

# KNOWLEDGE MANAGEMENT AS AN IT POLICY GOVERNING IT KNOWLEDGE IN BANKING SECTOR

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**Abstract** – In this document the definition of Knowledge and Knowledge management is provided in an attempt to depict the ambiguity of the term and the different authors' views on the subjects. Most scholars tend to agree that there are two type of Knowledge, Tacit and Explicit. The “Knowledge Cycle,” “Knowledge Conversion” and “Knowledge Refinery” methodologies have been addressed along with strategies and different schools of Knowledge Management. Once the theoretical framework was addressed, the document is detailing the Knowledge concepts focusing on Banking and thereafter in IT. In this way, an understanding of the Banking IT knowledge culture is demonstrated. Influences and interdependencies on multinational Organizational structures and cultures are presented under the prism of sociocultural perspective. The importance of Knowledge being a corporate initiative is discussed and respective opportunities and challenges are identified and described. The Knowledge Management framework was projected on current IT operations of the Bank in an attempt to identify a road map. Suggestions in relation to enhancements and future developments have been outlined thus providing with a stepwise approach of implementation.

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**Keywords** – Knowledge, Knowledge Management, Big Data, Variety, Operational Risk

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## I. INTRODUCTION

The Banking sector is highly regulated environment (Adams, 2007; Wallison, 2006). Consequently, all IT functions are closely monitored and audited. In-line with banking governance during an audit, IT was requested to present the Knowledge Management policy. The respective evaluation revealed gaps and inefficiencies where it was evident that the existing functions and procedures outlined could be amended for effective and efficient Knowledge Management within the Bank's IT. Knowledge acquisition, documentation and reusability should be revisited under the prism of the respective corporate environment.

Although the scope of the aforementioned audit for Knowledge Management was limited to IT rather than extended to Corporate level, there are several stake holders within IT. A further complication can be identified in the fact that some of these stake holders have outsourced several functions such as Incident Management.

By facilitating data gathering for Knowledge Management, or any other purpose, within an International Banking Organization, with presence in all continents and dimensions like volume, accuracy, consistency, formats, etc., become evident. These characteristics, direct to the Big Data ecosystem.

Big Data is primarily defined in terms of V's, based on the first definition by Laney (Laney, 2001):

**Volume:** Refers to the amount of data being created and stored (Khan, Uddin, & Gupta, 2014) in the digital universe.

**Velocity:** In Big Data environments, the speed in which data change is quite high.

**Variety:** This characteristic has to do with the data itself and the flavours it can pertain. Sensors, IoT (Internet of Things), database records, video and audio have different formats and standards, let alone the fact that in many cases alternative communication protocols must be used to disseminate the data streams.

In this paper the sociocultural environment along with corporate structures and processes will be examined in formulating a policy to transform scattered pieces of information into Knowledge. The operational model will be defined along with the respective tools to achieve on-the-job implementation. Industry standard techniques will be cross-referenced and projected on the corporate functional model in an attempt to enhance Knowledge Management (Acquisition, Refinement, Storage, Distribution, and Presentation.) (Zack, 1999)

## II. THEORETICAL BACKGROUND

In order to understand Knowledge Management (KM) it is essential to identify Knowledge, which can present difficulties since although Knowledge Management is a buzzword since the 1990's there are ambiguous definitions (Schultze & Leidner, 2002). In the following paragraphs, several authors' views will be presented in an attempt to dwell on Knowledge and Knowledge Management definition.

### 2.1. Knowledge

Knowledge is information amalgamated with experience, put into context and interpreted accordingly (Davenport, De Long, & Beers, 1998). Although there is no consensus definition of knowledge (Dattero & Galup, 2007) most scholars

tend to agree that Knowledge can be subdivided into Tacit and Explicit (Vasanthapriyan, Tian, & Xiang, 2015; Zack, 1999). Some researchers identify that these two types are two sides of the same coin (Borghoff & Pareschi, 1997). Where Tacit is the practical knowledge of making things happen, the

doing and Explicit knowledge is the competencies and intellectual assets of an organization (Borghoff & Pareschi, 1997). In further identifying knowledge, views of certain scholars are summarized in Table 1 (Hafizi Muhamad Ali & Ahmad, 2006).

Author(s)	Explicit	Tacit
Nonaka et al. (2002)	<ul style="list-style-type: none"> <li>• Can be formed and expressed in any language whilst being shared in the form of data, scientific formulas, specifications, etc.</li> <li>• Can be processed, conveyed and stored with relative ease.</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to formalize and highly personalized.</li> <li>• Is predominantly identified in action, procedures, routines, ideas, values and emotions.</li> </ul>
Van den Bosch & Van Wijk (2001)	<ul style="list-style-type: none"> <li>• It can be transferable with ease since it is articulated and codified which makes it a candidate for teaching.</li> <li>• Tacit knowledge is the foundation on which Explicit knowledge is built.</li> </ul>	<ul style="list-style-type: none"> <li>• Difficult to express and codify since it is context related personal experience and is mostly hands-on.</li> <li>• Can be expressed in the form of rules or routines.</li> </ul>
Lyons (2000)	<ul style="list-style-type: none"> <li>• Knowledge that has been codified and documented.</li> <li>• Can easily be categorized using taxonomy.</li> <li>• Is usually stored within a Document Management System or a Knowledge Base.</li> </ul>	<ul style="list-style-type: none"> <li>• Is private knowledge held by individuals. Is being accumulated over an extended period of time via experience.</li> <li>• Is influenced by intangible factors.</li> <li>• Is adhering to rule-of-thumb, intuition, and gut-feeling.</li> </ul>
Vorbek et al. (2001)	<ul style="list-style-type: none"> <li>• Knowledge being documented and classified that resides in various easily accessed media.</li> </ul>	<ul style="list-style-type: none"> <li>• Resides in the head of the professionals of an organization.</li> <li>• Comprises of experiences, ideas, rule-of-thumb, tips and tricks.</li> </ul>

