

Empirical Analysis of Explicating the Tacit Knowledge Background, Challenges and Experimental findings



Ninni Singh, Neelu Jyothi Ahuja

Abstract: Tacit knowledge is undocumented knowledge, gained by an individual by virtue of his/her experience on an activity. It rests with the individual, is hard to discover, express and articulate. It is a valuable body of knowledge, hence is essential to solicit, gather and explicate, so as to facilitate its percolation to the younger generation. In this paper, characteristics of tacit knowledge, the issues and mechanisms of explicating have been presented. Seismic data interpretation, as a tacit knowledge domain has been identified, issues faced in its explication and process followed in development of explicit knowledge capsule is detailed. In order to infer the tacit knowledge sharing behavior of an individual a large approximate 5000 survey responses from participant base of individuals from IT firms, Educational Institutions, Government Organizations, Research Organization and Students Community were obtained. The validity and reliability of the measure were verified. Exploratory factor analysis and confirmatory factor analysis was conducted on received valid responses. Based on the analysis, the concrete inference was deliberated.

Keywords: e-Learning, Intelligent tutoring system, Knowledge Management; Knowledge Acquisition,

I. INTRODUCTION

The term “tacit knowledge” has evolved from the modern epistemological literature. “Tacit” is a hidden, unspoken and unwritten knowledge grasped by every individual, based on her/his experiences, intuitions, emotions, insights and observations. Tacit knowledge is important and priceless to the entirety of an individual consciousness. It is attained through several activities such as interaction with other individuals, working on projects, experiencing some unexpected situations, and thereby gaining expertise over a period of time. Contrary to traditional knowledge of any subject, available in formal written form (explicit knowledge), this knowledge is very difficult to discover, gather and collect. This is one of the most challenging aspects of knowledge management. But this task is essential, as it needs to be passed on to the future generations, to draw intended benefits. Tacit knowledge is “practical knowledge learned informally while working on the job” (Wagner and Sternberg, 1985). This is partially complete definition of tacit knowledge as it covers only one aspect of tacit knowledge

(know-how). Tacit knowledge is not limited to experiences learned on the job, it includes values beliefs, ideals, culture and attitude. For example, the artisans know their work very well, but find it difficult to express the sequence of steps involved in making of an artifact. To gain this knowledge artisan may have spent many years. In spite of years of practice it is very difficult to comprehend his/her art in words or through process charts. These skills are largely gained by apprenticeship and through imitation and observation. Polanyi asserts “subject having tacit knowledge knows more than he can express”. Tacit knowledge is the knowledge which is not documented in books, manuals, files and databases. People deduce analogies, metaphor stories and demonstrations to express such knowledge (Orzea, 2009) (Jana, 2015).

(Johnson 2007) [3] depicts the characteristics of tacit knowledge. These are elaborated as under:

A. Personal Knowledge

Tacit knowledge is considered to be the part of individual understands, that is very personal to him/her. As per individual willingness, it can also be shared with others who are having similar tacit knowledge.

B. Tacit Qualities

Unarticulated knowledge is constituted as tacit knowledge. Tacit qualities of knowledge are rooted in sub-conscious nature of an individual.

C. Path Dependency

Tacit knowledge is the personal skill, its accumulation needs time and efforts, but its utilization depends on the propensity of the benefactor individual or organizations.

D. Context Dependency

To a larger extent, tacit knowledge is dependent on specific contents. Hence its application also depends on choice of right place and situations.

E. Embeddedness

Tacit knowledge is entrenched in nature. Skills like driving a car or riding a bicycle are skills perfected by practice.

Example, riding bike well needs practice (it requires both observation and imitation). With time these skills get embedded within an individual.

1.1 Categories of tacit knowledge

Tacit knowledge has different variations based on its usage. Categorization provides two advantages

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- i. It facilitates detailed analysis.
- ii. Understanding of how different types of tacit knowledge are learned and articulated using different mechanisms.

Tacit knowledge is divided into three categories (Martin Davis,1999)(Zhang, 2017):

A. Tacit Knowledge as Competence

This kind of tacit knowledge is directly related to the skills and physical activities that indirectly indicate the capabilities of a subject to ‘*know-what*’ (perform certain activities) but not able to describe ‘*know-how*’ (sequential steps involved in performing activities). This kind of tacit knowledge is of unreflected character. This is a fruit of rigorous practice, observations and imitation (eg:- learn bike riding). This category of tacit knowledge works in case of particular physical skills like abilities, such as, driving car, swimming etc. These skillful activities are performed by following some set of rules, which are not explicitly known by the subject, but rather implicitly implemented.

