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# The role of IT in the Documentation and Extraction of Tribal Knowledge

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## **The role of IT in the Documentation and Extraction of Tribal Knowledge**

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### **Abstract**

*Tribal Knowledge*, more formally known as *Undocumented Knowledge*, is a phenomenon that exists in every discipline, industry, artistry, skill, and trade. This essay explores the role of IT in capturing tribal knowledge directly, its benefits to an organization, the challenges of extracting this knowledge, and potential risks of failing to seize tribal knowledge. It will focus specifically on tribal knowledge that exists within a business, and illustrates the various knowledge management technologies and frameworks, which IT can utilize to claim ownership of tribal knowledge within the organization. With the end goal of converting tribal knowledge into documented (explicit) knowledge.

Keywords: Tribal Knowledge, Undocumented Knowledge, Service Management Frameworks, Process Improvement, Business Intelligence, Business Process Improvement, Documentation Frameworks, Know How, Explicit Knowledge

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## **Introduction**

What is tribal knowledge? As of the writing of this essay, there is no universal accepted definition. According to author Leonard Bertain, Ph.D., (2012) one of the first authors to coin the term, tribal knowledge is the “collective wisdom of the organization” or “the sum of all the knowledge and capabilities” within an organization. A more detailed definition, which will be used as the definition for this essay is “any (undocumented) information pertaining to a product or service process that resides only in the minds of the employees.” This definition of tribal knowledge is also accepted in the Six Sigma and Lean process improvement frameworks, which attempt to capture tribal knowledge to help reduce waste and increase business revenue.

Tribal knowledge borrows many of the characteristics of tacit knowledge in that it is transferred through socialization and mentoring. Both are shared by word of mouth, but unlike tacit knowledge, tribal knowledge is more easily communicated. Tacit knowledge is often skill based and difficult to put into words. (Oragui, D., 2021) For example, a gifted musician can explain their playing techniques to others, but it is unlikely anyone lacking the same level of musical talent would be able to follow along with the explanation.

What also makes tribal knowledge unique is that it is not always intentionally kept secret nor is it purposely made to be privileged or ‘need to know’ knowledge. A practical example of tribal knowledge would be any situation in which an employee or group of employees has knowledge of a specific workflow or process which is only known through word of mouth. This can be something as simple as a workflow nuance where employees are told to “use a black pen to sign timecards because the other colors do not work with the copier” or something that has a larger more direct effect on business operations like “Thursday deliveries are always 30 minutes late because of the drawbridge opening.”

In both examples the knowledge is only shared through word of mouth. Even though there may be documentation for the latter example such as a drawbridge would likely have an opening schedule posted or an announcement system for sharing this information publicly. That knowledge is not documented within the business, so it is not acted upon by management or known to anyone but the employees working directly in the shipping area of the business.

### **How and Why Tribal Knowledge Evolves**

Tribal knowledge evolves through a variety of factors including deadlines, process improvements, personalities within a workplace, natural talent, work ethic, as well as self-preservation, to name a few. (Wills, B., 2022). The value of the tribal knowledge related to each factor can vary substantially to a business. For example, the undocumented knowledge of how to deal with a particularly demanding department head is likely limited to those working within the department. However, a new business process developed from a brainstorming session in which tribal knowledge was shared, leading to reduction of expenses, has a true measurable value for an organization.

Another way tribal knowledge evolves through informal learning is as a natural result of individuals developing new ideas while working, or when sharing their thoughts and ideas with others during the workday. It also evolves from incidental learning, which is when insights are gained from a task or idea that can be applied in another work situation or its original context. (Jacobs, R. L., 2019) An example of this incidental learning is a studio engineer tasked with running lengths of audio cable through a drop ceiling. Normally this task is very time consuming, as it requires one to remove ceiling tiles along the path of the wiring, along with the need to move and then climb a ladder, to then drag the cable physically across the tiles until

reaching the destination. This entire process can take many hours to complete. That same studio engineer would later find a more efficient way to complete this task from word of mouth. In this instance, the idea conveyed was to tie a knot at the start of a pull string to the back of a small remote controlled toy monster truck. The large tires of the toy truck allowed it to cross the metal tracks used to mount the ceiling tiles and the truck had headlights on the front which allowed the engineer to see where in the ceiling the truck was headed. By implementing this trick, the other engineers working on the job were able to complete the job early, and presumably had a good laugh. However, this new approach to running a new length of cable was not documented, the knowledge was only shared within the group.

