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**Strategic Analysis of Knowledge Management Practices:
An analysis of Knowledge Management at Eaton Corporation**

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Submitted to the Lee Honors College

Western Michigan University

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April 2020

Abstract

This paper analyzes the critical success factors for knowledge management and looks at how the current knowledge management strategy of the Warranty department at Eaton. To analyze these success factors, the current platforms for knowledge management were analyzed for their intended use, determined how the platforms were used by the department, and determined flaws of the current platform in relation to the needs of the department. Training content and methods were analyzed to determine effectiveness. The results show that the current knowledge management strategy of the department lacks the ability to capture critical business knowledge, information is siloed between departments, and that knowledge transfer to and between employees needs improvement. Dynamics 365 is the proposed solution to centralizing and capturing department knowledge due to its Microsoft integration and feature set. Implementation of a training schedule is the proposed solution to employee knowledge transfer and retention due to the need for training evaluation, role identification, and a formal training strategy.

Section 1: Introduction

Large organizations may often find that managing knowledge within an organization is no easy task. With thousands of files, numerous different applications, and various departments, a knowledge management strategy is necessary for keeping the organization efficient and effective. Within the Warranty department at Eaton, employees often reported frustration and trouble when it came to locating information and organizational knowledge. To try and see what action could be taken to solve this issue, root cause analysis was performed to identify what was causing the users frustration. This paper seeks to understand the current knowledge management strategy of the Warranty department, identify key issues of the strategy, and propose solutions for improving it. Additionally, this paper analyzes critical success factors for training and applies them to the training of the department to determine potential weaknesses and their solutions.

Section 2: Literature Review

Kavakli & Loucopoulos (1999) state that “An organization’s knowledge has always been critical to its competitive success;” knowledge shared between workers increases efficiency, and market share is impacted by customer knowledge and interactions. This sort of tacit knowledge has normally been shared between workers naturally, but “rapid organizational change... [has] intensified organizational needs for knowledge” (Kavakli & Loucopoulos, 1999). Dalkir (2011) begins his book, *Knowledge Management in Theory and Practice*, by declaring, “The ability to manage knowledge is crucial in today’s knowledge economy” Indeed, studies have shown many benefits from the implementation of KM, including improvements to process performance, employee performance, market performance, and organizational performance. (Cebi, Aydin, & Gozlu, 2010). Data, knowledge, and information are extremely valuable in today’s day and age of deep learning, advanced artificial intelligence, and targeted marketing. However, organizations struggle to effectively capture the knowledge of their employees: ““When employees walk out the door, they take valuable organizational knowledge with them”” (Lesser

and Prusak as cited in Dalkir, 2011, p. 4). To enable organizations to effectively capture, use, and apply their knowledge, they need to adopt a knowledge management strategy.

Knowledge management (KM) is a difficult concept to define - there is no universal definition for this concept because it draws from multiple distinct fields (Dalkir, 2011). However you define it, KM revolves around the concepts of tacit and explicit knowledge. Dalkir (2011) distills the essence of these two types of knowledge: “Tacit knowledge is difficult to articulate and difficult to put into words, text, or drawings. Explicit knowledge represents content that has been captured in some tangible form, such as words, audio recordings, or images.” KM has been defined numerous times by numerous sources, but there are common concepts between them all. Perhaps the simplest definition comes from Patel and Harry, as cited in Dalkir (2011, p. 6): “Knowledge management is the concept under which information is turned into actionable knowledge and made available effortlessly in a usable form to the people who can apply it.” The common elements present between definitions include some form of knowledge capture, implied processes for refining knowledge, methods for storing knowledge, and distributing knowledge between members of an organization. This paper looks at the current KM strategy of the Warranty department at Eaton through these four processes of KM. Meyer and Zack (1996) as cited in Dalkir (2011, p. 35) determined the core stages found in a KM cycle are “acquisition, refinement, storage/retrieval, distribution, and presentation/use.” For the analysis of the department’s KM strategy, distribution and presentation/use were combined into a single category, named “sharing” to simplify the analysis.

Section 3: KM at Eaton

1.1 Current Knowledge Management (KM) Practice at Eaton

1.1.1 Acquisition

Within the Warranty department, there are few to no formal processes for acquiring or capturing knowledge; however, the department nonetheless has informal processes that happen to fall under the umbrella of knowledge acquisition. Any process that captures or elicits tacit knowledge or organizes and codifies explicit knowledge falls under knowledge acquisition (Dalkir, 2011, p. 98). Four informal processes were identified primarily within the Warranty Systems department: using a wiki to capture tacit and explicit knowledge, hiring employees to fill in a gap in the department’s skillset, learning through observing subject matter experts (SMEs), and reference guides. The Warranty Systems department created a knowledge wiki a year ago in response to the lack of documentation for every aspect of the department’s daily work. Knowledge needed to be passed from an analyst leaving the company to the newly hired analyst. Much of the knowledge used by these analysts came from months of working with the various systems, rather than training and documentation. The Systems Support department has since updated the wiki whenever knowledge is found to missing from any documented source. Microsoft OneNote is used to store the wiki, organizing knowledge first by system and then by topic. This is the sole process of its kind for all departments under Warranty.

