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LEVERAGING KNOWLEDGE AT STARTUPS

by

AMRUTA ANIL RANADE

A THESIS

Presented to the Faculty of the Graduate School of the
MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY

In Partial Fulfillment of the Requirements for the Degree
MASTER OF SCIENCE IN TECHNICAL COMMUNICATION

2017

Approved by

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ABSTRACT

Startups contribute to the economy and job creation in the United States. One of the primary assets of startups is tacit knowledge of the employees of the startup. Technical communicators can help startups capture, share, and leverage the tacit knowledge at startups. Technical communicators could benefit from learning how knowledge management initiatives at startups work. The current study is an ethnographic case-study that was conducted at a fast-growing startup in California.

The data for the study was collected through observations, informal and semi-structured formal interviews with participants, and feedback from customers of the startup. The collected data was analyzed based on Wick's conceptual framework. The framework describes four perspectives that technical communicators should know about knowledge management initiatives: document perspective, technological perspective, socio-organizational perspective, and knowledge organization perspective.

The study shows that at the research site, the content creation process for knowledge management initiatives is similar to the technical writing process for documentation projects. Technical communicators are expected to be technologically proficient in collaborative tools, authoring tools, as well as complex products of the startup. Technical communicators need to secure buy-in from all stakeholders and develop rapport with SMEs. Finally, knowledge management initiatives were on the radar of senior management at the startup. Being a part of high-visibility team could help technical communicators advance their careers. However, the conclusions are relevant only to the research site and cannot be generalized.

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NOMENCLATURE

Abbreviation	Description
KM	Knowledge Management
SME	Subject Matter Expert
VP	Vice President

1. INTRODUCTION

Today's Knowledge Economy is driven by startups. Out of the total U.S. GDP of \$15 trillion in 2015, \$1 trillion was contributed directly by only nine fast-growing startups (Beachy, n.d.). Startups are also the major job providers in the U.S. Haltiwanger, Jarmin, and Miranda (2010) conducted a study based on the data from the Census Bureau to determine the primary job creators in the U.S. economy. The authors concluded that smaller companies created more jobs than larger companies during 1992-2005.

The primary asset of startups is tacit knowledge (that is, intellectual capital). O'Dell and Grayson (1998) explained the difference between tacit knowledge (knowledge which resides in the employees' brains) and explicit knowledge (knowledge which is documented in the form of policies, white papers, and so on). Daley (2001) stated that it is imperative for startups to move the focus from material resources to intellectual capital (that is, tacit knowledge) to gain a competitive edge and increase the chances of the startup's survival (p. 3). But Hormiga, Batista-Canino, and Sánchez-Medina (2011) found that many startups do not recognize their tacit knowledge and hence do not manage the knowledge well (p. 2). International Data Corp. stated that Fortune 500 companies lose at least \$31.5 billion every year because of not sharing knowledge (Babcock, 2004).

Proactive knowledge management at startups could safeguard against "loss of skilled people through turnover, pressure to avoid reinventing the wheel, pressure for organization-wide innovations in processes as well as products, managing risk, and the accelerating rate with which new knowledge is being created" (Dalkir, 2011, p.4).

Knowledge Management (KM) is an interdisciplinary field (Dalkir, 2011, p. 8). As seen from Figure 1.1, one of the primary disciplines of KM is technical writing.

In 2003, Giammona conducted a study, wherein she enquired into the future of technical communication from the perspective of experienced practitioners. One of the participants in the study, Neil Perlin, stated, "Our role has to change as the environment changes" (as cited in Giammona, 2004, p. 352).

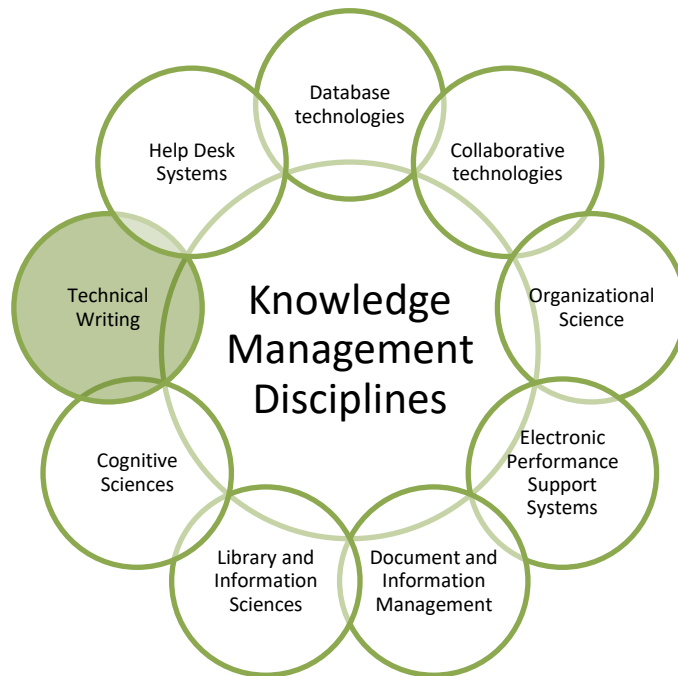


Figure 1.1. Interdisciplinary nature of Knowledge Management. Adapted from Dalkir (2011).

Giammona's (2004) study revealed that to stay relevant in changing technological and commercial times, technical communicators need to be innovative, be aware and mindful about an organization's financial and business roadmaps, and be in sync with the ever-changing technology. As Kimball (2015) stated, "What we do, what we call ourselves, how we form and encourage the development of new members of our profession – all have changed so quickly that we must constantly reassess where we stand, what we do, and who we are as technical communicators" (p. 89). Thus, technical communicators need to proactively look for opportunities that demonstrate their value to their organizations (Giammona, 2004).

Knowledge Management is one such area of opportunity for technical communicators to move beyond the "product-centered role in organizations" and capitalize on their unique skillset of capturing and sharing knowledge (Wick, 2000, p. 523). Hughes (2002) argued that technical communicators must consider themselves as "creators of knowledge" instead of just being "information packagers" (p. 284).

Knowledge Management (KM) is a well-researched subject within the entrepreneurship, business, and information technology domains. Even technical communication researchers have taken an interest in the field of knowledge management (Glick-Smith, 1998, 2001; Hughes, 2002; Leonard, 1999; Wick, 2000). The existing literature focuses on why technical communicators should consider KM as a career path. However, the literature rarely discusses real-life, behind-the-scenes processes and activities that can help technical communicators learn about working in the KM domain.

Usually companies make exciting discoveries, but due to lack of time and resources, they do not examine what aspects of the discovery worked and why. Hence, academicians should research industry's products and processes to understand and document the discoveries (Hughes & Hayhoe, 2009, p. 9).

My study attempts to investigate and analyze how a startup implements its KM initiative. The goal of the study is to provide an insight into KM initiatives at startups from a technical communicator's perspective.

LeCompte and Schensul (2010) recommended ethnography as the research method when the research topic is relatively new and under-researched. The topic then warrants exploration to identify and understand different aspects of the topic (p. 41). Because the topic of knowledge management at startups from a technical communication perspective is relatively unexplored, I adopted ethnographic case-study methodology. I conducted an ethnographic study at a fast-growing startup (hereinafter, Startup Inc.) in Sunnyvale, California.

Because little is known about the KM practices at startups, I adopted an existing conceptual framework as a starting point. Wick (2000) introduced four knowledge management perspectives for technical communicators: document-centered, technological, socio-organizational, and the knowledge organization perspective (p. 516). These perspectives informed my research questions for the study:

R1. What are the documents created by the knowledge management team at the startup?

R2. What are the technological tools employed by the knowledge management team at the startup?

R3. Who are the stakeholders and participants in the knowledge management initiative at the startup?

R4. Who are the members of the knowledge management team at the startup?

2. LITERATURE REVIEW

The three interweaving themes of my study are organizational knowledge management, convergence of knowledge management and technical communication, and relevance and importance of startups. The following sections review the existing literature about the central themes.

2.1. ORGANIZATIONAL KNOWLEDGE

Okuda (2001) explained how knowledge originates within an organization. He explained that when faced with problems, organizations do not simply process existing information to find a solution. Instead, organizations innovate and create new knowledge to redefine the problems as well as the solutions (p. 392).

Nonaka and Takeuchi (1995) argued that knowledge is created by individuals in an organization, whereas the organization supports the individuals and provides contexts for them to create knowledge. Therefore, organizational knowledge creation is “the process that “organizationally” amplifies the knowledge created by individuals and crystallizes the knowledge as a part of the knowledge network of organization. The knowledge creation process takes place within an expanding community interaction, which crosses intra- and inter-organizational levels and boundaries” (Nonaka and Takeuchi, 1995, p. 59).

To explain the knowledge creation activities, Nonaka and Takeuchi (1995) introduced four different modes of knowledge creation and conversion. The conversion modes help in deciphering the stages of knowledge management process in organizations. Figure 2.1 recreates the original image by Nonaka and Takeuchi (1995) that shows the four modes:

- Socialization is conversion from tacit knowledge to tacit knowledge
 - Externalization is conversion from tacit knowledge to explicit knowledge
 - Combination is conversion from explicit knowledge to explicit knowledge
 - Internalization is conversion from explicit knowledge to tacit knowledge
- (Okuda, 2001, p. 394).

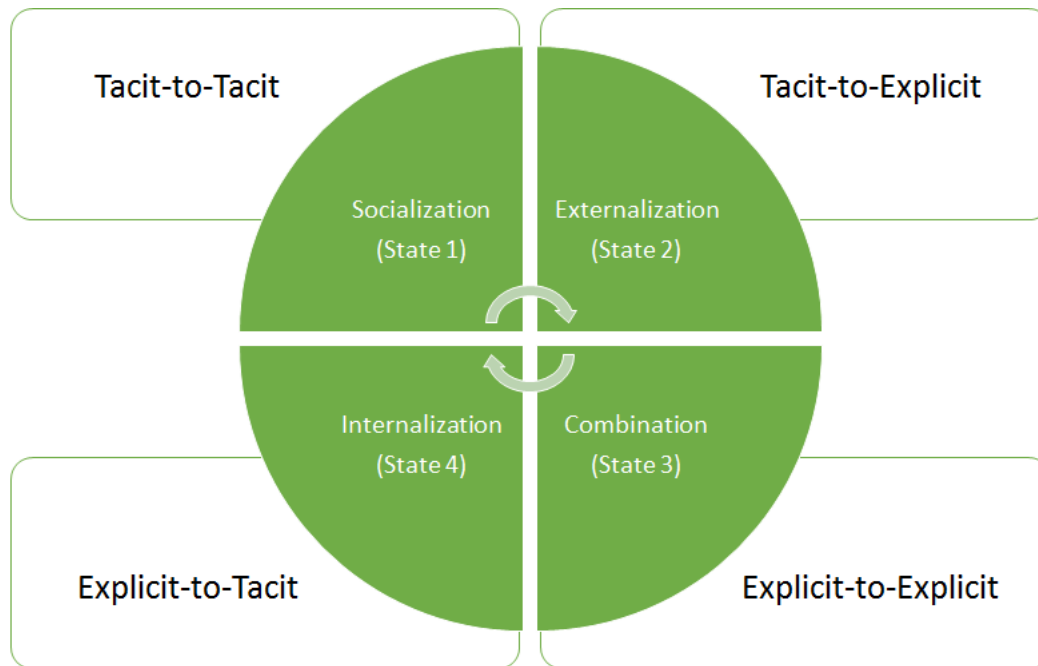


Figure 2.1. Knowledge conversion modes. Adapted from Okuda (2001, p. 394).