Table 1. Author(s) Explicit - Tacit Knowledge (Hafizi Muhamad Ali & Ahmad, 2006)

Based on the above definitions it is deduced that Explicit knowledge is much simpler to handle since it is codified and can be documented. Once identified and recorded this knowledge can be stored in a knowledge base for further usage. Tacit knowledge is more “elusive,” it resides within the individual and in order to be of value it has to be circulated (Yahya & Goh, 2002). In view of personal knowledge dissemination it is important to differentiate between data, information and knowledge (De Long & Fahey, 2000). An organization should manipulate data into information and information into knowledge, which in turn will become data into a evolvment circle (Bhatt, 2001) as shown in Figure 1.

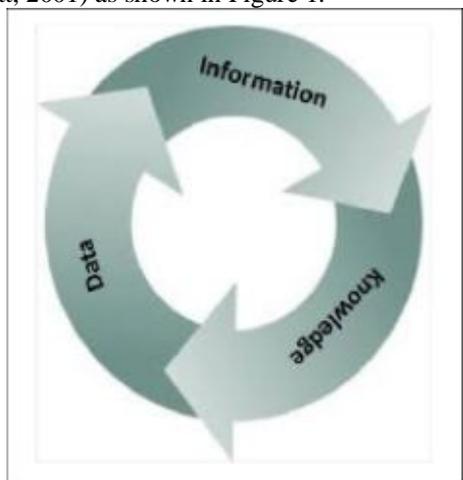


Figure 1. Knowledge Circle

Knowledge can also be subdivided into the following types (De Long & Fahey, 2000):

- **Human Knowledge**, which includes whatever individuals know or the know-how.
- **Social Knowledge**, which is the form of knowledge that is exhibited only through interaction of the individual within a group.
- **Structured Knowledge**, which is the knowledge embedded in the organization in the form of rules, procedures, and practices.

Once knowledge is formulated it has to flow, be disseminated and enhanced or else it ages and becomes obsolete. On the contrary knowledge that is propagated and shared will in turn generate new knowledge (Borghoff & Pareschi, 1997). The knowledge life-cycle consists of four distinct patterns – socialization, internalization, externalization and combination as shown in Figure 2 and described below (Nonaka, 2007):

- **From Tacit To Tacit**, is the case when two people interact and via socialization the knowledge is transferred from the teacher to the pupil. In this case, there is no Explicit knowledge created thus it cannot be easily leveraged.
- **From Explicit To Explicit**, in this case, by combining discrete pieces of Explicit knowledge, the new knowledge is formulated. Although this form of knowledge creation is documented and well-maintained, it attributes very little in

extending the company's existing knowledge base.

- **From Tacit To Explicit**, thought this process the individual holding the knowledge is codifying and distributing it via articulation. In this way, private knowledge becomes an asset that can be disseminated thought out the organization.
- **From Explicit To Tacit**, in this way documented knowledge becomes part of private knowledge by extending the individual tacit knowledge.

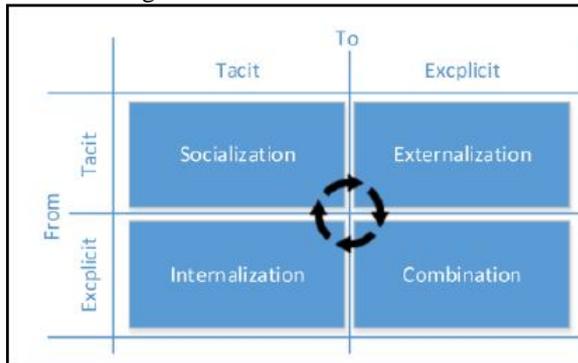


Figure 2. Knowledge Conversion – The knowledge Spiral (Borghoff & Pareschi, 1997)

All the above patters are present in an organization that is generating knowledge and will dynamically interact in forming the Knowledge Spiral.

## 2.2. Knowledge Management (KM)

Knowledge Management is a discipline that strives to bridge the information demand and supply pertaining learning within the organization (Dattero & Galup, 2007; Huizing & Bouman, 2002). In doing so, knowledge management is a method that aims in simplifying sharing, distribution, creation, capture and understanding of an organization's knowledge (Davenport & Prusak, 2003). Two main strategies can be identified in KM (Curado, 2009):

- **Exploitation**, is more about diffusion of knowledge and transfer of it within the organization.
- **Exploration**, is the strategy in which the organization is targeting to create new knowledge trough innovation.

Throughout literature we can identify the following schools of Knowledge Management (Bjørnson & Dingsøyr, 2008; Earl, 2001):

- **Technocratic**, which are primarily based on information and are targeting day-to-day operations.
  - **Systems**. This is the oldest strategy and is based on the codification of knowledge into knowledge bases.
  - **Cartographic**. In this approach people are of importance. Instead of codifying knowledge, "knowledgeable people" should be available. Thus, instead of recording the

actual knowledge, an attempt is made to create a knowledge map similarly to a knowledge "yellow pages" directory, by identifying the individuals that pertain it.