B. Tacit knowledge as background

This kind of tacit knowledge is different from the other types of knowledge. It is highly dispersed in nature, making it difficult to articulate and formalize, further causing it difficult to access. This knowledge has more than one affinity with the background. It is interiorized regulation of values and widespread knowledge that a subject knows by virtue of his or her direct experience. Background means that it is collection of cultural or biological capacities of pre-theoretic, presuppositions, assumptions, opinions that act as a pre-condition for any form of knowledge.

C. Tacit knowledge as implicitly held cognitive rules

This knowledge is considered similar to be “*correct answer*” or “*knowledge as justified true belief*” . Now, the question is how one can determine, that the knowledge that subject is having, is deliberated as a “*true belief*”. Tacit knowledge is not able to formulate it, then how one can hold a tacit belief? This kind of question comes into mind because this kind of tacit knowledge is different from physical activity and background knowledge. Tacit knowledge holds cognitive dimensions ruled from many years’ in epistemology and cognitive sciences. The only way of considering tacit knowledge was limited to admitting that it could have a role in skill-like abilities.

1.2. Challenges in tacit knowledge acquisition

Tacit knowledge is a knowledge attained through experience and personal practice, which presents itself in individual’s brain (Polanyi, 1958). Explicating it seems to be difficult or impossible (Augier and Vendelo, 1999). Many researchers have explored technique for the diffusion of tacit knowledge. Regardless of the estimation of means of knowledge diffusion, researchers assert that there are *difficulties* in sharing tacit knowledge. Some of these are listed in following section (Emma, 2015) (Andria,2007) (Martin, 1999).

A. Language and perception

Perception is considered to be main problem in sharing implicit knowledge. Formalizing explicit knowledge is easy but the understanding of the concept is missing or the fundamentals of perception (missing linking) are difficult to determine. The subject is not aware about own skill of having tacit knowledge. Just as we don’t need to be aware of our

blood circulation, an individual does not use oneself and we tend not using ourselves in reflecting own tacit knowledge. Language is also considered as one of the barriers in sharing implicit knowledge. Due to inability to use appropriate grammar and annotations, individual may not be able to explain views, even if he or she is willing to share. This may lead to loss of tacit knowledge due to difficulties in articulating. Investigations reveal that the subject or the person knows more than he or she can tell.

B. Lack of evidences

Tacit knowledge and skills completely innate in person’s mind in such a manner that over a period of time are, taken for granted and become impossible for anybody to copy. Person with experience deduces some unexpected, undefined information, which is somehow true in a particular scenario or environment. In such case person makes some heuristic rules in his or her mind to convince himself/ herself. But if he/she is asked to share the knowledge with others, is not able to explain due to lack of supporting evidences and facts. Formalizing explicit knowledge is easy and one can convince others without facing any difficulty. Thus lack of evidence to justify one’s knowledge in one of the key issues in explicating tacit knowledge (Nelson and Winter, 1982). There is need for clear distinction between implicit and explicit knowledge closely connected to the “*knowing that*” and “*knowing how*”.

C. Difficult to believe:

Tacit knowledge cannot easily be explained to others, because different people have different levels of understanding and thinking. Different people have different perceptions and different ways of looking at a given scenario. If someone is elucidating his or her skills then it is not necessary that other people too deduce the same thing as they may be at different level, may think differently and realize a different impact. There may be possibility that some people may not get convinced or may be having a room for doubt. They may consider it as a useless skill and may not want to accept it. Unlike knowledge of a computer code or a chemical formula, it cannot be expressed clearly.

D. Subject Personality traits:

It is cliché that each person has his/her own characteristic way of communication, and elaborating knowledge. Research shows that personality points out the “person’s uniqueness and stable pattern of acting, thinking, reacting and feeling” to his or her environment. These personality traits elaborate why some people are interested in sharing their knowledge while others are not.

E. Competitive environment:

Competitive environment often restricts subjects to share their experience. It is well known fact that to survive in the organization, one has to be extraordinary. Knowledge makes one popular and provides recognition. Thus to maintain importance and status, individuals conceal their knowledge, for the fear of loosing their importance amongst their fellow colleagues and peers.

II. MECHANISMS TO SUPPORT EXPLICATION OF TACIT KNOWLEDGE

A. Cognitive Map

Cognitive map is considered to be a way of depicting subject's thoughts (points) (Eden et al.,1981)[5]. Eden explores to understand and relate the subject's cognitive ability and also tries to understand the way he or she makes sense and explains the world around him (Eden, 1990, p. 37).