Contractors are sometimes hired to fill in gaps in the department’s skillset. These contractors often work closely with management to solve problems and subsequently teach the

organization how to solve the same problems themselves. While more processes need to be in place to capture and codify the knowledge and information these contractors disseminate, a basic level of tacit knowledge is captured in the work produced. This approach also ties in with learning from subject matter experts. Often, knowledge is acquired through demonstration. Employees will ask SMEs to walk through how they solve a problem, asking clarification questions to distill to knowledge into a documentable form. Employees carry their knowledge with them, meaning when they leave, the knowledge does too. The Warranty department unintentionally performs this knowledge capturing process. To capture knowledge more effectively, the department needs to intentionally host these kinds of knowledge demonstrations.

Reference guides are often created in response to frequent problems encountered by users. They capture information understood by skilled users and codify it into actionable items for the less skilled. Typically, reference guides contain troubleshooting instructions. Troubleshooting is a concept that is difficult to codify due to the ever-changing nature of the systems used. The responsive nature of these documents helps show that knowledge on troubleshooting within the department is not well-documented and much of it resides in its employees. To help bridge the gap, employees have taken it upon themselves to capture this knowledge. These guides are the beginnings of effective knowledge management practices. Informal practices still allow for the organization to implement a basic level of knowledge management.

1.1.2 Refining

The refining of knowledge is an intermediary process interwoven between identifying a problem, finding a potential solution, and delivering a solution as a contribution to the organization's knowledge base (Chung, 2011). No formal processes were found within the Warranty department that meet these criteria. The form of refinement present is the refinement of information. Old instructional documents are sometimes updated when their content is deemed out of date, determined by the 'date of release' – that is, the date the document was released to users.

1.1.3 Storing

The first step in analyzing how the department stores their data was to first identify the key platforms used to store it. Any platform that contained information relevant to an employee's daily job was considered. Four platforms were identified that make up the department's knowledge management strategy: Microsoft Teams, Microsoft SharePoint, intranet sites, and external websites. Next, each of these platforms were analyzed to see how the department utilized them for storing knowledge.

Microsoft Teams is widely used within the Warranty department to collaborate on and store documents that are frequently updated and/or used by the team's members. Wiki pages and discussion boards store captured knowledge and are made accessible to other members of the team. The Warranty Systems Support department uses a combination of Teams and OneNote to host a wiki that is a collection of a year's worth of process information, system best practices, low-level system functionality, and contact information for SMEs. Since no strategy was

provided by upper management for capturing this type of knowledge, the department created their own knowledge management process for storing information.

SharePoint is the Warranty department's primary method of storing data. The version used is SharePoint Server 2010. This allows the department to store documents, files, and links to other websites. To be granted access to a SharePoint site, an employee must submit a request for site permissions. Typically, employees are granted read and write access to their department's SharePoint enable them to retrieve information and edit existing files. However, for employees outside the department, read-only access is granted unless editing privileges are specifically required for their position. Within the Warranty umbrella, there are other SharePoint sites related to specific business functions, such as forecasting. Each SharePoint site is managed by its own department/function, with no formal process to guide the structuring of the site. However, despite there being no process, each of the sites was formatted similarly – a collection of folders and subfolders to organize information. Most of the information stored was in the form of Word documents, PowerPoint presentations, and Excel spreadsheets. Documents date back as far as 2012, providing a source of legacy knowledge for the department. The information stored within the Warranty SharePoint sites is organized for data retrieval as opposed to data creation. Few employees upload new knowledge to these SharePoint sites – the most common action performed on the stored files is updating them with the most recent business knowledge. In addition to allowing users to store and access data, SharePoint also hosts documents for the various Microsoft Teams within the department, acting as the backend storage system. To summarize, SharePoint is used at a very basic level to store information, and few processes exist to codify the structure of SharePoint sites. Users must be trained on the specific locations for files relevant to everyday processes.

Websites are another form of knowledge storage, including Roadranger.com, eatoncummins.com, and the Warranty intranet site. Both Roadranger and Eaton Cummins host product and process information for customers. As customers rely on these sites for information, the information is typically up-to-date and easy to locate. Some employees reported that these customer-facing sites often are more accessible than the internal sites and knowledge bases. Intranet sites are organized by department and physical location, as opposed to the business function separation of the SharePoint sites. These intranet sites store links to SharePoint sites and related functional documents. One person is responsible for keeping the main Warranty intranet site up to date. Similarly, few people are tasked with keeping the intranet sites current and relevant. Many different warranty functions are covered by intranet sites, providing potential solutions for a wide variety of problems, and storing archived and legacy documents for reference.

Roadranger.com hosts a plethora of product and warranty information. This site hosts the most accessible copies of knowledge, including current warranty coverages, guidelines for submitting warranty claims, troubleshooting guides, and repair guidelines. Roadranger.com is often more accessible and up to date than internal sources of information. The whole site is searchable and indexed, making it easy for users to locate information. There is a dedicated Warranty page hosting useful tools for helping customers and accessing warranty information

that houses the information listed above. Each section of the site is organized in a similar fashion, although the format of information varies greatly from section to section.

