

Artificial Intelligence and Tacit Experience Retention Management (TERM): Lessons learnt in incorporating Big Data, KM and CRM

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ABSTRACT: This paper introduces the new Tacit Experience Retention Management (TERM) concept. TERM captures the employee's tacit knowledge and experience by recording their undertaken systematic activities and transferring them to the next person needing this information to perform a given process that is recorded. TERM is founded on well-known concepts of AI, Big Data, Customer Relationship Management (CRM), and Knowledge Management (KM) facilitated by systematic technologies. This paper describes the lessons learned in incorporating Big Data, CRM, and KM to define how AI could be applied to manage, capture, and distribute individual's tacit knowledge and experience in providing a better service for an organization. The key challenge with TERM is understanding the impacts on an organization when TERM is implemented. Who will be affected? What are the potential changes in the organization's architecture? How do we introduce and enforce TERM? This study will concentrate on how TERM proposes to pass the boundaries of existing concepts of Big Data, CRM, and Knowledge Management, providing an effective relationship managing an organization's personnel by enhancing the value proposition to the customers (known as end users).

KEYWORDS: Artificial Intelligence, Tacit Knowledge, Knowledge Management, Big Data

I. INTRODUCTION

This paper discusses a merger of the major technologies of AI, Big Data, CRM, and KM, with the help of significant computer applications, proposing a new concept called TERM. TERM is a unique concept; hence, it can learn and record the tacit knowledge and experience of the people working in an organization. Thus, the knowledge and experience of the individual personnel who work in the organization are captured and distributed to the other personnel in the organization who do not know how to perform a specific task or process. Figure 1 below shows the two building steps that can be used by an organization in creation of TERM. (David, 2023) highlights the importance of AI in knowledge creation by stating that the rise of AI capabilities and promising features for achieving these goals may call for different forms of division of work between workers and intelligent machines than those we have witnessed in organizations in the past.

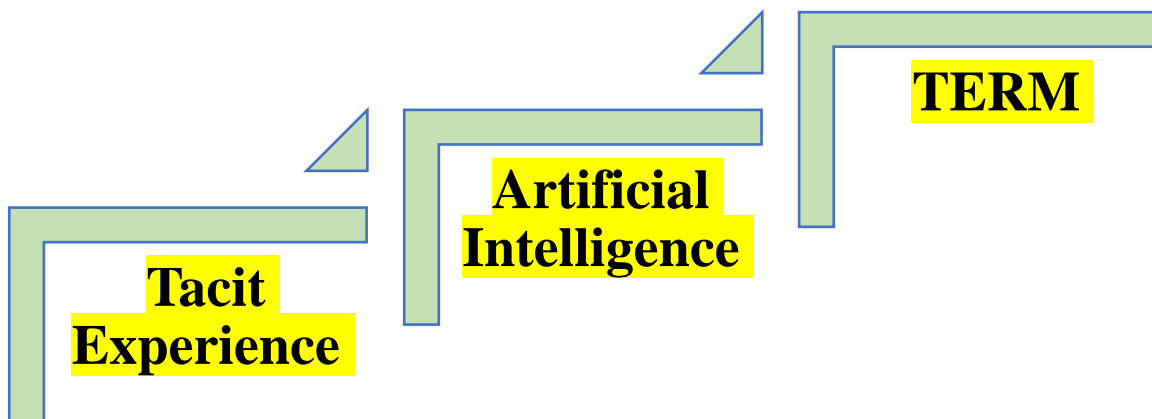


Figure 1: the two building steps that can be used by an organization in creation of TERM.

The real problems with the introduction of TERM are identified as:

- 1: What are the impacts on an organization when TERM is implemented?
- 2: Who will be affected, and what are the benefits for the end user?
- 3: What are the potential changes in the architecture of the organization?
- 4: How to introduce and implement TERM?
- 5: How do KM and CRM work together, and how does Mobile Technology facilitate this?