Map construction is used to construct a sketch of subject's tacit knowledge. Further this map is used to simplify the knowledge by expressing (elaborating) the subject's belief and opinions on a particular problem.

Cognitive maps are further classified into various types (Huff, 1990), causal map is one of them. Causal map is used to represent the tacit knowledge using graphical representation (nodes indicate the subject's belief and edges indicates the association between the construct), in which concepts are bound together by some relation (causality relation).

B. Causal Maps

Causal maps are one of the most promising techniques that explicates the tacit knowledge, as it mainly focuses on actions (Huff, 1990). Tacit skill is represented as the task or doing things, and relation (causalities) indicates the procedure knowledge (working and step by step procedure). Additionally, causal map is advantageous to extract factors that are context dependent. By observing and imitating particular experiential activities subjects develop opinions that are consistent with the task or activities. Thus causal map is a promising technique for extracting tacit knowledge.

Knowledge is gathered in causal mapping by continuously asking the subjects to share their experiences on what they do. During the construction of this map, subjects are persuaded to elaborate what they do and in process of reflecting, they are likely to reveal their behavior and tacit knowledge. In this probing, map develops unspoken skills. During mapping, researchers have reported the instances where subjects articulates ("I hadn't realize that, oh yes"). This kind of expression or reactions indicate transition of tacit towards explicit. This also provides confidence and satisfaction to the researcher in their whole exercise.

C. Self Q

Self-Q is a mapping (non-directive) technique. It is also known as self-interviewing technique, which deduces subject's account of his/ her opinions to produce construct. Self-Q as its name suggests, employs a process where the subjects interview themselves. The key idea is that: i) Subjects are the experts on their own knowledge, that guides their personal and social behavior. ii) Subjects frame questions on the basis of their personal knowledge, thinking ability and also about the situation and parameters they are questioning. Bougon et al. (1989) also claim that with self-interviewing, the concepts, objects and events used to frame their questions support to disclose their tacit knowledge.

This technique can also be applied in groups. i.e. divide the people with same skill in a group. In this, subjects ask questions for themselves about the topic to be mapped. Self-Q is considered to be the promising technique; because

expert knows himself/ herself more than others thus he/she will frame logical and appropriate questions.

D. Semi-Structured Interview

In this method the interview is semi structured, i.e. aim and structure is pre-determined. Researcher is interested to know the whole story (cause of success, types of problems, factors that create problems etc.) of subject experiments (with examples). (Martin, 1982) believes that it is very important to encourage the subjects to tell their experiences, because narrating story is considered to be an effective form of sharing implicit knowledge. Narrating story recollects memory of the experiments and also explains every possible aspect ("how things are performed"). It has been observed that in process of narrating tacit knowledge in form of story, subjects articulate more than they are normally used to say. Story helps researchers to interpret the opinion, ideology, criteria and filter out subject's consciousness (Veronique, 2001).

III. EXPERIENTIAL LEARNING.

Experiential learning as its name suggests it is acquired with experience or "Learning through by performing some hands-on activity". Hands-on activity is a kind of experiential learning but does not necessarily involve students reflecting on their product. It is completely related to cooperative learning, adventure learning, action learning, active learning and free choice learning.

A knowledge domain of geo-physics under field of petroleum exploration, 'seismic data interpretation' is a subject area that falls under experiential learning. In this geophysicists perform action to delineate the earth subsurface by interpreting a seismic map. The seismic interpreters use their skill to tie subsurface geology to presence of hydrocarbon. This decision is difficult and crucial thus they sometimes take more time to justify their decision. There is uncertainty in delineating structure of earth subsurface. There is no explicit knowledge. Seismologists gain reasonable interpretive powers with rigorous practice, while performing interpretations, over a period of time, under the supervision of senior geophysicists/seismologist/seismology experts. Knowledge is rare, individualistic, experiential and practical.

It is present in tacit form. All the above discussed factors make 'seismic data interpretation', an appropriate knowledge domain for considering as 'tacit knowledge' domain.

A. 'Seismic data interpretation' as domain with tacit knowledge

Petroleum exploration is accomplished by a petroleum geologist, with primary interest to discover geological structures appropriate for hydrocarbon amassing. Seismic images are widely used by geologists and geophysicists to describe terrestrial subsurface. By utilizing their skills and knowledge human specialists manually interpret the seismic images. Nevertheless, in this whole procedure of interpretation,

TABLE I: Partial Question Set For Causal Map Construction.