Socialization is the sharing of tacit knowledge, such as technical skills or conceptual knowledge. Examples of socialization include apprenticeship and on-the-job training (Okuda, 2001, p. 394).

Externalization is the codifying tacit knowledge in the form of documents, communication channels (such as Slack, Yammer, and Gitter), videos, conversations, and so on (Okuda, 2001, p. 394).

Combination refers to “organizing information into an accessible knowledge system. The process of sorting, adding, combining, and categorizing explicit knowledge can lead to new knowledge” (Regis, 2008, p. 281).

Internalization is the process of assimilating and learning the explicit knowledge and then using the knowledge to fulfill job responsibilities (Okuda, 2001, p. 394).

While discussing the importance and relevance of organizational Knowledge Management, Lew Platt (former CEO of HP) has often been quoted for saying “If HP knew what HP knows we would be three times more profitable” (as cited in Frappaolo, 2006, p. 2).

Several definitions of knowledge management are found in existing literature. Mahapatra and Sarkar (2000) defined knowledge management as “creation, sharing, and distribution of knowledge within an organization” (p. 1289). Carla O’Dell and C. Jackson Grayson, Jr. (1998) discussed the importance and application of knowledge management for organizations. The authors defined Knowledge Management as “a conscious strategy of getting the right information to the right people at the right time” (p. 6). The authors state that knowledge is an important asset for organizations that should be shared within the internal network. The knowledge can help employees take actions based on the knowledge.

Davenport and Prusak (1998) identified four reasons for the increase in the interest in knowledge management. The first reason they cited is the new competition in a fast-paced global economy. Learning to identify, manage, and cultivate knowledge is vital for organizations to gain and maintain the competitive edge. The second reason the authors cited is the trend towards leaner organizations, which creates the requirement of capturing knowledge of existing employees before they are let go. The third reason the authors cited is the realization that technology cannot substitute for human knowledge. Technology aids and enhances the knowledge management process, but at the end, only a human can make sense of knowledge. And the final reason the authors cited is the realization that knowledge is the prime capital for organizations.

To investigate if knowledge management is the latest fad in the business world or an important topic, Koenig (2012) plotted graphs of the number of articles in business literature with the phrase “KM” in the titles over a period of 10 years (Figure 2.2). The graph shows that KM is not the latest craze, but a topic of true interest.

The importance of organizational KM can be found in Phillipe Krutchen’s foreword to the first edition of the book, *Documenting software architectures: Views and Beyond* (2002). As an architectural lead at a fast-growing organization, Krutchen faced the challenge of transferring knowledge within a rapidly-growing engineering team. The challenge was compounded by the need to communicate technical information to non-technical cross-functional teams. The knowledge transfer required existing engineers to communicate same information to different audiences repeatedly. The repetitive task caused a drain on the engineers’ productive time. To address the problem, the

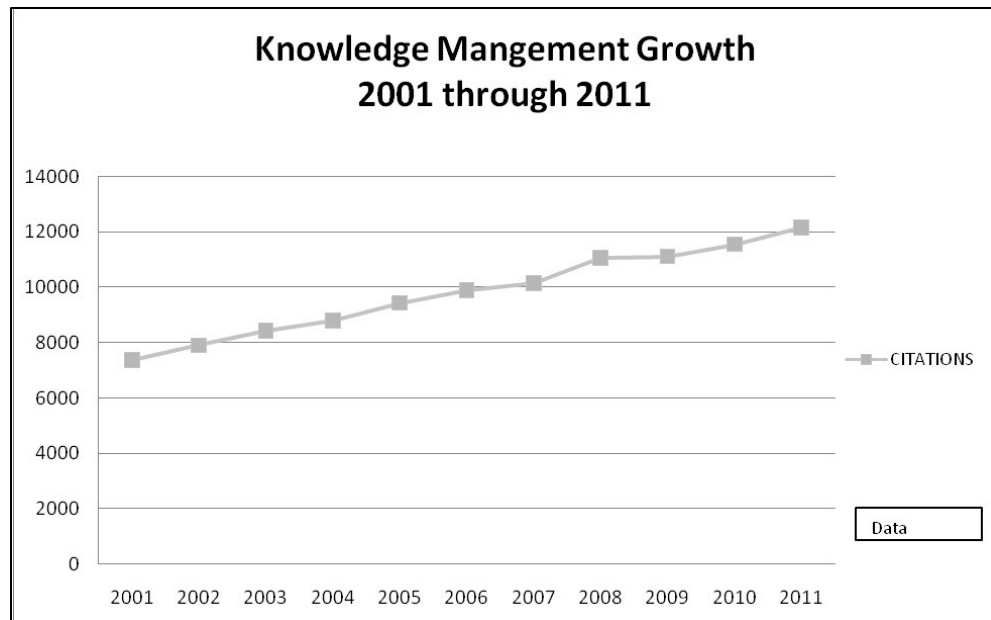


Figure 2.2. Knowledge Management growth. Reprinted from Koenig (2012).

engineering team captured the architecture and design of the product, as well as the logic for the design decisions, in the form of written documents. The written documents saved the productive time of existing engineers and allowed them to focus on their actual jobs. Krutchen's narrative demonstrated that a sound knowledge management strategy can help alleviate the growing pains of an organization.

Frappaolo (2006) discussed how knowledge management improves the financial gains of major organizations. He shared the story when IBM bought Lotus for a price 14 times that of Lotus' actual evaluation. IBM paid not for what Lotus already did, but for what Lotus could do based on its knowledge capital.

Frappaolo (2006) also gave the example of NASA's Apollo program. He pointed out that everyone related to the Apollo program has since then retired or has passed away, and with them, the knowledge of a manned moon landing has been lost forever. NASA did capture the logistical and scientific knowledge, but the tacit knowledge that was acquired during the mission was never captured and hence can never be used again. Thus, to safeguard against employee turnover, organizations need to capture their intellectual capital.

2.2. KM AND TECHNICAL COMMUNICATION

Jones (2003) discussed the convergence of knowledge management and technical communication. Jones observed that the fields of KM and technical communication developed remarkably in parallel from 1993 to 2003. Jones noted the convergence between the fields based on shared values, interests, and skills.

Several technical communicators have contributed to the understanding of KM from the perspective of technical communication. Glick-Smith (1998, 2001) introduced KM concepts and how KM should be implemented. Leonard (1999) stated that “our discipline is inextricably intertwined with the knowledge management revolution” (p. 19). He also identified three areas of knowledge management pertaining to technical communication: “business transformation”, “organizational learning”, and “Web knowledge transfer enablement” (p. 13). Leonard stated that because technical communicators are already involved in the creation of e-sources of information for organizations, they are at the forefront of the knowledge management initiatives at the organizations.

Wick (2000) claimed that technical communicators are top contenders for leadership roles in knowledge management, reminding us that technical communicators “will likely think of knowledge management as extracting and synthesizing knowledge from people with specialized knowledge (usually subject matter experts) and developing the knowledge into an easily understandable form (print or Web documents, multimedia applications, help files) for people who lack that knowledge” (p. 515).

Wick (2000) further argued that technical communicators have “three core competencies” that are crucial for knowledge management:

- Technical communicators “have a thorough understanding of the complexities of knowledge, language, and communication” (p. 524).
- Technical communicators “are exceptionally talented in working across functions, departments, and all disciplines” (p. 524).
- Technical communicators “are expert communicators” (p. 524).

Jones (2003) elaborated Hughes’ article (2002) to identify the three important contributions that technical communicators make as knowledge creators. Jones explained that technical communicators are knowledge specialists who help SMEs make explicit

what has become tacit through probing interviews and reverse engineering. And most importantly, technical communicators create knowledge assets.

2.3. THE RELEVANCE AND PAIN POINTS OF STARTUPS TODAY

The definition of a startup as suggested by the U.S. Small Business Administration is “a business that is typically technology oriented and has high growth potential” (“Startups & High-Growth Businesses”, n.d.). The important aspect of this definition of most interest to this study is “high growth potential”.

In many cases, high-growth potential startups are started by experienced and expert industry professionals. The professionals utilize their knowledge and field experience to spot opportunities of industry disruption. The professionals then leverage their knowledge and experience by starting a new commercial venture, that is, a startup. Consequently, the knowledge and experience that the founder members bring to the startup decide the success or failure of the startup (Dencker & Shah, 2007). The technical founders of the startups are the architects of the product and hence know the product in-and-out. In the early stages of a startup, the team size is typically small. Because the team is small, the founders are easily accessible and can be approached for any technical query. The operational functions include developing the product, and marketing and selling the product to the target market. These functions are usually handled by the same team.

Not only does the core team grow, but additional teams are introduced to handle different functions at the startup. These teams can be technical or non-technical, such as Quality Assurance teams, Customer Success teams, Finance, Sales, and so on. As Stanford University Professor Robert Sutton stated, “There is a lot of evidence that as a team gets bigger than five, and the closer it gets to 10, things get bad—you end up spending more and more time on coordination chores and less and less time doing the actual work” (as cited in “How To Manage Your Startup's Fast Growth”, 2014).

The major challenges that fast-growing startups face are (“Growing Pains”, 2014):

- Lack of decentralization of knowledge:

As discussed earlier, during the pre-growth stage of a startup, fewer developers

are involved in the development process and thus they have ready access to the chief architects of the product. But during the growth spree at the startup, more developers join the development team, yet the chief architects and existing developers remain the only source of information. The centralization of knowledge leads chief architects to conduct repetitive knowledge transfer sessions instead of focusing on their core productive tasks. Thus, the centralization of knowledge leads to loss of productivity of the chief architects.