According to (Cybulski J & Scheepers R. 2021), the field of data science emerged in recent years, building on advances in computational statistics, machine learning, artificial intelligence, and big data. Modern organizations are immersed in data and are turning toward data science to address various business problems. Global technology advancement has raised people's expectations of their work conditions and living standards. The customer is better informed with the availability of information at their fingertips over the Internet. The technology has also provided various access methods to this information source, which could happen anytime and anywhere. The Internet also has offered a window of opportunity for users to purchase products and receive services on a global scale. The corporate world has extended its boundaries to accommodate and adapt their organizations in response to this new phenomenon. The organizations also had to look hard at their customer handling policies and amend them towards more customer orientation. The orientation of various concepts and technologies, such as Big Data, CRM, and KM, provide organizations with better customer knowledge.

The objective of new technological concepts such as AI, Big Data, CRM, or KM is to benefit the users of the technology with the ease of distribution of the data across the organization, more robust processes, alignment of the technology between technology and infrastructure and better accessibility to the information when required - broadly described as the acquisition, growth, and retention of customers (Arunatileka & Unhelkar, 2003). Customer acquisition is where new customers are acquired using the knowledge created through various systems based on relative concepts. This could be in the way of presenting a better value to the potential customer by giving accurate time information, a more focused customer approach, and tailor-made solutions.

The prospective customers perceive a higher value in such a scenario, making it easier for the organization to acquire those prospective customers. Retention of existing customers in today's corporate world is also crucial since migrating to other suppliers is only a click away and of minimal cost to the customer. Customer enhancement or growth is adding value to the portfolios of existing customers. For instance, a customer having one service from an organization would be given an overall discount on the event if the customer wants to activate a second service from the same organization.

The advancement of Information and Communications Technology (ICT) and the popularizing of the web have revolutionized people's learning ability. Knowledge Management (KM) is another concept that has evolved where, by applying technology, people can share incredible amounts of information without being concerned about geographical and time boundaries. As described by (Balthazard & Cook, 2004), KM is realized by identifying the valuable tacit knowledge possessed by organizational members and making that knowledge explicit. Knowledge is compelling at the hands of the people; thus, mobile technologies would play a significant role in distributing that knowledge to the people who need it. Technology has provided a perfect platform for customers to easily access the web in banking, shopping, and information retrieval. Similarly, it has provided organizations with a platform to access customers in particular ways, reaching them through specific locations and providing a new value proposition. The Internet has also provided opportunities for service providers such as PayPal, an online payment processing company founded in 1999, to offer customers more cost-effective payment-related services like banking services—the concept of banking using mobile handheld devices, such as Personal Digital Assistants (PDAs).

After years of operation, PayPal has become the most used payment system for clearing auction transactions on eBay and many other financial-related portals, competing directly with traditional banks. The experience of the customer is changing with the advancement of technology. The marriage of the internet with Mobile Technology has also provided opportunities in many areas, such as banking, shopping, and work-related activities. The same marriage has provided a suite of opportunities for organizations in the form of AI, Big Data, CRM, and KM. AI, Big Data, CRM, and KM are strategic tools to acquire, retain, and enhance customers. Increased competition due to free market principles and intensified customer demand fueled by more knowledgeable customers also add more pressure to offer better customer service. This paper focuses on the importance of personnel knowledge for the organization and how technology will aid in distributing this knowledge anywhere and anytime to provide better customer service.

II. CHALLENGES OF INCORPORATING AI, BIG DATA, CRM, AND KM IN TERM

As described by (Harej & Horvat 2004), Customer Relationship Management in an organization leads to:
Increased revenue and market share obtained through flexible and fast responses to market opportunities.
Increased effectiveness in using the organization's resources to enhance customer satisfaction.
Improved customer loyalty leading to repeat business.

As per (Jukic, Meamber, & Nezelek, 2002) CRM is a business strategy that utilizes the power of technology to tie together all aspects of a company's business with long-term customer loyalty. According to (Fjermestad & Romano, 2003) Electronic CRM is about attracting and keeping economically valuable customers while eliminating economically invaluable ones. Furthermore, the paradigm in marketing has changed from marketing mix to relationship marketing. As we view and study the organization, they have already captured the idea, and they are in the process of implementing better services for their customers. As an example, telecommunication companies have established call centers to reduce the duration of waiting as well as provide their affiliated customers with better services with the development of a software interface that allows the web customer to click and talk to a customer representative in real time while seeing the picture and the profile of the customer representative.

