

# The Impact of Individual Behavioural Factors on Tacit Knowledge Retention in Oil and Gas Organisations

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## **Abstract**

*Relying on explicit knowledge sharing and old-style training courses are simply no longer effective knowledge management tools. Therefore, understanding the role of tacit knowledge retention as part of knowledge management is becoming increasingly more important to fulfil the organisation strategic goals. To attain the aim, a theoretical study on the oil and gas industry has been provided. Positive attitude of individual reflected in the willingness to share and transfer knowledge does improve tacit knowledge retention and fulfil the strategic goals such as gaining competitive advantage and improve the performance, productivity and employee's effectiveness.*

**Keywords:** knowledge management; tacit knowledge; knowledge sharing; oil and gas industry;

**JEL Codes:** M10;

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## **1. Introduction**

The oil and gas industry needs to be more effective in retaining the tacit knowledge (know-how and know-what). Retaining the expert knowledge in oil and gas (O&G) organisations is considered as one of the main knowledge management challenges. This knowledge can exit with the employee and cause a serious effect on organisational learning and memory capacity. It is important to make this knowledge accessible to other staff. The benefits of retaining the knowledge within the organisation manifest in three directions: accelerate the development of the young generation; reduce the processing and interpretation time, and finally, ensure more accuracy and efficiency for better decisions (Du Plessis, 2006).

De Long (2004) reported that personnel aging, forced or voluntary retirement, and downsizing result in massive knowledge loss within the organisation. About 40% of the companies that implemented major workforce reduction to cope with financial troubles have failed later on to meet their long-term goals (Fisher and White, 2000). Knowledge should be retained as it is considered to have a high intellectual asset value, is a strategic resource for maintaining organisation's competitive advantage, and is essential for achieving long and short-term goals (Acton and Golden, 2003). Liebowitz (2008) emphasized on the fact that in the years ahead knowledge retention will continue to be a challenging aspect for many organisations. These challenges were called "crew change" and were expected to cause a shortage of about 15,000 experienced staff in the oil and gas industry by 2017 (Birenbaum, 2015). For that, the O&G industry would need to hire about 10,000 new staff every year. The new hired staff needs to catch up with the practical and organisational knowledge, so companies should plan for knowledge retention in advance and should have it as a strategic objective (Birenbaum, 2015).

In this paper our goal is to assess the ways in which the organisational behavioural factors at individual level (i.e. diversity, perception, motivation personality, value and emotions) would impact the knowledge retention in O&G organisations. Based on findings, constructive discussion and recommendation have been proposed aiming to help managers and organisations to focus on the main behavioural factors that might improve the knowledge retention for the benefit of the competitive advantage, productivity and efficiency of the organisation.

## 2. Knowledge Retention

Knowledge retention via implementing knowledge management techniques, i.e., capture, transfer and retention, is needed for all organisations. Organisations from the oil and gas industry claim generation gaps. In order to become leading organisations, they should implement effective and active knowledge retention processes with great efforts (Riddell, 2011).