### **Tribal Knowledge Has Real Value**

Tribal knowledge has real value for a business, primarily in the form of increased productivity which in turn can lead to an increase in business revenue. (Wills, B., 2022) Tribal knowledge is born out of efficiency and creative problem solving by individuals or groups of employees in the various departments within an organization. Tribal knowledge becomes property of the business once documented, giving the knowledge permanence to exist after those who contributed the knowledge have moved onto other endeavors. (Henderson, L., 2010).

Leonard Bertain, author of the *Tribal Knowledge Paradigm*, has built a successful business consulting firm by working with businesses to identify and capitalize the hidden tribal knowledge within their employees. Tribal knowledge is seen by his consulting firm as a business asset, a hidden revenue driver that should be actively sought out, embraced, and ultimately improved upon. (Sibbald, G., & Bertain, L., 2012) Bertain interchanges the terms ‘know how’ and tribal knowledge to have the same meaning, and argues that the entire organization sees

overwhelming benefits when the business mission changes to act on extracting the value of their employee's tribal 'know how.'

One of the exercises Bertain's firm uses to realize know-how is to bypass management's traditional hierarchical structure and empower employees. This is done by asking each employee to solve the same problem. Find a way to reduce \$100,000 in waste from the company's top line revenue or costs, using a solution that was no more than \$2,000 to implement. The results of the exercise in the 23 small businesses which participated showed an average 38 to 1 return, or 3800 percent return on investment. (Sibbald, G., & Bertain, L., 2012) These results were similar across a variety of businesses and sectors. The conclusion of the exercise is that employees often had better ideas than management on how to find efficiencies in their specific departmental roles.

One of the secondary benefits to these exercises was that employees who took part in the exercise felt more valued and secure in their role when their ideas were recognized by management. These employees also gained a better understanding of challenges facing the business and were more likely to change their workflows to help meet those challenges. (Sibbald, G., & Bertain, L., 2012)

### **Sub-types of Tribal Knowledge**

To better define where tribal knowledge lives within an organization, it can be split into two commonly encountered scenarios; Undocumented knowledge that exists within 1.) a personal setting, and 2.) within a group setting.



### **Personal Knowledge**

Undocumented knowledge which belongs to a single individual varies drastically from tribal knowledge within a group. The key difference being that this knowledge lives only within the mind of the individual. Since everyone is different, so is the degree to which this knowledge is divulged or shared with others.

In some circumstances this undocumented personal knowledge is what makes an individual feel important and valuable within the organization. This knowledge gives an individual leverage within their role and a sense of job security, because it gives the individual a competitive edge in terms of ‘on the job experience’ gained from years of development in their role. (Liebowitz, J., 2009)

Personal knowledge has ownership; meaning there is a sense of personal responsibility that belongs to this knowledge being shared freely. The sharing of personal knowledge can be beneficial, but it can also be used to hold the individual personally responsible if shared in a way that has unintended consequences. For example, an employee giving a co-worker a “pro tip” which will save time, but that co-worker makes a mistake after following the “pro tip” because that particular tip required years of expertise to execute properly. When it backfires, the source of the tip is now personally responsible for the consequences of sharing the tribal knowledge.

### **Group Knowledge**

Tribal knowledge when applied to a group of employees, an entire division or department has a number of unique properties which separates it from undocumented personal knowledge.

In a group scenario tribal knowledge can remain long after the individuals who first shared the knowledge have left the group. This creates a unique property for group tribal knowledge not found in personal knowledge, because group tribal knowledge can have a lack of ownership. (Hartley, J., 2018) That lack of ownership creates a situation in which no single person in the group can be held personally responsible for the knowledge being shared. For example, clinical staff working in a hospital were found to be sharing the knowledge of how to use the mobile smartphone application of the electronic medical records system to take photographs of medical test results to quickly import them into a patient's electronic medical record.