S.No	Questions
1	What does the seismic snap show?
2	Where would you locate additional seismic data to confirm the size and shape of the potential structural trap that you have mapped?
3	Please elucidate, cases in which faults and horizon are wrongly interpreted?
4	Discuss process of Identification of various types of faults, through velocity correlation?
5	What are the difficulties faced during interpretations?
6	There are many stories regarding occurrence of error during interpretation (Presence of salts interpreted as hydrocarbons)? Please discuss.

There is a possibility that same seismic image is interpreted differently by different seismologists. This uncertainty is because of the absence of formal rules of interpretation and therefore, each seismologist uses his or her own skills, expertise that he or she has established over past years (Ahuja, N.J., 2012). The seismologists are very well-versed with this knowledge and uncover many less-known or unknown details. This knowledge is very valuable and deserves to be solicited and preserved for future use.

Lack of formal knowledge-base of interpretation rules, causes dependency on human experts, additionally, hindering much-needed training/imparting of knowledge to forthcoming generation. Thus this information is present in tacit form. The transformation from tacit to explicit form to facilitate knowledge dissemination is much needed for effective percolation to younger generation and utilization for years to come.

IV. CONVERSION OF TACIT TO EXPLICIT: FINDINGS

In the previous sections of this paper, several techniques for explicating the tacit knowledge have been discussed. In this section, the experiences with gathering of tacit knowledge of seismic data interpretation and its transformation into explicit form, have been elaborated. An anonymous private sector company dealing with ‘seismic data interpretation’ was interacted with, in order to gather the tacit knowledge on the subject domain. A formal notesheet introducing the overall purpose of the exercise was shared with the concerned authorities. Two independent teams of 2 members each, were constituted and assigned a task of soliciting tacit knowledge from 5 seismologists. Out of group of 5 seismologists, 2 were expert profiles, involved in interpretation activity for over 12 and 13 years respectively, 2 were middle level expert profiles, who had been doing interpreting activities since 3 and 4 years respectively, and the last member of the group was a trainee, newly in-cumbered into the team to learn and practice interpretation skill. The group constitution with varying expertise of interpretation skills, is intentional, so as to gather all perspectives and allow enough provision for iterative collection and validation. Over a series of meetings, the process of acquiring and soliciting tacit knowledge from seismologist’s group was undertaken. Initially, causal map mechanism was used, a series of questions were put forward by both teams’ in independent settings and gathered

knowledge used for developing the causal map. The first team carried out their questioning, probing and causal map construction activity, within a period of three weeks, whereas the second team took about four week period. In order to gather sufficient knowledge, questions ranging from processes involved in acquisition and processing to interpretation, were developed. Listed below is the partial list of questions, concerning questions relating to seismic data interpretation process.

A. Question set for Causal Map Construction

Terms gathered from casual map have been listed below:-

- 1 Seismic
- 2 Onshore
- 3 Offshore
- 4 Thumner Truck
- 5 Geophone
- 6 Air gun
- 7 Hydrophone
- 8 Analog Recording
- 9 Analog to digital conversion
10. Wiggle Trace
11. CDP Gather
12. Stacking
- 13 Normal Move-out correction
- 1 Processed seismic section
15. Common Depth points
- 1 Floating Datum
17. TWT (Two Way Time)
- 18 Time versus Depth
19. Seismic Map
20. Check-line scale and orientation
21. Top down approach for clarity of
- 22 Determine major reflectors and geometrics
- 23 Prediction of Hydrocarbon amassing

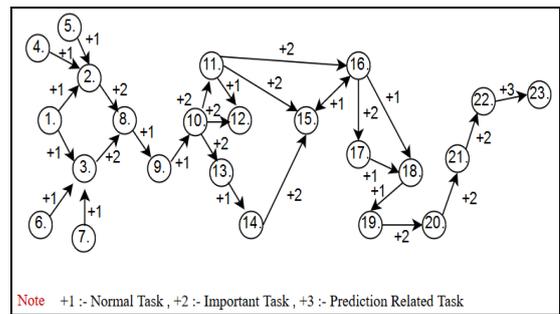


Fig 1. Causal Map for Processes involved in seismic interpretation

The causal map constructed by each team collated together has been reasonably appropriate material representing the transformation of tacit knowledge into explicit form. This part of work has been grouped as Phase I.

Figure 1 presents a generalized causal map listing activities ranging from seismic date acquisition and processing to seismic data interpretation. The current focus of this work is gathering knowledge of seismic data interpretation, whose terms are listed from 19 to 23.