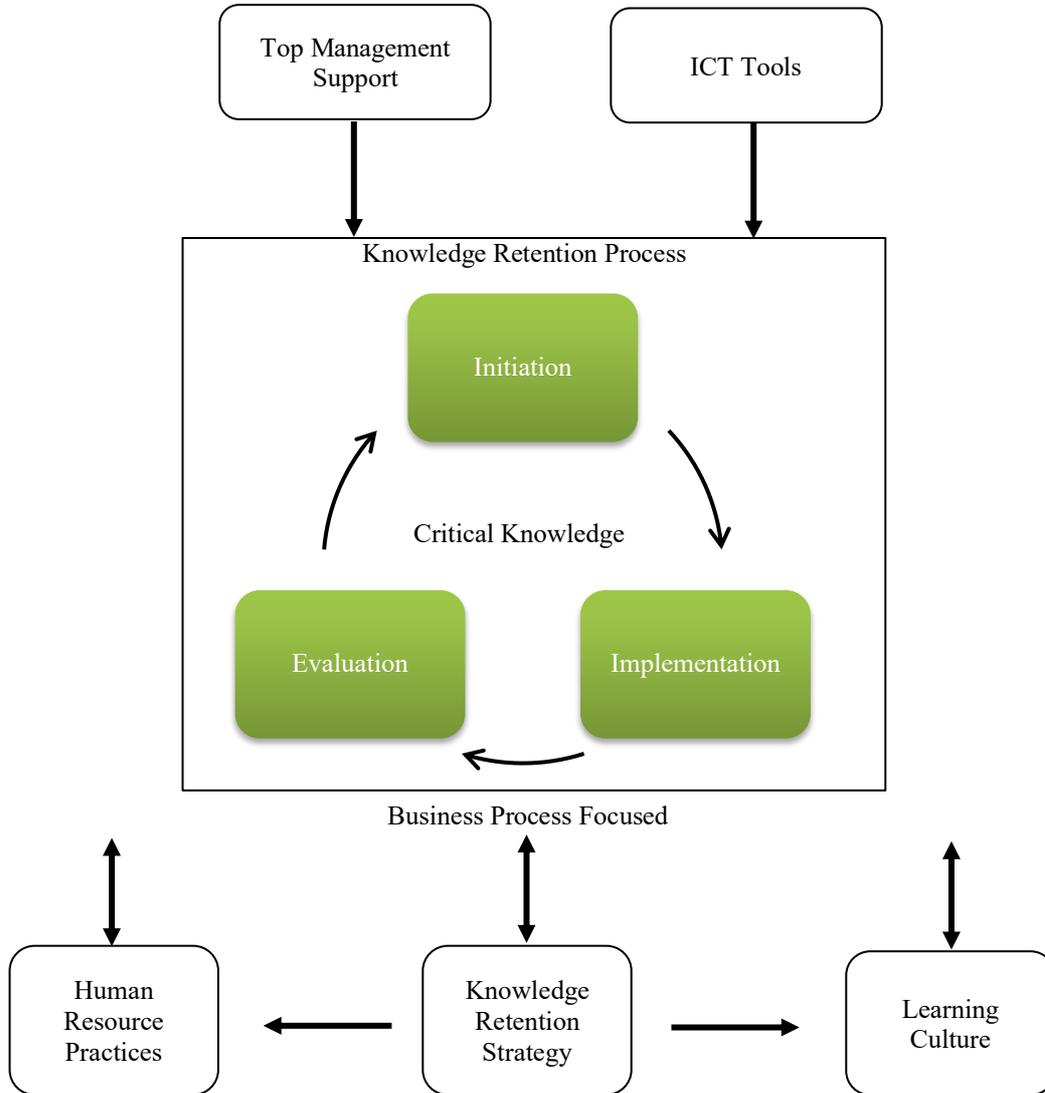
By definition, knowledge retention (KR) “*involves embedding knowledge in a repository so that it exhibits some persistence over time*” (Argot, 2012, p. 572). Knowledge sharing is the process by which employees mutually exchange their tacit and explicit knowledge (Nonaka, 2008). Based on a KPMG study (2002), the knowledge loss problem is a major source of concern for the whole oil and gas industry. Thus, a knowledge sharing solution has been established within most of the organisation aiming to improve the knowledge retention within their staff. At the individual knowledge behavioural level, the knowledge management (KM) implementation shows several problems. For instance, the KPMG survey (2002) displays the following results: 62% of the companies claimed the lack of time to share knowledge, 57% claimed the failure to use knowledge effectively, while 50% claimed the difficulty of capturing tacit knowledge.

Liebowitz (2008) classified the KR strategies to be integrated in daily work, in which vary based on the implementation period: reactive (short term), containment (medium term) and preventive (long term). A way to capture the knowledge of staff is to conduct interviews at the staff departure. However, this strategy is rather a reactive one, and it proves not be effective, because it does not bring real value in conserving knowledge. Recently, companies try to hire experienced retirees as consultants to fill the knowledge gap caused by the leave of personnel without a proper knowledge transfer. This generates a lot of costs for companies. One method is to have a contingency plan. Contingency plan is to have a strategy to transfer the knowledge of the retirees one to three years in advance before their retirement date. This is considered to be a medium-term knowledge retention strategy (Liebowitz, 2008; Levy, 2011). Another method, the preventive one, is considered to start after three months after the recruitment and continues till leave. Levy (2011) considered the preventive strategy to be the best method as it requires organisations to have KR as part of the human resource management (Liebowitz, 2008).

Preventing the “knowledge destruction” in the oil and gas industry is a priority due to the high attrition rate in general, as in the previous crisis, many companies have chosen to downsize as a way to reduce cost. Riddell (2011) stressed the importance of setting clear and relevant objectives for the organisation in planning a strategy for overcoming the negative impact of staff reduction (in terms of knowledge loss) by addressing the knowledge needs of individuals, groups or communities of practice (CoP), through a set of proper knowledge retention strategies.