This knowledge was found to be shared freely between staff. When IT was asked to troubleshoot a lack of Wi-Fi access in a particular exam room that prevented smartphones from taking photographs. This undocumented group knowledge was discovered by IT. Upon further investigation it was found that to save time, staff would take photographs of the medical images using the native camera app on their smartphone and would import those photographs into a patient's medical chart at a later time. Saving patient data on a personal smartphone is a HIPAA violation and this workflow was immediately corrected and documented. However, no individual staff member could name the original source of the knowledge nor take responsibility for following the non-standard and undocumented mobile application workflow.

It is very likely group based tribal knowledge will be freely shared. This shared knowledge is valuable because it can be influenced by 'network effects' as the more the knowledge is shared the more likely that this knowledge will be pooled with other knowledge and can lead to new innovations or applications. For example, many industrial advances are the

result of incremental progress contributed by multiple groups working on solving the same problem. (Lindberg, V., 2015)

### **The Risks of Not Documenting Tribal Knowledge to an Organization**

The risks of leaving tribal knowledge undocumented include, but are not limited to, missed opportunities for improving productivity, as well as unidentified workplace inefficiencies, regulatory noncompliance, and safety risks. The value of documentation changes in these contexts and value may not always be economic.

In the context of safety, tribal knowledge may include sharing of knowledge that bypasses safety processes or procedures. This type of tribal knowledge can be particularly dangerous when left unchecked. An example of this would be employees sharing knowledge on how to bypass a safety switch to save time or because it is seen as a nuisance in completing a task. In these circumstances an organization must be careful not to incentivize hiding safety problems and have a process in place that encourages employees to report safety issues and violations. (Miller, B., 2016)

In the context of inefficiency, tribal knowledge may involve employee workflows that are potentially risky, inefficient, and wasteful. For example, an IT employee working for a large hospital was responding to a service request ticket to troubleshoot a problem with a fax machine. He met with a surgery scheduler, to ask basic troubleshooting questions, and in doing so the surgery scheduler explained that she was printing surgery itineraries from the hospital's electronic medical records system to fax the printed itineraries to the operating room's scheduling manager. This was a problem because both the surgery scheduler and the operating room scheduling manager worked in the same hospital and each employee had access to this

information on the electronic medical record system, thus there was no need to print or fax the documents. When asked why she was printing and faxing materials from the electronic medical record system, the surgery scheduler explained that the operating room manager had made her own personal tracking system which she used to prepare the operating rooms for surgeries and that she preferred using paper faxes.

This undocumented workflow was inefficient and wasteful, but once discovered, the workflow was easily corrected. The fax machine was able to be retired, reducing plastic toner and paper waste, as well as the need for a telephone fax line. The security risk of patient information being printed and faxed was eliminated and the existing workflow was able to be streamlined through technology. The surgery scheduler was not aware that she could send messages with the surgery itinerary attached through the EMR system's messaging platform.

In the context of building institutional knowledge within an organization, a failure to capture and document tribal knowledge can be damaging to business operations and revenue, potentially jeopardizing an organization's long-term success. Mergers and acquisitions tend to be an area where business leaders regularly fail to consider the knowledge retention implications of their actions. (Howes, T., & Knight, T., 2002) It is during these times of transition that personnel can be moved, downsized, or leave the business taking their tribal knowledge with them.

For example, in 1983 Shell Oil Co. commissioned a written research study by two Shell planners and two business school professors. The purpose of the study was to investigate the question of corporate longevity and the factors that contribute to long-term success. The study focused only on companies still in business that were older than Shell Oil, which was founded in the early 1890's. One of the many conclusions of the study showed that strong employee

engagement was essential for an organization's long-term survival. Employees in these companies felt a sense of community and cohesion in the organization, because their expertise and knowledge were valued. Managers were chosen for promotion from within and felt valued as stewards of the enterprise. The study showed that the organization's continued long-term success was due in part to the generational flow of knowledge retention. (Geus, A., 2002)

In the context of regulatory noncompliance, all publicly traded corporations and auditors must fully comply with the financial auditing and reporting requirements of the 2002 Sarbanes-Oxley Act (SOX) which was created in response to a series of financial scandals in the late-1990s and early-2000s. However, private corporations are also bound by the law's penalty and liability provisions.

