LAPIN AMK

Lapland University of Applied Sciences

FACILITATING AND ENCOURAGING INTERNAL KNOWLEDGE SHARING

CASE: MANSYSTEMS

Nguyen Tuong Vi

Bachelor's Thesis

School of Business and Culture

Degree Programme Business Information Technology

Bachelor of Business Administration

2019

School of Business and Culture
Degree Programme Business Information Technology
Bachelor of Business Administration

This thesis focused on investigating the significance and purpose of knowledge sharing in SMEs, the common challenges they have to confront and the roles of an ICT application in knowledge sharing of companies, especially SMEs. Based on these findings, the purpose was to give possible ICT suggestions for the case company.

In the thesis, five research questions were answered using mixed methodology based on practical problems and the theory connected with them. To expand a deeper conception of the possible methods or the approaches to motivate employees to share their knowledge and facilitate the internal knowledge sharing in SMEs in real-time life, the constructive research methodology was applied in this thesis. In detail, the combination of theories, hypothesis and testing were implemented in the real case company to find the feasible ICT solutions for their effective knowledge sharing processes.

The thesis proved the importance of knowledge sharing in business growth and existence of every company, especially SMEs. In the meantime, they still have to confront challenges. Besides, ICT solutions have a vital influence on their knowledge sharing processes. However, it is a facilitator which cannot replace completely other significant factors such as human, leadership, learning and organization.

CONTENTS

FIGURES AND TABLES

1   INTRODUCTION

1.1   The Connection Between High Technology and Knowledge Sharing

In our digital era, digitalization and the cutting-edge technological base have ecome crucial parts in the daily life, especially in businesses. Digital innovation and advanced technology have become a vast momentum for other areas as a long term investment (Thorpe 2019).

In fact, according to a recent statistic, the world is estimated to spend almost $2 trillion in 2020 on the technologies and services which can enable our digital transformation. Moreover, companies can consume up to 10% of their revenue to conduct their digital strategies. Besides, in 2019, hardware and services are planned to account for over 75% of the total of expenditures on digital investments (Thorpe 2019).

In addition to advantages from the digital transformation, more challenges can be triggered due to the considerable amount of complicated knowledge, which require businesses to set up fruitful knowledge sharing management. Knowledge sharing (KS) is an activity where people can exchange their knowledge such as information, data, skills, and expertise with their friends, families, communities or organizations (Bukowitz & Williams 1999).

The latest research from *Basex* which is a New York analyst firm has shown that the information overload can cost the American companies $900 billion each year due to a decrease in employee productivity and innovation speed. (Potapovas 2017). Information overload was defined as a status happening when the amount of input to a system goes beyond its processing capacity. As a result, it can lead to a decrease in business decision quality (Gross 1964).

The more information you have, the more effort the KS and knowledge delivery in companies require. As Promineo (2017) stated in their whitepaper,

knowledge delivery is regarded as an activity where employees supply the knowledge required by a project or process to reach the completion. Meanwhile, the knowledge management (KM), which is a process including capturing, creating, sharing, utilizing knowledge in organizations effectively and systematically to achieve high productivity, intensive competitiveness, and spur innovation, is playing a primary role in their future innovative growth (Uriarte 2008). Above all, KM can determine their survival towards disruptive innovation.

In fact, KS which belongs to vital steps in KM can help all companies to improve their employees' competencies as well as expand their bonding. It contributes to a positive company culture formation, which can create a variety of experts or the involved workforce. In other words, investment in productive KS processes is a good approach to avoid the loss of knowledge during the tasks in business (Kunsman 2018).

In 2014, an industrial forecast report of Oxford Economics estimated that companies can spend more than £30,000 to replace a member of staff, resulting from the loss of productivity in the 28 weeks. A new recruit can cost them a substantial amount of budget to retrain, which also can cause high attrition rates. Instead, a greater initial focus on KS and mentorship in the company culture can at least lower their effort for this training period (Growth Engineering 2016). Knowledge has become a fortune of any enterprise, which is considered as a significant factor for productivity improvement. In 1993, Drucker noted in his report that "Knowledge today must prove itself in action." In fact, no organization can survive for the long term without continuous reflection, correction, and iteration. If a company fall behind in KS, they face challenges in maintaining their productivity, not to mention constant innovation (Janus 2016).

In fact, KS which belongs to vital steps in KM can help all companies to improve their employees' competencies as well as expand their bonding. It contributes to a positive company culture formation, which can create a variety of experts or

the involved workforce. In other words, this is a good method to avoid the loss of knowledge during the tasks in business (Kunsman 2018).

However, at the moment, it is not uncommon that companies have problems with their KM, especially KS. In KM, companies need to pay attention to find suitable solutions to prevent knowledge loss and waste. Knowledge loss (KL) is a failure to obtain organizational knowledge while knowledge waste (KW) is non-fulfillment in transferring theories to empirical experiences and use them in suitable cases (Spacey 2016). These negative factors can lead to serious business damage. (Bukowitz and Williams 1999). In a Workplace Knowledge and Productivity report (Panopto 2018), larger US businesses have a loss of around $47 million in productivity per year due to inefficient KS. Besides, this report has pointed out that employees need to spend an average of 5.3 hours to either wait for crucial information from their colleagues or recreate existing knowledge. This issue causes not only constant frustration but also a waste of time and chances (Panopto 2018). Plus, this report calculates that effective KS can save smaller enterprises about $2 million in work productivity while larger businesses might save approximately $200 million (Robinson 2018).

In the modern days of the business environment, enterprises need to understand the way to work towards open KS, avoid knowledge loss and waste, which is necessary for all companies.

To retain an effective KM strategy, technology is an inevitable element in a collection of processes to govern the creation, dissemination, and usage of knowledge to achieve organizational objectives (Dr. Gilbert E. Jones III 2017). In the reports of Nonaka and Takeuchi in 1995, Prusak and Davenport in 1997 and Dixon in 2000, they debated that technology is a means of explicit knowledge transfer in the internal companies. Moreover, Dixon (2000) pointed out that advanced technology application can facilitate national and international knowledge integration. Technology can support enterprises obtain their targets in KM, which many current businesses have not realized.

That explains the motivation for this research which is commissioned by the case company "Mansystems" as well as the reality in the problem of knowledge loss and waste in every SMEs. As a result, it gives SMEs a better understanding of the importance of KM, particularly KS and recommendations for their issues based on the case company. To achieve the expected outcome of the thesis, it focuses on identifying the current states, problems and the requirements of effective KS in SMEs across the globe, especially the case company.

Moreover, this thesis aims to consolidate and enhance the process of KS in the case company thanks to the help of digital transformation and supporting systems; as well as give possible technological solutions for other SMEs who have the same troubles in knowledge delivery.

In addition, four recommendations are presented below for the case company and used as references for other enterprises. They are carefully chosen with high applicability and validation in real business life after the whole process of research, surveys, analysis, and piloting.

1.2   Business Case

This thesis was commissioned by the case company "Mansystems", and based mainly on related research from paper sources and essential information from the case company to solve their business problem in KS at the moment.

The case company, Mansystems, has four offices in Germany and the Netherlands. It is an IT company, providing services for Mendix Platform and SAP. In specific, they offer services such as consultancy, sales, technical supports, experts services, and academy.

They are a good partner of the Mendix platform for a long time. Mendix is a low-code platform with tools which support the collaboration between business and IT when building an application in a short time.

In the company, they have mainly Dutch and German employees. This thesis was focused more on the Dutch offices. At the moment, they have challenges in sharing knowledge among employees in the company. They have several struggles with saving documents and sharing their knowledge related to projects and practical experience with others in the company. Their basic method to update their knowledge is in the sprint reviews with their team leads. Besides, they share their knowledge in small talks in their free time or when someone asks them for help.

As a result, whenever they have some problems with their projects, they do not know who they can contact to gain that knowledge or who can help them at that time, especially new employees. Besides, knowledge delivery in the internal company needs more improvements to improve their productivity and employees' personal development.

In detail, in the company, they have three portals for planning and project management, which are not integrated effectively. Moreover, they are usually operating workshops and meetups for employees, which is one of their main

methods for gaining knowledge. The other way is self-learning online courses with financial support from the company. However, they do not have any real effective solutions to connect all employees in sharing knowledge until now. All of these methods are based on their preferences without any compulsory rules.

Therefore, they are still looking for the most motivating, effective and efficient methods for knowledge spread. In the meantime, their KS process is restricted by their limited time. Most of the time, the employees share their knowledge through small talks or in their project reviews.

In general, the case company does not have enough efficient systems and methods to integrate their KS process in their daily working life, and to boost the employees to share their knowledge frequently.

2 RESEARCH QUESTIONS AND METHODOLOGY

2.1 Research Questions

The main purpose of this study is to develop an understanding of the possible methods to encourage and share their specialized knowledge in SMEs; as well as how they could easily apply them into a real environment, based on proposals for the case company.

To achieve the expected results on this thesis work, in particular, this thesis examines five main research questions:

1. What are the purposes and importance of efficient KS methods in enterprises, especially SMEs?
2. What common challenges do small and medium companies have in knowledge delivery?
3. What are the roles of ICT on KS and possible ICT KS solutions SMEs?
4. What is Mansystems' current state in KS?
5. What are suitable solutions for Mansystems to share their knowledge?

These questions are answered the later parts of this report. To get reasonable answers to them, some research needed to be conducted.

The first question in this thesis asked why enterprises need an effective KS system based on their current situations. The negative effect of knowledge loss at the moment which happened frequently in SMEs would be presented. In other words, it focused on pointing out the purposes and significance of the KS. Secondly, according to the benefits and importance of KS in companies, the thesis addressed common challenges they have to confront when implementing KS processes. Thirdly, it intended to search for effective methods to boost and encourage employees to share knowledge. One of the most important factors in this question was that the methods to motivate employees needed to be combined with their company culture. In addition, digitalization and technological base are playing a significant role in business, which helps to

facilitate knowledge delivery and storage. Fourthly, taking the case company as an example, the thesis needed to pay attention to discover their current KS process and company culture. Every company has its own environment and culture. It was the reason why the employees' motivation to share their knowledge differs from others. This step was to take in-depth comprehension of their situation and real requirements in knowledge spread. Finally, as a result, this study systematically reviews the data to advise an efficient and effective application, platform or tools aiming to provide the case company KS approaches in a cutting-edge way that is suitable for those tech-savvy in the enterprises.

2.2 Methodology

The topic is based on the analysis of the case company's current state and other SMEs through other research papers, which focuses on how to deal with employees' habits at work, how to encourage them to share their knowledge in harmonization with the company culture. Therefore, the thesis work needs to approach human behaviors.

Moreover, the outputs of thesis work are mainly the answers for those question what, how and why. As a result, qualitative research methods for the thesis work is chosen in the process.

In specific, to prepare for the efficient output, constructive research was chosen for it. Likewise, the methodological approach taken in this study is a mixed methodology based on practical problems and theory connection.
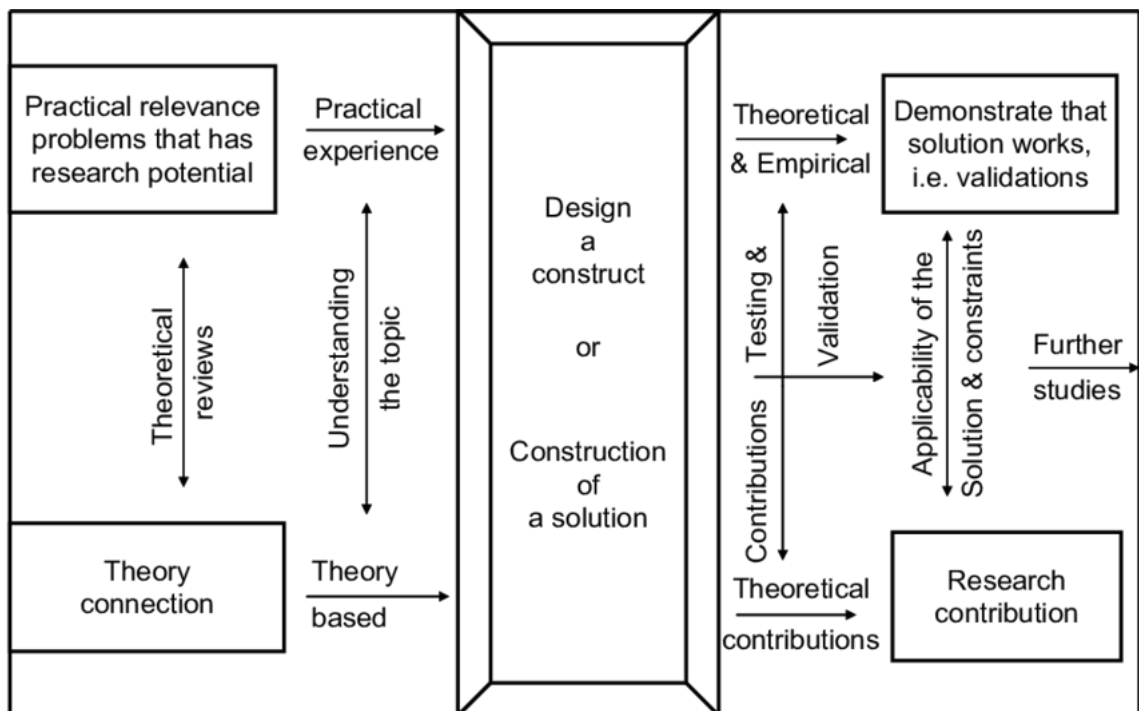
Figure 1. Mechanisms of a Constructive Research Method (Oyegoke 2011).

Constructive research is usually utilized in the area of theory where users have no requirement to do their research based on solidity. In other words, this

approach is constructed upon theories, hypotheses, and case studies, which is for testing theories (Researchinfoonline.com 2019).

In specific, the constructive research practice is a systematic approach which qualifies the purposeful creation of methods, modules, tools, and techniques. The creations have high applicability on the case study that stimulates them. This approach is widely conducted to solve practical problems while producing an academic contribution to computer science, mathematics, operations analysis, and clinical medicine. Particularly, it focuses more on the construction with the combination of theoretical demonstration and practical implementations, then considers them as valid consequences of the research (McGregor 2018).

Consequently, this approach is facilitated for research work based on the case company in the natural sciences field, especially this thesis. It can combine between the practical problems (practical experience) of the case company to give suitable solutions with the knowledge base (theory connection) to create an academically appreciated theoretical paper.

Based on the case company's potential issues (practical sides), it will combine with information and recommendation in books or paper sources (theory base) to give the best solutions to knowledge loss in enterprises at the present. These solutions need to be useful for both theoretical and empirical contribution. After gathering and analyzing enough data and information, it leads to the next to construct a solution for this company problem. In the following stage, the process of testing and refer theoretical of contributions such as valid articles, thesis works and famous research accompanied by the theoretical and empirical factors.

Those elements present the results of the output. The available suggestions could show the applicability and validation for the case company while it is a good contributor to other research contribution. Moreover, this study aims to

contribute to this growing area of research by setting a firm foundation for further studies

2.3 Steps in The Research Process

Throughout this thesis process, there were some sequent steps in the process together enough information in both theory and practical factors. In detail, a survey, careful research, and information analysis were conducted to give them appropriate solutions based on the support of cutting-edge systems to encourage internal KS.

The data collation process was significant because it was mainly based on research and data analysis. Therefore, some methods were utilized in the process such as reading, interviews, observations, and questionnaires accompanied by exploratory research work. Moreover, data for this study was collected using the methods "text analysis", "data analysis" with SPSS and "interviews" to compile data from paper, digital and survey sources to answer research questions.

Specifically speaking, the preparation for three interviews with stakeholders in the company was a part of the data collection. Contacting the company was for further investigation about projects and employees in the company. To create a good environment for KS, having an in-depth comprehension of their company culture was important. Besides, in-depth research to gain more optimal solutions to the issues was proceeded.

In the meantime, a survey to gather employees' ideas and preferences on sharing knowledge was created and accumulated. In the next step, analyzing the available information was one of the most significant steps in this thesis. Throughout gathering information, the real requirements of KS in the case company were comprehended.

Moreover, the BPMN (Business Processing Model Notation) tool which was Bigazi Modeler to analyze the as-is business model of the case company was utilized. Meanwhile, hypotheses for their future business model after the KS optimization was formulated.

In the following stage, the research was conducted to search for applicable answers for effective KS, and reliable methods to encourage the internal case company to implement new knowledge management strategies. In the meantime, the process of brainstorming and systemizing for all available ideas would be accumulated.

According to the refinement of the employees' opinions, the hypotheses were set and tested in a short time to check their validations and effects. To test those hypotheses, the relevant people in the case company were informed and asked for their decisions.

The following step was to do detailed research with dependable sources such as other thesis work and trustworthy website to adjust the hypotheses and give specific confirmation. When the most realistic solutions were available, finding the most suitable and time and cost-saving platforms had to be completed. Finally, these suggestions needed to be proceeded in a small group to ensure their applicability and effectiveness.

These methods need to be effective, cost-saving and applicable, which suits them as one of SMEs with more or less 100 employees in both the offices. Effective and affordable solutions are an excellent option for them to apply to their daily work environment. Furthermore, attentive consideration for their company culture and working motivation are taken to encourage their sharing process productively.

3   KS IN ENTERPRISES

3.1   Purpose of KS

Andrew Carnegie, an industrialist, claimed that knowledge and competency of employees is an invisible capital of every organization. That contributes to an increase in business productivity which requires companies to have effective KS strategies (Zucal 2016). In a Forbes' report of 2004, they disclosed that Fortune 500 companies have lost approximately $31.5 billion per year due to a failure in KS (Babcock 2004).

Moreover, an information technology and services company, AWH, has estimated quickly an economic impact on looking for answers within at least 5 minutes to common questions. With 100 employees and annual average salaries of $60,000, they wasted more or less $62,500 per year (Postolache 2017).