- Lack of cross-team communication:

As more functional teams are added to the startup, the new (technical or non-technical) employees in these functions need inputs from existing employees to learn the product. Thus, the existing employees are required to conduct repetitive knowledge transfer sessions to onboard new employees.

- Employee turnover and loss of intellectual property:

As Lesser and Prusak (2010) stated, “When employees walk out the door, they take valuable organizational knowledge with them” (p. 1). A fast-growing startup is always at the risk of suffering from employee turnover. The risk is higher if a chief architect leaves the organization and thus the organization loses access to the intellectual capital of the architect. Intellectual capital is a prime asset for a startup that gives the startup a competitive advantage. Losing access to the intellectual capital can hurt the growth prospects of the startup. It is thus imperative to identify knowledge of value and “at risk of being lost to the organization through retirement, turnover, and competition” (Dalkir, 2011, p. 4). The most effective way to retain important knowledge is to identify intellectual assets and then ensure the knowledge is captured and stored in an easily retrievable and reusable manner (Stewart, 2000).

3. RESEARCH METHODOLOGY

3.1. OVERVIEW OF THE SECTION

The current study is a qualitative research study that employs the ethnographic case-study research method. The following sections discuss the concepts and principles of qualitative research, ethnographic research method, motivation for the study, and the research study design.

3.2. QUALITATIVE RESEARCH

Hughes and Hayhoe (2009) stated that technical communication studies that deal with “why” and “how” questions about the research topic lend themselves well to qualitative research methods. They defined qualitative research as being characterized by collection of non-numerical data, such as conversations, observations, and survey responses. They identified three phases of qualitative research: observation of events, activities, and participants in their natural surroundings, recording or noting the observations diligently, and analyzing the observation notes systematically (p. 78).

Hughes and Hayhoe (2009) also discussed the standards of rigor for a qualitative study. They identified credibility, transferability, and dependability as the standards of rigor for a qualitative study (p. 78). A qualitative study is said to have credibility if the participants represent the population of interest, and if the participants have the freedom to participate or withdraw from the research study along with the freedom of responding honestly and without any repercussions. The authors specifically stated that observation notes made by the researcher are more credible and worthwhile than the participants’ self-reports. The authors suggested that the qualitative research methods of observation should be employed when the research question entails what the participants “do.” The research method of interviews and focus groups then complement the observation notes by answering the question about why the participants do what they do and how they feel about it.

Hughes and Hayhoe (2009) explained that a qualitative research study is said to have transferability if it is conducted in an authentic or natural environment. “Authentic” refers to the real-world environment where the activity would normally occur.

Finally, Hughes and Hayhoe (2009) discussed dependability as the extent to which the qualitative research study can be replicated at different research sites, or at the same research sites by different researchers. The authors identified three factors of dependability, namely “depth of engagement, diversity of perspectives and methods, and staying grounded in data” (p. 80). Depth of engagement refers to the number of participants in the study till the point of achieving data saturation. Data saturation would be reached at a point when interviewing one more participant, or observing the research site for an additional day, or surveying yet another user would not yield any new and useful information (Hughes & Hayhoe, 2009, p. 81). Diversity of perspectives deals with triangulation of research methods, participants, as well as researchers. Staying grounded in data safeguards against the bias that the researcher might bring to the study. The authors advised that being able to trace all conclusions back to gathered data and its analysis can prevent the conclusions being interpreted through a subjective lens.

3.3. ETHNOGRAPHIC RESEARCH

The research method chosen for the current study is ethnographic case study. LeCompte and Schensul (2010) defined ethnography as a systematic approach to learn about the social and cultural environments of organizations and communities. They described the ethnographic research method as scientific and rigorous. As Moorhead (1987) stated, ethnography can capture events by “accounting for many more situational variables that determine technical communication practice” (p. 326). She further stated that “ethnography can provide important insights for research in technical communication. Such ethnographic research can zero in on studying the policies, procedures, and practices, even the ritual and rhetoric, of technical communication” (p. 327).

Ethnographic research method employs the researcher as the primary tool of data collection (Ladner, 2014). The researcher carefully observes and notes what they see and hear in the organization. The researcher also interviews people to avoid bias and ensure accuracy of collected data. Ethnographic research requires in-person interactions with the participants, and may employ qualitative research tools such as questionnaires and surveys.

Ethnographic research is an immersive research methodology, wherein the researcher spends substantial amount of time in the organization. LeCompte and Schensul (2010) stated that the customary timeframe in the early twentieth century was one to three years. However, due to time and resource constraints, present-day ethnographers may not have the privilege of investing the customary period in the organization. To compensate for the lack of time and resources, yet wanting to accomplish high-quality research, ethnographers may confine their studies to a single topic or “lens” through which they observe the interactions and proceedings in the organization (p. 18).

3.3.1. Characteristics of Ethnography. LeCompte and Schensul (2010) listed the seven characteristics of ethnography (p. 23). Of the seven characteristics, the three aspects relevant to the study under consideration are:

- Ethnographic research is carried out in natural environments, not in clinical, controlled settings:

In ethnography, primary data collection is carried out primarily through fieldwork (Whitehead, 2005). Ethnographic research is carried out in naturalistic settings, where events occur, and people behave as they were, without any intervention or interference on part of the researcher. The researcher simply observes and notes the events and interactions.

Ladner (2014) suggested that academic researchers should spend at least one “season” in the field with participants so that the researcher experiences the full breadth of activities (p. 131).

- Ethnographic research entails in-person interactions with the participants:

LeCompte and Schensul (2010) considered in-person interaction and immersion in the organizational culture as a “hallmark” of ethnographic research (p. 24). They emphasized the importance of forming relationships and gaining trust of the participants. The authors also discussed the importance of ensuring that all voices and perspectives be included in the research.

Ladner (2014) explained that an ethnographic interview is different from a traditional interview, in the sense that the ethnographic interview is more of a “friendly conversation,” a natural conversation that just happens to focus on a particular topic (p. 26).

- Ethnographic research uses a predefined lens through which the collected data is interpreted:

LeCompte and Schensul (2010) stated that to accomplish high-quality ethnographic research while adhering to time and resource constraints, ethnographers define a lens or perspective through which they observe, assimilate, and interpret data collected at the research site.

3.3.2. Auto-ethnography. Reed-Danahay (1997) defined autoethnography as the “ethnography of one’s own group” (p. 2) that situates the ethnographer within the research setting being investigated. Autoethnography affords easier access to information to the researcher as compared to an “outsider.” However, the author also warned the researcher to be aware of bringing bias to the research and emphasized the importance of objectivity in the study.

Anderson (2006) introduced analytic autoethnography, wherein the ethnographer is a full member of the research setting. Anderson identified five elements characteristic of analytic autoethnography:

1. complete member researcher (CMR) status
2. analytic reflexivity
3. narrative visibility of the researcher’s self
4. dialogue with informants beyond the self
5. commitment to theoretical analysis (Anderson 2006, p. 378).

Anderson (2006) also stated that “autoethnographers should illustrate analytic insights through recounting their own experiences and thoughts as well as those of others” (p. 384). Most importantly, the author advised that although the researcher is visible in the text, the researcher should not generalize their personal experiences (Anderson, 2006, p. 386).

3.3.3. Appropriate Use of Ethnographic Research Method. Whitehead (2004) stated that ethnography is “a process of Discovery and Continuing Inquiries” (p. 18). LeCompte and Schensul (2010) recommended that researchers use ethnographic methods when the research topic is relatively new, as in not much research has been conducted on the topic. In such a scenario, the topic warrants exploration to identify and understand the factors associated with the topic.

Katz (1998) stated that research within organizations is almost necessarily interdisciplinary, in the sense that the subjects of the study are likely to be members of different disciplines. She explained that observational techniques allow the researcher to spend considerable time at the research site. She stated that observing the participants and their interactions with each other allows the ethnographer to understand how the participants work. Most importantly, observational techniques do not depend on self-reports by the participants. She noted that in ethnographic research, events are observed in real time and the researcher can ask questions about the events as they occur (p. 106).

3.3.4. Characteristics of an Ethnographer. LeCompte and Schensul (2010) described the characteristics that an ethnographer needs to embody. They stated that the ethnographer should truly believe in the project and be able and willing to immerse in the field for considerably long periods of time. The ethnographer should not only be capable of, but should genuinely enjoy interacting with the community. The ethnographer needs to be disciplined, at the same time remain flexible and adaptable.

3.3.5. Strategic Partnerships at Research Site. LeCompte and Schensul (2010) described how ethnographers depend on participants and stakeholders at the research site to provide them access, resources, and information. These strategic partnerships are not identified beforehand, but are formed during the research.

Triangulating Data Collection Methods. Katz (1998) warned technical communicators about the possible pitfalls of ethnographic research. She discussed the “observer effect,” wherein the actions or opinions of the participants might be influenced just by the fact that they are being observed. She also warned against the possibility of the gathered data being affected by the ethnographer’s beliefs, assumptions, and goals. She advocated the triangulation of research methods to ensure that the data gathered is not influenced either by the observer effect or the ethnographer’s bias (p. 20).

LeCompte and Schensul (2010) emphasized the importance of triangulating the data sources to ensure that information obtained from one source is corroborated by multiple sources. Triangulating the data collection methods also ensures that diverse perspectives on the same topic are considered in the research. Triangulating methods also helps to avoid the effects of observer’s bias. Hughes and Hayhoe (2009) echo the recommendation.

LeCompte and Schensul (2010) described the several data collection methods for ethnographic research. For the present study, I chose their methods for observations, interviews, and content analysis. LeCompte and Schensul (2010) explained that the purpose of collecting data through observations is to record events and activities as they occur. Activities, events, settings, conversations, and interactions should be observed and noted. The data collected should be recorded in form of written notes. With regards to ethnographic interviews, LeCompte and Schensul (2010) explained that the purpose of conducting ethnographic interviews is to collect in-depth information about the topics being discussed. The interviews should be conducted with key individuals in the organization. The interviews can be unstructured or semi-structured and should consist of open-ended questions. Finally, the authors explain the purpose of content analysis is to elicit content for analysis from a document.

The data collection methods for my study were chosen based on their suitability for investigating the research questions that guided the study. Further support for the choice of methods comes from a similar study that Katz (1998) conducted, wherein she employed these three methods to collect ethnographic data.