Therefore, to avoid the knowledge loss which leads to strategic problems, KR should be applied within the organisational system by examining four perspectives as suggested by De Long (2004): the strategic view, the human resources view, the operational content view and the knowledge management view. Doan *et al.* (2011) proposed the knowledge retention model to investigate the key factors that influence the KR process within an organisation. Doan *et al.* (2011) model includes five key factors critical for KR (Figure 1).

**Figure 1. The Model of Knowledge Retention**



Source: Doan *et al.* (2011), p.5.

In fact, both visions (i.e. Doan *et al.*, 2011, and De Long, 2004) are leading to the same target. However, Doan *et al.* (2011) focused more on SMEs as compared to the general overview provided by De Long (2004).

Morrissey and Schoemaker (2005) stressed on the organisation's degree of internal and external connectivity as a common diagnostic test to assess the degree of organisation's knowledge sharing and retention. In fact, effective knowledge share may result from achieving a common goal to improve the professional and social network within the organisation. Furthermore, understanding those dimensions would allow the organisation to comprehend the risks of knowledge loss and answer the following key questions: *what*

*type of knowledge* and *whose knowledge*. That could have a significant impact on the organisational performance (Martins, 2010).

Table 1 shows several KR strategies to avoid knowledge loss summarised based on different pieces of literature. Martins and Martins’ (2011) and De Long’s (2004) views have been adopted in this research.

**Table 1. Summary of KR Strategy Discussions Based on Different Authors**

Martins and Martins (2011) and De Long (2004)	Doan <i>et al.</i> (2011)	Frost (2014)
1. Whose Knowledge? 2. What type of knowledge? At different organisational levels. 3. The strategic risks of knowledge loss 4. Knowledge behaviour threats/ enhancer	1. What knowledge may be lost? 2. What are the organisational consequences of losing that knowledge? 3. What actions can be taken to retain that knowledge?	1. Understanding the risk factor 2. Classifying the knowledge 3. Understanding which knowledge is most critical 4. Understanding the pillars of knowledge retention 5. Understanding the success factors

Source: Based on Martins and Martins (2011) and De Long (2004)

Many leaders and managers are aware of the knowledge loss, though, they consider retaining knowledge and keeping the experts within the organisation a critical and challenging issue. In fact, retaining knowledge within the organisation requires a proper understanding of the individual behavioural factors that impact tacit knowledge retention within the organisation. Moreover, focusing on the knowledge retention as part of the KM strategy enhances organisation's productivity, efficiency and improves its competitive advantage (Gaghman, 2017).

Since oil and gas is a knowledge-intensive industry, it highly depends on the workers’ knowledge as individuals or as a group. This knowledge if lost, would significantly affect the ongoing activity and would impact the overall organisational knowledge (Doherty and Doig, 2003).

Nonaka (2002) considered that a worker’s knowledge depends on everyone else working in the organisation. Consequently, those workers who share knowledge represent a vital part of the organisation’s core competence and competitive advantage (Blackler, 2002). In order to prevent the loss of knowledge, organizations may develop employees’ profile, based on their knowledge, in order to create strategies for: efficient knowledge retirement, job evaluations, key knowledge experts' or specialists' identification, etc.

### 3. Knowledge Retention in Oil and Gas Organisations

Leading service companies such as Schlumberger and Halliburton in KM and IT solutions knew from experience that developing solutions to capture KM in oil and gas industry was considered to be a very challenging task. It requires expert’s knowledge and intuition to conduct data analysis and validate the interpretation which is only the result of accumulated experience in the brain of individuals (tacit knowledge). Moreover, due to the increased challenge of complexity of the industry, accurate and fast decisions need to use the proper knowledge to minimize the cost of delay or failure (Grant, 2013).

Historical data collected since 1994 for the major oil and gas companies indicated that organisations that deployed the KM have shown increase in the productivity. Furthermore, their learning process has improved, and they enabled the management to make better decisions (Smith, 2001). Edwards (2008) agrees that the oil industry is a leader of KM practice, being ahead of many other industries. Despite of this, most of the companies discuss about KM without referring to any KM literature. Nonaka (2008) mentions that the interest in developing a strong literature based in KM started in 1990 (see Table 2).