Two above cases are typical situations in the lack of fruitful KS process in current businesses. The importance of this process is usually underestimated, which can determine the survival of almost enterprises based on the creation and application of new knowledge (Yaacob, et al. 2011). These pieces of tacit knowledge are extremely vital to be shared within every company because (Gurteen 1999) :

- Derives substantial benefit to their competitive advantages for the long term.
- Avoids the situations when their experienced employees leave their companies, and tacit knowledge could be lost.
- Stimulates their productivity with the considerable extent of the knowledge, which prevents the common cases "not knowing what others know".
- Keeps companies up-to-date and qualified in rapid changes in ICT that can have a major influence on their business and societal changes.

Furthermore, creating a collaborative KS culture can help companies identify existing knowledge gaps in their business. Through the current technology level, they are able to realize what questions their employees ask frequently. From this, essential improvements in their current KS processes can be made in no time and can avoid negative business decisions at work (Top Benefits of Knowledge Sharing Across an Organization 2018).

Additionally, fostering a KS habit across enterprises is a smart method to save their cost and time. By sharing knowledge, employees can store necessary knowledge and experience from their colleagues in their mind, and extract them to use at any time. In other words, they will not make the same mistakes, as well as have no need to spend time finding answers to common questions. As a result, they save much time and cost when the problems are solved at the right time (Top Benefits of Knowledge Sharing Across an Organization 2018).

3.2   Importance of KS

KS is a vital facilitator to gain a successful business for every company. If KS is absent from companies, the gaps between individual and organizational knowledge are broadened (Ford and Chan 2003).

In 2012, when mentioning the importance of KS, Lisa Quast from Forbes confirmed that the overabundance of data is making KM, especially KS is more significant in all businesses. She gave a list of three key reasons for this importance as below (Quast 2012).

- Supports overwhelming data processes to make the right business decisions.
- Creates a learning company by making learning routines, which boost them to achieve constant improvement.
- Encourages cultural change and innovation, and become a fruitful method to evoke the free flow of fresh ideas.

Besides, gaps in KS can lead all companies to these below negative cases.

First of all, companies can dissatisfy the identification and creation of real experts. It is evident that every company will have some experts whose specialized knowledge is substantial and referred to as "deep smarts". The lack of KM can restrict the success of strong bonding in their working environment. As a consequence, they miss a chance to know valuable members specifically and train more experts efficiently (Postolache 2017).

Secondly, these enterprises seem to confront difficulties in the creation of a productive studying company culture. In the meantime, encouraging the learning routine can boost their staff to continuously searching for methods for effective performances and creativity (Postolache 2017).

Thirdly, ineffective KS processes can limit chances to foster constant innovation. One of the main reasons is that companies lack an adequate amount of high-qualified employees and waste much time and effort to update

essential knowledge. Therefore, they might be in risks of leaving behind in our digital era due to slow decision making. Basic knowledge triggers a lack of consistency in making important decisions and solving problems (Postolache 2017).

Based on IDC cited by Brainspace, around 16% of an experienced worker's time is used for exploring necessary information. Meanwhile, half of the time they can't find their suitable answers. These cases can cause to the economic impact on their business growth (Postolache 2017).

A failure to share knowledge hinders the business productivity, operations, and cost reduction by removing redundant or unnecessary processes and procedures as well as boosting loop feedback within the companies to reuse existing knowledge (Pasquariella 2003).

Finally, job-related KS is always vital to ensure that every enterprise can keep gaining benefits from the knowledge, which can avoid a phenomenon as "reinventing the wheel" (Pangil and Nasurddin 2013).

In conclusion, coming back to the first research question in this paper, sector 3.1 and 3.2 partly proved that KS has a vital contribution to the survival and success of companies, especially SMEs. In specific, it provides them new opportunities to proceed with plans and strategies for further innovation and internalization. In a study case's report, Bagnaia (2013) highlighted that KL plays a role as a bridge between the outside and inside factors of an organization and help to facilitate major innovation and internalization by the integration of the knowledge shared.

3.3   Common Challenges in KS

Although KS is playing a significant part in the sustainability and productivity of every business, this process still confronted with major challenges. In detail, these challenges can be related to complex psychological and behavioral factors that companies need to consider carefully to find fruitful measures to them.

According to Stan Garfield, an knowledge management author, the failure to implement a successful KS process can be because of these factors as in table 1 (Garfield 2014).

Table 1. Challenges in KS (Garfield 2014).

Challenge	Description
Employees do not have enough time:	In fact, they don't think that they have enough to for sharing knowledge with others. Time is considered as one of the biggest barriers making them hesitate to share their knowledge in the companies (Garfield 2014). It is understandable that they are surrounded by deadlines, projects, staff management, and other personal issues in their daily life. Thus, finding the time to tell others about what they have done and how they have finished any tasks seems not to be their favorite jobs. Moreover, this reason can lead them to think that there are other higher-priority tasks than KS.
They do not believe in others	In other words, this is overriding fear that others can utilize their credit for their work, ideas, creation for misused purposes. Thus, it leads to paranoia or lack of trust. In addition, they might always feel worried that someone can take advantages of their knowledge without giving anything in return.

They ponder that knowledge is power	In this case, employees want to hoard their knowledge to wait for someone asking them for it, treat them like a special expert, or give them value in exchange such as gifts, financial rewards, and promotion.
They do not know precisely the reasons why they should do it	This reason is caused by ineffective KS process in the companies. The employees do not receive any value, rewards, recognition, promotes or clear purposes for sharing knowledge. Furthermore, they can feel confused about why they should share their knowledge while they will not receive any positive or negative consequences. After all, KS is not their performance goals, and they are not forced to conduct it.
They do not know the appropriate ways to do it	This situation happens when the staff members have no proper training session about their KS. Apart from that, companies might have no powerful communication tools to encourage them to share their knowledge with others.
They do not realize what they are supposed to do	This cause is linked to the fourth reason "not knowing why they should do it". Again, the leadership has not built clear communication goals for, so they have no deep understanding of what they should do. Additionally, they can assume that they are doing it while they are not sharing their knowledge in an expected way.
They are afraid of a negative result	The employees face their concern about losing their current position in the company such as a guru. In other words, they are worried that no one will find them to beg for knowledge. It leads to their defensive attitudes against sharing knowledge. On top of that, they may think about taking responsibility for some misusage by sharing their knowledge with others. Besides, some people do not want to use their time for other tasks except for their vital goal. In several cases, staff members can be afraid of showing

	their ignorance or incompetency if they ask a question or present their ideas in public. As a result, they might suffer from blame or embarrassment due to improper KS.
Situations are out of their control	For instance, they do not manage to find a suitable time for KS, have no access to KS systems, or do not have a strong command of English in an international environment. For some people, they have a fear of answering questions that are not their strengths and showing their incapability of doing their jobs.

These above reasons are regarded as substantial barriers from implementing a proper KS process. Above all, cultural difference is a potential aspect which worths a careful consideration in conducting a KS strategy in every business. The significance of cultural differences can result in risks of a failure to a productive KS, especially in companies doing their business in international markets or global enterprises (Kivrak, Ross and Arslan 2009). Similarly, in 2005, Finestone and Snyman realized that cultural distinction in enterprises can urge to create barriers in KS (Finestone and Snyman 2005).

In every field, cultural differences can relate to the interaction among people within an organization, which is essential to conduct a successful business by encouraging KS (Shore and Cross 2005). According to Lee (2005), culture can lead to different behaviors, belief, habits, and goals in the working community, which can considerably affect the methods of KS implementation. Likewise, Sackmann and Friesl referred that culture can have a negative effect on working methods in a project team (Sackmann and Friesl 2007). Thus, companies need to take the cultural aspect into account.

In summary, this sector pointed out current common challenges of enterprises, which answered shortly the second research question aforementioned in chapter two. Again, although KS can bring many benefits as stated in sector 3.1

and 3.2, it requires companies thoughtful consideration and investment in planning and implementation no matter whether they are large organizations or SMEs. Riege (2005) claimed that different barriers in KS between large companies and SMEs have had no sufficient and empirical pieces of evidence.

3.4 Influence of Advanced Technology on KS

Knowledge always needs facilitation so that it can be transformed or utilized by enterprises to create new value and innovation. Knowledge management has, therefore, become a new indispensable target in business (Zyngier 2001).

With the huge importance of KS, the comprehension of the flow of knowledge and the capacity to upgrade them is an essential focus in our current information age. To have an effective KS strategy, technology is a tool which can support the data collection to govern the creation, dissemination, and usage of knowledge to achieve business targets (Zyngier 2001).
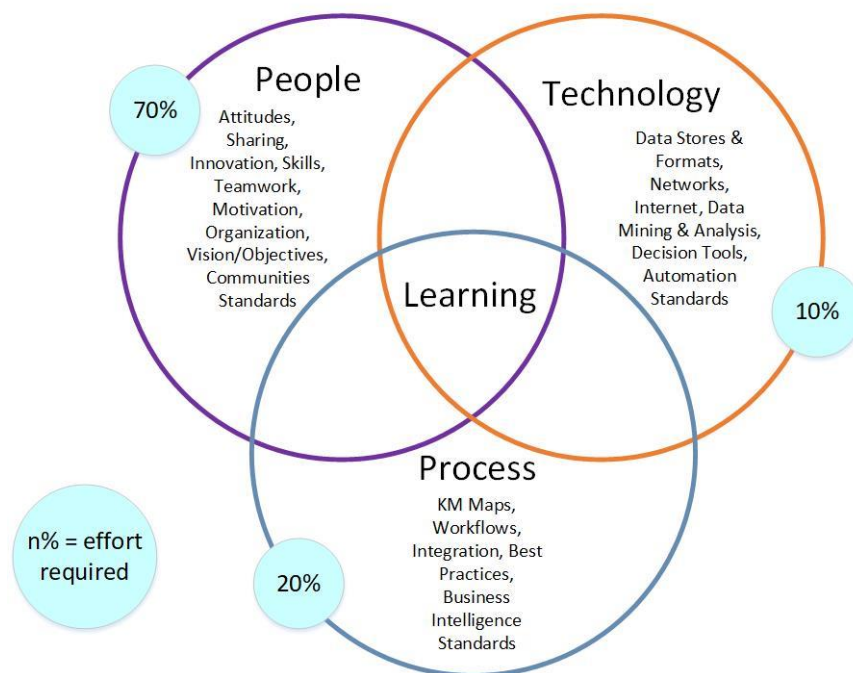
Figure 2. Components and Sub-elements in (Bhatt 2000)

As shown in Figure 2, components in KM require substantial effort and close correlation. Specifically speaking, people and culture cover 70% of effort; the process is required with 20% while technology is 20%. Although technology factor only engages in the least part of the total effort, it is an imperative component that companies need to pay attention (Chugh 2013).

Technology in KN, especially KS, can provide the companies with a smooth implementation. In detail, it can help them in accumulation of databases for better business decision making, enterprise resource for productive planning, expert for system deployment and information for systems management (Chugh 2013).

Information technology (IT) can offer enterprises well-functional knowledge management. Table 1 below presents a list of possible functions that advanced technology can assist them (Durden 2018; Abid A. 2015).

Table 2. List of IT Functions in Business.

Functionality	Channel
Communication	Email, Video Conferencing, Collaboration Software, Social Media, Blogging, Discussion Forum, SMS, MMS
Data Management	Big Data, Google Analytics, Microsoft CRM Dynamics
Marketing	Content Creation, Online Advertising, Ecommerce, Marketing Research, Search Engine Optimisation (SEO), Pay Per Click (PPC), Social Media Marketing, Smartphone App Advertisement
Enterprise Resource Planning	ERP (Enterprise Resource Planning) solutions, Communication Tools
Process Improvement	Customer Relationship Management systems (CRM), Collaboration Software, Communication Tools such as email, webinar, social media, member portals, online newsletters

High technology can give assistance in promoting effective communication, coordination, data management which facilitates fruitful KS in internal companies. Particularly, it allows them to convert explicit knowledge to tacit knowledge. In the meantime, communication tools and collaboration solutions are helpful factors for saving time, sharing, storing, accessing and organizing suitable knowledge in a transparent environment (Litsa 2017).

Cutting-edge technology is a useful measure to transfer knowledge from the understanding to real experience as well from national to global knowledge integration, and encourage the collaboration in KS (Dixon 2000). Furthermore, with the high speed of technological innovation, more and more users have a deep understanding of how to utilize technology in their daily life.

Internet World Stats estimated that 719 million of Europeans are using the Internet while Asian is leading this statistic with 2197 Internet users (Internet World Stats 2019).

Figure 3. Number of Internet Users in the World (Internet World Stats 2019).

Moreover, based on an analysis of Statistics Netherlands (Figure 4), the Netherlands is leading in 28 EU countries with the top level of internet access at home. There was 98% of Dutch households having internet access in 2017 (CBS 2018). Meanwhile, they stood the 6th most advanced information and communication technologies (ICT) economy across the globe (Blair 2012).
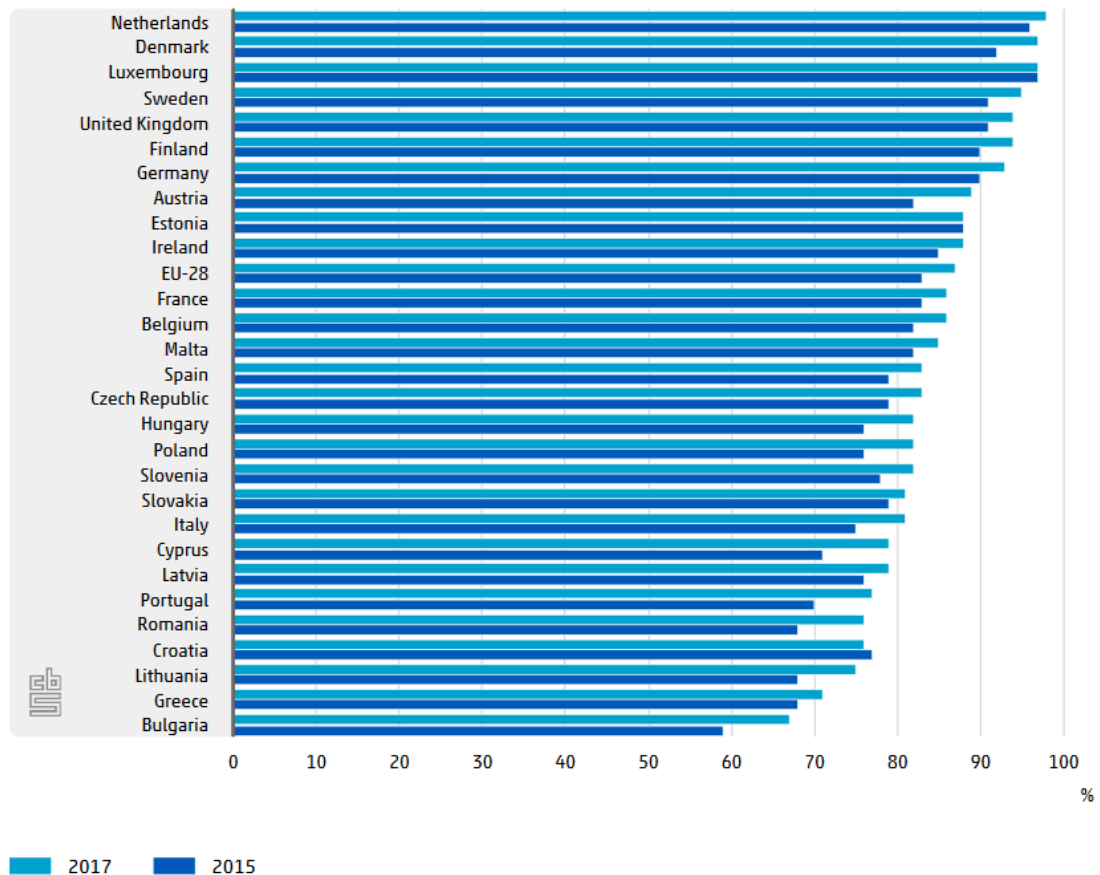
Figure 4. Internet Access Level of Top 28 EU Countries (CBS 2018).

These numbers show that companies have enough capability to combine leading technology with their business process where users need to have essential skills required to exploit an Intranet effectively as a knowledge management tool (Zyngier 2001).

Again, productive KM stands in the need for utilization of effective strategies and high IT level. Suitable IT implementation can trigger a good KM strategy, which the companies and organizations must consider as a crucial facilitator.

3.5   High-priority Factors on KS in SMEs

In Section 3.2, challenges of an effective KS process in enterprises are shown, but each company has different levels of priorities and concerns about them. In this section, we continue to discover how challenges and perspectives affect KS in SMEs.

Table 3. Challenges in KS of SMEs (Eze 2013).