1.1.4 Sharing

There are few defined processes for sharing knowledge between employees within the Warranty Department. Eaton University is an e-learning solution used to onboard employees and provide training to employees across the organization. Employees can enroll in courses and notify managers about their completion; managers can likewise assign courses to employees for them to complete. For the use of the CRM Siebel, customized and branded to users as C360 and the main tool used by Warranty employees for warranty claim management, instructional documents are hosted on SharePoint. On-the-job training is the main source of knowledge transfer between employees: “this is a large part of how our users become familiar with the system and their work, especially in the call center” (Hutchinson, 2020). Most of a warranty processor, systems analyst, or call center agent’s job is taught from real-world experience under the guidance of fellow employees. There is no formal process for this on-the-job training – employees are not given specific training for how to train others. Any employee within the same role could be tasked with training new hires, regardless of training ability. Further analysis of the effectiveness of the department’s training was undertaken to dive deeper into the department’s KM strategy found in Section 5.

Besides on-the-job training, Microsoft Teams is a key platform for inter-departmental knowledge sharing. Microsoft Teams is used by the Warranty Systems Support department to house documents that require frequent updates, documents that require collaboration between team members, and to capture tacit knowledge about the customized Siebel CRM, C360, the customer-facing warranty portal PRM, and other business-critical information. Teams is marketed as: “The hub for teamwork in Office 365... Invite everyone you work with to chat, meet, call, and collaborate all in one place, no matter where you are.” (Microsoft, 2020). While Teams has the ability to host meetings, chats, and calls, the Warranty department primarily uses teams as a means of sharing knowledge with team members. The collaboration ability of Teams makes sharing information quicker, since multiple people can read and edit files and information in real-time, but the most effective usage of teams is the ability to implement different page types, including a basic wiki page. The wiki functionality allowed the Warranty Systems department to collect tacit knowledge all in one place and share it within the team easily. The limitations of the wiki page on Teams drove the migration of the wiki to OneNote, because of the integration with Teams and the newfound ability to search the wiki for information, a feature not available on the Teams’ built-in wiki.

1.2 Challenges and Problems in the current KM Practice

1.2.1 Acquisition

As seen with each of the other aspects of knowledge management, there’s a lack of formal processes established by the Warranty department and Eaton, including those for acquiring and capturing knowledge. This is evidenced by a lack of knowledge continuity within the department. Transferring knowledge between an employee and their successor is a big part of knowledge continuity, one that does not happen effectively within the department. Employees

need to have an understanding about their knowledge and the knowledge of others, and why this knowledge is important (Dalkir, 2011, p. 133). Without processes to capture the knowledge of senior employees, the organization is losing tremendous amounts of organizational knowledge when they decide to leave the company. The Warranty department struggles to effectively capture the most valuable form of knowledge – tacit knowledge. At present, most of the knowledge of hired talent leaves with them, leaving the company in the same position it was before. In the same vein, knowledge shared by SMEs is transferred directly to employees under the current strategy. Without synthesizing the knowledge into organizational memory, the knowledge remains uncaptured.

1.2.2 Refining

The current KM strategy for refining knowledge relies on two assumptions: a user notices that information out of date, and the user has the knowledge to either correct the information or notify someone who does. This approach is unstructured and ineffective. Due to the current state of knowledge storage, refining knowledge would be difficult even with processes in place due to the distributed nature of files, as explained in detail below. Multiple copies of documents are hosted within the various storage platforms – if a document is updated, there are possibly many other versions of the document that are now outdated. Since the Warranty department struggles to define a process for refining knowledge, there is no way to ensure all copies of the document are updated, potentially causing employees to use outdated information without knowing.

1.2.3 Storing

In addition to the main methods of data storage mentioned above, there are countless other areas within the department where knowledge is stored. One major problem of the current knowledge storing strategy is that it has siloed data due to the independent storing of documents and lack of a centralized data storage strategy. Data silos are a newer concept within the world of data management, describing the “collection of data held by one group that is not easily or fully accessible by other groups” (McDaniel, 2019). Silos can potentially create many different versions of a single document, leading to inconsistencies across the department. They prevent relevant knowledge from being shared, hiding the true picture. As a result of siloed data both within Warranty department and the organization, there often is not a single source of truth (SSoT) or single version of the truth (SVoT). SSoT is “the practice of aggregating the data from many systems within an organization to a single location” to promote consistency, standardization, and relevancy of information (MuleSoft, 2020).

The knowledge management strategy of the Warranty department does not include a single source of truth. This has led to much confusion within the department and created inefficient workflows, costing the company valuable time and money. Similarly, there often is no single version of the truth among key documents. Many versions of a given document can exist at any time, and due to the data silos within the department, there is no way to tell how many versions exist or ensure every employee is using the same version. The analysis revealed that there were numerous instances of files hosted on SharePoint that were out of date compared to files hosted on Microsoft Teams, Roadranger.com, and the warranty intranet sites. Problems that can arise from data silos include “lack of shared insight... wasted time, money, and effort...”

[and] no single version of the truth” (Parker, 2019). Indeed, each of the problems is present within the Warranty department’s current knowledge management strategy. Some steps that could be taken to resolve these problems are combining platforms under a single software or centralized solution and centralizing data into a single source (Parker, 2019).