**Table 2. History of KM adoption in Oil and gas Organisations**

Company	Year of KM Adoption	Origins of KM
BP	1996	Organisational learning/best practices transfer in upstream
Shell	1995	Organisational learning initiatives by corporate planning (e.g. scenario analysis, cognitive maps)
Chevron	1996	Best practices transfers & cost reduction in Chevron's downstream businesses
Exxon Mobil	2003	In Exxon: application of IT to E&P. In Mobil, best practice transfers in downstream
Conoco Phillips	1998	IT support for E&P
Schlumberger	1997	IT applications to drilling
Halliburton	1998	IT applications to drilling and seismic analysis
Marathon Oil	1999	IT applications to exploration
Murphy Oil	2000	IT applications to exploration
BHP-Billiton	2000	KM uninitiated by IT dept. - but not adopted company-wide
Paragon Eng. Services Inc.	1999	KM practices based upon groupware, intranet, project & other IT tools

Source: Grant (2013), p. 95.

Grant (2013) introduced most recent comprehensive discussion about KM in oil and gas organisations, expressing the views of CEOs of several oil and gas companies such as Chevron, BP, Total and Schlumberger. The discussion was about the importance of using knowledge to drive learning and improve the knowledge behaviour within the companies and it highlighted many concerns top managers express related to knowledge loss. Instead of "knowledge shopping" outside the companies, organisation need be more effective in retaining the tacit knowledge and made it accessible for another staff (Carrillo *et al.*, 2013).

Like other industries; oil and gas organisations should manage "explicit" and "tacit" knowledge to achieve the objectives of knowledge management. Explicit knowledge (People to information) can be transferred and shared by using information systems as it is more visible. Tacit knowledge ((People-to-People), which resides in the individual's brain, needs more interactive mechanisms between experts (individuals) and groups (young professionals) such as communities of practice and knowledge sharing portals (Nonaka, 2002).

According to Grant (2013), oil and gas organisations use a more structured learning process aiming to improve the productivity and to increase the level of KR. Those tools and systems can be grouped into two main groups: technology based, and people based.

#### **A) Technology-based**

Most of the oil and gas companies have developed corporate database (organisation memory) which basically includes technical and managerial performance data, disciplines yellow pages and other logistics and administrative data, supported by different technology

and tools to granted easy access. Navigating through databases will help users to interpret and to analyse different sets of data more efficiently and in time. However, more focus needs to be put on lessons learned, on best practice to capture success and failure experiences and on more interactive way of communication.

## B) People-based

Desouza and Paquette (2011) highlighted the fact that O&G organisations focused in the past more on processes and technology despite the fact that individual ("People") knowledge has been the major driver for knowledge management with a focus on leveraging tacit knowledge. Recently, O&G conferences and events have changed their strategy, from bilateral knowledge exchange to a more interactive group sharing knowledge in a dynamic workshop manner (Grant, 2013). A relevant example is the AAPG / EAGE / SEG / SEP workshop organised to discuss the KM concerns and challenges, being a major workshop organised by APQC every year (APQC, 2016).

Knowledge can be retained based on people interaction in several ways; in what follows we summarize the most important methods implemented by several O&G organisations.

### 1) Communities of Practice (CoP)

Wenger *et al.* (2002) emphasised the importance of the communities of practice as the most widely adopted KM tool by companies to facilitate knowledge sharing. CoP were defined differently by companies. Despite some difference in nomenclature, the approach of setting and operating CoP was very similar. The most accepted definition for CoP is: "informal networks of people, who share a common area of expertise and need similar solutions to common problems" (Grant, 2013, p.103). CoP allow employees to share information, to strengthen and to fine tune their own skills. This led to potential value for organisation in terms of task delivery in less time by more competent staff. The difference of implementing and operating the CoP in oil and gas companies is in the degree of formality as it tends to become increasingly formalised over time. The formalisation of CoP is reflected in a "Charter" and steering teams that apply some governance guidelines (Figure 2).

**Figure 2. An Example of CoP for an Oil and Gas Company**



Source: Eni, Knowledge Hub internal website, <https://www.eni.com>

A community of practice is likely to involve face-to-face interaction. However, CoP are the most popular KM approach as 66% of organisations have CoP (APQC, 2016). It can become less effective over time due to failure in the way they implement it (i.e. busy leader, being separated from the organisation, un-clear objectives). CoP need efficient leadership and active membership to avoid the decline over time (Morrissey and Schoemaker, 2005).

