Engineering Management

Field Project

Improvements of Existing Knowledge Management Practices in the Consumer Electronics Industry

By

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Executive Summary

This Field Project report investigated best practices for Knowledge Management (KM) and Knowledge Management Systems (KMSs) and sought to devise a recommended action plan for the author's employer's existing KMS.

A literature review was conducted to first establish a sampling of different methodologies that may be applicable to a given KMS. Upon review of the different methodologies and additional research sources, themes were identified in the literature. These themes and components were combined and summarized to present a list of key components that are present in the most successful KMSs.

The research was then conducted in the following manner. First, a historical documentation review was completed to evaluate what the company originally aimed at accomplishing with the current KMS. This documentation review consisted of reviewing a former Field Project report in which the author's company's original KMS was established. In addition to the former Field Project, internal company documentation was reviewed to help understand the switch from one particular KMS software to another software during the life of the KMS. These two historical documents were then used to develop a survey to measure and evaluate the current KMS against the previously stated goals found in the documentation.

The primary output of the report lies in the recommended action plan. The recommended action plan provides literature-backed guidance for implementing best practices based on the results of the survey and with respect to the former documentation.

Introduction

Knowledge Management (KM) is a crucial element of success in the consumer electronics industry, particularly the mechanical engineering group. The mechanical engineering leaders within the company recognized this and began the development of a Knowledge Management System (KMS) in early 2010. However, today there's an ever-increasing need for a more robust knowledge management system as the products being developed are becoming increasingly complex. In addition, the team has grown from 20 members when the initial KMS was developed, to over 150 mechanical design engineers in locations all over the globe. These two factors alone are enough to warrant the improvement of a KMS that can be effective across different business segments and time zones.

By having a robust KMS, the company would be able to bring products to market more quickly, make fewer mistakes, and ultimately improve the company's overall financial bottom line. When the KMS within the company was first created, the creators and stakeholders set out to achieve a certain number of things. The primary objectives described in the former KMS Report are listed below:

1. Ease and enable learning and onboarding
2. Promote a culture of collaboration
3. Help mitigate the loss of tacit knowledge (intellectual property)

Also noteworthy is the KMS migration from the original tool (Microsoft SharePoint) to a Wiki-based solution (Atlassian Confluence). The current solution has a plethora of useful information, but it's not always easy to locate specific documentation. Furthermore, users often don't know where to put new information without consulting system administrators or team leaders. The main goal of this report is to offer improvements to the existing KM system by

identifying unaddressed elements that were part of the original KMS scope, providing any recommended changes to structure, and ideally, providing guidance for those wanting to contribute.

Literature Review

The review of the literature will focus on defining a KMS and its purpose and significance in the industry. The next section aims to dive deeper into Wiki-based systems. In addition, three different KMS methodologies will be detailed. The final section highlights key components of a successful KMS. This focused review of the literature is aimed to provide guidance on the original objectives of the KMS.

Knowledge Management

KM is a vast topic with numerous definitions and components. At one of the highest levels, KM is "the systematic management of an organization's knowledge assets for the purpose of creating value and meeting tactical and strategic requirements" (Yee et al., 2019, p. 1). This typically involves the implementation of an Information Technology (IT) based solution, or as Rasmus discusses: KM is mainly defined as the formal management of knowledge for facilitating the creation, accumulation, and reuse of knowledge, typically by using advanced technology (Rasmus, 2000, p. 36).

An IT-based solution is most commonly referred to as a KMS. KMSs are implemented as one of the primary methods to serve the value proposition of the system as defined by Eaton. They do so by enabling the capturing, sharing, and synthesizing of knowledge (Eaton, 2006). So, in this way, a KMS is the tool used to enable the KM Practices - the set of methods and techniques to support the organizational processes of knowledge creation, storage, and transfer (Centobelli et al., 2017, p. 295). For complete coverage, here are additional definitions:

- Feliciano describes a KMS as a "technology set in place to capture, disseminate, and retrieve knowledge" (Feliciano, 2007, p. 8)

- Additionally, a KMS is also typically a “technological information system that supports knowledge management and allows knowledge to be created, codified, stored and distributed within the organisation automatically” (Chalmeta & Grangel, 2008, p. 2)

Before proceeding, it’s prudent to define knowledge in the context of knowledge management and the scope of this report. Information and Knowledge are not necessarily synonymous. Eaton differentiates them as “information is data with context and knowledge is information complete with an understanding of its meaning and implications." (Eaton, 2006, p. 3)

Additionally, not all knowledge falls into the same category; knowledge can be separated into two categories: explicit and tacit. Explicit knowledge is commonly referred to as “know what” (Eaton, 2006, p. 2) and is typically “expressed in words and numbers, and easily communicated and shared in the form of hard data, scientific formulae, codified procedures, or universal principles” (Eaton, 2006, p. 5). These are pieces of knowledge that might be called Standard Operating Procedures (SOPs), or How-Tos. Explicit knowledge usually defines things where deviation from the knowledge is not necessary and not a lot of additional thought or context is needed; simply follow the process. Tacit knowledge is commonly referred to as “know-how” (Eaton, 2006, p. 2) and is “typically highly personal and hard to formalize, making it difficult to communicate or share with others” (Eaton, 2006, p. 5). Because of this, tacit knowledge often has the most to be gained by sharing (Eaton, 2006, p. 2). Eaton argues that although tacit knowledge is hard to formalize, “tacit knowledge can be codified through externalization as individuals contribute to the library” (Eaton, 2006, p. 21).

Significance of Knowledge Management

As previously mentioned, the significance or importance of KM was to organize and capture an organization's knowledge assets with the intent to create value or in service of meeting other business objectives (Yee et al., 2019, p. 1). These value propositions or business objectives could take on a variety of forms. One such effort might be to document historical experiences and knowledge so they can be reused for the creation of new product design and development (Huang et al., 2015, p. 2524). In the modern workplace, the employees (knowledge workers) and their tacit knowledge are key components to developing their products. As such, these "assets" needed to be managed and developed which led to the world of KM (Eaton, 2006, p. 5).

Wikis as Knowledge Management Systems

Wikis are one of many varieties of KM tools that can facilitate proper KM and be used as a KMS. A Wiki can be described as a "set of linked pages accessible by users or editing contributions; a simple tool, easy to use and access" (Brichni et al., 2014, p. 1217). In its most elemental form, "A Wiki is essentially like any other Web page except any user can readily modify it" (Eaton, 2006, p. 24). However, one of the key differentiators between Wikis and regular websites you might find on the internet is that typically a select group of internal users are able to add, modify, or update content (Standing & Kiniti, 2013, p. 190).

There are many benefits and advantages that Wikis have when used as a KMS. The ability for users to openly and freely edit pages is one of the major advantages (Eaton, 2006, p. 9). Utilizing this advantage, pages can be constantly updated by anyone, as new information is learned or developed (Standing & Kiniti, 2013, p. 190) - effectively making the information in a Wiki "open source" (Skoglund, 2011, p. 7). The democratic nature of this tool allows users to

"contribute without consequence to enrich its knowledge value." (Brichni et al., 2014, p. 1217). In addition, most Wikis have the ability to allow more natural conversations to happen through features such as blogs, comments on wiki pages, and discussion forums. These types of "conversational technologies" help enable the transfer of tacit knowledge (Standing & Kiniti, 2013, p. 192). Conversational technologies also facilitate the collaboration of users in different locations and time zones (Standing & Kiniti, 2013, p. 192). Wikis have proven so effective as the tool for KMS implementation, that some have even labeled Wikis as the "best currently available information technology tool for an interactive knowledge library." (Eaton, 2006, p. 24).

Knowledge Management Methodologies

There are a variety of methodologies and practices when implementing a KMS. Inputting or capturing information into a KMS is known as the "codification" of knowledge (Eaton, 2006, p. 6). The following methodologies are not intended to be a comprehensive list, but to give a general overview of the different types of methodologies. Before diving into the specific methodologies, it's useful to understand that the methodologies are trying to accomplish 2 things:

1. Encourage users to input information into the KMS
2. Promote users to retrieve information from the KMS (Skoglund, 2011, p. 9)

Methodology #1 - KM-IRIS

Chalmeta and Grangel (2008) have several articles that describe the KM-IRIS methodology. The general methodology is divided into five phases:

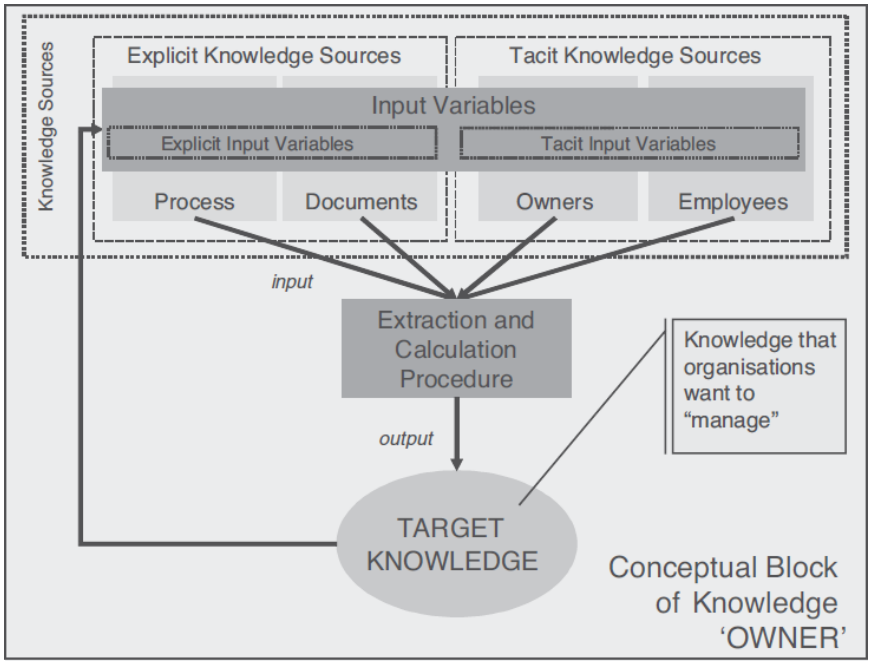
1. Analysis and Identification of the Target Knowledge
2. Extraction of the Target Knowledge
3. Classification and Representation
4. Processing and Storage

5. Utilization and Continuous Improvement

During the first stage, the scope of the KMS information is defined and labeled as the "target knowledge". The target knowledge is the information that will be housed and managed in the KMS (Chalmeta & Grangel, 2008, p. 9). Gathering and identifying the target knowledge can be accomplished using resources such as templates, questionnaires, and reference models (Chalmeta & Grangel, 2008, p. 9). Once the target knowledge has been identified, the next step is to identify the best methods and sources to extract the target knowledge and then execute the target knowledge extraction (Chalmeta & Grangel, 2008, p. 10). If the sources of target knowledge are already explicitly captured - such as documents and data, then the extraction process is relatively easy. If the target knowledge is held by people within the organization (tacit knowledge) then the knowledge is more difficult to extract (Chalmeta & Grangel, 2008, p. 10). Per the KM-IRIS theory, it is typically only possible to capture and codify "technical tactic variables" which refers to "know-how and skills that apply to a specific context" (Chalmeta & Grangel, 2008, p. 10). Figure 1 below shows the representation of phase two.

