MIXED METHODS, ACTION-ORIENTED, CASE STUDY RESEARCH

ON A KMS VENDOR SELECTION PROCESS IN A PUBLIC AGENCY

David E. Simpson

A dissertation submitted to the faculty at the University of Liverpool in partial fulfillment of the requirements for the degree of Doctor of Business Administration in the Management School.

Liverpool
2023

i

ABSTRACT

David E. Simpson: Mixed methods, action-oriented, case study research on a knowledge management system (KMS) vendor selection process in a public agency

(Under the direction of David Fogarty)

In a case study setting at a U.S. public pension plan, espousing a constructivist orientation, I conduct mixed method research comprised of action-oriented techniques informed by interviews and surveys, with a goal of advancing a software vendor selection process (that ultimately failed). I explore two central questions related to change management: i) what is the change that people are seeking, and ii) what obstacles are impeding that change. Informed by an extensive and iterative literature search on relevant topics, I conducted insider action-oriented research as a member of the self-selected, cross-departmental team formed to guide the KMS implementation in the organization. I highlight four sequential cycles of action, which comprise the meta-cycle of the KMS vendor selection process. Integrated into the action-oriented research was corroborating empirical research which took the form of document review and observations. The participative reflective process identified four failure factors that included i) team member constitution and engagement, ii) technical and project management skill sets, iii) the application testing environment and process, and iv) project scope. These findings led to six recommendations: i) an assessment of business needs, ii) integration within a larger technological vision, iii) technical requirements development, iv) a mapping of the vendor landscape with a cost-benefit analysis, v) leveraging consultants for vendor assessment and legal negotiations, and vi) bringing aboard project management expertise. While this actionable knowledge was not successfully transferred to the organization, the interactions generated additional insights into and opportunities for further research on public sector senior management decision-making rationale that seeks to avoid bureaucracy and public scrutiny. The paper ends with my reflections on changes to the organization and my development as a scholar/practitioner.

ACKNOWLEDGMENTS

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

Admin   Administrative Assistant

AUM   Assets under management

BOT   Board of Trustees

CEO   Chief Executive Officer

CIO   Chief Investment Officer

CMS   Content Management System

CRM   Customer relationship management

EBSCO   Elton B. Stephens Company

ESG   Environmental, social, and governance

ICT   Information and communications technology

ILPA   Institutional Limited Partners Association

IP   Intellectual property

IT   Information technology

KM   Knowledge management

KMS   Knowledge management system

LP   Limited Partner

PEPP   Public Employees' Pension Plan

PIO   Principal Investment Officer

QCA   Qualitative content analysis

RFP   Request for proposal

SaaS   Software-as-a-Solution

SIO   Senior Investment Officer

I.   Introduction

In 2015, I was working as a financial analyst on the thirty-five-person investment staff of a $50 billion Public Employees' Pension Plan ("PEPP") in California. The inconsistencies in the way we captured, stored, and used information led to a recommendation by an internal audit group to adopt a knowledge management system ("KMS"). Three years later, no progress had been made towards that goal. Reasons for the delays included conflicting agendas, differing priorities, ambivalence, cross-organizational complications, bureaucracy, and an uncertain technological vision. The fundamental problem is a public agency struggling to adopt, implement, and adapt to new technologies.

The developers of the KMS application promise that it will increase collaboration, streamline workflows, heighten productivity, save time, reduce costs, increase organizational effectiveness, break down silos, increase employee engagement, build community, create a learning environment, standardize and share best practices, improve decision-making, improve integration of clients and suppliers, improve measurement and accountability, and increase innovation.

The implications for workers, management, and leadership are significant. Centers of power and locations where work takes place would be altered. Relationship dynamics would change between a company, its customers, suppliers, and other constituents. Organizational cultures, stabilized and held at equilibrium for long periods of time, would undergo dramatic change.

This study explores impediments to change, the goals and aspirations of workers and management, shifts to organizational culture and structure, and heightened demands on leadership. My roles as both PEPP staff member and researcher advance objectives of relevance to practice and to academic rigor. In case study, I combine action-oriented research, semi-structured interviews, and a survey to examine organizational change through the lens of a failed KMS vendor selection process in a public agency.

A.   Components of Research

1.   Problem Statement

The fundamental problem is that billions of dollars in productivity and market value are being lost due the fact that most organizations fail to successfully implement information and communications technologies ("ICT") which results in lost productivity, impaired revenues and earnings, and greater employee and customer attrition.

2.   Literature Review

The literature review explores the body of knowledge related to organizational change and resistance to change in governmental entities. I commence the review by establishing foundational bases of knowledge in the technology selection and adoption processes, and knowledge management.

3.   Nature of the Study

The case study is viewed as the setting, in contrast to a laboratory setting. The case is taking place in the field where there is a unique, uncontrollable, and pre-existing organization, culture, people, and work content bound by a time-period which cannot be replicated.

The fundamental management research is predominantly qualitative with a small quantitative component. I use interview and survey methods to probe the nature of changing roles of workers and management in a government agency.

The purpose of action research, at its inception, was democratic social change and the liberation of workers (Revans, 1981). The action-oriented methods used in this research seek to enhance a KMS vendor selection process to better meet the needs of the investment staff. It is a participatory process that clarifies objectives in seeking a KMS across levels of the investment department, identifies sources of resistance, presents a forum to discuss and debate KMS, assesses current workflows, and reflects on organizational values. The discussion on value creation and diminution ideally lead to KMS empowering the workforce resulting in a liberation. Four cycles of action (comprised of plan, act, reflect, and re-frame) and one meta-cycle are explored along with concomitant empirical methods of document review and observation.

Finally, I functioned as an imbedded researcher/practitioner. I have close to 30 years of experience in the investment field working both in the public and private sectors, including seven years at the worksite. In addition to providing access to people and support from KMS project sponsors, the insider vantage point provided a nuanced understanding of the existing workflow processes, the people and departments involved, and the potential outcomes of implementation.

4. Research Questions

The research seeks to answer several qualitative questions:

- How do we work together to select a KMS solution that meets the needs and wants of the workforce?
- What are the needs and wants of the workforce?
- What are the obstacles to progress?
- How do workers and managers see their roles and responsibilities changing with the implementation of ICT?
- What do workers see as obstacles to and needs for successful ICT in terms of culture, systems, management, and worker skills?
- What is the role of leadership in the ICT advancement?
- Is management's adoption of ICT a means to achieve greater control?
- Do today's managers possess the tools to lead ICT workers?
- What role does being a public agency play in the equation?

5. Research Aims

Over 80 percent of digital transformation application implementations fail to meet their stated objectives (Rogers, 2016). A probable cause of this is that the true underlying needs and wants of the workers have not been identified. This research investigates the drivers behind the application search process. This research will use action-oriented techniques, interviews, and surveys to analyze the factors in the vendor selection process.

The aim of the study is to help similarly situated organizations understand the obstacles to technological advancement, enabling them to better understand root causes of problems and to implement better processes to select solutions

6. Research Objectives

The research objectives include:

1. Identify challenges in organizational culture of government agencies that undermine change

2. Identify and improve vendor selection process steps
3. Identify the wants and needs of the team in desiring a KMS
4. Analyze organizational constraints to successful vendor selection
5. Provide recommendations to strengthen the technology adoption processes

7. Operational Definitions

The following terms are used extensively throughout the dissertation. Accordingly, they are defined thereby establishing a common base.

- Knowledge Management System (KMS) - refers to any kind of information technology system that stores and retrieves knowledge, improves collaboration, locates knowledge sources, mines repositories for hidden knowledge, captures and uses knowledge, or in some other way enhances the KM process (http://www.knowledge-management-tools.net/knowledge-management-systems.php, 2018).
- Information and Communications Technology ("ICT") - refers to technologies that provide access to information through telecommunications including the internet, wireless networks, cell phones, and other communication mediums (http://www.techterms.com, 2010).

8. Limitations

I identified the following limitations of the study. First, participation in interviews and surveys was voluntary. Accordingly, important perspectives may have been skewed or excluded as roughly 50 percent of the workers and managers did participate. As asking someone who did not participate their reasoning might be mistaken for coercion or suggesting repercussions, I did not ask and can provide no insights. Second, there is no guarantee that this organization will be successful in its attempts to implement a KMS solution. Third, the researcher is a middle manager in the organization and thus subject to power dynamics.

9. Significance of the Study

In the United States alone, over twenty million people work for federal, state, and local government entities. This KMS study highlights change management issues that, it is hoped, resonate across those agencies, provide a path towards addressing impediments to change, and leading to better productivity and workplace cultures. On the academic front, the research has the potential to corroborate known issues and to invite research into new topics related to obstacles to change in government agencies.

B. Inside Researcher Role

In the PEPP practice, I am an Investment Officer on the Private Equity team with seven years of tenure at the organization. From a power position, I am an individual contributor (as opposed to a manager with direct reports). The current incumbents have held the positions at the top tiers of the pyramid for an average of twelve years. There is not much opportunity for career advancement. Nevertheless, PEPP has several attributes that help to retain workers, including a service-oriented culture, friendly people, a great location, a good compensation package, and intellectually stimulating work. For example, I recently won year-end awards for most innovative investment (a 5G wireless auction fund) and for industry activism (related to involvement in Diversity, Equity & Inclusion efforts). I exercise great autonomy on the activities I choose to pursue.

During PEPP's internal audit of the Private Equity department (or class?), roughly two years before the start of this case study, I was a strong advocate for a system to better capture contacts and meeting notes, ideally cloud-based, enabling staff to enter and access information when travelling. When the opportunity presented itself to be one of the leads from the Investment staff to manage that project, my hand quickly went up. Given the resistance to change in some parts of the organization, the KMS project seemed a perfect opportunity to build a research project around. An important element of choosing the project was the strong support of the KMS initiative by the head of the department. Strong sponsorship promised broad acceptance across the department.

My role during the project as a practitioner was to be part of the "KMS Team" (roughly seven to eight staff members from different parts of Investments, Legal and IT departments) evaluating KMS options and periodically reporting to the sponsors. I also acted as a two-way information conduit between the KMS Team and my private equity group. I produced agendas, led meetings, crafted first drafts of documents, and kept minutes of all meetings. As the meeting leader, I facilitated planning discussions and the reflexive and re-framing exercises. As the document maker, I took the first opportunity at sense-making for the group, initiating a participatory process to gain consensus on the KMS team. It should be noted that the action-oriented techniques were undertaken within the normal project workflow. That contrasted to the fundamental research of interviews and surveys which I led one-on-one in conference rooms.

C.   Summary

In a case study setting, leveraging an ICT adoption process underway, through fundamental management and action-oriented techniques, I probe workers and management to facilitate and identify obstacles to change in a public agency. The aim of the research is to help create a more productive workplace by empowering workers. To provide a roadmap through the remainder of the dissertation, I present the structure of the following sections:

- Chapter II - Situational Context: Case study background information focuses on the pension plan, its stakeholders, and the KMS initiative.
- Chapter III - Literature Review: Focuses on resistance to change in the government sector, the vendor selection process, and knowledge management.
- Chapter IV - Methodology: Discusses the procedures used for the action cycles, interview, and survey methods.
- Chapter V - Story of Cycles of Action, Reflection, and Sense-Making: Presents and explores the data gathered through the cycles of action, observation, and document review.
- Chapter VI - Fundamental Research - Structure of Data Analysis: Presents and explores the data obtained through the interview and survey processes.
- Chapter VII - Discussion of Findings: Synthesis of the various research methods into themes or assertions, framed as actionable knowledge leading into recommendations for practitioners going forward.
- Chapter VIII – Reflections on the Journey: Discusses challenges I faced and my growth as a researcher and practitioner, and next steps.
- Chapter IX – Conclusion: Holistic review of the case study and synthesis of findings.

The Appendices and References follow Chapter IX. Before delving into the literature and methodology, Chapter II sets the stage with the contextual setting at the pension plan for the case study.

II.   Situational Context

A.   Introduction

A mandatory element of case study methodology is a thorough description of the situational context (Creswell, 2013, p.237). This chapter presents the pertinent elements of the case study-setting, which is the investments department ("Investments") of a United States municipal pension plan. Sub-sections that follow include an overview of PEPP, descriptions of the pension's key stakeholders, the history of the knowledge management system in the organization, and distinct elements of the pension plan's organizational culture. Sub-section headings follow:

- Public Employees' Pension Plan
- Investments Department
- Internal Stakeholders
- External Stakeholders
- KMS Initiative
- Cultural Assessment
- Concluding Remarks

While most of the context is presented as factual in nature, the elements highlighted nevertheless reflect the world from my perspective.

B.   Public Employees' Pension Plan

The Public Employees' Pension Plan ("PEPP") is a $50 billion pension plan serving the 100,000 active and 60,000 retired workers of the municipality. The overriding mission of PEPP is to produce, protect and provide the promised benefits (life-long pension payments) to the retired members. PEPP receives contributions from the municipality and its workers, and pools them in a collective investment fund. Members of PEPP receive a defined benefit upon retirement based on their years of service and final salary. Examples of departments covered by the plan include parks and recreation, social works, the court system, and the sheriff. The majority of PEPP's 365 employees are focused on providing services to benefit holders, via telephone or in person. Other departments at PEPP include Information Technology ("IT"), Legal, Human Resources ("HR"), Accounting, and Investments.

C.   Investments Department

This research focuses on the selection and implementation of a KMS solution in the Investments department. PEPP is ranked in the world's top 100 pension funds by assets under management ("AUM"). Utilization of advanced technology is critical to achieving its mission. The Investments department consists of 34 investment professionals generally categorized by asset class (public equities, private equity, fixed income, real estate, and hedge funds) supported by a risk management team. The Investments team is responsible for the management of the portfolio. Figure 1 depicts the hierarchical organizational structure of the Investments department in early 2019.

Figure 1. PEPP Investment Department Organizational Structure (with AUM by Asset Class).
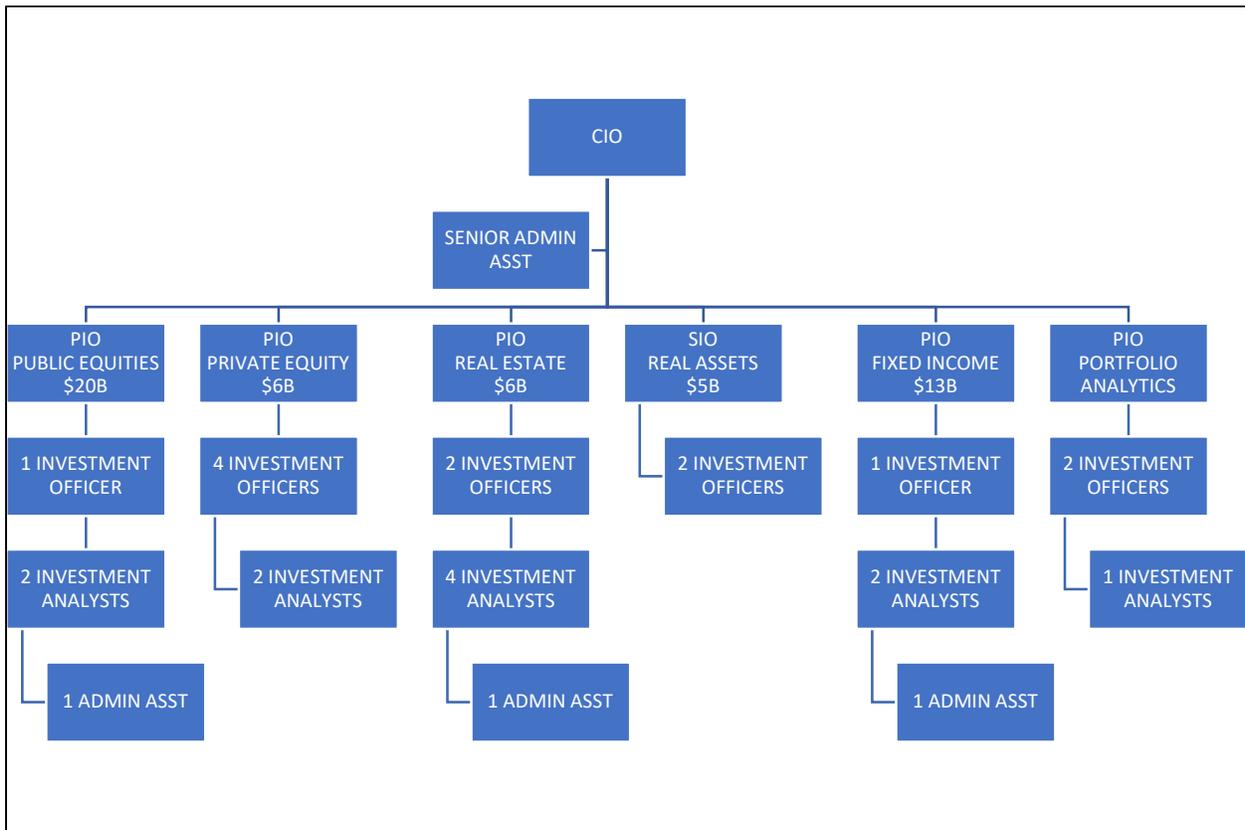
In sum, the Investments team has 7 senior leaders consisting of one Chief Investment Officer ("CIO") and six Principal or Senior Investment Officers ("PIO" or "SIO") level. The senior leaders manage and direct broad investment programs and provide direction to investment staff. Examples of the CIO and PIO job functions include:

- Directing the implementation of policies and strategies within asset classes;
- Directing, planning, and supervising activities of the investment staff; and
- Directing and coordinating activities between PEPP's investment officers and external managers, advisors, and consultants.

The senior leaders are supported by a staff of 27 investment professionals at varying titles but all essentially performing analytical roles. Four administrative assistants ("Admins") work across the department. The investment professionals assist in the management of the PEPP investment portfolio. Examples of essential job functions for analysts include:

- Preparing recommendations regarding investment policy, portfolio strategies, new vehicles, and trading practices;
- Participating in the process of review, selection, and retention of outside investment managers;
- Negotiating contracts for investment managers;
- Drafting investment plans and policy documents for Board approval.

Over the past two years, the CIO has introduced more cross-asset class projects to break down longstanding silos. Even so, the five asset class heads (excluding the Portfolio Analytics head) have been in their roles for ten to twenty-five years. The hierarchy in the public agency, excluding those at the very top, is somewhat rigid. Rubin and Brockner's (1975) research on entrapment is also germane to public pensions such as PEPP. The incentives to stay in a (virtually permanent) position that promises an increasing defined benefit at retirement dissuades people from leaving.

D.   Internal Stakeholders

The Investments team works with several internal departments and external stakeholders. Internal departments, with a brief description of their typical interactions with Investments, include:

- Legal – Reviews contracts and amendments; monitors contract compliance; approves external communications; responds to Freedom of Information Act requests from the public.
- Information Technology (IT) – Ensures necessary technology works; approves new applications; develops and maintains certain systems; maintains development budget; controls access.
- Accounting – Controls and verifies accuracy of cash flows between PEPP and various accounts with investment managers, banks, and properties.
- Internal Audit – Periodically reviews processes and policies of each investment asset class to ensure best practices are employed.
- Communications – Coordinates external publications (including Requests for Proposals or "RFPs"); maintains internal and external-facing web sites.
- Executive Office – The Chief Executive Officer ("CEO") oversees all departments of PEPP and reports to the Board of Trustees ("BOT" or "Board").

The internal PEPP departments listed above are relevant to the KMS implementation, or to potential workflows that could be automated by the system. In my role, I rarely interact with the Executive Office, Communications, or Internal Audit. My communications with the IT department would normally be an e-mail to a Help Desk citing an issue. The Accounting department processes the cash flows from our investment managers, but, barring special projects, my communication with the group is infrequent. Of the departments listed above, I have the most interactions with the Legal team. A member from the Legal department attends our weekly meetings and occasionally sits in on our due diligence sessions. Any investment that is approved undergoes an extensive legal review from a team that includes internal counsel, external counsel, and the investment team lead. We review the hundreds of pages of agreements, documents, and memoranda highlighting and negotiating terms in a handful of meetings over several weeks. I lead about four investments annually and each go through this process.

E.   External Stakeholders

Figure 2 is a rich picture, adhering to the guidelines suggested by Monk and Howard (1998), that helps to visualize the external stakeholders contributing to the PEPP fishbowl environment.

Figure 2. PEPP Rich Picture.
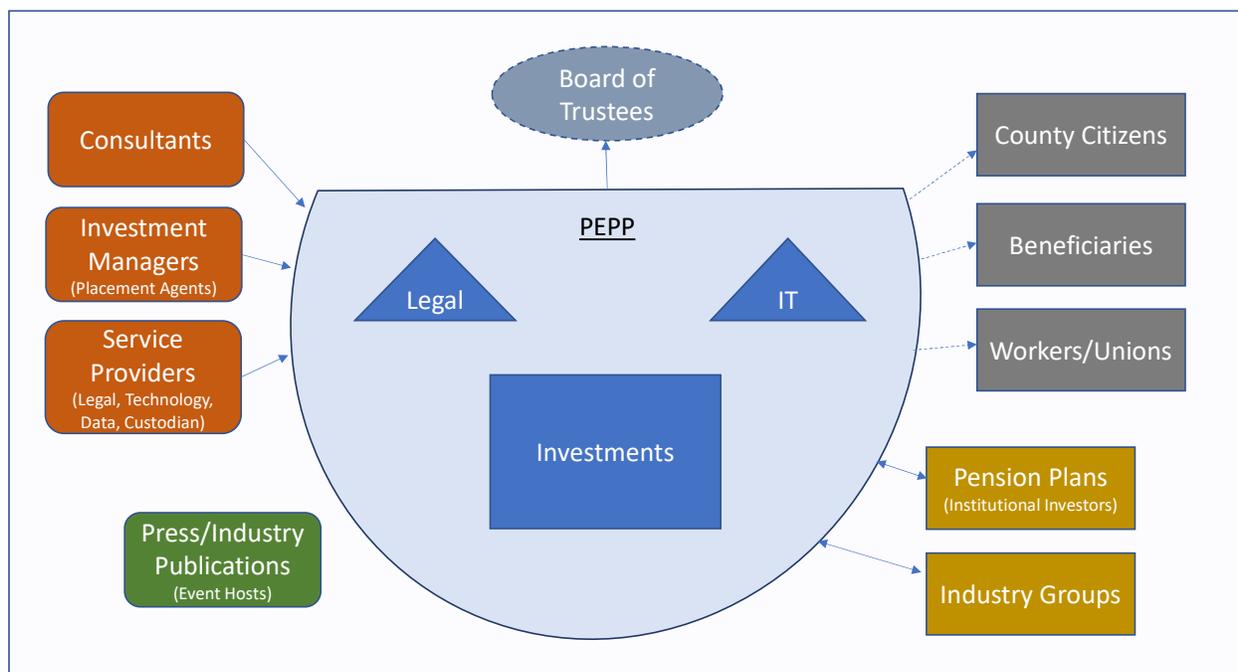
Most of the external stakeholders are self-explanatory, but it is worthwhile discussing the Board of Trustees ("BOT" or the "Trustees"). The BOT has seven members. Three are elected by (often unionized) active and former municipality workers, three are appointed by the Board of Supervisors (who themselves are chosen in general elections), and the last BOT member is the municipal treasurer who is also chosen in the general election. The Trustees govern and oversee PEPP; they approve consultants, major purchases, and investment manager recommendations proposed by staff. BOT issues of note include a focus on risk mitigation, fee reduction, and performance.

I classify the BOT as external to PEPP, particularly to the day-to-day operations. The governing body intentionally stands apart to provide oversight and ensure accountability. For many external constituents, especially at conferences, the BOT is the face of PEPP. Inside the walls of PEPP, the BOT is an external entity with its own agenda and demands. As a member of the Investments team, outside of the monthly BOT meetings, I have intermittent communications with BOT members usually addressing or following up on topics raised during the meetings.

F.   KMS Initiative

In 2015, a periodic Internal Audit investigation of the private equity asset class conducted for the BOT found inadequate and inconsistent capturing and monitoring of documents and communications with investment managers. Their report recommended the implementation of a customer relationship management ("CRM") system. While many organizations might face similar issues, the Trustees of PEPP are fiduciaries of the pension plan. Their fiduciary duty of care requires a prudent level of effort and diligence in exercising oversight and monitoring of the pension plan. Accordingly, the Board's approval of the recommendations necessitated remedial steps be taken to resolve the issues. Even so, the CRM initiative lost steam when the IT department identified several reasons why the project should not go forward. These included concerns over security, services in the cloud, maintenance resources, and third-

party vendor relationships. With no retort from the BOT, Internal Audit or the Investments department, the initiative languished for nearly a year.

The project gained momentum again in late 2016, as the underlying business needs remained unaddressed. IT was more open to exploring the topic, but the initiative was deferred a year as IT was implementing a new operating system enterprise-wide and lacked the resources to devote to the project. Finally, in late 2018, a cross-departmental team from Investments, Legal and IT (the "KMS Team") was formed to undertake the project. Over the subsequent 12 months, the KMS Team built the business requirements, established criteria to evaluate vendors, made a vendor recommendation that was approved by the project sponsors and BOT, and commenced KMS implementation. This period from late 2018 through the commencement of implementation in the summer of 2019 forms the basis of this case study.

G.   Cultural Assessment

Elements distinctive to PEPP's culture inform the context in which the KMS implementation takes place. One important element to understand in the PEPP environment is that as any cross-department initiative above a certain dollar threshold requires concurrence from numerous internal and external constituents with distinct agendas that can influence a project's progress and outcomes. There has been significant turnover at PEPP over the past five years. Three individuals have served as Chief Investment Officer (CIO). The current CIO has in place for just over two years (at the time of this writing) and reports to the Chief Executive Officer (CEO) of PEPP. That CIO has reported to five CEOs. The backdrop is a politicized environment, a divided and contentious BOT, and an undercurrent of stress especially at the senior management level.

PEPP manages several relationships with external parties where conflicts of interest abound. For example, independent consultants often have other lines of business in which they manage capital (an activity with a higher margin). The consultants would prefer to manage PEPP's money rather than provide advice for a fee. Similarly, investment managers may be termed partners in investments, but conflicts persist as they seek higher fees and greater portions of profits generated.

As a public agency investment entity, PEPP faces many of the well-documented cultural challenges of its peers. PEPP operates in a political environment (which is to say appointed and elected stakeholders) with deliberations taking place in a forum open to the public. The organization is also hierarchical in many regards with delineated powers ascribed to various ranks impacting the flow and form of communication between select parties. Finally, PEPP is a $50 billion pension plan in the financial services arena, which carries its own regulations, fiduciary responsibilities and risks, and cultural anomalies distinct to the sector. Key literature findings which resonate with PEPP include:

- In a Korean ICT migration, progress stalled by cultural inertia, anxiety, resistance to technology change, and political influence (Hur et al., 2019).
- The political environment in public sector agencies is pervasive (Common, 2004).
- Researching Swedish agencies determines that politics influences policies and organizational structures (Holmgren, 2018).
- A study found resistance to change implementation in the financial services sphere and highlighted the role of organizational power in impeding change in bureaucratic organizations (Turner, 2006).

- A study highlighted the potential for action learning initiatives to be perceived as subversive when initiated by internal staff members (Gentle, 2010).

The BOT is also an amalgam of varied and often conflicting agendas. Some forces on the BOT seek to radically transform the way we do business while other forces are averse to risk and the unknown. Individual trustee agendas may include supporting unions, amassing personal power, dutifully following process, promoting diversity, speaking at overseas conferences, and a desire for PEPP to be viewed as bleeding edge. Consistent with Attwood's research (2007), PEPP is a political organization that is risk averse, operating in a somewhat regulated environment where transformative change requires the support of numerous stakeholders. Brockner and James' (2008) research affirms PEPP-like organizations tend to avoid negative outcomes, which is to say that PEPP values risk mitigation over positive outcomes. Furthermore, focusing on boardroom effectiveness, Wall and Callister (1995) determined that increased conflict on boards lowers decision-making quality. Veronesi and Keasey (2012) reviewed and evaluated a selected mix of UK health boards and found that dimensions of cooperation and trust, the board decision-making style, and internal or external focus all impact board effectiveness. Given PEPP's cultural environment, change is not an easy task.

H.   Concluding Remarks

The nature of an action-oriented research case study focused on wicked problems attending organizational transition suggests rampant dysfunction. And there is a tendency in the case to highlight factors which impede progress. But there are reasons that people have twenty-year careers at PEPP that bear restatement. They include a service-oriented culture, amiable and well-intentioned people, strong values and visions, compensation, benefits, location, and for many, intellectually stimulating work. Even so, as will be evidenced in the literature review, many deeply ingrained cultural factors impede the organization's ability to fully flourish.

III.   Literature Review

"True knowledge exists in knowing that you know nothing."

Socrates

A.   Introduction

This KMS research project is a case study at a U.S. public pension plan, espousing a constructivist orientation, in which I conduct predominantly qualitative research comprised of action-oriented techniques informed by interviews and surveys, with a goal of advancing a knowledge-management-system vendor-selection process. I explore two questions related to change management in the public sector: i) what is the change that people are seeking, and ii) what obstacles are impeding that change? The literature review establishes an academic foundation for the key components of the project. Accordingly, the literature review focuses on, and the chapter is framed by, three key areas of i) knowledge management, ii) the software adoption process, and iii) public sector considerations.

PEPP is a public pension plan that commenced operations in 1937. Public sector organizational characteristics include a hierarchical structure, a highly regulated political environment, and a culture of imbedded workers (many resistant to change), controlled by policies, procedures, and operational manuals (Fowler and Rose, 2004; Kalpic and Bernus, 2006; Gunn, 1995; Ramsey and Barkhuizen, 2011). Challenging that status quo is a multi-generational workforce and an investment industry ripe with opportunities to participate in the technological and societal transformation (McDonald, 2011; Gabrynowicz, 1992).