The Warranty department also struggles with the accessibility of information. Roadranger.com is often the most accessible source of knowledge for warranty products and procedures, for both customers and employees alike. This is an issue because internal knowledge storage should be just as accessible as customer-facing information. The fact that some critical documents can be located quicker and easier on a customer-facing site shows that the internal knowledge management strategy is unable to meet the needs of its users. Furthermore, siloed data implies that users must access many different systems to find relevant information, and that is indeed the case within the Warranty department. While four main categories of data storage were identified, there are numerous different sites and applications used for specific purposes with their own subset of relevant information. Since there is no process for identifying redundant information, the sites that have the most readily accessible information are more frequently used, even if the information is out of date. Sites like the Warranty SharePoint and Warranty Intranet host many files and links but navigating them is not intuitive. New employees must be trained on what information each of the links lead to. Site maintenance is rarely performed, primarily because one employee is responsible for all Warranty intranet content. However, this same employee is also a manager and has many other responsibilities already. Knowledge within the department has limited accessibility due to data silos, lack of processes, and lack of man hours.

Dalkir (2011, p. 11) illustrates one of the common misconceptions about KM – that KM is primarily about making information tangible and then storing it all in one place. Organizations that approach KM in this fashion are stumped when they discover employees are not utilizing this newly created knowledge repository. The Warranty SharePoint and Intranet site both exemplify this “build it, and they will come” strategy, as Dalkir (2011) puts it. Simply storing information and knowledge is not KM. According to Dalkir (2011, p.11),

Knowledge management is broader and includes leveraging the value of the organizational knowledge and know-how that accumulates over time. This approach is a much more holistic and user-centered approach that begins not with an audit of existing documents but with a needs analysis to better understand how improved knowledge sharing may benefit specific individuals, groups, and the organization as a whole.

Currently, SharePoint and the intranet are not being used as an effective storage for knowledge management. These platforms simply store *information*; they contain no context for how to use the information stored there. Again, this showcases more downsides to having siloed information. The organization can’t begin to create an effective knowledge storage system without centralizing information first. From there, the organization can assess its needs and determine how to best store and organize knowledge to best serve employees.

After analyzing the main platforms of data storage – Microsoft Teams, SharePoint sites, external sites, and intranet sites – the findings suggest that the current knowledge management

practices of the department enable data silos, lack consistency about data storage procedures, and as a result, information is difficult to locate and access. For an effective knowledge management strategy, “critical knowledge must be stored in a location and format which can be easily found and accessed by users” (Morrissey, 2005). Per the analysis, the current knowledge management practices of the Warranty department do not meet these standards. Knowledge is siloed between platforms with few to no policies or guidelines to facilitate sharing knowledge between them. Existing employees with knowledge of the distinct platforms of data storage must direct newer employees to them and explain the usefulness of the information present. The organization has a clear need for an improved knowledge management strategy that includes policies for updating, adding, organizing, and making knowledge accessible.

1.2.4 Sharing

The main process for sharing knowledge is through on-the-job training. Normally, this is an effective method for having experienced employees share their understanding of the work environment to quickly get new employees up to speed. However, as mentioned above in the current practices for sharing knowledge, there are no employees designated or trained to train employees. The quality of training an employee receives is directly related to who and how their mentor trains them. While there is a help site dedicated to training documentation for the CRM C360 (a modified version of Oracle’s Siebel CRM), the biggest issue with the instructional documents hosted there is the assumption that that the system is working as intended. The instructions are not updated with current system issues and workarounds, which are common in the production environment. Many errors that are generated during the claim creation process can be fixed by the user without resorting to admin intervention, but the instructions instead direct users to contact admins whenever the system does not work per the provided instructions. Troubleshooting is a valuable and necessary skill for efficiently using C360, but little to no documented knowledge teaches users how to troubleshoot effectively. Relying on existing employees to share troubleshooting knowledge is a great weakness of the department, because system knowledge leaves the company when employees leave. Another issue is accessibility; the only way to get to the help page is by clicking on a small question mark icon when inside C360, located at the top of the screen. Most often, employees are not trained with this documentation. Whether through on-the-job training or documented guides, employees seldom pick up on how to troubleshoot in the system.

Section 4: Methodology

The scope of the analysis was within the Warranty department of Eaton’s Vehicle group, focused on the customized Siebel CRM, Customer 360 (C360) and the systems supporting knowledge management. The researcher is an employee of the Warranty System Support department as of the time of this paper. Observation based on the researcher’s work experience and communication with department members was the main method of collecting information. Supporting systems included SharePoint, Microsoft Teams, and both internal and external websites. While these platforms impact other departments within Warranty, the primary department surveyed was the Warranty Systems Support group due to their proficiency with

information technology, business understanding, and system knowledge. Other stakeholders include the Roadranger Call Center, Warranty Return Center, and warranty claim processors. Key personnel for this analysis include the manager of the Warranty Systems Support department, who provided much of the business perspective and aided in the analysis of the different knowledge management platforms.