Figure 1

Phase II of the KM-IRIS Methodology



Note. The figure shows phase II of the KM-IRIS Methodology for KM. Reprinted from "Methodology for the Implementation of Knowledge Management Systems" by R. Chalmeta and R. Grangel, 2008, *Journal of the American Society for Information Science and Technology*, 59(5). p. 747.

Once the extraction methods have been identified and the target knowledge extracted, the third phase is to classify and represent the target knowledge. The primary output of this phase is a model of the knowledge map of the organization (Chalmeta & Grangel, 2008, p. 11). In practice, the scope of this phase is outside the scope of the report so the different models used to represent the target knowledge will be reduced to simple target knowledge maps. The fourth phase, processing and storage, is also more technically involved than allows for the scope of this report. At a high level, this phase involves generating the model defined in the previous step. The final phase of the KM-IRIS methodology is utilization and continuous improvement, which

essentially means releasing the KMS to the greater organization to begin using and improving upon (Chalmeta & Grangel, 2008, p. 12).

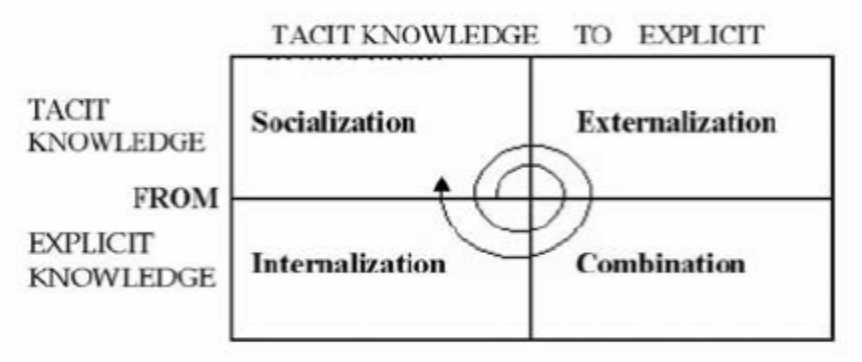
Methodology #2 - The SECI Model

Nonaka and Takeuchi introduced and popularized the SECI Model and the Knowledge Spiral. SECI stands for socialization, externalization, combination, and internalization - the four processes of the SECI method. The SECI methodology utilizes the tact and explicit framework as previously described (Hajric, 2018). This methodology is outlined below and showcased in Figure 2. The full process is summarized below.

- **Socialization** (tacit to tacit) – a process of sharing experiences and thereby creating tacit knowledge such as shared mental models and technical skills.
- **Externalization** (tacit to explicit) – a process of articulating tacit knowledge into explicit concepts (using metaphors, analogies, concepts, hypotheses, or models as appropriate).
- **Combination** (explicit to explicit) – a process of systemizing concepts into a knowledge system (i.e., combining different bodies of explicit knowledge).
- **Internalization** (explicit to tacit) – a process of embodying explicit knowledge into tacit knowledge (Eaton, 2006, p. 6)

Figure 2

The SECI Method and Knowledge Spiral



Note. The figure shows the four phases of the SECI method and their respective knowledge context, tacit and explicit. Reprinted from "Experiential learning through simulation games: An empirical study" by M. Saenz and L. Cano, 2009, *International Journal of Engineering Education,* 25(2), p. 297.

The graphical representation in Figure 2 aims to represent the continuous and dynamic nature of this methodology (Hajric, 2018). The popularity of this methodology has led to the SECI method being described as a cornerstone in the field of KM (Hajric, 2018).

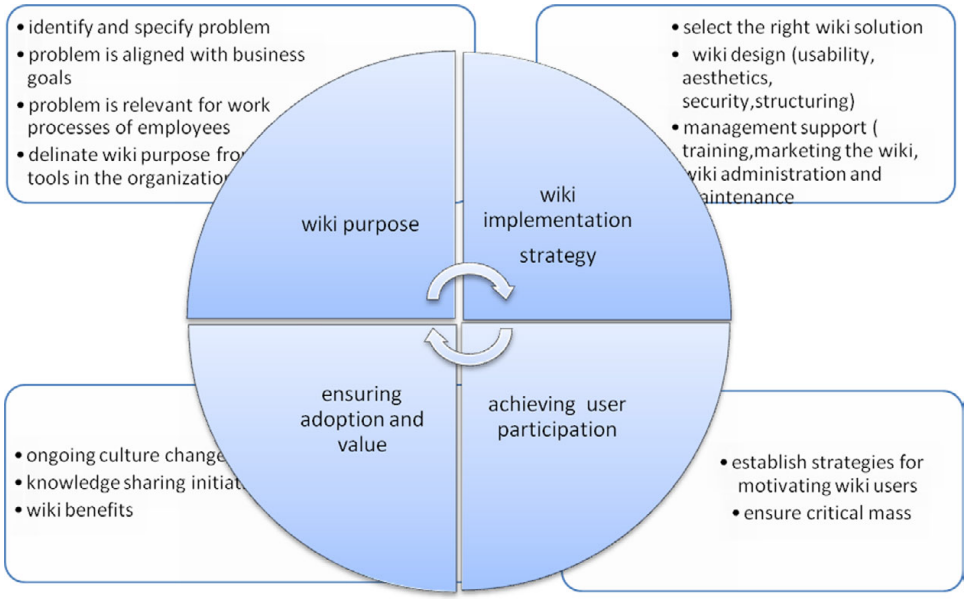
Methodology #3 - Wiki Adoption Methodology

Standing and Kiniti (2013) have defined a Wiki-specific adoption methodology for KM. The model has four key activities as outlined below and also can be shown in Figure 3.

1. Wiki Purpose
2. Wiki Implementation Strategy
3. Achieving User Participation
4. Ensuring Adoption and Value

Figure 3

Wiki Adoption Methodology



Note. The figure shows the four activities involved in the Wiki adoption methodology. Reprinted from "Wikis as knowledge management systems: Issues and challenges" by C. Standing and S. Kiniti, 2013, *Journal of Systems and Information Technology*, *15*(2), p. 197.

The first activity is to confirm the purpose of the Wiki. Defining the purpose should include identifying and specifying the problem that the Wiki is going to solve (Standing & Kiniti, 2013, p. 197). To improve efficacy, this problem should be in alignment with the company's overarching goals. In identifying the purpose of the Wiki, it's also necessary to ensure the relevancy of the stated problem to the workers who will be using the tool, that is, define how this tool is going to make the user do their job better or easier. In addition, the purpose should also help to confirm when and how to use the Wiki in relation to other tools (Standing & Kiniti, 2013, p. 197). The second activity is determining the implementation strategy for the Wiki. This activity will involve choosing the actual Wiki software to support the KMS and then

understanding the design and architecture of the Wiki. Mock-ups and prototypes can be helpful during this activity to ensure needs are met. Training and management support, among other things, are also part of this phase and will be discussed in greater detail in the following section (Standing & Kiniti, 2013, p. 197). The next key activity is achieving user participation. There is an abundance of methods for encouraging the usage of the system, and these methods will also be discussed in the following section. Ensuring adoption and value is the final activity. This activity can be completed by promoting a culture of knowledge sharing at the organization as well as outlining the benefits of the Wiki-based KMS (Standing & Kiniti, 2013, p. 198). Although these activities were presented linearly, the arrows within Figure 3 are meant to convey that this methodology should be an ongoing and continually refining endeavor.

Components of Successful Knowledge Management Systems

The following section is aimed at providing a nearly comprehensive list of characteristics that define a successful KMS as well as Wiki-specific success components.

Culture

Culture is a key characteristic of successful KM adoption, implementation, and reaching the highest value of the KMS (Standing & Kiniti, 2013, p. 198). One of the largest risks with any KMS is that a culture of knowledge sharing is not appropriately cultivated (Skoglund, 2011, p. 9). A culture that has been poorly cultivated for KM results in the lack of knowledge ever being shared at all (Eaton, 2006, p. 38). The remedy for a lacking KM culture comes from the top down. This includes garnering management support for knowledge sharing by encouraging users to allocate time contributing their knowledge (Skoglund, 2011, p. 11) and even going as far as putting the act of contributing or transferring knowledge as one of the primary responsibilities of employees (Meloche et al., 2009, p. 45). White and Lutters (2007) even go so far as to state that

every unsuccessful implementation of a Wiki KMS is due to a lack of management support (White & Lutters, 2007).

