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Collaborative Working in the Oil and Gas Production Support Industry

Alan M. Thompson, SPE, Production Services Network

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Abstract

This paper focuses on the collaborative working techniques in a ‘brownfield’ business environment within the oil & gas production support industry, based on experience gained from the introduction of a formal knowledge management programme within Production Services Network.

It describes the behavioural changes in the organization and the way the people within it respond to evolving collaborative technologies. It addresses the question, “How do we enable people to work in new ways in our new business model?”

The paper explores the internal and external factors affecting how knowledge is shared and techniques which foster collaboration on a global scale, where people collaborating may well be in different continents and time zones. Demographic issues and the related subject of transfer of experience and know-how are discussed, as are the techniques to develop collaboration on an asynchronous basis and amongst people who don’t know each other.

Probably most accurately categorised as being a ‘People, Process and Organizational Change’ topic, the paper offers some suggestions on how to apply knowledge sharing techniques in strategically important areas of activity, some of which are peculiar to the oil & gas production support industry, and application of tried techniques from un-related industries. The balance between networking, rather than outsourcing, is discussed and the introduction of new work methods explored. Some of the results will include previously unpublished examples of collaborative dialogues together with analyses of what interaction is actually taking place. It is intended that these will inform those interested in directing changes in attitudes about sharing amongst people. There is little published in this topic related to the brownfield sector of this industry.

Introduction

To set the context for this Paper, Production Services Network (PSN) looks after oil & gas facilities and assets for operating companies. It provides mainly engineering, construction, operations and maintenance support mostly offshore but also onshore. PSN was formerly a part of the Halliburton Company, which was bought by its management in May, 2006.

The ‘N’ in PSN is deliberate, for PSN’s management strategy is to support clients from any part of the organization using networking. Networking brings many challenges, and is in keeping with the new business model adopted by PSN. This paper describes some of the aspects of the collaborative knowledge management programme.

New business model

The development of the new business model is in response to changes in the global business environment. We find our clients place a greater emphasis on flexibility than ever before. Further PSN’s business is expanding globally and it has a superb opportunity to tap into the wide and varied experience of our knowledge workers wherever they are.

By “knowledge worker”, what is meant are people whose daily work might be described as ‘knowledge intensive’. A useful definition comes from Davenport (2005).

“Knowledge workers have high degrees of expertise, education, or experience, and the primary purpose of their jobs involves the creation, distribution, or application of knowledge.”

That is, the people who carry out their work mainly in the form of applying their knowledge to providing solutions, in this context, to a variety of oil & gas industry problems.

The downstream support industry especially at the present time is exceedingly busy, and the well publicised adverse demographic features of most Western cultures add urgency to the need to deploy knowledge workers as efficiently as possible. For some organisations the external impact of adverse demographics has caused the day-rates for personnel with skill in some key disciplines to rise. Drucker (2001) provides figures illustrating the forthcoming problems of the population in the developed world being of a high average age.

PSN has avoided the worst of that, by running an aggressive recruiting campaign, particularly of newly qualified graduates, although that in turn provides the challenge of putting ‘old heads on young shoulders’, or converting people already competent in their disciplines but who have been recruited from other industries, and who therefore need to become familiar with the working practices of this industry.

Principal features of the brownfield sector

The activities of the oil operating and service contractor organisations worldwide are focussed upon the long-term ‘life of field’ operational aspects of oil & gas production. In contrast to the activities leading up to the initial development of oil or gas fields, the support sector places a higher value on continuity and reliability of approach to problem resolution. Contracts are generally for longer durations too, offering those support organisations with successful knowledge sharing a competitive advantage. Thus, it is of great importance to such organisations that personnel share knowledge freely and effectively within their respective organisations.

Similarly, for the support industry, both the oil & gas operating and the support companies are concerned at the deeply significant potential loss of the tacit knowledge as yet unshared; the intellectual capital of the individuals and their employing organizations - sometimes referred to as the ‘corporate memory’. This could have not only an economic impact, but also a sociological one on, say, the Aberdeen area (Aberdeen is often cited as the oil capital of Europe). There are safety implications too – who will have sufficient historical knowledge to operate these “old technology” facilities safely after many of those experienced in the design and operation of them have left? All operating companies take great pains to retain documentation, but whilst documentation will generally answer the ‘how’ questions, the answers to the ‘why’ questions are often locked into the memories of those who were involved at the time.

Moreover, PSN has experienced greater growth than anticipated upon formation and that has raised the need for effective knowledge transfer still further.