Knowledge is created by investigation, observation, and experience, contrasting with information, as learning administers the information received to develop knowledge. As per (Bukowitz et al. 1991), KM is a fast-moving field created by the collision of several other fields, such as Human resources, organizational development, change management, information technology, brand and reputation management, performance measurement, and valuation. New understanding is generated daily as organizations experiment, learn, discard, retain, adapt, and move on. Knowledge Management (KM) is the association of the daily activities of the business, used for future development and decision-making purposes. Tiwana (2000) describes knowledge as a fluid mix of framed experience, values, contextual information, expert insight, and grounded intuition, providing an environment and framework for evaluating and incorporating new experience and information. It originates and is applied in the minds of knowledge personnel. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, and norms. There are a variety of disciplines that have influenced the field of KM thinking and practice, namely philosophy in defining knowledge; cognitive science in understanding knowledge workers; social science in understanding motivation, people, interaction, culture, and environment; management science in optimizing operations and integrating them with the enterprise; information science in building knowledge related capabilities; knowledge engineering in eliciting and codifying knowledge; artificial intelligence in automating routine and knowledge-intensive work and economics in determining priorities.

(Ekionea & Abou-Zeid, 2005) Conclude through empirical data that well-managed knowledge within an organization gives that organization a competitive advantage. (Macmanus, Snyder, & Wilson, 2005) state that recognizing the KM imperative will provide an impetus for organizations to understand and nurture their knowledge resources and activities. Furthermore, the current economic conditions have made organizations realize the value of their corporate knowledge and seek effective methods to reuse that knowledge. The organizations would be keen on data gathering and processing electronic data that originates from information management and systems applications. The data would be processed to information, then to knowledge, and finally wisdom, as explained below:

Data: Data is classified as raw facts and figures that do not necessarily mean anything, considering they could be structured. (Skovira, 2004) describes data as unrecognized and unprocessed static facts.

Information: Information is classified as a set of processed data that is meaningful and makes decision-making easier. (Tiwana, 2000) describes information as data endowed with relevance and purpose.

Knowledge: Knowledge is out there, and it exists in nature. Remaining competitive in the market is the organization's responsibility by gathering the proper knowledge and managing it in a transferable way to the right people at the right time and place. Explicit knowledge is recorded and documented in books, papers, reports, and so on. (Gourlay, 2023) asserts that there is no common definition of tacit knowledge, however, for the purpose of conceptual framework this study defines tacit knowledge is the essence of the accomplishment in the human mind based on their achievement and experiences. Suppose the organization cannot acquire the tacit knowledge that exists within. In that case, there prevails a chance that competitors may tap that tacit knowledge, which might enable them to control the market.

Wisdom: Understanding our surroundings and judgments are the aspects of the human mind that computers thus far have never comprehended. Knowledge belongs only to humans; therefore, we can conclude that wisdom is not fully understood in computing. However, wisdom cannot be ignored, and further studies are required to analyze it. The functionality of knowledge management would be to manage the acquired knowledge in the CRMs for practical use. The available technology that supports Knowledge Management (KM) has been around for many years, at least since the evolution of Information Technology and the invention of the Internet and Intranet. The flow of knowledge around people and communication is the most vital task of KM. Mobile and Wireless technologies, especially in today's business world, can play an essential role in assisting people to communicate the required knowledge without considering the limitation of place and time. Mobile devices can help the business tactics when accessing IT structures by the organization's personnel. All these activities will ultimately add and enhance the CRMs and thereby improve the customer intelligence of the organization. The emergence of wireless and mobile networks has substituted the meaning of trade and business and their application. Internet-enabled mobile devices such as handhelds, palms, PDAs, pocket CDs, and smartphones are examples of different forms that could assist the organization in communicating and transferring knowledge to people who need them. As per (Lindgren et al. 2000), mobility is an aspect of numerous jobs, but it comes in different forms and amounts. Some people move around all the time since their work requires them. However, with the use of Mobile Technology, these personnel will always be on to the organization if any new knowledge is needed from them. The system is a learning system, and the KM would store the regular areas of knowledge required in the organization's day-to-day activities. They thereby could be accessed through the CRMs to serve customers.

The KM could benefit the personnel (Internal to the organization) and their customers (External to the organization). The potential application of the technology on Term will be used in Web conferencing, Groupware, Data Warehouse, Decision Support Systems, Project Management, Document Management, Knowledge and Experience Sharing, Knowledge and Experience Retrieval, Document Exchange, and other day-to-day tasks, activities, and processes such as using email and SMS.