Usability

Usability can crucially debilitate the successful implementation of a KMS. Maximizing usability can be summarized in the points below:

- **Simplicity of Authorship** - the system should be quickly and easily editable by any of the users within the system (Standing & Kiniti, 2013, p. 191)
- **System Integration** - in order to maximize usage, the KMS should be as closely integrated with users' existing workflows and systems (Skoglund, 2011, p. 12)
- **Ease of Organization** - the KMS tool should allow users to easily reorganize and update the structure of the system as needed to enable quick organization changes when required (Standing & Kiniti, 2013, p. 28)

Incentivizing User Adoption

Closely related to usability, methodologies to encourage user adoption are a very highly researched element to successful KMS implementation. Motivating associates to use and adopt the KMS typically falls on the shoulders of the management and leadership teams. Encouraging and acknowledging user participation in the KMS is a key component to successful adoption (Standing & Kiniti, 2013, p. 195). The literature reveals that oftentimes creating a rewards system is effective at engaging users in the KMS (Skoglund, 2011, p. 16). The creation of a rewards system can help to overcome the risk of users not contributing due to time limitations or a lack of understanding of how contributing would benefit them (Standing & Kiniti, 2013, p. 196).

Reward-based incentive techniques typically fall into two categories: monetary and cultural (Eaton, 2006, p. 39). Monetary incentives are relatively straightforward and involve financial or monetary gain. For example, merit points could be awarded to users who are editing, adding, or sharing knowledge and these merit points could be then tied into year-end performance reviews (Yee et al., 2019, p. 2). One company even when at far as offering an elaborate company trip for the top percentage of knowledge sharers (Davenport et al., 1997, p. 18).

Cultural incentives involve the larger organization having buy-in to the KMS value proposition so that individuals can be recognized (Eaton, 2006, p. 39). Recognition can give the perception of enhanced employee power and identity, which further helps to strengthen the cultural incentive (Standing & Kiniti, 2013, p. 194). The most common approach to implement this sort of incentive would be to designate someone as a KMS specialist or mentor (Eaton, 2006, p. 39). The KMS implementation strategy could also go as far as assigning these experts titles such as “moderator” or “guru” (Skoglund, 2011, p. 18). Allowing users to rate the quality of contributions or displaying user information such as the number of pages updated, shared, added, and so on are further approaches for culturally motivating the KMS (Skoglund, 2011, p. 18). These types of cultural incentives can even foster healthy competition amongst users for the status of the different KMS titles (Skoglund, 2011, p. 17).

To execute the cultural and monetary incentives, the KMS must provide visibility at both a macro and micro level. At the macro level, this means outlining the purpose and benefits of the Wiki (Standing & Kiniti, 2013, p. 194) as well as demonstrating its efficiency and usefulness (Yee et al., 2019, p. 2). At the micro-level, it is effective to have a page that showcases users’ statistics. These statistics could include the previously mentioned items such as the number of

authored pages, the number of edits, the number of edited pages, the number of reviewed pages, the number of pages under ownership, or a contribution quality rating (Skoglund, 2011, p. 18). In addition to a statistics page, another useful visibility tool for engaging users is a "Wanted Pages" directory which aggregates the pages that other users would find most valuable. This can help to encourage user participation and reduce confusion on knowledge content, purpose, and organization (Skoglund, 2011, p. 12). These visibility techniques can drive social pressure from other users and are critical for gaining user adoption, especially during the introduction of the KMS (Skoglund, 2011, p. 13).

From a cultural perspective, there is a risk that certain users will want to hoard knowledge, which could be due to any number of reasons. One reason is that employees may not fully understand the significance of knowledge sharing and how it ties to their work performance. This can be addressed by showcasing the macro-level visibility techniques as described above. Additionally, knowledge hoarding is often a measure taken to prevent a user from losing status or perceived positions of power. This type of knowledge hoarding can again be addressed through a culture shift and promoting cultural incentives - that is they need to be recognized and valued based on what they share, not just what they know (Eaton, 2006, p. 38).

Wiki Gardeners

Wiki Gardeners are defined as a group of active and respected contributors to Wiki-based KMS. Gardeners are vitally important to the successful implementation of a KMS (Skoglund, 2011, p. 10). The role of Wiki Gardeners can be comprehensive but generally involves the following:

- championing the goals of the KMS by encouraging contribution (Eaton, 2006, p. 47)

- maintaining format and structure (Eaton, 2006, p. 47)
- coordinating, reviewing (or assigning reviewers), and uploading knowledge pages in the system (Yee et al., 2019, p. 2)
- reorganizing, improving, and checking KMS content (Eaton, 2006, p. 42)
- identifying and retaining Wiki technical support (Eaton, 2006, p. 42)

Meeting all or most of these responsibilities is one the best ways to prevent the Wiki from "turning to mush": a disorganized mess of knowledge content (Eaton, 2006, p. 42). Another secondary benefit to Wiki Gardeners is that they are able to increase the traffic to the Wiki-based KMS, in a similar way a website drives traffic through a Google search (Yee et al., 2019, p. 2).

Training

Lack of appropriate training can be one of the key contributors to a KMS failure. Without proper training, knowledge workers are far less likely to add information to the system as they could be unsure of how to organize their content or they may just fear doing things incorrectly (Skoglund, 2011, p. 15). As evident as it may be, training should incorporate information on how to use the system and, arguably more importantly, why they should use the system (Eaton, 2006, p. 42) as mentioned in the Incentivizing User Adoption section above. In addition, successful training should also include experimenting and trialing out the system in a nonintimidating way (Skoglund, 2011, p. 14). This can be accomplished by providing a Sandbox location or encouraging users to experiment and contribute to their own personal Wiki space (Eaton, 2006, p. 42). As a final note, training should be reinforced by the management team to maximize its impact (Standing & Kiniti, 2013, p. 195).

Guidelines

Guidelines can help to further complement the visibility component of successful KMS implementation. Pages in a Wiki can grow in number rapidly without proper guidelines that link back to the specific goal of the KMS (Standing & Kiniti, 2013, p. 194). Guidelines within a KMS should offer information regarding KMS usage and structure. The guidelines page of a KMS can also offer a place for overall KMS architecture discussions (Eaton, 2006, p. 45). Examples of KMS guidelines might include things like system architecture and design, page length suggestions, template locations, when to use templates, naming conventions, identifying facts from opinions, editing best practices, and guidance on using copyrighted or confidential material (Eaton, 2006, p. 46). To set expectations of the information contained within the KMS, it can be practical to add some guidance confirming that the KMS does not contain any actual standard and that each user should not follow any guidance blindly or without questioning (Eaton, 2006, p. 46).

System Architecture

As previously discussed in the KM-IRIS methodology, once the target knowledge has been extracted and processed, the knowledge needs to be codified into the system architecture (Chalmeta & Grangel, 2008, p. 9). The system architecture should be defined in a way to meet the needs of the organization (Eaton, 2006, p. 42). Often, the system architecture for a Wiki-based KMS involves organizing content such that the parent page is the primary target knowledge category, and the child pages are sub-subjects or components of the primary knowledge parent pages (Eaton, 2006, p. 43). A simplified example is listed below:

- Engine Design [Parent Page]
    - Top-End Construction [Child Page 1]

        - Valve Design [Sub Page 1]
    - Bottom-End Construction [Child Page 2]
        - Crankshaft Design [Sub Page 2]

The importance of defining the system architecture is to help prevent chaos and knowledge "piles" within the system (Eaton, 2006, p. 43). Providing this is an initial structure for the KMS is known as "seeding" and it is practical to include templates within this seeded structure (Eaton, 2006, p. 11). Providing the "seeded" KMS, along with proper Guidelines, help to minimize confusion on differing ideas on how to organize and classify the data (Standing & Kiniti, 2013, p. 194). However, defining the system architecture is not without any risks. Imposing too strict of organization or formatting may inhibit the full use of the system, so it is important to allow and have a place for information that doesn't fit perfectly within the major system architecture (Skoglund, 2011, p. 12). Appendix A has target knowledge and general architecture suggestions.

Templates

Templates are valuable aids during the KMS implementation phase (Chalmeta & Grangel, 2008, p. 9). Appropriate templates can be identified to support the different types of target knowledge (Chalmeta & Grangel, 2008, p. 3). For example, templates are often used for "know-how, skills, and experience" (Chalmeta & Grangel, 2008, p. 13). Similarly, templates and seeding benefit users by providing a common structure and formatting to the overall KMS and its pages. These commonalities allow users quick and easy access to information (Eaton, 2006, p. 44) and also mitigate the potential intimidation factor of starting from a blank page when contributing new content (Skoglund, 2011, p. 12).

Wiki-Specific Features

One potential way to overcome the limitations of a strict hierarchical structure is with the advent of new Wiki technologies which allow pages to be aggregated based on certain properties, often called labels or tags. As an example, in order to simplify the system architecture, a KMS could allow users to create a page *anywhere* within the system as long as the appropriate labels are applied. Modern Wiki software will typically have the ability to aggregate all of the data with the same label to generate reports or create custom views of your data (*Confluence Labels – The Ultimate Guide*, 2022). This could be used for strategic and organizational benefit, as information such as page status, owner, etc., could be displayed, which would help Wiki Gardeners keep informed of the current state of the KMS (Chalmeta & Grangel, 2008, p. 13). An example of what this might look like can be seen in Appendix B. In addition, some valuable features that can be found in Wikis can be found in Appendix C.

Research Method

There are three main areas of research that were conducted. The first was a documentation review. This review relied on the documentation from a former Field Project report: How to Successfully Implement a Knowledge Management System for the Mechanical Engineering Department at Gating Incorporate by John Mudd. In addition to the former Field Project, communications regarding the transition from the legacy KMS to the current KMS were also reviewed. The second research method was that of a survey. The survey was distributed to the entire mechanical engineering group (over 150 members). The content of the survey can be found in Appendix D. The survey questions aimed to quantify goals and components of the goals discussed in the previous Field Project report.

Research Results

The research results will be presented first with a documentation review. The purpose of the documentation review was to understand the history and goals of the company's existing KMS. This documentation review consisted of a former Field Project and some documentation of discussions in the form of email history. The second section of the results will highlight a survey conducted within the company. The survey's purpose was to evaluate the current KMS and how it measures up against the former objectives as outlined in the documentation review. The final section of the results outlines a recommended action plan. The action plan is drafted using the combination of literature and documentation review findings and the results of the survey.