It has been difficult to enact change at PEPP specifically with the KMS, as evidenced by the three-year process to launch the project. The literature search seeks to provide insights into how much of that difficulty is driven by technology adoption in general, the specific nature of knowledge management systems, or change management in general and, more specifically, within the public sector. The knowledge-based view of the organization postulates that the firm's know-how in combining and applying resources determines long-term sustainable differentiation and competitive advantage in the marketplace (Galbreath, 2002; Miller, 2017). Yet by some estimates, 80 percent of knowledge management initiatives fail to achieve their objectives (Gartner Group, 2007).

The drive to implement knowledge management solutions across private and public sector organizations is incessant. The promise of cost efficiencies, increased productivity, better relationships across constituencies, and creation of that competitive differentiator, new knowledge, are compelling. Yet many knowledge management systems have proven unsustainable; they created little new knowledge; and the usage of the system usage waned over time. Deployment of KMS suffers from low adoption rates because they are perceived to add little value (Sukumaran and Chandran, 2014; Muhlberger, Oppl and Stary, 2017). Much of what is captured as "knowledge" is irrelevant to most users. Systematizing and managing the cognitive creations of knowledge workers meets with resistance. Accordingly successful KMS design needs to focus on the people and context and less on the product they create.

The layout of the chapter is as follows:

Section B: Literature Methodology and Rationale
Section C: Knowledge and Knowledge Management

The body of knowledge that this research falls into is the intersection of action research and KMS (or BPM) implementation in organizations. Further, the research belongs to the subset of that body of knowledge focused on public agency implementations.

B.   Literature Methodology and Rationale

I debated internally the best approach to this chapter. Ultimately, the quote attributed to Socrates 2,500 years ago carried a simple humility that provided guidance. Much like the KMS vendor selection project itself, the literature review submitted earlier in the dissertation review process proved unsuccessful. Even so, reviewing the process undertaken at a high level helps to map out the journey that was taken and provide insights into choices made. Starting at the beginning provides clarity and learnings.

I was committed to proving that a body of knowledge existed on the theme of era transition. I believed that PEPP had experienced friction moving from an industrial age and use of tools mindset to an information age entity, and that that experience was not unique. This friction was playing out across industries and countries, some faster than others. I undertook a systematic literature review (SLR) to compile a body of literature evidencing this friction. I searched for articles in the Discovery database of 20 million articles with the terms associated with the industrial age or era (and Deming though this proved less fruitful) that also had terms associated with the information age (knowledge worker, digital age). After cleaning the results, 117 unique articles were identified. (See Table 1.)

Table 1. Article Search Count by Era Term Combination.

	Industrial Age Terms			
Information Age Terms	Industrial Age	Industrial Era	Deming	Total
Information Age	73	7		80
Information Era	2	4		6
Knowledge Management	6	12	6	24
Digital Age	3	2		5
Digital Era	1	1		2
Total	85	26	6	117

 Given the breadth of the SLR search, there were articles from all corners of the globe and all disciplines. Validating my theory, the era transition was seen in Chinese military strategy, South African food factories, and even calligraphy. Most of the articles centered on organizational development and management issues.

The primary issue with the SLR is that my mixed methods research project was on a KMS vendor selection process in a public pension plan. While some of the articles on knowledge management and

organizational culture were relevant, the majority of the SLR had little overlap with the body of my research. The previous version of this chapter touched on issues more germane to the KMS research but the SLR's lack of alignment with the research undermined any utility.

In this modified dissertation, I have removed the era-transition premise and the SLR but kept and repurposed some portions that retained relevance, namely around knowledge management, change management, and organization culture. But mostly, I undertook a new literature search targeting authors writing on the intersection of knowledge management systems, public agencies, and action research. That body of relevant literature is quite small. (See Table 2.) The searches were done in the Emerald and Discovery repositories. The Emerald database was especially helpful as it houses numerous knowledge management journals with decades of publications.

Table 2. Literature Review Terms and Results.

Search Terms	Articles
Knowledge	251,000
Knowledge management	207,000
Knowledge management system (KMS)	178,000
KMS & Action Research	291
KMS & Action Research & Public Sector	161

A review of the abstracts of the 291 articles found that most of the articles were not helpful to my KMS vendor selection research. Most were not using an action research methodology. There was a heavy focus on healthcare and education (as both have strong public sector components). And there was a greater emphasis on eGovernment initiatives which were targeting issues outside of the scope my research. Despite these findings, there were several articles (approximately 20) that were relevant to the KMS implementation process, and a subset of those employed action research techniques.

In subsequent iterations, I explored the works of many of the authors referenced in those articles. And with less success, I sought out subsequent research that had cited articles identified. These searches led to related research in business-process management. These several processes have contributed to a solid understanding of the body of literature to which this research belongs. Even so, several authors decried the lack of public sector practitioner research on knowledge management. I hope this study will be found worthy of broader dissemination.

C.   Knowledge and Knowledge Management

This section begins by reviewing the literature to define and better understand knowledge. With that foundation, an exploration of knowledge management theory and practices follows. Stated differently, the knowledge an organization is seeking to capture has implications for the technologies to be used and the expected value that can be derived from a system. A KMS that simply houses static employee handbooks is different than a system that fosters collaboration.

1.   Knowledge

An organization's competitive future will largely be determined by its ability to manage knowledge (Coakes, Bradburn and Sugden, 2004). The traditional value-drivers of cost and productivity are being supplanted by the knowledge-creation capabilities of the firm (Teece, 1998). The creation of knowledge

requires social interaction between individuals. Accordingly, managing flows of knowledge between people is a vital objective for an organization (Dikotla, 2021).

Knowledge is typically broken into two categories, explicit knowledge and implicit (or tacit) knowledge. Explicit knowledge is generally captured, structured, codified, and institutionalized for widespread dissemination. It takes the form of policies, procedures, manuals, forms, reports, meeting agendas and minutes, and governing documents. Explicit knowledge is often codified in corporate intranets with employee-specific content and extranets with public-facing information. This codified information is often static in nature, or periodically updated or added to (such as PEPP's annual reports) (Sveiby, 1997). Explicit knowledge is easily transferred, shared, and reused among members (Dikotla, 2021; Andriani et al., 2019).

Tacit knowledge can be defined as a combination of ideas, values, beliefs, assumptions, opinions, and emotions that is drawn from experience and is difficult to describe and transmit to others. Additional characteristic may include ambiguous, interpretive, dynamic, and non-linear (Nonaka, 2008). Tacit knowledge goes beyond deploying a technological solution; the socio-technological goal is about connecting people and facilitating the flow and creation of knowledge (Alvesson and Karreman, 2001). Tacit knowledge is acquired through apprenticeship, observation, and expert guidance. Tacit knowledge is better captured through abstraction and disconnected experiences that illuminate when flowing freely (Ehin, 2008). Tacit knowledge is extracted through interview, ghosting, and demonstrations (Kalpic and Bernus, 2006). Lewis (2014) reviewed learning models including Socialization, Externalization, Combination, Integration (SECI) to explain how tacit knowledge becomes explicit knowledge. Truch (2001) argues that the capturing and sharing of tacit (not explicit) knowledge will lead to the most enduring competitive advantages for the company.

Culture is the most elusive domain but the prime determinant in the success of knowledge management. Quinn and Finkelstein (1996) identified four types of knowledge: cognitive (know-what), advanced skills (know-how), systems (know-why), and self-motivated creativity (care-why). Knowledge management focused on the first two types. I gravitate towards the school of thought that asserts that despite all the competing theories, there is no agreed upon definition of knowledge (Petrescu, 2020).

As it relates to PEPP, despite thousands of pages of materials produced annually, and a consensus that a knowledge management system is needed, no formal definitions or theories of knowledge have been put forth. Yet the two types of knowledge are clearly spoken to. Documents, such as "Investment Beliefs" and "Operations, Procedures and Policie"' represent explicit knowledge. Tacit knowledge is reflected in concerns of "knowledge walking out the door" and reflected in the underlying, often unwritten, rationale that informs investment manager assessment.

Finally, numerous authors have explored organizational learning, knowledge management, and the definition of knowledge. An understanding of tacit and explicit knowledge informs organizational objectives in building knowledge management systems. Researchers attacked different questions in this quest such as, what is knowledge? What is the organizational objective of managing knowledge? How do we best manage knowledge? (Linderman et al., 2004; Momcilovic and Rajakovic, 2009; Truch, 2001; Kalpic and Bernus, 2006; Cavaleri, 2008; Jafari et al., 2007; Vrincianu, Anica-Popa and Anica-Popa, 2009).

Organizational knowledge is seen as explicit knowledge, exemplified by manuals, diagrams, and tangible captured processes. Tacit knowledge are the skills, ideas, and experiences learned but not written down,

largely acquired through interactions with other people. Knowledge was traditionally seen as an entity to be captured, stored, and circulated. Knowledge is now seen as inextricable from social relationships and practice (Newell, Robertson and Swan 2006). One of the key objectives of KM is the externalization of knowledge. Successful learning organizations are characterized by continuous learning, shared knowledge, and supportive organizational culture; critical thinking is promoted, risk takers and challengers of status quo are protected; and individual value and contribution is understood. Additional factors include transparency, proactiveness, sharing and control (release of information across organization), integrity, and formality (relates to trust). Organizations must understand the flow of information and knowledge creation (Kalpic and Bernus, 2006; Galbreath, 2002).

2.   Knowledge Management

Managing knowledge incorporates several objectives, including collaboration, knowledge capture, improving policies and procedures, improving consistency, better capture of documents, and mentoring. Organizational memory and organizational learning are competitive advantages that lead to higher corporate valuations. Knowledge management inherently requires an ability to measure the existing knowledge inventory of individuals and organizations. Imbedded in that statement is a need to understand what knowledge is critical to the firm's mission. Does the knowledge i) improve efficiencies, ii) save costs, iii) expand products, geographies, or customer segments, or iv) lead to new business combinations? To the extent that the potential impact is high and the cost to capture the knowledge is high (suggesting barriers for competitors), the knowledge should be prioritized (Wei, Chen and Chen, 2009; Vrincianu, Anica-Popa and Anica-Popa, 2009; Truch, 2001)

In many articles about knowledge management, this table of KM processes and artefacts (Alavi and Leidner, 2001), or a variation of it, is presented. (See Table 3.)

Table 3. Knowledge management processes and IT artefacts.

KM Processes	IT Artefacts	IT Platforms
Knowledge creation	Data mining and learning tools	
Knowledge storage and retrieval	Electronic bulletin boards, knowledge repositories, databases	Groupware and communication technologies
Knowledge transfer	Electronic bulletin boards, discussion forums, knowledge directories	Intranets
Knowledge application	Expert systems, workflow systems	

Forty-five years ago, the term "groupware" was defined by creators Peter and Trudy Johnson-Lenz to mean "intentional group processes plus software to support them" (Johnson-Lenz and Johnson-Lenz, 1990). Today, the term, synonymous with "collaboration software" applies to forums, chat boards, e-meeting systems, data conferencing, video conferencing, and voice conferencing software applications. Groupware packages often have calendaring and scheduling, discussion databases, reference libraries, and e-mail. Groupware applications may permit synchronous (concurrent work) or asynchronous functionality. A couple of questions to explore are i) is this still a valid or useful KM process list, and ii) given Web 2.0, mobility, big data, and computing power, are the artefacts and platforms listed still relevant?

Regarding the first question, does that process list best capture the way to think about knowledge management today? After reading the literature, especially related to KMS implementation failures (Adam, Riegel and Koch, 2013) combined with practical experience, I would make some tweaks. (See Table 4.)

Table 4. Seven-Step KM Process.

Step	Knowledge Processes	Discussion
1	Identification	Do you know what information is of value to the organization?
2	Capture	Do you have a process to capture the information deemed of value?
3	Storage	Is there a centralized repository and common metadata?
4	Retrieval	Can you search the repository?
5	Transfer	Can you share information?
6	Application	Can you use the knowledge, say in an automated business process?
7	Creation	Can you integrate, make new connections, form new insights?

Table 4 was based on the causes of failures of KMS implementations cited by several authors (Orenga-Rogla and Chalmeta, 2019; Alavi and Leidner, 2001; Adam, Reigel and Koch, 2013). It becomes clear that these are distinct questions that test the viability and usability of a KMS. Many authors combine identification and capture, yet there are stories of firms routinely deleting customer data that could be monetized. Storage and retrieval are often lumped together, but again is that valuable information stored on my personal drive or am I still using a Rolodex? Retrieval addresses more the searchability of the repository. Knowledge transfer and sharing go to collaboration. With application and creation, you start to realize the fuller potential of knowledge management processes (Dikotla, 2021).

The information age is driven by knowledge, which is the key competitive differentiator in the marketplace. Human intellectual capital is the most important ingredient integrated into the delivery of goods and services. An organization's core focus should be about maximizing the most valuable human components in the equation (Wei, Chen and Chen, 2009). Not surprisingly, knowledge management and organizational change were recurring themes in the literature.

Ramsey and Barkhuizen (2011) researched organizational design to determine best structures to optimize knowledge-worker effectiveness. The author recommends the breaking down of silos and the ongoing interplay between knowledge workers, business processes, and routines to extract and extrapolate tacit knowledge. The objective is to build a culture (with supporting technological infrastructure) to best manage the continuous capture and integration of tacit knowledge across the organization to improve performance.

Information age businesses require knowledge workers, who transform inputs (information), and, through a synthesis process, create new actionable knowledge whose value and ownership are interpretive exercises. Knowledge management is critical to organizational performance and to building organizational cultures that embrace continuous improvement, foster innovation, and sustain competence in increasingly unpredictable environments (Malhotra, 1996; Purnomo and Hadi, 2017: Awad and Ghaziri, 2010; Fernandez and Sabherwal, 2010).

D.   Knowledge Management Systems

Knowledge is the center of organizational competitiveness. The establishment of a knowledge management system is an important, even urgent, business asset in a knowledge-based economy

(Gourova and Toteva, 2014; Guan et al., 2012). A KMS is an information-technology application that can support the creation, storage, and dissemination of knowledge in the organization. For example, expert systems and decision-support systems can be used for knowledge creation, data warehouses for knowledge storage, and intranet technology for knowledge diffusion. A KMS that can quickly deliver timely and highly relevant knowledge on demand will become an integral component and necessary monthly cost in an organization's workflows. The potential of recurring cashflows has led to the development of hundreds of KMS systems, many specialized to the needs of industries (law, finance, education) and functions (sales, purchasing). They often connect to suppliers and customers to automate and make more efficient workflows while capturing data. Some even offer opportunities to implement artificial intelligence solutions.

KM systems evolved from content management systems of the 90s that captured explicit and tacit knowledge and disseminated it widely. Whether the information was stored on company intranets in data warehouses for decision support or document management, results ultimately fell short of expectations due to a mismatch between what was captured and what users needed; and there was an inability to easily find and use the knowledge (Serenko et al. 2010). Newer KMS systems focus on collaboration capabilities with content being provided by knowledge workers. These connections facilitate sharing and the creation of new knowledge, promote greater flexibility, and impact the way knowledge is managed (Razmerita, 2014).

I identified a software review site (softwareinsider.com, 2018) that rated approximately 150 KMS vendors. In addition to ratings, the site listed and categorized the functionality offered in each KMS application. A detailed feature description list with the percentages of vendors offering specific features is listed in Appendix A. Table 5 below summarizes the sixteen features common to KMS systems. Instead of trying to define what a KMS is given its varied applications, I focused on what a KMS does or enables as a more objective or pragmatic approach.

Table 5. Knowledge Management System Feature List

Item	Feature: Functionality
1	**Capture:** PDF conversion, scanning, OCR (optical character recognition)
2	**Retrieval:** Import and export of data, digital document retrieval, and assorted retrieval formats
3	**Storage**: Access and retrieval from anywhere, e-mail archiving, configurable storage locations, file compression
4	**Collaboration**: Documents retrieved and worked on by authorized users, rights access, document check-in/check-out, document assembly, and remote access
5	**Versioning:** Document check-in/check-out, allowing users to retrieve previous versions and to continue work from a selected point. Prior versions retained reference; audit trails, document versioning, automated control, tracking, document comparison, recording of document's life, edits tracking, new versions do not overwrite, version rollback
6	**Distribution:** Remote access, mobile access, multiple-channel distribution
7	**Publishing:** Customizable reporting, multiple document formats, configurable document access permissions, customizable functionality, multiple delivery formats, and locking mechanism
8	**Reproduction**: Assorted document delivery formats, automatic updates, watermarking
9	**Indexing:** Document indexing, archiving and retention, automatic data format conversion, and predefined index properties
10	**Metadata:** Records management, document tagging, and electron signature capture
11	**Searching:** Full text search, document content search, search by metadata, multi-condition queries, save frequent searches, search preview
12	**Integration**: Integration with MS Office, Outlook, Contacts, API (example would be Bloomberg), and Windows Explorer
13	**Workflow:** Workflow management, process management, rules-based workflows, calendar support
14	**Reporting:** Customizable reports, scheduling, automated distribution, graph integration, on all data elements
15	**Security**: Document encryption, password protection, web security, security reporting
16	**Support:** 24/7, blogs, brochure, FAQ, forums, help desk, videos, live chat, demos, manuals, remote training, webinars

Fourteen KMS features (excluding security and support) were then mapped according to Lorenzon and Pilotti's (2008) CRM Process Map Scheme. (See Table 6.) The insights derived from this exercise help to differentiate the knowledge management activities of the KMS (acquire, store, share and use) versus change management (reconceptualizing business and relationships).

Table 6. KMS Process Map Scheme.

Strategy	KMS Feature Category	Micro-Strategy
Knowledge Management	Capture	Knowledge Acquisition
	Storage	Knowledge Storage
	Indexing	Knowledge Development
	Versioning	
	Metadata	
	Distribution	Knowledge Sharing
	Publishing	
	Reproduction	
	Retrieval	Knowledge Access
	Searching	
Change Management	Collaboration	Relationship Re-Conceptualization
	Integration	Technology Integration
Operational Part	Workflow	Operational Re-Conceptualization
Analytical Part	Reports	Business Intelligence

The conundrum of the KMS is that it is a bespoke Rubik's cube that can address many varied needs and objectives of organizations. This foreshadows aspects of the PEPP KMS undertaking, as at one end of the spectrum, a KMS might mean nothing more than a better centralized storage bin for the department's policies and procedures. A stark contrast to the other end of the spectrum, where staff members envision critically analyzing every workflow and harnessing the power of technology to streamline and automate processes and transform working relationships. This range of potential outcomes also resonates with the opening assertion in the dissertation, that most innovative technology implementations fail to meet their objectives. With such disparate expectations, many organizations lack the required vision and buy-in across to enable, or even define, a successful implementation.

Information and Communications Technology (ICT) predominantly serves two functions in organizations. One is cost reduction, or operational efficiencies, such as back-office record keeping, planning, purchasing, and production. The other is to support growth-oriented activities around sales and marketing optimization. The tendency in most organizations is to focus on quantifiable benefits, gravitating to more comfortable positivist objectives (Toby, 2004; Spasojevic, Vojnovic and Nikolic, 2012; Watson, Watson and Reigeluth, 2015). But the countervailing argument is that technology and infrastructure vision must support the manufacturing of information (Ryan, 1988). There is an ongoing discourse about seeing ICT applications as change agents or as tools to monitor and measure productivity (Saari and Talja, 2009).

E. Technology Selection and Implementation Process

1. Implementation Process

With an understanding of knowledge, knowledge management, and knowledge management systems, I now turn to the system implementation process. Given the focus of the action in the research, this body of knowledge would prove relevant. Orenga-Rogla and Chalmeta (2017) developed a methodology to implement a KMS in an oil and gas company. They identified a seven-phase KMS implementation process.

- Draft: Feasibility study with cost-benefit discussion
- Planning: Steps include top management sponsorship, project team assemblage, SWOT analysis, communications plan, project timeline
- Analysis: Identify knowledge to be captured, data quality strategy, processes that will be reengineered
- Design: The functional design includes specifying how input variables will be managed, extracted, calculated, and formatted (norms and standards). Technological design addresses questions of buy versus build, on-premises versus in-the-cloud, and modifications to hardware. Graphic design deals with user interface and organization messaging.
- Development: Installation, development, customization of tools, data population
- Implementation: Phased in operationalization starting with subset of users
- Control: Ongoing monitoring, adaptation, modification

As mentioned, the KMS selection process ultimately failed, and this will be discussed in greater length in later chapters. But the KMS Team most critically fell short on understanding the functional design phase of the process. For example, we could move an Excel file from our current system into the KMS, but it became static content that could not be manipulated. That might be fine for content that just needs to be viewed and seldomly changes such as a training manual. But for a spreadsheet that is constantly updated and used for calculations, the lack of functionality in the chosen KMS was a death knell.

For PEPP, the shortcoming in the Orenga-Rogla and Chalmeta (2017) model is that it targets development of a KMS integrating Web 2.0 (blogs, RSS, Wikis, group chat, etc.) and Big Data tools. An integral step, which would be evaluating and selecting a system is quickly glossed over. Even though acquiring a system is mentioned, the emphasis is on development. Their case study focused on a KMS implementation at a large oil and gas company. They discussed the different business processes that will benefit from the technology.

The relationship between the business process management (BPM) tools and a KMS are vitally important and at times, the two concepts are indistinguishable. The knowledge being collected and managed may interface with other systems such as purchasing, sales, or operations. A Customer Relationship Management (CRM) tool is a KMS for a specific process and constituency. One reason I raise the topic is because the process of adopting a BPM system is very comparable to the process of adopting a KMS system.

Adam, Riegel and Koch (2013) put forth a framework for introducing a BPM into an organization, leveraging an action research methodology. Their method has been refined over several iterations and specifically addresses the tool selection process. Their process is more comprehensive than the Orenga-Rogla model, and is as follows:

- Initialization and Teambuilding: Idea introduced, top management support, internal team formed
- BPM Strategy Definition: Goals and measurement plan for organization, project team and system established
- Role and Method Definition: Employees working in and across processes define roles and methods
- Process Identification and Prioritization: Decisions made on which business processes will be prioritized (based on cost benefit analysis)
- Pilot Process Analysis: In depth understanding and validation of the as-is process and the to-be process
- Learning from Experience: Gather experiences to adapt roles and methods to best fit organization
- Selection of Tools: BPM toolkit that best meets needs of organization chosen (to be discussed in greater detail in next section)
- Introduction of Tools: Tools introduced into organization, including installation, integration, and training

The AR methodology used by the research fostered learnings in each step named above. The AR cycle employed by Adam, Reigel and Koch (2013) was comprised of five stages:

- Diagnosing the problem: identified actual challenges to be solved by BPM introduction
- Planning action: collected possible solutions to the problem
- Taking action: applied the framework to introduce a BPM
- Evaluating results: reviewed work, evaluated outcomes
- Specifying learning: collected lessons to refine the framework for future iterations

Contrasting the two system introduction processes, Orengla-Rogla and Chalmeta (2017) felt stronger around technical draft and design elements whereas Adam, Reigel and Koch (2013) presented a more practical approach including the process for selecting a tool. Taken together, they form a thorough approach for an organization considering a KMS or BPM.

M.-C. Roy et al. (2014) propose a 5-step knowledge audit as part of a necessary process in designing a knowledge management system. These steps are performed with a series of work groups involved in the activities:

- Clarify strategy and define core processes
- Identify, define, and describe the activities in the processes
- Identify the tacit and explicit knowledge required to perform each activity
- Identify major KM problems and solutions
- Categorize by project and prioritize

Subsequently the authors synthesized and expanded on these steps resulting in a methodological framework to introduce BPM into an organization. Their motivation was clear and resonated with the challenges faced by PEPP. Many organizations need expensive external consultancy to implement BPM, a budgetary challenge for many smaller and public organizations. But failure to introduce BPM with the

proper knowledge, methods, and tools results in wasted time, resources, and money. The authors believed this framework would benefit organizations going forward.

2.   Tool Selection Process

The relationship between Business Process Management (BPM) and Knowledge Management (KM) is very close. The capture, storage, and retrieval of information or knowledge feeds into business processes. They are integrated concepts. Critical of authors who were too theoretical or did not address the practical steps of selecting a BPM system, Adam, Riegel and Koch (2013) present several learnings from their AR cycles. The key learnings for selection of tools included to i) define "hard knock out" criteria to filter prospects early, ii) have strict agenda and time frame for presenters, and iii) review elaborate test cases that involve comparable daily tasks and challenging scenarios. Additional lessons rated as medium relevance included i) only inviting vendors that meet at least 60 percent of the criteria, ii) limit finalists to four vendors at most, and iii) consider the economic situation of the vendor.

The PEPP vendor selection process could have benefitted from knowing these lessons. Certainly, some aspects were learned through our own action-oriented processes. And as will be discussed in future chapters, we would add our own learnings, some specific to the public sector.

3.   Implementation Success and Failure Factors

Alazmi (2003) analyzed 159 case studies of KMS implementation in Pakistan and UK public-sector entities to identify best practices. Critical success factors were determined to be i) technology, ii) KM processes, iii) change management, and iv) top management commitment. Often organizations prioritize the technology and payer less attention to the softer issues. They also tend not to have mechanisms in place to capture or measure the value of system implementation. Alazmi also found a mismatch between what the KMS was best at and the actual priorities of the organization. There also tended to be a top-down approach to change that didn't have the support of employees.

Dwivedi et al. (2019) examines KMS successes and failures noting the significant costs and burdens associated with failed implementations. Delone and McLean (2003) developed one of the most-referenced models identifying factors associated with success or failure of KM systems.

Wang and Wang (2016) collected data from 291 Taiwanese businesses and determined several factors that impacted successful KMS implementation. These included technological innovation factors such as perceived benefits, complexity, and compatibility. Perceived benefits included expected increased efficiency and effectiveness of knowledge management activities. Complexity, driven by unstructured storage and processing of information, is seen as a barrier to implementation. Compatibility with existing systems and workstyles is a positive influence. Organizational factors included senior management support and organizational culture. Leadership unlocks resources and affirms positive support. Organizational cultures that embrace knowledge sharing and learning and are more entrepreneurial benefit from KMS adoption. The third and most important factor was environmental context defined as competitive pressures. Knowledge is a key differentiator and driver of value compelling use of information technologies to remain competitive.

There are three stages in a knowledge management project life cycle: initiation, implementation, and integration. Knowledge management failure can happen at any stage. Chua and Lam (2005) attribute failure to any of four factors:

- Technology: maintenance costs, over-reliance, connectivity issues, usability, search functions, integration
- Culture: politics, management commitment, perceived image, knowledge sharing, learning culture
- Content; irrelevant, outdated, ill-structured, knowledge distillation, taxonomy
- Project management: user involvement, conflict management, cost containment, roll-out strategy, external consultants, user training, effectiveness assessment

A failed KM project is defined by missed deadlines, exceeded budgets, and requirements not being met. Conversely, success attributes include growth in resources attached to project, increased volume of content, project is institutionalized, or a financial return generated (Alavi and Leidner, 2001).

F.   Relevant Change Management Literature

Leaders are challenged to manage change (the movement from the existing to a desired state) in the current era due to the speed, ubiquity, complexity, and immediacy of change. Five major change management models predominate in the US. Given the case study objective of moving from an incoherent knowledge management process to a holistic integrated system, espousing a theoretical framework is essential. In the following paragraphs, I will consider application of the model to the KMS case study.

The Lewin and Schein models involve three steps of unfreezing, moving, and refreezing. Elements of buy-in by the organization members and dismantling the prior state are factors that increase the permanency of change. Some critics see Lewin's model as obsolete given the complexities of modern organizations (Burnes, 2004). The top-down management-driven change that ignores organizational power and politics does not accurately capture the workings of the real world.

Kotter's Model focuses on changing the strategic orientation of the organization through a designed intervention, led by a coalition of powerful managers who target efforts on the most resistant individuals in the organization, to move away from the status quo through small rewards in a stimulus response conditioning variant (Pryor et al. 2008) to consolidate wins. Kotter's eight-step model is criticized for being rigid, top-down, seldomly researched with all steps implemented, and not adaptable to complexities within organizations (Applebaum et al. 2012).

The McKinsey 7-S Framework identifies seven stages that a company must undergo to successfully implement change. Stages include assessments of existing structures, systems, skill sets, staff, and style. The final two stages are strategy and shared values. Critics argue the model is time-consuming, difficult to implement, and neglects the human impact element of change (Galli, 2018).

The ADKAR Model focuses on small incremental and orderly changes in people leading to adaptation. In the KMS study, as discussed in Chapter II, Situational Context, awareness of the need and desire to change launched the project. However, three elements of the ADKAR acronym—knowledge of a strategic vision, ability to enforce change, and reinforcement steps—were not clearly integrated into the process. Critics suggest that the ADKAR model, because it focuses on the human element of change, is best used in conjunction with other models when tackling large-scale organizational change (Galli, 2018).

The Action Research change management model integrates both the organizational and human components, proceeding pragmatically with an action-oriented intervention approach followed by evaluation and stabilization. Typically, the action researcher works with the client to diagnose the problem and plan action. He then collects and analyzes data and reflects on findings. This leads to additional cycles of planning and action (Pryor et al. 2008). Critics of the action research model point to lack of generalizability and researcher bias, and they characterize it as more of a consultancy than a research approach (McKay and Marshall, 2001).

Finally, work done on change management issues specific to CRM implementation proved relevant to the KMS change management discourse. Finnegan and Currie (2010), noting high CRM project failure rates, analyzed three cases studies over a two-year period. They identified four integrated layers essential to successful implementation in organizations: culture, people, process, and technology. Recommendations included a fulltime project manager, a team balanced with business and technical staff, the use of consultants, and a clear definition of project scope. Their recommendation to companies was to map capabilities and shortcomings in each layer, enabling prioritization and weighting of efforts.