Section 302 Title III and section 906 Title IX of SOX require that CEOs and CFOs personally certify the accuracy of corporate financial statements and disclosures. These executives must certify that financial controls and procedures have been evaluated and implemented. Executives must also note any changes to these internal controls in the next quarterly disclosure. Undocumented & tribal knowledge could conflict with these financial auditing and reporting requirements because these workplace procedures and controls cannot be subverted or deviated from in any way. The organization can be subjected to fines and executives may even face jail time for willingly ignoring internal processes controls and submitting false financial statements. (Wagner, S., & Dittmar, L., 2006)

To remain compliant with SOX and other state and federal laws, organizations must implement strict process controls which can be audited both internally and externally in order to avoid the potential for tribal knowledge to create new undocumented workflows.

### **Limitations in Extracting Tribal Knowledge**

Tribal knowledge can be difficult to capture as it involves a combination of luck, timing of specific circumstances, and asking the right questions. There are no known universally applicable methodologies available for extracting tribal knowledge which are capable of producing consistent results. The value of the extracted knowledge may be lost on the observer during or afterward upon later review. Much like evidence collected in a police investigation, tribal knowledge may lack business value at the time of discovery and documentation, only for that knowledge to find value at a later point in time, or when viewed out of its original context.

An individual may choose to be a ‘knowledge hoarder’ or a ‘knowledge sharer’, the former acts as a barrier to knowledge extraction and may exist because of trust issues within the organization’s culture. (Liebowitz, J., 2009) In these circumstances the individual is displaying a level of trust known as competence-based trust in which others in the organization will seek out these individuals who are competent in their role and will trust in their knowledge and advice. The opposite is benevolence-based trust where an individual will freely share their knowledge for the good of the organization. Encouraging individuals to become more benevolence-based in their trust may require a shift in company culture. This should be led by human resources, or an equivalent department, to create an environment in which individuals who display knowledge hoarding and competence-based trust issues are rewarded or recognized for contributing their knowledge. (Liebowitz, J., 2009).

Additionally, it may be impossible to capture tribal knowledge if it is being actively repressed by managers or peers acting as a go-between who are resistant to change. These employees may take it upon themselves to act as a roadblock by preventing employee ideas and

knowledge from reaching those in upper management positions or other departments. (Sibbald, G., & Bertain, L., 2013)

These limitations should not be seen as reasons to avoid extracting tribal knowledge. Instead, IT can reduce limitations in capturing tribal knowledge by developing guidelines to aid in identifying opportunities to capture tribal knowledge. For example, businesses with a functional IT department will utilize a ticketing system to track service requests and other technology projects. It is not uncommon for a ticketing system to be a component of a service knowledge or business management system. Most ticketing systems allow for some degree of customization in what questions display and the type of data that can be entered into the ticket form. Additional guidelines on capturing tribal knowledge can be displayed as direct questions to the end user, or as a script IT can follow when responding to tickets and service requests. These types of practical solutions can be useful in extracting tribal knowledge and help to reduce limitations in documenting this knowledge.

### **Tribal Knowledge Frameworks**

The act of documentation is the transfer of valuable knowledge in a logistical sense, in physical space between people, but also over time, through persistence as storage. Documentation is the transfer of knowledge from a single source to a group or audience that will persist over time as memory. (Martraire, A., 2019)

There is a need for a documentation process within an organization which can incorporate tribal knowledge. The responsibility of accomplishing this task typically falls on IT. To help assist IT with this task of documentation there exist knowledge management frameworks which encompass the software, policies, and all other systems used for storing and sharing

information within an organization. A core component of a knowledge management framework for tribal knowledge includes a documentation framework.

To assist an organization in the act of extracting tribal knowledge are process improvement frameworks. These are special programs used to extract and act on knowledge hidden within an organization to reduce waste and increase revenue. A knowledge management framework will exist outside of a process improvement framework, but a process improvement program will typically require a documentation solution, managed by IT, as a prerequisite.

A process improvement program may alter the structure of a documentation framework and may even be used to improve this framework. It is important that IT choose a documentation management framework that is highly customizable, with standard and interoperable data and file formats. When properly implemented, a process improvement framework is more easily interfaced with the organization's existing knowledge management framework.