Documentation Review

The following section will detail the documentation that was available with respect to the current KMS at the company. The second section details documentation that was available regarding the transition from Microsoft SharePoint to the new Wiki-based KMS: Atlassian Confluence.

Former Field Project

Using the former Field Project report, a handful of primary objectives were identified. In addition, the report details components related to the objectives that the KMS was intended to achieve or improve. And finally, the report also outlined risks to success. The majority of the context of the report also specified the implementation plan for the KMS, but in order to keep the content of this report within scope, the implementation plan details have been omitted from the documentation review. The information of the former Field Project report is categorized into

different types and numbered in Appendix G. This numbering system will be referred to in the coming sections.

Transition to a Wiki KMS

The legacy KMS was implemented in early 2010. The system transitioned to the internet, Wiki-based KMS in late 2018 and continued the transition into 2019. Several issues had arisen since the legacy KMS inception. During this transition, a list of Mechanical Engineering needs and wants was also developed in tandem with the issues. These needs and issues can be found below in Table 1.

Table 1

Transition to Wiki - Needs, Wants, and Issues

Needs / Wants	
History / Background	house historical information including lessons learned, procedures, design guides, project history
Easily Searchable	have the history and background information be easily searchable
ME Roster	A list of mechanical engineers that contains their past projects and areas of expertise or specialized know-how
Group Forum/Discussions	A place to share tips and tricks, ask for advice or discuss designs
Issues	
Broken Links	an update had caused a variety of page links to break
Not User Friendly	the system was difficult to add content to
Permissions	permissions were difficult and not easy to manipulate
IT Support	unclear as to who the proper support personal was

Note. This table shows a summary of the needs, wants, and issues that contributed to the transition from the legacy KMS to the existing Wiki KMS.

Based on the needs and issues, the current Wiki-based solution was proposed. The Wiki solution aimed to improve upon the issues and needs as defined below:

1. Better permissions control
2. Easy creation and reorganization of pages
3. Blogs – categorization and sorting
4. User-friendly comment system
5. Wiki functionality for design guides and technical expert pages – giving each expert the ability to own their own Wiki page structure.
6. Less reliance on IT for support

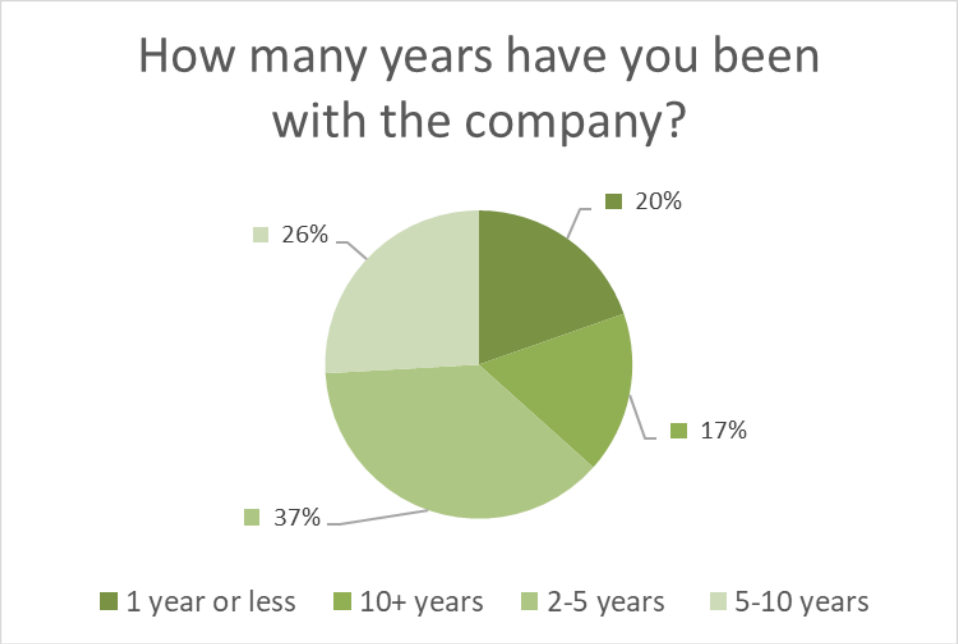
Evaluation of Current KMS

Based on the documentation review above, primarily the former Field Project, a survey was developed. The majority of survey questions aimed to gauge the effectiveness of the previously stated goals for the KMS. All of the survey questions can be found in Appendix D. For brevity, each question will be referred to as its question number. (Example: SQ1 = How many years have you been with the company?). The survey was open for responses for 1 week and distributed to an internal mechanical engineering email and message group that consisted of 186 members. At the end of the survey period, 112 replies had been recorded, resulting in a response rate of around 60%.

SQ1 through SQ3 were not primarily focused on KMS goals but were necessary to understand the demographic makeup of the surveyors and help to understand trends with certain demographics. Below are the demographic results. To maintain confidentiality, SQ2 and SQ3 results have been omitted from the survey results.

Figure 4

SQ1 Results



Note. SQ1 results shown. Categorized into the 4 respective groups for the length of time with the company.

The following survey questions contained the majority of questions targeted at evaluating the current KMS based on the previous Field Project. Appendix E has been prepared to help convey the connection between the questions and the former Field Project.

SQ4 aimed to gauge the effectiveness of FP6: to determine if people are using the KMS on a daily basis. The majority (48%) of users stated that their KMS usage averages 2-4 times per week. The second leading category was that of daily users (28%). The combined effect of users of these 2 groups makes up 76% percent of users taking advantage of the KMS 2 or more times per week. This result seems to indicate that the original goal of daily use is close to being

achieved. Respondents who use the KMS less than 10 times per month were 21 users (19%) and 9 (8%) users reported that they rarely use the KMS.

The next two questions, SQ5 and SQ6, were poised to gather information on how accessible the information within the KMS was to users. The goal of SQ5 was to help gauge accessibility by showing where people start their search for knowledge. Of the four options presented, the results are summarized below in Table 2.

Table 2

SQ5 Results

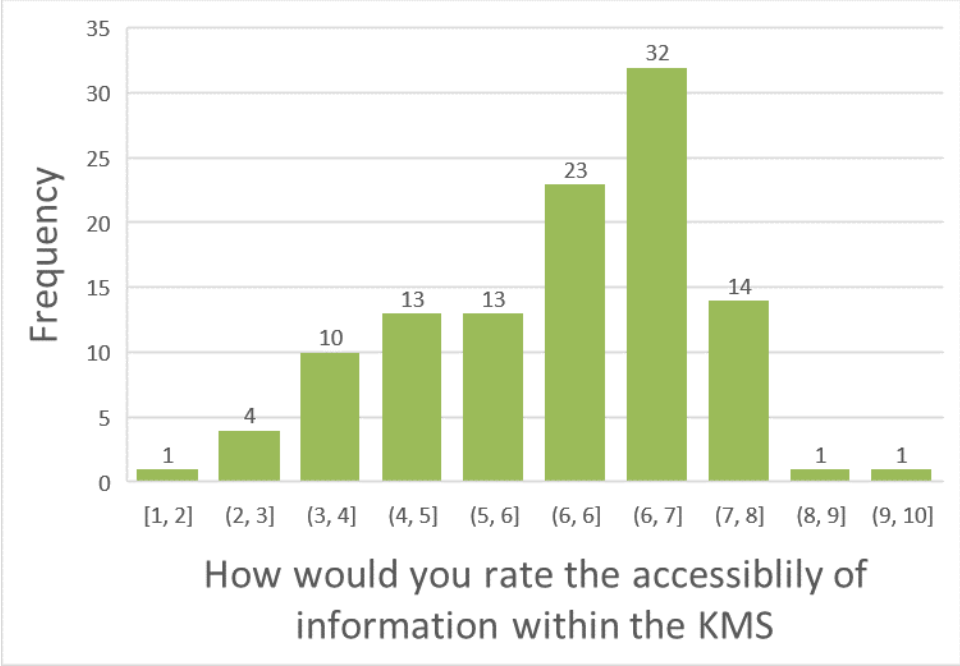
Votes	**Started Their Search with**	**Percentage of Total**
54	The KMS	48%
31	Team Leader or Coworker	28%
21	Internet	19%
6	Other Sources	5%

Note. Tabulated results from SQ5 showcasing where users start their search for knowledge with both the total number of users and the percentage of users who selected the response shown.

The next question, SQ6, asked directly for users to rate the accessibility of the information within confluence using a 1-10 scale, where 10 was “extremely accessible” and 1 was “not accessible”. The rounded average accessibility for the survey was 5.8 out of 10. Interestingly, the histogram below in Figure 5 shows a negative or left-skew distribution of results, seemingly indicating that a bulk of users are finding the information not highly accessible.