Of the researchers using surveys, the Jafari et al. (2007) research on organizations utilizing KMS features was akin but looked at the conditions in the organization leading to higher adoption. Factors such as training, flat organizational structures, CEO support, and interactive employee participation were determined to be significant. While Jafari's approach was more positivist, the themes that emerged resonated with my research.

The biggest obstacle to adopting innovative technology and processes is imbedded management who are threatened by the new technology (Fowler and Rose, 2004). As a government agency, PEPP is mired in bureaucracy, hierarchy, policies, procedures, and politics. But industrial-era management skills and managers will still find a place in modern organizations. Much like Toyota a half-century ago, firms will continue to compete on quality, informed by statistical method (Fogarty, 2016). The objective may be to understand when that mindset is best utilized, as opposed to, or in concert with, other constructs that are optimized through collaboration, consensus, and the integration of diverse viewpoints (Toby, 2004).

To implement new management ideas successfully, several factors such as organizational structure, culture, human resources, IT, and top management support are essential and critical. Characteristics of the firms best situated to undertake knowledge management initiatives include large knowledge-intensive organizations with a collaborative culture and organizations that practice quality management of organizational learning. Key success factors of systems implementation include training, a reward system based on participation, employee support of management and the program objectives, adequate resources, an effective strategy around knowledge dissemination to employees, and an understanding of the business's core competencies and how the KMS supports them (Vrincianu, Anica-Popa and Anica-Popa, 2009). Additional factors include interactive employee participation, training, flat organizational structures, and CEO support and commitment (Jafari et al. 2007).

A firm's true worth is in the intangible assets comprised of relationships between the firm, its suppliers, customers, employees, and other key constituents. Relationships drive value and employees drive relationships. Accordingly, personnel growth and development are integral to the success of the firm. Galbreath lists several elements necessary for a knowledge-based culture to thrive. These include transparency, proactiveness, sharing and control (release of information across organization), integrity,

and formality (relates to trust). He presents a framework to assess relationships by asking i) what is the goal, ii) what is the key value outcome, and iii) what is the key ingredient of success (Galbreath, 2002).

As it relates to organizational change, critical elements in the process include democratic management, interpersonal relationships, experimental learning, analysis of action, and analysis of power. Steps in managing change include awareness and vision, willingness to resolve the problem, definition and analysis of the problem, planning activities, organization and mobilization of resources, experiment, test, redesign, implementation, and evaluation of effects (Momcilovic and Rajakovic, 2009). Even so, organizational change requires top-down management support to overcome the resistance to change (Kalpic and Bernus, 2006). Critical to organizational change in the information era is the needed vision in integrating the technical infrastructure, the physical infrastructure, and the organizational design (Bahrami and Evans, 1997).

Organizational change will be met with bureaucratic resistance and interference. But certain components in the organization position it to succeed in the information era. These include decision-making tools, teamwork, performance standards, values, flat structures, and democratic processes (Gunn, 1995; Ramsey and Barkhuizen, 2011).

G. Public Sector Considerations

1. Organizational Culture

The primary driver for adoption of KM initiatives in public entities is the change of organizational culture (Riege and Lindsay, 2006). Organizational culture refers to the shared values, beliefs, opinions, and perceptions that provide norms of expected behaviors for employees. Organizational culture has been recognized as a critical factor and differentiator in organizational development given its relevance and contribution to innovation. Core values of organizational culture and a collaborative culture emerge as important antecedents to stimulate knowledge sharing among employees and improve innovation capacity for firms (Lam et al., 2021). Key elements that attract and retain knowledge workers include spontaneous self-organization, knowledge sharing, diversity, creativity, collaboration, teamwork, everchanging technology, and strong core values (Bahrami and Evans, 1997; Tetenbaum, 1998). Employees gravitate towards work environments they describe as intense, collaborative, novel, fun, and challenging.

Roman-Velazquez (2005) researched KMS initiatives in government agencies and non-profit organizations to understand the role of organizational culture in implementation success. He looked at the role of cultural types and identified eight critical success factors. In terms of culture, he found that those organizations with a dominant hierarchical culture have the lowest likelihood of success compared to all other culture types. They also noted that government agencies tend towards knowledge flow activities that support codification (formalization of tacit knowledge or people-to-document approach) and use personalization (sharing of tacit knowledge person-to-person) more as a complementary strategy.

The role of organizational culture in enabling change has relevance to the KMS initiative at PEPP. There are two aspects of organizational culture that I explore in this section. The first deals with the elements of organizational culture and how they manifest themselves at PEPP. Table 7 is a compiled from several authors (Turlais and Dubkevics, 2012; Mohelska and Sokolova, 2018; Ul Hassan et al., 2011; Tharp, 2009).

Table 7. Organizational Culture Elements and PEPP Examples.

	Assumptions, Ideologies	Values, Beliefs	Behaviors, Norms, Ceremonies, Rituals	Artifacts, Myths
Active	Sub-Conscious	Conscious	Evident	Landscaped reality
Definition	Taken for granted beliefs about human nature; moral principles	Values guide member behavior, expressed in member self-image, interactions with the outside world	Structures, processes, appropriate ways to act, learned habits	Tangible, overt, or verbally identifiable elements in the organization including dress code, office jokes
PEPP Examples	- The markets are rational - Life-long employment at PEPP (nobody gets fired) - Prudence equates to fiduciary duty	- PROFIT (Professionalism, Respect, Open communications, Fairness, Integrity, Teamwork) - Diversification is a prudent strategy - Diversity fosters better decision-making	- Policies, Procedures, and Structures control execution of investment strategy - Start Trustee meetings with hands to heart and the Pledge of Allegiance	- Awards and pictures of Trustees adorn the walls - The gavel at the Trustee chairperson seat - PEPP fared better than peers in last crash due to diversification

The movement from the sub-conscious level to conscious (articulated and manifested in action) is helpful to note (under Active, above). In the case of PEPP, pension money connotes "orphans and widows," and a fiduciary mindset assumes a risk-averse investment strategy. We believe that diversification of assets is the strongest risk mitigant in portfolio construction. Our policies, structures, and controls aim to ensure that diversification and risk objectives are implemented. Finally, under the lore of the organization, superior relative performance versus peers during market downturns is attributed to the benefits of diversification. Which serves to reinforce the ideology espousing prudence.

The second perspective on organizational culture warranting discussion is PEPP's position in the Cameron and Quinn (2011) Competing Values Framework (Ul Hassan et al. 2011; O'Neill, Beauvais and Scholl, 2001) as seen in Figure 3 below.

Figure 3. Competing Values Framework.

Flexibility & Discretion

Clan (Collaborate)	Adhocracy (Create)
Hierarchy (Control)	Market (Compete)

Internal Focus & Integration

External Focus & Differentiation

Stability & Control
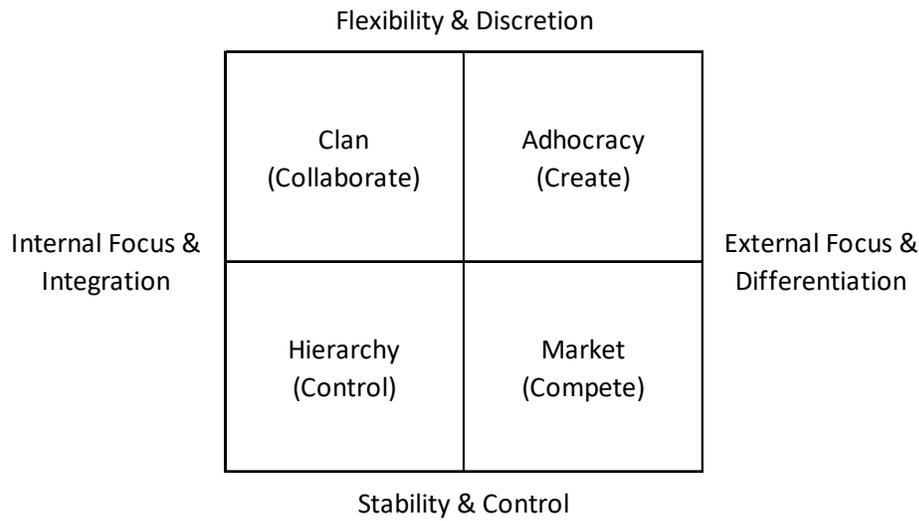
Authors stress that no judgment should be inferred through an organization's placement in the Competing Values Framework. Furthermore, no organization is without some elements of the characteristics of other quadrants. Even so, an organization's dominant value traits position it to undertake certain tasks with greater ease. The entrepreneurial companies of the Adhocracy quadrant with their external focus and flexibility, gravitate towards chaos, adaptability and risk-taking. Undertaking change is part of their DNA. At the diametrically opposed quadrant, the hierarchical, bureaucratic firms are more risk-averse and rigid in their ways. Change threatens the status quo. For an organization like PEPP, whose conservative bent is deeply rooted in protecting assets, change encounters opposition.

Organizational culture was deemed critical to success in the closely related CRM technology implementations. Rahimi and Gunlu (2016) reviewed extensive literature on the topic and identified numerous dimensions as predictors of implementation outcomes. These included cross-functional teams, teamwork, adaptability, service-orientation, empowerment, information sharing, risk-taking, and interdepartmental integration. This foreshadows the ideal elements of the information era organization. But how does an organization like PEPP, mired in an industrial era mindset navigate to the ideal state?

Not specific to public agencies, Taiwanese research found that environments with empowered workers led to greater participation in KM activities more spontaneously. Organizational cultures without this trait were more likely to find their KMS underutilized relative to expectations. (Kuo, Lai and Lee, 2011).

A note on the importance of the research on KM. Without proper knowledge-transfer mechanisms enabling individual tacit knowledge to be codified, and later retrieved and used, knowledge retention in an organization suffers (Levallet and Chan, 2019). Knowledge loss is an issue with mobile younger worker as well as retiring older workers. Older workers depart with subject matter expertise, knowledge about business relationships and social networks, and organizational knowledge and institutional memory (Joe, Yoong and Patel, 2013). This train of thought goes to the criticality of successful KMS implementation, especially in government agencies.

Aspects of today's information age organizational environment are starkly different than the predecessor environment. Terms depicting this new era included fun, novel, spontaneous self-organization, knowledge and information sharing, diversity, creativity, teamwork, fun, innovative, and strong core values (Tetenbaum, 1998; Bahrami and Evans, 1997; McLagan, 2000; Galbreath, 2002; McDonald, 2011).

The in-demand information era worker sought after by the recruiting managers is a different being than the intentionally replaceable automaton of the industrial era. She is a global, connected, technically proficient, self-directed risk taker who is an adept communicator and collaborator whose values include sustainability, work-life balance, and transparency (McDonald, 2011). She is entrepreneurial and innovative, and has aptitudes for aesthetics; she relates stories well, synthesizes information, and seeks out purpose and meaning in her life (McLagan, 2000; Torkaman, 2018). She also confidently seeks and expects immediate rewards for value added to the organization (Reck, 1987). The information era worker is about cooperation, collaboration, and finding win-win solutions; partnering with stakeholders in the value chain to promote solutions that benefit all; and embracing the community and environment as they consider those impacted by decisions (Gabrynowicz, 1992).

PEPP's workforce is both multi-generational and an amalgam of distinct, unrelated undertakings. Most workers are customer service representatives helping members with benefits in a call center or service center environment where they have timecards to record breaks and lunches. Contrast that to the Investment department where professionals are jetting off to conferences around the world. Individuals in the Investments department may aspire to offer a work culture that the in-demand information era worker would find gratifying, but institutional obstacles and bureaucratic structures persist that are incompatible with their envisioned workplace.

2.   Field of Practice Publications

In terms of practitioner literature, several of the larger consulting firms have built practices targeting public agency advancement through adoption of technology. For example, The Boston Consulting Group has the BCG Center for Digital Government which works with government leaders to unlock the potential created by advancing technologies. While not peer-reviewed, the group turns out white papers on a consistent basis. Mourtada et al. (2018) explored digitization of government services in many nations, extolling the virtues and framing expectations of the digital native generation demanding 24/7, one-click services from agencies. Deloitte Insights publishes articles under its Government & Public Services division with a focus on smart cities, emerging technologies, and mobility. George et al. (2019) put forth a new mindset for public sector leaders that embraced complexity, resilience, and a networked leadership model. KPMG's @gov magazine seeks to challenge government leaders' thinking on transformation of government in the age of technology. While many topics explored by the consulting firms provide interesting perspectives, ultimately the perception of bias derived from the commercial aims of generating business from government agencies diminishes the level of utility relative to other sources. While several of these sources discuss leadership, the sticky problem of government bureaucracy as an impediment to advancement do not appear prominently in their literature.

An example at PEPP of inter-organizational and intra-organizational networks can be found in the Institutional Limited Partner Association (ILPA) reporting templates. ILPA is an industry association serving the interests of institutional investors in private capital investments. With thousands of limited partners (LPs) representing numerous types of entities globally (public and private pensions,

endowments, sovereign wealth funds, individuals), the reporting needs are extremely varied. The ILPA reporting templates seek to standardize the information requested from investment managers in format and level of detail, to satisfy most LPs. Each LP then can extract the information they need, customizing reports to satisfy their constituents. The intra-organizational component is perhaps found in the departments sated by the reports. The investment staff, accounting team, and legal team may all be utilizing the data to satisfy distinct needs. The investment team is evaluating performance. The accounting team is validating the fees assessed. The legal team may be ensuring that no investment restrictions (e.g., use of leverage) are breached.

3. Public Sector Change Management

The critical questions explored center on challenges to change management that frequently arise in the environments of public agencies.

Aleksic, Zivkovic and Boskovic, 2015, determined that the most important factors determining public employee resistance to change included their level of involvement in planning the change, conviction in the benefits to be derived from the change, and overall levels of stress in their workplace.

Trader-Leigh (2002), researching resistance to management-initiated change in the US State Department, identified several factors impairing change adoption that are relevant to the current study including:

- Self-interest: people believe they will personally benefit
- Psychological impact: job security
- Tyranny of custom: the powerful are content with the status quo
- Redistribution of resources: loss of control, funding, policies
- Destabilization: radical new approaches conflict with existing bureaucratic structures
- Politics: proposed reforms threaten the balance of power

The author also discusses powerful organizational forces that impair change because change is perceived as benefitting some while disadvantaging others, leading to strong resistance and political struggle.

The majority of the KMS research project takes place in pre-implementation phase. The goal defined as "preparation" includes success factors tied to building a sense of urgency, securing top leadership support, developing committees, change leadership and the project team, ensuring appropriate stakeholders are involved, and undertaking a readiness and risk analysis.

The goal defined as "planning" incorporates vision, governance, the change management plan, the communication plan, and succession plan. The authors concluded that communication was the most critical component of any change management process (Trader-Leigh, 2001). While the researchers noted the limited generalizability due to the research being focused on one case study, one shortcoming in the study was that the researchers did not address peculiarities of public organizations.

Coram and Burnes (2001) looked at organizational change in the UK related to the privatization of a public agency. They point out distinct characteristics of public agency change in public accountability and the need to demonstrate value for money. They determined that critical factors in the change process required tending to structural and cultural aspects of change, with an ear towards soliciting and addressing staff fears and issues.

A key theme extracted from the literature pertains to the changing nature and reconceptualization of work in this era. Organizations will outsource more work and leverage external services (Davidson and Davis, 1990). Other elements of the information workplace include intra-organization and inter-organization networks that share information and integrate workflows. The integration will alter the balance of power between companies, their suppliers, and their customers, promoting partnerships and win-win solutions (Reck, 1987; Tjaden, 1996; Cox, Mowatt and Prevezer, 2002). Knowledge workers will be members of virtual teams that help to break down silos and foster continuously learning cultures and personal growth (Ramsey and Barkhuizen, 2011; Galbreath, 2002).

H.   Intersection of KMS, Public Sector, and Practitioner Research

As I noted above, this research best resides in the body of literature which focuses on the intersection of knowledge management systems, action research methodology, and the government sector. This section will summarize that literature and explore in depth the most relevant pieces.

Massaro, Dumay and Garlatti (2015) conducted a structured literature review of 180 papers focused on public sector KM literature. The topic is of growing importance, given goals of increased efficiency and digitization. But the research is fragmented. The authors cite low levels of international cooperation and comparisons. Furthermore, some topics are over-researched (the education sector), others under-represented (first responders). They note that organizational goals, political influences, and labor divisions make the implementation of KM more challenging than in private enterprise. Massaro's coding process in the literature review led to the following insights into the composition of the articles (as they relate to this KMS study). Although they admitted challenges to categorizing the authors' methodology, action research made up 11 percent of the articles examined; information technology made up 13 percent of the themes identified; 5 percent of the articles targeted finance related fields; and 16 percent of the articles emanated from North American authors. Massaro, Dumay and Garlatti (2015) point to contextual differences pertaining to accountability and stakeholders that justify a distinct research agenda. They also note the limited number of practitioner-authors and lack of significant contributions coming forth. They call for more practitioners to publish in-the-field activity. Based on their findings, it would seem this research would find an audience.

Two studies relate to the quality of data. Laihonen and Mantyla (2018) urge a holistic KM strategy and a systematic management framework to gather and utilize information. The process for refining and ensuring the quality of the information is critical to the system's utility. Jones and Vine (2016) analyzed AR-based research to identify factors impacting the effectiveness of an Australian KMS point. Findings point to the criticality of a standards-based metadata methodology to attach descriptions to the information being captured enabling it to be better managed, searched and disseminated.

Challenges and barriers to implementing transformational projects exist in government agencies, in part due to inadequate project management methods and tools (Furlong and Karaghouli, 2009). The authors list several challenges reported in a 2006 WITSA (World Innovation, Technology and Services Alliance) survey, including:

- Diverse and conflicting stakeholder interests, cultures, and mandates
- Blending changing technology, a mobile workforce, and bureaucratic work processes
- Application of traditional business models rewarded outdated transactional-based work routines

- Start-stop mentality of systems development subject to political and executive whims and priorities
- Political realities and dependence on private sector resources
- No holistic project management approach grounded on organizational objectives
- Scarce vital project management subject matter expertise with government agencies
- Organizational environment not pre-supposed to wide transformation

WITSA has members from over eighty countries and covers 90 percent of the world tech market. I always find the fascinating part of the literature review is how the challenges that PEPP struggles with on a day-to-day basis are ubiquitous. Government agencies around the world face the same dilemmas.

There are compelling reasons for the adoption of knowledge management practices in the public sector. These include driving efficiencies, replacing outdated and often siloed systems, improving accountability, and delivering better services to constituencies. Despite this, there is scant research on KM theory and practice in the public sector (Riege and Lindsay, 2006). KMS design issues, already with low success rates in the private sector, may not be suitable for public agencies (Huber, 2001).

I.   How Literature Review Informed Methodology

One of the primary objectives of the literature exploration is to inform and validate methodological choices. This literature search is related to numerous methodological decisions I made during the primary research process.

The sixteen survey questions probing expected utilization of the KMS features were drawn from the KMS definition exploration that led me to the softwareinsider.com website (softwareinsider.com, 2018) which listed and ranked features in KMS applications. The specific categories, sub-features, and definitions were tied to the comprehensive list provided. This construct of sixteen features was used as the framework to evaluate vendor candidates and to prioritize with the team which features provided the greatest value.

Themes extracted from the literature informed the open-ended interview questions. Integrated into the survey questions were probes related to the nature of individual's and manager's work today and how they envisioned that changing after KMS implementation. An additional question focused on perceived sources of value creation and required activities diminishing in value. Other questions focused on the skills required of individuals and managers as well as organizational capabilities and impediments to succeed in the knowledge-management environment.

The literature research affirmed elements of my approach as well. Certainly, the imbedded pragmatic researcher conducting interviews and surveys, reviewing documents, and observing activities (even in a mixed methods approach) were methods consistent with prior research in the field.

J.   Reflections on Literature Review

Key learnings for me began with understanding where my intended research resided and finding that body of literature. I started this process trying to validate a premise of era transition reflected in the adoption of a KMS. So enthralled was I with that theme, that I conducted a systematic literature review of 100 plus articles that met my identified criteria. In retrospect, a better strategy (and one subsequently undertaken) was an exploration of the literature that captured the core pillars of what this research was focused on, namely knowledge management system, action research, and public agency.

Because of that initial misstep, literature that could have informed methodology and the action-oriented research must instead be treated as emergent. It provided insights into what had already transpired, coming to light after the data had been collected. Like the insights in methodology, additional time in the planning phase would have resulted in a more efficient and impactful literature review process. That having been said, knowledge experienced trumps knowledge read.

Finally, the process of literature review and selection seemingly has no end. On the Discovery library search platform, there are over 160,000 articles and books on "knowledge management." If you add the term, "public sector," you arrive at a number just under 2,000. Finally, the term "action research" brings you to 27 items, only a handful of which had relevance to this research. From there, it was interesting to go backward and forward in time. I drilled down into the authors that those researchers referenced. And I also looked forward for articles that cited the research I had deemed relevant. This was a fascinating journey, though the dearth of practitioner research on the topic of knowledge management in the public sector was disappointing.

K.   Literature Review Concluding Remarks

This literature review has progressed through a sequence of exploring knowledge, knowledge management and knowledge management systems. The simple story is that, in this new world we are living in, knowledge is the primary determinant of competitive differentiation and organizational success. It is imperative that private and public entities take an inventory of their knowledge and implement sound knowledge-management strategies enabling them to identify, capture and store information that can then be retrieved. Advanced processes of knowledge enable collaboration, application of the knowledge in integrated business processes, and the creation of new knowledge. Knowledge management systems, properly implemented, offer an organization the opportunity to systematically manage and take advantage of their knowledge assets.

Despite the promise of KMS to deliver organizational transformation, most implementations fail to achieve their full objectives. This under-utilization is due to four categories of issues, i.e., technology, content, culture, and project management. The chapter also considered challenges impacting public sector organization, determining that the hierarchical organizational structure and imbedded workforce resistant to change were not traits conducive to innovative technology. Even so, the demands of efficiency from external constituents and a changing mobile workforce are compelling cultural change. Finally, the review also considered the dearth of practitioner research from the public sector on the topic of knowledge management.

While the literature review journey has not been a straight line and involved several iterations before, during, and after the case study, this chapter adequately captures the key literature and themes attending this research, exploring the topics and intersections of knowledge management, public sector, and action research. The literature review arc both informed methodology and action-oriented activities and then helped to explain what transpired during the case.

To bring this chapter to a close, I circle back to PEPP, funded in part by taxpayers and constructed to serve tens of thousands of municipal employees and survivors through their retirement years, the organization will presumably survive into perpetuity. Two reasons stand out as to why this inquiry is critical to the PEPPs of the world. First is that managing knowledge efficiently drives better decisions which leads to better performance. Failure to deliver performance leads to under-funded pensions that

are unable to meet their obligations, resulting in municipal bankruptcies and abrogation of promised benefits (Siedle, 2020; Miller, 2017). The second reason is that organizations mired in backward tools, structures, cultures, and compensation policies will not be able to attract and retain the best talent, further impeding their competitiveness in the marketplace, which again results in underperformance (Steyer, 2015). In free markets, barring government bailout, Darwinian "adapt or die" logic prevails. For government agencies, death may be more agonizingly slow, but underfunded pensions lead to unsustainable tax burdens that suffocate municipalities.

IV.   Methodology

A.   Introduction

Methodology refers to the data collection strategy and procedures of qualitative research. This chapter seeks to provide the blueprint enabling peers to understand the process and assess the quality of research undertaken and to determine if it adheres to best practices in the design and collection of data. Stated from another perspective, this blueprint should allow future researchers to undertake comparable research in their own organizations (recognizing the uniqueness of each case study). In any mixed- or multiple-methods research, it is imperative to not only explain the different research activities and data sources (and any constraints), but also the relationships between the methods used.

This research focuses on factors that advance or impede a software vendor selection process in a public agency. In a case study setting I employ methods of action learning cycles, interviews, and surveys. In sections in this chapter, I present the strategy for the data design and its collection, and I discuss the challenges presented by each of the methods.

Let's discuss the four components of methodology at a high level. The case study setting for this KMS vendor selection indicates the research is taking place not in a laboratory but in the field where all aspects of the environment cannot be controlled. While there is a sequence of steps in the vendor selection process, the people (and access to them), places, and timing are frequently uncontrollable variables. The action-oriented techniques (learning cycles of act-learn-reflect-reframe/plan) undertaken by the seven core KMS selection project team members sought to advance the vendor selection process steps. Empirical data from observations and meeting proceedings were collected in journals, meeting minutes, and project documents.

These vendor selection steps are informed by the two fundamental research methods undertaken. The surveys of eighteen of the thirty-four Investment department team members provide indications of the relative value of the various KMS features. The approach and results, while not statistically significant, inform several of the vendor selection and evaluation steps. The interviews, conducted with the same eighteen participants, examine the current workflows and environment, and envision what will change after KMS implementation. The aspirations and concerns of the workforce captured in the interviews is integrated into the discourse during the vendor selection steps.

Briefly, a discussion of my role is warranted here. I was invested in the research because I was frustrated at the pace of change. I also had access to people, an understanding of the issues, and the opportunity to be a part of the core KMS team immersed in the project. As a member of the team managing the vendor selection process, I leveraged those survey and interview insights while leading action learning cycles to influence outcomes. Throughout the duration of the case study, I observed events and captured notes formally as a project team member and informally through my own journaling. These survey results, interview transcripts, project documents, and journal entries comprise the data analyzed.

The qualitative approach I undertook in this study is an instrumental case study. Conforming to the best practices of the case study approach, several methods are employed to form a holistic understanding of the case (Creswell, 2013). Methods used included action-oriented research (action learning cycles) and fundamental research (interviews and surveys).

1. Overview of Research Activities, Data Sources, and the Relationships Between Methods

The KMS case study integrated three distinct research components comprised of different methodologies, research activities, and data sources.   In this case study setting, the three research components were surveys, interviews, and action learning cycles. (Reference Table 4.) I touch on each below, incorporating an example as a microcosm, noting that in-depth discussions are presented in subsequent sections. (Note that the activities discussed below were subsequent to an approved broader research design proposal and review of ethical considerations by the University of Liverpool and the PEPP leadership team.)

Surveys: I conducted 18 in-person surveys of investment team members probing projected usage of 16 KMS features generating numerical data. By example:

> Question: *On a scale of 1-10, with 10 being the most useful, once implemented, how useful will the Collaboration feature be to your job?*

> Answer: *Nine.*

Research activities undertaken included survey design, respondent sample selection, survey implementation, and quantitative analyses of the numerical data ultimately focused on descriptive statistics.

Interviews: I conducted 18 investment team member in-person interviews, probing their rationale for each survey rating, followed by five open-ended questions that generated both qualitative and quantitative data. By example:

> Question: Related to the Collaboration feature, how do you do things today? What do you envision will change after KMS implementation if anything?

> Answer: I think overall the KMS the purpose of it is more collaboration across the organization so that it's more efficient that it saves time.

Research activities undertaken included interview design, respondent sample selection, and interview implementation. The words of the respondents were recorded and transcribed and serve as the data which then underwent qualitative content analysis to identify themes. Themes were then categorized under topics, such as "productivity gains," in the example provided. Quantitative analysis was performed on the counts of themes to determine the most dominant themes.

Action-learning cycles: As an imbedded researcher, I facilitated four action-learning cycles forming a meta-cycle during the KMS project.

Action-learning cycle 1 – Vendor evaluation process

Inside researcher activities included leading discussions, implementing the action-learning framework, and nurturing a participatory environment. The qualitative data that was captured was reflected in the meeting minutes, documents produced by the KMS team, and a diary that captured noteworthy observations and my own thoughts during the case study.

To understand the full impact of and relationships between the several methods utilized on the outcome of the project, one can consider the end state. The KMS evaluation framework adopted by the Investments department existed as a direct result of the surveys and interviews conducted in this research project. This framework included definition of a knowledge management system, its contrasting features and capabilities, the nature and prioritization of work in the organization, and the shared language by which these concepts were socialized. During the vendor evaluation AL cycle, I introduced the framework to the KMS team. We subsequently adopted and integrated the framework into the project to evaluate KMS vendors and the Investment department's needs. The interviews and surveys informed the KMS team during the AL cycles as to what features were most important and why.

Table 4. Methodology Overview.

Methods	Case Study	Action Cycles	Interviews	Surveys
Type of Research	Case Study	Action-Oriented Research	Fundamental Research	Fundamental Research
Research Approach	Qualitative	Qualitative	Qualitative & Quantitative	Quantitative
Paradigm	Constructivist	Constructivist	Constructivist	Constructivist
Design	- Identify case - Determine data collection process - Determine type of analysis - Interpret meaning	- Identify the problem - Engage team in review - Conduct collaborative analysis - Plan and take action - Jointly evaluate results	- Thematize the inquiry - Design the study - Design sampling strategy - Conduct interview	- Set goals - Determine sample population - Structure survey - Select survey mode - Choose questions - Implement survey
Type of data	Observation Documents	Observation Documents	Interview	Form completed during interview
Data	Journal entries/notes Email Meeting minutes Project documents	Journal entries/notes Meeting minutes Project documents	Recordings Transcripts	Numerical responses
How stored	Computer files (Word, PowerPoint, Outlook)	Computer files (Word, PowerPoint, Outlook)	Computer files (MP3, M4A, Word, Excel)	Computer files (Excel)
Analysis Participants	Researcher	KMS Team	Researcher	Researcher
Analysis Process	- Review files - Reflect on events - Capture/categorize thoughts - Interpret events	- Identify and pose questions - Provide reflection time - Solicit responses - Engage in group discussions - Arrive at consensus - Summarize findings	- Listen to recordings - Read through/QC text - Import text in Atlas.ti - Form initial codes - Count frequency of codes - Create categories	- Listen to recordings - Verify/QC form data - Analyze in Excel (counts, average, dispersion, by demography)
Analytical Output	Case description, learnings	Stories of action cycles, reflection, sense-making	Themes	Descriptive statistics (frequency, mean, dispersion) Inferential statistics (cross-tabulation)

I wrestled with this question: "If you have a survey with numerical data, and if you group and quantify themes from interviews during qualitative content analysis, does this mean your research is 'mixed methods' (quantitative and qualitative) or simply 'multiple qualitative methods'?" The use of multiple qualitative methods is firmly ensconced in case study methodology research. When we think about quantitative research, terms such as scientific, positivist, sampling size and statistical significance

immediately come to mind. Positivists argue that the nature of human behavior is objective and can be scientifically measured. That orientation would not be appropriately associated with this study. The intent of numerical data here is simply to help organize and contrast qualitative data. This stance related to numerical data makes moot any concerns of philosophical inconsistency due to incompatible constructivist and positivist methods. Even so, I am attentive to the norms and rigor attached to the design, collection, analysis, interpretation of the numerical results in mixed-methods research (Bishop, 2015). The researcher is still required to integrate the various methods into a holistic, coherent account (Guetterman, Molina-Azorin and Fetters, 2020).