- **Engineering**. This is a school that emerged through business process reengineering and its primary focus is in recording the processes.
- **Behavioural**, which is primarily based on the social factors and the organizational culture.
  - **Organizational**. Is primarily interested in leveraging the organizational structure through "knowledge communities," in order to share and pool knowledge.
  - **Spatial**. Tacit knowledge is easier identified and disseminated through conversation, and this school is primarily interested in promoting space as the main driver to stimulate conversation and exchange of information. In this way, eg. dining areas, cafeteria etc. are brought into the spot light in becoming the primary drivers of knowledge.
  - **Strategic**. In this school knowledge is perceived as the competitive advantage a company can gain and is tightly wired to the company's strategic plan.

Yet another approach would classify Knowledge Management into the following strategies (Hansen, Nohria, & Tierney, 1999):

- **Codification Strategy**, where knowledge will be matched against a taxonomy and stored in a database for further usage by everyone in the company.
- **Personalization Strategy**, where knowledge is shared on a person-to-person basis. The primary objective is to communicate instead of storing knowledge.

From the aforementioned definitions and strategies, we can identify that there are two main trends. The one valuing interpersonal knowledge transfer through social interaction and the other where knowledge is becoming impersonal and eventually stored in a rigidly organized data store. It is very important to understand that both approaches are only complimentary to each other and that for any organization to efficiently manage knowledge it needs to follow the 80-20 rule. Any company should predominantly pursue one of the two approaches (by 80%) and complement it by leveraging the second approach (by 20%). It has been observed that the 80-20 rule can be beneficial whilst executives that try to implement both are having a greater risk in failing at both (Hansen et al., 1999).

For a human-centric KM system, it is important to understand and identify the following (Dattero & Galup, 2007):

- Where expertise and knowledge resides within the company?
- Which are the formal and informal channels of communication within and outside the company?
- Who is the best individual to perform a task?
- Where are the documents and material that will serve as the seed of knowledge, located?
- Who are the initiators / creators of Explicit Knowledge in the organization?

The above questions will help in attaining an understanding of the current Knowledge “structures” in the organization and will further assist in employing a Knowledge Management System.

### 2.3. KM in Banking

Banks are attempting to capture and manage their data in attaining corporate knowledge and eventually business intelligence. A task that due to the lack of a knowledge based management model in the past, was proven unsuccessful. However, this has changed. Nowadays Banks employ more effort and resources in managing to convert information and knowledge into an asset (Hafizi Muhamad Ali & Ahmad, 2006). In understanding the progress and stature of Knowledge in the Financial Institutions, statistics that were identified in the literature, will be outlined. Whilst KM is identified as one of the most important factors for success, adoption is relatively low (Hafizi Muhamad Ali & Ahmad, 2006; Kridan & Goulding, 2006; Nissen, Kamel, & Swngupta, 2000).

- 93% of the managers identify Knowledge as the most valuable resource in the banking environment.
- 87% said that there is no KM program.
- 76% indicate that Banks need to have (indicating that there is none at the moment) clear strategies in identifying, transferring and using Knowledge.
- In order to be successful and innovative in the Banking sector today (79%) and in the future (81%) managers agree that there has to be a cultural change towards viewing the world through the Knowledge perspective.
- 91% agrees that Banks suffer from Knowledge loss.
- Only 20% of the Banks apply KM principles.
- 40% of the Fortune-1000 companies have established the role of a Chief Knowledge Officer (CKO).

The following list exhibits Financial Institutions that have successfully employed KM (Hafizi Muhamad Ali & Ahmad, 2006):

- World Bank is a champion in KM application by identifying Know-How and recording it into knowledge bases that can be access by its entire staff.

- Skandia, a Swedish Insurance company, managed to increase its deployed Point Of Sale (POS) devices from 5,000 to 50,000 in less than 5 years by leveraging the internal know-how. They managed to reduce start-up time for new business to 7 months, while the industry standard is 7 years.
- Bank of Montreal, is one of the oldest Banks in Canada and the 3rd largest in the country. The Bank invested in KM in order to make knowledge discovery more economical and error-free thus becoming a leader in customer centric knowledge acquisition.
- Deutsche Bank, is the largest Euro zone bank and the 2nd largest in the world. The Bank has invested heavily in corporate learning and intellectual capital branding. The Bank has established the Deutsche Bank University as an umbrella organization for learning.

### 2.4. KM in IT

Software engineering is knowledge intensive, thus KM principles should be employed (Vasanthapriyan et al., 2015). Another important factor in employing KM is the constant evlvement of products and services in the IT industry which requires learning continuity.

In software development two types of knowledge can be identified (Rus, Lindvall, & Sinha, 2001):

- Knowledge embedded in the deliverables (artefacts).
- Meta-Knowledge which is, in essence, the knowledge about the products and services.

Most artefacts within a software project can be represented as documents thus being recorded, but in software engineering, employees and their tacit knowledge is the main asset (Rus et al., 2001).

KM can never “jail-break” the mind of the employees but it is imperative to use it, in order, to build structures and frameworks for capturing knowledge. In this way key information can be available even after the respective employee leaves the company (Rus et al., 2001).

## III. EMBARKING ON A TRIP TOWARDS KNOWLEDGE

People are the main enablers in the Knowledge Management ecosystem and Information Technology is the fundamental tool (Yeh, Lai, & Ho, 2006). In this chapter the human assets spread across the organization will be identified and presented in clarifying and understanding the environment, the structures and processes involved.

### 3.1. The Environment

Banking and especially a multinational Bank operating in all continents is bound to have a

multicultural orientation. Although Group functions will tend to be governed from the headquarters, still there will be localized presence that will have to be incorporated / amalgamated in effectively and efficiently managing the functions.