III. POSITIONING BIG DATA AND TERM :

Historically, companies used mainframe computers to store and analyze data. After that, microcomputers began to fill out mainframe rooms as servers, and these rooms became known as data centers. These data centers were the organization's brain center to store, analyze, and distribute all the data for the organization's needs. We are still evaluating how to store and use the data and big data. Big data and its associated computing and storage needs have significantly impacted the data center industry. The data center is an organization's brain. It takes in, stores, analyses, and disseminates all the data to satisfy organizational needs. Data generated has exploded recently, forcing data centers to evolve and grow. The natural resources, including various commodities, require vast amounts of investments and expenditure to be warehoused and transported to where it is needed. Data is effectively infinitely durable and reusable. This means that treating data, unlike other resources, can be replicated indefinitely and moved worldwide at the speed of light, at a meager cost, through various technologies. Data can also be more valuable the more it is used, rather than being permanently used or permanently converted into another form. For example, insurance records from a person can help in the establishment of insurance quotations and can be used for further studies by insurance companies for various other activities. Data becomes increasingly available as computer technology advances, our business and leisure activity moves online, and sensors become more sophisticated.

The companies in control of the data are responsible for using this vital commodity for the benefit of humanity rather than using it to enrich themselves. Humans have used other commodities like oil to cause damage to finite natural resources. Data mining does not intrinsically involve causing damage to our planet as it represents words, pictures, sounds, ideas, facts, measurements, statistics, or anything else that computers can process into strings of 1s and 0s that make up digital information. However, unregulated data mining causes a whole distinct set of problems, such as privacy, accuracy, property, and accessibility issues, as the imbalance of power is generated by information being in the hands of a few companies. Looking at the data as an ever-lasting source of power, such as the sun, we need to ensure that the energy of the sun is widely available to be used for the proper purpose to ensure less disruption of life like what we have done in the past with other commodities like plastic. A problem with collecting substantial amounts of data is that it tends to be imprecise and disorganized. Companies use the big data accumulated in their systems to improve operations, provide better customer service, create personalized marketing campaigns based on specific customer preferences, and, ultimately, increase profitability. Businesses that utilize big data hold a potential competitive advantage over those that don't since they can make faster and more informed business decisions, provided they use the data effectively.

Specific database structures have been created to combat this issue and allow meaningful storage of disorganized data. Organized data are easy to store and analyze. Unfortunately, this is rarely true for data in the real world, as real-world data tend to have messy structures of varying qualities and types, while some information will be lost when real-world data is organized. Since then, several critical milestones have changed the ICT industry's evolution, including the emergence of virtualization software and the shift towards cloud computing. Big data combines structured, semi-structured, and unstructured data collected by organizations that can be mined for information and used in machine learning projects, predictive modeling, and other advanced analytics applications. Structured data is information that either does not have a predefined data model or is not organized in a predefined manner. Unstructured data has an underlying structure but cannot be mined effectively in its current messy condition. Still, through thoughtful data mining, gap filling, deduplication, and benchmarking, associations can clean up their unstructured data to improve the quality and glean valuable insights. Taking it to the next level, by leveraging analytics and visualizations to mine unstructured data, associations can reveal member sentiment and the true motivation behind customer behaviors to improve engagement.

Many organizations are evaluating business intelligence and predictive analytics towards the evolution of the ICT industry. Big data comes from myriad sources, such as business transaction systems, customer databases, medical records, internet clickstream logs, mobile applications, social networks, scientific research repositories, machine-generated data, and real-time data sensors in Internet of Things (IoT) environments. The data may be left in its raw form in extensive data systems or pre-processed using data mining tools or data preparation software. Hence, it's ready for particular analytics uses. Systems that process and store big data have become a standard component of data management architectures in organizations. Big data is often characterized by the large volume of data in many environments, the wide variety of data types stored in extensive data systems, and the velocity at which the data is generated, collected, and processed. These characteristics were first identified by Doug Laney, then an analyst at Meta Group Inc., in 2001; Gartner further popularized them after it acquired Meta Group in 2005.