Challenges	Description
Trust	One of the main factors that have an influence on the success of KS activities in a company. When interpersonal trust is well-built in a firm can encourage the willingness of sharing knowledge among employees (Mayer, Davis and Schoorman 1995). A higher level of trust can make employees in SMEs feel comfortable, motivated to exchange their points of view about work and get ready for business growth (Chan and Chow 2008). Trust can inspire greater involvement in raising new ideas, which SMEs needs to improve their performance and competitiveness (Eze 2013).
Information Technology	Knowledge of IT or information and communication technology (ICT) is a significant facilitator in KS strategies in every company, especially SMEs. Information technology infrastructure can make a huge positive change in their operation, integration of information and knowledge (Teece 1998). IT can enhance the possibility of fruitful knowledge transfer by enabling information access for individuals in firms. In addition, ICT provides SMEs a chance to utilize extranets and intranets, discuss forum boards, Wikis,

	spaces or integrated online communication tools as an all-in-one application (Alavi and Leidner 2001). Moreover, ICT can ensure that a considerable amount of knowledge in SMEs connects with users timely and securely. Thus, they can take the advantages of these pieces of information and data for the deployment of effective information systems (Riege 2005). However, IT application in SMEs might be a costly investment in the KS process. Therefore, it is important to build careful knowledge of management systems and strategies (Mahapatra, R.K. & Sarkar, S. 2000).
Formalization	In 2002, Hall defined formalization as the extent where work roles or activities are structured apparently in legal contracts written documents such as standard operating procedures, job descriptions, regulations and policy manuals (Tolbert, P. S. & Hall, R. H., 1934-, (author.) (2016)). Additionally, individualized KS systems are usually informal and unstructured. Meanwhile, organizational KS systems are formal and integrated into the business process. That explains why enterprises need to focus on a combination of a formal internal structure and non-hierarchical structure with a suitable level to boost knowledge creation and KS among employees (Nonaka &Takeuchi 1995; Boh 2007). Nevertheless, SMEs tends to be nimble and lean to achieve high flexibility in its industry. In particular, this flexibility allows them to operate without a high level of formalization. In this way, they can easily create a less bureaucratic and more responsive work environment to enable their employees to feel free to share knowledge. If

	SMEs pay much attention to formal structure, they might face a failure to achieve benefits from KS activities (Grevesen & Damanpour 2007; Chen & Huang 2007).
Empowering leadership	The previous research in 1986 and 1997 proved that empowerment has become a major component in KS activities in firms (Burke 1986; Burpitt & Bigoness 1997). In fact, employees have a tendency to getting inspired and motivated to share their ideas or knowledge when they receive equitable recognition from their colleagues and leaders (Srivastava, Bartol and Locke 2006). As aforementioned in sector 3.2, employees can be in cases that they do not know why they should share their knowledge or what they are supposed to do. In these situations, empowers is playing a key role in conducting smooth KS processes. Being recognized becomes their motivation in KS. As a result, SMEs can have greater opportunities to derive huge benefits from KS when they empower their leadership in their firms. Positive behaviors from leaders or coaches will stimulate them to exchange their opinions effectively at work (Arnold 2000).
Motivation	In 1993, Robbin explained motivation as the willingness or tendency in behaviors to exert higher levels of effort to achieve their working goals. conditioned by the effort's ability to satisfy some individual needs (Robbins 1993). It can be categorized into extrinsic and intrinsic motivation. While extrinsic motivation is referred to as visible rewards or benefits, intrinsic motivation focuses more on the pleasure and inside satisfaction from finishing the tasks (Deci and Ryan 1987). According to Hislop (2003), the staff's willingness is the

	key initiative in the success of KS. The bigger motivation employees have, the more willingness to share their specialized knowledge or work experience they have (Fathi and Goh 2011). In other words, they will be ready for sharing knowledge when they feel happy at work. Furthermore, when employees have a huge working motivation, it means that they have a high sense of belonging to a company. Therefore, SMEs need to offer them motivational programs to ensure that they are motivated all the time, which is a crucial step to stimulate them to share key information and work processes (Eze 2013).
Productive reward structure	An effective reward structure is one of the important methods to boost employees' motivation. SMEs need to consider this factor carefully to identify the performance assessment from tasks in various working stages. Based on that, they can adjust their current reward systems in both the internal and external organization (Eze 2013). The companies can make use of many kinds of rewards including monetary such as annual increments, bonuses and profit-sharing, and non-monetary incentives such as recognition and praise (Srivastava, Bartol and Locke 2006). Fairness and equity in reward systems are indispensable factors to encourage a high level of self-efficacy and motivation for KS (Bartol and Locke 2000). In addition, clear and specific reward structure can contribute to solving the problem "not knowing why employees should engage in KS activities".

	Moreover, the employees will have to take challenges to achieve their targets and goals to enjoy their valuable rewards (Bartol and Locke 2000). Consequently, SMEs can implement a better KS system when they are able to maintain a fruitful reward system where employees can feel free from bias (Eze 2013).

4 ICT SOLUTIONS FOR KS

4.1 Roles of ICT Integration in KS

As was mentioned in the previous chapter, advanced technologies have a dominant influence on accelerating KS systems. Next, in this sector, the detailed roles of ICT in KM systems, especially KS processes would be clarified.

ICT was defined as the combination of all devices, networking components, applications and systems which let people and any organizations maintain their interact in the digital age (Rouse 2017). Meanwhile, ICT components consist of data, hardware, software, information, procedures, and people (ICTamymccarthy 2012). For example, they can be communication tools (such as email, Skype, Whatsapp, and other live chat apps), electronics devices (such as phone, laptop, desktop, digital TV and robots), web-based app, collaboration tools (such as Intranet and Extranet) and websites.

In KS, common ICT components, which companies can integrate into their systems to leverage their KM, include electronic devices, collaboration and communication tools, Electronic Data Management Systems (EDMS), Decision Support Systems, Expert Systems, Groupware, Wikis, Weblogs, and other shared networked and net-based technologies (Owiti 2019).

Hedriks (1999) referred that a substantial motivation in utilizing ICT in every organization can gain benefits of time and space elimination. In other words, ICT is considered as an effective enabler which enhances KS by narrowing the spatial barriers among employees consisting of time and geographical distances and improving the accessibility to information and other knowledge. He suggested that ICT should be noteworthy to be paid attention to creating productive KS processes (Hendriks 1999, 91). In detail, figure 5 below presents the goals of ICT in KS (Hendriks 1999).
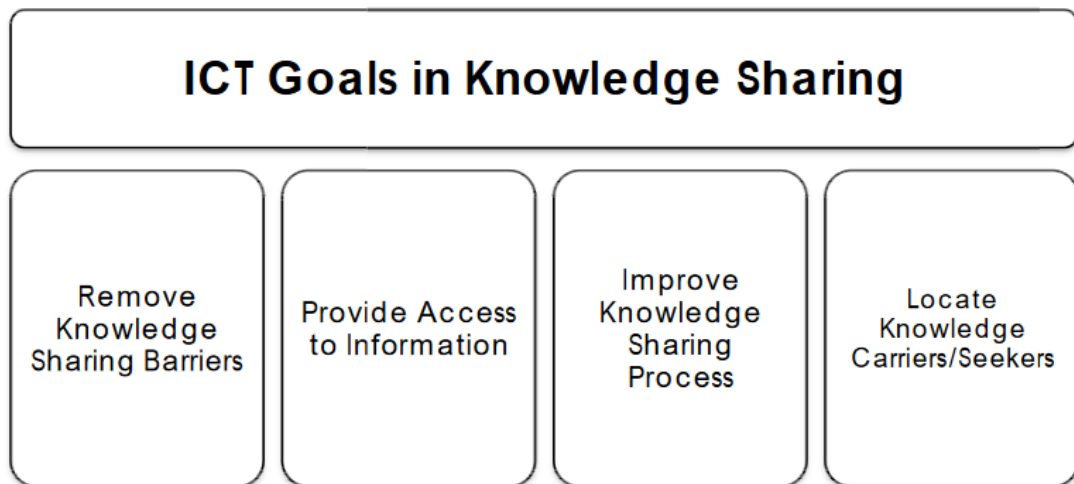
Figure 5. ICT Goals in KS (Authors' Illustration Adapted from (Hendriks 1999)).

In KM systems, a focus on technology-based initiatives via ICT such as the creation of databases, the expansion of decision support systems, and the hardwiring of social networks to enhance the connection with resources of non-collocated individuals could be a major advantage for companies (Alavi and Leidner 2001). In addition, Shahid and Alamgir (2011) identified that ICT is playing a vital part in KS with key functions below.

Codify data, store and retrieve to employ standard Database Management System (DBMS) processes.

- Transfer data and communicate by utilizing Internet access, emails, and portals.
- Encourage e-Communities and online/virtual meetings
- Create specialized KM systems for companies
- Support data mining and warehousing
- Formalize expert and intelligent systems for decision aids

Agreeing with Hendriks (1999), in 2006, researchers Mohamed, Stankosky, and Murray confirmed that the proper use of IT can help KS gain more momentum in both time and distance. As shown in figure 6, technology is a significant part of the KM system.

Knowledge Management – Enterprise Engineering

Figure 6. Pillar of KM (Authors' Illustration Adapted from (Mohamed, Stankosky and Murray 2006)).

For Hendriks (1999, 91), although ICT integration can provide great benefits in a fruitful KS, it still has its challenges. However, the advantages and stimulus for ICT's utilization seem to surpass its downsides.

Notably, in the process of knowledge creation, sharing and using, companies or organizations need to consider the availability of individuals who can manipulate and enhance knowledge assets by utilizing technologies and digital channels in KM systems (Hendriks 1999).

On one hand, in 2001, Rutherford agreed on Hendriks' idea by adding a metaphor: "Buying a typewriter does not make one a better writer". He claimed that investment in cutting-edge technologies does not make KM system in an organization better. The bottom line is how to use these technologies

effectively. In general, ICT infrastructure is a valuable enabler in KM, particularly KS processes, but ICT have no ability to conduct every step successfully alone.

Meanwhile, Hendrik (1999) and Mohamed, Stankosky, and Murray (2006) implied that ICT in KS should not be regarded as a complete solution, instead, viewed as a vital facilitator in systems.

4.2   ICT Usage in KS

4.2.1   Categories Based on Functionality and Process Support

The previous sector offers some important insights into ICT's key roles in enabling sharing information and knowledge in KM systems. In the current business environment, with the help of technologies, the productive implementation of KS has become more effortless (Subashini, R., Rita, S., Vivek M., Krishna P. V., Babu, M.R. & Ariwa, E. 2012). In detail, companies can take advantages of available technological tools to underpin the functionalities and processes of KM as exhibited specifically in table 4 (Ghani 2009).

Table 4. List of Functionalities and Processes Supported by ICT (Ghani 2009).

Functionalities/Processes	Description
Knowledge access	Advanced technologies can offer companies methods to access their explicit knowledge. Besides, they have the ability to transfer, share the knowledge or information across the internal systems (Ghani 2009).
	Convera can be taken as an instance for retrieval ware and data organization to get back data or information, which is a powerful tool to create, search and access content and collaboration networks in the enterprises (Johannesburg 2003; Ghani, 2009). However, in 2007, this app was retired when Convera sold its business to "FAST Search & Transfer" (Hane 2007).
	In addition, DiskDrill (for Windows) is one of the popular tools for data recovery, which allow the

	companies to recover their lost data. All their damage documents or files on internal and external storage will be easily recovered (DiskDrill 2019).
Semantic mapping	There are popular tools used for information and knowledge visualization to support employees' understanding, analysis and decision making (Ghani 2009). This category includes ontology tools which facilitate users to organize their information and knowledge by grouping and scheming. By this way, they can exhibit their systematical knowledge base (Ghani 2009). For instance, SpiderScribe is an effective option for visual thinkers. It can provide users an online mind mapping and brainstorming application so that they can share and connect their ideas, notes, files or calendar events in free-form maps (SpiderScribe.net 2019; Educatorstechnology 2013). In the meantime, Lucidchart can optimize business productivity to help employees collaborate and create online diagrams, charts or mindmaps in real-time. Besides, they can integrate seamlessly this app with G Suite, Microsoft Office or Atlassian (Lucid Software Inc. 2019; Educatorstechnology 2013).
Knowledge extraction	Knowledge extraction is an activity to explicate and shows interpretably the internal knowledge of a system or a set of data (Gestal and Andrade 2009). These tools can assist users to mine data from both unstructured (text, picture, and documents) sources

	and structured (such as tagged named entities, factual relations, queries, and replies) source by interpreting relationships among different elements and documents precisely and scalably (Ghani 2009). IBM SPSS is an example of this category, which can be utilized to enhance ad-hoc statistical analysis, build a vast library of machine-learning algorithms, conduct text analysis and advanced integrations. It is suitable for many companies with different sizes thanks to the high flexibility and scalability (IBM 2019). Moreover, one of the most popular cloud-based tools for text analytics is DiscoverText. It can offer companies with powerful features to deal with multilingual, text mining, data science, human coding, annotation, and machine-learning sources. The solution also has the ability to evaluate a vast amount of unstructured knowledge such free text, survey responses, public comment, social media, and other text data, which is trusted by many academic research groups (DiscoverText 2019).
Collaboration work	Collaboration solutions provide enterprises with the integration of globally shared spaces in project management, creating contents or materials, implement live discussions and interactions and maintaining a repository of materials connect with all steps in the process (Ghani 2009). In other words, they encourage effective communication, document exchange, conferencing, and real-time assistance to diminish collaboration barriers in remote and

	decentralized teams (FinancesOnline 2019).
	As an example of a collaboration application, Wrike is designed to accelerate the speed and productivity of co-located and distributed teams. It can help them complete their tasks effectively by scheduling, prioritizing, discussing, and keeping track of both work and progress in real-time. This application has been chosen by Fortune 500 companies such as Google, Stanford University, Adobe and HTC (FinancesOnline 2019). Additionally, Monday is a top-rated choice for project management and collaboration when it allows users to create, assemble and display their progress data logically and understandably so that other team members can update stages in processes (FinancesOnline 2019).

4.2.2 Categories Based on Common Association with KM

Apart from the aforementioned categories in the previous sector, table 5 will show a quick list of common technologies used in KM systems, specifically KS processes.

Table 5. IT Tools Commonly Connected with KS Methods.

Technology	Description/Tools
Communication and collaboration solutions	D'Aspremont, Bhaffacharya & Grard-Varet (1998) stated that KS is the process managed thoroughly through communication and collaboration to distribute knowledge to employees at the right time, place and form. That explains the reason why companies commonly utilize communication and collaboration tools to help them improve open interaction and diversity. A popular communication tool can be named in this category is Slack, which could be applied to organize the conversation through messages, screen sharing, video calling, and threading. Besides, users may integrate this app with other project management services (Aston 2018). In the meantime, Microsoft Team is a well-known team communication tool with essential features as Slack. However, it is built by competitive developers and integrated with other Microsoft solutions, which is suitable for enterprises of all sizes (Aston 2018).
Content management	Based on KMWorld, content management tools are employed as an overarching repository where enterprises can store their information, mainly for projects, websites,

	webpages, and document management. Nevertheless, content management solutions are not designed only for knowledge management because they cannot fill the gaps in collaboration and interaction among team members (Chakravarti 2008). WordPress is a typical content management tool in this category which allows users to start as a blogging software with full functions of Content Management Systems (CMS) such as themes, widgets, and plugins. On the CMS, the companies can create their blog/website quickly to manage their knowledge content (FinancesOnline 2019). Furthermore, HubSpot is a CMS solution for businesses, considered as a marketing suite to create attractive content, deliver them quickly to their target audience, boost their list of contacts, combine their email metrics directly into the solution with fruitful personalization (FinancesOnline 2019).
Intranet	For Mphidi & Snyman (2004), an intranet is clarified as a network utilizing and emerging the Internet concepts and high technologies to allow an employee in enterprises access and share their knowledge. In the same research, they also emphasized the main advantages of the intranet such as consistency, interactivity, easy and low cost for updates, user-friendly interface, centralization, accuracy, effectiveness, and efficiency. Intranets stand out as one of the most effective ways of sharing information and knowledge in companies. ThoughtFarmer is a good illustration of a social intranet solution created to centralize intelligence, enhance

	internal communication and promote collaboration. Moreover, it can provide integrated features for managing communication, content, assets, documents, recognition, and collaboration (GetApp 2019). In the meantime, Jostle's People Engagement® platform is regarded as a popular intranet with a user-friendly interface and work-relevant approaches to improve collaboration, communication, and KS.
Learning system	Learning systems can be an enabler and contributor to effective KS encouraging in every enterprise, which promotes more than face-to-face interaction. Apart from the tradition direct environment, e-Learning is playing the main part in the KM system. Regarding online learning systems, Khademi, Kabir and Haghshenas (2011) emphasized that e-learning can create a repository of knowledge that users can constantly deliver to others essential knowledge at a specific time and in a personal style that every individual can understand. For them, e-learning at this level can be regarded as an efficiency counterpart in inventory management. As an example of this category, SAP Litmos is a renown solution which can facilitate training delivery for global companies. It can provide them with a powerful LMS, a commerce platform, and a content-rich course catalog so that they can manage their whole learning system easily and flexibly. This solution also could be used to strengthen the businesses by aligning the corporate training with the strategic goals while boosting the engagement from experienced employees (Weiss 2019).

	Another knowledge reinforcement solution is Unicorn Training, which is known as a productive learning environment and administration platform of Access Group. Access Group is one of the leading software providers in the UK. Their packages can provide companies with a learning management system and e-learning custom (Weiss 2019).
Knowledge mapping tools	A knowledge map may be defined as a visual representation of intellectual capital in enterprises. Thanks to this map, the stakeholders have the ability to gain an in-depth understanding of what critical knowledge is, how it flows and whether it has any gaps or barriers. Therefore, it supports companies to point out knowledge risks and find effective knowledge opportunities (Harper 2018). With reference to a knowledge mapping application, Aithin can be concerned as a tool to help organizations publish their maps. As a result, staff members can quickly identify useful knowledge resources at work. In addition, it gives assistance to analyze various types of knowledge resources which are utilized to produce effective KM strategies (Straits Knowledge Digital Pte Ltd. 2018).