### **Process Improvement Frameworks**

The likelihood of a process improvement program being implemented varies by business need, but a process improvement program can be disruptive to IT as it will require additional resources from IT to aid with its implementation. To reduce this burden on IT, it is important to have an adaptable documentation management process in place.

Process improvement typically starts as an upper management initiative in an effort to reduce costs and eliminate waste within a business. There are many process improvement frameworks competing in this space including the popular Six Sigma, Kaizen via Lean, and Business Process Management. Some frameworks are industry specific and focus on product or



manufacturing process improvements, and others are improvement methodologies that can be applied to any business process.

Process improvement programs can take anywhere from a few months to over a year to complete and after the program is implemented, it is meant to be practiced continuously going forward. It is common for an outside consulting firm to facilitate the creation of the program. Consultants will gather select personnel from a variety of departments, including executives and IT management when assigning the roles and responsibilities needed to successfully manage the program. The task of developing or implementing a documentation process is given to IT. There are many commonalities in the technical requirements used in the three popular process improvement programs.

### **Lean**

Lean is a method for eliminating waste in a business process in order to deliver maximum value to customers. The modern concept for Lean was first published in the Fall 1988 issue of Sloan Management Review in an article by John Krafcik titled “Triumph of the Lean Production System.” Lean was used to describe the Toyota Production System, a process improvement program developed internally by Toyota Motor Co. (Shamsi, M. A., & Alam, A., 2018)

The Lean process has been continuously refined since its creation, spawning other process improvement systems, and remains popular in manufacturing and enterprise management. The main concepts of Lean manufacturing are just-in-time manufacturing, and smart automation. When applied as ‘Lean Enterprise’ the same concepts of eliminating waste and maximizing value in a manufacturing process are instead applied to business operations as a whole. (Hayes, A., 2022)

Tribal knowledge will be collected from a variety of sources during a Lean initiative. When implementing a Lean program, IT will be tasked with creating and maintaining the single source of truth which will contain the data collected, including tribal knowledge as well as providing the technology used for processing, analyzing, and the sharing of the collected data. (Padmane, G. T., Sohel, M. T., & Patil, P. D., 2013)

A 2017 Integral University study, which explored implementation of Lean (Six Sigma), found the four most common obstacles for IT in administering Lean programs were part-time involvement in the project, projects being too time consuming, staff turnover in the middle of a project, and difficulty in data collection. (Shamsi, M. A., & Alam, A., 2018) To help overcome many of these challenges, IT management will need to provide the organization with dedicated project staff as well as business intelligence tools, which can be used to reduce the project time and complexity of data collection.

### **Six Sigma**

Six Sigma was developed and trademarked by Motorola Co. and is a set of strategies and tools which are used to improve production in a manufacturing process by eliminating defects and reducing variation. It differs from other process improvement programs because it is used to improve a manufacturing process with statistical analysis and is heavily dependent on technology by design. For example, the definition of Six Sigma is a manufacturing process with less than 3.4 defects per million units or a success rate of 99.9997 percent.

There are two methodologies used in a Six Sigma project, both have 5 repeating phases and are intended for specific scenarios. The first is DMAIC which is an acronym for Define, Measure, Analyze, Improve and Control. This methodology is used to improve or solve a

problem in an existing manufacturing process. The second method is DMADV or Define, Measure, Analyze, Design, and Validate. It is used to create a new process and then measure to improve that process through continued statistical analysis. (Kwak, Y. H., & Anbari, F. T., 2006)

IT supports the implementation of these methodologies by managing the project's statistical analysis tools, software, documentation, and data systems. It is also recommended that IT help implement a change management process to track changes and notify all stakeholders taking part in a Six Sigma project of new changes found during the various project phases. (Schmidt, M., 2014) In this situation IT is not always directly involved in capturing tribal knowledge, instead IT typically provides the documentation system in which any tribal knowledge obtained by individuals working on a project can be captured and shared with all of the stakeholders involved.

### **Business Process Management**

Business Process Management (BPM) is considered a discipline, meant to be practiced within an enterprise, rather than a rigid process improvement framework that caters to a specific industry. It has many similarities with other process improvement programs, but the main difference between BPM and other programs is that the "business process" can be applied to any and all aspects of running a business.

