

Apprenticeship Tacit Knowledge Transfer and Team Performance in Oil and Gas Producing Companies in Rivers State, Nigeria

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Abstract: This study proposed apprenticeship as a technique to transfer tacit knowledge and suggest that the utilization of apprenticeship in the transfer of tacit knowledge influences team performance in oil and gas producing companies in Rivers State. Specifically, the study examined the extent to which apprenticeship relates to team performance (team task accomplishment and team efficiency) in oil and gas producing companies in Rivers State. A survey research design was used for the study. Of the 161 questionnaire forms distributed, 133 were found usable amounting to 82.6% of total respondents. Statistical tools including simple percentage, frequency tables, mean, and ordinary least square regression analysis were employed for data analysis using Statistical Package for Social Sciences software version 24. The study found that respondents' assessment of team task accomplishment is very high while that of team efficiency is high. Respondents rated apprenticeship to be moderate. The results also revealed that there is a significant relationship between apprenticeship and team task accomplishment and team efficiency in oil and gas producing companies in Rivers State. Based on the findings, the study recommends that oil and gas firms in Nigeria should invest and use apprenticeship in transferring tacit knowledge which would translate to higher performance.

Keywords: Apprenticeship, tacit knowledge, knowledge transfer, task accomplishment, team efficiency, team performance

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I. Introduction

As resource exploitation and technological competition dominates global businesses, organizations have become performance driven and are constantly seeking for avenues to improve employee performance, individually or as a team, in a bid to survive. This quest for higher employee performance has led organizations to consider alternatives that will increase performance and productivity. One such way is knowledge management, as studies show a clear relationship between knowledge management and performance (Gholami, Asli, Nazari-Shirkouhi & Noruzi, 2013), as a knowledgeable employee will undoubtedly perform better than one who lacks the requisite knowledge required to perform a given task.

The vital role of experiential (tacit) knowledge to the workforce cannot be overemphasised. If every team member, including novices, are as knowledgeable about an area of the organization's expertise as the most experienced team members, then tacit knowledge becomes organizational knowledge. This reduces to the barest minimum, waste and unproductivity in the organization. This enables the organization to easily use and reuse vital information, replace experienced team members without loss of organizational knowledge which encourages innovation and creativity. Due to the vital role tacit knowledge plays in the organization, and its importance, it is imperative that organizations look for ways to share and transfer this vital knowledge among members of a team to foster innovation among them.

Transferring tacit knowledge is challenging as it is neither codified nor expressed in any form of language, rather it is got from shared experience, observations, and imitation, where the possessor of such knowledge is not aware of having such knowledge much less, codifying it for others (Mohammad & Juhana, 2013).

Previous studies like the empirical study of Harold (2008) demonstrate that tacit knowledge has links to firm performance, suggesting that tacit knowledge is a measurable quantity. Other studies on tacit knowledge focused on codifying tacit knowledge to explicit knowledge, which has generated considerable debate as some researchers argue that tacit knowledge is primarily individualist in nature and cannot be codified in entirety even with technology. This is because the option lies in social interaction, hence the importance of the social realm in transferring of tacit knowledge (Nonaka & Takeuchi, 1995; Polanyi, 1966; Casonate & Harris, 1999; Kimiz,

2011). Miroslav and Karin (2010) in their research paper, suggest that tacit knowledge can be transferred through traditional workplace learning and training methods of apprenticeship and direct interaction.

Teams are the vehicles organizations use to the institutionalize new knowledge into the organization (Li, D'Souza & Du, 2011), particularly in the oil and gas producing sector where cross-sectional teams are used to work on projects that requires multiple skills and knowledge. This paper used apprenticeship, a traditional method of learning and developing skills among novice, but with emphasis on the social relations that exist between a 'master and an apprentice', to transfer tacit knowledge among members as opposed to codifying/organizing tacit knowledge into explicit knowledge.

When experts and knowledgeable employees leave an organization either through retirement, sudden death/illness or resignation, they usually take with them vital experiential organizational knowledge that are in most cases difficult to replace or costly when available (Steve and Mike, 2017) thus, the need to develop a knowledge transfer strategy especially tacit knowledge transfer strategy, since tacit knowledge is difficult to codify, so as to mitigate the problems associated with knowledge lost and its associated cost.