Section 5: Analysis

5.1 Finding the root cause

The analysis began by trying to answer why information within the Warranty department was difficult to access, locate, and maintain. Employees often reported issues trying to locate information throughout the various systems used daily. With a complicated network of systems and areas of storage, there's no simple answer to this question. Root cause analysis is best suited for complicated problems like these. "Root cause analysis (RCA) is a systematic process for identifying 'root causes' of problems or events and an approach for responding to them. RCA is based on the basic idea that effective management requires more than merely "putting out fires" for problems that develop, but finding a way to prevent them." (Washington State Department of Enterprise Services, n.d.). Many initiatives within the Warranty department are simply 'putting out fires,' reacting to a symptom but never fixing the cause. The method used to determine the root cause was a combination of the Fishbone diagram and 5 why's method. Both are popular RCA methods. For the analysis, symptoms observed by employees were recorded over a two-month period. Working with the manager of the Warranty Systems Support department, symptoms were categorized into three main categories: The Business, The System, and The Users. Once symptoms were organized into the Fishbone diagram, the analysis then proceeded to follow the 5 Why's methodology for each symptom, continuing to ask "why?" until agreement between the researcher and manager was made about the root cause. Figure 1 below show this hybrid Fishbone/5Why's chart.

The findings of this analysis show that under both *The Users* and *The System*, the lack of a centralized data repository is a root cause for the difficulty in accessing, locating, and maintaining information. Symptoms of this cause include siloed data, distributed data, and usage of outdated or incorrect information. These results indicated that there was a lack of processes for managing the department's knowledge and information. This led to the study of Knowledge Management, which deals with the processes an organization has for effectively utilizing its organizational knowledge.

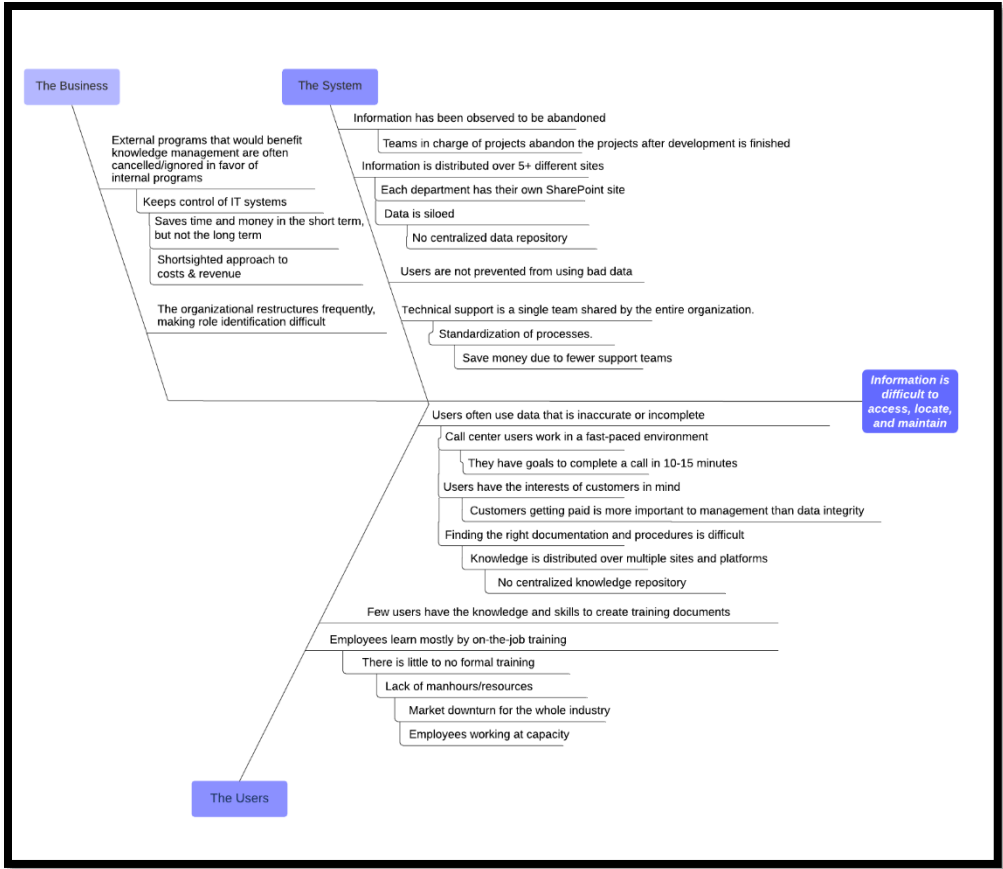


Figure 1- Hybrid fishbone/5 Whys methodology

5.2 Sharing knowledge – a deep dive into training

Effectively sharing organizational knowledge with employees is key to a successful KM strategy. Employees need to be trained in their positions, and organizations have many options available to them for training employees. To understand the efficacy of training for the Warranty department, the manager of the Warranty Systems Support department was asked to review 12 critical success factors (CSF) for ERP training and provide his input on both the perceived relevance to the department and the current level of competency the department exhibits relating to that success factor. While the main system used by employees is CRM software, training employees on any form of software relies on traditional training techniques and ideas. The manager was aware these CSFs were, in part, related to ERP training, yet still found them to be valuable measures of the department’s current training processes and procedures. **Table 1** contains 12 critical success factors, their definitions, and the manager’s comments. CSFs highlighted in yellow are thought to be of utmost importance, and CSFs highlighted in grey were not determined to be very relevant to the department.