Whitehead (2004) recommended that ethnographers continuously record field notes about what they are observing on the research site. He stated that the “open-ended, emergent, discovery-oriented iterative, and reflexive attributes of the ethnographic enterprise make the collection of daily field notes necessary simply as a means of recording what is being observed and experienced by the ethnographer. The rich details which make field notes valuable require that an ethnographer make these notes every day in the field” (p. 21).

Two perspectives that are characteristic of ethnographic research are emic and etic perspectives. An emic perspective refers to the ethnographer’s experiences in the field as an insider to the culture or organization under study. An etic perspective refers to the ethnographer’s explanation of the activities or events based on multiple sources (Woodside, 2010). Ethnographic observations in which the ethnographer participates during social activities helps the ethnographer gain emic perspective. When the ethnographer observes the participants during social activities, the observations help the ethnographer gain an etic perspective of the social setting being studied.

3.3.6. Analyzing Ethnographic Research Data. LeCompte and Schensul (2010) cautioned ethnographers that the amount of raw data gathered during the data collection phase may seem daunting, and the task of analyzing and making sense of the collected data may seem overwhelming. However, they described strategies to tackle the data analysis phase and uncover relevant knowledge.

LeCompte and Schensul (2010) stated that one way to analyze the collected data is to examine it iteratively until patterns or themes emerge. Another way to analyze the data is to sort the data into existing, predefined categories. Both strategies require combing through the data repeatedly. The big picture does not become clear all at once, but slowly emerges over multiple passes of data analysis. Once the data is segregated, then the researcher can unfold the story that the data tells by interpreting the data based on the conceptual framework.

3.3.7. Protection of Human Subjects and Ethical Considerations. LeCompte and Schensul (2010) summarized the following considerations to ensure the protection of the interests of the human participants in ethnographic research:

3.3.7.1 Voluntary involvement. The participants need to be made aware that the participation in the research study is purely voluntary, and they consent to be a part of the study.

3.3.7.2 Understanding risks and benefits. The participants need to be informed about the benefits of the study as well as the possible risks (if any) they may face on participating in the study.

3.3.7.3 Privacy/confidentiality. The privacy/confidentiality/anonymity of the participants needs to be protected.

The authors recommend obtaining the approval of an IRB (Institutional Review Board) before commencing the study so as to ensure the human participants are protected.

3.4. MOTIVATION FOR THE STUDY

Yin (2015) stated that the worldview of researchers and the desire to understand how people operate in the contextual richness of the real-world environments under different circumstances can serve as motivational factors for research.

My interest in the topic of KM at startups from a technical communicator's perspective stems from my personal experience. I secured a summer internship at a startup (Startup Inc.) in Sunnyvale, California, as the technical writer for the KM initiative of the startup. While preparing for the internship, I surveyed academic literature and other freely available sources such as blogs and websites to figure out what my role could entail. Though I found literature on why KM is a great opportunity for technical communicators, I did not find any real-life, behind-the-scenes, actionable literature that would have helped me on the job. I believed that technical communicators could benefit from learning about the inner workings of the KM initiatives at startups. Hence I chose KM at startups as the topic for my thesis.

Yin (2015) also warned that merely having a motivating interest is not sufficient to carry out a credible research study. The researcher must conduct original research that is transparent, methodical, and adheres to evidence found in the collected data. To ensure I achieve these objectives, I designed an ethnographic case-study research described in the following section.

3.5. RESEARCH STUDY DESIGN

The selection of the research method was based on the literature about knowledge management, startups, and ethnographic research. I designed an ethnographic research study to gain insight in the knowledge management practices at Startup Inc. from the lens of technical communication.

Anderson (2006) introduced the term analytic autoethnography as the ethnographic study where the researcher is a full member of the research setting. The author identified five key elements of analytic autoethnography that include the researcher having complete member researcher (CMR) status, analytic reflexivity, narrative visibility of the researcher's self, dialogue with other informants, and commitment to theoretical analysis (p. 378). My experience as a technical writer at Startup Inc. grants me CMR status. My "researcher self" is clearly visible in the current study. However, I triangulated my observations and self-narrative with interviews with other employees and collating feedback from customers of Startup Inc. Triangulating data collection methods help avoid researcher bias (LeCompte & Schensul, 2010).

3.5.1. Research Site. Katz (1998) suggested that the site for ethnographic research should be selected based on relevance, suitability, and accessibility (p. 22). The research site selected for the study, Startup Inc., is a fast-growing startup in the enterprise backup domain in Sunnyvale, California. Startup Inc. was the suitable choice because the work done at the startup is *relevant* to a study of KM at startups, the employees are *suitable* participants for such a study, and the startup executive team were willing to give me *access* to the participants.

Background of startup: Startup Inc. provides cloud-native data governance solutions for enterprises. Startup Inc. was founded in 2008 and is headquartered in Sunnyvale, California, with additional offices in India, the United Kingdom, Germany, Singapore, Japan, and Australia. Startup Inc. started with only 7 employees. Today, the employee strength is more than 300, spread all over the world.

With the massive growth spree, Startup Inc. experienced growing pains. In 2008, when the first product was built, the architects of the product designed the product end-to-end. The architects were thus the only source of information for the new developers who joined the team since 2008. But now with the engineering team consisting of more than 100 developers, the over-dependence on the founding architects hampers their productivity. Startup Inc. undertook a major hiring spree, where every week a new batch of developers joined the team. The existing developers had to conduct knowledge transfer sessions for each batch of new hires, and thus had to spend time conducting repetitive sessions for them.

Also, the number of cross-functional teams has increased since 2008. Startup Inc. now has a dedicated Sales team, a Customer Support team, a Documentation team, Quality Assurance team, and Implementation team. The cross-functional teams work closely with the Engineering team and rely on the Engineering team for inputs and clarifications. A considerable amount of information exchange is required that eats into the developers' time and hampers their productivity. Another lurking danger is that if a chief architect left the company, the departure could result in losing the intellectual asset the architect had gathered during their employment at the startup. And once the knowledge was lost, Startup Inc. would miss out on a major competitive advantage in the market.

To address the growing pains, the executive management team at Startup Inc. took proactive measures. A KM initiative was launched to streamline the capturing and leveraging of tacit knowledge of employees and disseminate the knowledge within the organization as well as to its customers and partners. The positive and proactive attitude of the executive team towards KM and the work of the KM team makes Startup Inc. the suitable choice for my study.

3.5.2. Protecting the Interests of the Startup and Participants. I obtained an approval from the IRB (Institutional Review Board) at Missouri S&T. I met with the CTO of Startup Inc. in India in December 2015 and asked for permission to conduct the research study at Startup Inc. I was readily granted permission and access to resources and participants. I also informed the VP (Post-Sales) and the KM Manager about the research study. To protect the confidentiality and anonymity of the startup, I refer to the organization as “Startup Inc.” and do not mention the name or any identifying information. To maintain the privacy and anonymity of the people involved in the study, I address them by their job titles and not by actual names. I also do not divulge any demographic or otherwise identifying information about the participants. Moreover, while conducting interviews, structured or qualitative, I verbally informed the participants that their participation was purely voluntary, and that they could refrain from answering any question or withdraw from the interview at any time.

3.5.3. Ethnographic Data Collection. I adhered to the ethnographic data collection methods prescribed by LeCompte and Schensul (2010) and Katz (1998).

As discussed earlier, LeCompte and Schensul (2010) elaborated on the data collection methods of observations, interviews, and content analysis. Katz (1998) employed these data collection methods for her ethnographic case study. Following Katz’s method, I identified the gatekeepers and obtained permission to access the resources, stakeholders, and participants. I observed and participated in the content creation efforts and trainings organized by Startup Inc. to gain an emic perspective. To gain an etic perspective, I took copious notes about my surroundings, interactions with the team members, and the training proceedings. I also conducted informal as well as semi-structured formal interviews with the stakeholders and participants and collated feedback from the training attendees (internal employees and external customers).

3.5.4. Adhering to the Standards of Rigor for Qualitative Studies. In the design of the research study, all possible measures were employed to ensure adherence to the standards of rigor for qualitative studies discussed by Hughes and Hayhoe (2009): credibility, transferability, and dependability.

3.5.4.1 Credibility. Hughes and Hayhoe (2009) described credibility of data with respect to whether the participants represent the population, activities, and environment of interest. Credibility also depends on whether the participants were free to participate, provide inputs, and answer questions honestly and without fear of repercussions. The presented study was conducted at a real-world location – a fast-growing startup in Sunnyvale, California, with willing participants who are members of an active knowledge management initiative. The participants were informed about the study and were explicitly told that they were free to withdraw from the study, decline to answer any question, and raise any doubts they had at any point in time without any repercussions.

3.5.4.2 Transferability. Hughes and Hayhoe (2009) stated that a qualitative research study is said to be transferable if the study is conducted in an authentic real-world environment and what is observed during the study matches the findings in the real world. Because the presented study was conducted at an active research site where knowledge management activities were carried out by the participants on a normal, day-to-day basis, the study has transferability.

3.5.4.3 Dependability. According to Hughes and Hayhoe (2009), a study is said to have dependability if it has depth of engagement, diversity of participants and methods, and staying grounded in data. I took every conceivable opportunity to observe, participate, and inquire into the KM activities at the startup, thus ensuring depth of engagement. The diverse roles of participants interviewed and observed for the study (CTO, VP, KM Manager, Trainers), as well as analyzing feedback from the beneficiaries of the KM activities at the startup ensures diversity of participants. The triangulation of research methods – interviewing, observing, analyzing feedback – ensures the diversity of methods. And finally, to ensure that I stay grounded in data, I analyzed the collected data based on an existing theoretical framework propounded by Wick (2000) and correlated the perspectives he defined with the observations and findings from my study.

3.5.5. Data Analysis. As LeCompte and Schensul (2010) recommended, I categorized the collected data into predefined conceptual bins. To analyze the collected data about knowledge management efforts at the startup from the perspective of technical communication, I used the conceptual framework described by Wick (2000).

Wick (2000) identified the following four perspectives of KM that technical communicators need to know about KM initiatives:

3.5.5.1 Document-centered perspective. The document-centered perspective pertains to “extracting knowledge from individuals, analyzing it, synthesizing it, and developing it into documents that make it easier for others to understand and apply” (Wick, 2000, p. 516).

Davenport and Prusak (1998) stated that organizations benefit from codified knowledge and reusing the knowledge to generate revenue. They noted that the purpose of the codification process is to transform tacit organizational knowledge into an explicit and understandable form for those who need the knowledge.

3.5.5.2 Technological perspective. The technological perspective deals with the multitude of technologies and supporting infrastructure that enable the diffusion and application of organizational knowledge.