Studies have suggested that reinventing the wheel, repetition of past mistakes, a lack of improvement, lack of cost-saving techniques or an inability to innovate, create or add value are some of the problems associated with lack of requisite knowledge (Martínez, 2016), and in some cases tacit knowledge, as Nowshade (2006) highlighted the importance of tacit knowledge as a source of competitive advantage and identified the problems associated with a lack of tacit knowledge in relation to team performance.

From the review of literature conducted, this paper suggests that there is a lack of empirical study on tacit knowledge transfer using apprenticeship and its influence on team performance in oil and gas producing companies in Nigeria, especially in Port-Harcourt, River state. Therefore, the study seeks to empirically investigate the impact of apprenticeship tacit knowledge transfer on team performance.

The broad objective of this study is to examine the relationship between apprenticeship as a tacit knowledge transfer mechanism and team performance proxied by task accomplishment and team efficiency. The specific objectives of the study are; to:

- determine the extent to which apprenticeship relates to task accomplishment in oil and gas producing companies in Rivers State; and
- ascertain the extent to which apprenticeship relates to team efficiency in oil and gas producing companies in Rivers State.

To guide this study, the researchers formulated and tested the following hypotheses:

H₀₁ There is no significant relationship between apprenticeship and team task accomplishment in oil and gas producing companies in Rivers State.

H₀₂ There is no significant relationship between apprenticeship and team efficiency in oil and gas producing companies in Rivers State.

II. Conceptual Review

Concept of Tacit knowledge: Since Polanyi (1966) introduced the concept of tacit knowledge, the concept has scholars divided on what exactly tacit knowledge is, what role it plays in today's knowledge-based organization and its usefulness. While most scholars agree it is the innovative, experienced, intuitive, personalized knowledge that leads to competitive advantage, the major dispute focused on whether it can manage, let alone transfer it across an organization.

Tacit knowledge is the knowledge that is difficult to codify either in text or words. It is experiential, individual, expert knowledge that resides in the mind of experts and can only be transferred through social interaction.

Tacit knowledge has several major elements which are; first, its lack of conscious awareness. Usually, the users of tacit knowledge are not consciously aware of it. This is because this knowledge is built over time and stored in such a way that the user is no longer aware, he/she possesses such knowledge. The second element is the degree to which it is not expressible, as Polanyi (1966) considers tacit knowledge as "we can know more than we can tell", stressing the difficulty to express to others either orally or written. The third element to tacit knowledge is demonstrability. That is the ability to perform a given task-based only by seeing the activity performed or the outcome. The greater the ability to do this, the greater the reliance on tacit knowledge, the lesser the individual depends on explicit instructions. This is especially useful in a complex situation that requires an unobservable task. The fourth element depends on prior learning and arises in the degree to which a person appears to be applying a knowledge-based, in a formal or informal manner. That is after an individual learns a process that involves explicit steps, over time, if he/she can do those steps without reliance on those steps, then such individual is said to be high on tacit knowledge as they now perform their step in an illogical way when viewed by an outsider (Michael & James, 2007). Again, the aim is not to test these elements of tacit knowledge but to use methods that incorporate these elements in transferring tacit knowledge to team performance.

Apprenticeship: The master-apprenticeship relationship has been in existence as far back as the early 2000 B.C and practiced in the east by the Egyptian and Babylonians. It also has a long history in the west, from old Greek sophists (Leonard 2002). This ancient relationship has rules that are still applied today. It is a practical, repetitive approach that questions the why, what, how and when a decision or action should be taken by the apprentice. This repetitive process of guidance, practice, observation, imitation, and analysis helps their apprentice learn tacit knowledge, which is knowledge to become an expert.