In more recent times at least 50% of our income is generated from outside the UK. Our North Sea practices, with a significant accent upon safety of working (one of our core organizational values), have been inculcated in all locations, which can be hard to instill where there has been a legacy of a low safety culture. It is of prime importance that our people are working safely. Collaborative working has a part to play in that, and we have used the opportunity offered by the use of modern collaborative technology to transfer good safety practices across the network. For example, our operations in the Philippines constructed a safety training and awareness facility, which was subsequently copied by our team in Chad, replicating the success.

There are many factors influencing how knowledge is shared, and some of these are discussed below.

People behaviors

Within the company, as many knowledge management practitioners will also have seen elsewhere, there are many issues associated with trying to influence the behaviors of people. At the knowledge worker end of the workforce spectrum, a balance between giving them direct instructions and using enticement or incentive needs to be struck, so to effect efficient knowledge transfer, and in particular the transfer of working practices.

Some research has been carried out within PSN aimed at finding out what knowledge transfer techniques have worked for other organizations, both within the oil & gas industry and elsewhere. The common links we were looking for included;

- Similar business models, such as that of a service provider.
- Similar strategic need for knowledge transfer, such as rapid global expansion or inter-company mergers
- Similar size of organization and skills mix of people

Unsurprisingly, in keeping with what we observed of other organizations in the foregoing categories, Communities of Practice (CoPs) are at the core of our knowledge management work. We have a number of these, some operating in a steady manner, whilst others are more erratic in terms of activity. That was what we expected, and a similar pattern can be observed in the SPE Technical Interest Groups (TIGs).

Within PSN we have developed different types of CoPs as a function of our business needs and predominantly these are of business strategic importance, supporting PSN’s overall knowledge transfer strategy. Each CoP has a ‘champion’ or moderator, sometimes more than one, who looks after the CoP. The moderators are given specific training, mainly on ‘people skills’, rather than the subject matter upon which the CoP is focused.

Single discipline CoP

The single discipline CoP, given the type of business we are in is the most obvious type of CoP, particularly as PSN is organized as an international matrix organization [Thompson (2007)].

In PSN’s matrix design (see below) the horizontal rows represent the functions or engineering disciplines, and their respective specific skill sets, whilst the vertical columns represent the various project assignments, generally aligned with a specific client.

	Project assignment A	Project assignment B	Project assignment C	Project assignment D	Project assignment E	Project assignment X, Etc.
Function / discipline 1	Individual (s)	Individual (s)	Individual (s)	Individual (s)	Individual (s)	Individual (s)
Function / discipline 2	Individual (s)	Individual (s)	Individual (s)	Individual (s)	Individual (s)	Individual (s)
Function / discipline 3	Individual (s)	Individual (s)	Individual (s)	Individual (s)	Individual (s)	Individual (s)
Function / discipline N, etc.	Individual (s)	Individual (s)	Individual (s)	Individual (s)	Individual (s)	Individual (s)

It is the task of the discipline or function chiefs to advise on resourcing to fill the jobs with suitably competent individuals, to be guardians of good practice, to deliver updated methods to their functional personnel, and garner good practice from the network.

This type of CoP was not only our starting point for the KM programme, but also provided detailed analysis of behaviors at the working level, described later.

Common activity CoP

One example of this type of CoP in PSN would be where there are multiple skill-sets involved in adding a riser for a step-out field development, such as might be the result of additional oil or gas being brought onto an existing facility from an outlying field. This is a typical activity within PSN, and is illustrated in Fig. 1