BPM is heavily focused on identifying repetitive tasks and process flows and using technology to optimize these with automation whenever possible. Automation is where the value is found with BPM and is typically implemented using technology administered by IT. (Hagen, C., & Kung, P., 2018)

BPM is accomplished using a life cycle, which begins with taking an existing process and engineering a new design from it. Modeling on the new design is done using variables to see how it performs under different circumstances and scenarios. Then the execution phase of the new business process begins. This new business process is now monitored, measured, and tracked using technology, allowing for additional optimizations on the new process. Finally, there is re-engineering of inefficient or overly complex processes which starts the life cycle over again. Each step of the life cycle creates new opportunities to discover tribal knowledge hidden in the process being optimized.

Because BPM is considered a discipline, the life cycle can be used to decide on the business processes used by IT to develop the technologies for the BPM life cycle itself. For instance, IT can utilize BPM to develop guidelines for acquiring and sharing tribal knowledge into existing workflows and processes. Once established IT can reapply the BPM life cycle again later and use the insight gained for further improvement to the collection process.

For example, in 2007 the Swiss bank Credit Suisse started a new BPM process which incorporated IT into the process itself. In this case IT was tasked with assisting with automating a special-order system for customers calling in non-standard financial service requests. The problem was that the existing special-order system was very inefficient. The system included a mix of manual labor, and logistical hurdles of multiple personnel being pulled from various departments to assist in fulfilling each request. The special-order process was also very involved, with some orders being delayed because the data analytic and communication tools were not uniform across all departments. Some special requests were prioritized while others were overlooked because there was no reliable method to track the status of any particular order due to the lack of a tracking system.

Through a combination of BPM and IT, the special-order process saw a 30 percent decrease in cycle times, improved response times by a factor of 10, and an increase of at least 15-30 percent in overall employee productivity. The new technology-based documentation process created a data storage solution for undocumented knowledge and most importantly, by automating the special-order process, data accuracy was greatly improved and freed employees to work on other tasks instead of manual data entry. (Hagen, C., & Kung, P., 2018)

### **Documentation Strategies**

Meeting the dual challenge of the extraction and documentation of tribal knowledge is key to the long-term success of an organization. To do this a business must rely on IT to provide the technology and strategies needed to capture, retain, and share company knowledge. These business intelligence (BI) tools can be incorporated into documentation strategies as a method for process improvement in the absence of a process improvement program. (Delaney, R., & D'Agostino, R., 2015)

Another consideration when adopting a documentation strategy, especially for any business that provides business-to-business services, is the need for compliance with a System and Organization Controls (SOC) audit. The SOC, created by the American Institute of Certified Public Accountants (AICPA) is a framework of information security standards. Organizations that adopt the SOC are then able to provide an SOC report to business partners or regulators. A SOC report can be seen as quick proof that an organization's internal information and data security practices are trustworthy and compliant with SOC standards.

A documentation strategy must be in place to meet the requirements needed to pass a SOC audit. During the assessment phase of a SOC initiative, IT will work with an independent

CPA to identify potential gaps and lapses in a company's financial and information systems. It is during this assessment phase that tribal knowledge should be documented and converted to institutional knowledge. This is important because a SOC audit requires that 'key policies, procedures, and processes are defined, documented, and enforced.' (Rose, K., 2022)

After the assessment, IT will make the recommended changes and then the CPA will complete an audit of the financial and information systems. This is to verify that the new security and information controls have been implemented for protecting business, employee, and customer data. Upon successful completion of a SOC audit a report is generated which can be shared upon request. A SOC 1 report is created from an audit which captures a snapshot of the organization's existing financial controls at a single point in time. A SOC 2 report is more in depth and covers information and data availability, 'security, processing integrity, confidentiality, as well as privacy controls'. (Gallagher, B., 2022) There is also a SOC 3 report, a sanitized report lacking sensitive information, which shows compliance and can be shared with the public.

Regardless of whether an organization takes part in a SOC audit, a documentation strategy provides an organization with the tools needed to document and share information, while also providing IT with the tools needed to track, log, and secure company data.

### **Knowledge Management Systems**

Knowledge management is a strategy developed to capture, share, and apply knowledge within an organization. (Liebowitz, J., 2009) Knowledge management systems are relatively new, having been first introduced in 2007 as part of the Information Technology Infrastructure Library (ITIL V3) revision 3. The ITIL is one of several publishers of IT service management

frameworks and standards. Other standards include the ISO/IEC 20000 international framework and the Business Information Services Library (BiSL).