## **2) Best Practice Groups**

Interviewing people, recording and sharing the best practice they experience are tools which increase the knowledge reservoir in some companies. In some companies, video conferences have been introduced; however, staff requested a more personal connection when implementing such practice (Grant, 2013). Schlumberger integrates Best of Practice as key part of CoP after applying some validation and technical quality assurance to be part of CoP knowledge hub.

Grant (2013) considers “Best Practice transfer” as one of the most important area for knowledge management. However, referring to stickiness of the knowledge concept in most companies, Best Practice tends to become less interactive and it loses its proper interactive style, turning into a less helpful method in improving the staff’s efficiency. Best Practice groups need a proactive leader and active members.

## **3) Peer Review Group**

Oil and gas organisations may be considered as project-based businesses. Group sessions are hold regularly to share work experience acquired in different projects. During these meeting discussions, feedback is collected, documented and made available for other groups either to repeat the good practice, or to improve activities in order to avoid mistakes. This is considered a lesson learned knowledge sharing tool. The quality of the report and of the documentation may be considered a limitation for this tool.

## **4) Mentorship programs**

Mentorship programs are considered easier to be implemented as compared to other KM tools. In these programs, experienced staff shares their knowledge with young professionals (juniors). They provide advice and counsel whenever their juniors face challenges at workplace. Mentors would share their previous experience tacitly (Morrissey and Schoemaker, 2005). In practice, the success of these programs highly depends on both parties (capacity of experienced staff to share knowledge and willingness of juniors to ask for and receive advices and counselling).

## **5) Professional Training**

To reduce the impact of knowledge loss, companies use well-defined training plans, including regular training courses conducted by training professionals. These trainings usually focus more on explicit knowledge and have few benefits in reality. Other companies target the tacit knowledge and prefer to organize tutorials, workshops and short assignments conducted by expert and senior staff aiming to transfer and retain the tacit knowledge within the organisation.

Based on the tools discussed above, two concerns arise. The first one is how usually 20-30 experts are going to interact with the entire technical staff, knowing that most companies in O&G industry have more than 2,000 employees (O’Brien and Rounce, 2001). Secondly, how KM will be shaped in the context of IT-based solutions and web-based or online approaches with less human interaction.

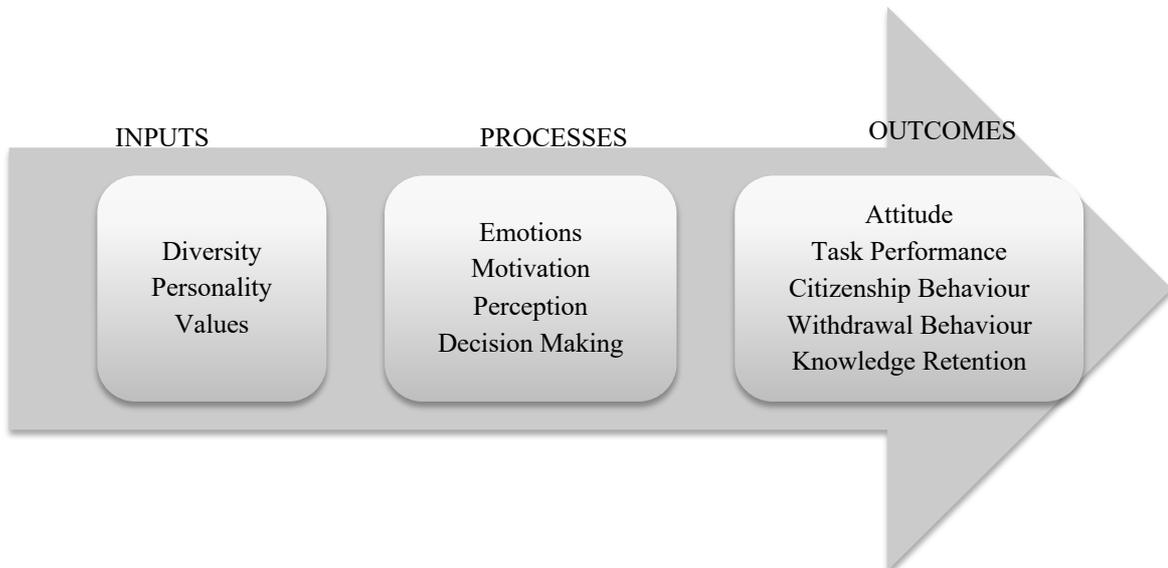
#### 4. Individual Behavioural Factors

The research and literature on organisational behavioural model (OB) related to knowledge management in oil and gas industry are very fragmented and no widely accepted model or theory exists. OB model has a significant impact on understanding organisational knowledge and on knowledge retention because of the differences between behaviour at individual, group and organisation levels. The purpose of this section is to review extensively the role of organisational behaviour factors at individual level that may influence knowledge retention.