Erdelina, (2011), In his paper, pointed out that the apprenticeship process today is replicated to the coaching, mentoring and counseling process. The study finds what Erdelina said interesting because in Nigeria, apprenticeship as a term is not used in the organization as much as the terms, coaching, mentoring and counseling, rather alternative term like on-the-job-training and action learning is more often used. Since apprenticeship is replicated in the coaching, mentoring and counseling process, this research will use these terms to define apprenticeship as these terms are well understood in today's organizations in Nigeria. Also, Miroslav and Karin (2010) argued that tacit knowledge, rather than explicit knowledge, allows an individual to perform at a higher level because of the experience tacit knowledge gives and therefore suggest that tacit knowledge can be transferred through traditional workplace learning and training methods of apprenticeship, because it covers the four categories of tacit knowledge as identified by Lubit, (2001) which are hard-to-pin-down skills, mental models, ways of approaching problems and organizational routines.

This paper, based on reviewed literature, agrees with Miroslav and Karin (2010) that tacit knowledge is transferred in the apprenticeship process as the social interaction between the apprentice and experts grows, explicit knowledge which is first transferred in the process, gradually turns to tacit knowledge as the apprentice get used to the fundamental principles relating to the discipline in line with Michael and James (2007) description of major elements of tacit knowledge.

Baum and Ingram (1998), mentioned that there is growing empirical evidence to indicate that organizations that can transfer knowledge effectively are more likely to be productive and outlive those less adept at knowledge transfer. (Tang, Xi, and Ma, 2006). This goes to prove the importance and vital role that knowledge transfer plays in today's organizational, as it shows the link that exists between effective knowledge transfer and productivity.

Concept of Team Performance: The use of teams as a tool to accomplish organizational tasks and goals is a widely accepted management practice (Hamson, 2001). This practice of employee involvement through teams is aimed at getting the best out of each employee by promoting group cohesion, goal attainment, continuous improvement and respect for people. This is more particular for the knowledge worker, which makes a greater percentage of today's workforce. The knowledge worker represents a class of individuals whose primary task in the workplace is thinking and the creation of new knowledge. The primary task includes relying on information technology tools to gather information, analyze data, innovate new solutions and make decisions (Reinhardt, Schmidt, Sloep, and Drachsler, 2011).

The concept of team performance is gotten primarily from performance management, and has its root in employee performance, which is about setting goals for employees, monitoring and evaluating performance as well as ways to improve employee performance, thus, it is an on-going process, that aims at improving both the effectiveness and efficiency of an employee. Likewise, team performance aims to facilitate the overall improvement of the team, as well as ensuring the team is working together to achieve its objectives. The idea of working together entails, combining resources, talents, skills, effort, as well as understanding individuals' roles and responsibilities within and among team members. There is also a need to define clear communication links within and among team members that will assist team members to carry out their responsibilities.

MacBryde, Mendibil, and Kepa (2003), identified team effectiveness (process outcomes), team efficiency (internal team processes), team learning and growth, and team member satisfaction as measures of team performance. The definition of team effectiveness is the degree to which a team is successful in producing a desired outcome or result, that is its accomplishment. Jack, (1997), agreed that team task accomplishment is the first measure of any team performance. Therefore, in measuring team performance in oil and gas producing firms, the researcher, based on Jack (1997) and MacBryde et al (2003), used team task accomplishment and team efficiency as measures of team performance.

Team Task Accomplishment: Accomplishment is value-added results the team leaves behind every day after work. They are contributions the team makes for the organization that results from the team's activities. Jack (1997), identifies three reasons why task accomplishment is the first and best measure of team performance. The first; it takes less time. He stated that agreeing on what result a team is to achieve takes less time that agreeing on the best activity to realize these results, meaning that the team usually agree more on the goal that the means to the goal. The second, is that gathering data is less expensive when measuring accomplishments as assessing activities leading to results requires greater cost than, assessing the results. The last, it allows the team focuses on what is significant. Focusing on results, rather than activities allows the team to know what is imperative unless what the organization wants is activity.

In measuring team task accomplishment, for oil and gas producing firms, that deals with the knowledge worker, the study looks at the end results, level of productivity, timeliness, meeting deadlines, and work quality.

Team Efficiency: Efficiency as a measure of team performance looks at value-added service or product to the work process, mapping out the work process involved in accomplishing a task, with the purpose of identifying cost-effective activities, process re-engineering, and innovative ways of achieving a given task. Say for example, an oil and gas producing company, working on a project of renovating a complex well-head, measures efficiency after definition and agreement on the task to be accomplished, meaning that efficiency looks at the cost, time-saving methods and other input, with a view of using the lowest amount of input to maximise output. In a nutshell, efficiency as a measure of team performance in Oil and gas producing refers to the work process activities, cost-effective methods, problem-solving and innovative ways of achieving a given task with the lowest input and maximum output.