Figure 5

SQ6 Results

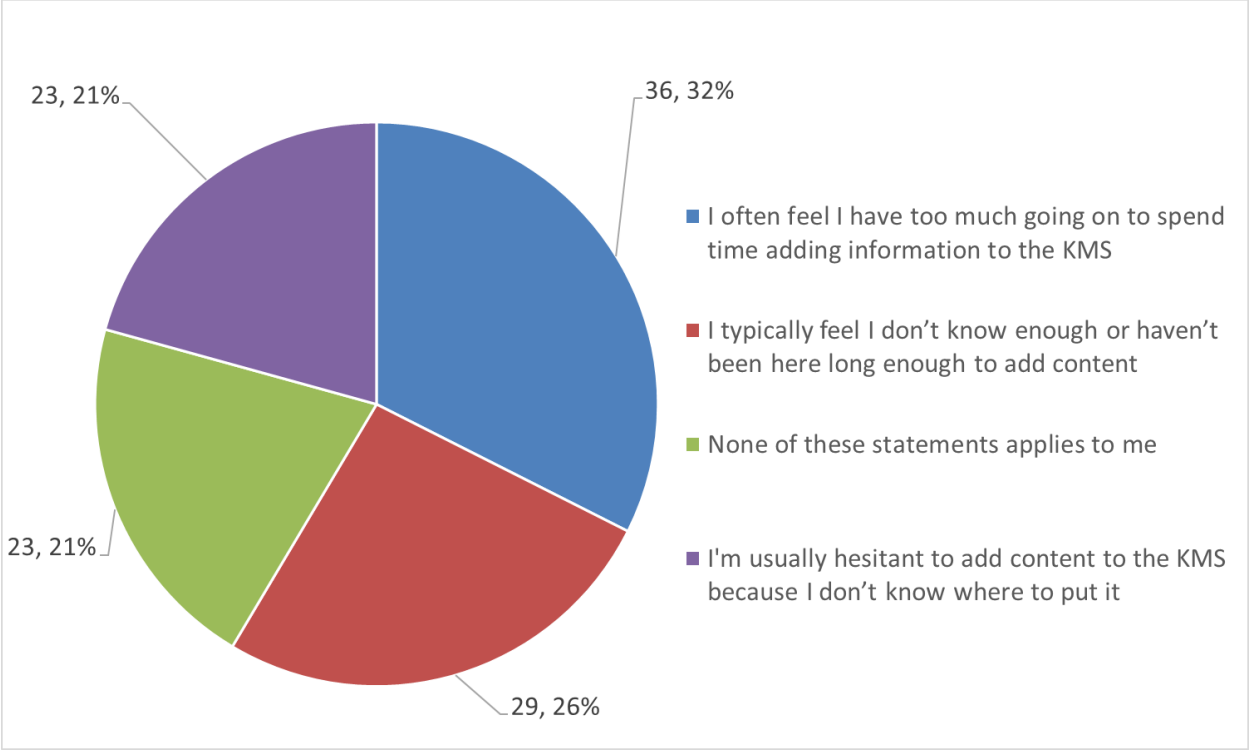


Note. SQ6 Results are shown in the histogram with the total number of votes above the bar.

Promoting a culture of collaboration was also a previously mentioned elements of the KMS as derived from the former Field Project. To help understand the limitations of collaboration with the current KMS, SQ7 was presented in the survey. The goal of this question was to help understand what is stopping users from contributing to the KMS. The pie chart shown in Figure 6 below can summarize the results. Upon review, there is a fairly uniform distribution of limitations, with no singular item representing the majority. However, there are still actionable takeaways from this information which will be discussed in the following section.

Figure 6

SQ7 Results



Note. SQ7 Results are shown based on the four different response options presented to respondents. Both the number of responses and percentage are shown.

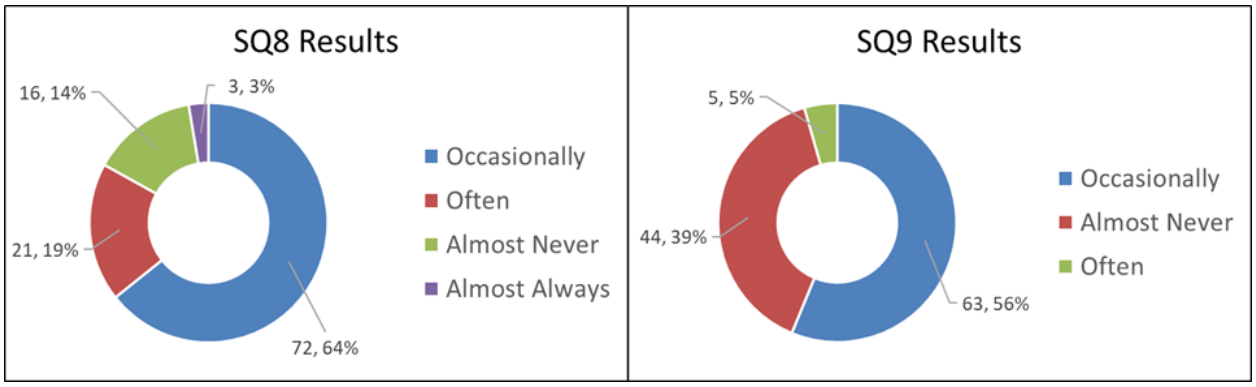
The next grouping of questions (SQ8 and SQ9) was targeted to identify the accuracy and relevancy of information with the KMS. The two questions broke apart this topic into two categories below and the results can be seen in Figure 7. The most common response to both survey question findings is "Occasionally," showing that there is not a large amount of material that is either out of date or not widely agreed upon. SQ9 results further solidified that the large majority (95%) of people answered that there was almost never or occasionally information that they did not agree with.

SQ8: How often do you find information within the KMS which is out of date?

SQ9: How often do you find information in the KMS that is incorrect, or you do not agree with?

Figure 7

SQ8 and SQ9 Results



Note. SQ8 and SQ9 Results are shown above on the left and right respectively. The charts show both the total number of responses and the overall percentage.

SQ10 and SQ11 focused on trying to solicit feedback on the type of information users felt was needed or missing from the existing solution (i.e., the target knowledge of the system). Recall that there were 4 areas of target knowledge proposed in SQ10, listed below in Table 3. SQ11 allowed users to suggest modifications to the list provided in SQ10. A large majority (84%) of users responded that the target knowledge proposal was adequate. It should be noted that if users thought the list in Table 3 was comprehensive, SQ11 was skipped and could not be responded to.

Table 3

SQ10 Target Knowledge Proposal

Target Knowledge
● ME Deliverables ● Design Checklists ● Lessons Learned ● Work Instructions ● Design Guides

Note. Target Knowledge proposal presented during the survey.

Of the remaining respondents who responded to SQ11, here is a summary of the suggestions or modifications proposed:

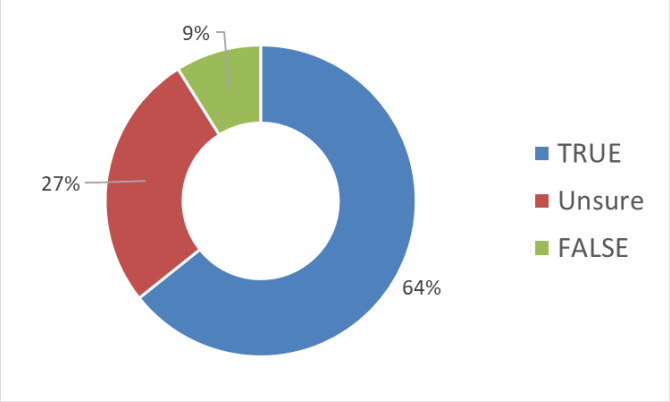
- Technical Knowledge: knowledge of broad topics of technical information such as injection molding, heat transfer, etc.
- Simple Work Instructions: how to add a printer, submit a test request, submit a shipping request
- Lessons Learned: organize by business segment and have lessons learned inform design guide updates
- Testing Documentation
- Design Guides: update to include statistical data of usage when available
- About: information regarding the KMS and how to use the system effectively
- Onboarding Guidance: information for new hires
- Drawing Standards
- ME Deliverables: the current solution for deliverables is overwhelming and interested to understand deliverables within KMS
- Associate Directories: for example, component engineering

- Project (Design) Decisions
- Business Segment Specific Pages: pages containing filtered information based on business segment
- Mission, Vision, and Goals

Around 64% of respondents noted that they liked the idea of having preformatted templates to aid in the contribution of knowledge into the system. This question, SQ12, was in an effort to help understand and mitigate one of the former Field Project's identified risks: widespread diversity in formatting across the KMS. The second largest response group to this question (30 people, 27%) was unsure of how they would benefit from the preformatted template. The remaining 10 users felt that they would not benefit from templates in the system. The final results are shown below.

Figure 8

SQ12 Results



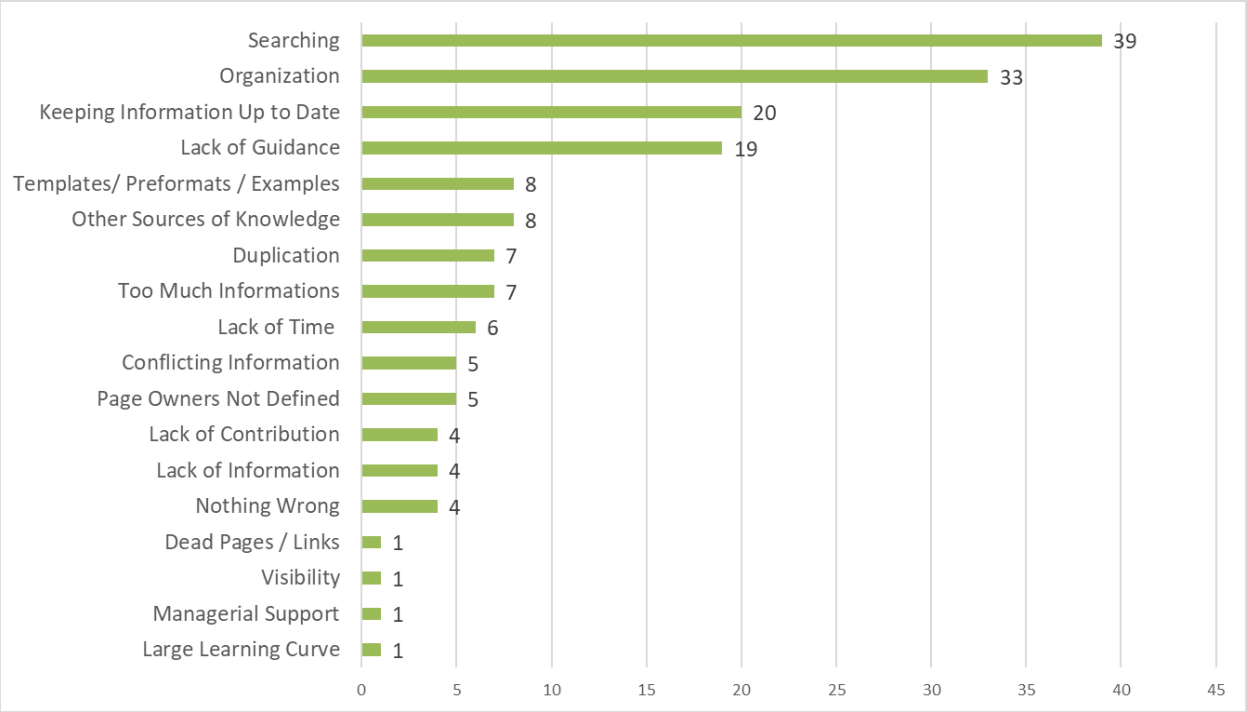
Note. SQ12 Results show the distribution of respondents who felt templates would be valuable as a percentage.