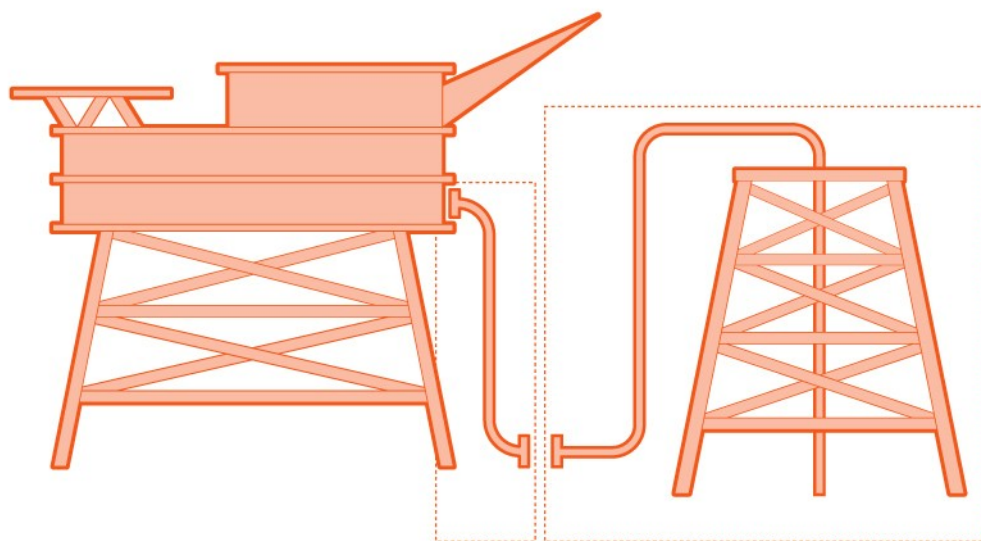


Fig.1 – Typical step-out development, showing the retro-fit riser (\$2.5m) and new jacket facility (\$20m).

What *used* to happen in PSN before we developed our knowledge management processes can be illustrated by noting that over a two year period we executed 11 such retro-fit riser projects for seven different clients, seven different ways! Each project team produced good, competent work, and indeed four of the seven teams each had a particularly good feature which improved the solution included in the execution of their work, but none of the teams had all of these features. Why was that? One reason was that the teams who carry such activity on a regular basis have historically behaved in a ‘silo’ like manner, generally associated with one particular client, and thus the whole organization was not sharing as effectively as it could have on a global scale. Getting the ‘retro-riser people’ to talk to each other enables them to adopt collaborative methods. However, simply getting them to make contact we have found is not enough, for the company also wants them to continue to develop the organization’s improvements in retro-fit riser work, and so there are other factors also influencing the outcome. One of the most important of these influencers is the issue of mutual trust and development of a loose social network. The social network is cited by BP’s Parcell (2000) who noted “...you only share knowledge with people you trust”. One way of dealing with this (of several possible) is to establish some means whereby the trust level between the seeker and the author of previous work can be increased. PSN has developed and deployed a ‘people to people’ system for putting people in touch with others having the same technical or professional interests, where everybody is invited to put some information on their

professional backgrounds into this database; into the public (intranet) domain, in effect. Many companies see this as merely an extension to the organization's 'yellow pages', however, that misconception under-values the worth of such a system, for within PSN we have given the ownership and management of the pages over to the individual, and each maintains his/her own profile. This means that unlike other systems, the profiles belong to the individuals, not the HR department, nor the project assignment manager, nor the functional head. In effect, each person's profile in the system, which is called 'SkillFinder', is rather like a rolling CV, and includes a passport size image. We also carried out some work with the industrial psychology department of a Scottish university, which tended to confirm what we had already observed; that people are more likely to make contact with someone they don't previously know if they can picture what they look like before they make contact. There are cultural aspects to this too, of course one of which is of excessive modesty. This technique is used by the UK's Transport Research Laboratory [TRL] where they have also included a discussion on the currency of each individual's profile as part of the TRL annual personnel appraisal process. (Miles, K. 2005). Evolution of the CoP concept assists the sharing of retro-riser work experiences and good practice, and since this particular work activity is predominantly within our construction function, then there are even greater opportunities to share methods and technical solutions for not only risers, but also for other related construction projects – replacing caissons being but one example.

Project assignment CoPs

The third principal type of CoP centres upon project assignments. With this type of CoP there are two main thrusts. Firstly, the assignment manager wants to ensure all of his team supporting the work for his client are aligned to the work methods, and so each member can access the corporate processes via the collaborative portal and those peculiar to their particular client.

Figure 2 shows a graph of usage of a group of CoPs since January 2007, when our portal system became independent of the former parent company. Breaking away provided an existing software solution and to some extent a support infrastructure. However, whilst that was something less to congest the critical activity path during the early stages of the transition, we have since made some adjustments to suit our business – particularly those of networking aspects.

