition of deeper understanding by team members could aggregate to value exploitation at the collective level, when there is a mechanism to support collective interpretation. Furthermore, studies on group learning suggest that the aggregation of individually embedded knowledge is a necessary precondition for team effectiveness in knowledge intensive work domain, especially when creativity and problem solving skills are required (Nahapiet and Ghoshal, 1998). Thus, collective cognitive capability through shared cognition ability is critical to the application of individually assimilated knowledge at the joint team level.

6 CONCLUSIONS AND FURTHER WORK

Consistent with recent conceptualization of ACAP as multidimensional construct (Zahra and George, 2002; Lane, *et al.* 2006; Todorova and Durisin, 2007; Nemanich, *et al.* 2010) the present findings demonstrate the specific level corresponding to each dimension. Nevertheless, further to the clarification of the individual and team abilities underlying knowledge acquisition and utilization in joint project teams, this study also offers opportunities for further research. Future studies should attempt to clarify the effects of relevant antecedents on both the individual and collective components of ACAP. There is also need for study to investigate the mechanisms through which individual components are linked to the collective components. The impact of cultural differences on ACAP within joint project is another important area for future studies. Furthermore, subsequent studies are expected to address some of the limitations of this study. The use of longitudinal design is recommended, so as to capture the underlying temporal and causal effects of ACAP. Also, the attendant weakness of the self-reported survey could be minimized by incorporating data from other sources. For example, future studies should consider the perspective of the foreign team members on the ACAP dimensions. Finally, the validated model should be extended to other contexts, in order to ascertain the generalization of the findings.

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