4.2.3 Artificial Intelligence Solutions as KM Trends in 2019

As one of the top 10 digital transformation trends by Forbes (Newman 2018), AI is in the center of these advanced technological factors. It is playing a primary role in dealing with data which are key components for companies to make the right business decision about their products, services human resources (HR) and other strategies.
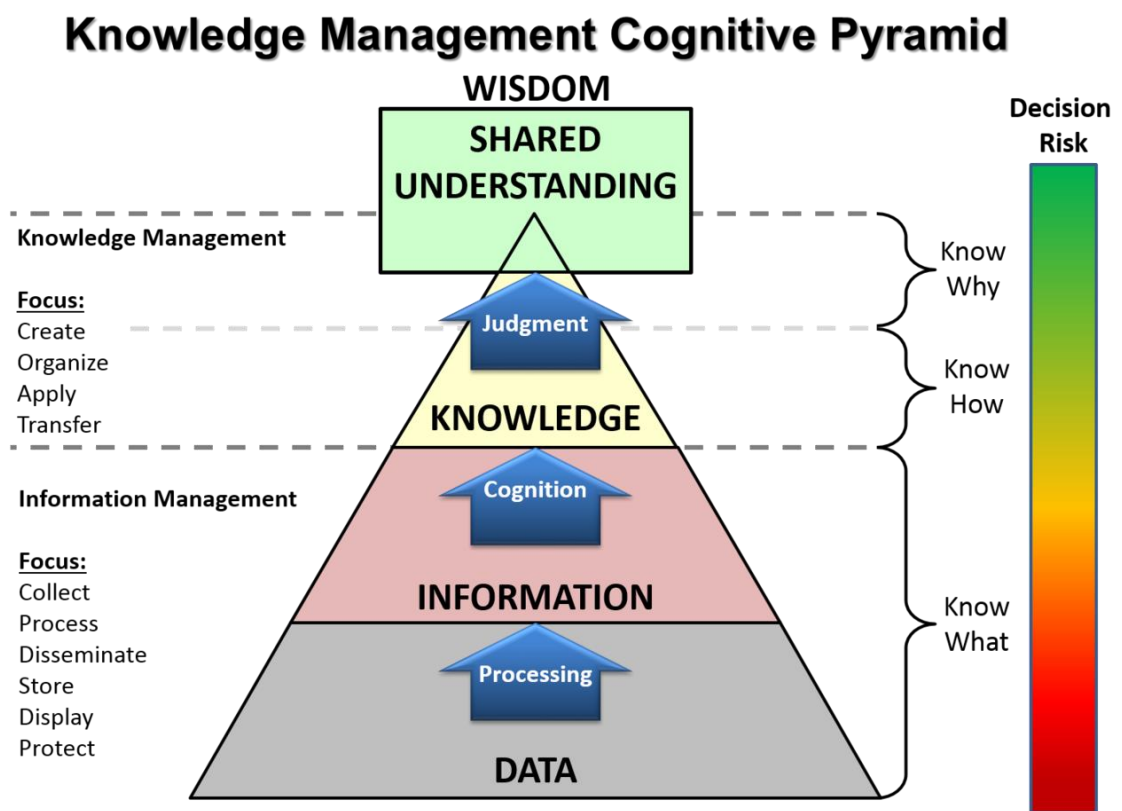
Figure 7. Knowledge Management Cognitive Pyramid (Adapted from the DIKW pyramid by US Army Knowledge Managers).

As represented in Figure 7, raw data are initiative and vital components in cognitive knowledge management. According to Forbes, in research in 2018, we have created 90% of total data in the world, but have been using productively only 1% of them (Newman 2018). Thus, data handling processes have the main influence on the success of KM strategies, which Artificial Intelligence (AI) can support you to conduct effectively.

To follow the growing technological momentum, organizations are becoming more insight-driven. Likewise, the quick development of AI technologies such as machine learning and natural language processing (NLP), the demand for AI-powered is increasingly focused (Newman 2018). In 2018, Suss has identified the benefits that AI can support KN requirement including automation, data and insight analysis, and strengthening customer/employee participation (Suss 2018).

Detailed functions that AI technologies can provide the organizations will be exhibited in Table 6.

Table 6. AI-enabled Functions (Newman 2018; Suss 2018).

Functions	Description
Cognitive Insights	In this category, AI is developed for predicting information, automizing personalized targeting of digital advertisements and accumulating or categorizing them (Suss 2018). Google has changed their search technology to allow enterprises to become more data-driven by the combination of search features and technologies like machine learning and NLP (collectively known as Cognitive Search) to let the businesses gather the important insights. Consequently, the demands for AI-powered search and analytics solutions are increasingly (Newman 2018). According to Search Technologies, a part of Accenture, one of their global customer in the oil and gas industry are utilizing an AI-powered knowledge platform to making thorough drilling plans, design, and incident reporting. This solution is developed with smart search engines and

	NLP to extract and normalize ambiguous and unstructured content such as text documents, images, surveys, well logs and exploratory drilling reports. As a consequence, they can eliminate the time and effort on manual review processes (Newman 2018).
Process Automation	These AI solutions are clarified as the no-human process of digital and physical tasks which are utilizing robotic automation technologies. For example, these tasks can be transferring data from the email into a set of record, interpreting contractual documents to extract essential data by making use of natural language processing, or updating customer files to Customer Relationship Management (CRM) systems (Suss 2018). In fact, around 80% of business content is unstructured, which is produced by humans via notes, emails, text documents, survey, research, reports, voice recordings or videos. These unstructured data require more effort to search and analyze. That is one of reasons organizations have been adding NLP and machine learning capabilities to obtaining, processing, and tagging a vast amount of the content to make it possible for searching and analysis (Newman 2018). Moreover, the AI-enabled chatbots and virtual assistants can help companies conduct data analytics, deliver simple responses and complete easy tasks to boost employees' productivity (Newman 2018).
Cognitive Engagement	Typical AI-enabled technologies in this category are chatbots or intelligent agents, which can provide the companies with effective customer service, answers to employees' questions and boost route engagement (Suss 2018). The combination of KM and AI can be an advantage for enterprises in gathering essential

	information so that employees can use it at the right time, get the suitable answers in the real-time (via question-answer (Q&A) systems) and response the customers punctually. In other words, AI offers benefits of enriching the knowledge-searching experience for the staff members. By integrating the Q&A systems into the processes, the enterprises can bring positive effects with the supports of expansive domains and natural language understanding (NLU) capabilities (Newman 2018).
	For instance, Google has leading Q&A capabilities transforming the "search engine" into "knowledge engine" with Google Knowledge Graph. Whenever users search any keywords, the returned results can be a compilation of data about all relevant from various Internet sources such as Wikipedia, Wikidata, news articles, and other websites.
	In addition, NLU algorithms can give assistance to create an interconnected information network referring to the methods every individual, project, and customers are connected with each other. This network or business knowledge graph can support companies to deliver insights their users prefer (Newman 2018).

To sum up, this chapter which gave details for the third research question proves ICT has an important influence on facilitating KS processes effectively. In other words, ICT solutions can shed light on the implementation of successful KS strategies to support business growth and technical innovation. Nevertheless, ICT factors are not all essential determinators for a successful KS strategy. Instead, they are mainly fruitful facilitators in smooth KS processes.

5 KS IN MANSYSTEMS

5.1 Case Description

One of the important parts in this thesis is to take advantages of theories and hypothesis to approach the real case. In this case, it is the case company Mansystems which is processing an ineffective KS system. Although KS processes can be affected by factors such as learning, human, leadership and IT applications as aforementioned in the previous chapters, fruitful KS implementation in every company might emphasize more on different factors. For example, some companies might focus more on systems rather than leadership.

In details, the company culture and employees in the case company can have a vital influence on how to boost their motivation and obtain productive KS processes. Therefore, gaining a deeper understanding of their current states, especially KS processes, their employees' motivation and their company culture is the main factor which contributes to finding out possible ICT solutions for them.

5.1.1 As-is Situation

As aforementioned in previous chapters, KS has a close connection with culture, human, society, and technology factors. Therefore, to clarify and investigate the current KS processes in the case company, then choose the most suitable solutions to their problems, this thesis will present their general information and company culture.

Currently, the case company has four offices in the Netherlands and Germany. This thesis was paid more attention to one office in the Netherland, and this office has around 70 employees. Around 10 years ago, they conducted a transition to the low-code development platform "Mendix" and "SAP RAD" to strengthen their customers on the digital transformation journey. From that time,

they have been innovating quickly and becoming one of the most important partners of Mendix (Mansystems 2019).

At the moment, they mainly focus on four services including (Mansystems 2019):

- Consulting: They provide their customers helpful advice on creating trust, identifying and starting with MVP applications (Minimum Viable Product) on their digital transformation.
- Developing: The company supports individual and business to create their own applications fast on Mendix/ SAP RAD. In addition, they can conduct their own Quality and Control testing as well as performance add-ons to the Mendix platform.
- Supporting: They can help their customers in their certified support center all the time.
- Training: As a certified Mendix Academy, the company can offer its customers training programs on Mendix/SAP RAD to have enough understanding of low-code development and digital transformation roadmap.

General speaking, they belong to the group of SMEs in the technology industry, whose social mission is to assist the young generations, build a digital future and maintain sustainable local businesses (Mansystems 2019). Although the prices, product, and access that they can provide their customers are on average, with their high level of customer orientation, they are renowned for their excellent customer experience (Appendix 1).

Moreover, their core values and cornerstones are customer-oriented, initiative, responsibility, creative, open community and surpass (Mansystems 2019). As a result, their employees seem to be self-motivated, supportive, flexible and open-minded. In the company, they prefer open communication where they can communicate directly face to face or through Outlook, Whatsapp, Skype. In the past, they used to utilize Microsoft Team to share their project-related knowledge. However, at present, they do not make use of it anymore. They love

to tell the truth, face the reality, aim to win-win situations to provide employees and customer the most satisfying moments.

Based on the company's current project working processes (Appendix 2), the thesis identified their sequent steps in their business. In daily working life, the company usually received a large number of projects and this process is repeated all the time. The project working process seems to be well-organized, but it still needs more improvements in the system which will be presented in the later sectors. Nevertheless, by and large, the connection between employees, team leads and academy departments maintains close and effective at the moment.

In this thesis progresses, a survey was sent to gather the employees' response (Appendix 3). There were 16 responses per around 70 employees in the office in the Netherlands to this survey, which was more than 10%. Therefore, they could be considered as a sample group for the whole company. All data from the survey were analyzed and organized on SPSS. In the next step, charts, tables, and analysis will be shown below. Consequently, the conclusions will be made about their problems, needs, and insight so that the direction of this research will be more precise and narrowed down.

From the two pie charts from results of the survey (Appendice 6&7), it was obvious that most of the people in this survey were male (75%) and came from consultants department (37.5%). However, in this case, the result of the rate of genders and departments did not affect the total outcome of KS sharing. The explanation is that the genders affect slightly on their KS habits. Instead, the company culture seems to have a bigger influence on them. Besides, the survey can show that all departments in the company such as consultants, technicians, experts, and salespersons have specific interest in KS processes. Although they are working in the IT company and have common eliminatory knowledge about IT, they still have different expertise and insights in sharing knowledge due to their different departments. As a consequence, further

analyses about their KS and knowledge gaining processes will be presented in the next two sectors.

5.1.2   Current Processes in Gaining Knowledge

With their core values in open communication and high flexibility, they tend to work and conduct their processes based on self-motivation and willingness from the employee. It might be a plus point for them because one of the most significant factors in successful KS processes is human. Thus, taking advantage of human motivation to conduct effective KM strategies is a suitable method. Appendix 3 exhibit their knowledge gaining process where the employees can choose to participate by themselves. They do not have mandatory steps in the processes which the whole company need to follow. In this case, it can cause an issue that the employees only are involved in these activities when they have enough motivation. Otherwise, they are unwilling to join in this process.

On the contrary, they seem to be operating their gaining processes effectively and flexibly thanks to the high level of motivation from the employees. In detail, the employees mainly can share their knowledge and show their feedback in the review meetings with their team leads. Again, after all, the employees primarily can make a decision to study their online courses or join Mendix meetups or workshops by themselves according to their preferences. For this reason, it can lead to the case that some employees do not want to share or gain knowledge. Luckily, the employees in the company are motivated, proactive and eager to learn new experience as well as improve their individual knowledge, which is presented clearly in their frequency of workshops or meetups participation (Appendix 8&9).

The above chart (Appendix 8) and the statistic table (Appendix 9) shows the frequency of workshops/meetups attendance, which is obvious that the most of employees attend workshops in the company twice or three times a year with 25% (4 per 16 people). In the meantime, a person takes part in these workshops 6 times per year, and two people participate in one to two workshops per month. In addition, these numbers distribute quite evenly in almost every departments such as consultants, experts, sales and recruitments.

Meanwhile, the employees from consultants, sales and technical departments join in the workshop more frequently such as twice or three times a month and six times a year.

In general, the case company has no compulsory rules for how often the employees should attend their workshops or meetups. They mainly register and attend the workshops according to their preferences, personal development, and suitable timetable. Although the results were randomly shown, it is evident that the employees have their own motivation and inspiration to improve their competencies. Besides, the employees take part in the workshops or meetups with an average rate of frequency (2-3 times/year).

In the following stage, the thesis will identify their level of satisfaction with their workshops or meetups. With 68.75% (Appendix 10) and 87.5% (Appendix 11) of the number of employees feel satisfied with their current workshops or meetups. As a result, they seem to be happy with their knowledge of the current state. The employees are motivated and proactive in their learning and personal developments. The company can take advantages of this plus point to encourage and conduct fruitful KS processes in the company. Those reasons make them operate effectively in knowledge gaining.

5.1.3 Current Processes in Sharing Knowledge

In the KS process (Appendix 4), it seems that they need to improve the steps and methods to achieve better productivity. First of all, most of their sharing activities happen randomly without any schedule in their break time and lunchtime For example, only when the employees need some helps for their projects. This issue can cause a limit in sharing knowledge. In specific, some employees may never have a chance to share their project knowledge with others. During small talks, they might be talking about other personal stories, not relating to their projects. In addition, it can be a barrier for the employees if they feel shy to talk too much with other colleagues. The reason is that not everyone can feel comfortable to talk about tasks during their break time.

Moreover, they mainly can share their knowledge when they lead a workshop for other employees. However, the bottom line is that only some people such as experts or professionals can host a workshop. That results in minimizing the possibilities for other staffs to share their own knowledge.

Furthermore, KS in review and evaluation meeting might have the same above problem, because only team members can share their ideas about projects with each other. In the meantime, salespersons or IT consultants will have no chance to learn new related-project experience.

In the past, the case company used to try to utilize Microsoft Teams for a short time to share their documents and project-related knowledge. Nevertheless, Microsoft Teams seems not to be a productive approach for them to share knowledge. In specific, only some of the employees were attempting to test communicating and sharing files on this platform. Yet, after a while, they stopped making use of it because they have little time to do sufficient research to point out effective methods of implementing Microsoft Teams for the whole company at that time.

5.1.4 Employees' Working Motivation

This sector continues to identify the human factor in KS processes in the case company. To find all-around answers to the employees' motivation level and their interests in working at the company culture, a survey was to investigate their individual motivation and inspiration at work.

When it comes to the satisfaction level of working in the case company, the survey carried out four statements to check their excitement about working in their daily life. According to their company culture, their employees are always encouraged to finish their own tasks and improve their knowledge (Appendix 12).

Appendix 12 are the results of these four statements through the frequency tables. These tables point out the frequencies that the employees feel like to work and are inspired to meet their goals at world proactively without any mandatory rules. By and large, most of the employees totally agree and agree with the statements in the result. In specific, there are 10 people agreeing that they always focus on working while 9 people feel excited about going to work every day with the "agree" option. In the meantime, 7 employees thought that their working days fly so fast. Moreover, 11 people are inspired to meet their targets at work with the "agree" level. The rest of the results are mostly "totally agree" and a few "neutral". Consequently, the numbers present that the employees love working in the company and feel satisfied with the company culture.

In the further stage, the tables in Appendix 13 display their motivation in KS through five statements. With 6 "disagree" and 7 "neutral" options for the first question to check their awareness of distinctiveness in their tasks, the rate of disagreement shows that they know fairly well about their jobs and make clear about what they are doing in the company (Appendix 13).

As an outcome of the second statement, 12 people admitted that they always got a clear vision for what they have to do (Appendix 13). It leads to a case that they are interested in all different tasks based on their strength. It is inevitable that they love their jobs and have enough motivation to finish their jobs every day.

Next, to figure out what the employees want to become in the company, the third statements checked whether they are inspired by belonging to the company with 10 "agree" and 5 "totally agree" (Appendix 13). In this case, it seems that the employees in the company like to have something or some activities for being a member of the company. In other words, they are motivated by feelings clear that they are important factors in the case company.

The above outcomes proved that the employees like to attend team-building activities or events that they can close to together and feel that the company is their second home. In this situation, networking or small meetups can be a good idea for them from times to times.

Coming to the forth statements, with 15 employees getting interested in learning new things, the outcome deployed that they are ready to share and learn all the time to improve their skills and knowledge (Appendix 13). Meanwhile, only 2 people thought that their motivation at work is their high salary (Appendix 13). This number indicates that the high salary only affects partly on their work. Instead, they tend to gain more mental benefits such as being a part of the company and learning new things.

After pointing out their motivation at work, the crosstables in Appendix 14 shows their opinions about sharing their knowledge. As the first two tables (Appendix 14) present, the employees are always ready to share their knowledge with their colleagues.

However, up to 5 people disagree that they will share their work story every month. This result can refer that the time "every month" is not suitable for them.

One of the reasons for this statement is that the employees usually work on their 3-month or 6-month projects. Another explanation is that they are busy most of the time to spend time sharing too frequently. In this case, a longer period might be a better solution for them.

The final two tables revealed the fact that they tend to be willing to write something to share in an online community. In the meantime, only two employees disagree on this method (Appendix 14). An online community seems to be a nice way for them to share their knowledge because not all the time they can gather at one place and tell everything with others.

Based on the obvious above numbers, the information about their willingness to share is nearly enough. However, after all, they might need more specific motivation in sharing knowledge, which maintains their sharing habits in the long term.

That is a reason why appendix 15 exhibits their priorities on motivation via the points from 1 to 7, which is equal to "Lowest" – "Highest" degree in each component In specific, as expected, the factors "being forced," "getting a bonus" or "getting gifts" are in lower priorities in their mindset. It seems that they prefer a proactive and optional way to share their knowledge. It is obvious that no one wants to be forced to do what they do not desire.