III. Methods

The population consists of ten (10) oil and gas producing companies in Rivers state, of which seven (7) were selected based on the criteria of twenty (20) years or more existence (finelib, 2016). The seven companies have a total of fifty-four (54) projects, thirty-six (36) team members (each team consist of an average of 5 team members), giving a total population of two hundred and seventy (270) team members. From this population, the researcher used Taro Yamane (1976) formula, at 0.05 margin of error, to get a sample size of one hundred and sixty-one (161), using proportional stratified random sampling to choose the representative sample which consist of Company A (12), Company B (18), Company C (18), Company D (30) Company E (12), Company F (35) and Company G (36). A total of 161 copies of a questionnaire was administered out of which 133 were found usable, amounting to 82.6%. Statistical tools including simple percentage, frequency tables, mean, and ordinary least square multiple regression analysis was employed for data analysis using Statistical Package for Social Sciences (SPSS) software version 24.

IV. Data Analysis and Results

Demographic Analysis: Table 1 shows the presentation and analysis of data for the background information of the sampled respondents in terms of company, position, marital status, gender, age and level of education of the respondents.

Description of Research Variables: To descriptively analyze the data obtained on the research variables, values such as 4, 3, 2, 1 were attached to *Greater Extent, Great Extent, Moderate Extent, and Low Extent* to calculate the mean by multiplying the values (weights) by the frequencies and later divided by the total number of respondents

Apprenticeship:

Table 2: Frequency distribution and mean scores of apprenticeship

Q/N	Question	Great extent	Cons. extent	Mod. Extent	Slight extent	Mean
1	To what extent is on-the-job training practiced in your organization?	39 (29.4%)	17 (12.8%)	30 (22.6%)	47 (35.4%)	2.36
2	To what extent is coaching practiced in your organization?	17 (12.8%)	61 (45.9%)	4 (3.1%)	51 (38.4%)	2.33
3	To what extent is mentoring practiced in your organization?	30 (22.6%)	30 (22.6%)	36 (27.1%)	37 (27.9%)	2.40
4	To what extent is counselling practiced in your organization?	31 (23.4%)	17 (12.8%)	29 (21.9%)	56 (42.2%)	2.17
Overall Mean for Apprenticeship						2.32

Table 2 above shows that majority of the respondents agreed to a moderate extent that on-the-job training is practiced in their organizations ($\bar{X} = 2.36$); coaching is practiced in their organizations ($\bar{X} = 2.33$); mentoring is practiced in their organizations ($\bar{X} = 2.40$); counselling is practiced in their organizations ($\bar{X} = 2.17$). The overall mean score for apprenticeship is 2.32. It can be concluded that respondents' assessment of apprenticeship is moderate.

Team Task Accomplishment:

Table 3: Frequency distribution and mean scores of team task accomplishment

S/N	Question	Greater extent	Great extent	Mod. Extent	Low extent	Mean
1	To what extent is the team aware of its daily task, results/accomplishment?	87 (65.5%)	46 (34.6%)	0 (0%)	0 (0%)	3.65
2	To what extent does the team make effective use of its time, even during 'down time'?	35 (26.4%)	98 (73.7%)	0 (0%)	0 (0%)	3.26
3	To what extent does the team meet all its deadlines?	69 (51.9%)	64 (48.2%)	0 (0%)	0 (0%)	3.52
4	To what extent does the team look after every little details of the task to make sure it is done properly?	87 (65.5%)	46 (34.6%)	0 (0%)	0 (0%)	3.65
Overall Mean for Team Task Accomplishment						3.52

Table 3 shows that majority of the respondents agreed to great and considerable extent that team is aware of its daily task, results/accomplishment ($\bar{X} = 3.65$); team make effective use of its time, even during 'down time' ($\bar{X} = 3.26$); team meet all its deadlines ($\bar{X} = 3.52$); team look after every little details of the task to make sure it is done properly ($\bar{X} = 3.65$). The overall mean score for team task accomplishment is 3.52. It can be concluded that respondents' assessment of team task accomplishment is very high.