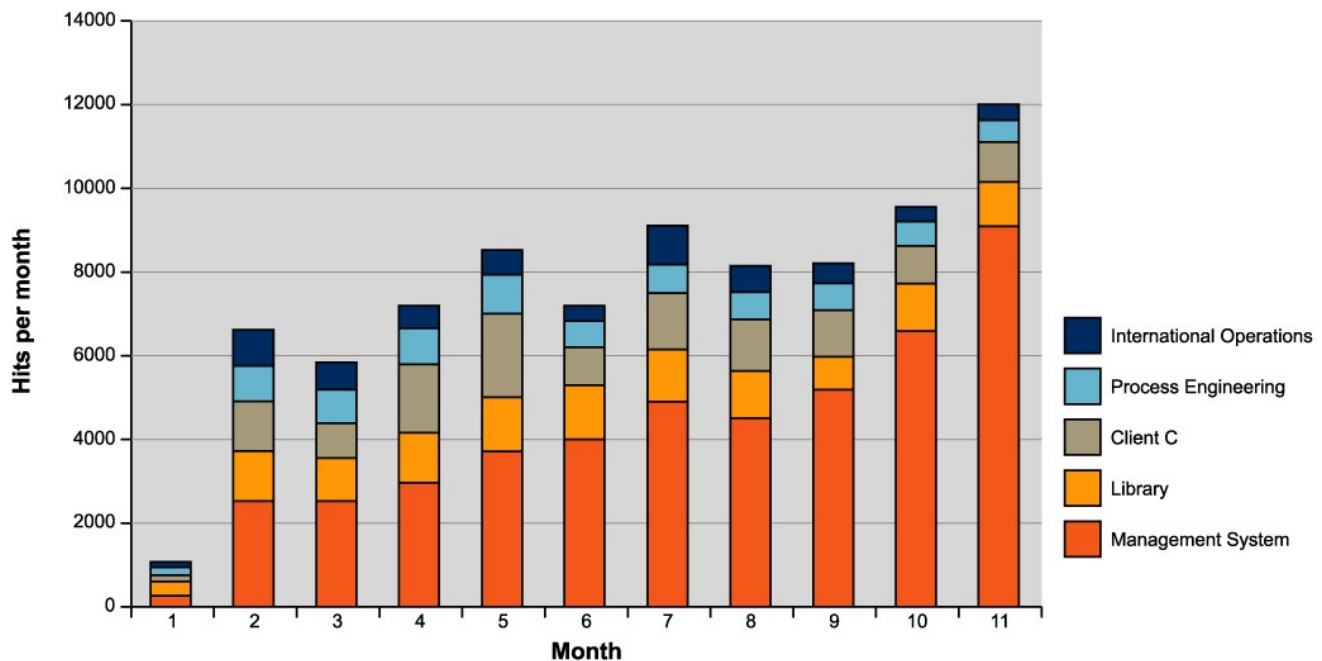


Fig. 2 – Sample of growth in usage of CoPs in site hits, since PSN's system became independent in January 2007.

The second thrust is to provide an insight to what that particular assignment is doing in general terms, thus assisting implementation of the strategic desire to make networking the principal 'way we do things around here'. In the network sense that allows part time or short-term help to be managed well and to inform those others not normally assigned to this project what activities are taking place, in essence rather as a website would. That means other non-assigned members of PSN can participate in collaborative discussions and contribute to developing solutions, irrespective of time zones or locations. Prior to

using collaborative techniques, cross-project assignment contact activity was much less frequent, because finding information on activities about other parts of the organization was more difficult. Now, PSN personnel can access information from any Internet PC on the planet, and are therefore able to see what activities are happening in various each assignment if they chose to do that.

Must it *always* be a “strategic” community?

We have around 80 CoPs of which around 10 might be called non-strategic, but these are still useful. Each of the group of 70 CoPs is essentially strategically important in knowledge transfer terms, but it would be wrong to ignore the non-strategic knowledge management activities, for these also have a part to play in developing knowledge management practices. We have noticed that in asking people to change the way they work or use a new or unfamiliar technique, there will be a significant number of people who are somewhat wary of the change. In general terms, changing work practices is almost always met with some resistance. Such indifferent behavior is not new, of course, as Machiavelli (1515) noted,

“There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in a new order of things, because the innovator has for enemies all those who have done well under the old conditions and lukewarm defenders in those who may do well under the new”.

This suggests that perhaps when people feel threatened by any ‘new order’, they may exhibit resistant behaviors so as to disrupt its arrival or success. Turkeys, it has been remarked, don’t vote for Christmas!

So to help people make changes easily, there are also relatively ‘friendly’ areas hosted in the portal system, like that of the classified adverts of buying and selling items such as cars, household goods; seeking car sharing; supporting charity events and the like. That particular CoP has been augmented with a simplified set of ‘how to...’ instructions, so users can post adverts and so on. In effect we have exploited the users’ personal desire to use the classified adverts, as a means of discovering the portal system is really quite easy to use. We believe it is vital to recognize the importance of the human response to what we are asking them to do differently.