The objective of the research was to identify factors that enhanced and impeded the vendor selection process. The case study is a methodology and here primarily the setting in which the research is taking place. The survey construct and results inform steps in the action cycles. Similarly, themes that emerge from the interviews inform my discourse with the group. As an example, the "Support" feature rated highly in the survey and in interviews; likewise, a recurrent theme for managers was not knowing where information was stored. These topics were ultimately woven into the discussions resulting in vendors with robust training and support capabilities deemed as more attractive.

The chapter is organized as follows. First, in Section B, I present the philosophical underpinnings of the research. In Section C, I define and discuss the case study methodology, strategy, and any researcher biases. In Sections D and E, I discuss the data design, collection, and analysis approaches undertaken for each of the three methods used. I also address validity, reliability, and shortcomings for each method used. My goals in these sections are, i) to illuminate and reflect upon the thought processes behind the critical choices made at each stage, and ii) to convey the thoroughness in research design, reflecting conscious decisions and awareness of limitations and biases identified in advance of undertaking the research. In Section E, I elaborate on the relationships and integration between the methods. I close the chapter with my reflections on methodology and conclude by revisiting the concerns cited earlier. Accordingly, the remainder of the chapter outline follows:

B. Methodology Underpinnings
C. Case Study Methodology
D. Fundamental Research Methods
E. Action-oriented Research Methods
F. Relationships Between Methodologies
G. Reflections on Methodology
H. Conclusion

With that introduction, I next present the philosophical foundation of the research methodology.

B.   Methodology Underpinnings

This section explores the philosophical foundation of the research. As the research has both qualitative and quantitative data, it necessarily falls into a mixed methods school of thought. Even so, the quantitative data is not purported to have scientific significance. Stated another way, no KMS software developer would look at these survey results and base their development budget on the features rated highly by the PEPP team. The numerical data sheds light on subjective, qualitative data, but is not meant to be conclusive.

1. Ontology and Epistemology

Ontology and epistemology address two questions related to the researcher's philosophy: what is there to know and how we can know about it? Ontology captures the researcher's philosophical assumptions about the nature of reality (Easterby-Smith, Thorpe and Jackson, 2012). Epistemology captures the researcher's assumptions about the most appropriate ways of enquiring about the world. The researcher is expected to declare their allegiances and adopt a positivist or anti-positivist framework and then adhere to acceptable methods established by precedence for that school of thought.

As an inside researcher, I had access to a plethora of data. I saw my job as the researcher to sift through the data, identify what was relevant, and synthesize the information into a coherent picture that made sense of what was happening and ultimately could be used to guide others. Reality is multi-dimensional and constantly evolving because people are not static. The following paragraphs explore different schools of thought and their applicability to the KMS research.

The positivist stance seeks to explain the world according to the standards and methods of natural science. The use of surveys and the quantification of qualitative content in this research suggests the repeatability and objectivity of adherence to a scientific school of thought. Prior understanding of the complex social and organizational problems at PEPP, and my personal involvement in the research, place the research in the hermeneutic school of thought (Bandyopadhyay, 2015). I hold the Chartered Financial Analyst credential and operate in an investment industry that espouses a manage-by-evidence mode of operation, thus a positivist mentality permeates my world. Yet my frequent stance is that humans make management decisions and then choose to make prominent the evidence that supports their decisions. In this research process, I ask questions of a diverse group of workers, I toil daily in the workplace, and I observe what is transpiring to make sense of a discrete moment in the organization's timeline.

But the immersion of the researcher as a participant in that which is being researched and the reliance on individual perceptions and sense-making to understand phenomena point to an anti-positivist stance. The constructivist school of thought associated with the social sciences advances a reality based on cognitive structures (Thorpe and Holt, 2008). Social constructionism holds that reality is socially constructed and given meaning by or interpreted by people. This research adopts a social constructionist paradigm, espousing the belief that organizational culture is a social construct. Accordingly, interviews and observation are proper instruments to probe the cognitive building blocks that people have assembled to make sense of their worlds. There are many truths, with selected facts subject to interpretation. Inquiring into the opinions of workers and management across the spectra of rank, gender, and tenure, this research sought to ensure that a diversity of opinions was compiled, enabling the truths experienced by many to form a mosaic that best reflects reality.

I personally find it paradoxical that so much of my practice embraces the importance of diverse investment management teams (better decision-making) and diversified portfolios (better risk-adjusted returns). Yet this philosophical debate on the purity of a positivist or constructivist approach necessitates discussion in every mixed methods research paper. Numerous philosophical schools seek to address the incompatibility of realist and constructivist ontologies attending mixed methods research (Molina-Azorin and Fetters, 2020).

The pragmatist (or often practical or sensible) framework best houses this research. The researcher is not confined to one system or philosophy. The focus is not on methods but on solutions to problems. Pragmatists use multiple methods and multiple sources of data collection to explore the research question (Creswell, 2013). They are not shackled by a particular mental constraint or technique, they reject the intractable disputes and dichotomy (Lipscomb, 2011). Pragmatism's objective of generating useful knowledge is very aligned with action research's aim to generate actionable knowledge. Pragmatism is often considered the foundation of action research, given its emphasis on practice and action (Lim and Chai, 2015). Even so, a challenge for mixed methods researchers is designing integrated methods as opposed to distinct stand-alone studies. The objective is to inquire with the most appropriate research methods with the intent of producing socially useful knowledge (Feilzer, 2010).

The pragmatist's concept of the duality of data, confounding attempts to characterize it as qualitative or quantitative, is evident in the KMS study as well. As will be discussed later, interviews capturing qualitative data are coded to identify dominant themes determined by counting instances of the theme using a software application. The plethora of themes represent the constructed realities of the subjects. The determination of the dominant themes leverages a positivist approach that mitigates the potential for researcher bias in elevating preferred themes. This integrated mixed methods approach is consistent with Castro et al. (2010) up to the point of themes becoming variables in modeling exercises. To conclude, this KMS research pursues a case study methodology rooted in a pragmatist framework employing mixed methods.

I did consider other frameworks during the research. The transformative paradigm holds that power is the central issue to be addressed to attain social justice. All methods are viable so long as there is an interactive link between the researcher and the participants, and power issues are explicitly addressed. Multiple socially constructed realities co-exist, and the researcher must respect the complex social and historical context, espousing a social justice pursuit (Mertens, 2007). In this study, the tenet that adoption of information age technologies unfetters workers qualifies as a social justice aim. But while the impact of power on technological adoption is discussed, the lack of explicit confrontation and exploration of power would make the transformative paradigm not truly reflective of this research.

Critical realism potentially offers a synthesis of the constructionist and positivist paradigms. The world is viewed as an open system with emergent properties (Thorpe and Holt, 2008). Critical realism integrates concepts of three realms: that which is perceived, that which is actual, and that which is real. Real includes causal powers that are often disadvantageous to the worker class (Easterby-Smith, Thorpe and Jackson, 2012). Critical realists operate under the notion that there is one objective reality but many ways of discerning the truth (Schoonenboom, 2019). The co-existence of the three realms resolves the dichotomy encouraging mixed methods for many researchers, though the school of thought is evolving, and different definitions of realism undermine its utility (Lipscomb, 2011). The critical paradigm is appealing for the KMS study in that the implementation of the technology potentially serves to unleash productivity in workers who have been constrained by longstanding processes and policies challenging existing social structures.

Also appealing is the emergence of mixed methods as a paradigm in and of itself. The existence of shared communities of practice, quasi-exemplars, with peer reviewed journals to exhibit their work all support MMR as a research community (Ghiara, 2020). Despite a myriad of worldviews, researchers also self-identify as mixed methods, distinct from quantitative or qualitative, further bolstering the claim. As

discussed earlier, while some quantitative methods are employed, it remains a qualitative study espousing a constructivist philosophy, best suited to the pragmatist framework.

2.   Research Problem

The research is a case study focused on a knowledge management system selection process in a U.S. public pension plan. The study seeks to understand the factors helping or hindering success at adopting and implementing the innovative technology. The economic impact of a failure to implement business applications can be significant. Businesses can experience productivity loss, lower morale, and employee attrition. Even more damaging, business models may no longer be viable, displaced by companies that have embraced new technologies.

Themes that will be explored include the changing labor/management roles in the knowledge worker era, cultural elements that advance or hinder a KMS implementation progress, and an assessment of success factors for implementation. Integrating the research questions posed at the outset with themes that emerged from the literature, questions to be probed include:

- What are best practices in a vendor selection process?
- How do workers, managers, and leaders see their roles and responsibilities changing with the implementation of ICT?
- What do workers see as obstacles to and needs for successful ICT implementation in terms of culture, systems, management, and worker skills?
- Is adoption of ICT a means to liberate or exercise greater control over workers?

These themes were identified in advance of conducting the research and informed by the literature review. I maintain a grounded approach, seeking to allow novel themes to emerge from the words and behaviors of the participants as the case evolves.

3.   Research Purpose

The purpose of the study is to generate knowledge that will provide insights into the mental frameworks of workers, management, and leaders that can be used to facilitate the implementation of initiatives, increasing the likelihood of transforming the organization into a viable information-age entity. But it also will provide workers, managers, and leaders knowledge that will allow them to reflect on changes taking place and recalibrate their skill sets and expectations as to the future of work and the workplace environment.

4.   Research Objective

The research seeks to gauge people's readiness and eagerness to transition to the KMS technology (with its promise of streamlining and integrating the flow of information), and to understand the impediments to success (such that they might be better navigated by this organization and others in similar straits).

5.   Research Approach

The research follows a predominantly inductive approach. After collecting data grounded in the language and behaviors of the participants, I paused and allowed the findings and theory generation to emanate from the data (while acknowledging that the limited number of observations make generalization hard). Even so, abductive reasoning is considered appropriate for pragmatic research in that it alternates and integrates connections between data and theory. The approach invites the researcher to flow between different types of knowledge, allowing them to inform one another (Feilzer,

2010). The intellectual curiosity that impelled me to undertake a pragmatic mixed methods inquiry logically seeks to utilize academic and practical, along with the experiential knowledge of being an imbedded practitioner, to arrive at a final product of actionable knowledge that both advances organizational effectiveness and the academic body of literature.

6. Research Strategy

This pragmatic research project pursues an instrumental case study strategy. The case being explored centers on a KMS vendor selection and implementation process. The multiple sources of information include interviews, surveys, documents, action research, and observation. This single case is perceived to be instrumental in understanding an organization's cultural climate in the context of imminent adoption of new communications technology.

7. Study Justification

In evaluating investment managers, some ask, "does this manager have a right to exist?" The same question is asked of this research. The practitioner answer is that, if at the end of the research, workers are more liberated and the organization is more democratic, then the undertaking is justified. The academic answer is that, if the methodology and practices adhere to expected standards, then the findings attain a rigor enabling the research to advance the body of knowledge.

The objective of the research was to understand how different people in the PEPP investment department were experiencing the friction resulting from the KMS selection and implementation process. This research involves the study of a case within a real-life, contemporary bounded setting.

Other qualitative research methods were considered and ultimately rejected. While this research is grounded in the viewpoints of the participants, the objective was not to develop a theory but more to uncover common themes that tie the experiences of the PEPP workers to other researched organizations undergoing change. Ethnography and phenomenology lacked the proper populations to study and a defining phenomenon. Similarly, while some stories are captured during the interviews, a narrative research approach would not have obtained as many voices focused on a smaller window of time. A comparable approach can be seen in Ramsey and Barkhuizen (2011), who researched how to unlock the expertise of knowledge workers in a South African service center by using guided discussions in focus groups to identify key themes. Accordingly, the instrumental case study proved the best methodological approach for the research.

C. Case Study Methodology

The first component of case study methodology is selecting a case to explore the topic. PEPP has distinct characteristics as a public agency, and the KMS project has several elements that make it an ideal action-oriented case study to explore change. The KMS project was supported by senior management, required cross-departmental participation and had taken several years to advance. In addition, the software application promised to dramatically alter the way work was done at the organization, impacting internal and external parties. In this case, the vendor selection stage represents a pivotal time for the organization as the needs, expectations, and uncertainties of change driving the project are top of mind.

1. Definition and Application

Case study methodology is defined as a qualitative approach to inquiry in which the investigator explores a real-life, contemporary bounded system, through detailed in-depth data collection involving

multiple sources of information, and reports a case description and case themes (Creswell, 2013). Defining features of a case study include the identification and description of a specific case, the intent or specific issue under investigation, in-depth understanding gained through many forms of qualitative data, and a data analysis approach that leads to themes or assertions. Continuing to leverage Creswell's descriptions of case study features, the following delineate how each element of the case study applies to the current research.

- Case study – real-life, contemporary setting: The KMS vendor selection and implementation process is the case or unit of analysis which meets the requirements as it centers on a live process going on in a real organizational setting.
- Instrumental case study – focuses on a specific issue within the case: An attribute of the KMS case study is the central question of understanding change and obstacles to change evident through the vendor selection process.
- Bounded system – bounded by time and place with interrelated parts that form a whole: The KMS case study took place over a nine-month period at the PEPP headquarters. The potential impact of the KMS system necessitated three departments (Investments, Legal, IT) working together and integrated input from the most junior administrative assistant to the CEO of PEPP.
- Case description – or the narrative description: The facts and context of the case are presented in Section II, as The Situational Context.
- Case themes – the major findings or categorical aggregations: after coding and analyzing the data, I present the findings as themes that emerged from the case study.
- Multiple sources of information: This research employs interviews, surveys, action research, document review, and observation to provide depth to the case.

The multiple qualitative methods utilized in this case study present some challenges related to philosophical underpinnings.

Defining features, consistent with the long-standing traditions of case study research are evident (Creswell, 2013):

- A specific case with decision points related to adopting and implementing a KMS solution
- An instrumental case study with intent of exploring a specific issue
- An in-depth understanding of the case supported by interviews, observations, documents
- A data analysis approach being one single case focusing on one department
- A detailed chronological description of the case that identifies specific themes
- A discussion of findings and lessons learned

D.   Fundamental Research Methods

The research pursues a qualitative methodology that includes a semi-structured interview consisting of sixteen two-part survey questions and five open-ended questions asked of each participant. The characteristics of qualitative research are apparent:

- Subjective analysis more focused on non-statistical data;
- Data includes level, tenure, and gender;
- Small sample not representative of the entire population; and
- Exploring, interpreting, and seeking to understand social interactions.

This section is broken into three parts. First, I cover the method elements that were common to both the survey and the interview. For example, the conference room set-up and sample selection are the same. The subsequent sub-sections consider elements specific to the survey and interviews.

1. Method Elements Common to Survey and Interview

a) Research Process

The research process with the participants consisted of the following steps:

- An invitation e-mail was sent to the entire Investments department with a high-level overview of study.
- A detailed e-mail was sent to the eighteen staff members who volunteered to participate in the study. The e-mail included a more detailed description of the study including a list of the KMS functionalities that would be probed during the interview to familiarize participants with the KMS features.
- At the commencement of the interview, each participant was given a Participant Consent Form (see Appendix C) and provided as much time as they desired to read it. All eighteen participants signed the form.

The interview elements were:

- Thirty-to-sixty-minute time frame
- Conducted in a conference room on the worksite premises during work hours
- Face-to-face interview
- Recorded on two devices (iPhone and a laptop)
- Confidentiality assured to participants
- One interviewer (me) asked all participants the same questions in the same order
- No compensation was offered to participants
- Consistency: questions were asked in the same order and tone by me in similar conference room conditions with the same two recording devices during working hours (8 a.m. – 4 p.m.)
- Dispassionate and objective: I communicated that I was indifferent to the results and that all responses would be confidential. Any KMS feature or the entire project could represent significant change, have no impact, or even make things worse. The interviewer's responses remained inquisitive and dispassionate, displaying neither excitement (dis)agreement, or any emotion other than interest in capturing the subject's opinions and rationale.

Approximately two years before my research began, another worker interviewed colleagues for her dissertation project. Precedent had been set in terms of internal approval process, use of facilities, and carving out time during the workday to conduct interviews. Accordingly, the research project was approved by the heads of Human Resources (HR), Legal, and Investments. To reserve conference rooms, I coordinated with the administrative team, but only my name would have shown on the reservation. Only one person, late into the process, expressed consternation about participating during work hours. But he became more comfortable when he realized that a dozen people had preceded him and that HR had signed off.

b) Sample Selection

The participant group comprised eighteen investment team members working in a public pension investment department. The participants represented nearly 50 percent of the entire investment staff.

All thirty-four staff members were sent an e-mail invitation introducing the study. All eighteen respondents who volunteered to participate were interviewed. Three demographic pieces of information (shown with the numbers belonging to each category) were captured for each participant:

- Role: management (three), analyst (thirteen), administrative staff (two)
- Tenure: 0-5 years (eight), 5-10 years (four), >10 years (six)
- Gender: male (thirteen), female (five)

While not formally captured as variables, the subjects represented a mixture of investment asset classes (e.g., private equity, real estate, fixed income, hedge funds, public equities, and portfolio analytics). Also not tabulated were the racial and cultural profiles of the participants, which nevertheless reflected the diverse composition of the department. The subjects are knowledgeable about the pension plan, investments, and their roles in the department.

I was desirous of a critical mass of at least ten to twelve (about 25-35 percent) of my colleagues to volunteer to generate an adequate amount of data. The eighteen volunteers reflected the composition of the entire team with approximately 50 percent participation across all demographic categories. Their participation reflected support for me (a mid-level employee in a non-threatening role with six years tenure), support for any worker pursuing education, support for the KMS initiative, and curiosity. While I would have found intriguing colleagues' reasons for not participating, I never pursued such a line of questioning. Inquiring why someone didn't volunteer felt intrusive and contrary to the spirit of the invitation. I should note that several senior leaders of the department participated and at least one mentioned the study in a team meeting signaling support for the undertaking.

c)   Design Considerations

An overriding objective was to design open-ended questions that were divergent and evaluative, leading to more thoughtful responses, as opposed to convergent, which might lead to short answers. The design of the research instrument addressed the following elements:

- Number of questions: the study was designed to take about forty-five minutes to complete. The length of time to complete responses to the sixteen survey questions followed by the five open-ended questions averaged forty minutes.
- Throughout, I considered McDonald's (2010) question attributes to be key:
    o   Ease of response – easy to answer, no undue burden; and
    o   Relevance to central question with good probability of yielding results.

The aim of the design work was adoption of best practices, providing evidence of academic rigor, ensuring validity of results, affirming the ability of and rationale for the study to be replicated, and ultimately delivering relevant results with real world application.

d)   Researcher Biases

As it relates to questionnaire design, a key objective was to identify potential researcher biases, and then review each proposed interview question in that light to ensure that responses supporting the hypothesis were not being unduly elicited. Potential biases fall into a few different categories, but several are discounted:

- Physical characteristics have no impact.
- Gender impact is inconclusive.

- Race is generally only impactful on data gathered when the subject is race.
- Age and tenure impact is inconclusive.

The following discussion identifies biases and steps undertaken to mitigate the potential bias impact. Evident biases include race, gender, age, as well as rank, and tenure in the organization. While I am of African American descent, as none of the content focuses on race, the research sees no race-driven interviewer subject friction which would have constrained robustness of responses (Miyazaki and Taylor, 2008).

Pre-conceived potential findings: by externalizing and acknowledging the following expected findings in advance, the researcher can mitigate the risks that, through question design or researcher actions, the interviewee is influenced.

- The connected world has made work 24/7, or on all the time, as opposed to a factory where the means of production was inside four walls.
- The nature of work has evolved such that management no longer understands it.
- Management distorts or perverts the advanced technologies to control rather than liberate.
- Risks for management have changed; risks for companies have changed.
- KMS will be beneficial, is necessary, is more wanted by staff than management.
- Older, longer-tenured workers are more fearful or averse to KM technology.
- Government agency bureaucracy impairs successful KMS implementation.
- Benefits of adopting the KMS technology are pervasive; risks are minimal.

The goal in addressing pre-existing biases is to minimize their influence: question design, interviewer effects, or even facial responses can lead or elicit responses that fulfill the desired outcomes of researcher. Hence, neutrality of questions is an imperative. Leveraging Fowler and Mangione (1986), the research employed the best methodology in question design and interview process to mitigate interviewer bias and effects. To offset the possible impact of these effects on the research, the following was done.

- Interviewer bias was mitigated through a semi-structured, open-ended format, and questions were checked to ensure that none were leading.
- Interviewer effects, such as behavior and attributes (race, role, gender) were not material, as discussed above.
- Interviewer-interviewee interactions were mitigated via a neutral interviewer that asked probing questions.
- Consistency was achieved via use of a single interviewer (acknowledging that multiple interviewers increase reliability).

Additionally, the interview process embraced the psychological characteristics that elicit deeper conversations:

- Displaying personality, friendliness through smiling, laughing, or eye contact (McAdams, Jackson and Kirshnit, 1984).
- Warm, person-oriented approach elicits more consistent data than task-oriented and business like approach (Rogers, 1979).

e)   Ethical Considerations

The following steps were taken to address ethical elements of the study:

- Confidentiality was assured of all participants. The identities of participants were segregated from the data in secure locations. The data was anonymized at the earliest feasible point after data collection. The recorded tapes and identities were deleted post-data analysis.
- Interviews were conducted during the workday. A few participants expressed some anxiety participating in the interview during work hours. Participants were assured that their participation during office hours was approved by the department.
- The research was approved by the University of Liverpool dissertation committee.
- The research was approved at the worksite by the head of Investments, the chief counsel, and the head of Human Resources.
- It is worth noting that my role as a mid-level individual contributor with no direct reports is not threatening or intimidating and carries no authority. However, with six years of tenure in the organization, I am well-respected and viewed amicably. Which is to say that I had no powers to compel participation.

f)   Validity

Validity is defined as the extent to which measurements and research findings provide accurate representation of the things they are supposed to be describing (Easterby-Smith, Thorpe and Jackson, 2012). The methods employed here, the survey data and interview content, increase the validity of the findings as the two prongs serve to inform and validate the other. According to Morse's (2006) classification of qualitative data, workers' reflections on work processes would be considered semi-direct data (approximations of what transpires), with variations and different interpretations, recognizing that people aspire to validly reflect reality.

Other perspectives on validity are found in Krefting (1991) who argued that a qualitative study is credible when it presents an accurate description of a human experience that people who share the same experience would immediately recognize. The extent to which the experiences of the study participants parallel experiences surfaced through the literature review enhances study validity.

g)   Reliability/Dependability

The reliability and generalizability of the findings addresses the elements of rigor in the research, or the steps undertaken to establish trust and ensure confidence in the findings. Qualitative rigor enables subsequent researchers to replicate and build upon the study (Thomas and Magilvy, 2011). This transferability is accomplished by providing a dense description of the population, along with the demographic and geographic boundaries of the study (Lincoln and Guba, 1985).

The dependability of this research was further bolstered by the creation of this audit trail that includes the specific purpose of the study, participant selection process, the data methodology, interpretation process, and elements establishing the validity of the data.

h)   Research Limitations

I identified several limitations regarding the project. These include:

- Sample size: I conducted eighteen interviews from a staff of thirty-four professionals. Accordingly, the generalizability of the study is constrained.

- Voluntary participation: All staff members were invited to participate in the research. The attitudes of the self-selected interviewees may generate skewed results if their views vary markedly from those who chose not to participate.

- Government agency: PEPP is a California public agency operating in the investments industry possessing distinct cultural elements and employee behaviors. While any case study will be faced with generalizability concerns, broader applicability of results may be constrained due to these specific contextual factors.

- Given the anticipated small sample size, interview questions were not beta-tested on a small sample in advance to determine if alternate probes might be more effective.

- Solitary researcher: Without a doubt, there is strength in numbers. Having multiple interviewers decreases the potential for one researcher's biases to affect the results. Similarly, having multiple individuals code the interviews increases the reliability of the data.

2. Method Elements Specific to Survey

This section focuses on the fundamental management research comprised of the survey with sixteen questions. Topics that will be addressed include the survey design and data analysis approach.

a) Survey Design

As discussed earlier, the survey was designed leveraging insights from a software review site (softwareinsider.com, 2018) that rated approximately 150 KMS vendors. In addition to ratings, the site listed and categorized the features and functionality offered in each KMS application. A detailed feature description list with the percentages of vendors offering specific features is listed in Appendix A. Table 9 (below) summarizes the sixteen features common to KMS systems. Instead of trying to define what a KMS is given its varied applications, I focused on what a KMS does or enables as a more objective or pragmatic approach.

Table 5. Knowledge Management System Feature List (Abbreviated)

Item	Feature: Functionality
1	**Capture**: PDF conversion, scanning, OCR (optical character recognition)
2	**Retrieval**: Import and export of data, digital document retrieval, and assorted retrieval formats
3	**Storage**: Access and retrieval from anywhere, e-mail archiving, configurable storage locations, file compression
4	**Collaboration**: Documents retrieved and worked on by authorized users, rights access, document check-in/check-out, document assembly, and remote access
5	**Versioning**: Document check-in/check-out, audit trails, document versioning
6	**Distribution**: Remote access, mobile access, multiple-channel distribution
7	**Publishing**: Customizable reporting, multiple document formats, configurable document access permissions, customizable functionality
8	**Reproduction**: Assorted document delivery formats, automatic updates, watermarking
9	**Indexing**: Document indexing, archiving and retention, automatic data format conversion, and predefined index properties
10	**Metadata**: Records management, document tagging, and electron signature capture
11	**Searching**: Full text search, document content search, search by metadata, multi-condition queries, save frequent searches, search preview
12	**Integration**: Integration with MS Office, Outlook, Contacts, API (example would be Bloomberg), and Windows Explorer
13	**Workflow**: Workflow management, process management, rules-based workflows, calendar support
14	**Reporting**: Customizable reports, scheduling, automated distribution, graph integration, on all data elements
15	**Security**: Document encryption, password protection, web security, security reporting
16	**Support**: 24/7, blogs, brochure, FAQ, forums, help desk, videos, live chat, demos, manuals, remote training, webinars

On a scale of 1-10, each participant was asked to rate the potential impact of each of the sixteen features on their own job and that of their supervisor (or direct reports depending on role). The participant's numerical responses were written down on a form during the interview. During the transcription verification phase, when I listened to each interview, I validated the ratings. Ultimately, the

data comprised eighteen participants multiplied by thirty-two responses formed the data set with 576 data points.

b) Data Analysis Approach

A quantitative analysis was undertaken on the survey data. Participants graded the anticipated utility of sixteen KMS features, once for themselves and once for their managers (or the reverse) on a scale of 1-10. Using a Microsoft Excel spreadsheet, I analyzed the medians, averages, and dispersions of results for each feature across the entire population and three sub-categories (level, tenure, and gender).

3. Method Elements Specific to Interviews

a) Methodology Justification

Qualitative content analysis (QCA) leveraging the Atlas.ti 8 software application allowed me to analyze the interview text, enabling the identification of prominent themes systematically and consistently. I used a grounded thematic coding scheme (Saldana, 2016) to construct a reality reflecting the truths as voiced by the participants, which diminishing the role of interpretation that is potentially subject to bias. While some concerns have been voiced about the ambiguity of QCA methods and the appropriateness of a positivist approach imbedded in a qualitative study, I see the methodology as one tool in completing a more holistic understanding of the social dynamics accompanying the KMS selection and adoption processes. QCA is increasingly utilized in international methods literature (Schreier et al., 2019).

b) Interview Design

During the research, data was collected by means of a semi-structured interview. The interview form was a data collection tool including the information about the purpose of the interview and the interview questions (Creswell, 2013). I designed the interview format and used it for all eighteen interviews. The interviews consisted of sixteen two-part survey questions, followed by five open-ended questions. The survey questions asked respondents to rate and then elaborate on how useful various KMS features would be to their own jobs and their managers jobs (or the reverse for managers). Hence, in addition to the numerical survey responses, verbal responses were also captured. The five open-ended questions were designed specifically for this study, seeking to assess job roles and transformation, and cultural elements that might facilitate or inhibit the successful implementation of the KMS system.

My objective was to design questions that were divergent and evaluative (leading to more thoughtful responses) as opposed to convergent (which would lead to short answers). The design of the research instrument (Appendix D: Interview Template) addressed the following:

- Types of questions: I used multiple constructs, which resulted in varied responses as different question types resonated with different people (Konetski, 1970; Kennedy, 1998; and Middlestadt et al., 1996). Examples from the interview questions include:

  - Cognitive memory questions that require a reproduction of facts, such as "Can you describe how the process works today?"
  - Evaluative questions that require judgment, such as "Do the people, systems, and management exist today to successfully implement KMS?"