Figure 2 indicates the schematic diagram of interpretation task. It shows identification of horizon and faults. There are few more geological features that may be present in a given seismic section, may held to be identified to successfully interpret a given seismic section. However for simplicity, only

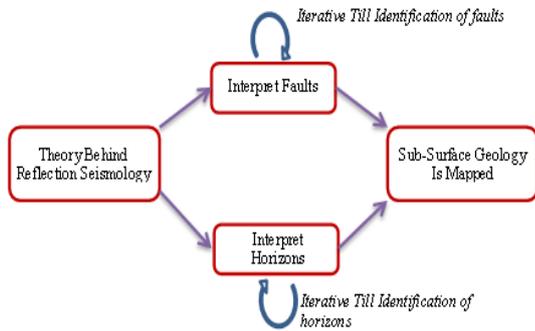


Fig 2 Schematic Diagram Of Seismic Interpretation Task

horizon and fault are mentioned here. This interpretation task is a iterative process, performed repeatedly on each segment of sections. After combining all the interpreted segments section, subsurface geological map is prepared.

The causal map constructed has been further detailed. Figure 3 presents the detailed causal map with steps numbered. These are essentially a continuation from step no 19, which have been numbered from 1 to 9, for ease of understanding as shown in Figure 2. The description of steps is listed below:

Terms gathered from Semi-Structured map have been listed below:-

1. Seismic Map
2. Interpretation initiates
3. Structural Interpretation
4. Structural analysis
5. Stratigraphic Interpretation
6. Stratigraphic analysis
4. Faults and folds
- 4.2 Salt
4. Shale Diapers
- 4.4 Structural Trends
- 4.5 Structural Features
- 6.1 Unconformities
- 6.2 Stratal Packages
- 6.3 Environments/ Facies/ Lithologies
- 6.4 Ages
7. Identify Prospect elements
- 7.1 Source of geological feature
- 7.2 Migration
- 7.3 Reservoir
- 7.4 Trap
- 7.5 Seal
8. Assess Highest Potential Prospects
- 8.1 How much oil/gas do we expect?
- 8.2 How certain they are?
9. Economical analysis

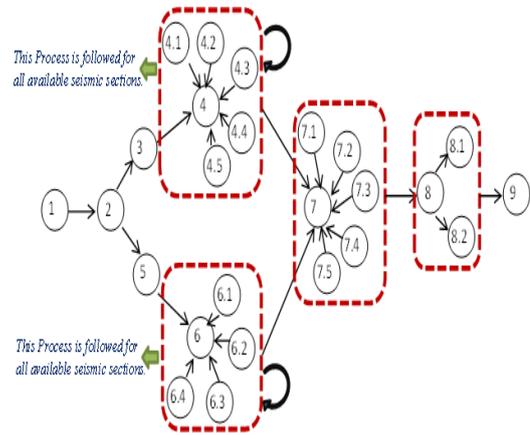


Fig 3 Semi-Structured Mechanism.

The second phase of the work was initiated with semi-structured mechanism. The same subjects and same researcher teams, as in phase-I, were continued. The subjects were interviewed and encouraged to share their experiences, stories, findings, record of what worked and what did not. Their narrations were recorded. Both teams brought out their results as account of detailed narrations and experience stories. This exercise culminated in 5 weeks by both teams working parallelly.

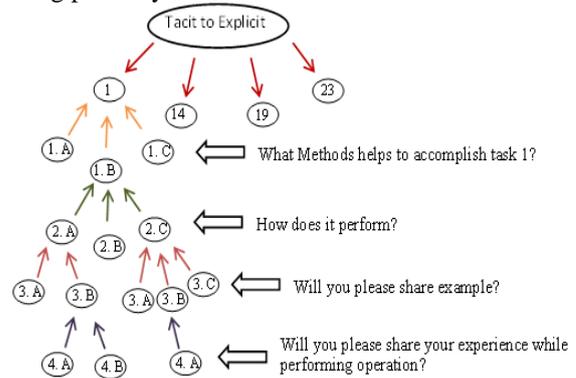


Fig 4 Semi-Structured mechanism.

The results were cumulated and a formal account of each topic of interest was generated. This led to construction of a knowledge capsule. The major contribution of the present work is this explicit knowledge represented as a knowledge capsule, facilitating its future dissemination.

Figure 4 indicates the generalized diagram representing semi-structured mechanism. In which node 1, 14, 19 and 23 indicate the tasks or knowledge that need to be converted explicitly from current tacit form. These have been further divided. 1.A, 1.B, 1.C are further probing of node 1. For example if node 1 is representing a particular task, further probing of this interms of 1.A, 1.B, 1.C may be the various methods to accomplish task 1. The main purpose of probing was to get more clear understanding. Each probing undertaken has its aim, the aim in node 1 of probing is to understand the various methods to perform the task 1. Similar process may be followed for task for remaining tasks 14,19, until 23. In this manner, the probing can continue further uncovering unknown details and eliciting experiences. Figure 6 shows probing to 4 levels and presents questions that may be asked to the subjects.