IT is responsible for building the systems and creating the processes needed to gather, analyze, and share knowledge within an organization. An established KMS based on these standards can be absorbed into a process improvement framework to serve as the documentation hub throughout an initiative and will remain as the single source of truth afterwards. (Cahana, E. et al., 2021)

For example, in 2013 the London Metropolitan Police (the Met) in the United Kingdom went through a strategic workforce transformation program. The goal of the program was to increase diversity in hiring practices. Through a combination of data collection and analytics provided through a KMS, multiple databases and spreadsheets were able to be condensed and merged into a single source of truth. After running analytics, the HR team at the Met was able to increase diversity of new hires by 10 percentage points year-over-year, meeting head count targets while also remaining under budget for the fiscal year. (Guenole, N. et al., 2017)

To help with this task, the software as a service delivery model has created new competition in this space, with multiple players offering knowledge management software as service. Microsoft has the Office365 platform which includes SharePoint, Teams, and OneDrive for documentation storage, sharing, and collaboration. Alphabet Inc. has the Google Cloud platform which integrates with Google Workspace and there are smaller companies like Asana and Ivanti offering customers tailored knowledge management software and collaboration services. There are also a variety of open-source solutions including the extremely popular MediaWiki, created for and used on Wikipedia, as well as lesser-known newcomer projects like

Foam. IT management should follow an IT service management framework when vetting potential knowledge management software solutions. This will help with finding a solution that is within budget and can scale with the business.

### **Service Knowledge Management Systems (SKMS)**

Service knowledge management systems are also defined in ITIL V3, but specific to IT. The purpose of a SKMS is to act as the central repository of all data and knowledge IT uses to deliver services to an organization. An SKMS provides IT with complete flexibility when choosing the specific software and hardware needed to provide specific IT services. (Nabiollahi, A. et al., 2011) The methods and mechanisms for capturing tribal knowledge should be explored when upgrading or planning an SKMS. (Orr, A., 2012)

When implemented as described in ITIL V3, an SKMS should contain 4 layers. Each layer is responsible for processing a specific data set. The first layer is the data and information layer which contains all of the files, databases, documents, and applications used to manage the knowledge management system as previously described. It is at this layer that IT should incorporate the various systems used by employees to collect tribal knowledge into a common data format that can be indexed, analyzed, and searched. Data in this layer can be thought of as simple observations of the state of the entire organization. (Howes, T., & Knight, T., 2002)

The second layer is the information integration layer which is used to process data collected in the previous layers so that it is given relevance and purpose. (Howes, T., & Knight, T., 2002) An example of this is extraction of metadata from images. When a digital camera takes a photograph, metadata is attached to the digital image file. This metadata can include the make and model of the camera, including the settings used for that photo as well as the camera's serial



number, time and date of the photo, and even GPS location data. (Keathley, E., 2014) In the information integration layer of an SKMS this data is collected from the images and made searchable for inclusion in the third and fourth layers.

The third layer of an SKMS is the knowledge processing layer. This layer typically includes software and tools used to query and analyze the data collected in layers one and two. This layer is also used for forecasting and planning, as well as data monitoring and alerting. This layer is important because the data that is collected and processed, is given context and meaning. New organizational knowledge and insights are gained from the data analyzed on this layer. (Howes, T., & Knight, T., 2002)

The final layer is the presentation layer. On this layer is the IT management dashboard which displays data from the other layers and systems in a single location. From the presentation layer IT can view various performance dashboards, collaborate and manage projects, and manage the service desk. When implemented, a SKMS provides IT with a method to collect, sort and analyze data from all areas of a business in one location, serving as an organization-wide knowledge platform. (Brahmachary, A., 2018)

### **The Role of IT in Discovery of Tribal Knowledge**

In the absence of a process improvement, or other initiative from upper management that more directly addresses tribal knowledge throughout the entire business, opportunities to discover tribal knowledge will still present themselves to IT. The tribal knowledge obtained by IT may be limited in comparison to a companywide process improvement program but will still benefit the business. For example, the situations in which tribal knowledge will be discovered in a process improvement program will include circumstances in which IT has little to no direct involvement.