Besides, the employees are quite busy with their schedules. Thus, it might be a good idea for them to join it in their suitable timetable based on their preferences. The bottom line is that if they can attend KS activities based on their preferences, the effectiveness can be maintained for the long term. Otherwise, it brings to ineffective outcomes.

In addition, the results clearly showed that material elements have minimal impact on their motivation. As a consequence, the material motivation should be alternated with thoughtful approaches such as being recognized (4 people

choosing level 6), being thanked (5 people choosing level 5) and getting a promotion (5 people choosing level 5).

Going deeper into the numbers, the tables can show that the employees tend to share their knowledge because they can be recognized and thanked. In other words, they mainly want to help others and gain knowledge back and forth.

Although the thesis can be focused on boosting them to share knowledge, it needs to be paid more attention to creating an environment to take actions, because they seem to have enough motivation.
However, keeping the KS activities relaxing and enjoyable might be an effective way in addition to formal steps in the processes.

In the following step, it is apparent that the small talks and presentations cover the most percentage in the pie with 37.5% and 31.25% (Appendix 16). These numbers depicted that the employee tends to prefer interactive methods when they are sharing their knowledge. Besides, it helps them to build up their good relationship with their colleagues. Moreover, talking directly with each other may be a good way to instruct others to do something. Mainly, their knowledge is related to product developments, so interactive ways are their preferences. The high interaction on a community portal can be a good option for them when they can save their time and access to this platform at any time they want.

Above that, these below two pie charts (Appendix 17 and 18) will show their interest in both online and offline workshops. As can be seen in the charts, the employees are excited about taking part in offline and online workshops at the moment. However, it seems that they get more interest in offline workshops as in the current processes with 68.75% on "agree" without any "disagree" option (Appendix 17 and 18).

Looking back to the current processes of gaining knowledge, the company also still offer the employees online courses so that they can learn by themselves. Nevertheless, if the company wants to improve online methods for KS, more

effective options need proposing. The explanation is that the employees feel efficient in interactive approaches.

Finally, although they are always motivated and willing to share their knowledge, they still have their barriers in KS. Based on their barriers (Appendix 19), efficient and effective methods can be presented. With the largest part of "busy" in the chart (56.25%), they usually have difficulties in finding free time, which is one of the common challenges mentioned in Table 1.

5.2   General Perception of Current KS in the Case Company

In accordance with the current numbers in the previous sectors, the KS processes in the case company have these below main points, which details answers to the fourth question in this research paper.

Firstly, in general, their plus is the high level of the employee's self-motivation. As forementioned about their company culture, the staff members are customer-oriented, flexible and highly motivated. They primarily can teach themselves and be willing to join in KS activities with the aim of personal development instead of material rewards. Thus, high attention to motivate them in a material method is not a good choice. Instead, focus on metal rewards such as improving their recognition and creating their interactive environment to learn may work more fruitfully.

Secondly, their knowledge gaining and KS processes are still random activities (Appendix 3 and 4). Particularly, most of their KS activities in small talks and projects review session. That can cause the case that some employees cannot gain their knowledge and have chances to share their project-related knowledge if they do not attend these meetings.

Thirdly, knowledge gaining is mainly based on the employees' preferences (Appendix 3). Therefore, the success of this process is due to the self-motivation from the employes. However, luckily, with the high level of motivation (Appendix 13 and 14) and satisfaction about the current workshops and meetups (Appendix 10 and 11), their knowledge gaining activities seem to be operating effectively. Thus, at the moment, the company need to focus more on improving their KS activities rather than the knowledge gaining activities.

Fourthly, with their core value in open communication (mentioned in Sector 5.1.1), the employees prefer open environment and direct interaction. That explains why their current methods in KS are small talk and feedback in review sessions with team leads. Specifically, employees prefer more practical and

interactive approaches rather than single reading and writing (Appendix 16). In addition, the results are shown in appendix 17 and 18 proved that they prefer both offline and online KS activities, but offline interaction still is preferable. Therefore, creating a dynamic community and small activities that everyone can join when they have time can be a great way.

In the past, they are trying to utilize Microsoft Teams (Teams) for the short term. As a consequence, some employees are accustomed to using this platform. Nonetheless, the company has not discovered a suitable method to implement it for the whole company. After all, they still have tremendous motivation and consideration to explore new solutions to proceed with KS processes fruitfully and appropriately.

Lastly, it can be understood when they have to work in multiple projects most of the time. For this reason, time is one of the most important factors the company need to concern. In other words, to gain effective KS processes, the methods need to be less time-consuming, simple and available for both online and offline. In fact, not all people can join every sharing session or be present in the company every day. Hence, it can be appropriate for them to have two ways to share their knowledge at any time and any place.

6 RECOMMENDATIONS

6.1 Expected Benefits and Features from ICT Solutions for KS

As aforementioned in Chapter 3 and 4, ICT solutions are playing a vital role in business existence in the digital age. The ICT applications allow the businesses, especially SMEs, to build a firm and effective KS process to facilitate their knowledge flow. In other words, they can limit KL and obtain fruitful KM.

The ICT applications can bring advantages to any organizations. However, to build a productive and suitable KS systems, it should be fitting with their requirements and other factors such as human, business systems, leadership and learning. Therefore, based on the current states and conceptions of the case company, benefits and expected features from the ICT solutions for KS processes are clarified correspondingly as stated in Table 7.

To begin with, an ICT solution can allow the company to access all work-related information immediately at any time. In other words, the employees can search, manage contents, files and documents proactively and effectively by themselves.

In particular, the case company currently does not have a specific knowledge base to store knowledge or important information about multiple projects for the whole company. In the meanwhile, each employee may be storing their own knowledge and documents on cloud services on their own. Therefore, it can hinder the possibilities of gathering and accessing all their knowledge in one place. Moreover, most of the time, the employees contact and support each other directly in review meetings during their projects or via small talks in their free time. As a result, they are working quite individually and randomly. It might be proceeding fruitfully at the present. In the future, however, it might not an

appropriate method for all of them when the company size is expanding gradually.

Moreover, high-tech usage connects people all together and let the employees find any contact information to collaborate or get support effectively. At the moment, the employees are mainly utilizing Outlook, Whatsapp, Skypes or Slacks to communicate and collaborate. However, it might not be an effective way to share knowledge on many platforms at the same time. Not only is it challenging to gather all information, knowledge and find contacts, but it also costs them much time to transit to other platforms. Meanwhile, the company has no solution to show all available contacts from four offices at this time. It results in the case that the employees only get to know some of them in the company. The cycle of partnership seems to be downsized. Especially, newbies or interns can have difficulties in finding a suitable person to ask for help. Besides, if the company is expanding, the employees will have no chance to get to know their colleagues or suitable people when necessary.

Furthermore, the ICT implementation can improve their interaction during KS processes such as searching, reaction, asking and answering through forums, discussion areas, idea boards, and team spaces. Throughout the survey (see in the appendix), the results have pointed out that the employees prefer interactive methods to share their knowledge. Active interaction will help all employees engage in sharing knowledge and receiving assistance when they need quickly and easily.

The solution should help the employees update new information or announcement on time and organized. Currently, all announcements from HR, Sales or Management departments are mainly via Outlook, while they usually receive tons of emails every day. As a result, they can lose or reply late to some important announcements. Furthermore, the employees seem to have no chance to search and recheck any older news from the company. Besides, forms, surveys or events which need to gather all responses and feedback from

every employee are being done through Outlook or online sheets. It is relatively difficult for them to update and fill out these forms punctually. Furthermore, the employees can forget to check and reply these forms among a myriad of other emails and tasks.

Last but not least, this is an efficient method to save time and cost for the whole company. In Appendix 19, the figures showed that the biggest concern of employees is the lack of time. Every worker has to solve their own tasks and seems busy to share their knowledge all the time. That explains why they need an effective and efficient solution to save their time and effort to learn how to use and implement it.

Table 7. Benefits and Features from an ICT Solution for KS.

Expected benefits	Desired features
All-time access	- Effective file management, available for all types of documents such as doc, excel, powerpoint, audio, image, and video. - Deep search engine to search every character on their file contents - Integration with cloud services such as Drive and Dropbox. - Shared files across different teams - Blog or content areas such as Wiki pages
Broaden internal networking	An organization chart or employee profiles to show

	- enough contact information such as names, roles, emails, and phone numbers. - Deep search engine to search all contact information.
Engagement Boosting	- Forums, discussions and questions areas - Instant messaging (live chat for private and group communication) - Social interaction features such as @mention, #tag, like, react, comment, share, comment, and vote. - Gamification to boost engagement
Real-time news updating	- Dashboard or internal company site to help the employees access all old and new news and announcements - Pinned posts or bookmarks to allow them to read and mark important - Calendar integration such as Outlook to sync events (The company still use Outlook all the time to connect with their customers.)
Business Efficiency	Active Directory (login with

	LDAP) • Less maintenance • Secure data • Mobile access • User-friendly interface • All-in-one solution

6.2 Possible ICT Solutions for KS in Mansystems

6.2.1 MangoApps

MangoApps is an all-in-one integrated suite of workplace apps, which can combine useful apps together such as Intranet, workplaces, filesharing, recognitions, files managements, messaging and training. They provide all solutions for both SMEs and larger companies, especially for the mid-market organizations (MangoApps Inc. 2019).

The MangoApps solution can help the employees access fast and easily to all of their desired features (table 7) while the subscription fee is lower than other competitors which have equivalent functions. Moreover, the case company can customize features they wish to have on their app. Thanks to it, the cost might be more reasonable.

In general, MangoApps can offer the company multiple choices including Company Portal Apps (Mango Intranet, Mango Community and Mango 360), Employee Engagement Apps (Mango Pulse and Mango ESN), Internal Communication Apps (Mango Exchange, Mango Messenger, TinyTake for Teams) as well as Contents & Collaboration Apps (Mango Teams and Mango CloudCMS). Every package is corresponding to specific features that they can choose based on their requirements. However, depending on Table 7, the represented features on MangoApps are Company Site, Dashboard, Instant Message, Forms & Trackers, Survey, Ideas, Wiki, Teams, Files Management, Newsfeed, Recognition, Gamification, and Questions.
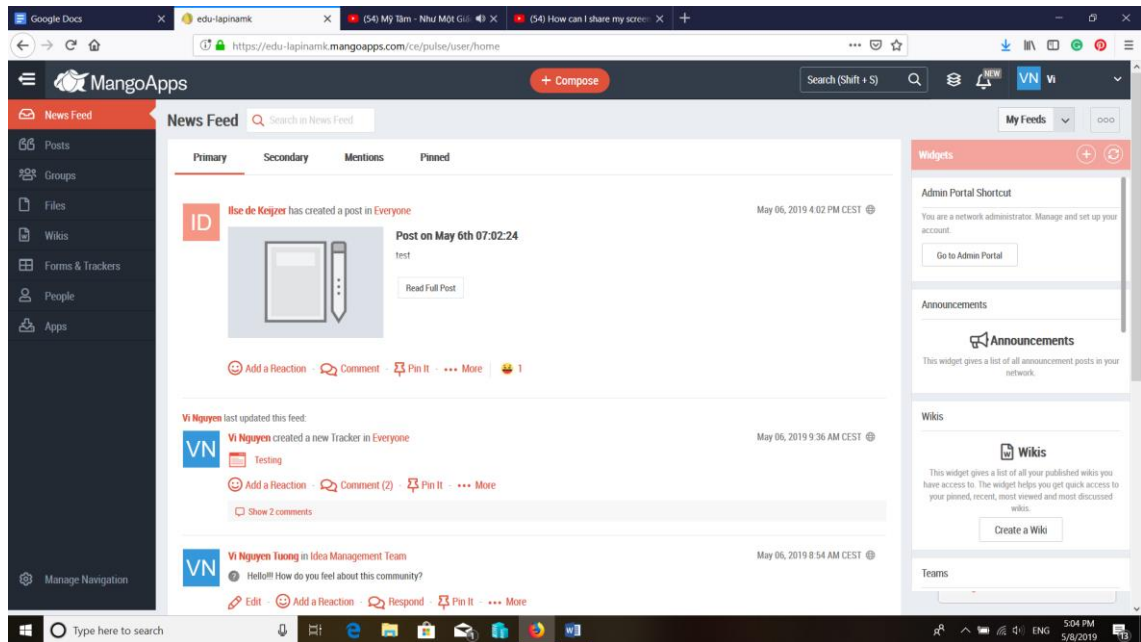
Figure 8. User-friendly Interface of MangoApps

In general, Mangoapps might be an appropriate choice with the all-around features and user-friendly interface. In details, they have a variety of features and service package so that the case company can depend on their expected features to choose the best options for them. It can be called as a tailored measure. Nevertheless, they have downsides as in Table 8.

Table 8. Pros and Cons of Mangoapps.

Pros	Cons
• All-in-one solution • User-friendly interface • Detailed guidelines for users in the app • Enable most of the desired features • Potential file management • An organization chart or employees profiles of the whole company	• Have customized fee • From less popular company (compared to Microsoft)

• Deep search engine (search with characters on the content) • Be maintained by the third party • Available on mobiles • Available in multiple languages (Dutch, German, and English) • Have a translation function for documents • Have a virtual assistant to read documents	

With the advantages and disadvantages, choosing Mangoapps can cause the case company to some challenges:

Firstly, if the company choose this solution, they need to consider whether the benefits can be worth their investment. By and large, the case company is one of SMEs, so spending much budget should be considered carefully before deciding. However, MangoApps offer free 14-day trial accounts, which can be useful for them to have testing sessions with small groups first before making any further decisions. Moreover, they can start with some features and see whether the solution can work for them or not. After that, they can enable more features if necessary.

Secondly, the support teams can response quite slowly. Therefore, they need to be patient and schedule a live demo with them to customize the features based on their wish benefits and current states. It is also an easy method to bargain the cost with MangoApps. As aforementioned, the fee is based on requirements.

Finally, no matter which solution they choose to implement, it can be challenging for them to change the employees' habits. Although the employees seem to have avid motivation to share their knowledge, they have less time to

spend on new apps and start to change their working routines. In the current, they are familiar to Outlook. When the company starts to make use of a fresh solution, they have to get familiar to new features, interfaces and move their documents to another place. That is the reason why the company needs to think about a good implementation plan to help the employees at the beginning. Otherwise, the KS processes can fail in the first steps.

6.2.2 Combination of Teams, Yammer and Sharepoint

To begin with, the case company tried to use Teams for a short term to share their knowledge (Section 5.1.3). Although this solution was not a useful choice for them at that time, it is a potential approach for them to implement a successful KS process. Especially, with their subscription with Enterprise Microsoft 365 package, they can use almost Microsoft applications without any fee, which can save them much money. Besides, some of the employees get familiar to Microsoft. Therefore, it is easy for them to implement it in some ways.

Moreover, the company cannot only use Teams for their KS because Teams mainly can meet several requirements compared to their expectation in Table 7. Teams, Yammer and Sharepoint seem to have cross functions, but one of them cannot offer all of the expected benefits. In the meantime, if they combine Microsoft Teams, Yammer and Sharepoints effectively, they still can have most of their desired features at the beginning.
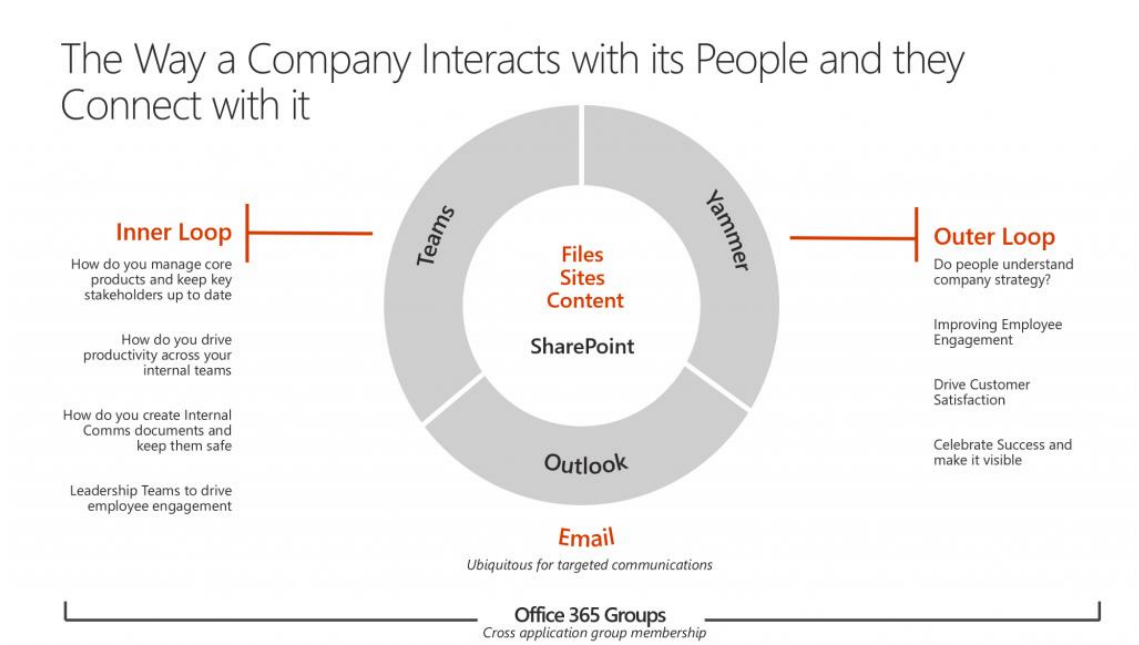

Figure 9. Functions of Communication Platforms from Microsoft (Crandon 2018).

Figure 9 pointed out that Teams is a suitable option for working in an inner loop. In other words, it can be regarded as a fruitful choice for working with teams or small groups, which allows the employees can have a live instant chat at any time. Meanwhile, Yammer is a represented approach for an outer loop and helpful for larger groups. Specifically, it can show the interface with a newsfeed and other social network features such as create a post, react, comment, and @mention.