With expert guidance, this knowledge capsule divided into topics/ subtopics and appropriately sequenced has been transformed into a course, and represented as a course plan for possible course delivery. Thus, this part of work has taken the tacit knowledge, one level farther from explicit form to a tutorable form.

V. EMPIRICAL ANALYSIS ON KNOWLEDGE SHARING BEHAVIOR

This analysis is performed on the responses collected from the conducted survey. Survey included 17 question, questionnaire. Which was circulated through emails, as hardcopy and by personal visit. Approximate 9470 review forms were circulated. Among 9470 survey forms about 5000 valid responses were collected. All the valid respondents were from IT firms, Teaching fraternity, Government Organizations, Research Organizations and Students Community. The statistical demographic characteristics of the survey have been shown in Table 2. This analysis proposes five factor solutions. Each factors consist two or more than two items or parameters. The parameter in the first and second factor indicates the behavior of knowledge collecting (KC) and donating (KD) behavior. The parameter in the three, four and five factors indicates the factor that demotivates to share knowledge (KI), Knowledge sharing nature (KSN) and knowledge sharing ideology (KSI). The questionnaire for knowledge sharing includes 17 questions, or items that have been shown in the appendices.

Table 1 Demographic characteristics

Demographic Characteristics		N= 5000	
Characteristic		Frequenc	%
		y	
Gender	Male	2449	49.0
	Female	2551	51.0
Age	18-24	623	12.5
	25-34	885	17.7
	35-49	1245	24.9
	50-64	1202	24.0
	>65	1045	20.9
Education	Diploma	953	19.1
	High/ Secondary School	1571	31.4
	Graduation	1002	20.0
	Post-Graduation	1113	22.3
	PhD and above	361	7.2

5.1 Exploratory Factor Analysis

As aforementioned during survey valid 5000 responses were received. 5000 valid responses were split into two groups each consisting of 2500 responses. Exploratory factor analyses was performed on 2500 responses by utilizing principal component analysis with VariMax rotation. Before applying this analysis Kaiser-Meyer-Olkin Measure (KMO) of Sampling Adequacy and Barlett test of sphericity were tested. The statistical result indicates ($KMO = 0.758$, Barlett test of sphericity $p < 0.001$) the collected survey sample is appropriate for factor analysis. Factors having

eigenvalues greater than 1.0 were removed. Therefore, three parameters (questions that encompasses demographic information) were deleted. Thus remaining 14 parameters or items (Here parameters means questions in the questionnaire, Each questions possess one to one correspondence with parameters, which further combines together and form meaningful factor) were taken into the consideration for factor analysis. Factor analysis also observes the acceptability of variable multicollinearity and communality. Table 3 illustrates the five factors drawn from 14 parameters or items.

Table 2 Factor Analysis Factor Analysis

Questions	1	2	3	4	5
A1	.945	.091	.020	.077	.005
A2	.945	.135	.009	.020	.016
A3	.928	.089	.025	.041	.007
A4	.671	.725	.012	.119	.005
A5	.631	.686	.038	-.055	.044
B1	.206	.701	.004	.002	.106
B2	.123	.622	.050	.084	.303
C1	.070	.814	.248	.620	.020
C2	.052	-.185	.059	.852	.064
D1	.048	.277	.745	.777	.052
D2	.011	.082	.873	.141	-.028
E1	.033	.067	-.129	.039	.642
E2	.062	.136	.019	.006	.679
E3	.015	.048	-.178	.087	.776

The reliability analysis is also performed on five latent factors using Cronbach’s alpha coefficient. The reliabilities of these factors were found to be **0.810, 0.793, 0.770, 0.785 and 0.789** respectively. The reliabilities values of 5 factors are lying in the acceptable range, thus it is considered acceptable.

A. Confirmatory Factor Analysis

Confirmatory factor analysis were performed on remaining 2500 responses by utilizing Maximum Likelihood Estimation for determining the construct validity and to observe the relation between observed parameters of measurement model. Figure 5 indicates the Confirmatory factor analysis of knowledge sharing behavior of an individual.