3.5.5.3 Socio-organizational perspective. Socio-organizational approaches to KM emphasize the social aspects of knowledge creation and sharing. The socio-organizational perspective involves fostering trust and collaborations between knowledge workers, situated learning, and an ongoing dialog about the ever-evolving knowledge in the organization.

Wick (2000) identified two types of communities that engage in converting the tacit knowledge to explicitly shared knowledge. The two common types of communities are “communities of practice” and “communities of interest” (p. 518). Wick (2000) explained that the communities of practice are composed of professionals throughout an organization who share similar responsibilities and job role, whereas communities of interest consist of professionals of different backgrounds who share an area of interest.

3.5.5.4 Knowledge organization perspective. Knowledge organization “is an entity that realizes the importance of its knowledge, and applies techniques to maximize the use of the knowledge to its employees, shareholders, and customers” (Liebowitz &

Beckman, 1998, p. 14). Knowledge organizations have high level executives in charge of developing, implementing, and maintaining company-wide knowledge management programs. Knowledge organizations value the knowledge creation and sharing activity as a prime driver of business and a significant competitive advantage.

4. DATA COLLECTION

The ethnographic data collection methods employed for the study are observations, informal and semi-structured formal interviews, and content analysis. The collected data is presented in the subsequent sections.

4.1. OBSERVATIONS

To reiterate suggestions made by LeCompte and Schensul (2010), the ethnographer should record situations as they occur. The ethnographer should observe and take notes about physical settings, interactions, and activities and events as they occur. In concordance with the suggestions, I recorded the observations made at Startup Inc.

4.1.1. People. The structure of the KM team was lean and flat. The senior-most level of the team include the Chief Executive Officer (CEO) and Chief Technology Officer (CTO) of the startup. They are the co-founders of the startup and are the primary champions of the knowledge management initiatives. They provide their inputs to the Vice President (VP) of Post-Sales operations. The VP (Post-Sales) overlooks the Customer Support, Customer Success, Documentation, and Knowledge Management initiatives at the startup. The next level in the team structure is the Knowledge Management (KM) Manager. She is responsible for the activities, events, successes, and failures of the knowledge management initiatives at the startup. She is assisted by the technical writer and the Trainers. Customer Support personnel at the startup usually take up the role of Trainer. Figure 4.1 shows the pictorial representation of the team structure.

4.1.2. Knowledge Transfer Sessions. At Startup Inc., the knowledge transfer process took place in the form of trainings. The KM Manager and team organized several trainings that facilitated the exchange and discussion about product knowledge, company culture knowledge, market competition knowledge, internal software architecture knowledge, and so on. The participants in the trainings differed as per the training goal. In the duration of three months my ethnographic research, I observed the product transfer sessions, product trainings, and sales trainings at Startup Inc.

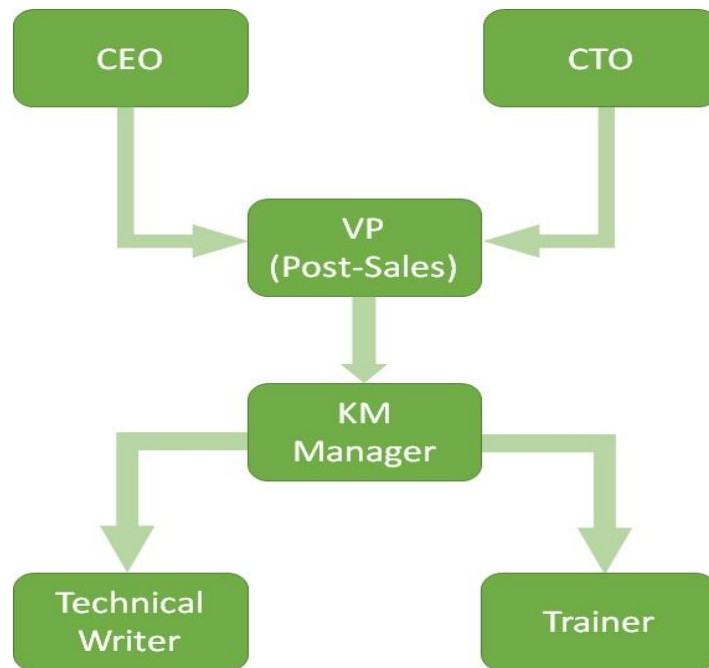


Figure 4.1. Knowledge Management team structure.

4.1.2.1 Product knowledge transfer. The primary form of knowledge transfer process was the “onboarding” of new customers. The startup has two flagship products – both catering to enterprises and corporate conglomerates. The knowledge transfer sessions were conducted by a diverse team of startup representatives in the following order: Sales Engineers, Implementation Managers, and finally, the Support personnel. Each representative brought their own expertise to the table. The Sales Engineer provided an overview of the products, what customer problems the products address and how, and the technical requirements for implementing the products. Once the Sales Engineers educated the customers about the functionality of the products, the Implementation Managers stepped in to share their knowledge about how the customers could implement the products in their production environments easily and efficiently. Once the products were successfully implemented, the Support personnel shared their knowledge about maintaining and troubleshooting the products. While transferring their tacit knowledge to the audience, the startup representatives also relied on the technical documents generated by the technical communication team at the startup. The technical communication team

routinely got requests to create customer-specific documents that helped the customer understand and deploy the products.

4.1.2.2 Product trainings. Another form of knowledge transfer sessions organized by the KM Manager was product trainings for existing customers who had already deployed the products in their environment, and were now interested in learning more advanced features of the products. The trainings were also attended by internal audience (new employees or existing employees wanting to learn more about the products). These trainings were conducted by the Support personnel or Implementation Managers, but were driven entirely by the KM team.

The product training sessions took several forms:

- In-person, onsite trainings
- Virtual, instructor-led trainings
- Technical webinars

Figure 4.2 depicts the activities involved in product training.

Scheduling Activities	Pre-Training Activities	Training Activities	Post-Training Activities
KM Manager schedules a training on receiving a training request or if a training is pre-scheduled	Technical Writer creates Training Materials (Content and Lab Guides)	Trainer conducts actual training for attendees	KM Manager sends Training Material and Lab Guides to attendees
KM Manager sends email to all stakeholders	Subject Matter Experts (SMEs) review and finalize the content	Trainer demonstrates the product functionality	KM Manager sends feedback forms to attendees
	Trainer conducts mock training for internal team members	Trainer facilitates hands-on product practice for attendees	KM Manager collates, analyzes, and reports feedback to executives

Figure 4.2. Product training activities.

The KM Manager scheduled regular trainings each month. On average, two three-day product trainings, and one hour-long webinar were scheduled every month. In addition to the scheduled trainings, the Manager also received requests for additional trainings, each customized for a particular team within Startup Inc., or customized for a customer.

During my three-month research period, the following trainings were offered by the team. I participated in the content creation process, attended, observed, and made notes for each of the trainings. Table 4.1 gives the details of the trainings.

Once the training was announced, the Manager sent out emails to all the stakeholders. She asked me (as in, the technical writer) to work with the Subject Matter Experts (SMEs) to create the content for the trainings. The content was presented in the form of Google Slides. The content was supported by lab exercises in the form of MS Word documents. I created content for the trainings based on my knowledge of the products, product documentation, marketing materials, and other reference material. The content was reviewed by the SMEs.

Once the content was ready, I shared the content with the KM manager and the Trainer. The Trainer was usually one of the Support team members who had an intricate understanding of the product as well as solid rapport with the customers and internal employees. Before the actual training, the Trainer conducted full-length mock training session for the KM team and the Support team. The mock trainings helped the team to catch any errors in the content, to anticipate any infrastructure issues (for instance, the lab setup for attendees), and figure out how to tackle the issues. The mock sessions also allowed the new members in the team to clarify their doubts within the organization instead of discussing the doubts during the actual training. The role of the Trainer was offered to different team members each time. Experienced Trainers provided valuable feedback to them during the mock training. The mock training was an excellent way to train the new trainers and cultivate KM culture at Startup Inc.

A few days prior to the training, the KM Manager sent out reminders to the attendees about the timing of the trainings, along with technology requirements to attend the trainings.

Table 4.1. Details of trainings offered by startup during research period

Training	Purpose	Duration	Frequency
Instructor-led virtual training	Enable customers and employees to successfully install, configure, deploy, and use the data governance solutions at their organizations. Introduce concepts, give product demo, and facilitate hands-on exercises in a lab setup.	3 days (4 hours per day)	1 per month
Technical Webinars	Introduce new features, troubleshoot existing features, technological deep-dives.	1 hour	1 per month
In-person, onsite trainings	Enable customers and employees to successfully install, configure, deploy, and use the data governance solutions at their organizations. Introduce concepts, give product demo, and facilitate hands-on exercises in a lab setup.	As per requirement	As per requirement

The actual trainings were attended by employees from other teams at Startup Inc. as well as customers. The trainings were interactive. The Trainer usually went through the Google Slides and presented a demo of the product features. The attendees then tried out product features and use-cases using the lab setup. The attendees asked questions throughout the trainings. The attendees were encouraged to continue asking questions even after the training concluded via email. One interesting observation I noted is that though the content was structured for a novice administrator, the participants are highly experienced professionals. Most of the participants had tried the product on their own and attended the training because they couldn't figure out a particular use case, and wanted pointed answers. The product experience of the participants was evident from the questions they asked. The questions were about particular use-cases of the product, usually prefaced with the product features they had already tried out but did not work. The Trainers were also experienced Support personnel who could gauge the participants' experience levels and course-correct on the fly.

The Trainers facilitated hands-on experience with the product, wherein they set up mock environments for the customers to try the product features without harming live production setups. Throughout the process, a healthy conversation about the product itself and any issues and questions that the audience might have was actively encouraged. The encouragement usually led to a discussion-driven knowledge transfer session than a monologue by the startup representative. Thus, the tacit knowledge of the startup representatives was consciously converted into explicit, shared knowledge.

After the training, the KM Manager sent the Google Slides to the attendees for their reference.

Mapping the knowledge transfer process at the startup to Nonaka and Takeuchi's (1995) knowledge creation and conversion modes:

- State 1 or Socialization is from tacit knowledge to tacit knowledge

Trainers and SMEs share knowledge with startup employees, technical writer, and training attendees through demo of the product and facilitating hands-on practice with the product.

- State 2 or Externalization is from tacit knowledge to explicit knowledge

Technical writer converts the knowledge into codified form in the form of Google slides.

- State 3 or Combination is from explicit knowledge to explicit knowledge
Combining Google Slides, discussions, hands-on, demo into one package = training session
- State 4 or Internalization is from explicit knowledge to tacit knowledge.
Attendees learn the product features and functionality and become capable of administering the product on their own.