Table 1: Training CSFs and Manager Comments			
#	Critical Success Factor	Definition	Manager’s comments
1	Personnel skills and competencies	in order to deliver proper training, the company’s roles must be defined, and training must be	This is an important one for our group because most users have very different roles and

	(Dorobat & Nastase, 2012)	delivered at individual levels of competence required. In an organization ERP training must be delivered for several groups: the managerial personnel, key-users, end-users and the trainers.	responsibilities in our Warranty System. Just because a user can complete a 'warranty' claim does not mean they know how to properly process a 'policy' claim. Also overtraining is not useful as users can become overwhelmed so role identification is very high on our list.
2	The user's training commitment. (Dorobat & Nastase, 2012)	Trainees need to feel that the training course is relevant to their jobs. Therefore, is important at the beginning of the ERP training program to explain to users what the objectives and benefits of training are.	This is another very important one and I think this is an area we could show some improvement in. Relevancy to not only your personal role but also how your actions affect other people in the organization can drive behavior and make training more meaningful. For examples if someone knows creating a bad account by not checking all fields could affect a customer payment for a sales deal, they will be more likely to pay attention than if they think they are only affecting themselves.
3	Contingency plan for refresher courses (Esteves, 2014)	There is often a need to develop some refresher courses. Regular refresher training should be provided to the end-users for lesser-used features.	This one is something that we do not utilize. It could be useful but we don't always get the chance for first round training, let alone re-training.
4	Create mechanisms of training evaluation (Esteves, 2014)	The main reasons for training evaluation are to justify training costs, to improve the design of training, to facilitate the selection of training methods, to measure training program results, to assess the quality of the training program and its impact in the business	This is again something we should utilize but to do not. My hope is to get to a point where our training is online (Eaton University) and we can not only track the training but show how user needs/mistakes go down after it is completed.
5	Create a continuous training program (Esteves, 2014)	It is important to design a training plan after the go live. It is recommended to manage employee turnover, hiring of new employees, system changes and to deliver training tailored to advanced usage of the new system. Not all the end-users are trained during the ERP implementation project	This is something that would be good for us but, to the point here we mostly do consider the biggest portion of the training to be when the system is deployed. Training new users happens in more of a 'legacy' way where more experienced users will show the new users the ropes, but its not really a system or plan. This I would like to see change.
6	Training manuals both online and within the ERP system (Esteves, 2014)	An important aspect of training is well-designed learning materials in the form of training manuals. Users should be able to easily find reference material and understand it.	We have tried several ways to do this in the past, and not until recently have we ever been very successful at it. The problem is that development happens so fast and close to user deployment there is rarely enough time to develop the material in time. Often after that initial push and training we 'move past' into operations hoping to circle back later and do the training material, a bad practice and often it doesn't happen. If there were more time between the end of the development and the beginning of deployment for this material creation, I think it would help the success of deployment and launch greatly.
7	Training content focused on the user's short-term needs (Esteves, 2014)	Initial training should be at a basic level – to start working with the system. Then, after some time users will learn more advanced topics since they already manage the system.	We do not practice this one in any formal capacity. In general, it's good to start off with basic system navigation, but we typically do that right along with the full job training. This approach could be better, but since training time is limited it's not really feasible.
8	Training content is accurate, relevant, and current (FIND CITATION)	Training documentation must be updated frequently to account for bug fixes and major system updates. Accurate and relevant information ensures that the employee learns the proper skills and is not overwhelmed by extraneous information.	This is one that I would say is of the utmost importance, however we are not good at this one. The system changes quite regularly and our training documents struggle to keep up. This ends up in documentation that could take users

			down dead ends or train them to use old processes.
9	Involve users in design of the training course (Esteves, 2014)	The involvement of employees (both end-users and key-users) in the training design process ‘increases their satisfaction with the training course because they feel that they are getting the adequate training and skills that would be beneficial to them in their current service and role’.	I can see how this could be useful, but you would need to engage a very skilled set of users who are at least somewhat familiar with how software and databases work. Otherwise you could get into a situation where the users are asking for things that either aren’t reasonable, or aren’t useful. I think this one is something that sounds good in theory, but could end up being counter productive in practice.
10	The learning programs must be a blend: (Flynn, 2014)	The learning programs need to focus on the development of the priority skills, competencies and capabilities addressing the learning around the application of the above in the new strategy or environment. The learning programs must answer the questions, “what do I need to do my job?” and “what’s in it for me?” In addition, the learning programs need to be embedded with the key communication points on the vision and platform to bring it all together as noted later. (Flynn, 2014)	I would agree with this one. Its very similar to point number 2 in my opinion because it basically says they need to understand WHY they are doing tasks not just what tasks to do. I also feel like some of the more relevant information (latest code changes, important job based announcements, etc.) should be worked into the training so it not JUST system training.
11	Trainers with experience (Esteves, 2014)	In order to train effectively, an ERP trainer should have the ability to understand the current business environment and pro-actively motivate employees to use the new system by demonstrating the software application comfortably.	This one is of the utmost importance. The users must feel that the person training them is not only versed in the system but also in the operations of their department. This ensures that examples are relevant and useful. Nothing worse than seeing very simple examples in training that are not realistic once you go live on your own. This is something I think we do very well in that we understand the needs of our users and their function, and make training relevant to that.
12	Informal training (Esteves, 2014)	Informal training occurs in many organizations as a normal part of day-to-day work. In the ERP context, ‘employees learn about the ERP system by watching other employees use it’. Employees share their experience, either while working or during breaks.	With our system this is a large part of how our users become familiar with the system and their work, especially in the call center. The call center sees such a wide range of work requirement that training a user for EVERY scenario just isn’t realistic. That’s why they work very closely with each other and depend on our more seasoned users to fill in the gaps when a new issue comes up. This will be a lot harder to do if we continue to need remote working, however IM and video conferencing can help bridge that gap.