Griffin *et al.* (2014) highlighted the importance of understanding organisational behaviour to examine how to enable managers that lead the organisation to act embracing a more human aspect of management (people as organisations, people as resources, and people as people) (Griffin *et al.*, 2014, p.7). Therefore, experts considered this as a source of competitive advantage (Robbins *et al.*, 2013). The OB model of Robbins *et al.* (2013) consists of independent factors at the three levels (individual, group, and organisational) which lead to processes and result in dependent outcomes. Our focus in this paper is on knowledge retention as one of the dependent outcomes affected by several independent factors such as: diversity, personality, motivation, value, emotions and perception (Robbins *et al.*, 2013) (Figure 3).

**Attitude** is the main outcome (Robbins *et al.*, 2013). Attitude defined by Slocum and Hellriegel (2009) is “*relatively lasting feelings, beliefs, and behavioural tendencies directed toward specific people, groups, ideas, issues or objectives*”; Attitudes influence an individual's choice of action, and responses to challenges, incentives, and rewards (together called stimuli).

**Figure 3. The OB Model at Individual Level**



Source: Robbins *et al.* (2013)

In more details, Breckler (1984) identified three main general components of attitude: affect, behaviour, and cognition. Affect can be observed by monitoring physiological or emotional response, sympathetic nervous activity. Behaviour can be noticed via verbal statement, actions, behavioural intention. Cognition refers to beliefs, perceptual responses.

Moynihan and Pandey (2007) classified work-related attitudes into three main groups: job satisfaction, job involvement and organisation commitment. These attitudes have a significant impact on overall employee behaviour/ reaction such as the higher the level of job satisfaction, the better the performance and contribution. Studies suggested strong correlation between job satisfaction and job performance, and it is called 'satisfaction-performance' relationship from individual to organisational level (Harter *et al.*, 2002). This reflects an individual behaviour which increases the engagement and the participation in the KM practices.

Hausknecht *et al.* (2008) indicated a strong link between individual's commitment and job citizenship, and loyalty to the organisation. This commitment should be recognised by the organisation as "perceived organisation support" (POS). This concept was defined by Robbins *et al.* (2013, p.72) as "the degree to which employees believe the organisation values their contribution and cares about their well-being". In addition, Vandenberghe *et al.* (2007) emphasized on the strong relationship between the POS and commitment, with a direct link to the knowledge retention beside the job satisfaction. The more support from the supervisors, the higher the level of knowledge-shared behaviour and the better the performance (Martins and Martins, 2011).

Individuals are more willing to participate in knowledge sharing in a positive workplace, where each individual's personality, motivation, and perception, combined together positively, support individuals to achieve a common goal (Bock *et al.*, 2005). Martins (2010) emphasized on employee's attitude like willingness versus resistance or hesitation to share knowledge as the main attitude factors to enact knowledge sharing behaviour. As a conclusion, positive individual's attitude highly impacted his contribution in knowledge transfer, sharing and retaining practices.

## 5. Conclusion and Recommendations

The study shows the importance of individual's behavioural factors and characteristics as leverage of the knowledge within the organisation which proves the knowledge sharing - attitude - work performance linkage.

Based on study findings, few practical recommendations arise for the managers to improve KM practice:

1. Provide benefits for staff who participate actively in the knowledge processes. Employees should feel the value of sharing their ideas and knowledge with their workmates and should understand that their input is important.
2. Design knowledge sharing practices to transform individual knowledge into organisational knowledge.
3. Achieve satisfied and committed individuals, working in a positive workplace (even if the workplace environment is considered to be challenging and/or interesting). This will reflect in better performance and low turnover rate for the company.
4. Measure job attitude effectively to identify how individuals react and measure its impact on knowledge retention.

The active seek or/and profiling of colleagues' and employees' personality and value can give managers valuable insights into better understanding team members, and, as consequence, increase the job performance and satisfaction.

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