The following two questions were in an effort to collect open-ended responses on what users identified as the largest obstacle or challenge with the KMS (SQ13) and what users felt is

most valuable with the current system (SQ14). The most common term used for SQ13 was related to searching, where 39 of 112 respondents mentioned this in their response as being a challenge. The responses from users for SQ13 were read and analyzed and the recurring themes were noted. Figure 9 depicts the most frequently mentioned recurring themes by users. Note that more than one theme could have appeared in a single response.

Figure 9

SQ13 Themes



Note. Responses from SQ13 were categorized into themes and presented and sorted in the horizontal histogram above based on frequency. Note that it's possible more than one theme could have been mentioned in a single response.

After identifying existing obstacles with the KMS, users were given the opportunity to share the things they found most valuable within the KMS in SQ14. Figure 10 depicts the data as a word cloud, with larger words representing more user mentions. As the figure shows, "design

guides" and "information" were the most frequently mentioned items of value with 26% of respondents mentioning these.

Figure 10

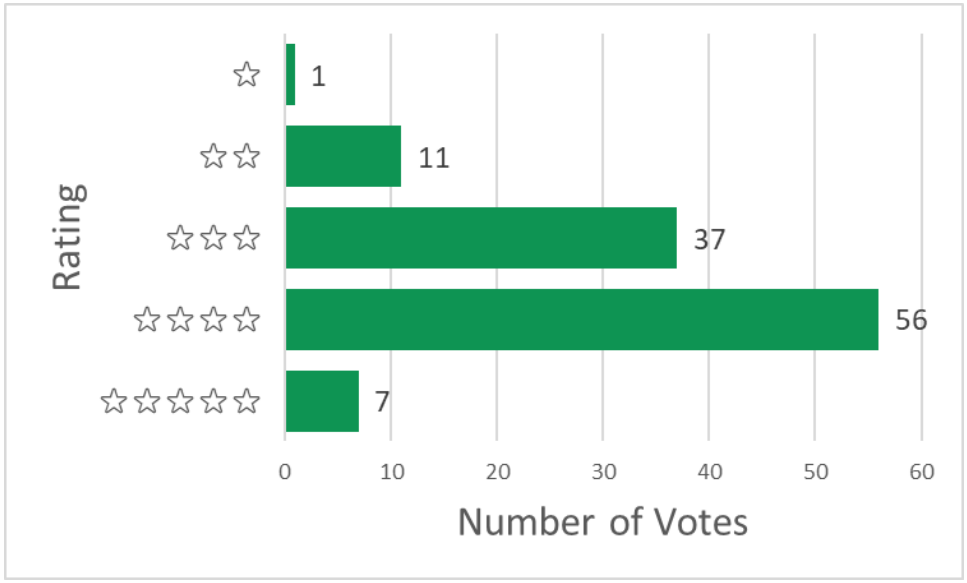
SQ14 Word Cloud

Note. SQ14 response text was analyzed and presented into a word cloud where relative size represents a higher frequency in responses.

The final question of the survey was quite subjective and asked users to rate the current KMS on a scale from 1 to 5, with 5 being the best. This question aimed to rate the current system so that future improvements and surveys can be completed, and this overall rating metric could be observed over time. Figure 11 shows the findings, and the average rating for the KMS was 3.51.

Figure 11

SQ15 Results: Overall Rating



Note. SQ15 Results are presented based on a 5-star rating system with the total number of votes shown to the right of each rating.

Recommended Action Plan

Given the Literature Review, Documentation Review, and Survey conducted, the following action plan is recommended to the improve effectiveness of the current KMS within the company. The action plan will follow the Wiki Adoption Methodology described in the Literature Review.

KMS Purpose

The first course of action is to re-establish the purpose of the KMS. The initial aims and priorities, as described in the former Field Project, are quite likely to have evolved since the original report was prepared in 2009. To help re-establish the purpose of the KMS, a focus group should be formed. The focus group should be included throughout the entire action plan process, but first, the group should provide feedback and suggestions on the KMS purpose.

Following the Wiki Adoption methodology, a problem should be identified that is the goal of the KMS to solve. The problem should have two key characteristics, the first of which is that the problem should align closely with overall department and business goals. The recommendation is that the leadership group help to establish the goal of the KMS and its position within the overall business and department goals. Secondly, the problem should be *relevant* to the users of the system; the problem should be one that they find value in resolving and that helps them with their work. The relevancy to the users should be an interactive process from the leadership team with heavy consultation from the focus group. Then the focus group can help to ensure the execution of the goals and make sure the KMS is meeting users' needs.

The focus group should also be consulted to help define the KMS in relation to other tools, meaning that the group should define when this tool is to be used and what type of information the KMS will hold. Answering this question will ultimately start to shape the Guidelines of the KMS. The guidelines would then define the items listed below. Defining the below items in the guidelines will help address the 21% of users who felt they didn't know where or how to contribute to the KMS per SQ7. Additionally, clear guidance and templates can also help to encourage the usage of the KMS, which will be further detailed in the KMS Engagement section. The guidelines would include, but would not be limited to, the following:

- KMS Purpose, Mission, Vision
- Organization and System Architecture
- Target Knowledge and respective location
- Naming Conventions
- Differentiation with other tools
- Contribution and edition guidance

- Template locations
- Formatting

Using the recommendations from SQ11, the focus group should amend or modify the target knowledge. It may be sensible to add an area of target knowledge that acts as a catch-all in which information that doesn't fit well into the target knowledge areas could be captured. This miscellaneous section could then be analyzed to add additional areas of target knowledge if recurring topics or themes arise.

KMS Implementation

The current software solution (Atlassian Confluence) has already been selected and changing or re-evaluating software solutions is outside the scope of this action plan. However, if there are additional resources or needs within the company, this is one element that could be explored separately, and the large majority of the action plan would still be of value.

Wiki Design

To start the implementation phase of the adoption methodology, the Wiki design should be reassessed, focusing on the organization and usability of the system. To begin, the target knowledge, previously defined in the KMS Purpose, should help to form the seeded structure of the KMS. These will be the high-level parent pages of the Wiki. Based on the redefined target knowledge, the system should be reorganized to more clearly fit within these areas of target knowledge. In addition to the target knowledge structure, the following pages could be added to the system:

- Statistics Page - displays information such as most authored pages, most edited pages, and most active uses

- Target Knowledge Pages - pages that display the children pages of target knowledge in a database-like format

While adjusting the Wiki design, the templates should also be defined, where each area of target knowledge might have a separate template format. Legacy information in the KMS should be updated with this templated information. Adding templates to the KMS would also address the majority of users who felt templates would be a valuable asset from SQ12. To further aid in content generation, templates could also provide references to the guidance for things like naming conventions and system organization. An example template is shown in Appendix F. Given the functionalities of the current KMS software, Table 4 suggests properties and features could be added to templates.

Table 4

KMS Page Properties/Features Suggestion

Property/Feature	**Detail**
Page Owner(s)	Clearly define a page owner(s)
Last Edited	Showcase last edited date
Workflow for Editing	Workflow to send edits to the page owner for approval
Workflow for Stagnation	Workflow to automatically notify page owner after a certain time has passed without updates
Label	A label applied to a page indicated the type of target knowledge
Rating	Rating or voting of the value of the content in the page

Note. The table presents the properties and feature recommendations for target knowledge templates.

The page owner property's purpose is to clearly define either a person or group of people who will own and maintain the page. This property could evolve over time as new owners come

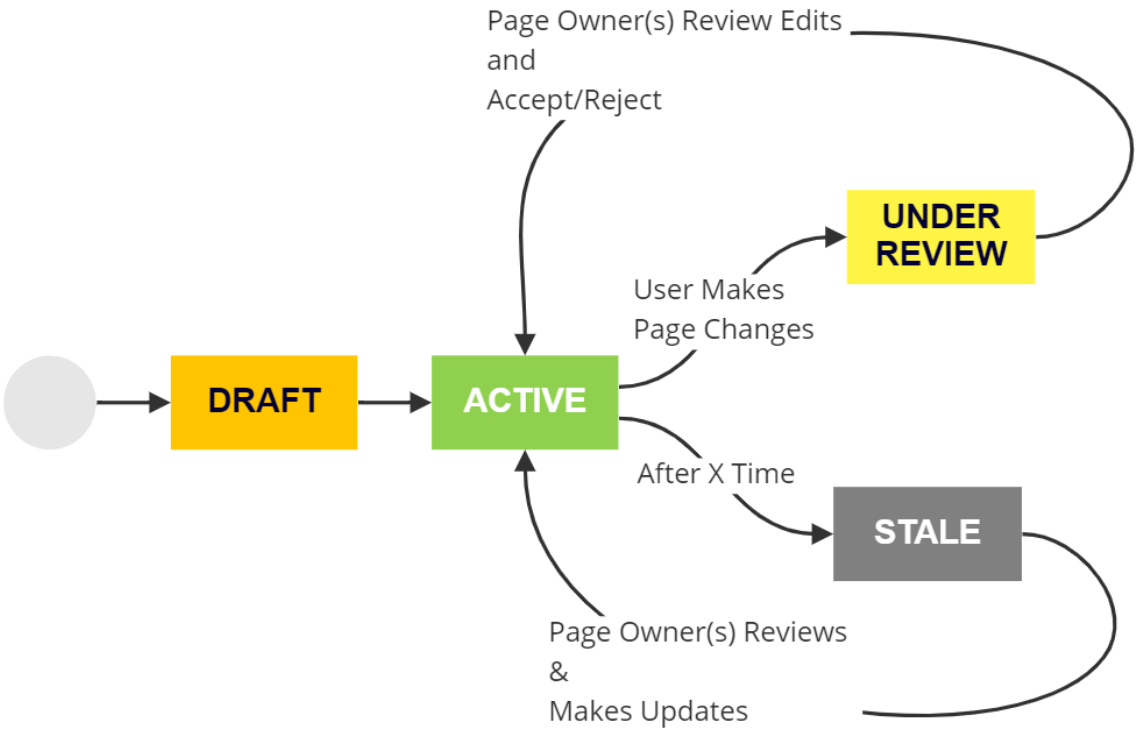
in and out of the page's lifecycle. Additionally, under the guidance of the focus group, some pages could be left without owners for the collective user group to update and maintain.