Whilst on the face of it this is of little value, we would argue it helps to dispel the fear of the unknown, and indeed would draw a parallel with the early days of the introduction of desk-top computing, when wise IT departments added games like ‘Solitaire’, so people could become adept at using mouse commands and so on. Enlightened management teams saw the wisdom, whereas those of a more blinkered view looked on in horror!

And yet - that was the right thing to do, because the ‘people’ elements are vital; knowledge management is 80% people, 20% smart technology. Arguably this is a classic example of the capitalist view of speculating (allowing ‘unproductive’ time to be spent) so to accumulate (the gains of networking)!

Motivation

What motivates people to share (or not) their knowledge? This is one of the hardest questions to answer. We have indications of what’s going on from some research work we carried out into collaborative discussion activity [called threaded discussions (TDs)].

We also conducted interviews with those involved to gain an insight into what was actually going on within the communities they represented or are associated with, and to explore motivational issues. Our analysis provided a number of useful leads. We are also acutely aware that there is a widely held perception about this industry that of the two main groups of people engaged in the support sector of the business; i.e. those employed on a contractor basis will not share their knowledge as much as company staff might.

Our research studies frequently challenged some of the conflicts and perceptions here.

One such perception was that our contract personnel, and around 52% of our technical professional personnel are contract (one week notice) personnel, won’t share was simply not true.

In conducting the research [Thompson (2004)], the following hypothesis was tested.

“That the mode of employment of technical professional personnel engaged in the oil & gas support industry, namely, a relatively high proportion of contract personnel, has an impact upon knowledge sharing”.

The reasoning behind this hypothesis was to ascertain whether there might be some peculiar features influencing knowledge sharing related to the high proportion of contract personnel engaged the oil and gas production support industry, which has experienced significant peaks and troughs of activity, in turn causing fluctuations in recruitment [Sprunt (2006)]. Typically, in organisations within the support sector of the industry, 50-65% of technical professional personnel are contract people, with usually 1 week’s notice of termination given by either employer or employee. That proportion is generally much higher than in other industries employing similarly qualified people, where around 10 – 15% would be more common. This mode of employment is mainly an effect of the intrinsically cyclical supply / demand nature of the oil & gas industry [Yergin (1991)]. In general terms, these contract knowledge workers are paid around 15-20% more than their permanent staff equivalents, in recognition of their relatively lower company provided benefits, such as lower job security, no occupational pension, sick pay or low cost private healthcare, and fewer paid holidays. There is also potentially a ceiling on promotion and fewer training opportunities, driven by a management desire (and often encouraged by clients) that senior personnel should demonstrate “more commitment” by accepting staff positions, thus reducing the likelihood they may leave.

As is often the case with research of this nature, whilst we found some answers, we were also faced with further questions! At present our belief is that you share what you know as a function of the values you hold as an individual. Precisely which values are the dominant ones is as yet unclear and there may be no overwhelming single characteristic. Further research work is planned over the next two years. However, from the analytical work we have done so far, we offer the following characteristics as contenders on the list of those values which might be the most significant.

A ‘calling’ as a professional

Sharing to the advancement of a particular discipline is not a new concept; indeed, in Europe in particular, many of the engineering Learned Societies have a legacy of over 150 years of sharing, albeit at an ‘intellectual calling’ level, for example by hosting Papers on a variety of topics likely to be of interest to the membership, just as SPE does today. As a result the whole organizational membership gains in knowledge and the writers also gain in reputation within their field. It is a complex issue to be definite about, but we have noticed that for some organizations, including PSN, a significant number of professional knowledge workers feel obliged to share their knowledge with those who are members of the same profession, as a matter of professional duty. In short, they view their allegiance to their profession as being stronger than allegiance due to their present employer.

A desire or motivation to mentor

Some will also share because the organization for which they work operates some form of incentive scheme which provides a reward for people who mentor. Clearly an organization’s management can encourage this, possibly by use of spot bonuses, or some other form of recognition.

The “What’s in this collaboration for me?” factor

Something we have learned from previous change management programmes is the need to be aware of one of the most frequently thought, but not always articulated question, “What’s in this for me?”