- o Divergent questions that require intellectual operations where the individual generates their own data and information: "How do you think implementation of the KMS capture feature would change the way your manager works, if at all?"
  - o Revealing questions that probe behavioral patterns: "Describe a typical day on your job."
- • Sub-probes: periodic, standard sub-probes (to mitigate any bias) typically invited interviewees to elaborate or clarify remarks. Typically, I asked for more elaboration or restated elements of the question.
- • Number of questions: the study was designed to be completed in about 45 minutes. The average completion time was 40 minutes.
- • Consistency: the questions were asked in the same order and tone by me in similar conference room conditions with the same two recording devices during working hours (8 a.m – 4 p.m.).
- • Throughout, I considered McDonald's (2010) question attributes:
  - o Ease of response – easy to answer, no undue burden
  - o Relevance to central question with good probability of yielding results

The five open-ended questions directly probed many of the themes identified in the literature review. Queries included the nature of work currently and envisioned post-KMS implementation, and the roles and skillsets needed of management. However, I specifically did not include the word 'leadership' in any questions as I wanted to see if subjects raised the topic without prompting. A probe also explored organizational capabilities as it related to anticipated change.

The survey questions invited respondents to describe how they conducted work today and how the availability of the features would alter their work, if at all. These comments and the responses to the open-ended questions comprise the data set upon which the qualitative content analysis was conducted.

c) Data Analysis Approach

The following qualitative content analyses were conducted on the verbal data collected during the interviews:

- • Coding of text
- • Thematization of codes

Tools utilized to qualitatively analyze the data included:

- • Atlas.ti – QCA software application
- • Wreally Studios (online transcription service provider)

An example of Atlas.ti Coding, which illustrates a participant's response and the coding process, is included in Appendix E.

d) Data Analysis Process

The qualitative data analysis process adhered to a spiral framework (Creswell, 2013) consisting of the procedures for organizing, reading, classifying, and representing the data. I digitized the interview transcripts creating files for each of the eighteen interviews. I then read the transcripts while listening to the audio to ensure the transcripts accurately captured the participants' responses, segregating the interviewer's remarks. Next, the I read through the interviews, reflecting on the broad ideas raised,

forming initial categories. From there, I coded the text in a grounded manner, allowing the interviewee's own words to drive coding decisions. Each new code was entered into a codebook with a definition. I also maintained a coding diary to capture my thought process during the coding process. I then reviewed the text correcting and collapsing any codes for consistency. Similar codes were then grouped. In the final stage, themes were identified.

A quantitative analysis was also undertaken on the qualitative data. I explored the most prolific themes, as determined by the frequency that themes were identified in the participants' responses. I also analyzed any differences across the sub-categories. The following analyses were undertaken:

- Frequencies for each code and category
- Differences in theme category counts by demographic category

Tools utilized to analyze the data included:

- Excel (standard version)

There comes a point when the number of data points for sub-categories is so small as to make the data not statistically useful. For example, I conducted an analysis that calculated the variance between actual and expected number of appearances of each code across the demographic variables. But with two Admins and three Managers, small variances were magnified, undermining any credibility in advancing meaning to the results. Accordingly, I focused on the codes with the most responses displaying evident differences between the groups.

e)   Process for Analysis of the Data
Qualitative content analysis and descriptive analysis methods have been applied to the data. Qualitative data analysis applications enable efficient coding, re-coding, categorization, and thematization (Patton, 2002). For this KMS study, I used the Atlas.ti 8 package program for qualitative data analysis. The initial rounds of coding were grounded in the language of the respondents.

Basic coding methodology was in vivo coding, primarily utilizing the language and terminology uttered by the participants. As Saldana (2016) states, in vivo coding is appropriate for beginning qualitative researchers, action and practitioner research, and interviews featuring participants' voices.

I categorized the codes as I created them. For example, under anticipated benefits of the KMS implementation, respondents mentioned 'time-savings', 'cost-savings', and 'resource-savings'. So, while these were treated as distinct codes, they were initially categorized together under productivity.

The data was then reviewed and calibrated by looking i) across the responses of each participant, and ii) at all responses for each of the survey questions and open-ended questions. This review process helped to refine the coding and ensure reliability and consistency in the application of the codes. This process helped understand the nuances in the data and also driving towards the creation of the central themes that were relevant to the study. After these first cycles of coding, the data was themed further, validating, and collapsing the initial categories and identifying new categories.

4.   Concluding Remarks on Managerial Research
In sum, managerial research was composed of two methods in the survey and the open-ended questions. In this section we have reviewed methodology elements common to both (such as participant selection process, research process, biases, and ethics) and distinct to each (such as data analysis

approach and validity). Each method was rationally incorporated in the research, thoughtfully designed, and implemented emulating best practices. Finally, in all cases, I sought to be respectful of limitations to generalizability due to small sample sizes.

E. Action-Oriented Research Methods

It is said that without action there is no action research, and without research there is no action research. Action research is a form of pragmatic research that seeks to discern practical solutions to real-life problems and to add to the body of knowledge through a constructive partnership of exploration between the embedded researcher and participants in the organization.

The activities of the case study were framed by an action learning construct. The action learning cycle is comprised of four steps: plan, act, reflect, and reframe. In the KMS case study, four distinct cycles of action learning were identified and undertaken. The cycles identified included the vendor evaluation process, the finalist recommendation stage, vendor testing, and the implementation process. The four cycles taken together formed a meta-cycle.

The planning and acting (or doing) stages were stalwarts of project management at PEPP. As the meeting facilitator, I consciously integrated the reflection and reframing steps to foster a collaborative and continuous participatory learning environment. It should be noted that the action learning cycles employed were never directly identified or referred to as a learning framework to the KMS team. As the team and project existed prior to the research inception date, I did not attempt to repurpose the group for the research. Even so, the initial scattered planning and implementation steps provided an opportunity for me, as the meeting moderator, to invite the group to pause and reflect on what was working and what could be improved. The team could then share and discuss what had been learned at the next meeting, allowing the team to build consensus on modifications to the plan (reframe) with ongoing checks to assess progress.

The action learning process was embraced by the team because of its effectiveness in soliciting thoughtful and honest input from all members of the team and then working together to build the path forward. PEPP had a bureaucratic environment where quiet acquiescence to senior management views was the prevailing modus operandi. Publicly and authentically reflecting on progress and building consensus and accountability on a reframed approach required the use of new muscles. As people grew more trusting and comfortable expressing views that differed from others, the cultivation of a truly collaborative work group was welcomed by the diverse team.

Figure 4 (below) presents a detailed perspective on the action-oriented research process and is helpful in framing the entire research process and timeline. The dark blue shapes represent the current state and desired end state, or the meta-cycle. The four sequential stages in the planned change process, represented by the numbered circles, depict multiple cycles of planning, acting, reflecting, and re-framing. The diamond-shaped sponsor updates are highlighted as they represent project milestones. The fire icons represent unexpected events that altered the course of the project. The fundamental research box is shown above the dashed line as results of the surveys and interviews informed the vendor evaluation and recommendation processes. Finally, the green-shaded timeline at the bottom provides the boundaries of the case study.

Figure 4. Action Research Process Overview.
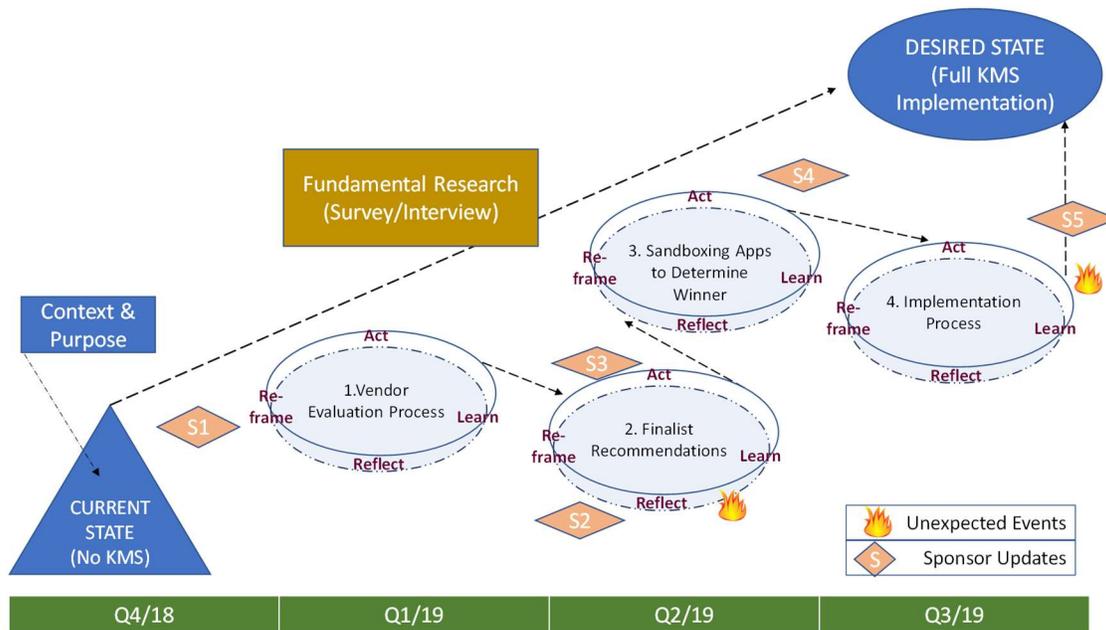
It should be noted that the Context and Purpose box was addressed internally in Q4/18 through certain actions undertaken to bring aboard the new information technology including:

- securing the support of business sponsors and leaders (the three department heads)
- the drafting of business requirements and a project charter and sponsor sign-off

In the following sections, I discuss the action-oriented methods utilized. (Note that in Chapter V, I will discuss the findings that resulted from the methods employed.) Action research requires four elements: action, research, community participation, and localization of context. Action consists of solving practical issues and making change. The plan to select a KMS vendor and implement the solution represents a significant intervention with the objective of solving several interrelated issues in the organization. The case study captures the ongoing search for solutions while planning for change.

1.   The Action Research Cycle

In contrast to the fundamental research designed in advance, the action-oriented research component transpires unscripted and possesses large degrees of messiness and unpredictability (Coghlan and Brannick, 2014). The research involves gathering validated and reliable data from multiple sources by various methods. The basic methodological elements of action research (Lim and Chai, 2015) were in place:

- Action-oriented research
- Learning set
- Cycles of action
- Journal activity

I discuss these elements in the following sections.

As an **inside Action Researcher**, I was both a paid employee, working on the project, and an action-oriented researcher, observing the unfolding of the case. I impacted the evolution of the case through second person work; I leveraged relationships to engage in collaborative inquiry into the effectiveness of various actions that enabled joint action to occur. My style in meetings most closely followed Torbet's parts of speech framework (Lee, Yip and Shek, 2021), whereby I was framing the issue, advocating goals, illustrating the story, and inquiring to solicit the perspectives of my colleagues. I drafted and distributed meeting agendas and minutes. As the business lead from the Investments staff, I was allowed to facilitate team meetings, enabling our use of the framework.

Learning set: The KMS team served as a multi-disciplinary, cross-organizational team of self-selected individuals, participating in a joint effort to ameliorate issues in their departments caused by the lack of a KMS solution. The group met bi-weekly. In my role as a business lead, I solicited input, set the agendas, and took meeting notes, which I circulated afterwards. (I always invited additional input to ensure consensus on all interpretations of the group's discourse and decisions). An important distinction to note is that this KMS Team was not formed as a formal learning set. While I guided action learning processes, these activities were conducted seamlessly in the normal flow of meetings.

The **action learning cycle** consists of four steps: Act, Learn, Reflect, and Re-Frame/Plan. Following the action as mapped in Figure 4, the KMS Team tackled each sequential step, agreeing on a course of action and collection of data. For example, in Step 1, Vendor Evaluation Process, the **plan of action** was for each individual team member to find KMS solutions that might work for PEPP's needs, take notes, summarize findings, and return with that data to the group. The **learning** process represented the sharing of data and discussing the findings in the bi-weekly meetings. I circulated the agenda on Fridays, and periodically I would include an item called **reflection**, which invited the team members to capture what was and was not working and why in the current plan of action. These ruminations were not shared in advance to ensure individuality of thought. At the next meeting, each person would share their perspectives. And while I took notes in the meeting and published a summary in the meeting minutes, the personal reflections of the team members were not collected or centrally deposited. Of the eight team members, four or five typically entered the meeting with written notes. The remaining members had seemed to have thought about the topic and shared their perspectives freely (though some of that thinking may have occurred during the meeting). After the reflection activity, the team would discuss alternatives and arrive at consensus on an **adjusted or re-framed plan of action** moving forward. The action cycle would recommence from this point.

Journal activity: Meeting minutes served to capture the group's reflections, decisions, plans, and activity throughout the project. Separately, I maintained a journal that captured my reflections and observations during the research. Coghlan and Brannick (2014) lists several functions of keeping a research diary including focusing on key events and painful experiences before your perception of the events changes with passing time. My journal entries typically accompanied significant events in the case study or periods of greater emotional turbulence. I followed Schein's (1989) ORJI (Observation, Reaction, Judgment, Intervention) model paying particular attention to my emotional reactions. Generally, it was my awareness of emotional reactions to events that prompted diary entries.

2. KMS Case Study Action Cycles

The vendor selection and implementation process took approximately nine months, included several iterative steps along the way, and consumed hundreds of staff hours. Individual engagement ranged

from conducting web searches of KMS applications alone at a desk to a formal recommendation being made to a board of Trustees in a recorded public session. The vendor selection process brought together the three departments (Investments, Legal, IT) to narrow the number of KMS applications from over 100 to the three finalists that presumably met the agendas of individuals, departments, and Trustees. This section highlights four key steps:

1. Vendor Evaluation Process
2. Finalist Recommendations
3. Sandboxing Exercise
4. Implementation Process

While this process is presented in Figure 4 (above) as a linear sequence of discrete steps, it was much more circular, jagged undertaking. One application, XYZ-900 (pseudonym), successfully navigated all steps and was approved by the KMS team, by the sponsors and CEO, by the IT department, and finally by the Trustees. While many wondered if the KMS selection process would bear fruit, the trajectory towards completion accelerated when the project was embraced by a new CEO.

For each of the four steps listed above, I discuss the cycles of action, I reflect, and I make sense of what transpired. I will also discuss a general empirical method attending action research (Coghlan and Brannick, 2014), which in this case study includes observation and document review. I digress to highlight one distinction which became evident to me likely because this is a mixed methods study. Managerial research is very compartmentalized—I designed my interview and survey, collected the data in the conference room settings, coded and quantified the data, analyzed the data, and generated findings. Action research is a much more dynamic, fluid situation where learning is constantly taking place and informing subsequent direction—driven by a social, consensus process.

My most pronounced roles throughout this action research approach follow:

1. At key points, initiating reflective pauses and activities with the KMS team;
2. Capturing, synthesizing, and distributing weekly meeting notes (basically sense-making);
3. Integrating outside academic resources and knowledge (best practices in team formation, project charter construction, promoting sponsor relationships);
4. Injecting learnings from managerial research (importance of different KMS features to different constituents); and
5. Maintaining a journal that mostly captured instances of wonderment and angst during the 12-month journey.

3. Quality and Rigor of Action Research

The elements to determine quality and rigor in an action research project are distinct from other methodologies. Integrating Levin's (2003) and Reason's (2006) frameworks, the quality of action research is dependent upon the following criteria:

1. Participation of and cooperation between researchers and members of organization;
2. Significant, real-life problems;
3. Joint meaning construction achieved through iterative reflection; and
4. Workable solutions, sustainable change.

The current research meets the requirements for all four criteria. As it pertains to participation, the KMS Team was composed of seven cross-division and cross-functional members who volunteered to participate in the project because they had a personal interest in the outcome. As stated previously, Marquardt's learning set criteria (cited in Wyton and Payne, 2014) included a) four to eight members from diverse parts of the organization, b) a process that emphasizes questions and reflection, c) the power to take action on strategies, d) a commitment to learning, and e) a coach committed to capturing the learnings, distributing key takeaways, and soliciting and incorporating feedback. I fulfilled the role of the coach for the group. The participation and commitment to the learning process from the KMS Team and the sponsor group were a constant throughout the action-oriented research process.

In terms of real-life problems, the KMS selection and implementation processes were live projects that PEPP management dedicated staff and resources to pursue. Persistent pain points across the organization required innovative technological solutions to move the organization forward into the information age.

Examples of construction of joint meaning exist in each action cycle, and they enabled the group to achieve a consensus at each step in the selection process. For example, answering the question, 'what do we mean when we say a vendor is highly rated?' demonstrates the process of constructing a group understanding that enabled progress.

And in the final action cycle, the team undertook a reflective activity that led it into an authentic self-critique of strengths and weaknesses. This process led to the production of workable solutions, which identified a path forward for the organization.

4. General Empirical Methodology

The empirical research takes the form of observation of events and people as the KMS process unfolds, with an emphasis on leadership. I also review relevant documents and news articles that shed light on the case. Observations of significance were captured in a journal. All documents generated during the case were maintained in a repository on a shared drive, but also typically e-mailed amongst parties as newer versions were created. The documents and observations determined significant are subjective and unique to the case.

Observation and field work in naturalistic settings are not guided by a predetermined, fixed topic methodology. Key incidents are emergent, unanticipated and, to the researcher, intuitively surprising or significant (Emerson, 2004). Shortly after critical incidents occurred, I would write down observations and interpretations of what transpired. Most often, these incidents arose in interactions with senior leadership during meetings at key junctures of the KMS project timeline. Akin to naturalist ethnographers, there was no preconceived theory. I watched events unfold, capturing that which seemed significant, and reflecting at leisure, often discussing with the KMS team later.

a) Document Review Methodology

The documents collected and incorporated into the study fall into the two categories of anticipated and emergent. Anticipated project management documents included the project charter, project plans, meeting agendas, and meeting minutes. The communication plan anticipated a range of memos and presentations to staff, sponsors, and Trustees. Foreseeable KMS selection process documents included vendor materials, industry resources, rating schemes, legal contracts, and workflow diagrams.

The emergent documents, by definition, were not envisaged at the research design stage but emerged during the research and were deemed relevant to the research by the researcher. Emergent documents ultimately included this study included:

- PEPP press releases and internal publications addressing the termination and hiring of CEOs
- Periodical articles on PEPP CEO
- CEO memos and presentations to the Trustees
- Letters between PEPP and vendor regarding application performance and voiding of contract

If a subsequent similarly-situated inside researcher designed a similar study around a technology implementation, the anticipated documents would likely be included in their research. Their emergent documents would be unique to their situation. By virtue of my position on the KMS project team, I had access to all the above listed documents and was frequently involved in writing them or reviewing them to discuss with the team. The caveat is that the determination of what documents and what content are relevant is subjective, based on my judgment. I either saved copies of pertinent documents on my personal hard drive or made notes to myself, downloading them later.

b)   Observation Methodology

While observation was incorporated into the design of the study, I implemented no formal consistent processes to capture observations. At the outset, I expected to see evidence of era-transition friction in the form of resistance to change, anxiety, excitement, and frustration. In practice, sporadic journaling captured some of these observations but, in the work environment, the practitioner mentality and mode of operating found me only rarely consciously acting as an observer jotting down impressions. Accordingly, a handful of times during the research, I paused during my workday to immediately capture developments relevant to the research. More frequently, I made a mental note of my impressions and wrote them down in the evening, or days later.

The dominant relevant observations that I did capture tended to emerge at seminal moments in the delivery of information to various stakeholders. Examples included:

- Staff reactions to the selected KMS vendor introduction
- Sponsor reactions to KMS vendor recommendation

This type of observation, of reactions to delivered communications, is grounded in verbal responses and therefore suffers less researcher bias. The more difficult aspects of observations are tied to attributing motive to behaviors. For instance, when the Head of Technology, one of the project sponsors, skipped KMS meetings or habitually showed up late (unless the meeting was called by the CEO), the project was weakened. His concurrence on especially technical decisions was crucial to the project's progress. The objective element of the observation is that he was absent. My interpretation (corroborated informally by others) was that the project was unimportant to him, deemed unnecessary by him, and represented progress he wanted to delay. In those seminal moments, I captured both the evident behaviors and my admittedly myopic interpretations of the events (that was not privy to the hundreds of attempted breaches to our systems daily that require the technology head's vigilance). A handful of times during the KMS selection process, colleagues suggested my bias towards wanting the project to continue was because my research depended on it. Which also acknowledges that my colleagues were observing me.

5. Action-oriented Research Limitations

The critical limitations in the KMS research, as it pertains to action-oriented methods, were the learning set and my role on that team. The group was a pre-existing project team in place for several months, with team members from three distinct departments, and I was not in position to select nor coopt the team, declare them a part of my research project, or to stand at the head as an action researcher.

As a team member, I consciously and successfully facilitated discussions following an action learning framework. The team members were all aware that the KMS project was the focus of my research project. Discussions were all focused on trying to make the project successful, and the team members freely participated in the conversations, primarily because I intentionally and consistently invited perspectives from individuals who might have been more reticent to speak up. Even so, this distinction between having a formal learning set and acknowledgment by that group that I was leading action research speaks to my power limitations in the organization and moves the KMS project from traditional action research to a research model that uses action-oriented research methods.

F. Relationships Between Methods

This KMS study espouses a constructivist philosophy and maintains a qualitative orientation while utilizing mixed methods that include action learning, interviews, and surveys in a case study setting. While these may feel disparate and incompatible at times, returning to the essence of the project and research provides comfort. PEPP is selecting a vendor to implement a KMS solution. The surveys and interviews ask the ultimate users (volunteers) which features of the KMS do they most need, what will that change, and what are they most concerned about? The responses and insights derived from these research activities inform the action learning process. The KMS Team identifies and confronts issues related to evaluating and selecting a vendor. The Team ultimately leverages the survey framework and data, working together to construct solutions. My task, while respecting the privacy of the volunteers, was to integrate the knowledge gained during interviews and surveys into the action learning discourse.

During the roughly nine-month course of the case study, I am gathering, analyzing, and integrating the data; reflecting on and identifying themes that emerge, and ultimately making sense of the proceedings.

G. Reflections on Methodology

The KMS research project was a far more ambitious undertaking than I contemplated in the planning stages. Design and implement surveys and interviews. Be a project participant, researcher, and observer in an ongoing multi-department project (that ultimately failed) with political currents addressing a wicked problem. Collect, synthesize, and integrate the various data into a holistic product. And yet, if the central tenet in constructivist theory is that there are many truths, and as a researcher, my goal is to extract those truths through whatever methods are available and make sense of what's transpired, then I would laud the effort and execution.

Several topics dominated the internal discourse as it related to methodology. First, philosophically, coming to terms with mixed and multiple methods research took time to get comfortable with. Can you maintain a constructivist orientation when you have two quantitative methods in surveys and QCA, or are you then required to embrace a positivist stance on your research? Ultimately, with 18 respondents and underlying qualitative data being quantified, I determined there was no dispute, the research is qualitative and neither claims nor aspires to scientific validity.

Another challenge faced in the design of the research was the action research. With limited power and no formal cohort or learning set, how do you design anticipated interactions that you expect to emerge during the project? You can have a framework for action cycles and hopes of participation by the group and hopes of your abilities as a researcher to facilitate a meeting, but these are unknowns at the start. But I think you can control yourself, your emotions, and your actions, especially around being observant, taking notes, keeping documents, and being willing to insert yourself into a conversation and gain permission to redirect it for the benefit of the project's progress. That having been said, in future research projects, I would be more disciplined about journaling driven by timing rather than by event.

On the managerial research, three decisions requiring the least resistance reflected choices of a novice researcher. The search for research volunteers netted eighteen of the thirty-four department members. The response of all eighteen volunteers were included in the study. The survey was based on an existing industry tool that listed and evaluated sixteen features of KMS applications. I used all sixteen features for the survey. During the qualitative content analysis, I adopted a grounded-coding approach, using terms spoken by the participants. These were all practical and valid choices, consistent with a pragmatic philosophy, soliciting multiple viewpoints. Other alternatives were considered and discarded.

Finally, action research at inception intended to decentralize power and democratize the workforce. The idea that the KMS would, by itself, transform workflows may have created some myopia for me. I think there were opportunities in case study design to be more attentive to power dynamics in the organization. During the case, significant demonstrations and shifts of power at the project sponsor and CEO level took place. Some elements were in notes, but a lot of activity took place at levels I did not have access to. But with a cross-departmental wicked problem being addressed requiring Trustee approval, a better attempt could have been better attuned to those dynamics.

H.   Conclusion

In a case study setting, mixed methods (qualitative and quantitative) were designed to generate data. The several methods employed demonstrate awareness, thoughtfulness, and competence, thereby providing affirmation of the credibility and utility of any data generated. Furthermore, the reflexive discourse affirms my growth and self-awareness as an action-oriented researcher. The following two chapters present the data derived from the action-oriented research and fundamental research methodologies.

V. Fundamental Research - Structure of Data Analysis

A. Introduction

The data analysis section commences with the fundamental management research methods of interview and survey because they ultimately feed into and bring clarity to the action cycles. The presentation of the fundamental data analysis is broken into two sections. Section B focuses on the quantitative data obtained via the responses to the survey questions. As a reminder, there are sixteen KMS features, and respondents answered the question on expected utility for management (CIO/PIOs) and staff (Analysts/Admins). I analyze the data at the aggregate level looking at mean, range, and variance for the responses. I collected and reviewed the demographic data but, given the small numbers of respondents in the subcategories (two admins, three managers, five women), I elected not to elevate any insights to a level of findings. I conclude the section highlighting the most prominent and relevant themes.

Section C focuses on the qualitative content analysis of the comments on the five open-ended questions along with the comments solicited on the anticipated impact of each feature as the survey was administered. It might be helpful to reference **Appendix D**, the Interview Template, as it presents the questions asked each respondent. As articulated in the methodology discussion, I adopt a grounded coding scheme leveraging the language of the interviewees (with examples provided). The codes were categorized and ranked for frequency of appearance. I discuss the key themes that emerged. Chapters V and VI present data analysis of the fundamental research and the action-oriented research, respectively. They lead into Chapter VII, the discussion of findings.

B. Quantitative Data Analysis of the Survey

The quantitative analysis of the survey data looks at the data at the summary level, probing the expected impact of each feature on staff and management. I reiterate that the survey served as a mechanism to help respondents clarify their thoughts on the utility of the various features. Two analysts in similar roles could rate the same feature very differently. But the subsequent question sought to understand the rationale, in that respondent's mind, as to what was changing that warranted the grade. Accordingly, I keep the quantitative analysis of the survey data at a high level and downplay its relevance. Even so, the process of design and collection adheres to best practices for the methodology.

1. Summary Level Analysis

The eighteen participants in the research project were asked to rate sixteen KMS features on a scale of 1-10 two times. First, on how incrementally helpful the implementation of the feature would be to their own jobs, and secondly to their asset class head's job (or their direct report's jobs, if they were the asset class head) thus resulting in thirty-two survey questions per respondent. For example, if the KMS included a cloud storage capability, and this was a significant improvement over the way documents are stored today enabling you to better do your job because you would have remote access to files while traveling, that would presumably translate to a 9 or 10 score. However, if you were someone who never traveled and never worked from home, the feature would have little impact, and presumably be scored at the lower end of the scale.

Accordingly, the thirty-two survey questions had numerical responses. For each of the KMS features, I provided brief descriptions and, if requested, examples of how the features might be used. In addition to their numeric responses, the respondents were then invited to expound on how things work today

and how they envision they will work after the implementation for themselves and their managers. The quantitative analysis of the numerical responses is discussed here. The content analysis (and descriptive analysis where applicable) of the verbal responses, along with the participants' responses to the five open-ended questions, is discussed in Section C of this chapter.

A few decisions warrant discussion. An alternate path would have been to distribute the survey to the entire department potentially generating a greater response rate. The features and descriptions were provided in advance of the participant's session, providing them an opportunity to review the material. Even so, thirty-two questions were excessive, especially with several features very closely related. Even so, all eighteen interviewees answered all the questions. The rationale to conduct the survey live was to obtain the respondents' elaboration and elucidation of their answers. The goal was to understand how the content of work and relationships would change, if at all, by implementation of the feature. The answers became more abbreviated as the survey progressed. If I dealt with a larger population, I would have demonstrated greater stewardship of the process by pruning five to eight questions that were not generating incremental insights. But as a novice researcher, the prospect of having uneven data sets and subjects with different experiences was not desirable.

a)   Discussion of Appropriate Statistics

One of the first questions asked in assessing the validity of a survey is 'does the surveyed population represent the general population being studied?' In the U.S. financial services industry, the top 1,000 retirement plans total $10 trillion in assets. The defined benefit plans represent 66% of that figure or $6.6 trillion (Kozlowski, 2018). Figures show that 5,500 state and local defined benefit pension plans manage $8.75 trillion in assets (Federal Reserve, 2019). Consider that virtually all states, counties, and cities have plans, and many municipalities have distinct plans for police and fire, public utilities, and teachers. However, many plans are combined and managed by one investment office. If I extrapolate PEPP's roughly $50 billion asset, forty-person investment team out to the broader defined benefit population, I estimate a population in the range of 6,000 workers. Many corporate pension plans, endowments and foundations have similar organizational structures and work content, however, the common factors for these 6,000 workers are that government agencies are bureaucracies, of a political nature, operating under public scrutiny. Accordingly, the challenges facing this sub-population are unique compared to other institutional investment management firms. Note also that most of these institutions, like PEPP, will have multi-asset class portfolios, and a mix of staff similarly comprised of admins, analysts, and managers (e.g., CIO and PIO level).