Going a step further, even in the headquarters, the actual staff employed will origin from different cultures. This is due to the fact that there is staff mobility between countries and headquarter resources and also due to the multinational nature of the Bank. In certain cases, locals are preferred for hiring (in some countries mainly due to legislation limitations) however, the Bank is always striving to recruit the best resources from all around the world. This is greatly achieved. Thus in all areas, Business and controlling/supporting functions (eg IT, Risk, Audit, Finance), Subject Matter Experts (SMEs) with substantial experience are employed. However, they are coming from different continents, countries and most importantly cultures.

Having identified the multinational internal resources mix it is important to also understand that the Bank is not operating in a single culture. In this way, the cultural effect is compounded since there are different cultures interacting internally in the headquarters that will have to collaborate with local internal cultures in an attempt to serve customers with yet another external culture. To understand better let the following example illustrate. In the headquarters team, you might have Chinese, Indian and Jordanian resources working together to facilitate a local team in France composed of French, British and Pilipino resources in an attempt to serve French customers. In the aforementioned example, you have an amalgamation of cultures and religions.

The primary objective for the Bank is to make sure that operation is not discontinued or even interrupted. Thus, by bringing all these diverse resources into play, there has to be a proper governance and the

rules of conduct should be explicitly identified into operational procedures. On the other hand this kind of management, highly operational efficient, will have to be amended / transformed in attaining Knowledge Management since organizational culture is identified as one of the major barrier in leveraging knowledge (De Long & Fahey, 2000). In the section to follow possible steps along with threats and strengths will be outlined in formulating a road map.

### 3.2. Identifying the Target

In attaining the expected dissemination of knowledge and realizing the competitive advantage, the "Knowledge Refinery" process can be exercised. This process, diagrammatically shown in Figure 3, includes the following five stages (Zack, 1999):

- Acquisition. Information and knowledge created within the organization alongside with external resources should be acquired.
- Refining. Before storing knowledge, it will have to go through the process of value-adding, which includes cleansing, labelling, indexing, sorting, abstracting, standardising, integrating and re-categorizing.
- Storage and Retrieval. In this stage, upstream repository and downstream knowledge distribution should be bridged.
- Distribution. The mechanisms to make use of the content and access the knowledge repository should be identified.
- Presentation. End-users' knowledge capitalization based on the knowledge repository should be the ultimate goal. Mechanisms for flexible arrangement, selection and integration should be present in order for the environment to be easy enough for the users' to use.

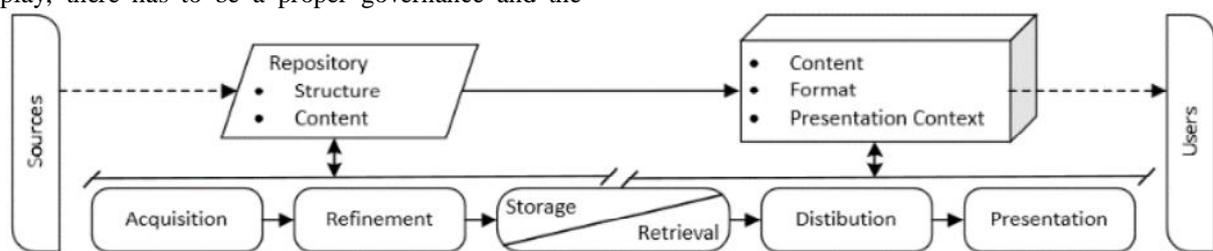


Figure 3. "Knowledge Refinery" process.

The "Knowledge Refinery" will serve as guidelines. However, as stated before, in implementing a Knowledge process, there has to be a 80-20 approach leveraging both Codification and Personalization approach (Hansen et al., 1999). In the case of this a paper, where a multinational Bank was considered, the Codification will have to be the dominant approach, across the organization in order to cater for consistency and distributed access across all continents and knowledge domains. The Personalization will have to be implemented on a

local basis, thus enhancing succession and knowledge transfer in an interpersonal manner by utilizing on the job training.

### 3.3. Designing a Roadmap

In designing a Knowledge Management roadmap there are several concepts and processes that have to be taken into consideration. In the following sections the scale, challenges and opportunities that should be evaluated, when planning for Knowledge Management, are presented. Due to the complexity

that is compounded by the internationalization, the following items should not be considered an exhaustive list but indicators towards guidelines.

### **KM is a Corporate Initiative**

Knowledge Management initiative has to be a corporate approach and higher management commitment and engagement is required. Several departments/functions will have to evaluate and provide with their respective feedback and policy formulation. In the following paragraphs, certain aspects (this will not be an exhaustive list) of departmental involvement will be outlined.

- **Knowledge Risk.** Although the importance of knowledge assets is acknowledged, mainly market, credit and operational risks are evaluated. The respective risk should also be streamlined and evaluated with the help of the Risk experts. For instance, a risk to be evaluated is the dilution of competitive advantages due to unrestricted transfer of knowledge. Knowledge Risk is defined as the risk encountered in terms of the dependency on, loss of, unsuccessful intended or unintended transfer of knowledge assets that results in the lack or non-exclusivity of these assets (Bayer & Maier, 2006).
- **Human Factor.** In excess of technology, knowledge requires, the means and willingness of its handlers to share (Rodriguez & Edwards, 2009). There are several reasons why employees will not share eg. Feeling of the Organization depending on them, individualism culture, lessons learned from failures have negative connotation, etc. (Rus et al., 2001). On top of this possible resistance to adopt KM training should be provided in orienting people towards a KM oriented culture (Hafizi Muhamad Ali & Ahmad, 2006). A KM can only succeed if the appropriate incentives and rewards are provided to the managers and the employees (Earl, 2001; Lee, Hoong, & Lim, 2011; Nissen et al., 2000; Rus et al., 2001; Yahya & Goh, 2002). Thus, Human Resources department involvement and guidance is imperative.
- **Knowledge Audit.** A knowledge audit is the initial step in the assessment of a knowledge plan (Grossman, 2006). The respective audit should include: a) existing and potential knowledge sources b) identify and categorize knowledge in explicit and tacit c) build a knowledge map d) identify missing knowledge e) identify recipients of knowledge f) assess and provide recommendations in improving knowledge management (Dattero & Galup, 2007). With the help and guidance of the respective Audit Function the Bank will be able to thoroughly assess its current status.
- **Business Units & Analysts.** For a structured KM relying on the Codification approach, it is important to have a taxonomy to assign the