Figure 4.3 depicts the knowledge conversion process at the startup.

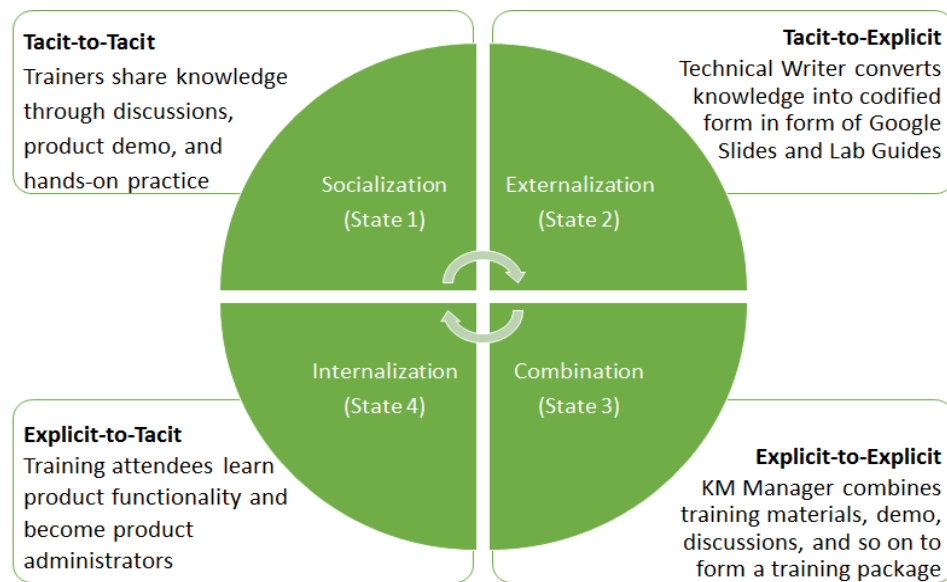


Figure 4.3. Knowledge conversion modes. Adapted from Okuda (2001).

4.1.2.3 Sales training. The KM Manager organized a quarterly sales training that was strictly meant for internal employees of Startup Inc. Sales representatives from all global locations of Startup Inc. were invited for the training. The attendees participated in various knowledge transfer sessions spread over three days and conducted in the US office. I had the opportunity to observe one Sales training conducted during the research period.

The sessions were led by the CEO, the CFO (Chief Financial Officer), expert Sales representatives at the startup, and the attendees themselves. The CEO shared his knowledge of the state of the global market and how the startup's products fared against competition, and his vision for the startup. The CFO shared his knowledge about the revenue generated by the products, and how the Sales representatives can help achieve the financial goals of the startup. The experienced Sales representatives shared their knowledge in the field and tactics that led to successful deals. Finally, the attendees were asked to share their field experiences, and give mock Sales presentations to ensure they integrated the tactics into their presentations.

Thus, the training also followed the knowledge conversion modes (Okuda 2001). Through sharing field stories with new Sales representatives, the expert Sales representatives converted tacit knowledge to tacit knowledge. Through the Google Slides and other materials, the knowledge was codified in document form and thus converted from tacit knowledge to explicit knowledge. All the training materials and sessions were combined to form one training package, thus converting explicit knowledge to explicit knowledge. And finally, the mock presentations by new Sales employees led to conversion of explicit knowledge to tacit knowledge.

4.1.3. Physical Settings. The startup embraces an open-floor plan for its office space, which means clusters of cubicles with free access to colleagues, managers, and executives.

As the technical writer for the KM team, my cubicle was near the KM Manager and the VP of Post-Sales. The cubicles of the subject matter experts (SMEs) were also in the adjoining region. The SMEs had to walk past my cubicle on their way to the conference rooms for meetings or the cafeteria for lunch and snacks. They used to stop by and enquire about the project I was working on and volunteered their views and knowledge about the topic. The cafeteria was an open space with room for standing tables only. Almost every day at lunch and for snacks, employees from all levels – individual contributors, team leads, managers, VPs, and the CEO – gathered around the tables and discussed technical implementation details, problems they were facing with one of the customer accounts, and how they could resolve the problems and volunteered help for solving the problems.

4.2. INTERVIEWS

As directed by LeCompte and Schensul (2010), the ethnographer should conduct informal as well as semi-structured formal interviews with representative individuals and key personnel. Following these guidelines, I conducted semi-structured formal interviews with the CTO, VP, Manager, and Trainer at the startup. Appendix A lists the interview questions. I also made use of the break times to engage the personnel in informal interviews. I made every participant aware of my research study and secured their consent before asking them the questions, even in informal conversations. The following sections summarize the responses to the informal and formal interviews:

4.2.1. Chief Technology Officer (CTO) and Co-founder of the Startup. The CTO of the startup is the chief advocate of the KM efforts at the startup. He was keen on documenting the internal workings of the product to capture the tacit knowledge of developers and architects and make the knowledge accessible across cross-functional teams. He saw the need for formalizing the KM process because he was unhappy with the way the SMEs were presenting product knowledge to educate customers. He said, “The sales and support folks do not understand the difference between training and just telling customers how to use the product. We need a systematic process to understand what training the customers need and then provide a structured training program. Just getting on a call with a customer and answering their queries is not enough” (personal communication, December 29, 2016).

He further said, “We (the senior management) wanted to bring all forms of training under one umbrella and streamline the efforts. The existing training efforts were haphazard. Every team did their own form of training – they still do. We need to streamline the efforts” (personal communication, December 29, 2016). He thus wanted to bring the entire training and knowledge transfer efforts at the organization under one umbrella. His vision included the knowledge transfer and trainings meant for new hires in engineering and non-engineering teams, customer trainings, and corporate partner trainings. Being the chief advocate of the KM efforts at the startup, the CTO’s vision was one of the main driving factors for all decisions made for the KM initiatives.

4.2.2. Vice President (VP). The VP (Post-Sales) is the primary decision-maker of all KM activities at Startup Inc. When asked why was the KM initiative started, he simply said, “Because the customers asked for it” (personal communication, August 4, 2016). He further explained that setting up knowledge transfer programs for customers was becoming an industry practice. Thus, the process was started to comply with the market demands and meet the industry standards.

When asked about his vision for the KM initiative, the VP said, “The plan is a long-term one. The end goal is to create a certification program, where the attendees will be certified for our products. Of course, the products have to capture the market share and be the dominant players in the field for the certification course to be of value. But the certification course will be valuable. The students will not only learn about our products – they will learn everything about backup technologies, the need for backup, which products to choose – right up to how our products can help them with their problems” (personal communication, August 4, 2016).

When asked about the roadblocks he foresees, he said, “The immediate roadblock is the pace is slow. We should be churning out trainings and for different audiences. The content is not where it should be. We really need to increase the pace of training delivery. We should have self-paced modules – the customer should be able to access the trainings whenever they have time. And the videos should show up at one click. The customer clicks on the training and the video should start playing. Customers don’t have time to register and reregister and get an email and then access the trainings. That’s just bad user experience” (personal communication, August 4, 2016).

4.2.3. Manager. The Manager was hired by the startup when the process of formalizing the knowledge management process was initiated. She was the sole driver of the process. Surprisingly, she did not have an answer to the question about why the process was started and what was objective the startup wants to achieve. Her perspective is that offering trainings and other knowledge sharing activities for customers is a way to add value to the customer experience and become market leaders in the domain.

As of the time of the interview, the program was limited to product trainings, new hire sales trainings, and the webinars. But her vision was to extend the program to encompass the new hire trainings in teams across the organization, partner training, and to introduce self-paced modules. She said,

“Every team has their own way of training – the engineering team does their own thing, the sales and engineering team hold calls, the sales and support folks train the customers. I want to streamline the process. We (the KM team) should be the go-to people for any training here. That’s what I have been doing since I joined – build the brand of the (KM) program. When I joined, the corporate template was used for everything – even the training PPTs. I worked with the marketing team to rebrand the (KM) program. Now our brand is sometimes more recognizable than (Startup Inc.’s) brand” (personal communication, June 30, 2016).

The major roadblocks she encountered are lack of resources. She lacked technological support and content development resources. She also faced lack of time and interest from the SMEs. In addition, she also had to secure resources for publicizing and marketing the training offerings.

“There are so many things we can do – but we are always short of resources. Before you (the technical writer) joined, it was just me. I have to coordinate with everyone, send emails to customers, send them the codes, then ask their customer executives to touch base with them. I want to focus on the actual training delivery – but these tasks are important. They need to be done. But they are time consuming” (personal communication, June 30, 2016).

During the interview, the KM Manager also explained the process she had put in place for each knowledge transfer session. The process has been described in detail in the Knowledge Transfer sessions section.

During our informal conversations over coffee breaks, the KM Manager shared her relief about having a full-time technical writer on the team. She shared her frustrations about the time before I joined the team as a technical writer, when there was no clear allocation of the content development work. She expected the SMEs to develop content for the trainings, but the SMEs were reluctant to do so, citing that content development was not part of their job description and was out of their comfort zone. They

were willing to provide inputs for the content and review the final content, but were unwilling to take up the entire content generation effort. The SMEs expected her to be responsible for the content creation efforts, but she claimed she didn't have the necessary technical background to create useful content. She was thus relieved to have finally resolved the matter by having a full-time technical writer onboard. She reciprocated by being an enabler and problem-solver for any issues about tools requirement or access to SMEs that I faced as the technical writer.

During the informal conversations, I also asked her about the technological tools selected for the KM programs and the reasoning for the selection of the tools. While observing one of the Instructor-Led Virtual Training sessions, I had observed a debate between the Trainer and the KM over the choice of presentation tool – Google Slides or MS PowerPoint. The content for the training was created in Google Slides. But the Trainer downloaded the content in the form of MS PowerPoint and used the PowerPoint slides for conducting the training. The different preferences of presentation tools led to numerous issues. For instance, the formatting for Google Slides is not compatible with MS PowerPoint, hence the formatting did not render correctly during training. I asked the KM Manager about why the team does not use MS PowerPoint instead of Google Slides if the Trainer prefers MS PowerPoint. She responded that because the KM activities are highly collaborative in nature, she had to select a tool that allows stakeholders to comment on the content and for the comments to be visible to all. The tool should also allow for online discussions and let people reply to others' comments. Google Slides provides the functionality whereas MS PowerPoint does not. Another important factor is that Google Slides maintains multiple versions of a file online in Google Drive. Anyone with access to the Drive can get instant access to the latest version. But with MS PowerPoint, different versions of the content would reside on the individual laptops of the stakeholders and people would not have access, or even be aware of, the latest version of the presentation.