The results of the analysis have been shown in Table 4, specify the good fit of knowledge sharing model. The

goodness-of-fit parameters values $\frac{\chi^2}{df} = 4.662$, $GFI = 0.9231$, $AGFI = 0.9029$, $NFI = 0.9668$, $IFI = 0.9703$, $CFI = 0.9703$ and $RMSEA = 0.0404$. Thus the measurement model is appropriate and acceptable. Table 5 and 6 show the goodness-of-fit indices.



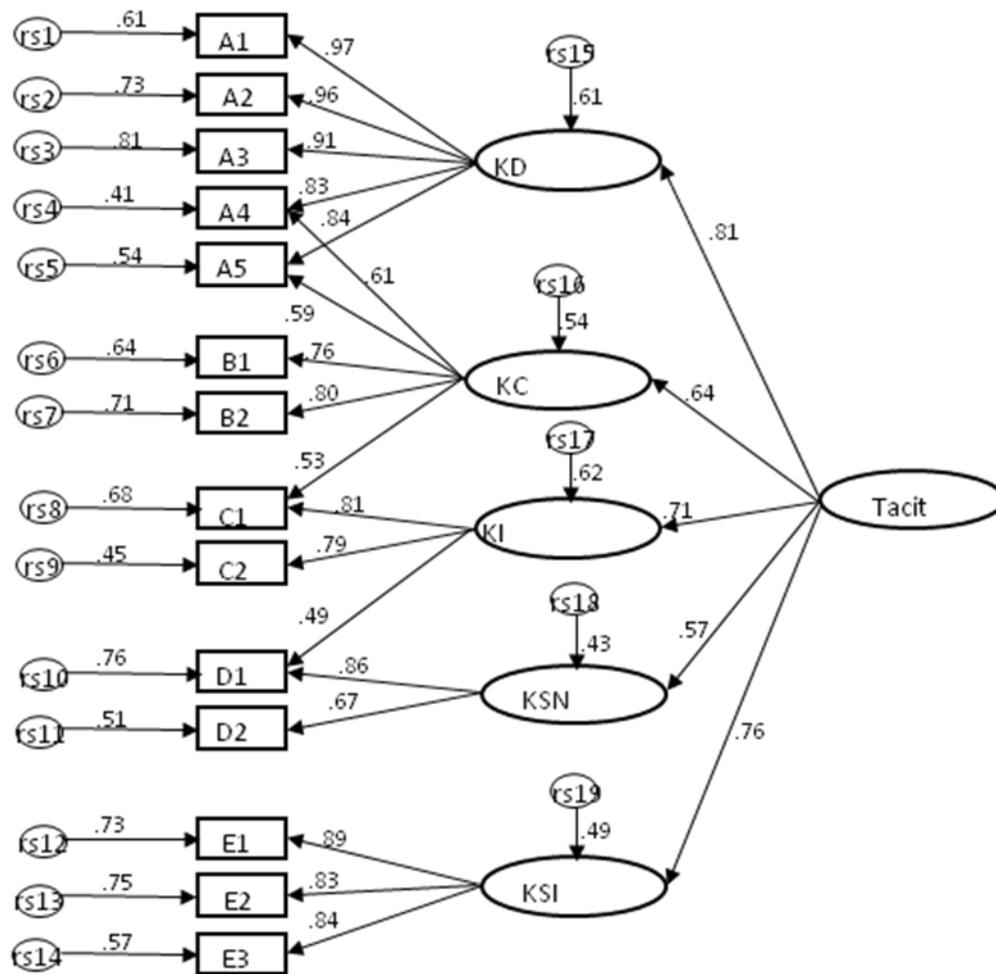


Figure 5 Confirmatory factor analysis of knowledge sharing behavior of an individual

Table 3 Summary of Confirmatory Factor Analysis

Factors	Variable Name	Standardized Loading	S.E.	C.R.	AVE
Knowledge Donating (KD)	A1	0.97	-	0.813	0.79
	A2	0.96	0.049		
	A3	0.91	0.045		
	A4	0.83	0.052		
	A5	0.84	0.043		
Knowledge Collecting (KC)	B1	0.76	-	0.81	0.73
	B2	0.8	0.041		
Knowledge Inhibiting (KI)	C1	0.81	-	0.772	0.63
	C2	0.79	0.044		
Knowledge Sharing Nature (KSN)	D1	0.86	-	0.793	0.65
	D2	0.67	0.043		
Knowledge Sharing Ideology (KSI)	E1	0.89	-	0.79	0.67
	E2	0.83	0.041		
	E3	0.84	0.043		

Table 4 Baseline Comparison

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.9668	.9502	.9703	.9554	.9703
Saturated model	1.0000		1.0000		1.0000
Independence model	.0000	.0000	.0000	.0000	.0000

Table 5 RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.0404	.0375	.0433	1.0000
Independence model	.1911	.1888	.1934	.0000

Additionally the average variance extracted (AVE) and construct reliability (CR) value were computed shown in table 3. Result shows that the value of CR is lying between the ranges 0.772 to 0.813 thus the measurement model is moderately adequate. The observed AVE values are greater than 0.50 which indicates that the measurement models have good convergent validity as more than 50 % of variance is detained by the factors.