Team Efficiency:

Table 4: Frequency distribution and mean scores of team efficiency

Q/N	Question	Great extent	Cons. extent	Mod. Extent	Slight extent	Mean
1	To what extent does the team initiate alternative ideas about alternative solutions instead of reliance on old ideas?	0 (0%)	52 (39.1%)	81 (61%)	0 (0%)	2.39
2	To what extent do team members collaborate and relate to each other?	61 (45.9%)	41 (30.9%)	31 (23.4%)	0 (0%)	3.23
3	To what extent is teamwork well-organized and systematic?	60 (45.2%)	44 (33.1%)	29 (21.9%)	0 (0%)	3.23
4	To what extent is the team performance superior in all respect?	115 (86.5%)	18 (13.6%)	0 (0%)	0 (0%)	3.86
Overall Mean for Team Efficiency						3.18

Table 4 shows that majority of the respondents agreed to great and considerable extent that team initiate alternative ideas about alternative solutions instead of reliance on old ideas ($\bar{X} = 2.39$); team members collaborate and relate to each other ($\bar{X} = 3.23$); teamwork well-organized and systematic ($\bar{X} = 3.23$); team performance superior in all respect ($\bar{X} = 3.86$). The overall mean score for team efficiency is 3.18. It can be concluded that respondents' assessment of team efficiency is high.

Model Estimation and Interpretation: Pearson correlation analysis was carried out to establish the relationship among the variables interest. Also, the results of regression analyses are presented accordingly.

Correlation Analysis

Table 5: Pearson correlation coefficient

		TTA	TE	AP
Team Task Accomplishment (TTA)	Pearson Correlation	1	.621**	.858**
	Sig. (2-tailed)		.000	.000
	N	133	133	133
Team Efficiency (TE)	Pearson Correlation	.621**	1	.694**
	Sig. (2-tailed)	.000		.000
	N	133	133	133
Apprenticeship (AP)	Pearson Correlation	.858**	.694**	1
	Sig. (2-tailed)	.000	.000	
	N	133	133	133

** . Correlation is significant at the 0.01 level (2-tailed).

Table 5 shows that team task accomplishment (TTA) is positively correlated with apprenticeship (AP). Similarly, team efficiency (TE) is positively correlated with an apprenticeship (AP). Interestingly also, all the variables are statistically significant at 1% level.

Table 6: Relationships among team performance and apprenticeship tacit knowledge

Variable	Team Task Accomplishment			Team Efficiency		
	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
C	2.8268	71.2357	0.0000	2.4618	34.8508	0.0000
Tacit Knowledge						
Apprenticeship	0.3004	19.0843	0.0000	0.3095	11.0450	0.0000
Diagnostic Statistics						
R-Squared	0.7355			0.4822		
Adj. R-Squared	0.7334			0.4782		
F-Statistic	364.2085			121.9923		
Prob (F-Statistic)	0.0000			0.0000		
DW Stat	1.9296			1.5127		

Dependent variable: Team Performance

Table 6 shows that when apprenticeship tacit knowledge was regressed against team task accomplishment an R^2 value of 0.7355 was obtained. The result reveals that apprenticeship is statistically significant at $P < 0.05$. The F-statistic of 364.2085 is significant at $P < 0.01$; this means that there is a statistically significant relationship between the independent variables and the dependent variable as a group. The Durbin-Watson statistic of 1.9296 reveals the absence of first-order serial correlation.

Similarly, Table 6 also shows that when apprenticeship was regressed against team efficiency, an R^2 value of 0.4822 was obtained. The result reveals that apprenticeship is statistically significant at $P < 0.05$. The F-statistic of 121.9923 is significant at $P < 0.01$; this means that there is a statistically significant relationship between the independent variables and the dependent variable as a group. The Durbin-Watson statistic of 1.5127 reveals the absence of first-order serial correlation. The sign of the coefficients of the variable is all positive.

Hypotheses Testing: The results in Table 6 were used to test all the hypotheses stated for this study

H_{01} There is no significant relationship between apprenticeship and team task accomplishment in Oil and gas producing companies in Rivers State.