In the current research, the eighteen respondents represented just over 50 percent of the thirty-four-person investment team. For the subpopulations explored, the respondent representation was at or above this threshold in all but one case. Table 8 shows the breakdown by Level:

Table 8. Survey Respondents by Level.

Level	Respondents	Total	Percentage
Admin	2	4	50%
Analyst	13	24	54%
PIO/CIO	3	6	50%
Total	18	34	53%

A similar representation of the investment team was evidenced based on the tenure (Table 9) at the organization of the participants:

Table 9. Survey Respondents by Tenure.

Tenure	Respondents	Total	Percentage
<5 Years	8	12	67%
5-10 Years	4	10	40%
>10 Years	6	12	50%
Total	18	34	53%

Finally, Table 10 shows the participants proportionately represented the investment team's gender make up:

Table 10. Survey Respondents by Gender.

Gender	Respondents	Total	Percentage
Female	5	9	56%
Male	13	25	52%
Total	18	34	53%

Despite the 50 percent threshold being reached on the population, several challenges arose in determining the best statistical methods to employ to identify significant results. First, the three independent variables are all nominal variables, with tenure and level having three categories and gender having two categories, resulting in eight distinct categories.

It is important to note that the most critical dimension being analyzed for this study is differences by level: the central question focuses on how information technology implementation impacts the roles of staff versus management. As a secondary basis, tenure was perceived to be an interesting and available variable, as it might provide insights into feelings towards technological adoption and resistance. Gender, again an available variable, was thought to be interesting as it might inform behavioral preferences in the uptake of communications technology. Even so, as two of the five women are the only admins in the study, some concern existed as to the utility of any findings by gender. (Basically, with 40 percent of the women and none of the men being admins, attributing differences to gender would be a stretch.)

The dependent variables are the numerical responses to the thirty-two survey questions to which the respondents provided answers ranging from 1-10 (although in some cases respondents chose 11) as they estimated the incremental impact each of the features would have on their job and their manager's job. While numerical data is obtained, these independent variables are ordinal variables requiring nonparametric analyses. Basically, unlike a continuous variable such as temperature where there is a scientifically verifiable precision between 2° and 3° Celsius, such precision does not exist between two people in assigning a 7 versus 8 on a finite scale of 1-10. As a result, means and normal distributions are often considered suboptimal statistics to apply to the population.

I compared the medians across the demographic categories but found the insights into the data were unsatisfactory. For example, on the capture feature, the medians across the eight distinct demographic subcategories were 8.0 suggesting no differences across any of the populations. Contrast those results

to the means for the same sub-populations on the same capture feature. The results range from 7.2 to 8.8, providing greater insight into the dispersion of viewpoints emanating from various groups.

I also considered ranges of answers as a potential indicator of dispersion of results. But one outlier rating could make two vastly different populations appear similar. Accordingly, variance was determined a truer indicator of degree of dispersion about the means of responses.

The pivotal question then becomes what is the best accepted measure to analyze the survey results where respondents are rating the anticipated benefits of a feature on a scale of 1-10? Based on the prior discussion, analyzing the mean differences between populations and the variance within the populations will best allow us to contrast populations and understand the dispersion of results within those populations.

Accordingly, for each of the 32 questions, the mean and variance metrics were analyzed. This analysis was done for the total population and then for each of the three dimensions captured in the survey, i.e., level, tenure, and gender. The objective of the analysis is to understand what functionality the investment staff believes will be most and least impactful, and then to identify differences that may exist in the identified sub-populations. Nonetheless, as discussed in the methodology chapter, a limitation of the research is the small sample size. While two admins, three managers and five women represent at least 50% of those sub-populations for PEPP's investment team, they remain, in absolute terms, small numbers from which to extract trends and draw generalizations. Accordingly, while the data on the sub-populations was analyzed, I deemed it inconclusive and not additive to the study. Accordingly, it was omitted.

b)   Total Sample

For the thirty-two questions, the lowest score given was 1, the highest 11, and the mean was 8.0. As seen in Table 11, looking just at the KMS anticipated impact on staff, the low was 1, the high 11, and the mean at 8.2, and the dispersion of ratings, as evidenced by the variance, was 3.5. The KMS anticipated impact on management, the low and high were also 1 and 11, with the mean slightly lower at 7.9; and the variance was higher, at 4.5.

Table 11. Survey Responses by Feature – Total Sample.

Feature	Staff				Management			
	Minimum	Mean	Maximum	Variance	Minimum	Mean	Maximum	Variance
Capture	6.0	9.2	10.0	1.3	3.0	7.9	10.0	2.5
Storage	5.0	8.9	11.0	2.0	1.0	8.8	11.0	4.6
Retrieval	5.0	8.9	10.0	1.5	3.0	8.1	10.0	4.4
Searching	6.0	8.9	10.0	1.6	6.0	8.8	10.0	1.7
Metadata	5.0	8.5	10.0	2.3	5.0	7.9	10.0	3.6
Indexing	6.0	8.8	10.0	1.4	2.0	8.2	10.0	4.7
Distribution	2.0	7.1	10.0	6.7	2.0	7.6	10.0	5.9
Publishing	1.0	6.9	10.0	5.7	2.0	7.2	10.0	4.6
Reproduction	1.0	6.3	9.0	4.5	1.0	5.9	9.0	4.1
Reporting	2.0	7.8	10.0	5.0	2.0	7.5	10.0	6.0
Collaboration	4.0	8.7	11.0	2.4	5.0	8.2	11.0	2.6
Versioning	3.0	8.0	10.0	4.3	1.0	7.4	10.0	6.6
Integration	6.0	8.4	10.0	1.9	2.0	7.9	10.0	4.9
Workflows	5.0	8.4	10.0	1.8	6.0	8.4	10.0	1.5
Security	1.0	7.9	10.0	9.3	1.0	8.2	10.0	6.9
Support	3.0	8.5	10.0	4.8	1.0	7.9	10.0	7.9
Total	1.0	8.2	11.0	3.5	1.0	7.9	11.0	4.5

The KMS features that were expected to be most impactful on staff capture (9.2 average score), storage (8.9), search (8.9), and retrieval (8.9) of knowledge from the system. The features deemed to be least impactful reproduction (6.3), publication (6.9), and distribution (7.1) of documents from the system.

For management, the KMS features deemed to be most impactful were storage (8.8) and search (8.8) capabilities. The feature deemed to be least impactful was reproduction (5.9). The remaining thirteen features ranged from 7.2 to 8.4. Noticeably, the four previously mentioned highest rated features for the analysts averaged 9.0, and were rated a bit lower, averaging 8.4, for the management group.

Also noteworthy are the features that generated the greatest variance, or differences of opinion, as to the potential impact of the KMS feature. For the analysts, the features generating the greatest variance (5.0 or higher) included publishing, security, reporting, and distribution. All five features had the high score minus the low score at 8.0 or better. For the managers, reporting, security, versioning, distribution, and support all posted variances of 5.0 or greater.

I have discussed the lack of significance derived from category several times. To provide an example, I include just one of the sixteen tables prepared at the feature level. Table 12 below details the expected impact of the Integration feature on staff and management broken down by the three categories of Level, Tenure, and Gender. In each category, the count, range, mean, and variance are provided. As a reminder, Integration was defined as the KMS application integrating seamlessly with other desktop applications such as Outlook, MS Office, and even external data providers such as Bloomberg.

Table 12. Survey Response for the Integration Feature by Category.

Category	Count	Staff				Management			
		Minimum	Mean	Maximum	Variance	Minimum	Mean	Maximum	Variance
Level									
Admin	2	6.0	6.5	7.0	0.3	7.0	8.5	10.0	2.3
Analyst	13	6.0	8.7	10.0	1.8	2.0	7.8	10.0	6.3
Manager	3	7.0	8.0	9.0	0.7	7.0	8.0	9.0	0.7
Tenure									
< 5 Years	8	6.0	8.5	10.0	2.0	5.0	8.4	10.0	4.0
5-10 Years	4	6.0	8.6	10.0	2.4	2.0	7.3	10.0	9.7
> 10 Years	6	7.0	8.0	10.0	1.3	5.5	7.8	10.0	2.1
Gender									
Female	5	6.0	7.4	10.0	2.2	5.0	7.6	10.0	4.2
Male	13	7.0	8.7	10.0	1.3	2.0	8.0	10.0	5.1
Total	18	6.0	8.4	10.0	1.9	2.0	7.9	10.0	4.9

Turning attention to the Total line, the study included eighteen respondents, predominantly men and analysts, with tenure more evenly distributed. For the expected impact of Integration on Staff, the responses ranged from 6.0 to 10.0 with a mean of 8.4 and a variance of 1.9. For Managers, responses ranged from 2.0 to 10.0 with a mean of 7.9 and a variance of 4.9. From this example, you can see the reluctance to attribute any significance to results at the category level. The counts are too small to draw any conclusions. One can say that the consensus is that Integration is expected to have a greater impact on staff than management (means of 8.4 to 7.9). And that, based on the comparative variances (1.9 vs 4.9), there are greater differences of opinion, especially among Analysts, as to how this feature will change the jobs of managers. (The three distinct low marks of 2.0, 5.0, and 5.5 must belong to Analysts.)

A useful framework for categorizing the fourteen KMS features (excluding security and support) is found in the Lorenzon and Pilotti (2008) CRM Process Map Scheme. The process map attaches the various features to micro-strategies and strategies. I completed a similar mapping exercise for this KRM study. (See Table 13.)

Table 13. KMS Process Map Scheme.

Feature	Micro-Strategy	Strategy
Capture	Knowledge Acquisition	Knowledge Management
Storage	Knowledge Storage	
Retrieval	Knowledge Using	
Search		
Metadata		
Indexing		
Distribution	Knowledge Sharing	
Publishing		
Reproduction		
Reporting	Business Intelligence	Analytical Part
Collaboration	Relationship Re-Conceptualization	Change Management
Versioning		
Integration	Technology Integration	
Workflows	Systems Automation	Operational Part

Lorenzon's scheme delineates strategies termed knowledge management, change management, operational part, and analytical part. The current research probed the i) relative weightings of the strategies, and ii) differences between staff and management in the importance of strategies. In terms of relative weightings of sub-strategies, the KMS was deemed to have the biggest impact on knowledge capture (8.5), storage (8.5), and usage (8.7). The sub-strategy rated to have the least impact by the KMS implementation was knowledge sharing. As it pertains to the differences in ratings between staff and management, the sub-strategy exhibiting the greatest disparity was knowledge acquisition, where the impact on staff was rated 9.2 versus 7.9 for management.

The first nine features, by strategy labeled knowledge management in Table 13, do not fundamentally change anybody's job. Think of it this way: instead of storing my meeting notes on my local computer, I will now put them in a shared directory. Contrast that to the last four features on Table 13: collaboration, versioning, integration, and workflows. They are distinct in that they all represent potential changes to the way that work is being done. They speak to how people and systems work together. Note that most of these features rated above the means for both staff and management.

2.   Conclusion

After analyzing 576 survey data points on KMS features (eighteen subjects times thirty-two questions), I highlight a few conclusions. I reiterate the caveat that the case study is a single unit and already subject to concerns about generalizability. Any conclusions I point to from the analysis of the data are best termed indications or trends due to the small sample size. With subcategories that contain three or fewer respondents (Admins, Females, Managers), attributing weight to results would be specious. With those considerations, based on the aggregate numbers, the following themes were noteworthy:

- The KMS features supporting knowledge management strategies (acquisition, storage, usage) rated the highest, while knowledge sharing features were deemed least impactful. Features supporting change management trended above the overall means.
- KMS implementation was deemed to have a slightly bigger impact on workers (Analysts and Admins), with a mean of 8.2, than management, with a mean of 7.2.

- The higher variance figure on management (4.5) versus staff (3.5) suggested there was greater uncertainty as to the impact of the KMS features on the jobs of managers.

My most profound insight after having analyzed the survey data is that the output is helpful but the elaboration and rationale behind the numbers provides better insights into what people are thinking and why they think that way. The survey provided a framework for the discussion which generated rich data analyzed using content analysis methods, which I think validated the in-person survey administration method choice.

C. Qualitative Content Analysis

1. Introduction

The qualitative content analysis ("QCA") section presents the results of the interview data. As a reminder, the goal of the analysis was to identify themes that might advance or hinder the KMS vendor selection process. From that analysis, six key themes or topics emerged. Table 14 summarizes the themes, provides a brief description of the theme, and reports the number of unique codes and total instances that the underlying codes incurred.

Table 14. Themes, Descriptions, and Counts

Theme	Unique Codes	Instances	Description
Projected Outcomes	22	158	Anticipated KMS impact (positive or negative)
Job Responsibilities	31	154	Job duties and responsibilities
Productivity	14	117	Comments related to KMS impact on productivity
Culture	25	110	Comments on organizational culture elements
Collaboration/Teamwork	12	96	Comments related to working together
KMS Resolvable Issue	8	39	Issues cited that KMS could address
Grand Total	112	674	

In sum, there is a lot of good will towards the KMS project and its promised benefits throughout the department. The job profiles of the workers are diverse, running from simple, manual, repetitive tasks to the complex, strategic, and differentiated. KMS is expected to help the department on several fronts including increased productivity, better collaboration and teamwork, and better data management. Numerous issues were identified in the interviews, some which may be resolved through the KMS implementation and others that point to cultural challenges which will persist regardless of KMS.

In the following sections, I first provide summary descriptive statistics on the data. From there, I define and discuss each of the themes that emerged, followed by concluding remarks.

2. Summary Descriptive Statistics

There were 18 respondents who generated 1,237 quotations. I entered 674 instances of 112 distinct codes. The 112 codes were collapsed into six categories, as shown in Table 14, above. The summary descriptive statistics are shown in Table 15.

Table 15. Qualitative Content Analysis Summary Statistics.

Metric	Count
Respondents	18
Quotations	1,237
Quotations / Respondent	68.7
Codes Generated	112
Total Instances of Codes	674
Instances per Code	6.0
Categories Determined	6
Codes per Category	18.7

As discussed in the methodology chapter, a grounded coding scheme was followed. Accordingly, the codes closely follow the language of the respondent. For example, the code, "Time Savings" was applied nineteen times. In ten cases, the word "time" is used. In the remainder, words such as "quicker," "more expeditious," "faster," or "saving 3 out of 40 hours" are used by the respondent. They are eventually represented as a part of the Productivity theme.

3. Results by Theme

The findings generated the following key themes. Note that I have included representative quotes from the respondents for each of the key themes.

a) *Projected Outcomes*

The theme or topic that generated the most coded comments was Projected Outcomes. In this category, respondents envisioned the process of adoption, workflows post-implementation, or impact on culture. And while most tilted towards the positive, there were numerous comments that contemplated the risks if the system was unsuccessful. (See Table 16.)

Table 16. Projected Outcomes.

Projected Outcomes	Unique Codes	Instances
Data/Systems	5	51
Positive Outcomes	4	29
Support	4	25
Knowledge Management	2	24
Risks	3	22
Culture	4	7
Grand Total	22	158

Aside from generic rosy expectations, respondents looked to improved data and knowledge management, and maintained hope for a system that was easy to use and had solid training and support. Excerpts from their comments follow. (See Table 17.)

Table 17. Respondent Quotations - Projected Outcomes.

Respondent	Quotation
D18	I think we really need to have training and not just training where we where there's a speaker and we're just there listening. I think we should have a training where there's a computer in front of us and we get to follow along so it gets trained. I think easier since you get to use it you kind of memorize like, you know what the functions are. So I think once you know what the functions are is easier for you to use a system rather than just saying, okay you first have to follow through this one step and go to this other step. Nobody think if you know the layout I think it's easier for you to understand how to do how to use the KMS. No, major training.
D1	[If a failure], I think they'll be a reluctance to do anything like this in the future.
D1	Yeah, I think that would also be a 9 for the manager because he can access to your supervisors. Yeah, so John would be able to access them information himself didn't want to rely on us just in case we're not in the office traveling for work any of the above.
D9	I think would also be a 10 because if I'm out on the road or whoever's on the road to be nice to access or if I'm working from home, then it'd be nice to access the material that I hadn't taken with me. So it'd be easy to you know to retrieve it. And then as far as just having it there, I think it's one copy and one location that everybody can Access.

Note that I included Support in this category as it refers to the ability of the KMS vendor to provide training and plentiful support on an ongoing basis to facilitate adoption of the application. There was a strong sentiment that the application would end up being used by a minority of the team. Accordingly, during the action cycles, elevating the importance of the vendor's training and support capabilities to ensure widespread adoption as an outcome was critical.

b) Job Responsibilities

The topic that generated the second most responses was termed Job Responsibilities. This is not surprising as a direct open-ended question asked subjects to describe their key job activities. While Job Responsibilities is not a theme providing insights into the nature of change, the data does provide the audience with a clearer picture of the nature of the responsibilities of the workers in the Investments department. (See Table 18.)

Table 18. Job Responsibility Categories

Job Responsibilities	Unique Codes	Instances
Portfolio Management	8	50
Manage Projects/Workflows	5	28
Attend Meetings	3	20
Administrative Functions	3	14
Document Review	4	14
Strategy & Policy	3	11
Other	2	9
Manage People	3	8
Grand Total	31	154

The range and complexity of tasks is commensurate with a department of thirty-four team members managing over $50 billion in assets. Excerpts of comments from several respondents describing their job duties are presented in Table 19.

Table 19. Respondent Quotations – Job Responsibilities

Respondent	Quotation
D11	So each one of them had a different Outlook different amount of allocation. I was managing about 2.5 billion dollars of real estate assets under management on that with these three managers in totality and now I'm just handling the two debt accounts that we have.
D2	So two main, I guess three main components one is as far as the the more quantitative side of it. So more volume based is really a lot of the the bank accounts that that PEPP ends up opening for the properties. At the property level will have these title called holding corporations. And so we open deposit accounts with Bank of America and some of that is just for funding purposes to do from for PEPP that primarily used by US and then the majority of the accounts are more at the operational level.
D15	I think we focus on assessing and promoting good individual corporate governance practices of portfolio companies and broadt Financial Market policy that hopefully aligns and safeguards long-term value on on behalf of the members of the organization.
D18	Typical job mostly consists of checking emails and saving the attachments from the managers. When it comes to our corporate box, we report or are pulling documents from the managers website interfacing with SunGard Dynamo. Then also tracking our legal documents or requests, the process. Answering phone calls, minor office duties like sending system request for somebody needs more memory little office stuff like taking care of our copy room making sure we have enough supplies, papers. Yeah, that's like my daily routine.

For each of the themes, I will preface how the data was useful, if at all, in advancing the action-oriented cycles. As there were direct questions related to job duties, that this topic would generate a high quantity of instances is not surprising. What the data underscores however is the breadth of job duties covered by the thirty-four-person team. At one end of the spectrum, an administrative assistant is cleaning up a breakroom after inconsiderate co-workers. At the other end, an investment officer is speaking at a conference in Singapore. The point is that scoping and prioritizing the functionality of a KMS is critical as it is unlikely to meet everyone's needs.

c) *Productivity*

Productivity captures the concept of saving, e.g., time, money, or resources, reducing waste with the right KMS in place. Although, it should be noted that not all respondents were optimistic. For this theme, I categorized the responses as positive or no/negative effect. (See Table 20.)

Table 20. Productivity.

Productivity	Unique Codes	Instances
Positive Effect	9	100
No/Negative Effect	5	17
Grand Total	14	117

Productivity savings is an important attribute for a new application as it buttresses the rationale for investing money and time in acquisition, implementation, and training. The expectations of savings suggest the system will more than pay for itself. (See Table 21.)

Table 21. Respondent Quotations – Productivity.

Respondent	Quotation
D13	Can you say the report's done and they'll know it's done on a certain date and they can just go in and receive it or do you set up a distribution list type of thing? Because how would that be different than what the current process is, which is just pushed out by email? Yeah, but I think maybe because I'm not understanding what distribution is give it a two. I don't think we really need it.
D4	I think the more efficient dissemination of information the you know, the better, more standard generation of reports RFPs, work product, better knowledge sharing, more productive time in the workplace, more productive teams together, better use of everybody's time.
D11	We want to be as productive as quickly as possible and all those items sound like they would help and maybe not ensure that but would give us the tool that we need to be to be productive right off the bat and you know, in case we don't understand something or we need some help.
D9	I think it makes everybody's life smoother and easier I think because you will have everything in one place where everybody can go in and look and you don't have to keep separate piles for everything and and you can get rid of the paper copy. So your paper copy files should be smaller and it's the same version and and if you're looking at something up to talk to a manager of perspective manager existing manager, then everybody has the same information and I think it's actually save time for a lot of people.

There was evident skepticism that KMS would be a panacea healing all productivity issues. The fact that PEPP was successfully managing a $50 billion portfolio suggested to some that the necessary work was getting accomplished. But not every process was broken or improvable by the KMS.

d) Culture

As seen in Table 22 below, the potential KMS benefits grouped under the Culture theme typically hinted at KMS unlocking ways of working together post-implementation. Typically, these comments focused on collaboration and knowledge sharing, envisioned the reduction of silos and barriers. Some believed that movement towards a cultural transformation could lead to a less structured environment.

Table 22. Culture.

Culture	Unique Codes	Instances
Work Process & System Support	5	36
Mindset	9	28
Capability	5	25
Structure & Design	6	21
Grand Total	25	110

In this instance, the sub-category codes map to a construct that identifies the four elements of organizational culture transformation (Korn Ferry Insights, 2022). They include having the right mindset, strengthening the abilities on the team, making sure the processes and systems support and enable employees, and ensuring the organizational and team structures enable the desired behaviors. As seen in the quotations below, PEPP possesses numerous cultural factors that can advance or impede progress. (See Table 23.) As the action cycles unfold, it would be necessary to distinguish realistic workflow changes that can be expected from a successful KMS implementation versus cultural changes that require different solutions.

Table 23. Respondent Quotations – Culture.

Respondent	Quotation
D16	Should be I don't know will be but should be this could be a way of opening up. We're too little too closed off and open this up a little bit because everything's very bureaucratic. And so it's just like a bottleneck on a clog and hopefully this is like the dream of that opened up that clog and we focus on The feasibility of doing things. On the feasibility of doing things are opposed to the bureaucratic restrictions and the downside risks. I think this might help us with what the upsides being to be focused too much on the downside and negative risks that we forget about, so we're doing in this old Paradigm that so, you know, it restricts us.
D4	The one thing is that it might be hard. Comes back to whether or not we can do this given security concerns that the Systems group has, and/or the ability of the current Systems group to implement and maintain it in a way that makes it useful to everyone. I hope I'm not too hard on Systems, but I you know what, I think We just a bomb this place down. They really do It's like we can't do you know, I have an application on my desktop that I still can't run and it's you know, it's a critical application to P so many and in public equities and yeah, you know, it's been two years so and I don't even ask for it anymore, you know.
D3	Relates to my previous answer. Just getting people to use it and getting to a mass that's value add is important. There's Legacy Muscle memories at the institution. I don't know if that's cultural, but people won't change, do a 180 degree turn on their habits and behaviors. When they implement a new format for a memo or something, people don't always remember. The old template gets used. It can be a headwind, And I don't thnk it's because of wrongdoing ny people. Its just habits.

IT departments are often the greatest source of resistance to the adoption of new technologies (Ryan, 1998). Respondents cited e-mails automatically being deleted after three months, no remote access impeding telecommuting (if such were allowed), lack of support on applications needed to complete work, lack of open-mindedness, architectural constraints, gatekeepers imposing access restrictions and constraints on functionality, and clunky and outdated applications and browsers. Interestingly though, the IT department retorts that limitations are often driven by decisions from the business leaders.

The frustration with cultural impediments to change was strongly expressed during the interviews. But consider that comment from Respondent D16 cited above – that KMS "is like the dream that opened up the clog." This sentiment sensitized me to guarding against unrealistic expectations during the action cycles and communications with team members.

e)   Collaboration/Teamwork

The team voiced strong expectations that the KMS solution would impact the way they work together. (See Table 24.) This sentiment explains the strong survey scores for features like collaboration and versioning. The integration and workflow capabilities of a KMS system also speak to opportunities to improve how information flows and how work is staged.

Table 24. Collaboration/Teamwork.

Collaboration/Teamwork	Unique Codes	Instances
Collaboration & Teamwork	5	42
Knowledge Sharing	2	17
External Parties	2	16
Support	2	16
No Impact	1	5
Grand Total	12	96

Table 25 presents select quotations from the respondents regarding the collaboration and teamwork features.

Table 25. Respondent Quotations - Collaboration/Teamwork.

Respondent	Quotation
D8	I think overall the KMS the purpose of it is more collaboration across the organization so that it's more efficient that it saves time more of the work is shared and everyone kind of is on the same page.
D4	I think that the implementation of this system would improve the culture because it would make information accessible across individuals and even across groups, perhaps. And would therefore put people on more equal footing in terms of having knowledge that might be useful to them and their jobs. Might make things more efficient and more productive. Whether we're discussing things like memo generation or RFP generation. That we would all be able to benefit from the latest and greatest thinking as opposed to things that are kind of spread inefficiently by word of mouth. It would help us standardize things in a way that would move us more quickly towards a professional work product. And have all of the positive external benefits that come with that. I believe it would be a net big positive for PEPP.
D13	One thing I'm picturing now is our current wire process. I don't know whos going to have access to this but currently I have to draft up a memo, manager has to sign it, then it comes back to me. I don't know who's going to sign it. If it gets automatically sent back once it's signed, helps the process on both sides. I don't know if accounting is looped into this. Or if it's just legal, investments and systems. So yeah, if accounting is part of this, once a manager signs the wire request, I don't even know if we're at that (approval) level financially, creates that audit trail. Could get sent down. Adds value, if it works.

This may sound like an oft-repeated refrain, but as we advanced into the action cycles to evaluate and select a KMS vendor, the reality was that many of the outcomes the Investment team was seeking were currently available. But permissions, hierarchy, and work routines stand in the way of progress. Accordingly, the application may invite discussions on how work is getting done, but a culture of, "we've always done it this way," persists. On a positive note, while collaboration and teamwork certainly exist in today's environment, the KMS promises better integration with external parties, higher levels of knowledge sharing, dissemination, and adoption of best practices, and hopes of a collaborative leadership group.

f) KMS Resolvable Issues

The voices captured under the theme of KMS Resolvable Issues frequently spoke to the underlying business issues that justified the need for and precipitated the search of a KMS vendor. And they were differentiated from other categories that might have been contemplating the benefits of a KMS. (See Table 26.)

Table 26. KMS Resolvable Issues.

KMS Resolvable Issue	Unique Codes	Instances
Data	3	19
Documents	3	14
Knowledge	2	6
Grand Total	8	39

At first read, many of the respondent's remarks could justifiably be categorized as related to organizational culture. (See Table 27.)

Table 27. Respondent Quotations - KMS Resolvable Issues.

Respondent	Quotation
D5	I think what we may need is the organization of resources dedicated to working on certain functions with a within KMS. Like I think there are a lot of rules and a lot of organizational things that at the onset somebody needs to be allocated as a resource to define the rules on how we're going to load documents how we'll manage the documents and how will tag the document so that it functions the way we need it we need it to function. So there's not just a mass chaos of documents that are being dumped into there and all of a sudden there's so many different formats. When you go and try to use a search function because there's no consistency in the way. The documents are named in the where they're placed. The search function doesn't work the way it's supposed to.
D4	I forgot to mention this on there, but you know, there are people who have a lot of institutional knowledge who just kind of You know try to keep it to themselves and less start poked or prodded or whatever and you know, that's all great as long as they're here. I mean if something happens and they go away it's going to create kind of a vacuum point in time.

But I would argue that in both cases cited above, the KMS solution mitigates an ongoing cultural issue. The file migration to a new application will provide an opportunity to establish global conventions on file structures and placement. Similarly, to the extent that team members input data and files into the system, team members should know where to find that information in the case that an employee leaves the organization. As mentioned, the core capabilities of capturing and storing information compelled the acquisition of a KMS system.

4.   Closing Remarks

I started this chapter by saying there was a lot of good will towards the KMS project, that the job profiles of the workers were diverse, and that the KMS was expected to help the department on several fronts, including increased productivity, better collaboration, and better data management. Numerous issues were identified in the interviews, some which can be resolved through the KMS implementation and others that point to cultural challenges which will persist regardless of KMS.

Three topics merit discussion in their omission from the comments of the participants. The first deals with productivity and workflows. Despite the expressed discontent with industrial-era constraints inhibiting productivity and the desire for KMS to be the panacea ushering in a new era of efficiency, none of the participants put forth a suggestion of undertaking a critical analysis of the workflows and asking, "why are we even doing this?" This finding recalls Darwish (2019) whose thesis on the adoption of innovative transportation technologies found that incumbent business models were locked in legacy models. Additionally, he found the socio-technological transition difficult, thus impeding resource optimization and, in his case, the commercialization of the new technology.

The second topic relates directly to one of the open-ended questions:

> "Regarding the KMS implementation, what skills, people, systems, or aspects of culture do you believe will be most critical to the implementation? Do we have them today?"

The lack of insights into the necessary elements to successfully implement the project, and a lack of self-knowledge regarding organizational capabilities proved prescient. Basically, the dominant mindset was that we have smart people in the department who will figure it out. This attitude persisted even though there is a reliance on IT to undertake any implementation and there is an overall distrust with the

department, as thematized earlier. This deference will be explored more during the action discussion, but there was an unwillingness to even admit a blind spot existed and an aversion to bringing aboard a consultant, which continued to undermine the progress of the project.

The third omission identified in the research was that the management and workers of the investments area (excluding one administrative assistant) did not identify "leadership" as a key component of an initiative cutting across the department and between departments. This omission stands out given that the project was four years in process and that it involved IT, the department viewed as the greatest source of frustration. The interviews found the terms "leader" or "leadership" mentioned only two times. An administrative assistant advocated on two separate questions for a collaborative leadership group to monitor the new system. The terms were not uttered by any of the other seventeen interviewees during the approximately fifteen hours of question-and-answer sessions.