VI. RESULT AND DISCUSSIONS

The aim of this analysis is to determine the critical factor which inhibits an individual to share the knowledge with their colleagues. This comprises the novelty of this survey. By refereeing theoretical deliberation, a survey has been conducted, that was designed by considering the critical factors of tacit knowledge. Confirmatory and Exploratory factor analysis were performed to determine empirically validated tacit knowledge factors drawn from the survey samples. The results illustrated that this analysis assert that tacit knowledge was classified into five factors, knowledge collecting (KC) and donating (KD) Knowledge inhibition (KI), Knowledge sharing nature (KSN) and knowledge sharing ideology (KSI).

Knowledge collecting and donating has more effect on tacit knowledge sharing than others. Knowledge inhibition (KI), Knowledge sharing nature (KSN) and knowledge sharing ideology (KSI) approximately similar effect on tacit knowledge sharing. Tacit knowledge is considered to be as an important asset that is beneficial for both individual and for organization to persist in a competitive environment. The finding of this study to support a practical model about the scopes of tacit knowledge This analysis specifies the valid measurement tool for knowledge sharing behavior of an individual worked in various institutions and organizations. This measurement tool is fruitful to ascertain the knowledge sharing structure for governing institutional knowledge management practices. Managers identify the amount of tacit knowledge possess by an individual on the basis of their experience, quality of work, performance and many more and select different measures to motivate their subordinates or colleagues to share knowledge with others. To improve the knowledge sharing culture in an organization a suitable balance between benefits and payoff have a great impact on salary system, will possible to encourage an individual to share their valuable knowledge with their coworkers or friends.

VII. CONCLUSION

In the current era of knowledge economy, knowledge is considered to be an important artifact. In this work, tacit

knowledge of seismic data interpretation has been captured and explicit knowledge capsules have been developed. Contribution in terms of tacit to explicit conversion and development of knowledge repositories, as an asset, is detailed. These knowledge capsules are an effort in the direction of improved access to this rare, expensive knowledge domain, benefiting knowledge seekers at large. There are various factors that are responsible for sharing and inhibiting the knowledge sharing behavior of an individual. Exploratory factor analysis and confirmatory factor analysis have been performed on received responses. The reliability analysis is also performed on five latent factors using Cronbach’s alpha coefficient. The reliabilities of these factors were found to be **0.810, 0.793, 0.770, 0.785 and 0.789** respectively. The results of confirmatory factor analysis specify the good fit of the knowledge sharing model. The goodness-of-fit

parameters values $\frac{\chi^2}{df} = 4.662$, **GFI = 0.9231**, **AGFI = 0.9029**, **NFI = 0.9668**, **IFI = 0.9703**, **CFI = 0.9703** and **RMSEA = 0.0404**. This measurement tool is fruitful to ascertain the knowledge sharing structure for governing institutional knowledge management practices.

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Appendices

Variable	Label	Name	
A1	You prefer gathering expertise from your fellow workers before you share, your expertise with them.	Knowledge Donating (KD)	
A2	It is good to be used to share your ideas and expertise with your fellow workers if you are capable enough to help them ?		
A3	your fellow workers can learn a lot from you ?		
A4	It is a good practice to express your valuable views with your fellow workers even if they don't request you for it		
A5	What are the factors that motivates you to share knowledge?		
B1	You usually look for something in return before expressing your expertise with fellow workers	Knowledge Collecting (KC)	
B2	Competitive environment prevents you from expressing your knowledge with friends or fellow workers		
C1	It is good to be used to sharing whatever you know with your fellow workers even if they don't request you for it	Knowledge Inhibiting (KI)	
C2	What are the factors that motivate you to share knowledge?		
D1	If an individual has been a knowledge sharing enthusiast in his student life, this behavior is likely to continue in his work place in future ?	Knowledge Sharing Nature (KSN)	
D2	After motivation is it likely to develop a positive temperament for sharing expertise		
E1	There should be a natural tendency to help fellow workers	Knowledge Sharing Ideology (KSI)	
E2	It is best to share expertise and assets with fellow workers		

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