Table 2: Relevancy of training CSFs												
Critical Success Factor	1	2	3	4	5	6	7	8	9	10	11	12
Areas of improvement	X	X	X	X	X	X		X				
Areas of competency										X	X	X
Irrelevant							X		X			

Users' training commitment, the presence of accurate, relevant, and current training information, and experienced trainers were identified to be the most important success factors to the business. Trainees' commitment to training was found to be important because employees often lack understanding of how their input affects the rest of the organization. Training opportunities are limited, making it difficult to incorporate a comprehensive organizational view. With an increased focus on the users' commitment to training, less problems will arise: "...if someone knows creating a bad account by not checking all fields could affect a customer payment for a sales deal, they will be more likely to pay attention" (Hutchinson, 2020). Similarly, ensuring the quality and accuracy of training material will contribute to employee efficacy. The manager states that the quick pace of system development causes the department to struggle to maintain content relevancy and accuracy. With the understanding that this factor is key to training success, the department now has a lot of room for growth. To sustain this growth, continued effort should be put into developing trainers with system experience. The business has identified this as one of their strengths, in terms of "[understanding] the needs of our users and their function, and make training relevant to that" (Hutchinson, 2020). Out of the success factors deemed most relevant to the department, two of them are areas of improvement and the other is an existing area of competency, suggesting that there is room for growth.

Involving users in the design of training courses (9) and training content focused on employee's short-term needs (7) were the two success factors determined not to be relevant to the Warranty department. To involve users in the design of training, the manager mentioned that you have to pick a "very skilled set of users" to provide input – otherwise, users may end up asking for solutions that are ineffective or otherwise irrelevant. While this could potentially be useful for the company to implement, there's a high risk that this initiative will be create more problems than it will solve (Hutchinson, 2020). In terms of focusing on employees short-term training needs, this strategy is not currently employed by the business because basics are taught to employees as they are trained in their job function. Navigating the system is effective at teaching employees the basics. While the possibility the short-term approach is better was recognized, the limited time available to training employees means this approach is not feasible to implement at this time (Hutchinson, 2020).

Section 6: Discussion and Recommended Solutions

6.1 Discussion

The results of the analysis show that the Warranty department has few formal processes for each of the four aspects of knowledge management. At the heart of the issue is siloed data, which feeds into the problems discovered with acquiring, refining, and sharing information. In an organization as large as Eaton, it is all too easy to unintentionally create data silos. The analysis suggests that organizations facing issues with data silos should seek solutions that allow for a single version of the truth for documents and store knowledge in a central knowledge repository. Multinational organizations should seek to unify its applications under a single system to enable effective knowledge management practices.

The Warranty department lacks a clear knowledge management strategy. To remedy this, the department should perform a technique called concept analysis to define what knowledge management should mean to the department. Dalkir (2011, p. 14) states that every organization should create their own definition knowledge management, and strongly suggests using concept analysis to help define it. Concept analysis revolves around “obtaining consensus around three major dimensions of a given concept.” (Dalkir, 2011). These three dimensions, as defined by Dalkir (2011) are:

1. A list of key attributes that must be present in the definition, vision, or mission statement
2. A list of illustrative examples
3. A list of illustrative nonexamples

Participants can take turns providing both an example and nonexample, then discussing them as a group to determine what qualities of KM are present in the example and that the organization believes should be part of the definition. Five to nine attributes is a good number to stick to. Once all participants agree on the attributes, they can be summarized in a KM concept formula (Dalkir, 2011). An example could be “In our organization, knowledge management must include the following: both tacit and explicit knowledge; a framework to measure the value of knowledge assets; a process for managing knowledge assets . . .” With this organizational (or departmental) formula, the Warranty department can seek out KM solutions that adhere to these agreed on attributes.

6.2 Recommended Solutions

Microsoft Office products are heavily used by the Warranty department, including SharePoint and Teams. These two platforms store documents, knowledge, and can be utilized for collaboration. Word, Excel, and Outlook are used daily for various tasks. Employees use many more applications as well – solutions to improve knowledge management should be able to integrate with existing applications as to avoid introducing another disparate application for employees to learn. To eliminate data silos, integrate with existing Microsoft Office applications, improve knowledge acquisition efforts, and enable effective knowledge refinement efforts, Dynamics 365 Customer Service Hub package should be purchased and integrated with the Warranty department. All 4 areas of knowledge management (acquisition, refining, storage, and sharing) are included in Dynamics 365.