This emergent theme of the disconnect between delegated leaders in government bureaucracies and staff is in alignment with prior research. Nutt and Backoff (1996) found that rifts between management and leadership were driven by suspect loyalties, career civil servants not fully engaging, and conformist, dispassionate, pragmatic followers who lack commitment and feel alienated. Nass (1986) distinguished between delegated bureaucratic authority and professional authority driven by technical expertise.

There are two reasons why I did not probe the areas I identified as gaps. The first is that they were not immediately evident but came to light mostly during the analysis of the content. The second reason goes to my role as an action-oriented researcher conducting grounded research. If I insert the term "leadership" into the conversation, then I am altering the flow of consciousness of the respondent to invite them to address a topic I think is important. My approach was to ask for clarification, ask for further elaboration, or to ask if there was anything else the interviewee wanted to add. But a clear aim was not to put words in the subjects' mouths.

As mentioned in the Introduction, this KMS vendor selection process ultimately failed. With that knowledge, as we move into the action-oriented research, it's interesting to consider what information was extracted from the surveys and interviews to help guide the selection process and what was missed. The three gaps identified above, though presented here, came to light in reflection months later. They will be discussed again during the Findings section.

VI.   Story of Cycles of Action, Reflection, and Sense-Making

In Chapter IV, I discussed the Action Research methodology. In Chapter V, I brought the AR journey to life. In this chapter, Section A starts with the foundational section of context and purpose—the pre-existing conditions at PEPP impelled the KMS project and the subsequent delays in its implementation. Then, I review the KMS team formation, the determination of business requirements, and the drafting of the project charter. In Section B, I explore four participatory-change-management steps and the cycles of action experienced in each. Section C focuses more holistically across the project or meta-cycle. Section D focuses on personal reflections, and Section E summarizes the findings and draws conclusions. Note that I will synthesize these findings and discuss more fully actionable knowledge with the other components of the research in Chapter VII, Discussion of Findings.

A.   Context and Purpose
1.   The PE Audit Report

Briefly discussed in Chapter II, Situational Context, an internal audit was performed in June 2015 on the private equity program of the investment department. The primary purpose of the audit was to provide assurance that the proper internal controls existed, functioned as intended, and complied with existing policies. The audit determined that the capture, maintenance, and management of private equity information and data was inconsistent across the department and over time. Furthermore, the potential of staff turnover posed a risk of loss of institutional knowledge. The recommendation (agreed to by senior management and the BOT) was for the department to consider improved document and data management practices and the implementation of a CRM system. The report suggested that the entire Investments team would benefit from the implementation of such an application. As the pension's Investments team is not selling product to customers, staff amended the CRM recommendation with the more encompassing term, knowledge management system.

2.   Two Years of Delay

The KMS project languished for close to two years from the time the audit report was delivered to the BOT. The initial obstacles to progress mostly lay with the IT department. Philosophically, the IT department was not comfortable with the business adopting a software-as-a-service ("SaaS") model, nor with PEPP's data being hosted in the cloud. IT was also not prepared to commit resources to build the software in-house. The IT head also pointed to varying degrees of conviction about the utility of the KMS anecdotally, citing some unnamed investment team members who either did not want the system or did not want to waste time on a system they doubted would ever be implemented.

Continuing delays in the second year were also due to the IT department. The group was implementing a new Microsoft operating system across the organization. That effort required full utilization of the short-staffed department. The KMS was a low-priority initiative and was tabled until the operating system project was completed in the summer of 2017.

It is probably worth noting that the IT department faced several challenges, some driven by external factors, others self-inflicted.

- IT department reputation: At the most basic level, multi-year delays in updating browsers and essential applications raised questions about the IT department's competence.

- Staffing and pay levels: The IT department was chronically understaffed, in part due to below-market wages being paid to employees. The disparity to investment and legal professionals in PEPP was evident, as government salaries are public information. In the years that the KMS project languished, the IT leadership was able to secure raises for its staff.
- IT operating model: At project launch, IT was averse to having an off-the-shelf KMS product. This stance made the organization dependent upon IT (personnel and scheduling) to develop any applications in-house and maintain the application going forward.
- Finally, it should be noted that the IT department primarily served the customer interfacing Member Services areas. Accordingly, initiatives for Investments and Legal had lower priority on IT's slate of potential projects.

Many in Investments and Legal believed that a KMS product would ever be developed with our existing IT team at the helm, which validated a posture of resistance and justification for some asset class heads to not fully engage in the effort.

Delving into this theme, these findings are very much aligned with Lianga et al. (2017) who researched e-government cloud adoption in Chinese public agencies, which found that, in addition to the importance of leadership and organizational readiness, specific elements of the IT department were deemed critical to adoption. These included trust in the cloud as a secure site for sensitive information, willingness to take risks and whether concerns (such as complexity, cost, or security) outweighed the perceived benefits. Lianga also discussed situations where organizations with pre-existing specialized and internally developed applications (finance specifically mentioned) are more resistant to adoption due to migration issues.

3.   KMS Team Formation

Launched in 2017, the KMS Team was initially comprised of workers at different levels, performing different functions across asset classes. This composition was intentional to facilitate the surfacing of issues and to ensure that a wide cross-section of likely users was represented at each phase of development. Additionally, as both the legal and investments teams were searching for KMS-like solutions, the two efforts were combined. The third leg of the stool was representation from the IT department. Accordingly, in theory, the core team had seven to eight people from Investments, four to five from Legal, and two to three from IT. The team included administrative assistants, analysts, and managers. The team also had some members with over 20 years of PEPP experience and others with less than two years.

In practice, the core team was one person from investments, two from legal, and one from IT. The administrative assistants rarely came to meetings, though they made efforts to participate in product evaluations. Only one finance analyst regularly attended. Meeting agendas, and more diligently, meeting minutes were captured and e-mailed to the entire team, as well as saved in a shared directory. Two of the three IT representatives on the larger team quickly dropped off; one member regularly attended meetings and acted as a liaison to the department head.

The heads of the three departments (Legal, Investments, and IT) served as the project Sponsors. Periodically the KMS Team updated the sponsors on progress. All major decisions effectively required unanimous agreement of all three individuals. After the PE Audit, the IT department had earmarked a $150,000 annual budget for the project.

PEPP's procurement policy guided all spending processes. The policy stipulated elements such as approval authority for various roles and the required number of bids for services to ensure that a transparent and fair process was followed. Finally, any purchase for KMS would likely require a sequential process: subcommittee and then BOT approval to i) commence a request-for-proposal (RFP) process, ii) to establish minimum qualifications (MQs), iii) to distill materials from vendor submissions, and iv) ultimately leading to a Board-approved contract with the selected vendor.

In sum, the core KMS team, its peripheral team members, the sponsors, and the Board made up the entire team and stakeholders responsible for the selection, approval, and implementation processes. This core KMS team met all the requirements of a learning set. Marquardt's 2004 learning set criteria (cited in Wyton and Payne, 2014) include a well-defined problem, four to eight members from diverse parts of the organization, a process that emphasizes questions and reflection, the power to act, a commitment to learning, and a coach committed to capturing the learnings, distributing key takeaways, soliciting and incorporating feedback, and building the review into weekly or bi-weekly team meetings to improve the overall effectiveness of the group. I fulfilled the role of the coach for the group.

4.   Business Requirements

One of the first tasks required of the KMS team was the development of business requirements. Building on work done in the Private Equity department, the team identified several challenges or pain points that a KMS might address pertaining to all asset classes. Each of the KMS team members from the various asset classes and the Legal department met with their colleagues and compiled and synthesized the issues raised. The list of requirements clustered into the following categories:

- Knowledge capture and sharing
- Business intelligence/relationship re-conceptualization
- Knowledge storage and retrieval
- Reporting/dashboards
- Managing contacts
- Workflow management/activities

The complete business requirements document, with detailed descriptions and examples, is imbedded in the Project Charter. Staff identified several technical considerations that were not business requirements and not a focus of the KMS project to date:

- Remote access—ability to access information away from office
- Access rights—ensuring document confidentiality
- Global search—ability to tag documents with key words
- Data organization—consistency of structure across the department

There were several takeaways from this business-requirement process. A cross-departmental team had surveyed staff and identified, highlighted, and attained consensus on the KMS functionality that they believed would be most impactful on their daily jobs. The KMS team communicated this information back to the department and project sponsors. It was expected that IT would take the simply-stated business requirements to form the basis of technical requirements.

5.   Project Charter

The final draft of the KMS Charter was completed in June 2018; the sponsors had been given opportunities to provide feedback and contribute ideas. The business requirements were incorporated into the document. Other key elements included a timeline, as well as the project's mission, objective, features in scope, success criteria, vendor selection process.

A critical, if unspoken, objective of the Charter was to ensure that all three sponsors agreed on the fundamental aspects of the project. In late August 2018, the KMS team got all three sponsors in the same room to forge agreement on the following aspects of the project. The project would be web-based. Data would reside on external servers hosted by a third party. The IT department's task was to focus on security issues, as these other elements had attained consensus. Finally, the proposal selected would meet the needs of both the Investments and Legal departments. Given over two years of delay and consternation on these issues by the IT head, memorializing these stipulations was something of an insurance policy. This agreement represented significant breakthroughs in thinking and overcoming the resistance that from IT.

In the following sections, I present the four action learning cycles and the meta cycle, my reflections, and the learnings imbedded in those cycles. In subsequent sections in this chapter, I present the empirical methods that grew out of this action-oriented research methodology.

B.   Cycles of Action

The four cycles of action and the meta-cycle are presented and discussed. Schein's general epistemological approach, advanced by Coghlan (2009), of observe, react, judge, intervene (ORJI) is also interwoven in the discussions (and underlined below). These stages are reflected in the KMS Team meeting notes, excluding the reactions, which are more found in my journal entries or recollections.

1.   Vendor Evaluation Process

The vendor evaluation process captures the KMS Team effectively starting with a wide funnel of vendors and then undertaking a deselection process whereby the top three to five applications remain. I present the cycles of action below.

Act: Individual KMS Team members search out KMS applications. They bring findings back to the team, and we set up introductory meetings with the most promising candidates. Aside from the Business Requirements (discussed earlier), the main criteria are i) an "enterprise solution" that can handle both Investments and Legal department needs, ii) an off-the-shelf solution that will require minimal resources from the IT department, and iii) a cloud solution.

Learn: What we observed was that this process was quite ineffective. Some individuals researched many applications that were especially tailored to legal firm needs, often meeting with the firms, and presenting their assessment to the group. At the other end of the spectrum, some team members researched zero applications. Given the wide range of interactions team members were having, from just looking at websites to holding introductory meetings, the notes captured on applications varied widely.

Reflect: At my urging, the team took some time to reflect on what was and was not working in the process and discussed the topic at a subsequent weekly meeting. KMS Team member reactions from the Investments side were frustrated that members from the Legal team were jumping ahead, trying to

drive an outcome that favored their preferred vendor and not allowing for a socialization process across the team. The Legal team, which had a head start based on an initiative done the earlier year, was frustrated at the slow uptake of the Investments people. The judgment from the team noted the inconsistency in what was being evaluated, and the capturing and dissemination of notes.

Re-frame: I found a website, softwareinsider.com (2018) that listed over 50 KMS applications, many of them rated. Importantly, the site listed all the features and functionalities of KMS applications, and the percentage of KMS applications that offered each functionality. (See Appendix A.) This resource shaped how the team approached evaluating KMS applications for the remainder project. From the same website, we added to legal matter the management features allowing for the evaluation of the specific needs of that department. This intervention drove a framework and consistency as to how we assessed applications, talked to vendors, and discussed candidates with each other.

Vendors that appeared to have functionality of importance to PEPP based on the Business Requirements were discussed at the weekly meeting. The lead individual would set up an introductory meeting, typically a webinar, with the vendor and invite the whole team. After the introductory meeting, or at the next weekly meeting, the team would discuss the strengths and weaknesses of the vendor and to determine if further meetings and due diligence were warranted.

Act: With the revised process, we observed a more collaborative undertaking in evaluating vendors and getting the whole KMS Team on the same page. The team also started a shared directory such that key information on the vendors and review processes were available to the whole team. In essence, the reaction by the team to the intervention was to adopt a more cooperative undertaking. From this point forward, the team was effective at:

- Identifying the universe of potential solutions
- Establishing the baseline feature needs
- Narrowing the list of vendors, eliminating vendors that lacked required features; or, as in the case of Microsoft SharePoint and Dynamic, where the expected customization and development costs and demands on IT were deemed excessive.
- Conducting vendor demonstrations
- Determining a consistent grading scheme

Reflect: An objective judgment of the situation: the post-introductory meeting conversations enabled Investments, Legal and IT to better understand each other's needs, wants, issues, and concerns. We were directed by the sponsors to find a solution that met all needs but had yet to really appreciate anybody else's position. What also emerged was how subjective feature evaluation can be as ease of use and user interfaces are tied to an individual's style of work.

In sum, during this vendor evaluation process, the KMS Team reviewed over seventy-five systems, discussed over fifty vendors, had twenty-three live demos, and evaluated five systems in live, hands-on tests. Overall, the KMS Team was satisfied with the process and confident that the best solutions had risen to the top.

2.   Finalist Recommendations

Act: The evaluation of the five semi-finalists required different constructs. First, we had been evaluating applications leveraging the softwareinsider.com (2018) feature matrix. Separately, my fundamental

management research was asking subjects to rate utility of those same features which was providing me insights. But the management research results were meant to be confidential. And I did not want to extrapolate the data of voluntary participants to the entire department. What I pushed for was for each KMS Team member to go back to their areas and survey their peers on which KMS features were most important to them. The goal was to determine which vendors rated highest on the features we most cared about. (See Appendix B.)

The second change in the evaluation process brought in additional data about the vendors. "Features and Functionality" would now be weighted at 60 percent of the vendor's score. "Cost" would be 25 percent and "Training and Support" would comprise the remaining 15 percent.

Learn: Three firms were advanced to the final stage. One vendor was vastly more expensive than the other two and was eliminated from consideration. Of the remaining finalists, the first was a cutting-edge software firm that was designed specifically as a KMS. The firm had no legacy systems or baggage, had been built with contemporary coding languages and sensibilities. The firm was venture-backed and highly rated by Gartner. The second finalist was a Netherlands-headquartered, well-established firm with a marquee client list in Europe, including government agencies demanding the highest security. The team had strong conviction that either solution could meet PEPP's needs. The team drafted a presentation detailing the process and rationale for advancing the two firms to the next stage.

Unexpected Event: The first "unexpected event," as displayed in Figure 4 (p. 54), then occurred. The KMS team observed that the Sponsor group rejected both finalists selected. The first finalist was rejected basically for still being a start-up. The cutting-edge firm was venture-backed and boasted a roster of A-list clients but was a less mature company. The second finalist was rejected because they were headquartered in Europe. There were concerns about data being hosted outside of the country and support being in a different time zone. This despite Europe having stronger data protections than U.S. law and the references of U.S. clients.

Reflection: Clearly, the criteria the KMS Team focused on in evaluating the vendor applications failed to incorporate elements of paramount importance to the leadership team. There is an old saying that nobody gets fired for hiring IBM. The risk of even a well-funded firm going out of business in two to three years and their application ceasing to be supported was not palatable. The risk of confidential data being breached overseas represented an unnecessary threat. The sponsors' reactions reflected PEPP operating in an environment of public scrutiny, and a desire to eliminate even remote risks with potentially extreme negative optics as adequate justification to reject the finalist options. The KMS team was disappointed given the amount of work and thought that went into advancing the finalists.

Re-Framing: The judgment of the KMS Team led to modifying the 'must-have' criteria to include U.S. headquartered firms (or strong U.S. presence), cloud data resident domestically, and a company profile that included years in business and financial strength, thereby incorporating the concerns of the sponsor constituency.

Act: The team reviewed its database, reshuffling the order of vendors. From this intervention, two finalists emerged in the XYZ-900 and the KM-Other applications. Additional meetings were held with the vendors. A subsequent presentation was made to the sponsors with the recommendation that the two finalists advance to deepest stages of due diligence, including an IT sign-off and sandboxing of the application. The sponsors approved the recommendation.

### 3.	Sandboxing Exercise

With the two potential KMS vendors accepted by the sponsors, the KMS Team advanced to a deeper level of due diligence. Ostensibly, the sandboxing process affords prospective customers an opportunity to interact with the applications in a live environment. Given the customization necessary for each client, these environments are optimized to accentuate the favorable characteristics and features of the application while shielding the deficiencies. Typically, three to nine KMS Team members logged in to the environments and interacted with the systems for anywhere from one to three hours. The cycles of action are discussed below.

Act: The KMS Team, including many of the Analyst level members who had fallen off, were to participate in sandboxing the KMS applications. Our instructions to the vendors were, after a training session, to provide a test environment for two weeks—with as much functionality as possible—consistent with our expected final product so that the KMS Team could interact with the application, conducting activities representative of expected uses.

Learn: What we <u>observed</u> was that due to the product customization specific to each customer, generic testing environments tended to be quite basic. For example, as the connections between PEPP and the vendor's application were not built, one had to trust that process was seamless and that all the client's knowledge would be deposited without glitch in the system. Other challenges included a wide range of PEPP team engagement with the exercise. Some people spent less than an hour performing basic activities, others spent several hours, and some only tested one of the applications.

Reflect: The result was an incoherent assessment of the vendors. One person in the Legal department, who may have been biased going into the evaluation process, favored a KMS solution more tilted to legal matter management. He had undertaken the most detailed examinations and was swaying the group towards his preferred outcome. Most of the group barely interacted with the two applications, and their <u>reaction</u> was to express dissatisfaction with what was <u>judged</u> to be an inadequate process. The IT lead on the team did not offer much insight, and, as this was a business use assessment, deferred to the rest of the team.

Re-frame: We obtained additional time from the vendors for the sandboxing exercises. Leveraging guidance obtained from softwaretestingclass.com (2015), we developed basic acceptance test cases to standardize the business user application review process. These consisted of scripts of actions that each team member would undertake and the criteria to rate the vendors on. We established time parameters given more precise windows when the environments would be available to us. The goal of this <u>intervention</u> was to better standardize the evaluation process across the team.

Act: More of team engaged in the re-tooled exercise, diligently ran relatively simple scripts from the same playbook, and assessed ease of use and functionality.

Learn: Even so, we were still limited by the test environments which provided basic functionality and little integration with our systems. For example, we could move and share documents that already resided in the test environments, but we were unable to upload a document from our system into the sandbox environment. The vendors cited API development costs to customize the sandboxes as prohibitive. The KMS Team met afterwards and compared results. The result was an incomplete assessment of the vendors.

Reflect: Overall, better results and more input was received from the team. Even so, not as many of the lower-level analysts were involved in the review process. Others reacted with deference to more vocal team members, a "well, you guys probably know best" attitude. Key learnings include i) the team should agree on and standardize test scripts and evaluation construct, ii) vendors should provide a training session, iii) the team should hold people accountable, and iv) the testing process should be time limited.

After the sandboxing exercise (and a separate systems questionnaire and interview process), the team individually and then collectively graded the applications, ranking the vendors and ultimately recommending the top pick to the sponsors. Based, in large part, on the outcome of the sandbox results, the XYZ-900 KMS platform was rated moderately higher (49 to 42) than the KM-Other alternative on Features and Functionality (60 percent of the score). The price of XYZ-900 was approximately 33 percent of the KM-Other application, and the team confidently recommended XYZ-900 to the sponsors. The proposal was supported by the CEO and, following a presentation by the team, funding was approved by the Trustees.

4. On-boarding Process

Act: The XYZ-900 KMS on-boarding process commenced in late August YEAR. At the behest of the KMS team, roughly forty Investments and Legal team members convened to get their first extended look at the KMS solution that had been four years in the making.

Learn: What was quickly observed was that anytime PEPP's staff inquired about features that were not out-of-the-box, the XYZ-900 implementation team balked at incorporating the capability. This was in stark contrast to the sales team's earlier assertions. The issues raised, and the attitude they were being met with were annoying, were not yet fatal to the application.

There were three main thrusts to the meeting, sometimes intertwined. The first dealt with the cultural elements both necessitating and providing resistance to the KMS initiative. The second dealt with the expected impact of KMS implementation on the individuals. And the third dealt with technical questions raised by staff during the demonstration of the application by the XYZ-900 technical team.

Examples of topics discussed relating to existing cultural constraints included:

- An overview of existing impediments: people e-mailing documents to themselves to have external access, document version confusion, manual processes, systems limitations, the "we have always done it this way" mentality.
- Culture change: some things we could theoretically do already, but had been blocked, such as remote access, work from home, e-mail archiving.
- Stress involvement: not offloading elements to others.

The team also discussed the upcoming steps and the post-implementation environment including:

- Benefits included time savings, efficiency productivity; opportunity to fundamentally question our workflows; knowledge sharing, consistency of data, and capabilities around reporting.
- Some relationship reconceptualization: pushing tasks out to our managers, lessening our workload, streamlining the review of information.
- Better tracking of things like meetings and workflow status

Several technical and application concerns were flagged during the demonstration (explored in greater detail during Learnings discussion):

- Technology integration between systems that appeared less seamless than portrayed
- Data mining and search capabilities did not seem robust
- Unresolved questions around extent of support from vendor
- Microsoft Excel links and formulas shed light on storage attribute constraints

While a few people were silent during the meeting, the interactions and <u>reactions</u> were generally positive. One of the longer-tenured managers (whose asset class was heavily mired in manual processes) went so far as to take a dollar bill out of his pocket and slam it on the table declaring that he was all in. The engagement of the team was positive. Expansion and turnover in the department has translated to a more youthful workforce which is tech savvier and expects adoption of modern technology by their organization.

Reflect: The KMS Team's <u>reaction</u> to the broken Excel links and lost formulas issues was best termed as baffled and a bit embarrassed. The XYZ-900 knowledge management system would have been better termed a content management system ("CMS"). It's a subtle distinction, but Excel documents with links and formulas migrated to the CMS would end up as a document with static values; the links and formulas would be lost. You would get a picture of the last values, but not a working, dynamic document. Levin (2003) argues that the research component in action research is the negotiation of new knowledge or meaning between researchers and participants. In our judgment, for an investments department, filled with analytical work and reports automatically updated through links, this served as a fatal flaw for the XYZ-900 application.

Reframe: Shortly after this meeting, the team drafted a memo citing the misrepresentations that were made during the sales process that were deficient in the product. The most important included:

- The system infrastructure was a hierarchical file structure rather than a relational structure
- Version control for Excel
- Integration of Excel functionality
- Limitations of search capability

We expressed our disappointment and were able to void the contract (intervention), averting financial loss and litigation. But despite the well-intentioned actions of so many staff members over the four-year period, there was still no KMS in place.

C.   Personal Reflections

There are three topics I discuss in this reflections section focused on the action-oriented research. The first focuses on design of the methods and its relationship to the central questions in the dissertation. The second focuses on my roles as an inside researcher and challenges encountered with that duality. The final topic addresses the integration of the fundamental managerial methods and the action-oriented methods.

1.   Action-oriented Methods Design

The central objective of the action-oriented techniques was to advance the KMS vendor selection process by identifying and resolving any obstacles to success with the full participation of the KMS

Team. While grander ideas and implications of the research at times diverted my attention to era-transition themes, this core component of research, perhaps because it was tied to sequential steps in the project plan, maintained course throughout the research project.

As a result of my meandering, era transition at times was presented as the main literature course and other topics such as technology adoption, knowledge management, and change management in the public sector were treated as side dishes. The growth that transpired over time was to discard the grandiose ideas. The side dishes, so to speak, have taken their rightful places as the main course.

2.   Integration of Methods

One of the less-well-understood elements of the research design project was how the fundamental managerial and action-orient methods would complement each other. Given the emergent nature of action and the unknowable results coming from surveys and interviews, contemplating in advance how they would work together was challenging. While mentioned during the stories of action, I wanted to take a moment and highlight the impact of the fundamental research in the broader scope of the research project.

The surveys were helpful on two fronts. First, the survey construct, with each feature and its sub-components listed, provided a framework for the KMS Team to have a common language to talk to the features at a detailed level. (**Refer to Appendix A**.) The KMS Team was able to use the feature list to have conversations with their asset class teammates, enabling us to rank and then prioritize various features. From the surveys, we were able to determine that the capturing, storing, and retrieving information were the top capabilities desired in a KMS. The collaboration and workflow features were rated next highest indicating their importance in a KMS fulfilling the objectives of the team. The third insight provided by the surveys was the greater dispersion of results for the management versus workers on the anticipated impact of the system. On the third insight, the interviews offered clarity on the thought process.

The interviews provided numerous insights that were filtered into the fabric of conversations with the KMS team by me during the cycles of action. That greater dispersion of manager results had clear justification from the respondents in the interview sessions. Consider respondent D13:

> *"I can't envision an environment where [the managers] are actually going in and looking at data. I think the request will still end up going to me and I'll be pulling the data and manipulating it."*

On the other hand, you have department members who anticipate new ways of collaborating and redesigning workflows to diminish hierarchical flows and approvals of information. There was clear friction on manager roles combined with strong voices urging a vendor with superior training and support. My messaging during the action cycles focused on the importance of training across the department and setting expectations that the full potential of any system would be dependent on everyone using the system. The outcomes of those dialogs led to a planned fazing-out the old system (thereby forcing everyone to learn the new system) and the designation of power users who would undergo more in-depth training, ultimately being the local first line of support for their teams.

One other thread that was pulled from the interviews was alluded to in the theme KMS Resolvable Issues. Many respondents identified issues that a KMS system should rightfully cure such as inconsistent data-naming conventions. An opposing theme was the Mindset sub-theme in Culture. Many issues

raised in the interviews would not be solved by a KMS. Longstanding cultural issues such as organizational structure, permissions, and risk-averse mentality are not suddenly cured by a KMS. In that regard, my role was to be the cautionary voice promoting realistic objectives for a KMS.

3. Role as an Inside Researcher

For me, the duality of being an inside researcher meant that when I was at PEPP, working on the KMS implementation project, I was constantly listening and observing while doing. When I was away from PEPP, reading literature relevant to the fundamental question, I was constantly pondering how that research informed the developments at PEPP. Therefore, defining insider action research is challenging. If I am the only person in the room that understands my role duality (setting agendas, facilitating meetings, sense-making, guiding the team through reflective activities, and journaling important observations), does that diminish whatever is co-produced?

And this touches upon a second design issue specific to the action-oriented techniques in the group participation. With fundamental research (following approvals from the top levels of PEPP), eighteen of my colleagues volunteered to be participants, stepped into my research environment on a set date and time, and responded to my line of questioning for thirty to forty-five minutes.

With the action-oriented research, I was not in a position within the PEPP organization to turn the KMS team into an Action Research cohort. The cross-departmental team had already been established. The fact that my dissertation was centered on the KMS project was known to all. Two of the three Investment team members (excluding myself), from the seven-member KMS Team, participated in my interview process. Accordingly, my action-oriented research on the KMS Team was interwoven into the fabric of daily work. I willingly led the action cycles and provided guidance as needed. I needed the discourse for my research but more importantly it was clear to me the group needed to process the events that had taken place. I met no resistance more forcefully taking the reins and guiding the team's direction.

I contrast the passivity of fundamental research to the ambiguity of the action-oriented research role where you are in the muck, trying to learn in partnership and conflict with your peers. There is no lag as you ponder meaning in a room by yourself. This is an active and dynamic process demanding attentiveness. Your viewpoints are challenged in real time, but they also influence the course of events. Even so, it is important to recognize the limitations given the level of participation by the KMS team.

D. Conclusion

Chapter IV presented the methodological framework under which the action-oriented research component of the case study was to be conducted. In Chapter VI, I presented the stories and cycles of action, integrating the general empirical approach utilized throughout the study. I reviewed four sequential action cycles which in aggregate formed the meta-cycle. The KMS team, working autonomously, progressed through the stages of each cycle, and found ways to cooperate and work through emotions, to reflect and co-create, to implement a plan of action together and, in the process, to create actionable knowledge related to the KMS selection and implementation process. In Chapter VII, Discussion of Findings, I will discuss the meta-cycle findings, actionable knowledge, and recommendations.

VII. Discussion of Findings

A. Introduction

The case study methodology seeks at its core to illuminate complex phenomena. The findings herein discussed capture the dominant themes, trends, and aspects of the case study centered on the processes surrounding the selection of a KMS solution for one U.S. pension plan. To clarify, the focus of the research is on understanding impediments to change through the lens of the KMS vendor selection process. In triangulation, researchers make use of multiple methods and sources of evidence to corroborate findings (Creswell, 2013). The objective herein then is to integrate the literature, fundamental research, and action-oriented research into a coherent set of findings. This research supports findings in the following areas:

- Team member constitution and engagement
- Requisite skill sets
- Test environment process
- Project definition

During the methodology chapter, an argument was put forth justifying the using of surveys, interviews, and action-learning to arrive at a more holistic understanding of the complexity of a socially dynamic situation.

Actionable knowledge is defined as knowledge that advances both practice and the academic body of literature. In a case study setting, the uniqueness of the organization and temporal context challenge generalizability. But many of PEPP's challenges are common to public agencies and bureaucracies. These include a political fishbowl environment and unionized life-long employees. Each of the findings presents opportunities, especially for practitioners, to assess aspects of their organization and their readiness to undertake potentially transformative change through systems adoption. The findings have implications for academic research, either corroborating or advancing the body of knowledge.