The results in Table 6 show that there are positive and statistically significant relationship between apprenticeship ($\beta = 0.3004$; $p < 0.05$) and team task accomplishment. The t-statistic values of 19.0843 confirmed the results. Based on the results, we do reject the null hypothesis. We, therefore, conclude that there is a significant relationship between apprenticeship and team task accomplishment in oil and gas producing companies in Rivers State.

H_{02} There is no significant relationship between apprenticeship and team efficiency in Oil and gas producing companies in Rivers State.

The results in Table 6 show that there are positive and statistically significant relationships between apprenticeship ($\beta = 0.3095$; $p < 0.05$) and team efficiency. The t-statistic values of 11.0450 confirmed the results. Based on the results, we do reject the null hypothesis. We, therefore, conclude that there is a significant relationship between apprenticeship and team efficiency in oil and gas producing companies in Rivers State.

V. Discussion of Findings

This study found that apprenticeship positively and significantly related to team task accomplishment and team efficiency. This outcome adds credence to Baum and Ingram (1998) position that organizations that can transfer knowledge effectively are more likely to be productive and survive than those less adept at knowledge transfer. This goes to prove the importance and crucial role that tacit knowledge transfer plays in organizations today, as it shows the link that exists between effective knowledge transfer and productivity. Apprenticeship is vital in transferring knowledge, mainly tacit knowledge that will be difficult to transfer through traditional teaching and learning methods, rather it is done through long-term observations and experience and is sometimes supplemented by classroom learning that involves discipline, power play and social relationship (Leonard 2002).

VI. Conclusion and Recommendations

The result revealed the following conclusion

- That there is a positive and significant relationship between apprenticeship tacit knowledge transfer and team task accomplishment in oil and gas producing companies in Rivers State, Nigeria;
- That there is a positive and significant relationship between apprenticeship tacit knowledge transfer and team efficiency in oil and gas producing companies in Rivers State, Nigeria;
- That apprenticeship tacit knowledge transfer affect team performance in oil and gas producing companies in Rivers State, Nigeria.

Based on these, the research recommends that

- Organizations should utilize the apprenticeship model of knowledge transfer irrespective of the position to ensure that new employees gain as much as they can from experts in the field.
- Apprenticeship model of learning should be adjusted to allow for more social interaction between the apprentice and the experts to improve the transfer of tacit knowledge and not just explicit knowledge.

References

[1]. Casonato, R., & Harris, K. (1999). Can an enterprise really capture “tacit knowledge”? We Answer Two Top Questions on Knowledge Management. Electronic Workplace 1999 Conference Gartner Group Research Note Select Q&A 16th March.

[2]. Celia Zarraga-Oberty & Petra De Saa-Perez (2006). Work teams to favor knowledge management: towards communities of practice. *European Business Review*, 18, 1, 2006.

[3]. Cohen, S.G., & Bailey, D.E. (1997). What makes teams work: Group effectiveness research from the shop floor to the executive suite. *Journal of Management*, 23(3), 239-90.

[4]. Erdelina, K. (2011). Working with tacit knowledge: An empirical investigation in glass blowing tradition in Sweden. *Journal of computer science/physics and mathematics*.

[5]. Finelib.com. (2016). Nigeria Directory and search engine. Available at www.finelib.com.

[6]. Gary, I. S., McIntyre, N., & Dawley, D. (2008). Tacit knowledge: A refinement and empirical test of the academic tacit knowledge scale. *The Journal of Psychology*, 142(6), 561-580.

[7]. Grotenthuis, F., & Weggeman, M. (2002). Knowledge management in international mergers. *Knowledge and Process Management*, 9(2), 83-89.

[8]. Hamson, N. (2001). Organizing for high performance. *Journal for Quality and 1657 Participation*, 24(4).

[9]. Harold Harlow (2008). The effect of tacit knowledge on firm performance. *Journal of knowledge management*, 12.1, 2008.

[10]. Hildrum, J.M. (2009). Sharing tacit knowledge online: A case study of e-learning in Cisco's network of system integrator partner firms. *Industry and Innovation*, 16(February), 197–218.

[11]. Jack, Z. (1997). Team performance measurement: A process for creating team performance standards. *Compensation and Benefits Review*, 29, 38.