The last edited property would display the date on which the page was most recently updated. This will be most useful when looking at a summary of pages and their properties. This may also be necessary to have to utilize the workflow tools which exist in the current KMS software.

The next two properties could very likely be combined into a single property with the features that exist in the current KMS software. The goal of these properties is to aid in the maintenance of the pages within the system. One of the most frequently mentioned themes in SQ13 freeform responses was that information was not kept up to date. Similarly, SQ8 identified that 64% of users found information out of date on occasion. The workflow for editing and workflow for stagnation could help enable users to not only reduce fear of contribution but also to help keep things up to date. This property would display the current state of the page to give others visibility to the page's status. The editing workflow would allow users to propose changes and then those changes would then need to be approved by the page owner(s). The stagnation workflow would send notifications to the page owner(s) when the page has not been updated in a predetermined period of time. The exact amount of time should be determined with the focus group. The proposed workflow and its corresponding states are shown below in Figure 12.

Figure 12

Workflow Proposal for KMS



Note. The workflows for editing and stagnation are shown above. This workflow proposal helps to prevent incorrect and outdated information.

Continuing through the property and features from Table 4, labels on the pages would utilize the built-in features of the current KMS to aggregate the target knowledge pages into a single database on a single summary page. In this way, the pages could be more loosely organized, and a strict organizational hierarchy would not need to be imposed, eliminating a key risk of trying to impose organization in a large group.

The last-mentioned property would allow users to vote on the usefulness of the page. The more votes a page has, the more other people may be interested in finding the page and utilizing

the knowledge. Additionally, this can be used for further engagement with the system as described in the next section.

Improving the searching features of the KMS should be added to the Wiki design and address the most frequently mentioned obstacle within the system. There are a couple of ideas that should be discussed with the focus group to improve the search functions of the KMS. The first idea, if you know what type of target knowledge needed to be searched, is to search within the target knowledge summary page. Recall that summary pages for target knowledge would offer a database-like format that would include all of the pages related to the target knowledge. The second idea is that a dedicated search page should be included with pre-filtered search bars so users can search based on the type of information they are after. In addition to the two ideas, further guidance could also be provided on how to best use the native search function in the KMS software.

Wiki Administration

Wiki administration is the next area of focus within the implementation phase. The primary recommendation for administration is to identify a group of individuals to act as the KMS Wiki Gardeners. These individuals should serve the role defined in the Wiki Gardner section of the Literature Review. In addition to Wiki Gardeners, the workflow proposal highlighted in Figure 12 also offers a form of self-sharpening Wiki maintenance, particularly with the implementation of the "stagnant" workflow. The workflow would also allow the gardeners freedom from having to monitor each individual page for stagnation.

Wiki Support

Supporting the KMS comes primarily through training. This training should capture all of the information housed in the guidelines but would be presented in an open forum for discussion,

questions, and feedback after the training has been completed. It would also offer users a different medium to digest the guidelines depending on user learning preferences. As an additional area of training, users should also be made aware of their own personal spaces within the KMS. These spaces can be used as a sort of "Sandbox" to do activities such as starting draft pages and experimenting with formatting and features of the software. Training may also take the form of announcements or showcases of features of the software. For example, this could take on the form of a monthly update detailing the elements of a specific, useful feature of the KMS software.

KMS Engagement

To activate engagement, review the Literature Review's Incentivizing User Adoption section, which highlights key ideas for enhancing engagement. Culturally, there is much that can be done to increase engagement. Adding page ratings not only allows users to rate the quality of information on a page but also incentivizes the engagement of users to create good content so that the authors of the pages can have the highest-rated pages. Ratings, in conjunction with the Statistic Page mentioned in the Wiki Design, would help to easily facilitate the recognition of top KMS performers and thereby drive cultural and social incentives to use the system. The focus group should help to confirm which of the previously mentioned accolades would be most valuable to recognize. If cultural incentives are ineffective on their own, they can be combined with the previously indicated monetary incentives.

KMS Adoption

Defining the purpose of the KMS, as well as maintaining reinforcement from team leaders, helps to drive the cultural motive behind the system which will ultimately lead to mass adoption. The leadership team could even go as far as instilling a sense of responsibility by

adding KMS activity into the job duties of the individuals. To achieve this, the first opportunity would be to look at the internal behaviors of the company (a list of 3 key behaviors) and find an opportunity to relate the participation of KMS activity to one or more of these key behaviors. The second opportunity would be to look at the department's internal career path (a document that defines activities and behaviors with respect to mechanical engineering) and find items within the career path that either directly relates to KMS activity or could be amended to include verbiage that more directly associates the activity with KMS participation. Leaders should motivate and inspire users to contribute. The leadership team should work hard to establish clear links between the work done in the KMS and the user's overall performance. Leadership may accomplish this by validating the benefit to users and ensuring that everyone understands the value of the system. A push should be made for a cultural shift that actively encourages and commends KMS participants.

Suggestions for Further Research

The literature was intended to be comprehensive, but inevitably, there are gaps in the information presented. If further research were to be conducted, the recommendation would be to put a stronger emphasis during the research on key terms such as implementation, application, development, deployment, and methodologies to help seek out papers that have concrete implementations and methodologies. In addition, any further research in the Wiki domain should also place an emphasis on finding results that are Wiki-based or methodologies that are highly applicable to Wiki systems. As a final note on the literature review, it may also be advisable to conduct research on tacit knowledge extraction methodologies, depending on the researcher's familiarity with these methods

When conducting the survey, a few minor suggestions could help lead to more valuable results. For SQ1, the recommendation would be to include more age groups as well as properly diving them so there is no overlap (group 1 and group 2 both contained “2 years of work”). For SQ6 and SQ7, attempt to make the response options tie more directly to quantifiable results. Lastly, depending on the size of the organization, consider looking for data trends within the respondents such as business groups or teams. This could help to identify if the global survey trends apply holistically or if groupings of users have differing survey results.

When providing a recommended action plan, consider allowing more time between the research and literature review and the recommended action plan. During this time, the focus group could be formed and consulted *during* the report creation yielding an even more actionable and concrete plan as an output.

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Glossary of Key Terms

KM	Knowledge Management
KMS	Knowledge Management System
IP	Intellectual Property
IT	Information Technology
Wiki	IT-based KMS that typically consists of a set of easily editable and interconnected pages on the internet with only a select group of users with access
Target Knowledge	building blocks or high-level categories of knowledge to be represented in a KMS
Explicit Knowledge	expressed in words and numbers, and easily communicated and shared in the form of hard data, scientific formulae, codified procedures, or universal principles (Eaton, 2006, p. 5).
Tacit Knowledge	typically highly personal and hard to formalize, making it difficult to communicate or share with others (Eaton, 2006, p. 5)
SECI	Socialization, Externalization, Combination, and Internalization. A KM methodology popularized by Chalmeta and Grangel (2008)
SQ	abbreviation used to define a Survey Question
SOP	Standard Operating Procedure

Appendix A

Architecture Suggestions

Note. In the architecture suggestion below, the library is synonymous with KMS. Reprinted from "The Interactive Knowledge Library Capturing, Sharing and Synthesizing Tacit Knowledge in Engineering" by C. Eaton, 2006, p. 19-20,35.