respective knowledge and identifying the nature and categorization of knowledge almost all units must get involved (Capilla, Jansen, Tang, Avgeriou, & Babar, 2016; Do Rosário Cabrita & Vaz, 2005; Earl, 2001; Rus et al., 2001; Schultze & Leidner, 2002; Vasanthapriyan et al., 2015). It is of importance to understand here that knowledge is not about data. It is in fact about de- and re-contextualization of information (Bayer & Maier, 2006). Thus IT, MIS or any other Data steward unit will not be satisfied unless the actual creator/user of the respective data is involved.

The above-mentioned functions are a subset in order to understand that any KM initiative cannot be driven from nor can it reside within any single Organizational function / department. Although it might be tempting to engage in a small scale (eg. on a departmental level) but based on the aforementioned interdepartmental involvement, is highly unlikely that there will be any substantial benefit for the organization from such a small scale “stand-alone activity.”

### **Opportunities**

In recent years a growing number of executives, consultants and authors have proclaimed that knowledge is the major source of organizational competitive advantage (De Long & Fahey, 2000). Corporate value is enhanced if, on a strategic perspective, intellectual capital is used in creating and applying knowledge (Do Rosário Cabrita & Vaz, 2005). Below are some of the functions, risk elements, which KM is attempting to address:

- Knowledge Management is serving as a quality gate in capturing and implementing best practices (Kridan & Goulding, 2006).
- Knowledge Management, in particular, generation and transfer are integral components of the sustainability of the firm’s competitive advantage (Do Rosário Cabrita & Vaz, 2005).
- In mitigating the risk of knowledge loss due to attrition and turnover (Nissen et al., 2000), a knowledge base of “Who Knows What?” can be established in order to understand the peoples skills and accordingly prevent ‘brain drain’ (Rus et al., 2001).
- Knowledge created and disseminated will increase productivity since the daily related operations challenges will be addressed in an effective and time efficient manner (Lee et al., 2011).
- Compliance and “suite for purpose” along with tractability are enhanced and leveraged with the use of Knowledge (Capilla et al., 2016).

### **Challenges**

In view of any implementation or adoption of a methodology it is of outmost importance to identify

any risk factors that might affect the outcome. In mitigating risks several challenges are presented below. The respective list cannot be acknowledged an exhaustive list but based on the fact that the considered bank is at an initial KM adoption stage, it can serve as a safeguard:

- Lack of time is considered a direct threat against knowledge management. In many cases the capitalization of knowledge acquisition and learning are not prioritized against the deadlines of the projects. As long as this culture prevails knowledge management is not likely to happen (Rus et al., 2001).
- Socio-organizational and technical factors tend to limit the capture and dissemination of systems Architecture Knowledge Management (AKM) since none of the existing, commercially available, software modelling tools provide for effective AKM (Capilla et al., 2016). New software development concepts like open source and crowd computing will only intensify the limitation due to their “distributed” nature.
- Developers mentality is another factor. Usually software developers are not accustomed in reusability, with some few exceptions of application on a micro level within their code but not amongst them. Taking into account that knowledge management is all about reuse of assets, this culture can substantially diminish effectiveness (Rus et al., 2001).
- Software nature is classified as elusive while most knowledge in software development is tacit and can never be transformed into explicit (Rus et al., 2001). This could be a factor for consideration throughout the knowledge life cycle but could also be the driver behind a conscious decision not to implement end-to-end KM.
- Managing Documents instead of Knowledge can be also a misguided implementation. Users instead of managing knowledge tend to manage documents which in essence will provide the organization with no benefit (Lawton, 2001).
- People psychosynthesis can be a limiting factor since employees tend to think that the capturing of knowledge will result in them becoming expendable. Below, an example of the rational why employees might be reluctant, can be identified (Rus et al., 2001):
  - Employees would like to feel that the organization is dependent on them.
  - Some cultures tend to encourage individualism instead of cooperative work. As a matter of fact, most Western schools have a history of not investing on group work. During recent years, there is a considerable adoption of group assignments in academia and schools.

- Negative connotation of lessons learned and “stigmatism” will also refrain employees from sharing experiences. In certain corporate cultures instead of sharing the failure and learn from it in order to avoid reoccurrence the primary objective is to offload liability.
- A Reward System is essential in developing a knowledge-sharing culture. Companies like Xerox and Hewlett Packard have recorded extensive benefits in their adoption of knowledge management by implementing such systems (Rus et al., 2001).
- Knowledge education is very important in order for all employees to be educated on the concepts. There have to be Knowledge Champions that will promote and market the system to the rest of the employees by persuading them to contribute to it and use it (Rus et al., 2001). The absence of such promotion will result in a deprecated underutilised ill-nourished knowledge system that will be on no use.