Advantages for the individual

We need to demonstrate the value of collaboration to the individual, and there are several ways in which there is gain for the individual, such as:-

When worthwhile collaboration and sharing takes place in an organization, each individual knows more and is thus more useful, which tends to make him or her worth more to the organization, and more marketable in an increasingly mobile workforce marketplace. Recognition of individuals by peers is also important, especially when new teams are being formed for that will assist in the selection process, rather than the project manager relying on his ‘little black book of highly reliable people’, containing the names of those people he knows personally and with whom he has worked in the past, which as he becomes older will diminish unless back-filled with new people. Being perceived by management as being more valuable than those who won’t go out of their way to share or collaborate, and rewarded as such is also a motivating factor. Further, by adopting collaborative working practices, the individual can carry out the work in less time and often at a more pleasant pace, perhaps even spending less time at work as a result. Frequently the freedom to carry out research rapidly for prior solutions within the correct context, or seek better solutions is a result of collaboration is an outcome pleasing to the individual. In many occupations, organizations are willing to help individuals comply with the continuing professional development requirements of the engineering institutions, and part of that is widening experience. Collaboration with others assists that, and it sends a positive message that the organization is a good place to work, where career development will be better.

There will be more perceived gains, no doubt, for motivational drive is a subject which is both large and complex, and cannot be expanded upon in this Paper.

What’s in this collaboration for the organization?

To the organization and management a number of benefits accrue, such as:

The economic benefits of getting more from fewer man hours and so gain a competitive advantage. In PSN, as a major player in our part of the oil & gas support industry, this is vital to maintain our strategic goal of growth. Putting old heads on young shoulders is more consistently achieved, and given the large intake of over 100 graduates this year, collaboration will provide the graduate personnel with a good grounding, and at the same time allow them rapidly to understand the wider activities of the organization.

PSN has developed the concept of ‘lean’ engineering, which has introduced ‘slicker’ work processes, designed for the specific size of the task in hand. To maximize the use of that work technique, the collaborative approach helps the use of the lean engineering concepts to permeate more rapidly than before, when such things would be dependent upon the efficiency of a ‘cascade’ from a senior level, assuming they first understood it fully anyway. That view is based on the number of observed problems with cascading concepts through an over-burdened middle layer of management, particularly in more recent times, following the ‘downsizing’ initiatives of the late 1990’s, one legacy of which has been to ‘squeeze’ the time available to middle managers. That in turn often makes them poor advocates for change, because their prime concern is simply to balance the activities of a typical working day.

Managing the change

When Argyris (1960) noted *“Most of the major oil & gas companies now have some experience introducing KM, but the industry is conservative, and many companies under estimate the potency and complexity of the organisational and behavioural change issues involved”*, he probably did not realize quite how complex organizational culture and the structure of organizations would be in terms of knowledge management, or how much organizational learning would need to take place. This view is supported by many KM practitioners and for example, Davenport & Volpel (2001) remind us of the structural changes needed in many organizations to allow KM to be successful, *“...firms will need a cadre of knowledge project managers – a middle management layer within the knowledge structure”*. The role of this middle layer of management is seen as crucial in times of organizational change by many writers. For example Kanter (1993) on organizational change believes middle managers can ‘make or break’ change programmes.

Many organizations would find themselves aligning with Dayan’s (2003) experience in the Israeli aircraft industry. He comments on the need for organizations to prevent re-invention of the wheel and in common with many KM practitioners, believes *“The first step is convincing someone they need to look elsewhere for an answer”*. His organization has implemented a procedure to make sure design engineers check prior work for potential re-use. A parallel can be found here with the Ford Motor Company’s processes (Dixon (2000). Dayan’s view of engineers – *“Engineers sometimes look at themselves as artists who want to create; they often don’t want to be channeled to existing designs.”* – would easily find support in the many organizations. One of the main challenges to managers of such organizations is to achieve the right balance between the freedom, autonomy and spontaneity which is often essential to foster creativity, with the practical need to get the task actually finished. Some would argue that design personnel will continue to refine their designs until the time runs out, and are rarely happy at the end result, believing that *just a few* more improvements can be made – if *only* they had more time!

Strategic intent

For discussion purposes, consider the following statements on knowledge management strategy

“An organization’s ability to learn & translate that learning into action rapidly is the ultimate competitive edge”

Jack Welsh, formerly Chairman, General Electric

“Only a few businesses will survive by having the lowest price, so most will need a strategy that includes customer service”

Bill Gates, Chairman, Microsoft Corporation

Into action rapidly

Some years ago an operating company wanted to develop an outlying oil field offshore Poole Harbour in the UK, right in the sight of very up-market, expensive flats. They considered the development options:-

Option 1: build a utilitarian mini-island, and try to persuade the flat-dwellers to accept the ugly view for the good of the nation.

Option 2: build a mock lighthouse to hide the drilling rig and design the harbour to look like a yacht marina. Pity about the noise and light pollution.