Outside of a process improvement program, tribal knowledge can still be discovered during routine system upgrades and other workflow transitions, which occur as a result of normal technological change and advancements. (Keathley, E., 2014)

To maximize the chances of uncovering tribal knowledge, IT should be proactive and engage with operators and end users who regularly work with business software and hardware systems, especially when upgrading and updating training documentation for these systems. A common opportunity for tribal knowledge discovery by IT is during the renewal phase of any subscription-based software. For example, Adobe Acrobat can be purchased as a monthly or yearly subscription from Adobe Inc. The yearly price as of 2022 is \$239.88, a price which adds up quickly if there are multiple users with subscriptions. Before renewing the software, IT can be proactive, and simply ask the end users to explain what they do with Adobe Acrobat and from that conversation, the tribal knowledge may present itself and can be acted upon.

Adobe Acrobat is used to create Portable Document Files (PDFs). It is not uncommon for employees to request the paid version of Adobe Acrobat when they actually need the free Adobe Reader software. Worse yet, the end user may be using Acrobat to edit documents sent to them. In this circumstance three workflow inefficiencies are discovered; the first is the waste of paying for a subscription that is not needed, the second is an inefficient workflow, and finally, but most importantly, there is a quality/document control issue at hand. As a workflow inefficiency, a PDF file is always a copy of an original file, the end user should be editing the original document, not a PDF copy of it. The quality and document control issue occurs because now there are two versions of a file being shared, the lost original document, and the copy of that document in a PDF form which has now been edited.

In this scenario, by proactively asking an end user to explain their workflow IT is able to discover tribal knowledge, and then immediately act on it to reduce expenses, correct an inefficient workflow, and prevent document fragmentation. There will be circumstances where IT cannot act on the tribal knowledge discovered but with a functional knowledge management solution in place IT will have the guidance necessary to report and relay tribal knowledge discoveries to the proper channels. (Keathley, E., 2014)

## **Conclusion**

Tribal Knowledge is undocumented knowledge that lives in the minds of employees working within a business. Tribal knowledge can be hidden away, known only to an individual, or shared widely within a group setting. Tribal knowledge can be beneficial when realized as process improvements and workplace efficiencies, but it can also be wasteful, in the form of bad advice or shortcuts, which bypass workplace policies, regulations, or even safety procedures.

Tribal knowledge, whether good, bad, or indifferent, adds value to an organization and should be documented whenever possible, because only when it is documented does tribal knowledge become company property. (Henderson, L., 2010) The true value in documenting tribal knowledge is realized in areas such as identifying efficiencies, like reducing waste in a business process, as well as increased productivity and revenue.

IT has a pivotal role in shaping a documentation process which serves as the single source of truth for all knowledge in an organization. ITIL V3 or ISO 20000 are both standards which outline how IT can build a robust service management system and ensure that the data stored within is interoperable. Process improvement programs are valuable for capturing value from tribal knowledge, but they can also be disruptive to IT operations. IT can accommodate

these programs with a properly provisioned document and service management framework.

(Brahmachary, A., 2018)

The ability to capture and mobilize knowledge is increasingly seen as a major driver of organizational success. (Howes, T., & Knight, T., 2002) Tribal knowledge that remains undocumented will inevitably become waste. IT is uniquely positioned within a business to assemble the documentation framework used to secure, store, and share company knowledge as part of a broader service management foundation. (Nabiollahi, A. et al., 2011) These frameworks and the business intelligence tools within, are required to achieve compliance with regulations like SOX, HIPAA, and for successful completion of a SOC audit. A knowledge management system is useful for providing up-to-date guidelines, and training materials, as well as issuing tasks, and notifying all stakeholders of updates and changes.

IT interacts with all technologies and departments withing an organization in some capacity. IT staff will encounter opportunities to extract tribal knowledge during normal service desk activities. By creating guidelines and training, IT can increase the success of extracting and then documenting this knowledge so that it can be shared and acted upon by management in the future. A universal solution for extracting undocumented knowledge does not exist, but IT can prepare a business for continued long-term success (Geus, A., 2002) by providing the technologies which enable business leaders to capture, analyze, and extract value from tribal knowledge.

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