### 3.4. Defining the Possible Steps

Knowledge Management tools are technologies that will enable and enhance the acquiring, codification and dissemination of knowledge (Gallupe, 2000). A brief discussion of these tools will be provided to understand the systems that the Bank can utilize towards knowledge management (Vasanthapriyan et al., 2015):

- **Skills Management**, tools that will facilitate the recording of the knowledge map by attempting to depict the answer of questions like: Who knows what? Who knows Who? Who knows this?
- **Document Management**, the repository where corporate documents are stored in a structured manner.
- **Data and Knowledge Discovery**, are tools that target in generating knowledge from existing raw data, knowledge bases, document repositories and other sources. The main function of such tools like data mining, text mining and intelligence gathering, would be to identify associations, relationships and patterns that will in turn enhance knowledge.
- **Collaboration**, one of the most traditional set of tools in the business environment that are utilised in enhancing communication, cooperation, coordination, etc.
- **Forums**, facilitate the communication and in essence produce knowledge through human interactions by recording tacit knowledge.
- **Knowledge Portal**, is a single point of truth for all accumulated knowledge and designates a structured way of consuming the knowledge assets.

- **e-Learning**, can be an efficient way of disseminating knowledge. It can facilitate unattended knowledge transfer through seminars and interactive sessions, while recent mobile technologies open new boundaries set by ubiquity and localization (Triantafyllidis, Clarke, Dowland, & Vranopoulos, 2016).

In different stages, different tools will be utilized depending on the knowledge process maturity level of the organization. Document management and Collaboration tools are widely used in the business. Banking sector is also conforming with this norm. These tools can be considered KM entry level tools since they already have presence in most organizations. Tools like Skills Management, Forums and Knowledge Portals will be the next steps in understanding the knowledge assets of the organization and initiate the exposure of the Knowledge Management to a wider audience. Knowledge discovery and e-Learning will further enhance well established knowledge cultures in further “harvesting the fruits of knowledge”.

In the case of the Bank, knowledge initiatives are in the entry level since no structured and formalized knowledge initiative has been attempted up to now. Based on this assumption, it is suggested that not all tools are utilized since there has to be a cultural adaptation of the knowledge principles. In the sections to follow tools, practices and suggestions are recorded in paving the road towards a Knowledge Organization. Since it would be impossible to outline the suggestions for all departments of the Bank, IT is used in exhibiting/describing the concepts.

### **Suggested Course of Action**

As already identified the Bank should work towards an 80-20 approach, leveraging 80% Codification and 20% Personalization. The dominant strategy to be followed for KM should be Exploitation since the Banking nature is less about Research oriented efforts. A mix of Technocratic and Behavioural schools approach should coincide with the decision to conform to the 80-20 rule. In view of this suggested approach the following should be taken into consideration as implementation principles:

Source Code Control Systems (SCCS) are tools that facilitate corporate memory. Version Control will keep track of changes and user comments during the check-in process and will facilitate understating (Rus et al., 2001). For more than ten (10) years up to now, the Bank is employing a leading market solution in SCCS thus fulfilling the requirement of accumulating knowledge. It is nonetheless identified that in some cases the respective comments, upon check-in of changes, are not updated by the developers. In enhancing the process, it is suggested that a systemic control is enabled in requiring the comments and a quality control is performed on regular basis in assessing the comments.

Since knowledge management should adopt the “lightweight approach” (Rus et al., 2001) and can happen on an informal basis (Vasanthapriyan et al., 2015) it is suggested that the Bank should encourage informal tacit-to-tacit knowledge transfer utilising the Behavioural-Spatial school principles. In this way, the employees will not feel threatened (see Designing a Roadmap / Challenges). In doing so, HR team building and creative thinking facilities could be utilized. Of course, there has to be a repository of all documents and the Bank has already invested in documents handling by implementing an elaborate documents repository adhering to the Technocratic school. This informal and formal knowledge management method should, by no means, be translated into KPI(s) since the organization’s adoption rate is very low and would result in abusing the Knowledge Management initiative by doing it for the sake of doing and reaching the KPI(s) (Lee et al., 2011) rather than for the benefit of the individual and to a greater extent for the benefit of the organization.

An integral part of the aforementioned document repository reflects the architectural design of the enterprise IT systems. Standard industry practices reveal that usually Architects tend to record and analyse only the solution to be implemented without recording any decision points and the rationale behind them, despite the well-established benefits of doing so (Capilla et al., 2016). It is therefore suggested that there should be an extension of the Bank’s architectural document template in depicting the rationale behind selecting the respective implementation. The document extension should be chosen over a commercial application such as SAW, ADvISE, RGT, gIBISm, DRL and QOC. Although these applications are quite thorough in addressing the issue, they have gained limited acceptance by practitioners (Capilla et al., 2016).

Attaining Knowledge accumulation, especially when subcontractors and far-flung teams are involved, can be a tedious task (Malhotra & Majchrzak, 2004). The Bank has been utilizing on-site as well as off-site, in certain cases off-shore, subcontractors in augmenting the internal development teams, which has been a common industry standard for the last 20 years (Adeleye, Annansingh, & Nunes, 2004). In order to maximize knowledge capitalization it is suggested that the following communication norms are established (Malhotra & Majchrzak, 2004):

- Discourage one-to-one email communication within the teams.
- Use annotation capabilities in all documents residing in the corporate document repository so that comments are visible by all.
- Establish rules on what should be shared outside the team in facilitating inter-team communications.

- Ensure privacy and control possible knowledge “leakage” by imposing access rules on the document repository and its content.
- Abolishment of private folders and documents in facilitating communication and sharing.