Option 3: use horizontal drilling from a land site with new and more expensive technology.

Whilst the latter was the most expensive option at that time, it was also the fastest one, avoiding the need to upset the population or delay the project until a public enquiry to weigh the objections had taken place, and so on.

That organization had learned from similar earlier projects.

Customer service

PSN is only too well aware there are competitors in the same business and this sector of the oil & gas industry is most certainly service-orientated. All companies in the sector are of course aware of that, and each will have an appropriate business strategy. PSN’s is aimed at performing higher value-adding activity and offering flexibility through the network concept. Networking is far more effective we believe, than outsourcing for the kind of business model have been developing, and brings superior service to clients, because the organization works as an extended team, rather than the classic ‘locked box’ solution offered by many forms of outsourcing. To make the networking effective, the collaborative techniques and smart technology have a significant part to play, especially considering the various cultures, asynchronous time zones and locations of our teams.

Impact on operational performance

We have noticed a number of improvements in the way our business is conducted. For example we have reduced the amount of material moving around the organization by e mail, despite the fact that the organization has grown by over 2000 people since it was formed. We have improved the way solutions have been developed with greater inclusion of people who have relevant experience, particularly in engineering activities.

These improvements have in part been the result of the use of the collaborative discussions, called ‘threaded discussions’

(TDs). What follows is, by way of example, one such threaded discussion. Clearly direct comparisons between the TD and say an e mail trail are not possible because such discussions can only sensibly take place once.

Our research, apart from detailed analyses of TDs, included in-depth interviews with each of the CoP champions and users. The interview activity allowed direct feedback from both CoP champions and users about each TD and on the behaviors of the CoP users. This information was gathered on audio tape, and for each TD an extract of the feedback was prepared to provide input to the analysis.

Typical treaded discussion and analysis of what is happening.

TDs were extracted from the CoP portal, and abridged only to the extent of removing names of personnel or organizations involved to maintain the confidentiality agreed with the participants during this analysis. It is a direct extract copied from PSN's (BEA/ Plumtree) portal system.

This particular TD comes from the CoP owned by the control systems engineering team. In this thread, the focus is on a highly specialised aspect of advanced control systems. It should be noted that for the support part of the oil & gas industry, control systems engineering requires proportionally much larger numbers of discipline engineers due to the complexity of the subject matter.

TD 4 Nucleonic Level Measurement

Nucleonic Level Measurement

Posted by P L on 17/10/03 12:42

I would appreciate comments/experience on the use of this form of measurement for a trip function.

Client X has a preference for this type of measurement due to problems experienced using displacers/bridle arrangement. However I have not come across using these for a trip function. A new vessel is being designed without any nozzle connections for level so the level measurement will rely completely on nucleonics for control & trip functions. I have asked VendorCo to clarify fail safe conditions. Has anyone experience of this application?

re: Nucleonic Level Measurement

Posted by K C on 27/10/03 16:43

I have had some experience in the use of nucleonics as a trip function. The system is in practice robust in most cases, depending on the right process conditions. It is easy to see where the system may fall down where there is sand and scale build ups, inside separators for example. Where a lo lo trip is used, the lo lo nucleonic detector is looking for a high radioactive count to trip, i.e. the fluid in the vessel reduces the count. If the nucleonic source were to deteriorate to the point where the radioactive count output were not high enough to trip the lo lo detector, then the system would not trip. The reliability of the system obviously depends on the half life of the source and proper maintenance of the equipment (including mucking out the separator). The VendorCo interface unit has a common fault output, which among other things looks at the radioactive count received by the unit (according to VendorCo). It is critical that the common fault output contacts be wired in series with the trip output contacts in the VendorCo units to give the system a fail safe characteristic.

re: Nucleonic Level Measurement

Posted by B T on 19/11/03 14:00

I have used them on trip measurements and agree with KC regarding solids build up inside the vessel. On low level trip duty a high solid level could block the beam and prevent low level trip detection.

You need to decide early on whether you are going for point detection for the trip or using a separate set of analogue detector tubes as if you were measuring continuous level. Using the point detector method makes the trip points difficult to set and commission, using the analogue method and setting trip points is easier. If you use the point method then for the high level trip you can achieve a fail safe trip because the detector is shielded by the rising liquid and so its output drops to generate the trip. The failure mode of Geiger tubes is to lose their output and so you are OK. As KC says for low level the reverse is true and so you need to configure the fault alarm. If you use a set of analogue tubes for the trip devices you get the advantage of having continuous measurement and fault monitoring over the whole set of Geiger tubes and you can set the trip points using a trip amp method rather than trying to achieve an exact trip point by moving the point detector up and down the outside of the vessel and taking account of it's curvature (depending upon the vessel shape). If you want to talk further you can call me on XXXX.