Big Data improves operations, provides better CRM, creates personalized marketing campaigns based on specific customer preference, and increase profitability. Organizations that utilize big data have a competitive advantage since they can make faster and more informed business decisions, considering if they are using their big data effectively. Furthermore, this utilization of big data enables organizations to become increasingly customer-centric, allowing historical and real-time data to assess the evolving consumer preferences to improve their marketing strategies and become more responsive to their desire and needs. Based on the above discussion, metaphorically speaking, a drop of water in an organized swimming pool can be found in the context of a swimming pool, but a disorganized swimming pool will never reveal an individual drop of water. This drop of water in a data pool can be a detailed specification of a particular customer. However, a disorganized swimming pool can still reveal helpful information such as water temperature, capacity of the pool, pool sanitation, quality of water by measuring the degree of contents, and much more information. As a pool of information (either organized or disorganized), Big Data can provide similar information based on the application's design accessing these databases.

According to the nature of the organization and its specific requirements, TERM can be configured to access the retained information in the big data and distribute this information across the organization based on the authority and access level of the individual. For example, a customer can approach customer service in a motor registry requesting to change the color of her car. This request is rare and complex; only specific team members are familiar with completing such a process. TERM registers the performed process by grabbing the necessary information by writing the used screen, capturing data in each screen to finalize the changed color, and recording the old color in the system. When a less skilled team member is at the counter, and the same inquiry is requested, the personnel can ask the system to direct them to the necessary screen and data that needs to be filled based on the work done by a previously skilled team member. An alternative example is using GPS systems for bus drivers' general or specific routes. TERM can record the best special runs or main routes and present them to the next new driver or a driver who is not necessarily familiar with the area. TERM's application could be defined and evaluated in various scenarios to assist and encourage organizations to share their database and distribute knowledge and information. Medical researchers could also use the TERM to identify disease risk factors and doctors to help diagnose illnesses and conditions in individual patients. In addition, data derived from electronic health records (EHRs), social media, the web, and other sources provides healthcare organizations and government agencies with up-to-the-minute information on infectious disease threats or

outbreaks. TERM could be used in other government agencies for emergency response processes, crime prevention, and innovative city initiatives.

IV. STRATEGIES FOR HANDLING THE POSITIONING OF VARIOUS APPLICATIONS WITH TERM

The primary function of customer-oriented technologies is to create better intelligence with the existing data available to the organization. This could also create streamlined processes across the organization by:

- Personnel Management (Personnel Knowledge Management and Personnel Relationship Management).
- Updating/equipping personnel to deal with customers.
- Improving management understanding and control of personnel.
- Informing the customers of the organizational changes.

The frontline of any organization (Front desk people and people in the background) are the people who directly interact with customers and experience "the moments of truth," which play a significant role in the organization's success. A CRM can only succeed if the people in the organization function well in managing the CRM. This could happen if the employees are under the impression that they are undervalued, or their experience and knowledge are not appreciated. Organizations must apply the available technology to create better relationships with their personnel, capture their knowledge, and use and distribute them. The achievement of the personnel and their successful behavior could be recorded and distributed through their related sections and through to the whole organization using TERM within current and future technologies such as Mobile Technology.

TERM is defined as an ideology to interlink knowledge of personnel in an organization within its boundaries of technology (software), processes, and its customers with the use of Mobile Technology. TERM will give the advantage to distribute and share knowledge and experience within the organization. Organizations could use Mobile Technology in two ways: Mobility in the workplace and mobility in the service of customers. TERM would use both these methods to generate knowledge. The advantage of mobility would be that the customers, as well as the employees, could be contacted anytime, anywhere. The system would learn the expertise of the people and store that as knowledge in the CRMs for future use. TERM works with technology to capture wisdom, knowledge, and information, transferring them into Data (placed in Big Data) and redistributing them as information, knowledge, and wisdom, creating a process that will eventually lead to better benefits for the end user. The primary functionalities could apply to mobile technologies, connecting customers with the organization's personnel anytime, anywhere.

The mobile technology allows the end user to directly link to CRM, where they can enquire about stocks, delivery times, and the like via web-enabled systems. However, primary communication would be via the organization's personnel using Mobile Technology. Technology, software, and processes are internal to the organization, which feeds the CRM. The knowledge base is provided by the technology, software, and operations and by the CRM. Personnel and customers also feed the Knowledge base. The following section explains the merger of CRM and KM, creating the TERM concept.