Forums, WIKI’s and Content Management Systems should be utilized in gathering operational knowledge and ad-hoc process documentation. This is already implemented in the Bank but is more on a sub-departmental level rather than on a corporate level. The suggestion would be to standardise the process with the use of a tool instead of custom implementations. It has to be identified that this tool will serve as the basis for the implementation of the Knowledge Refinery (Zack, 1999) and no immediate knowledge assets can be harvested. The implementation will serve more as an introduction and familiarization process in changing the corporate culture towards a Knowledge Organization. In identifying the best tool a balances score card should be utilized in evaluating functional requirements, technical requirements, vendor commercial and CapEx / OpEx metrics (Vranopoulos & Triantafyllidis, 2016).

In relation to user acceptance, familiarization and reduction of resistance, the suggestion would be to implement an incentive mechanism (Earl, 2001; Lee et al., 2011; Nissen et al., 2000; Rus et al., 2001; Yahya & Goh, 2002) along with training. The reward mechanism should be fair and should also make sure that Knowledge is rewarded instead of just adherence to the process. In respect to training the train-the-trainers concept should be utilized in attaining the Knowledge Champions (Rus et al., 2001) that will promote the Knowledge Culture internally (Hafizi Muhamad Ali & Ahmad, 2006).

Apart of the aforementioned proposals it is also suggested that the next step, once all above have been implemented, would be to engage in a more structured approach towards Knowledge. This step will be available for planning only after the Bank has matured in terms of Knowledge Management and has engaged in attaining an Organizational Knowledge Culture. What is suggested, is to use guidelines provided by the Software Engineering Body of Knowledge (SWEBOK) that was initiated in 1998 as a joint effort between IEEE and ACM in documenting knowledge in Software Engineering (Rus et al., 2001; Vasanthapriyan et al., 2015). The basic knowledge areas covered are the following:

- Software requirements
- Software design
- Software construction
- Software testing
- Software maintenance
- Software configuration management
- Software engineering management
- Software engineering process

- Software engineering tools and methods
- Software quality

## CONCLUSION

This paper has addressed bibliography in an attempt to define Knowledge and Knowledge Management. Types of Knowledge and its life cycle were presented. Available classifications, strategies and schools in relation to Knowledge Management were highlighted. On these theoretical concepts the Banking and IT operational models were superimposed in identifying the best mix in planning and implementing a roadmap towards a Knowledge Organization.

Whilst the theoretical background is available, this paper “puts it all in perspective” and tries to formulate an implementation process which will cater for the distinct characteristics of an international Banking institute, particularly focusing in the IT function. Although KM is an enterprise initiative, in this paper the IT department is selected as an implementation prototype due to its peculiarities in relation to Knowledge illuiveness. Banking is a highly regulated environment with presence in several countries which causes a knock-off effect in implementing KM since governance and sociocultural aspect must be considered.

Through the prism of governance and internationalization the lists of opportunities and challenges are drafted in providing awareness to implementers of KM in the Banking ecosystem. Operational suggestions, utilizing the structured approach towards Knowledge, are formulated along with the description of tools to be utilized and enhancements of the existing processes.

Further research initiatives can be identified in managing the implementation of the proposals and in measuring effectiveness and efficiency along with Return on Investment (ROI) of the Knowledge Culture implementation. This work, although focused in international banking IT, with relative adjustments, aims to serve as a good set of best practices and workflow priorities for knowledge governance at large addressing requirements both for the corporate world and academia.

## REFERENCES

- [1] Adams, J. Q. (2007). What is the rationale for regulating banks?, (December), 40–43.
- [2] Adeleye, B. C., Annansingh, F., & Nunes, M. B. (2004). Risk management practices in IS outsourcing: An investigation into commercial banks in Nigeria. *International Journal of Information Management*. <https://doi.org/10.1016/j.ijinfomgt.2003.10.004>
- [3] Bayer, F., & Maier, R. (2006). Knowledge Risks in Inter-Organizational Knowledge Transfer. *Proceedings of I-KNOW '06*, 76–84.
- [4] Bhatt, G. D. (2001). Knowledge management in organizations: examining the interaction between technologies, techniques, and people. *Journal of Knowledge Management*. <https://doi.org/10.1108/13673270110384419>