At the same time, Sharepoint can work effectively in file and content management. With Sharepoint, the company can create company sites, dashboards and files easily. The employees can access these sites and files all the time. However, they cannot have any instant chat or messages on this application. If they wish to communicate with other colleagues, they have to utilize other options such as Yammer, Teams, Outlook or Skypes.

Table 9. Differences among Teams, Yammer and Sharepoint.

Teams	Yammer	Sharepoint
• Focuses more on small teamwork. • Has dynamic instant chat features. • Can create other tabs to expand its functions. • Can integrate with multiple solutions, especially Yammer. (Yammer seems to be a bridge of this combination)	• Focuses more on an internal community. • Have modern look with social network functions such as tag, @mention, comment, like, votes and reply. • Can update posts, questions, polls, praises, announcements. • Have email	• Can create a dashboard or companies site for the whole company • Have a file management feature to go through easily all new news, conversations or documents, but the company needs to customize these

• Can link files with Sharepoint.	message features, instead of instant chatting. • Cannot pin the posts. • Cannot link files with Sharepoint	sites manually. • Can add Yammer to any sites and Teams to its navigation bar. • Can comment, like and share the whole site, but not for any specific posts.

Above are the reasons why the case company might combine Teams, Yammer and Sharepoint to get their full expected features. Nonetheless, this combination can be cumbersome and challenging for the company as in Table 10. Undeniably, they are free-of-charge and more reliable for them.

Table 10. Pros and Cons of the Combination of Teams, Yammer and Sharepoint.

Pros	Cons
• Is free-of-charge. • Is potential to meet most of our requirements. • Has a professional support team (from Microsoft). • Has more dynamic instant chats in Teams. • Links to Outlook (the employees are using Outlook all the time). • Has a video call feature via Teams.	• Has no organization chart or employee profiles. • Has less dynamic search engine (only search on file names and whole keywords). • Has less effective file management and sharing. • Has to combine 3 platforms to meet most of the requirements (table 7). • Is less user-friendly than MangoApps. • Takes time to set up and guide

• Is potential to integrate more solutions from Microsoft and other partners.	users at the beginning. • Takes time for the company to upgrade or maintain by themselves. • Is hard to use mobile versions (The employees need to download two or three applications in one phone). • Is better for using the website version. • Has slow loading speed. • Has no translation feature (hard to share documents for both Dutch and German colleagues).

Like Mangoapps, the downsides of the combination of Teams, Yammer and Sharepoint can require more attempt and other investment from the company:

First of all, despite the full potential for being implemented as a fruitful KS solution, this combination still causes many challenges for the company. They have to establish and customize all applications based on their requirements. In specific, the company needs to create team spaces, tabs, company sites and dashboards by themselves. It might take their time and effort to think hard about organized structures to help the employees use these applications effectively and quickly.

Moreover, as aforementioned in section 5.2, their main concern is time-saving. Consequently, if we need to invest time more in creating a logical structure and a proper user path or guidelines. In particular, this solution needs customization from the company. That explains why the employees cannot know how to use it at first glance. Thus, they need to have a manual, guideline or a useful user path to start utilizing it.

Not to mention, when they have any problems with this combination, they need to maintain and upgrade by themselves. It can cost them much time and attempt to fix errors. Moreover, it can have a negative impact on their KS processes such as losing information and having no backup options to share knowledge. In other words, the company needs to fix these applications as soon as possible.

Last but not least, like MangoApps option, when the company starts to implement the combination of Teams, Yammer and Sharepoint, they need to pay sufficient attention to how to help the employees change their working habits at the first steps. At present, they are mostly using Outlook, so it might take a short time to make them engage and become active in a new KS solution.

In summary, Section 6 has proposed two ICT suggestions for a productive KS method in the case company, which has also answered the final research question in the thesis. Despite a variety of workplace applications and platforms in the market, these recommendations are chosen to be fit all their requirements and current states after analyzing the data and doing much research.

7   CONCLUSIONS

Indeed, KS is playing a vital role in business growth and existence in the information age these days. If any business underestimates its significance, they might have to confront massive troubles in improving their quality services and products. On the other hand, sufficient and effective investment in KS processes can save their finance, time and effort to support their constant and stable development.

Nonetheless, a productive KS implementation can be challenging for any enterprises, especially SMEs with limited resources. There is a range of reasons to cause a failure in the KS processes. Primarily, they may be involved in human factors. Employees can face deep concerns such as little free time, unwillingness to share their knowledge, afraidness of leaving behind, hesitance to change and unawareness of how to share. Not to mention, every enterprise needs to pay attention to cultural aspects and working environments which lead to employee's different attitudes.

To implement successful KS strategies, enterprises can take advantages of advanced technologies in the digital era to boost their employees' engagement and smoothen KS processes. Utilizing ICT solutions can facilitate KS activities and make them productive and efficient. Nevertheless, ICT solutions are only considered as a facilitator, because they cannot replace completely with human, process and learning factors in the pillar of KM (Figure 6). Thus, if companies have a misunderstanding of the roles of technology in KS strategies, they can be on the verge of failure.

Yet, after all, ICT combination still has a massive influence on fruitful KS processes. That explains why I emphasized on two ICT recommendations for the case company, which helps them improve their random KS in the current state.

In general, although Mangoapps is less popular than Microsoft, its solutions have enough potential features for an all-around KS application based on the

list of expected benefits and functions (Table 7). Consequently, MangoApps option can allow the employees to have efficient communication and high interaction while they can save their time.

In the meanwhile, the combination of Teams, Yammer and Sharepoint can also be a reasonable choice for a narrow budget since this solution is free-of-charge for the case company. Still, mainly, it will take them much time and effort to establish organized sites, structures and guidelines before they start to implement. According to the figure of the survey (Appendix 19), the biggest problem in KS is time consumption.

Therefore, the MangoApps solution might be a proper choice for the case company due to its versatility, time-saving, user-friendly interface, and enriched features. When the company makes use of it, they can get rid of Microsoft Teams which they used to utilize for a while. MangoApps can combine all of their expected features in one application. In other words, it supports them to sync all documents, knowledge, and communication from the whole company with four offices in one system. Although its live chat function is not potential on the website version, they still have effective instant communication on the mobile version. Moreover, the company can implement immediately. If they have any technical issues, they can contact the support team to get help quickly. With those advantages, it is a potential option for the company, even in the future when it is increasing in size.

In contrast, the second solution of Teams, Yammer, and Sharepoint is still possible. To get better efficiency, they should combine Teams with other Microsoft tools such as Yammer and Sharepoint. However, they have included in Office 365 packages, which save much budget for the company. It seems to be an economical choice for SMEs for the short term. In detail, this combination requires them to do more research to make a firm foundation for their KS systems before their implementation. Furthermore, the slow loading speed can be slightly challenging for them to operate and manage it for a long time, especially if they plan to upsize their business.

The case company is a typical example of one of SMEs in the technology industry. They are not the only business which concerns about and has challenges in facilitating an effective KS system, particularly in the information world where knowledge is a key to business existence. That is one of the primary reasons for starting this thesis. The findings throughout the thesis have proved that a meticulous consideration and investment in fruitful KS activities are essential to avoid money, time-wasting, and knowledge leakages.

In spite of various factors in every SMEs in the world, those findings and recommendations might contribute slightly to supporting any business decisions when a company is thinking about implementing innovative and effective KS processes. Hopefully, with the combination of theory and empirical cases can give an overall insight for SMEs in all industries, especially technology areas, to decide on KS investment and their future research.

Generally speaking, this thesis has given reasonable answers to its research questions at the beginning. The results draw attention to the vital roles of technological advance in KS strategies. Moreover, the findings have extended and updated the latest ICT solutions for SMEs, typically the case company. They mainly can help them save time and effort on attempting to use the full potential of a KS process. In other words, they can avoid reinventing the wheels in KS issues during their growth.

However, the informatics in this thesis needs improving in the future. In specific, the survey was only sent out in the case company, so the results seem to be appropriate for them. Further research and data analytics can help this thesis entails and ensure the real requirements of SMEs. Besides, it would be of significance if additional studies could reveal a deeper insight into the implementation plan. In particular, although this thesis has proposed two recommendations, it needs more research on how the company can start to implement them. No matter which solution they choose, they still confront common challenges. One of them is the human factor. ICT solution implementation should come together with a careful plan for the first steps of

changing or innovation in KS. If so, the company can avoid disappointments and failure to proceed with new processes.

BIBLIOGRAPHY

Abid Afzal, B. 2015. The Role of Information Technology in Business Success. Accessed 5 May 2019. https://www.linkedin.com/pulse/role-information-technology-business-success-abid-afzal-butt/.

Alavi, M. & Leidner D.E. 2001. Review: knowledge management and knowledge management systems: conceptual foundations and research issues. MIS Quarterly, Vol. 25, No. 1 107–132.

Arnold, J.A., Arad S., Rhoades J.A., & Drasgow, J. 2000. The empowering leadership questionnaire: The construction and validation of a new scale for measuring leader behaviors. Journal of Organizational Behavior 249 – 269.

Aston, B. 2018. Engage Your Teams: 10 Best Communication Tools Of 2019. Accessed 15 May 2019. https://thedigitalprojectmanager.com/best-communication-tools/.

Babcock, P. 2004. Shedding Light on Knowledge Management. Accessed 25 May 2019. http://bit.ly/2kJOTQ2.

Bagnaia, S. 2013. The role of knowledge sharing in SMEs' innovation and internationalization process - A case study: Monnalisa Spa. Accessed 20 May 2019. https://bit.ly/2kdk2LH.

Bartol, K.M., and E.A. Locke. 2000. Incentives and motivation. Compensation in Organizations: Progress and Prospects 104 – 117.

Bhatt, Dilip. 2000. EFQM Excellence Model and Knowledge management Implication. Accessed 23 May 2019. https://bit.ly/2mckQkz.

Blair, C. 2012. Netherlands has 6th most advanced ICT economy in the world. Accessed 16 May 2019. http://bit.ly/2mf5j3v.

Boh, W.F. 2007. Mechanisms for sharing knowledge in project-based organizations. Journal of Information and Management 27–58.

Bukowitz, W. R., and Ruth L. W. 1999. The Knowledge Management Fieldbook. London: Financial Times Prentice Hall.

Burke, W. 1986. Leadership as empowering others. San Francisco: Executive Power.

Burpitt, W.J., & Bigoness W.J. 1997. Leadership and innovation among teams: the impact of empowerment. Small Group Research 414 – 423.

CBS 2018. The Netherlands leads Europe in internet access. Accessed 25 May 2019. http://bit.ly/2ke7Qdt.

Chakravarti, N. 2008. Content Management vs. Knowledge Management. Accessed 7 May 2019. http://bit.ly/2kxDWBm.

Chan, S.L., & Chow, S.W. 2008. Social network, social trust and shared goals in organizational knowledge sharing. Information and Management, Vol. 45 No. 1.

Chen, C.J., & Huang, J.W. 2007. How organizational climate and structure affect knowledge management – the social interaction perspective. International Journal of Information Management 104 –118.

Chugh, Mitali, Chugh, N., Punia, D.K. & Alok A. 2013. The Role of Information Technology in Knowledge Management. Accessed 28 May 2019. https://www.atlantis-press.com/article/6397.

Crandon, J. 2018. Internal Communications Where Should Your Conversations Start. Accessed 20 May 2019. http://bit.ly/2keXN82.

Deci, E.L., & Ryan, R.M. 1987. The support of autonomy and the control of behaviour." Journal of Personality and Social Psychology 1024 – 1037.

DiscoverText 2019. About Our Text Analysis Data Science Software. Accessed 21 May 2019. https://discovertext.com/.

DiskDrill 2019. Top 5 Best Free Data Recovery Software for Windows. Accessed 25 May 2019. https://www.handyrecovery.com/best-data-recovery-apps.html#forward.

Dixon, N. M. 2000. Common Knowledge; How Companies Thrive by Sharing What They Know. Boston: Harvard Business School Press.

Dr. Gilbert E. Jones III, D. 2017. Knowledge sharing and technological innovation: The effectiveness of trust, training, and good communication. Cogent Business & Management.

Durden, O. 2018. Five IT Functions in an Organization. Accessed 28 May 2019 https://smallbusiness.chron.com/five-functions-organization-34002.html.

D'Aspremont, C., Bhaffacharya, S., & Grard-Varet, L. A. 1998. Knowledge as a public good: efficient sharing and incentives for development effort. Journal of Mathematical Economics 389–404.

Educatorstechnology. 2013. 8 Good Mind Mapping And Brainstorming For Teachers And Students. Accessed 27 May 2019. http://bit.ly/2kJUYMn.

Eze, Uchenna & Goh, Gerald & Goh, Choon Yih & Ling Tan, Tiong. (2013). Perspectives of SMEs on knowledge sharing. VINE. 43. 10.1108/03055721311329963.

Fathi, N.M., Eze, U.C., & Goh. G.G.G. 2011. Key determinants of knowledge sharing in electronics manufacturing firm in Malaysia. Library Review 53 – 67.

FinancesOnline 2019. Monday.com Review. Accessed 10 May 2019.

https://reviews.financesonline.com/p/monday/.

FinancesOnline 2019. Top 13 Most Popular Collaboration Software. Accessed 25 May 2019. https://collaboration-software.financesonline.com/.

Financesonline 2019. Wrike Review. Accessed 26 May 2019. https://reviews.financesonline.com/p/wrike/.

Finestone, N., & Snyman, R. 2005. Corporate South Africa: making multicultural knowledge sharing work. Journal of Knowledge Management 128 – 141.

Ford, D. P, & Chan, Y. E. 2003. Knowledge sharing in a multi-cultural setting: a case study. Knowledge Management Research & Practice 11 – 27.

Garfield, S. 2014. 16 Reasons Why People Don't Share Their Knowledge – and what to do about it. Accessed 5 May 2019. http://bit.ly/2kxhmJ7.

Gestal, Marcos, & José M. A. 2009. Evolutionary Approaches to Variable Selection. Accessed 2 May 2019. http://bit.ly/2lT6mWo.

GetApp 2019. Intranet Software. Accessed 21 May 2019. https://www.getapp.com/collaboration-software/intranet/.

Ghani, S. R. 2009. Knowledge Management: Tools and Techniques. DESIDOC Journal of Library & Information Technology 33 – 38.

Gilbert, N. 2019. 15 Best Content Management Software Systems For Your Business. Accessed May 7 2019. https://financesonline.com/top-15-content-management-software-systems-business/.

Grevesen, C.W., & Damanpour, F. 2007. Performance implications of organisational structure and knowledge sharing in multinational R&D networks. International Journal of Technology Management 113 – 136.

Gross, B. 1964. The Managing of Organizations: The Administrative Struggle. New York: Free Press of Glencoe.

Growth Engineering 2016. The importance of a Knowledge Sharing Culture. Accessed 24 May 2019. https://www.growthengineering.co.uk/knowledge-management-online-learning/.

Guest Contributor 2018. Top Benefits of Knowledge Sharing Across an Organization. Accessed 28 April 2019. http://bit.ly/2mchVbv.

Gurteen, D. 1999. Creating A Knowledge Sharing Culture. Knowledge Management Magazine.

Hane, P. J. 2007. FAST Acquires Convera's RetrievalWare Business. Accessed 16 May 2019. http://bit.ly/2kJRGZx.

Harper, M. 2018. 4-Step Guide to Knowledge Mapping. Accessed 17 May 2019. https://www.apqc.org/blog/4-step-guide-knowledge-mapping.

Hendriks, P. 1999. Why share knowledge? The influence of ICT on the motivation for knowledge sharing. Knowledge and Process Management 91 – 100.

Hislop, D. 2003. Linking human resource management and knowledge management via commitment: A review and research agenda. Employee Relations 182 – 202.

IBM 2019. Why IBM SPSS software? Accessed 17 May 2019. https://www.ibm.com/analytics/spss-statistics-software.

ICTamymccarthy. 2012. Components of an ICT system. Accessed 20 May 2019. http://bit.ly/2kH2ckp.

Janus, S. S. 2016. Becoming a knowledge-sharing organization. In Becoming a knowledge-sharing organization, by Steffen Soulejman Janus, 3 – 7. Washington: World Bank Group.

Johannesburg 2003. Introduction to Convera. Accessed 20 May 2019. http://bit.ly/2ke5ICv.

Khademi, Maryam, Hoda K., and Maryam H. 2011. E-learning as a Powerful Tool for Knowledge Management. 5th International Conference on Distance Learning and Education 42.

Khan, K. 2019. 2019 Knowledge Management Trends: Search, Analytics, and the Impact of AI. Accessed 26 May 2019. http://bit.ly/2lSThMN.

Kivrak, Serkan, Andrew R., & Gokhan A. 2009. Impacts of Cultural Differences in Knowledge Management Practices in Construction. Istanbul: Fifth International Conference on Construction in the 21.

Litsa, T. 2017. Why have collaboration tools become so popular?. Accessed 27 May 2019. http://bit.ly/2mdMygP.

Lucid Software Inc. 2019. How Lucid Chart Works For You. Accessed 10 May 2019. https://www.lucidchart.com/pages/home

Mahapatra, R.K. & Sarkar, S. 2000. The Role of Information Technology in Knowledge Management. AMCIS 2000 Proceedings 421. Accessed 30 May 2019. http://aisel.aisnet.org/amcis2000/42

MangoApps Inc. 2019. What Is MangoApps? Accessed 10 May 2019. https://www.mangoapps.com/

Mansystems 2019. The Mansystems Story. Access 28 April 2019. https://www.mansystems.com/about-us/

Mayer, R.C., Davis J.H., & Schoorman, F.D. 1995. An integrative model of organizational trust. Academy of Management Review, Vol. 20 No. 3.