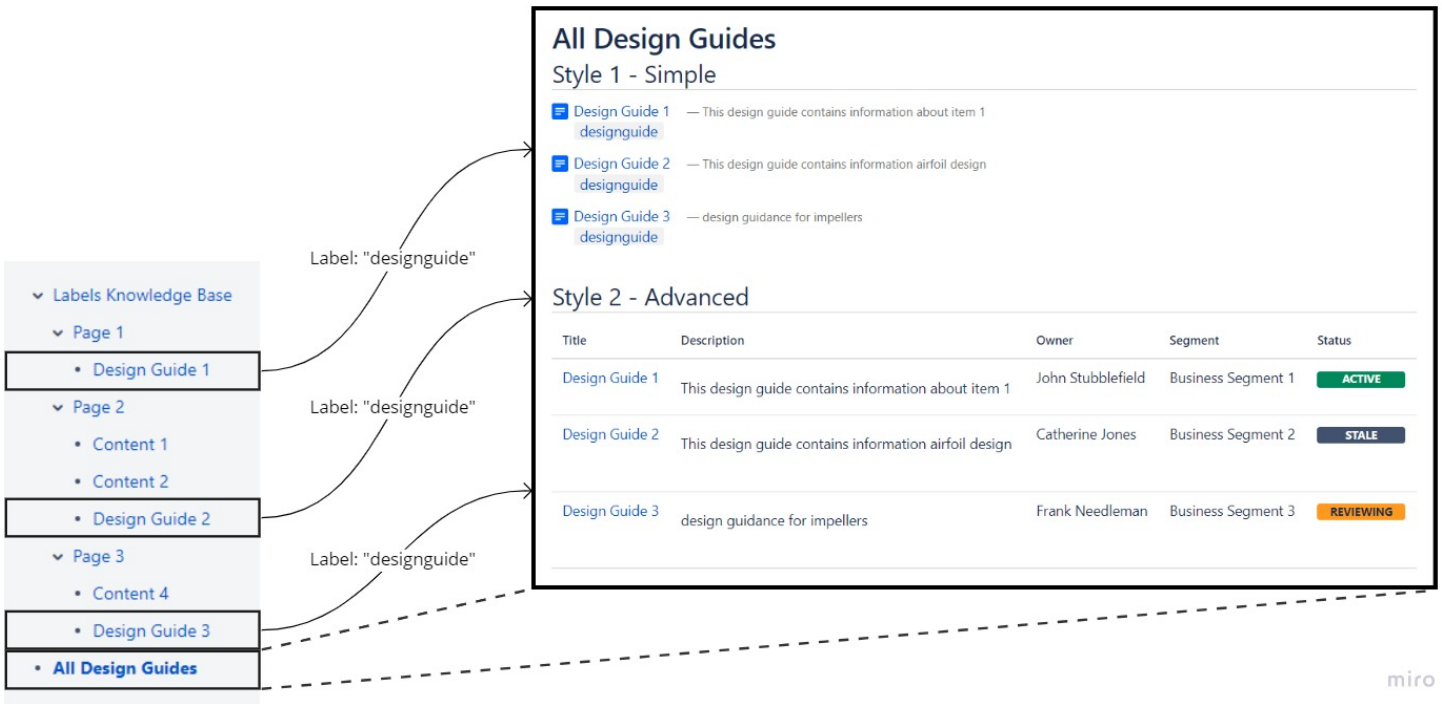
- **Ongoing** – Enable collaboration for ongoing projects
- **Reuse** – The explicit and tacit knowledge from previous projects, stored by placing design contexts to reference the design documents.
- **Best Practices** – While corporate standards are the location for true best practices since they should be incorporated into the quality system, the formation of new proposed best practices can take shape within the knowledge library.
- **Lessons Learned** – Lessons learned can be posted by all, straight into the knowledge library.
- **Expertise Management** – The library can identify key contributors and refer to experts to consult for each topic.
- **External Dependent** – The library can reference the relevant standards and which section thereof for each topic.
- **External Relational** – Feedback and perspectives from clients can be entered into the library.
- **Expert Finder** – This is a directory of subject experts
- **Project Database** – The project database is intended to contain a project overview and examples for reuse, typically associated with a system or specification
- **Wanted Pages** – A useful tool for identifying where contributions are needed.

- **Orphaned Pages** – The software can find pages that for whatever reason no longer have any hyperlinks leading to them. This is a key site maintenance tool. If the knowledge on the orphaned page is no longer relevant it can be deleted, else it can be linked suitably to the rest of the Wiki to enable users to find the knowledge more easily.

Appendix B

Labels System Architecture

Label architecture allows for more flexibility in structuring. Using this specific KMS software, two different styles are presented below. The page “All Design Guides” extracts pages throughout the KMS with a specific label applied at the page level. In this instance, the label applied was *designguide*.



Appendix C

Wiki Specific Features

- **Versioning** – “Prior versions are stored in the wikis temporal database. This version management acts as a safeguard against accidental content destruction or vandalism as well as providing a way to keep track of prior changes including author, date and other related information" (Standing & Kiniti, 2013, p. 191).
- **Instant publication** – “New saved pages are instantly published in the wiki because there is no editor review. Because any published content is immediately visible, other users have opportunity to add to the contribution, thereby creating new content and new opportunities for further editing resulting in a continuous process of incremental knowledge contribution referred to as wiki magic" (Standing & Kiniti, 2013, p. 191).
- **Collaborative authorship** – “Wikis enable web documents to be authored collectively and individual web pages are not owned by their creators. Any user (registered or not) can edit the pages and save new page version which replace earlier versions" (Standing & Kiniti, 2013, p. 191).
- **Page Index** – “The creation of an index while not critical aids navigation and management of the library" (Eaton, 2006, p. 34).
- **Data Storage** – “Preferably a robust database based system to ensure sufficient scalability and backup functions" (Eaton, 2006, p. 34).
- **Reverting to previous versions** – “If an edit is made to a page which is inappropriate or in error then the whole page can be reverted to a previous version" (Eaton, 2006, p. 26).

- **Page History** – “Shows all the edits made to a page, when and by whom, facilitating discussions. By enabling identification of key contributors, enables expertise management" (Eaton, 2006, p. 26).
- **Backlinks** – “These links are to the pages which feature a link to the currently viewed page and allow the user to easily navigate through the Wiki page structure" (Eaton, 2006, p. 25).
- **External Hyperlinks** – “Web pages outside the Wiki, either within the corporate internet or on the World Wide Web can be linked to. These can be used to link to reference material and citations" (Eaton, 2006, p. 25).
- **Internal Hyperlinks** – “Hyperlinks to other Wiki pages are the main way of navigating the Wiki site. If a search does not yield exactly the knowledge required the resultant page may feature a hyperlink to the desired knowledge or may lead the casual browser to an item of interest" (Eaton, 2006, p. 25).
- **Searching** – “The search function allows pages to be found by keyword. If there is no specific page for the searched key word they are listed by relevance" (Eaton, 2006, p. 25).
- **System Indicators** – “Establishing a system of interrelated indicators that keep us permanently informed about the status of the knowledge management system, both at a strategic and a technological and organisational level" (Chalmeta & Grangel, 2008, p. 13).

Appendix D

Survey Questions

The following questions were presented in the survey. Modifications have been made to maintain confidentiality.

Survey Question	**Question**	**Responses**
SQ1	How many years have you been with the company?	☐ 1 year or less ☐ 2-5 years ☐ 5-10 years ☐ 10+ years
SQ2	Which segment are you in?	[removed for confidentiality]
SQ3	What site location are you at?	[removed for confidentiality]
SQ4	How often do you use the KMS?	☐ I use the KMS almost daily ☐ I use the KMS around 2-4 times/week ☐ I use the KMS < 10 times/month ☐ I rarely use the KMS
SQ5	When looking for information or knowledge, where do you typically start your search?	☐ The KMS ☐ Internet ☐ Team Leader or Coworker ☐ Other
SQ6	How would you rate the accessibility of information in the KMS?	0 = Not Accessible 10 = Extremely Accessible
SQ7	When considering adding content to the KMS, which of these statements most applies to you?	☐ I often feel I have too much going on to spend time adding information to the KMS ☐ I'm usually hesitant to add content to the KMS because I don’t know where to put it

Survey Question	Question	Responses
		☐ I typically feel I don't know enough or haven't been here long enough to add content None of these statements applies to me
SQ8	How often do you find information in the KMS which is out of date?	☐ Almost Always ☐ Often ☐ Occasionally ☐ Almost Never
SQ9	How often do you find information in the KMS that is incorrect, or you do not agree with?	☐ Almost Always ☐ Often ☐ Occasionally ☐ Almost Never
SQ10	Below is the proposal target knowledge to be housed within the KMS	[target knowledge removed for confidentiality] ☐ I feel this list is comprehensive ☐ I feel this list needs to be modified
SQ11	If you said the list needs to be modified, please write any additional areas of target knowledge or suggestions below	*freeform text response*
SQ12	I feel I would benefit from having pre-formatted templates to contribute to the target knowledge within the KMS	☐ True ☐ False ☐ Unsure
SQ13	In your own words, please describe the largest obstacle(s) you think exists with making the KMS site an effective knowledge management solution	*freeform text response*

Survey Question	Question	Responses
SQ14	In your own words, list the things you find most valuable with our current KMS	*freeform text response*
SQ15	Please give our KMS site an overall rating	*0 to 5 stars presented* ☆☆☆☆☆

Appendix E

Survey Question Relation to KMS Goals

This table helps to correlate the survey questions (SQ#) to the former Field Project elements (FP#) which are located in Appendix G.

SQ#	Related FP#	Related FP Item
SQ4	FP6	Users of the KMS utilize on a daily basis
SQ5	FP1	Easily accessible information
SQ6	FP1	Easily accessible information
SQ7	FP3	Promote a culture of collaboration
SQ8	FP9	How to keep information current and up to date.
SQ9	FP9	How to keep information current and up to date.
SQ10	FP7	Target Knowledge within the systems will be compromised of: Test Results, Tooling and Part Cost Estimates, Design Guidelines, Lessons Learned
SQ11	FP7	Target Knowledge within the systems will be compromised of: Test Results, Tooling and Part Cost Estimates, Design Guidelines, Lessons Learned
SQ12	FP15	Huge diversity in the formatting of information.

Appendix F

Example Template

The example template below is for a new area of target knowledge. The text in grey and italicized boxes is meant to be instructional and will be deleted before the page is created.

Title of New Page

Page Owner	*use the @ symbol to tag a user*
State	*field automatically populated using current workflow state*
Last Edited	*automatically populated using software macro*
Business Segment	*Segment 1* *Select from dropdown list*
Summary	*add a short summary of the information presented*

New Page Creation Checklist:

- ☐ *Fill in page properties above*
- ☐ *Apply appropriate labels*
- ☐ *Review Guidelines (linked) for formatting, structure and naming conventions*

Insert page content here

Appendix G

Summary of former Field Project

The summary of the former Field Project is presented below with the types defined. Goals were the formally stated goals of the project. Goal Components are supporting elements of a Goal, and Risks were formally identified risks in the report.

Number	Item	Type
FP1	Easily accessible information	Goal
FP2	Improve onboarding process	Goal
FP3	Promote a culture of collaboration	Goal
FP4	Help mitigate the loss of intellectual property	Goal
FP5	Improve company bottom line	Goal Component
FP6	Users of the KMS utilize on a daily basis	Goal Component
FP7	Target Knowledge within the systems will be compromised of: ● Test Results ● Tooling and Part Cost Estimates ● Design Guidelines ● Lessons Learned	Goal Component
FP8	Users have sufficient time and training on the KMS	Goal Component
FP9	How to keep information current and up to date.	Risk
FP10	Lack of a long-term strategy.	Risk
FP11	Proliferation and/or duplication of data.	Risk
FP12	Dead links on the system.	Risk
FP13	Difficulty in finding information due to poor indexing and information being held on private servers.	Risk
FP14	Access to official company resources is difficult due to poor awareness of its availability.	Risk
FP15	Huge diversity in the formatting of information.	Risk