- [5] Bjørnson, F. O., & Dingsøy, T. (2008). Knowledge management in software engineering: A systematic review of studied concepts, findings and research methods used. *Information and Software Technology*. <https://doi.org/10.1016/j.infsof.2008.03.006>
- [6] Borghoff, U. M., & Pareschi, R. (1997). Information Technology for Knowledge Management. *Journal of Universal Computer Science*, 38.
- [7] Capilla, R., Jansen, A., Tang, A., Avgeriou, P., & Babar, M. A. (2016). 10 years of software architecture knowledge management: Practice and future. *Journal of Systems and Software*. <https://doi.org/10.1016/j.jss.2015.08.054>
- [8] Curado, C. (2009). PERCEPTIONS OF KNOWLEDGE MANAGEMENT AND INTELLECTUAL CAPITAL IN THE BANKING INDUSTRY.
- [9] Dattero, R., & Galup, S. D. (2007). The knowledge audit: Meta-Matrix analysis. *Knowledge Management Research & Practice*, 5, 213–221. <https://doi.org/10.1057/palgrave.kmrp.8500142>
- [10] Davenport, T. H., De Long, D. W., & Beers, M. C. (1998). Successful Knowledge Management Projects. *Sloan Management Review*, 43–57.
- [11] Davenport, T. H., & Prusak, L. (2003). Working knowledge: how organizations manage what they know [Book Review]. *IEEE Engineering Management Review*. <https://doi.org/10.1109/EMR.2003.1267012>
- [12] De Long, D. W., & Fahey, L. (2000). Diagnosing Cultural Barriers To Knowledge Management. *Academy of Management Executive*, 14, 113–127.
- [13] Do Rosário Cabrita, M., & Vaz, J. L. (2005). Intellectual Capital and Value Creation: Evidence from the Portuguese Banking Industry. *Electronic Journal of Knowledge Management*, 4(1), 11–20.
- [14] Earl, M. (2001). Knowledge Management Strategies: Toward a Taxonomy. *Journal of Management Information Systems*, 18(1), 215–233.
- [15] Gallupe, R. B. (2000). Knowledge Management Systems: Surveying the Landscape.
- [16] Grossman, M. (2006). An overview of knowledge management assessment approaches. *Journal of American Academy of Business*, 8(2), 242–247.
- [17] Hafizi Muhamad Ali, & Ahmad, N. H. (2006). KNOWLEDGE MANAGEMENT IN MALAYSIAN BANKS: A NEW PARADIGM. *Journal of Knowledge Management Practice*, 7(3).
- [18] Hansen, M. T., Nohria, N., & Tierney, T. (1999). What's Your Strategy for Managing Knowledge? *Harvard Business Review*. Retrieved from [www.hbr.org](http://www.hbr.org)
- [19] Huizing, A., & Bouman, W. (2002). Chapter Knowledge and Learning , Markets and Organizations : Managing the Information Transaction Space.
- [20] Khan, M. A. U. D., Uddin, M. F., & Gupta, N. (2014). Seven V's of Big Data understanding Big Data to extract value. Proceedings of the 2014 Zone 1 Conference of the American Society for Engineering Education - "Engineering Education: Industry Involvement and Interdisciplinary Trends", ASEE Zone 1 2014. <https://doi.org/10.1109/ASEEZone1.2014.6820689>
- [21] Kridan, A. B., & Goulding, J. S. (2006). Emerald Article : A case study on knowledge management implementation in the banking sector A case study on knowledge management implementation in the banking sector. *VINE*, 36(2), 211–222. <https://doi.org/10.1108/03055720610683013>
- [22] Laney, D. (2001). 3D Data Management: Controlling Data Volume, Velocity, and Variety. *Application Delivery Strategies*, 949, 4.
- [23] Lawton, G. (2001). Knowledge Management: Ready for Prime Time? *Computer*, 34(2), 12–14. Retrieved from <http://dl.acm.org/citation.cfm?id=619060.621644>
- [24] Lee, A., Hoong, S., & Lim, T.-M. (2011). The Use of Knowledge Management Systems to Support Knowledge Creation and Sharing Activities among Employees – A Survey based Study of IT Shared Services Company.
- [25] Malhotra, A., & Majchrzak, A. (2004). Enabling knowledge creation in far-Fung teams: best practices for IT support and knowledge sharing. *Journal of Knowledge Management*, 8(4), 75–88. <https://doi.org/10.1108/13673270410548496>
- [26] Nissen, M., Kamel, M., & Swngupta, K. (2000). Integrated Analysis and Design of Knowledge Systems and Processes. *Information Resources Management Journal*, 24–43.
- [27] Nonaka, I. (2007). The Knowledge-Creating Comany. *Harvard Business Review*.
- [28] Rodriguez, E., & Edwards, J. S. (2009). Knowledge Management and Enterprise Risk Management Implementation in Financial Services. *Society of Actuaries*.
- [29] Rus, I., Lindvall, M., & Sinha, S. S. (2001). Knowledge Management in Software Engineering Available from: DoD Data & Analysis Center for Software (DACS).
- [30] Schultze, U., & Leidner, D. E. (2002). STUDYING KNOWLEDGE MANAGEMENT IN INFORMATION SYSTEMS
- [31] RESEARCH: DISCOURSES AND THEORETICAL ASSUMPTIONS 1. *Knowledge Management in IS Research MIS Quarterly*, 26(3), 213–242.
- [32] Triantafyllidis, A., Clarke, N., Dowland, P., & Vranopoulos, G. (2016). Increasing eLearning Engagement using Mobile Technologies. *ICERI2016 Proceedings*, 8644–8653. <https://doi.org/10.21125/iceri.2016.0957>
- [33] Vasanthapriyan, S., Tian, J., & Xiang, J. (2015). A Survey on Knowledge Management in Software Engineering. *IEEE*, 237–244. <https://doi.org/10.1109/QRS-C.2015.48>
- [34] Vranopoulos, G., & Triantafyllidis, A. (2016). Managerial & Technical Insight in Knowledge Management. In BEFB 2017, International Congress on Banking, Economics, Finance, and Business. Kyoto, Japan. <https://doi.org/2412-4044>
- [35] Wallison, P. J. (2006). Why Do We Regulate Banks? *Regulation*, 1991, 14–19.
- [36] Yahya, S., & Goh, W. (2002). Managing human resources toward achieving knowledge management. *Journal of Knowledge Management*, 6(5), 457–468.
- [37] Yeh, Y.-J., Lai, S.-Q., & Ho, C.-T. (2006). Knowledge management enablers: a case study. *Industrial Management & Data Systems*, 106(6), 793–810. <https://doi.org/10.1108/02635570610671489>
- [38] Zack, M. H. (1999). Managing Codified Knowledge. (cover story). *Sloan Management Review*, 40(4), 45–58. <https://doi.org/Article>

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