[12]. Kelley, D. J., & Rice, M. P. (2002). Leveraging the value of proprietary technologies. *Journal of Small Business Management*, 40(1), 1-4.

[13]. Kimiz, D. (2011). Knowledge management in theory and practice. Elsevier Butterworth–Heinemann

[14]. Lam, A. (1997). Embedded firms, embedded knowledge: Problems of collaboration and knowledge transfer in global cooperative ventures. *Organizational Studies*, 18, 973–996.

[15]. Leonard, D. (2002). *Learning theories: A to Z*. Oryx Press, Westport.

[16]. Lubit, R. (2001). The keys to sustainable competitive advantage: tacit knowledge and knowledge management”, *Organizational Dynamics*, 29(3), 164-178.

[17]. MacBryde, J., & Mendibil, K. (2003). Designing performance measurement systems for teams: theory and practice. *Management Decision*, 41(8), 722-733.

[18]. Martínez Sanz, M. (2016). Overcoming knowledge-sharing barriers. Paper presented at PMI® Global Congress 2016—EMEA, Barcelona, Spain. Newtown Square, PA: Project Management Institute.

[19]. Miroslav, R., & Karin, S. (2010). Fostering innovation by unlearning tacit knowledge. *Kybernetes*, 36(3/4), 406-419.

[20]. Mohammad S. A., & Juhana S. (2013). A conceptual framework for managing tacit knowledge through ICT perspective. The 4th international conference on electrical engineering and informatics. Available online at www.sciencedirect.com

[21]. Nonaka, I., & Takeuchi, H. (1995). *The knowledge-creating company: How Japanese companies create the dynamics of innovation*. Oxford University Press, New York, NY.

[22]. Nowshade, K. (2006). Effects of advances in technology on tacit knowledge transferability. *A Journal of Grenoble Graduate School of Business*

[23]. Okwu Hanachor E., (2019). Tacit knowledge transfer strategies and team performance in selected oil and gas producing companies in Rivers State, Nigeria. Unpublished master’s degree theses, department of office and information management, Rivers State University, Port Harcourt.

[24]. Patton, J. R. (2007). Metrics for knowledge-based project organizations. *SAM Advanced Management Journal*, 72(1), 33.

[25]. Polanyi, M. (1962). *Personal knowledge: Towards a post-critical philosophy*. Chicago, IL: Chicago University Press.

[26]. Polanyi, M. (1966). *The tacit dimension*. London: Routledge and Kegan Paul.

[27]. Reinhardt, W., Schmidt, B., Sloep, P., & Drachsler, H. (2011). Knowledge worker roles and actions result from two empirical studies. *Knowledge and Process Management*, 18(3), 150–174.

[28]. Steve T, & Mike M, (2017). The power of knowledge transfer- Preserving your secret sauce while mitigating talent management risk. *Careers Partners International*.

Appendix 1

Description of Research Variables

Variable	Category	Frequency	Percent	Cumulative Percent
Name of Company	Company A	8	6.0	6.0
	Company B	16	12.0	18.0
	Company C	12	9.0	27.1
	Company D	24	18.0	45.1
	Company E	10	7.5	52.6
	Company F	30	22.6	75.2
	Company G	33	24.8	100.0
	Total	133	100.0	
Position	Team Leader	49	36.8	36.8
	Team Members	84	63.2	100.0
	Total	133	100.0	
Marital Status	Married	81	60.9	60.9

Variable	Category	Frequency	Percent	Cumulative Percent
	Single	52	39.1	100.0
	Total	133	100.0	
Gender	Male	97	72.9	72.9
	Female	36	27.1	100.0
	Total	133	100.0	
Age	20years and below	-	-	-
	21-30years	18	13.5	13.5
	31 - 40 years	81	60.9	74.4
	41-50 years	21	15.8	90.2
	Above 50years	13	9.8	100.0
	Total	133	100.0	
Educational Qualification	SSCE/GCE	-	-	-
	NCE/Diploma/OND or Equivalent	-	-	-
	HND/B.Sc. or Equivalent	97	72.9	72.9
	Postgraduate	36	27.1	100.0
	Total	133	100.0	

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