Analysis and interview with the CoP Champion

Here, the instigator is seeking advice from others who have experience with this particular application of nucleonics. The community champion remarked,

"This was a particularly useful thread because the issue the inquirer was asking about wasn't really known about in nucleonics until fairly recently, and I knew that KC had had some problems with it on a project for one client, so I prompted KC to reply, by giving him a call and asked him to go and look in the portal as there's a discussion relevant to the problem we had last year, and he responded. That was a classic example of 'knowledge brokering'."

Two experienced engineers (one contract, the other staff) have responded: the first response itself actually provided sufficient information to satisfy the query. However, the second adds more information, and at the same time provides confirmation. This is an interesting point seen in discipline-centered communities - that of agreement by default, but not of the disinterested type; merely of an unspoken understanding, rather as the psychological contract described by Handy (1981), and in a KM context, by Saint-Onge (2000). The champion noted that more of this fairly large group could have contributed to the discussion, but didn't. He believes that to be acceptable behavior, recognizing that everybody is busy, and there is little point in making a token contribution.

Thus the role of the CoP champion must include sufficient monitoring of any TD to ensure that a small section of the community does reflect the general consensual view. From the champion's viewpoint, whilst more people could have contributed, the value here is in the detail within the responses, for developments in this particular technology have placed a greater reliance on sole (rather than secondary) use of nucleonic measurement, and consequently the need for it to be both reliable and effective.

Our research extended to a large number of these TDs, and following detailed analysis we made a number of observations which we then used to adjust our KM programme. These may provide guidance to others in planning similar KM programmes.

Design features of a KM programme

The KM programme should focus on the network business case. Overall it should place emphasis on encouraging collaboration. Some suggestions for achieving that are:-

There is a need to achieve a balance of activities of the interested parties, such as the CoP champions or moderators, the CoP members, the organization's population in general, and the KM team.

In the process of establishing CoPs, there is a need to determine and communicate a statement of purpose for what the CoP is about. There must be a sound business case and alignment with the organization's business strategy is vital as is setting out clear Terms of Reference (ToR). The ToR must consider at least the following:-

- Clarity over who does what in terms of the overall KM programme, and what the role of the champion is. The choice of person for the role of champion (or moderator) is important. Our experience suggests that the prime quality is that of having good people skills, for that will help the champion to encourage others. In some organizations, such as Halliburton [Velasquez, G. & Odem, P. (2005)] this role is a full time one.
- The balance of other duties within the CoP, which is unlikely to be the same for all CoPs, because we are dealing with people and people are different. We have found that some CoPs work better if the CoP duties are distributed amongst the members
- The anticipated life-span for a CoP. Observation suggests there may be a life (& death) cycle for some CoPs, just as there may be 'doldrums' times of little activity. Again that is observable within some of the SPE TIGs.

The 'user experience'

Related to the organization's population in general, where there are many skill sets, e.g. engineers, accountants, planners and so on, there needs to be effort made to inform people who need to know what's happening. Here we have noted a desire from users to be selective in what they want brought directly to their PC screens. In PSN we have offered the user population the opportunity to free themselves from what many organizations would describe as a daily tidal wave of e mail, and instead balance that with self-selection of information which they actually want on a daily basis. We've made it clear that attaining any freedom brings with it the responsibility to subscribe to updates they might need. Thus, an electrical engineer would subscribe to updates from the electrical engineering CoP, but not from the structural CoP, although he is still free to visit that area of activity. The overall principle here is to move away from 'push' technology, where 'they' send information to you, towards 'pull' technology, where the user selects areas of particular interest.

Concluding remarks

It may take more than one attempt to get the balance of the KM programme right, and it may need adjusting from time to time to maintain that balance. KM literature sometimes refers to the 'organic' nature of KM, and there are many examples of this. From the experience we have had in PSN we can see some elements of that. For example we have seen how user expectations have changed, generally towards demanding increased features, reliability and speed. Users can easily make comparisons with their experiences as users of Amazon or Google, and not unreasonably expect similar ease of use for

company systems. It will be a challenge to organizations to achieve that, when the business model of on-line retailers and the like are quite different. It is important then, to remain focused on delivering what the clients want, as efficiently as possible, whilst the organization continues to gain in knowledge.

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