McGregor, C. 2018. Using Constructive Research to Structure the Path to Transdisciplinary Innovation and Its Application for Precision Public Health with Big Data Analytics. Technology Innovation Management Review Vol. 8 Issue 8.

Miniwatts Marketing Group 2019. Internet World Stats. Usage and Population Statistics. Accessed 5 May 2019. https://www.internetworldstats.com/.

Spiderscribe.net 2019. Capture, connect and share ideas easily! Accessed 10 May 2019. https://www.spiderscribe.net/

Mohamed, Mirghani & Stankosky, Michael & Murray, Arthur. (2006). Knowledge management and information technology: Can they work in perfect harmony?. J. Knowledge Management. 10. 103 – 116. 10.1108/13673270610670885.

Mphidi, Hamilton, & Retha S. 2004. The utilization of an intranet as a knowledge management tool in academic libraries. Intranet as a management tool. Vol. 22, No.5 393 – 400.

Newman, D. 2018. Top 10 Digital Transformation Trends For 2019. Accessed 17 May 2019. http://bit.ly/2kH5F2g.

Nonaka, I., & Takeuchi, H. 1995. The Knowledge-creating Company. Oxford: Oxford University Press.

Owiti, J. O. 2019. Use of Information Communication Technologies in Knowledge Management. Nairobi: Technical University of Kenya.

Oyegoke, A. S. 2011. Sep. The Features of the Constructive Research Approach 28 April 2019. http://bit.ly/2lT46hS.

Pangil, Faizuniah, & Aizzat M. N. 2013. Knowledge and the Importance of Knowledge Sharing in Organizations 15 May 2019. http://repo.uum.edu.my/16360/1/15.pdf

Panopto 2018. Unshared Knowledge Costs Money. Accessed 2 May 2019. http://bit.ly/2kH2pUJ.

Paolo, Neirotti, & Paolucci E. 2013. Why do firms train? Empirical evidence on the relationship between training and technological and organizational change. International Journal of Training and Development 93 – 115.

Pasquariella, S. 2003. Knowledge Management & KnowledgeSharing: An Interactive Session 28 April 2019. http://www.aplici.org/wp-content/uploads/2003/susan.pdf

Postolache, A. 2017. 10 Ways Not Sharing Knowledge Impacts Your Company. Accessed 30 April 2019. http://bit.ly/2kH7igv.

Potapovas, N. 2017. Information overload is plague of modern society. Accessed 30 April 2019. http://bit.ly/2keMbSt.

Promineo AS 2017. Knowledge delivery management: A method for planning knowledge work. Accessed 4 May 2019. http://bit.ly/2mfXYRh.

Quast, L. 2012. Why Knowledge Management Is Important To The Success Of Your Company. Accessed 2 May 2019. http://bit.ly/2kJSBJt.

Researchinfoonline.com 2019. Research Methods. Accessed 28 April 2019. http://www.researchinfoonline.com/research-methods.html.

Riege, A. 2005. Three dozen knowledge-sharing barriers manager must consider. Journal of Knowledge Management Vol. 9 No. 3, 18 – 35.

Robbins, S. 1993. Organizational Behavior. NJ: Prentice Hall, Upper Saddle River.

Robinson, S. 2018. Nov. Lack of Knowledge Sharing Can Cost Millions. Accessed 10 May 2019. http://bit.ly/2ke6fEv.

Rouse, M. 2017. ICT (information and communications technology, or technologies). Accessed 20 May 2019. http://bit.ly/2lK1m6B.

Sackmann, S.A., & Friesl, M. 2007. Exploring cultural impacts on knowledge sharing behavior in project teams – results from a simulation study. Journal of Knowledge Management Vol. 11, No. 6 142 – 156.

Serban A.M. & Luan, J. 2002. Overview of Knowledge Management. Special Issue: Knowledge Management: Building a Competitive Advantage in Higher Education. Vol. 2002, Issue 113 5 – 6.

Shahid, Ahmed, & Rana A. 2011. ICT Enabled Knowledge Sharing – Impact of ICT on Knowledge Sharing Barriers - The Case of Avanade 18 May 2019. http://bit.ly/2mf3Gmp.

Shore, B. & Cross, B.J. 2005. Exploring the role of national culture in the management of large-scale international science projects. International Journal of Project Management, Vol 23 55 – 64.

Spacey, J. 2016. Knowledge: Loss vs Waste Jun 1 2016. https://simplicable.com/new/knowledge-loss-vs-knowledge-waste.

Srivastava, A., Bartol, K.M. & Locke, E.A. 2006. Empowering leadership in management teams: effects on knowledge sharing, efficacy, and performance. Journal of Management 1239 – 1251.

Straits Knowledge Digital Pte Ltd. 2018. What Can You Do With Aithin? Accessed 11 May 2019. https://www.aithinsoftware.com/

Subashini, R., Rita, S., Vivek M., Krishna P. V., Babu, M.R. & Ariwa, E. 2012. The Role of ICTs in Knowledge Management (KM) for Organizational Effectiveness. Berlin: Springer Berlin Heidelberg.

Suss, T. 2018. How Is Artificial Intelligence Changing Knowledge Management?. Accessed 20 May 2019. http://bit.ly/2lT4iO8.

Teece, D. 1998. Capturing value from knowledge assets: the new economy, markets for know-how and intangible assets. California Management Review, Vol. 40 No. 3 55 - 79.

Thorpe, E. K. 2019. Strategy. Accessed 28 April 2019. http://bit.ly/2majB5i.

Tolbert, P. S. & Hall, R. H., 1934-, (author.) (2016). Organizations: structures, processes, and outcomes (Tenth edition). London Routledge, Taylor & Francis Group.

Uriarte, F. 2008. Introduction to Knowledge Management. Jakarta: ASEAN Foundation.

Wang, Minhong & Stephen J.H.Y. 2009. Knowledge Management & ELearning: An International Journal. HongKong: Hong Kong Bao Long Accounting & Secretarial Limited.

Weiss, C. 2019. Top 10 Learning Systems for 2019. Accessed 26 May 2019. http://bit.ly/2kcObus.

Yaacob, Raja A.I.R., Muhammad R.T.L.A., Raja A. R. Y., Abdur R.M.A., Zulqarnain A.B., Azelin M.N., & Azrai A. 2011. Knowledge Sharing in Organizations: Issues of Society and Culture, Problems and challenges. International Journal of Basic & Applied Sciences IJBAS-IJENS Vol. 11, No. 02.

Zucal, C. 2016. Why Your Company Needs Knowledge Sharing and Continuous Learning . Accessed 1 June 2019. http://bit.ly/2kahwFQ.

Zyngier, S. M. 2001. The role of technology in knowledge management: trends in the Australian corporate environment. Melbourne: School of Information Management & Systems, Monash University.

Åkerblom, Nilsson, J. & Pontus. 2017. Knowledge Management Systems Issues Within Organizations. Växjö: Linnaeus University.

APPENDICES

Appendix 1. Mansystems Customer Satisfaction Level, Photo

Appendix 2. As-is Project Process in Mansystems, Photo

Appendix 3. As-is Gaining Knowledge Process in Mansytems, Photo

Appendix 4. As-is Sharing Knowledge Process in Mansystems, Photo

Appendix 5. Questions in the Survey, Survey

Appendix 6. Genders of Responders in the Survey, Photo

Appendix 7. Departments the Responders Come from, Photo

Appendix 8. Chart of Workshops/Meetups Frequency from Departments, Photo

Appendix 9. Statistic Table of Workshops/Meetups Frequency From Departments, Photo

Appendix 10. Satisfaction Level for Workshops/Meetups Content

Appendix 11. Satisfaction Level of Workshops/Meetups Organization, Photo

Appendix 12. Frequency Statistic Tables of the Employees' Working Interest, Photo

Appendix 13. Frequency Tables of Their Motivation at Work, Photo

Appendix 14. Crosstables of Employees' Interest and Willingness in Sharing Knowledge, Photo

Appendix 15. Frequency Tables of the Priority Levels in Motivating Methods in KS, Photo

Appendix 16. Employees' Preferred Ways in KS, Photo

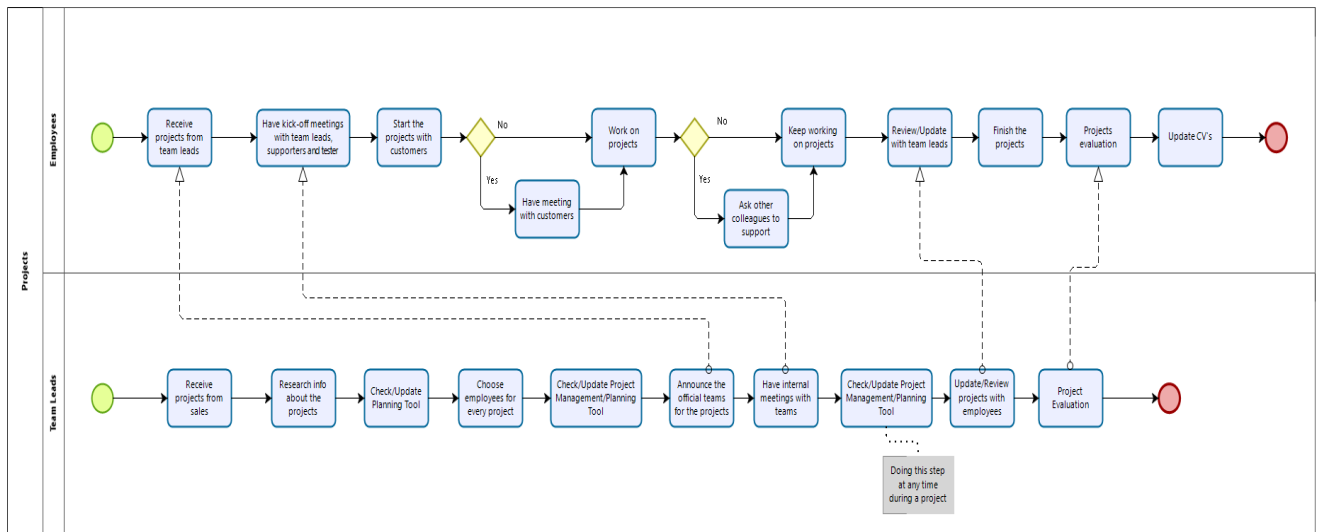Appendix 17. Employees' Preference for Online Workshops, Photo

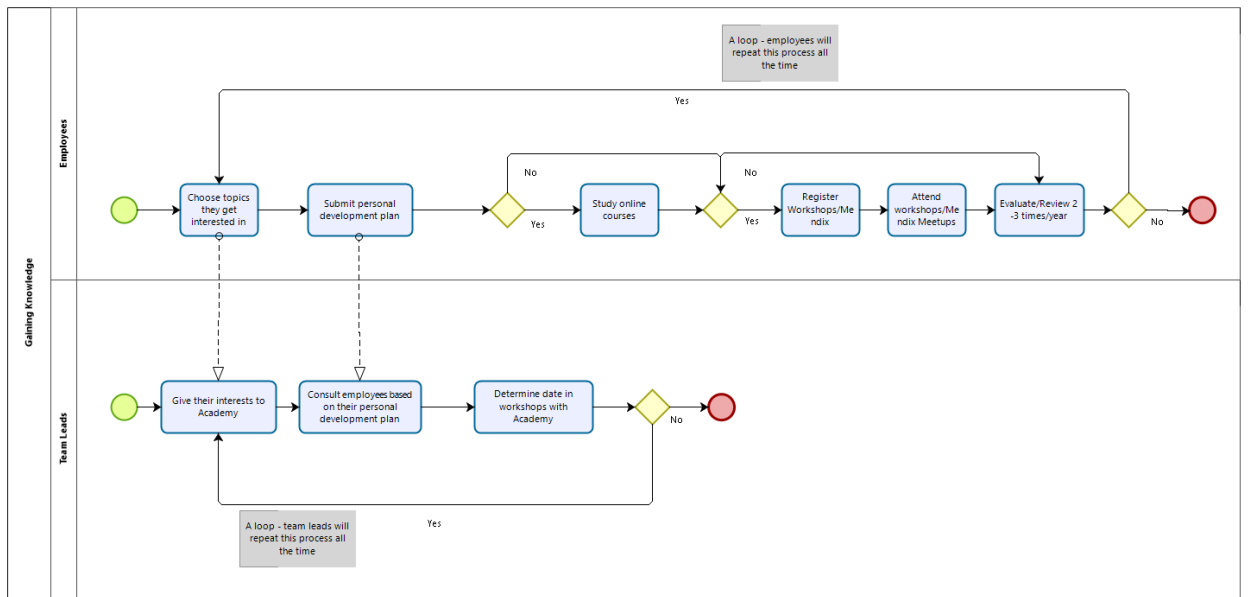Appendix 18. Employees' Preference for Offline Workshops, Photo

Appendix 19. Barriers in the KS, Photo

Appendix 1. Mansystems Customer Satisfaction Level (Mansystems 2019).

Appendix 2. The as-is project process in Mansystems

Appendix 3. As-is Gaining Knowledge Process in Mansytems
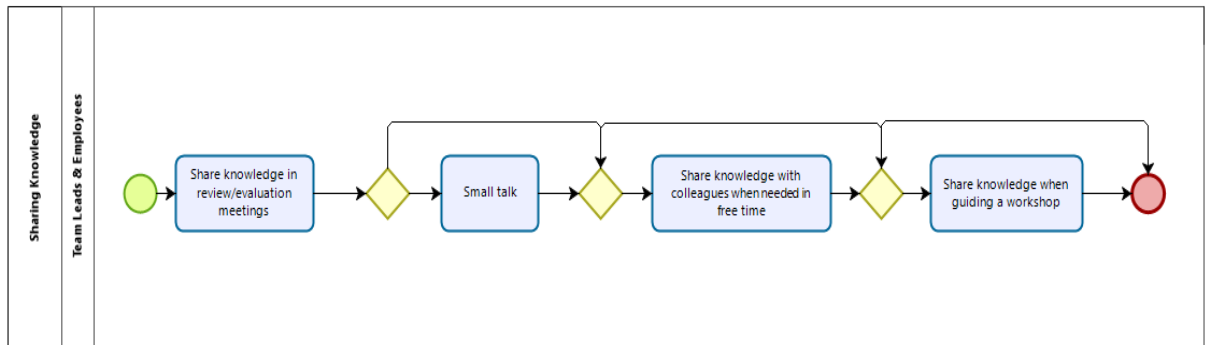
Appendix 4. As-is Sharing Knowledge Process in Mansystems

Appendix 5 1 (2): Questions in the Survey

Part 1: General Information

1. Gender (required): Female/Male

2. Which departments are you in? (required): Consultants/Technical/Academy/Experts/Other

3. How often do you attend a workshop/Mendix meetup?

4. Are you satisfied with the organization of our workshop and meetups? (required): Yes/No/Somehow/Other

5. If not, why?

Part 2: Working (required): Totally disagree/ Disagree/ Neutral/ Agree/ Totally agree

1. At work, I always focus on my work

2. I am excited about going to work

3. I feel that working days go fast

4. I'm inspired to meet my goals at work

5. I cannot think of many special characteristics that distinguish me from others at work

6. I've got a clear idea of what I want to be

7. I feel happy being a member of this organization

8. I do this job because I derive much pleasure from learning new things

9. I do this job because it allows me to make a lot of money

10. I prefer outside activities with my colleagues rather than indoor activities.

Appendix 5 2 (3): Questions in the Survey

Part 3: Learning & Sharing (required):

1. Choose Totally disagree/ Disagree/ Neutral/ Agree/ Totally agree

   a) I'm interested in learning by reading.

   b) I'm always ready for sharing knowledge with others.

   c) I'm willing to share my work story every month.

   d) If the company has an online community, I am willing to write something to share.

   e) I'm interested in online workshops

   f) I'm interested in offline workshops

   g) I'm interested in learning by reading.

   h) I'm always ready for sharing knowledge with others.

   i) I'm willing to share my work story every month.

   j) If the company has an online community, I am willing to write something to share.

   k) I'm interested in online workshops

   l) I'm interested in offline workshops

2. How often you share your experience & information about your projects with others? Frequently/Often/Sometimes/Never/Other

3. In which ways do you prefer to learn and share? (required): Small talk/Presentation/Write/read blogs/Record/watch videos/Comment & feedback via an online community/Other

Appendix 5 3 (3): Questions in the Survey

    4. What prevents you from sharing knowledge at the company? (required):

Busy/ Don't know what to share/ Don't know how to share/ Don't know when to share/ Don't know who to share/ Lack of convenient tools/ Be unconfident of your knowledge/ Security of data or information/ Other

Part 5: Sharing Knowledge

    1. What boosts you to share your knowledge with others? (Please based on your priority 1-7 as lowest-highest) (required)

    a) Being recognized

    b) Bonus

    c) Small gifts (caps, shirts, candies, cakes,...)

    d) Service gifts (vouchers, coupons, gift cards,...)