V. CULTURAL EFFECTS OF TERM

(Ozcelik, 2001) describes the culture and compares the Eastern and Western cultures. According to this, individualism (low-context culture) is a cultural pattern found in the Western world, such as in North America, Canada, and Western Europe, whereas collectivism (high-context culture) is the dominant pattern in the Middle East, Central Asia, Far East, Africa, South America, and to an extent in Eastern and Central Europe. However, in both individualistic and collectivistic cultures, one can find individuals who are allocentric (pay primary attention to the needs of a group) or idiocentric (pay more attention to their own needs than others). The technology has increased the connectivity all around the globe. Organizations are globalizing faster than ever before. As per (Lan & Unhelkar 2005), globalization is the conducting and coordination of business structure, functions, activities, units, and employees, together with the incorporation of appropriate strategies across geopolitical borders. Considering the mentioned factors, it is also essential to realize the importance of the cultural factors while applying the concepts of CRM and KM strategies in different cultures. Most US and European corporations use call centers for customer service. The cultural and legal differences are the significant drawbacks of going global. In www.unpan1.un.org, the cultural issues of Asian countries (Eastern) are described. Price Waterhouse Cooper's director of management consulting services, Craig Ower, states that it is challenging to introduce many CRM concepts that worked for the US and Europe to be used in the Asian markets since

Asians still prefer the traditional person-person contact. However, those channels are less efficient for them. In Eastern Culture, people connect with a person in the organization rather than dealing directly with the whole organization. This means that that individual's behavior is presenting the organization's behavior. In some cases, if that person is leaving the organization, the customer could also be lost to the organization. However, in the Western world (generally the US and Europe), people deal directly with the organization. It is legitimate for them to have their representatives replaced, and the dealings would be carried out with the replacement. Therefore, there is a gap, a vacuum where CRM could be improved to be used universally, adding a personal touch to it. We believe the concept of TERM would address these issues of distrust in the Asian context and add value to the current CRM establishment by further personalizing it. Apart from the national cultures influencing organizations, fast-changing technology also impacts organizations. Mobile technologies have facilitated mobility, which has changed the organization's culture regarding customer orientation. As per (Arunatileka, 2006), mobile technologies present two ways of changing the organization: Mobility at the workplace and mobility in the service of customers. This is further verified by (Ghanbary 2006), stating that the ubiquitous connectivity accorded by mobile technologies has improved communications between people and business processes.

TERM would facilitate an expert to be present in real-time in tackling customer problems. Similarly, most of the frontline people would also be available most of the time through Mobile Technology. Therefore, some cultural issues in Eastern countries, such as person-to-person handling, could be addressed with improved availability through mobility. Each time the system interacts with customers, if there is new knowledge generated, that would be stored for future use. Thus, if one of the frontline people leaves the organization in the future, the knowledge that that person created will be held in the CRMs, which will be very useful for a new person who will take that job. The new person will almost know the customer with the existing knowledge stored in the system and thus would be able to win the customer's confidence easily. Therefore, TERM would negate the cultural barriers to a greater extent. The presented idea identifies that by going global, different strategies are required to have a successful CRM. Differences in Eastern and Western cultures also raise another vital cause for implementing a successful TERM. Since people are moveable and can leave at any given time, the organizations must capture their knowledge in TERM regularly to provide professional and reliable support for mobile commerce in the global mobile market. Consequently, mobile commerce also includes support and transferring customer feedback to the business for a sufficient CRM in the future trade.

VI. CONCLUSION AND FUTURE RECOMMENDATIONS

The introduction of TERM is significant in merging the three essential concepts of Big Data, CRM, and KM and facilitating these concepts through various technological advancements. It is also necessary to understand the cultural issues and the concepts of globalization while capturing this tacit knowledge that exists all over the multiple divisions of the organizations. TERM also proposes to focus more on the knowledge capital of an organization and transfer that knowledge effectively to the CRMs, presenting a higher value proposition for the customers. However, further research must be done in cross-cultural organizations to explore the concept of TERM within various industries to provide a scientific solution. Such research would immensely benefit the human societies.

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