The Knowledge Articles module is a critical component for improving the Warranty department’s knowledge management. This functionality can aid in capturing knowledge – employees can create knowledge articles via a rich text editor. Articles can even be created in HTML, allowing great depth in customization. Once articles are created, they are sent for review. This is a key process that’s currently missing from the Warranty department’s current strategy. Knowledge employees can be designated as reviewers, ensuring that only quality content is allowed in the knowledge repository. If an employee or reviewer notices an article is out of date, they can mark it for review. Importantly, keywords can be associated with knowledge articles. As discussed in the paper, information needs to be easily accessible. Keywords allow knowledge to be indexed, so that even if they cannot search for the exact title of the article, they can find it via index. Since these knowledge articles are stored in a central location, they can easily be shared to anyone in the organization. This feature alone would improve each aspect of knowledge management.

In addition, Dynamics365 has support for Microsoft product integration. Importantly, Dynamics365 can use SharePoint Server 2010 as the backend for data storage, like how Microsoft Teams functions. The Warranty department could use and improve upon the existing platform it uses for document storage. By integrating with Dynamics, information formerly siloed in individual SharePoint sites can be connected. Knowledge articles can link to files hosted on SharePoint – this could allow the department to have a single version of truth for important documents and knowledge.

There are many areas identified in which the Warranty department can improve their training. Identification of employee roles, accurate training, and skilled trainers are the biggest areas of opportunity for the department. The proposed solution to foster this improvement and change is a training schedule. The manufacturing side of Eaton currently uses a training schedule for its employees, meaning there is existing knowledge and support for how to implement this tool. Below is a screenshot showcasing the structure of the existing training schedule.

Name of Training Session	Target Audience	Frequency	Schedule				Effectiveness Measure	Owner / Evaluator	Required or recommended learning approach
			Q1	Q2	Q3	Q4			

Figure 2 - Screenshot of the training schedule template used by the manufacturing side of the organization. Used with permission.

This structure meshes well with the critical success factors identified in the analysis. First, training material is identified, and its target audience is defined. Taking the time to identify what knowledge employees need will show the department why a given training session is relevant to a given employee, meeting success factor 2. While simple, the target audience field requires that the department first sits down and thinks about the various distinct roles within the department. Once this is done, each training session can be matched to the various roles identified. The Frequency and Schedule fields determine how frequently training should be administered and during which quarter training should be held. This covers success factors 1 and 5 – identifying required skills and competencies and planning a continuous training program. Additionally, success factor 3 – plans for contingency training – can be covered by this framework as well. If training needs to be administered semi-annually, the department can track when training should be administered. Effectiveness measures can also be determined to monitor the quality of training provided. Tracking the owner/evaluator of the training enables the department to monitor the progress of training for a given departmental role. Finally, the learning approach field can be used to differentiate the style of training offered. For example, EHS training could be administered online but System Troubleshooting administered in person. This enables the department to meet success factor 10, providing a blend of training. With this bird’s eye approach, the training strategy for the department can be reviewed for content accuracy and relevancy, meeting success factor 8, and enables the department to identify skilled trainers, meeting success factor 11. However, the training schedule itself does not store records of when training is completed; the schedule provides an overview and plan for the department to follow. Some form of storage is needed to track the completion of each course. One possible solution is

to use the existing e-learning solution, Eaton University. Eaton University already has capabilities available to managers to assign courses and view completed courses. Combining a training schedule with a source of data collection would enable the Warranty department to significantly improve their training strategy. Table 3 summarizes how the propose training schedule aligns with the CSFs defined above

Table 3: Alignment of the proposed Training Schedule to training CSFs

Critical Success Factor	1	2	3	4	5	6	7	8	9	10	11	12
Training Schedule	X	X	X	X	X			X		X	X	

Section 7: Conclusion

This analysis was performed to determine the effectiveness of Eaton’s Warranty Department’s current knowledge management systems by key knowledge management processes and evaluating the department based off them. The initial analysis process had to be adjusted halfway through due to the impact of COVID-19. Meeting with team members proved difficult and all workflows had to be adjusted accordingly. This analysis primarily reflects the structure and processes implemented by the Warranty department before the stay-at-home mandate was issued in the state of Michigan. The analysis shows that the current knowledge management strategy is lacking in each of the four aspects of knowledge management, suggested by an overall lack of formal processes. Siloed data was determined to be the cause for much of the Warranty department’s struggles with knowledge management. Any organization that sees large amount of siloed data should look to implementing knowledge management practices, starting with an organizational definition of knowledge management. Unifying applications under a single platform as much as possible is pivotal. Organizations may find the use of a training schedule beneficial to the sharing of knowledge within the organization. The Warranty department’s knowledge management strategy may benefit from the implementation of Dynamics365 and a training schedule by reducing data silos, enabling effective knowledge acquisition and refinement, promoting knowledge sharing, and improving training management.

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