    e) Being thanked

    f) Being forced

    g) Get promotion

    2. What other factors boost you to share knowledge? (except above)

    3. Do you have other ideas about my project? Feel free to tell me. I really appreciate it.
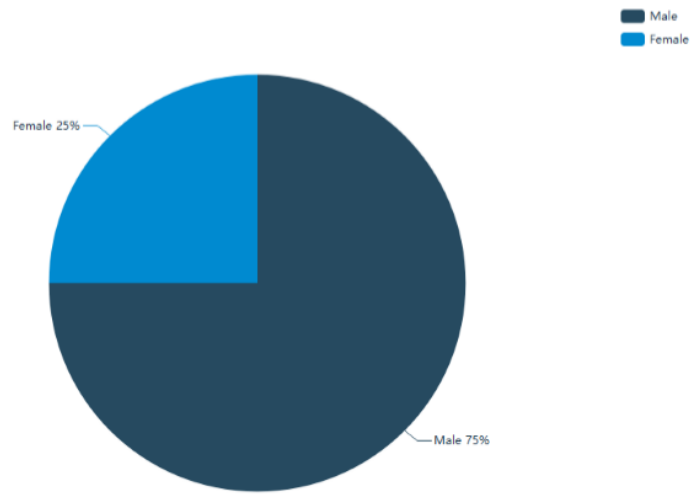
Appendix 6. Genders of Responders in the Survey
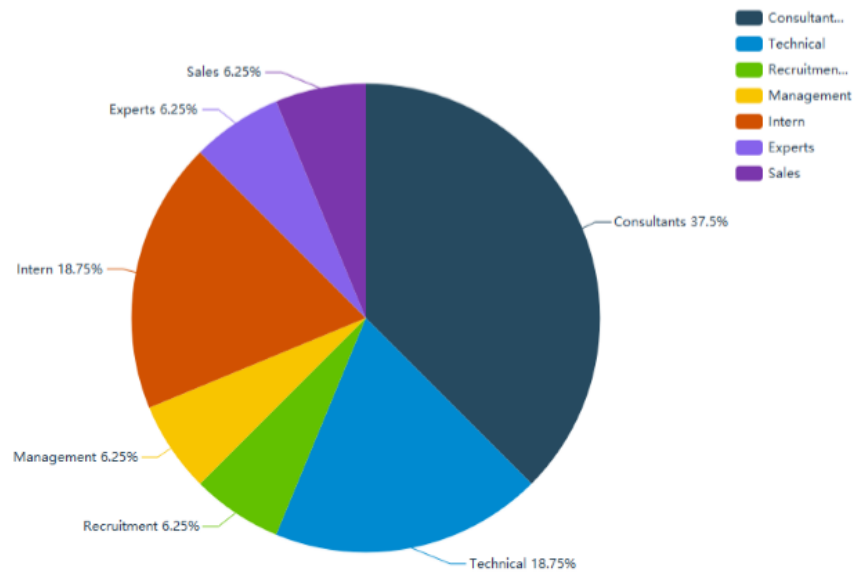
Appendix 7. Departments the Responders Come from
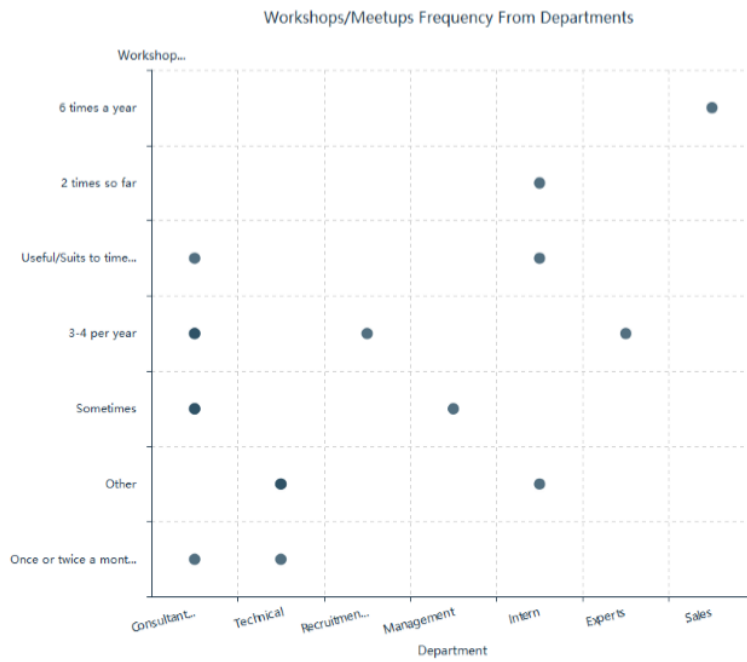
Appendix 8. Chart of Workshops/Meetups Frequency from Departments

Statistics

Workshop Frequency

N	Valid	16
	Missing	0

Workshop Frequency

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2 times so far	1	6.3	6.3	6.3
	3-4 per year	4	25.0	25.0	31.3
	6 times a year	1	6.3	6.3	37.5
	Once or twice a month	2	12.5	12.5	50.0
	Other	3	18.8	18.8	68.8
	Sometimes	3	18.8	18.8	87.5
	Useful/Suits to timetable	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

Appendix 9. Statistic Table of Workshops/Meetups Frequency From Departments
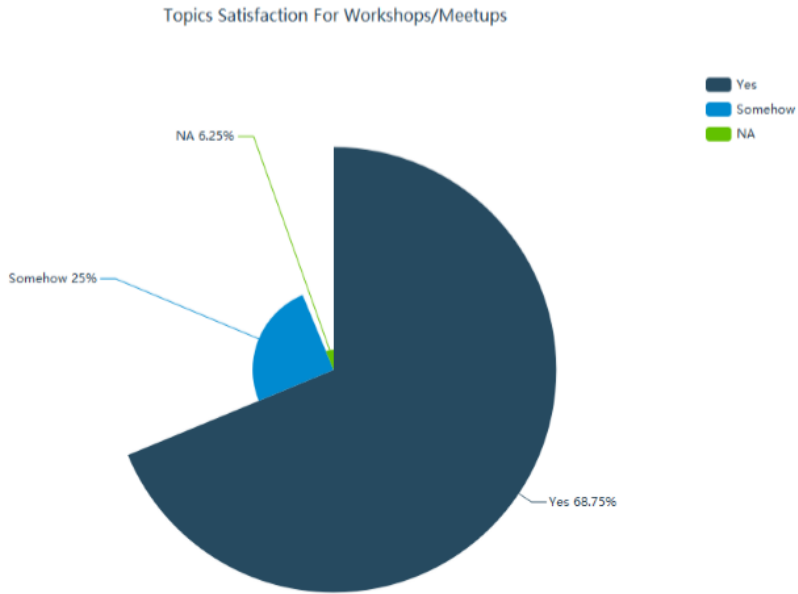
Topics Satisfaction For Workshops/Meetups

Appendix 10. Satisfaction Level for Workshops/Meetups Content

Workshops/Meetups Organization Satisfaction
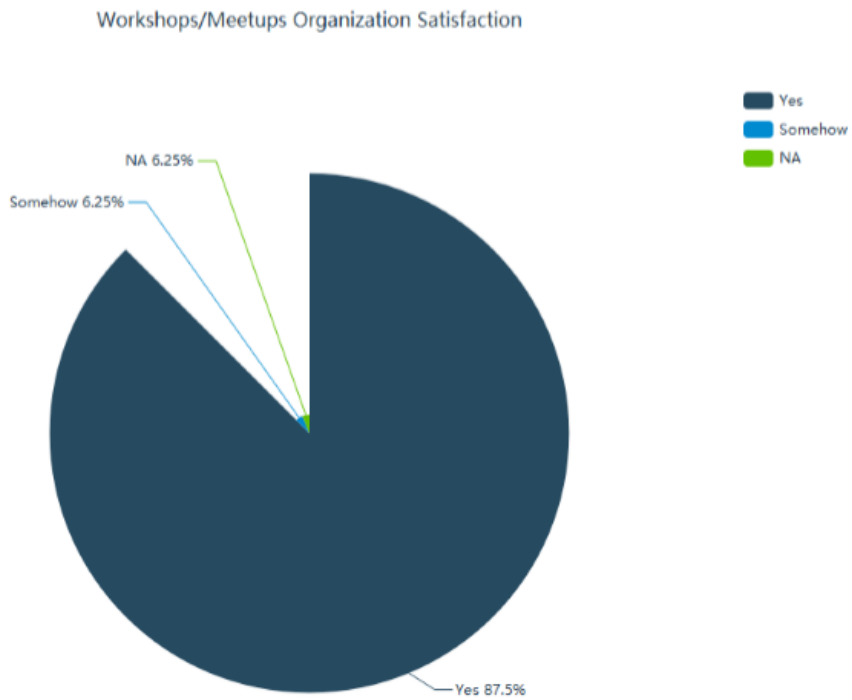
Appendix 11. Satisfaction Level of Workshops/Meetups Organization

Working [At work, I always focus on my work]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	10	62.5	62.5	62.5
	Disagree	1	6.3	6.3	68.8
	Neutral	2	12.5	12.5	81.3
	Totally agree	3	18.8	18.8	100.0
	Total	16	100.0	100.0	

Working [I am excited about going to work]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	9	56.3	56.3	56.3
	Neutral	1	6.3	6.3	62.5
	Totally agree	6	37.5	37.5	100.0
	Total	16	100.0	100.0	

Working [I feel that working days go fast]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	7	43.8	43.8	43.8
	Neutral	4	25.0	25.0	68.8
	Totally agree	5	31.3	31.3	100.0
	Total	16	100.0	100.0	

Working [I'm inspired to meet my goals at work]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	11	68.8	68.8	68.8
	Totally agree	5	31.3	31.3	100.0
	Total	16	100.0	100.0	

Appendix 12. Frequency Statistic Tables of the Employees' Working Interest

Working [I cannot think of many special characteristics that distinguish me from others at work]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	2	12.5	12.5	12.5
	Disagree	6	37.5	37.5	50.0
	Neutral	7	43.8	43.8	93.8
	Totally agree	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Working [I've got a clear idea of what I want to be]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	10	62.5	62.5	62.5
	Neutral	4	25.0	25.0	87.5
	Totally agree	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

Working [I feel happy being a member of this organization]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	10	62.5	62.5	62.5
	Neutral	1	6.3	6.3	68.8
	Totally agree	5	31.3	31.3	100.0
	Total	16	100.0	100.0	

Working [I do this job because I derive much pleasure from learning new things]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	10	62.5	62.5	62.5
	Neutral	1	6.3	6.3	68.8
	Totally agree	5	31.3	31.3	100.0
	Total	16	100.0	100.0	

Working [I do this job because it allows me to make a lot of money]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Agree	2	12.5	12.5	12.5
	Disagree	4	25.0	25.0	37.5
	Neutral	10	62.5	62.5	100.0
	Total	16	100.0	100.0	

Appendix 13. Frequency Tables of Their Motivation at Work

Learning & Sharing [I'm always ready for sharing knowledge with others.] * Learning & Sharing [If the company has an online community, I am willing to write something to share.] Crosstabulation

Count

		Learning & Sharing [If the company has an online .	
		Agree	Disagree
Learning & Sharing [I'm always ready for sharing knowledge with others.]	Agree	4	2
	Totally agree	4	0
Total		8	2

Learning & Sharing [I'm always ready for sharing knowledge with others.] * Learning & Sharing [If the company has an online community, I am willing to write something to share.] Crosstabulation

Count

		Learning & Sharing [If the company has an online ...	
		Neutral	Totally agree
Learning & Sharing [I'm always ready for sharing knowledge with others.]	Agree	4	1
	Totally agree	0	1
Total		4	2

Learning & Sharing [I'm always ready for sharing knowledge with others.] * Learning & Sharing [If the company has an online community, I am willing to write something to share.] Crosstabulation

Count

		Total
Learning & Sharing [I'm always ready for sharing knowledge with others.]	Agree	11
	Totally agree	5
Total		16

Learning & Sharing [I'm always ready for sharing knowledge with others.] * Learning & Sharing [I'm willing to share my work story after every month.] Crosstabulation

Count

		Learning & Sharing [I'm willing to share my work story ..		
		Agree	Disagree	Neutral
Learning & Sharing [I'm always ready for sharing knowledge with others.]	Agree	3	5	3
	Totally agree	0	0	4
Total		3	5	7

Learning & Sharing [I'm always ready for sharing knowledge with others.] * Learning & Sharing [I'm willing to share my work story after every month.] Crosstabulation

Count

		Learning & ...	
		Totally agree	Total
Learning & Sharing [I'm always ready for sharing knowledge with others.]	Agree	0	11
	Totally agree	1	5
Total		1	16

Appendix 14. Crosstables of Employees' Interest and Willingness in Sharing Knowledge

Being forced

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	10	62.5	62.5	62.5
	2	4	25.0	25.0	87.5
	4	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

What boosts you to share your knowledge with others? (Please based on your priority 1-7 as lowest - highest) [Being recognized]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	6.3	6.3	6.3
	2	4	25.0	25.0	31.3
	4	3	18.8	18.8	50.0
	5	3	18.8	18.8	68.8
	6	4	25.0	25.0	93.8
	7	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Bonus

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	5	31.3	31.3	31.3
	2	3	18.8	18.8	50.0
	3	3	18.8	18.8	68.8
	4	2	12.5	12.5	81.3
	5	2	12.5	12.5	93.8
	6	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Service gifts (vouchers, coupons, gift cards,...)]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	4	25.0	25.0	25.0
	2	5	31.3	31.3	56.3
	3	2	12.5	12.5	68.8
	4	2	12.5	12.5	81.3
	5	1	6.3	6.3	87.5
	6	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

Being thanked

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2	1	6.3	6.3	6.3
	3	2	12.5	12.5	18.8
	4	3	18.8	18.8	37.5
	5	5	31.3	31.3	68.8
	6	3	18.8	18.8	87.5
	7	2	12.5	12.5	100.0
	Total	16	100.0	100.0	

Small gifts (caps, shirts, candies, cakes,...)]

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	4	25.0	25.0	25.0
	2	6	37.5	37.5	62.5
	3	2	12.5	12.5	75.0
	4	3	18.8	18.8	93.8
	6	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Get promotion

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	18.8	18.8	18.8
	2	4	25.0	25.0	43.8
	3	2	12.5	12.5	56.3
	4	5	31.3	31.3	87.5
	5	1	6.3	6.3	93.8
	7	1	6.3	6.3	100.0
	Total	16	100.0	100.0	

Appendix 15. Frequency Tables of the Priority Levels in Motivating Methods in KS
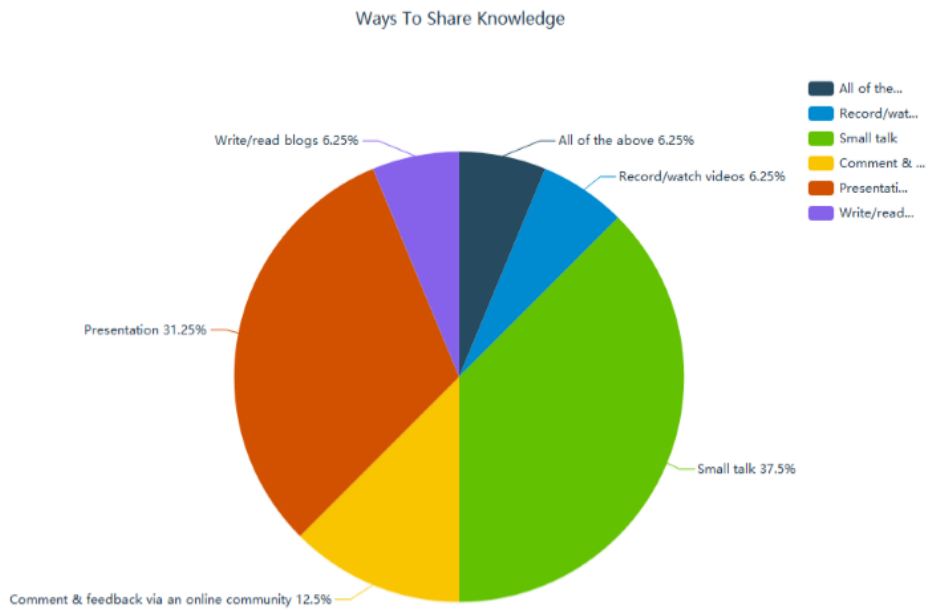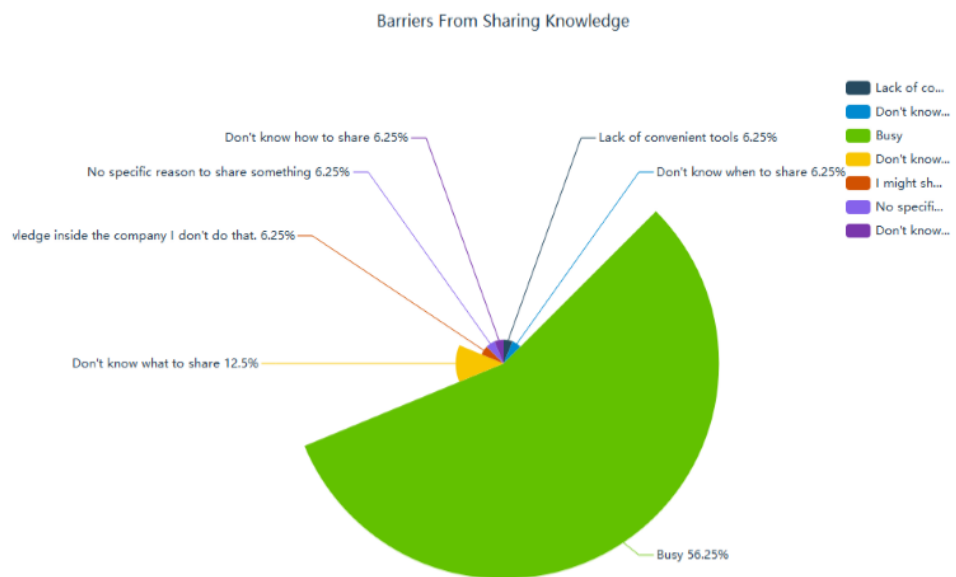
Appendix 16. Employees' Preferred Ways in KS

Appendix 17. Employees' Preference for Online Workshops

Offline Workshop Preference

Neutral 6.25%

Totally agree 25%

Agree 68.75%

Agree
Totally ag...
Neutral

Appendix 18. Employees' Preference for Offline Workshops

Barriers From Sharing Knowledge

Don't know how to share 6.25%

No specific reason to share something 6.25%

...vledge inside the company I don't do that. 6.25%

Don't know what to share 12.5%

Lack of convenient tools 6.25%

Don't know when to share 6.25%

Busy 56.25%

Lack of co...
Don't know...
Busy
Don't know...
I might sh...
No specifi...
Don't know...

Appendix 19. Barriers in the KS