Yet another technological debate occurred between the Manager and the VP. The debate was concerning the learning portal that the Manager had insisted upon. The purpose of the learning portal was to present a one-stop shop for all the training offerings of the startup. The customer or the startup's employee would create a login for learner

profile, enroll in the trainings offered, and get the link to the training through the portal. The portal would then direct the learner to the GoToTraining site, where the learner would have to login again to finally access the actual content of the training. The VP believed the long-winded process hampered the user experience of the training and hence the portal should be done away with or the user experience should be simplified. There was a monetary component to the discussion as well – the portal was outsourced to another startup that charged a considerable amount of money for its services. The VP's opinion was reflected in my interview with him as well when he stated that the KM team focused more on tools rather than the actual content. I asked the Manager about why she insisted on the learning portal. She responded that having a learning portal is an industry standard and that she had put in considerable time and energy into setting up the portal. She believed in the utility of the portal. The disagreement between the KM Manager and the VP over the learning portal ultimately cost the Manager her job. Because the incident occurred after my research period, the details of the incident are beyond the scope of the current study. It is important to note, however, that the paid learning portal was discontinued soon after her departure from the startup, and was replaced with an in-house platform with a simplified user experience.

4.2.4. Trainers. Trainings and knowledge transfer sessions were conducted by members of the Support Team, Escalation Teams, and Implementation Managers. I interviewed two Trainers. From their perspective, they approached the trainings and knowledge transfer sessions from a more hands-on method, wherein they conducted live demo of the product features and let the attendees try them out, and answer their questions and resolved their doubts. Their purpose for the sessions was to reduce the number of support calls and enable customers and employees to gain enough expertise in the products that they not only successfully deploy and configure the products but also troubleshoot and resolve any issues that might crop up.

As is expected in any ethnographic study, my interview with the KM Manager informed my questions for the Trainers. The KM Manager had shared her frustrations about content creation, specifically about how the trainers and SMEs were reluctant to create content for the trainings. She had shared her relief for having a full-time technical writer onboard who would be responsible for content creation. To gain a different

perspective into the issue of content creation, I asked the trainers if they had experienced similar frustrations about content creation before a technical writer joined the team. They validated the Manager's response and shared their own reluctance as well as lack of confidence in creating effective and worthwhile content material for the training sessions. They expressed their relief for not having being asked to perform the task and were glad to have the technical writer onboard.

One of the Trainers shared their frustrations about the KM Manager not being "technical enough." I suggested that being technical was not a job requirement for her position. The Trainer reverted saying that at a technical startup, everyone needs to be technically proficient. A person's role-specific expertise should be based on their technical proficiency. The Trainer's statement complemented my observation that the startup employees held in high regard others who demonstrated technical know-how of the product and ridiculed anyone they did not deem to be technologically inclined.

4.3. CONTENT ANALYSIS OF ATTENDEES' FEEDBACK

While attending the training sessions, I observed that most of the participants had already tried using the products and were attending the session because they were looking for specific help or specific use cases. My observation stems from a comment one of the attendees made after a training session. The trainer asked the attendees if they were able to follow along, and one of the attendees replied, "Yes, but we already knew what we covered today. We have already deployed the product you know. What we are looking for is [particular product feature]." Another reason for the customers to attend the sessions were to comply with the standardization requirements of their companies and their home countries (personal communication with VP, June 1, 2016). The employees of the startup attended the training because they were either interested in learning about a new feature or use case, or were switching from one team or business function to another, or were new employees.

On the completion of each training, the KM Manager distributed feedback forms to the attendees. With her permission, I collated and analyzed the feedback from the attendees for the trainings conducted within the three-month observation period.

The analysis of attendees' feedback shows that most attendees said they found the training helpful, they would recommend the sessions to their colleagues, and that they could apply the skills they learnt in the training in their tasks immediately.

Table 4.2 shows the questions asked in the feedback form, the expected response type, and average responses. The total number of responses analyzed was 106.

Table 4.2. Analysis of attendees' feedback

Question	Response Type	Average Response
How satisfied are you with the overall experience?	Likert scale from 0 to 10. (0 being least satisfied)	8. 308411215
How likely is it that you recommend the course to a colleague?	Likert scale from 0 to 10. (0 being least satisfied)	8.537962963
Did the training meet your expectations?	Yes/No	Yes: 96 No: 7 No answer: 3
Can you immediately apply what you learned in the course?	Yes/No	Yes: 101 No: 5
What did you like the most about the course?	Comments in text box	44 responses 11 attendees said they liked the hands-on lab exercises. 12 attendees said they liked the trainer's command of the product, professionalism, patience. 7 attendees said they liked the contents of the course.
What are the additional topics you would like to see covered?	Comments in text box	More features, more in-depth troubleshooting.
Any additional comments or feedback	Comments in text box	Better instructions in lab guide, customized training

5. DATA ANALYSIS AND DISCUSSION

As discussed in the methodology section, I heeded LeCompte and Schensul's (2010) recommendation and categorized the collected data into predefined conceptual bins. To analyze the collected data about knowledge management efforts at the startup from the perspective of technical communication, I used the conceptual framework described by Wick (2000). The four perspectives discussed by Wick are: document perspective, technological perspective, socio-organizational perspective, and knowledge organization perspective. The following sections analyze the collected data based on Wick's perspectives, and discusses the takeaways for technical communicators.

5.1. DOCUMENT PERSPECTIVE

The document-centered perspective on knowledge management pertains to extracting knowledge from other employees and codifying the knowledge into documents that can help others in their work.

From the document-centered perspective, the documents created at Startup Inc. consisted of training materials, specifically the Google Slides and lab guides. To create these documents, I (as in the technical writer) conducted an audience analysis to figure out the target audience for the trainings. I learned the product myself, used the product documentation, marketing material, and other information sources to create the rough draft of the content. I got the material reviewed from the subject matter experts. The documents created were also reviewed during the mock training sessions and modified accordingly. The finalized documents were used in the actual training and distributed to the attendees.

The audience analysis was conducted ex post-facto. I attended the trainings and noted the audience's introductions, responses, and questions. Attending the sessions gave me a much better understanding of the audience. The initial presumption was that the audience were technologically sound, yet novice users of the product. On attending the sessions, I realized that the participants had already tried using the products and were attending the session because they were looking for specific help or specific use cases. Another reason for the customers to attend the sessions were to comply with the

standardization requirements of their companies and their home countries. The employees of the startup attended the training because they were either interested in learning about a new feature or use case, or were switching from one team or business function to another, or were new employees.

As seen from the analysis, the steps to create knowledge management materials are analyzing audience, researching information and interviewing SMEs, drafting the content, and getting the content reviewed by stakeholders. The content creation process is similar to the technical writing process described by Markel (2012). Markel (2012) described five steps of writing a technical document: “planning, drafting, revising, editing, and proofreading” (p. 41). He included audience analysis, researching the topic, brainstorming with SMEs in the planning stage. He included getting the draft reviewed from SMEs in the revising stage. The takeaway for technical communicators is that the process for creating knowledge assets and materials is similar to the help-authoring process.

5.2. TECHNOLOGICAL PERSPECTIVE

The technological perspective refers to employing technologies that facilitate the dissemination and application of knowledge.

From the technological perspective, Startup Inc. made use of Google Slides to create and share content. As stated by the KM Manager, the reason for using Google Slides over PowerPoint presentations was to make it easy to share content for review across teams. Shared content with publicly visible comments also enabled clarification of opposing review comments. In one incident, an SME provided a review comment that was technically inaccurate. Had the comment not been visible to all reviewers, I would have assumed the comment to be correct and incorporated it into the content. But because Google Slides allows all participants to view all comments, another SME caught the mistake and corrected the comment.

While distributing the documents to the participants, the documents were exported in PDF format.

The trainings were conducted via GoToTraining. Email was used as the preferred form of communication. The feedback forms were distributed via SurveyMonkey.

Also as noted in the Interviews section, the learning portal implemented by the KM Manager was not deemed a success and was discontinued after a long debate with the VP. The VP was strongly against the paid portal and wanted the KM Manager to find an alternative for the portal and focus more on the content.

The tools described here are specific to Startup Inc. The tools will differ with each company. Hence the takeaway for technical communicators is that being technologically literate is important. Technological literacy, in this case, pertains to tools for communication, content creation and distribution, trainings, and so on depending on the company you are working for. The more important takeaway for technical communicators is that while tools are important, they can never take precedence over content. As noted in the Interviews section, the battle over the learning portal, which was the KM Manager's platform of choice, ultimately cost her the job.

5.3. SOCIO-ORGANIZATIONAL PERSPECTIVE

Wick (2000) describes socio-organizational perspective as the "Socio-organizational approaches to knowledge management emphasize the social nature by which knowledge is constructed and shared" (p. 517). Encouraging employees to share knowledge and develop professional rapport with each other enhances trust and teamwork among the organization's employees.

At Startup Inc., the socio-organizational aspects included the stakeholders: the KM Manager, technical writer, SMEs, Trainer, VP, CEO and CTO, as well as the attendees: the employees, customers, and partners of the startup.

The mock training sessions proved to be of immense value in nurturing a knowledge-sharing culture at the startup and facilitating the development of professional rapport within team members.

Wick (2000) talked about the two types of communities from the perspective of knowledge management: "communities of practice" and "communities of interest" (p. 518). Communities of practice involve the people whose work responsibilities are impacted by the knowledge shared. Communities of interest involve the people whose work responsibilities may not be directly impacted by the knowledge shared, but the knowledge relates to their area of interest and can benefit them professionally. At the

startup under study, the instructor-led trainings seemed to be oriented towards the community of practice. The KM team as well as the attendees had vested interest in the knowledge being shared during the training. The knowledge gained through these trainings would help the attendees handle their work responsibilities. On the other hand, the Technical Webinars seemed to be oriented towards the community of interest for the startup. The attendees as well as the training organizers for the Webinars did not depend on the Webinars to do their job well, but were certainly interested and benefitted in the topics discussed.

An important observation is that securing the buy-in of stakeholders was necessary. Officially on the payroll of the KM team were just the Manager and me (the technical writer). The KM Manager had to coordinate the availability of the trainer, schedule the trainings, and coordinate with the portal owner. She also had to coordinate and communicate with the attendees. She had to convince the senior management about the direction of the KM efforts and secure funds and resources for the projects. A major shortcoming for her was that she had to rely heavily on the stakeholders, and that proved to be a mammoth feat. She was also perceived as not technologically skilled. The importance of being technologically inclined is made even clearer by my observation that as a technical writer with an engineering degree, I had an easier time asking and getting help from the SMEs. Hence securing the buy-in from all stakeholders and earning their confidence in our technological abilities is imperative to the success of the knowledge management efforts.

Another interesting insight gained from interacting with the stakeholders is that the lack of a dedicated technical writer for the knowledge management initiative creates several issues for the team. The primary issue is the lack of clarity about who should be responsible for content creation. Should the KM Manager create the content, or the Trainer, or the SME? Before I joined as the full-time technical writer for the team, the team members found themselves being asked to create content, but believed content creation was not their responsibility. When I joined as the full-time technical writer, they were relieved and glad to have me onboard and were willing to help me succeed because they wouldn't have to worry about the content. The insight demonstrates the need and value of having a dedicated technical writer on the KM team.

One more takeaway for technical communicators is that KM initiatives can involve direct interactions with customers and other stakeholders who normally are not directly accessible when working on documentation projects. Thus the social aspects of KM can be significantly different, and perhaps richer in experience, than documentation-specific projects.

5.4. KNOWLEDGE ORGANIZATION PERSPECTIVE

Knowledge organization “is an entity that realizes the importance of its knowledge, and applies techniques to maximize the use of the knowledge to its employees, shareholders, and customers” (Liebowitz & Beckman, 1998, p. 14). Knowledge organizations increasingly have high level executives in charge of developing, implementing, and maintaining company-wide knowledge management programs.

From the knowledge organization perspective, the startup had a dedicated team for KM efforts led by the manager and sponsored by the VP of Post-Sales. The CEO and CTO had the KM efforts on their radar and were actively involved in the progress of the knowledge organization. The KM team organized and created knowledge within the startup and disseminated knowledge within and beyond the organization. As evident from the analysis of attendees’ feedback, the knowledge transfer served their purpose as attendees stated they learnt skills they could apply to their jobs immediately. The attendees also stated that the sessions met their expectations and they would recommend the trainings to their colleagues. The trainings also generated revenue for the startup as the instructor-led trainings were paid for by the customers and were charged at \$2000 per seat.

The takeaway for technical communicators is that KM initiatives might be on the radar of senior management. Also, the monetary contribution made by knowledge management initiatives is tangible and concrete. Thus knowledge management initiatives are a great way to prove the value of technical communication to the company.

6. LIMITATIONS OF THE STUDY AND SCOPE OF FUTURE RESEARCH

The current study has two major limitations due to the choice of research method and sample size.

6.1. LIMITATIONS DUE TO RESEARCH METHOD

Although the research method employed for the study is ethnographic case study, the fact that I was a full member of the research site makes the study more of an analytic autoethnographic study than a purely ethnographic study (Anderson, 2006). As warned by several authors (Alvesson, 2003; Anderson & Herr, 1999; Anderson, Herr, & Nihlen, 2007), I was aware that me being a “native” of the research site could lead to bias in my observations and analysis of data. To counter the bias, I triangulated the research methods by incorporating qualitative and structured interviews with participants, analyzing customer feedback, and observing and noting all activities and events that occurred at Startup Inc. If I get the opportunity to replicate the study in the future, I will try to design a purely ethnographic study, wherein I am not an active participant of the organization.

6.2. LIMITATIONS DUE TO SAMPLE SIZE

The current study was conducted at only one startup. Hence all the observations and data collected are relevant only to one research site. The current data analysis and conclusions cannot be generalized to be applicable to the entire field of technical communication. Yet the data gathered from the current study and the analysis of the data can inform and provide guidance for future research at a different startup. Based on the current study, following future studies about knowledge management at startups from a technical communication perspective can be designed:

- Document perspective:
 - What KM documents are created at other startups?
 - Are the documents similar or different than the documents created at Startup Inc.?
- Technological perspective:
 - What tools do KM teams at other startups use?

- What are the criteria and requirements for tools selection?
 - Who are the stakeholders involved in the tools selection?
 - At what time in the KM development process is the tool selection done?
- Socio-organizational perspective:
 - Who are the stakeholders in the KM process at other startups?
 - What are the attitudes of the stakeholders in the KM process at other startups?
 - Are other startups proactive about KM efforts? Why?
 - What are the challenges that stakeholders of KM processes face at other startups?
- KM organization perspective:
 - What is the team composition of the KM team at other startups?
 - How are KM teams structured at other startups? Why?

7. CONCLUSION

This ethnographic case study conducted at Startup Inc. reveals the processes, participants, and deliverables involved in the knowledge management initiatives at Startup Inc. from the perspective of technical communication.

Reiterating Nonaka and Takeuchi's (1995) knowledge conversion modes, knowledge management initiatives involve:

- Converting tacit knowledge to tacit knowledge through socializing,
- Codifying the tacit knowledge and converting tacit knowledge into explicit knowledge through externalizing,
- Combining various forms of externalized knowledge,
- Converting the explicit knowledge to tacit knowledge through internalizing.

From the startup's perspective, proactive knowledge management can help the organization leverage the knowledge of its cofounders, product architects, and other employees. KM can help the startup share knowledge within and outside the organization, reduce the dependency on the technical founders and architects, facilitate cross-functional team communication, and safeguard against the loss of intellectual capital when employees leave the organization (Dalkir, 2011; Growing Pains, 2014).

From the technical communicators' perspective, the deliverables created for knowledge management activities can include documents, slides, videos, lab guides, and so on. The process of creating those deliverables includes audience analysis, research and gathering relevant information, creating content, reviewing the content with SMEs, and sharing the final deliverables. Thus, the content creation process for knowledge management activities is similar as that technical writing (Markel, 2012).

The technological literacy required for technical communicators working in the field of knowledge management can include being proficient at using Web-based authoring tools such as Google Slides and Google Docs, various document formats such as generating PDFs from Google Slides, online conferencing platforms such as GoToTraining and Zoom, and survey conducting tools such as SurveyMonkey. More importantly, technological literacy also involves being technologically sound with the complex, technical products that the startup creates.

From a socio-organizational perspective, technical communicators can benefit from identifying the key stakeholders in the knowledge management initiatives at their organizations. At Startup Inc., the prime drivers and champions of the knowledge management initiative were the senior management executives – CEO, CTO, and VP (Post-Sales) of the startup. The KM Manager was the sole owner of the KM activities and was wholly responsible for the activities, successes, and failures of the initiative. Before I joined the KM team as the technical writer, the KM Manager as well as the Trainers and SMEs were frustrated with content creation process. The frustration was because of lack of clarity on who should be responsible for the content creation. Once the technical writer was onboard, the KM Manager and Trainers were relieved and gladly helped the technical writer be successful at the content creation efforts. Thus, being a technical writer on a knowledge management team was a good way to demonstrate the value of technical communication to the organization.

As the technical writer for the KM team, I got direct access to customers, which is very rare in a pure documentation-oriented role. The direct access allowed me to interact and analyze their audience better, and even seek feedback about the deliverables. Thus, being a part of the KM team can prove to be complementary to the documentation tasks that technical communicators undertake.

KM initiatives were on the radar of senior management at Startup Inc. Being a part of a highly-visible team can help technical communicators gain recognition and advance their careers. Also, KM activities usually generate tangible revenue, which can help technical communicators make their case as being business-minded individuals who can contribute directly to the financial bottom line of the organization.

To summarize, the takeaways for technical communicators who might be considering the role of technical writers at a knowledge management initiative at a startup are:

- The document-creation process of knowledge management initiatives is similar to the technical writing process for a product documentation project. The skills required for product documentation projects, such as learning technical concepts in short time or building rapport with SMEs are directly transferable to KM initiatives as well.

- The technological proficiency required for a KM program is different from a product documentation project. KM programs require technical writers to be acquainted with collaborative content-creation tools like Google Slides, conferencing tools like GoToTrainer, as well as technical product know-how.
- The socio-organizational aspects of KM involve identifying and building rapport with all stakeholders, and getting input and feedback from the stakeholders about the content, and interacting with external customers and incorporating their feedback in the content.
- The knowledge-organization aspect of KM refers to being on the radar of senior management at startups and contributing to the financial revenue of the organization.

Along with the takeaways for technical writers, additional takeaways for technical communicators who might be considering a managerial role at a knowledge management initiative at a startup are:

- Define the goals and objectives of the knowledge management initiative, and ensure that all stakeholders agree on and support the goals and objectives.
- For a smooth operation, all stakeholders should be convinced about the choice of tools. Also, focus on the content of the KM sessions is as important as focusing on the technological tools.
- A single person handling all responsibility for the KM initiatives might not be feasible. Getting the right team members and delegating tasks are important. At the same time, as is typical of any startup, being prepared to wear multiple hats is crucial.

APPENDIX

INTERVIEW QUESTIONS

Questions for CTO & VP (Post-Sales)

1. What is the origin story of the knowledge management initiative at the startup?
Who took the initiative to start a formal knowledge management process, when, and why?
2. What was the original goal of the knowledge management initiative?
3. Who was the target audience for the knowledge management initiative?
4. Were any success metrics decided upon at the beginning of the knowledge management initiative?
5. What are the challenges you faced or saw others facing while implementing the knowledge management initiative?
6. How has the knowledge management initiative evolved since then?
7. If any initial success metrics were defined, how does the knowledge management initiative fare as compared to those metrics?
8. What do you envision as the future roadmap of the knowledge management initiative?
9. Do you foresee any roadblocks to achieving the vision?

Questions for KM Manager

1. Tell me about your role as the KM Manager at the startup.
2. What motivated you to accept the position as the KM Manager?
3. When you first joined the startup, what was the state of the knowledge management initiative?
4. From your perspective, what was the original goal and audience for the knowledge management initiative?
5. Who are the stakeholders in the knowledge management initiative?
6. How did you get started with the knowledge management initiative?
7. What process do you follow to implement the knowledge management initiative?

8. What challenges do you face in your role as the KM Manager?
9. What do you consider as the biggest accomplishments of the knowledge management initiative so far? What do you think were the factors for the success?
10. What do you envision as the future roadmap for the knowledge management initiative?

Questions for Trainers

1. Tell me about your role as a trainer.
2. What motivated you to take up the role of a trainer along with fulfilling your responsibilities as a Support Engineer?
3. When did you conduct your first training? Which training was it?
4. How did you prepare for your first training?
5. How did the first training go?
6. How has the training evolved since then?
7. Who are the attendees in your trainings?
8. Why do you think the attendees attend the trainings?
9. What do you find most surprising about the training material or the attendees?
10. What could the technical writer do to make your job easier?

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