B. Action Cycle Findings

The four cycles of action represented steps in the broader objective or meta-cycle of implementing a KMS solution at PEPP. They reflect an integrated and mostly sequential workflow. This section focuses on the higher-level picture of the case study mandated by the abrupt cessation of the XYZ-900 adoption process. In the aftermath of the decision not to go forward with XYZ-900, the KMS team members individually and collectively underwent a period of reflection. As the business needs persisted, there was a strong desire to capture learnings to i) ensure they were preserved for institutional knowledge, and ii) to help guide future iterations of the project. Each of the four action cycles exhibited discourse between constituents to arrive at a shared understanding, however this final reflective exercise stands apart in that it contemplated all aspects of the meta-cycle from inception through that date.

One of the nuances of this exercise was that the honest assessment of what worked and did not work included some project elements outside of the control of the team. Team members shared their thoughts at the next scheduled meeting. Many of the identified milestones were administrative or high-profile events that represented stepwise progression. In retrospect, the actual milestones were found in subtle decisions that barely registered at the time. For example:

- Forcing one solution to meet the needs of Investments and Legal departments
- Determining in advance that a third party out-of-the-box solution would prevail
- Requiring the use of internal resources without the guidance of a consultant

Some of these were not conscious decisions but became default positions. Others were decided in private conversations by the Sponsors with conceptual organizational objectives (enterprise-wide systems favored over department-specific applications) trumping the distinct tactical objectives of the departments seeking the systems. The team drafted the following summary points following the reflective discussions, to be shared with the Sponsors and then the BOT. This co-created synthesis of learnings will represent the basis for actionable knowledge.

We begin by reviewing the findings from the action cycles:

i. KMS team member constitution and engagement:
   a. Integrating all levels across groups given diverse work content. While the original team composition included more of the "worker bees," their engagement was tepid, resulting in incomplete assessments of business needs.
ii. Skill sets - varying levels of competence were exhibited at critical tasks:
   a. Project managers versus business leads: belief that a businessperson with a passion regarding the unmet need therefore possessed a skill set to manage a software selection and onboarding process.
   b. Mapping and prioritizing workflows
   c. Capturing technical system requirements
   d. Undertaking application evaluation processes
iii. Application testing parameters - after narrowing the search to three vendors, the team was provided access to the applications in a test environment. Briefly, findings include:
   a. Having the right people consistently testing the applications.
   b. Implementing consistent testing processes to compare application functionality.
   c. Ensuring necessary functionality could be evaluated in test environment.
   d. Ensuring an adequate amount of time is granted to test the system.
iv. Scope creep
   a. Initially identified needs expanded to address a plethora of unmet technological needs. The 2015 audit report pointed to CRM and document/data management needs. The envisioned KMS functionality integrated e-mail, documents, contacts, matter management, billing system, cash flow approval process, and other workflows. While this goes to the integrated and fluid nature of knowledge as the work product, the original business needs of the project were overtaken by a broader technical vision.

Every case study KMS implementation process is unique. But the PEPP KMS Team, through a participative process, determined these four areas, that were under the control of the team, and were critical factors in the mission's failure. It's important to restate my role in this process. As a researcher, I facilitated the reflective process and discussion, and I captured notes. As an insider, I participated in those discussions and leveraged the notes to draft a presentation, content agreed on by the KMS Team, to the Sponsors with the team's recommendations.

1.   Role of Data

When the KMS initiative started at PEPP, the belief was that a customer relationship management system (CRM) was the tool needed by the department to better manage relationships. While a CRM is a specialized type of KMS, it speaks to the nebulous definitions and bespoke nature attached to KMS applications. Accordingly, the detailed listing of 16 KMS feature categories with over 120 specific application capabilities used in the surveys I conducted proved to be an integral component of the organizational practice. First and foremost, it provided a common language and framework to define what constitutes a KMS not just for the KMS team, but for the entire department.

The framework was then used to enable the department to determine, from the menu of features that potentially make up a KMS, what was deemed most important. The interviews with the respondents provided greater insights into the envisioned benefits and end state post implementation of the features. The KMS Team members met with their broader asset class teams to share the framework and incorporate their feedback into the process. This ensured that the feature importance weightings reflected the sentiments of the entire department and not just the 18 who participated in my research.

In the reframing exercise of the first action-learning cycle, the KMS team adopted this same framework to assess the functionality of vendors. As we reviewed online or met with different vendors, a blank template would serve as a scorecard to evaluate their capabilities with each feature category. The KMS Team huddled after each vendor presentation to compare scores and build consensus on assessments. By interlocking the data gathered on the department's needs with the vendor capabilities, the KMS team determined which vendors were best positioned to deliver positive outcomes to the department. This scoring was factored into the final scoring of each vendor, accounting for 60% of their score. Cost represented 25% and Training & Support accounted for the final fifteen percent.

C.   Actionable Knowledge

Actionable knowledge reflects "*the learning capability of individuals and organizations to connect heterogenous elements…; to extend existing modes of knowing and inform future action*" (Antonacopoulou, 2006, p. 15). During the action-oriented research, I identified and explored four discrete cycles of action and then discussed a meta-cycle comprised of all four cycles. Following the failure of the vendor selection process, the team undertook a re-framing exercise to translate the learnings from the project into recommendations for next steps in the project and as a journal to share with future technology implementation project team members. This re-framing exercise serves as the co-created actionable knowledge for the project.

After extended discussion, the consensus recommendation from the team was to engage a consultant, with benefits anticipated at numerous steps along the way:

- Holistic assessment of business needs: a comprehensive analysis with benchmarking and vision of the direction of the industry; comparative analysis of organizational structures and impact on technology choices.
- Integration of options with larger PEPP technological vision: helping to extract clarity in the longer-term vision for the organization and its implications on the business's technology choices.
- Development of technical requirements: helping consistently bridge the business needs to technical specifications of a system.

- Mapping vendor landscape and optimal strategy (buy or build): the agendas and experiences of people driving technology decisions balanced by an external, agnostic party who can help better quantify costs and benefits.
- Vendor selection process and contract negotiations; leveraging the expertise of an independent third party to assure that the correct questions are asked and properly answered; and that the prevailing market norms (or better) are in place.
- Development, testing, and implementation processes: while our process did not progress this far, the team believed that project management expertise should guide these stages and would serve as an outside force ensuring compliance where some people might not respond to project demands from an internally led team.

This reflective exercise, with the consensus recommendations, was packaged and presented to the three Sponsors of the KMS project. It is helpful to revisit the literature to understand where these learnings reside in the scope of past research. The table below recreates the Chua and Lam (2005) matrix shared in the literature review table with the PEPP failure factors shown in a separate column. (See Table 28).

Table 28. Failure Factors and PEPP Actionable Knowledge.

	Failure Factors Chua and Lam (2005)	PEPP Identifed Issues	PEPP Actionable Knowledge
Technology	- Connectivity - Usability - Over-reliance - Maintenance	- Technological strategy (buy vs build) - Design / Technical system requirements	- Integration with organization's technical vision - Development of technical requirements
Culture	- Politics - Knowledge Sharing - Perceived Image - Management Support	- Targeted populations - KMS Team member engagement	
Content	- Coverage - Structure - Relevance and currency - Knowledge distillation	- Scope creep	
Project Management	- User involvement - Technical/business expertise - Conflict management - External consultants - Roll-out strategy - Project evaluation - Project cost	- Excluding consultants - Application testing parameters - Technical/business expertise	- Holistic assessment of business needs - Mapping of vendor landscape with aid of external consultant - Leverage consultants for vendor selction process and legal negotiation - Add project management expertise

You'll note that on PEPP's failure factors, I included the four action cycle areas of learnings and the three sponsor decisions related to i) buy versus build, ii) combining Investments and Legal, and iii) not using

consultants. Perhaps the single biggest message coming from the KMS team, in areas where we don't have expertise, was whether to use additional staff or consultants, and to add the resources to the team.

None of PEPP's failure factors are groundbreaking. The Chua and Lam (2005) failure factors and the IS Failures table in Appendix F (Dwivedi et al., 2019) attest to a litany of known reasons that technology implementations fail. Furthermore, while this KMS study takes place in a U.S. public pension plan, none of the failures listed are the exclusive domain of the public sector.

D.   Discussion

The KMS Team drafted the presentation laying out the causes of the failure of the vendor selection project and its proposed recommended next steps. The meeting with the project Sponsors was brief with not much consideration given to the KMS team recommendations. The two key outcomes from the Sponsors meeting were as follows:

i.   The Sponsors were in unanimous agreement to not share the reflective document updating progress with the Trustees due to its assessment of internal deficiencies. The Sponsors appeared uninterested in any of the learnings shared in the reflective exercise. They preferred to focus on the misrepresentations of the vendor and to say that staff is looking at alternatives.

ii.   The Sponsors were in total agreement that hiring an external consultant was not desirable. The objections seemed to be around incremental cost, a cumbersome approval process, questionable effectiveness, and undesirable trespass on the technology department's purview. In sum, they believed that the organization had the expertise in-house to figure it out. Furthermore, to go back to the Trustees with a request for more money to get a consultant was not palatable.

This aversion by management in bureaucratic organizations to utilize consultants was studied by Werr and Styhre (2002) who cited management's disfavor of consultants due to fear of projecting incompetence or failure. Progressive information era leaders are more embracing of contracting with external parties to leverage expertise that resides outside of the organization and to offload non-core competencies thereby maximizing productivity of their own teams who are focused on the highest value activities (Harris, 1997; Bahrami and Evans, 1997).

Lyso, Mjoen and Levin (2011), in looking at the shortcomings of action learning, found that the lack of transference of learnings to the organization was a deficiency of the theory. The outcome in this case is aligned with those findings. The reflections and recommendations of the KMS team seemed to be of no use to the Sponsors and thus did not benefit the organization.

The fact that the KMS Team's lessons were not transferred to the organization as a whole was disappointing. Greenwood and Levin (2007) assert that organizations fail to advance because they use a tiny piece of their collective knowledge. This is due to powerful elite controlling resources and the desire to maintain the bureaucratic status quo. In the case of PEPP, there was no incentive or mandate for the Sponsors to shed light on PEPP's deficiencies. Even so, Reason (2006) stated that sometimes action research is about creating tentative beginnings and planting seeds that eventually come to fruition.

In the prior section, I stated that the failure factors attending the PEPP KMS project were not unique to the public sector. Yet the subsequent turn of events did shed light on a new cultural factor for PEPP and

perhaps similarly situated entities: suboptimal decisions are made due to factors related to being a government entity and being subject to public policy and oversight. However, the decision to avoid consultants, because of feelings of inferiority or concern about value add, can happen anywhere.

The decision to avoid consultants because of bureaucratic process would be more common to public than private entities. For PEPP, undertaking a several month RFP process and adhering to a procurement policy may be considered taxing by the senior management team—and taxing on short-staffed departments. For a different project in Investments that I led, instead of getting one consultant approved to work with us on secondary transactions, we got a bench of three consultants approved by the BOT, with staff having discretion to engage any of the consultants, based on certain criteria. This construct has proven successful and could serve as a model fulfilling broader mandates.

The decision to avoid consultants perhaps reflects the trust issues between management and the BOT. But it could also be the shortcomings of individual leaders in the organization. However, a broader cultural issue is related to the avoidance of contentious, complex, or ambiguous discussions in the public and often political forum. In fairness, some of that attests to the diverse professional backgrounds of BOT members that necessitates presenting information such that a layperson can understand it. In any case, trust issues remain. One possible solution is to try to carve out more opportunities for dialog between the BOT and senior management in closed session meetings (to the extent that laws permit). Not having public audiences and live webcasts of meetings could lead to more authentic conversations and provide a forum to safely discuss more challenging topics.

The final two objections to adding a consultant are high cost (necessitating further BOT approval) and questionable benefit (value-add): these are valid concerns that require skillful negotiation, project scoping, and relationship management. I liken this discussion to a family taking a drive in the country (pre-GPS). The driver knows they are lost but refuses to pull over and ask for directions. I am tempted to add these factors to Table 28, given that they reflect my thinking and were not part of a participatory process--I decline to do so. Even so, public sector senior management decision-making avoidance would be an interesting area for future research.

E. Reflections

I will discuss in greater detail in Chapter VIII Reflections the loss of knowledge in the organization due to Sponsors' exercise of power. While not surprising, nonetheless this was disappointing to the team. The Sponsors were also quite adamant in the KMS Team not pointing fingers at themselves. There were no evident political repercussions. And perhaps it is most accurate to say not that the recommendations were rejected by the Sponsors, but that they were not interested in sharing that thinking with the Trustees, and certainly not in a public setting. Perhaps that art of management is controlling the narrative.

Not long after the seeming conclusion of the KMS project, COVID 19 exploded into a global pandemic, claiming thousands of lives, and profoundly altering human activity across the planet. Under the directive of the new PEPP CEO, the IT department rose to the occasion. In a matter of three days, remote access was enabled for all workers. Most files that had been stored on local servers were moved to servers into the Microsoft Cloud. Microsoft SharePoint and Teams licenses were activated or obtained and installed for all employees. The new, new CEO praised the hard work and dedication of the IT department.

While not all files were migrated to the cloud before the stay-at-home orders ended such activities, in these weeks of self-imposed quarantine, the nature of work for the staff underwent drastic change. Meetings with internal and external parties are now video conference calls, with notices integrated into Microsoft Calendar, invites through Microsoft Contacts. People collaborate drafting documents concurrently by leveraging Microsoft Office 365 products and SharePoint. Barely into this new operating reality, the culture of the organization is likely forever changed. The inescapable truth is that bureaucracy, hierarchy, silo-protection, fear, life-long employment, and cultural obstinance turned a three-day implementation process of existing, already-paid-for application licenses into a four-year ordeal. It took a global pandemic to propel PEPP into the teeth of the information age.

In the aftermath of the acute response to the COVID onset, the new CEO replaced the technology leadership at the firm. Consultants were hired to map out and assess the organization's technological needs as part of the process towards creating a holistic technological vision and pathway. A formal Project Management department was established. While the KMS team can take no credit for these outcomes, two of the three KMS Team Sponsors are highly regarded members of the CEO's executive team leading the organization.

The desire of senior management to avoid potentially contentious discussions in the boardroom spoke to the need to develop trust between the Board and senior managers enabling authentic discussions. To recognize that growth as an organization is the result of learning through a process of reflecting on negative experiences. 'Sunshine laws' were implemented to ensure that the business of public agencies was done in a transparent manner. Accordingly, a proposed recommendation to conduct some meetings in closed session providing a safer environment to discuss challenging topics would likely fail to satisfy the requirements, excluding the meeting from the sunshine laws. Board and senior management gravitate towards offsite events that are heavily scripted, with outsiders presenting material on agreed upon topics. The bureaucracy, autocracy, legal guideposts, and lifetime employment confound the full potential of PEPP attaining a learning culture.

While the tendencies of senior management to gloss over weaknesses and mistakes is not exclusive to public agencies, the public scrutiny in a glass bowl environment and the dynamic of politically elected and appointed board members add two elements that private industry is not subject to. This results in multiple agendas being articulated that serve political constituencies but may undermine a discussion that permits airing of all factors. This curtailment or derailment of discussion topics impedes progress towards sustainable satisfactory resolutions.

In this KMS case study, we saw senior management avoid such a public discourse opting instead for a deflection of any internal responsibility to the external vendor. This tactic served the needs of senior management as no culpatory discussion ensued at the Board meeting, but it robbed the broader organization of an opportunity to reflect on the drivers of failure and codify the learnings that might allow future projects to avoid similar fates. Furthermore, the immediate needs of the department in terms of consulting and project management expertise were swept aside.

Leaders forment organizational culture by modeling behavior. The Investments department analysts filter through a colossal amount of often ambiguous quantitative and qualitative data on investment managers, portfolio companies, financial performance, ESG, ODD, DEI, reference calls, and the marketplace. Following senior management's imprint, many analysts present in essence marketing

reports to sell their peers on the merits of an investment or viewpoint, downplaying risks or shielding negative data to avoid tough discussions that might lose votes or reflect poorly on process.

The challenges revealed through the AL process at PEPP related to technology adoption, Trustee-to-senior management relationships, and organizational culture point to potential next steps in the pension plan's journey. Consulting firms active in the public sector periodically share insights on their practice. The Boston Consulting Group (BCG) has a Center for Digital Government that helps government agencies embrace and adopt digital transformations. Deloitte's competing practice called Government Digital Transformation Services addresses issues related to AI, the Cloud, Cyber, and technology trends. Funston Advisory Services has a practice focused on public sector Governance Effectiveness Management that explores the roles and responsibilities of boards and staff autonomy. Korn Ferry's public sector consulting addresses organizational culture issues to attract and retain high performing talent.

A review of articles published over the past handful of years highlights several relevant themes. The outgoing California State Teachers Retirement System CEO, Jack Ehnes, indicated that their organization's learning culture was the key ingredient to success and that their Board's role was to understand that culture and support it (Jacobius, 2021). Rick Funston, CEO of Funston Advisory Services speaks to the bureaucracy, political nature, and fishbowl environment attending public pensions that impact the daily agenda (Steyer, 2022). Board governance plays a factor in pension plan investment performance. Good governance is determined by seven factors including professionalism within the organization, board composition, board engagement, staff representation, institutional knowledge, diligence in the governance process, and transparency. Interestingly, the researchers found that lack of transparency was an issue with two thirds of pension plans. (Merker and Peck, 2019.) Another board governance issue was identified as the inability to separate policy approval from policy implementation (Ilkiw, 2004). Pivoting forward, for PEPP and similarly situated pension plans, the challenges and opportunities for research are in board governance, clarifying roles and responsibilities to diminish bureaucracy, and building organizational cultures that promote transparency.

F.   Concluding Remarks

This research adds to an admittedly thin but well-received body of practitioner literature on knowledge management in the public sector. The action-oriented, mixed methods, case study of PEPP's failed KMS vendor selection process in a municipal government entity stands alongside the works of Adam, Riegel, and Koch (2013), Orenga-Rogla and Chalmeta (2019), Alazmi (2003), Dwivedi et al. (2019), and Chua and Lam (2005). The research provides relevant and rigorous practitioner findings that corroborate factors resulting in KMS implementation failure. Actionable knowledge is generated through a participative process and offered to the organization. The case study also provides insights into the rationale for the failure of actionable knowledge to be transferred to the organization. Accordingly, the research provides guidance to practitioners and further research ideas for researchers.

VIII. Reflections on the Journey

A. Introduction

This chapter relates my reflections on the journey undertaken with this material over the past few years with an eye towards my personal growth as well as reflections on PEPP organizational change. Topics to be discussed include:

- Research project design
- My development as an academic
- My development as a practitioner
- How the organization has changed
- Perspectives on power
- Next steps in the journey

The objective of this chapter is to dispassionately explore the research process from my point of view. This is an uncomfortable process for me as I cling to the image of a detached, impersonal researcher who projects a scientific, unassailable position. Revealing my mental state, shortcomings, and developmental process feels antithetical to that stance. Being a practitioner and academic conducting research on complicated problems inside your own organization is a messy undertaking. Through the course of sharing the research process, my own understanding of my research has profoundly expanded. This chapter explores and integrates the variety of research processes to hopefully create a complete picture.

B. Research Project Design

The fundamental issue to overcome was that the research problem was framed as an exploration of an era transition through the lens of a KMS vendor selection process in a public agency. A systematic literature review was undertaken and identified over 100 articles to validate the premise. Ancillary topics such as knowledge management, technology adoption, and public agency change management were given short shrift in the literature review.

Even so, the methods that were utilized were all focused on the vendor selection process. The interviews and survey sought to understand what change was being pursued by the Investments department through the KMS application. That knowledge helped inform the discourse and vendor selection process in the action cycles. The mission of the action cycles was to identify and select the vendor that best promised to deliver the change being sought.

Undeterred by the focus of the methodology that was implemented, my earlier analysis of data gravitated towards highlighting data and extracting voices and themes that supported the era transition premise. My self-congratulatory sentiment was short-lived as the flawed design and researcher biases were exposed during the Viva examination. Granted a year to reflect upon and modify the dissertation, it became clear that once the era transition overlay was removed, the remaining core pieces of the research were sound and that an action-oriented research project generated actionable knowledge. The binding concept behind the research was always an exploration of obstacles to change in a technology adoption process in a public agency.

While it has been an arduous process unpacking and then repackaging and fortifying the document, profound learnings are imbedded as I go forth. First, the haste to get a project launched should never

shortchange the design phase. Better spending the time crafting a great blueprint than to be near the end of construction and come to realize that your plan was flawed. Second, you want to choose a project that you are passionate about that touches wicked organizational problems. But with that passion comes biases as to why you believe the problem exists. The challenge is to impartially collect and analyze the data and not allow your biases to elevate the data that supports your claim. Finally, small contributions evidencing rigor and relevance outweigh loosely supported grandiose statements.

C.   Development as an Inside Researcher

My position is a 60-year-old, black Harvard graduate in an individual contributor role in a governmental agency who had already been passed over for promotion by much younger colleagues. My pursuit of the DBA and its accompanying insider research felt accepted and supported if not fully embraced. My retirement and a pension stand on the near-term horizon, followed by a likely transition to part-time teaching and consulting. The continued pushing of the envelope personally and professionally stood in stark contrast to many peers in my age category who sometimes gave the impression of dialing it in and not exerting themselves. This attitude was consistent with cultural complacency with the status quo.

As mentioned earlier, I was anticipating eight to twelve respondents, hoping I would attain a critical mass. I was delighted that eighteen people volunteered, resulting in a more robust data set that cut across many demographic categories. The drivers to participation included senior management support for the KMS initiative, individuals supporting anyone pursuing academic goals, and curiosity. Overall, I felt that getting 50 percent of the department was an affirmation of respect for me as an individual. I did not feel comfortable asking people who did not volunteer what their reasoning was. That seemed to be contrary to the spirit of freely allowing people to participate or not. Despite my own curiosity, failure to volunteer should not result in repercussions or loss of friendship. One person who eventually volunteered expressed that their delay was due to a sense of inadequacy. I understood that most people were extremely busy, and the interview would be one less thing they needed to deal with.

The willingness of the KMS Team to participate in the action learning cycles was rewarding. The team was a pre-established work group from multiple departments, and, given my role, I did not attempt to migrate it to a formal action research group. Nevertheless, the team welcomed the facilitation and a structure that allowed us to ponder and confront issues, get everyone's viewpoints on the table, then craft solutions that worked for everyone, and subsequently check in on their progress and results. Circulating a draft of the meeting notes also built trust, as, on numerous occasions, team members reached out to clarify their remarks. I flourished in the practice of using the framework to guide the discussion but not the outcome.

D.   Researcher Perspectives

As a novice researcher, I opted for safe and theoretically unassailable, but also pragmatic, choices when confronted with divergent paths. So as not to bias the research, anybody who volunteered was included in the study. Final composition of the participant group happened to mirror the make-up of the department by tenure, gender, and level. This enabled me to proceed with the numbers obtained, and I did not have to adjust due to over or under-weighted sub-populations. It also simplified the methodology discussion on sampling technique.

Another aspect of being a practitioner-academic doing insider research is the potential of being deemed subversive. This KMS study, and the likely adoption of innovative technology was most threatening to

older, imbedded managers who also had the most power in the department. In writing descriptions of clear dysfunction and breakdowns—Trustees terminated the CEO, sponsors appeared averse to admitting shortcomings—how deeply do I want to delve into that in a document that might be read by outsiders? Earlier versions of the dissertation cited public documents and news stories. And yet, is it so integral to the dissertation as to reveal the organization and real individuals? The organization already has a high profile. In the unlikely event of a news article appearing, related to findings in this dissertation, it would certainly have negative repercussions.

The only person during the interview process that I was a little intimidated by was the division head. His interview was likely the shortest. He answered all questions dutifully but clearly had other matters to attend to. Even probes after initial questions were sincere and concise, but he seemed content to be able to power through the interview in about fifteen minutes.

E. Research Process

Several aspects of the research process warrant discussion. The Lorenzon and Pilotti (2008) categorization that mapped features to strategies was an overlay applied after the fact. If it had been integrated the questionnaire was designed, it would likely have led to a different set of survey questions. At the least, a better balance of questions might have helped to assess Business Intelligence, Technology Integration, and Systems Automation. It provided a different lens to categorize the functionality being contemplated. But ultimately the potency was diluted given the small number of features mapped to the strategies.

The survey questions captured all the functional categories evaluated by the software magazine on KMS systems. It felt like an objective approach to undertake the analysis where I was not picking and choosing which functionality to include. We ultimately also used the same categories on our evaluations to rank and compare the vendors. So, the rationale seemed justified. Once underway, it became clear that sixteen survey questions (really thirty-two as each one needed to be responded to twice) was a bit draining for the subjects. Furthermore, the nuances and overlaps between several of them were confusing. I did have examples to help clarify functionality and potential uses. But my goal was to let people respond with as little guidance as possible, basically diminishing the possibility that I might lead the participant towards answers they thought I wanted to hear.

The one change that I did make quickly, given how long the surveys were already feeling, was to define management as the asset class heads. There were a few analysts who had other analysts reporting to them, which could theoretically give them three columns of questions to complete (e.g., 'how does the functionality effect your job, your managers, and your direct report's?') But these mid-level analysts are primarily still working as analysts. After one such interview, I solidified the level classifications.

I used two recording devices (iPhone and laptop) which proved useful as the iPhone recordings for two sessions had issues. The voice files were uploaded to a service called Wreally, which was helpful. Even so, I subsequently listened to the tapes, editing the responses to ensure accuracy. Also extracting my questions such that all that remained was the language of the respondents. Finally, whether termed pragmatic, practical, or just the simplest and least contestable approach for a new researcher, I chose going with a grounded approach for the qualitative content analysis of the respondents' content.

F.   Role of Power

As I reviewed notes, documents, and meeting minutes and reflect on the exercise of power, numerous instances became evident:

- The BOT and Project Sponsors (heads of the three departments) commissioned the project, affirmed the team composition, and signed off on the project charter.
- The IT department head frequently missed meetings, ignored requests, and clogged progress.
- A new CEO of PEPP embraced the project. Her periodic meetings heightened accountability and ensured the IT Head's attendance.
- The KMS Team was empowered to adopt a vendor review process and make recommendations which had to be approved by the Project Sponsors.
- After the failure of the KMS project, and rejection of the chosen vendor, the Project Sponsors (in a sense-making capacity) discarded the KMS Team findings and crafted a message laying the blame on the vendor, deflecting any possible criticism on PEPP.
- My limited power as a mid-level officer at PEPP meant that I did not lead the KMS Team as a formal Action Research group, but instead adopted a more docile approach

The power to commission and oversee the KMS project was driven by statutory regulation based on spending authorizations. In a hierarchical organization, especially subject to public scrutiny, systems and controls on expenditures, tied to levels, is to be expected. This structure dictated what powers the BOT, sponsors, and KMS Team could exercise in advancing a KMS solution.

The IT Head's displays of power frustrated the KMS Team and often infuriated the other Project Sponsors. Yet the organization was captive to the rule of his dominion. Years of delay to the KMS project were tied to an unclear technological vision for the organization combined with an understaffed department perceived by many to lack requisite expertise.

I should also mention that the new CEO referred to above that was highly supportive of the KMS initiative was also terminated during the project. There were two areas where I felt her impact on the project. First, her support was integral to removing certain roadblocks. Second, she insisted on designating a project manager for the KMS project but seemed unable to understand that we didn't have those skills on the team. Ultimately, a power struggle at the BOT level led to a highly publicized battle and her speedy exit. Even so, the facts of the case were discussed in closed session. I claim no insights into the drivers of the decision.

The sensemaking demonstration after the failure of the selection process was disappointing but not unexpected. In reviewing the document with a co-creator, we joked about which portions would get deleted before advancing to the BOT. The aversion to public displays of negative self-reflection was strongly inculcated in the culture. The more politically astute and ascendant staff members package information to reflect well on the department. Can an organization or individual learn if unwilling to confront deficiencies? What I am not privy to (given my station) is whether the findings were discussed by the sponsors and senior management in private settings sparking changes later.

G.   How the Organization Changed

Not long after the seeming conclusion of this case study, the COVID 19 virus exploded into a global pandemic claiming thousands of lives, profoundly altering human activity across the planet. Under the

directive of the new PEPP CEO, the IT department rose to the occasion. In a matter of three days, remote access was enabled for all workers. Most files that had been stored on local servers were moved to servers into the Microsoft Cloud. Microsoft SharePoint and Teams licenses were activated or obtained and installed for all employees. The new, new CEO praised the hard work and dedication of the IT department.

While not all files were migrated to the cloud before the stay-at-home orders ended such activities, in those weeks of self-imposed quarantine, the nature of work for the staff had undergone drastic change. Meetings with internal and external parties are now video conference calls, with notices integrated into Microsoft Calendar, invites through Microsoft Contacts. People collaborate drafting documents concurrently by leveraging Microsoft Office 365 products and SharePoint. Barely into this new operating reality, the culture of the organization likely changed forever. The inescapable truth is that bureaucracy, hierarchy, silo-protection, fear, life-long employment, and cultural obstinance made a four-year ordeal out of what (thanks to a pandemic) turned out to be a three-day implementation process of existing, already-paid-for software licenses and permitting cloud access to the server.

In the aftermath of the acute response to the COVID onset, the new CEO replaced the technology leadership at the firm. Consultants were hired to map out and assess the organization's technological needs as part of the process towards creating a holistic technological vision and pathway. A formal Project Management department was established. Many of the recommendations from the action meta-cycle findings were ultimately implemented in the organization. While the KMS Team can take no credit for these outcomes, two of the three sponsors are highly regarded members of the CEO's executive team leading the organization.

H.   How I Changed

The KMS project failed in its goal of selecting and getting approved a vendor to meet the needs of two departments. This failure carried no evident ramifications. Even so, as the project lead for Investments, it certainly did nothing to advance my career. One outcome from the project continues to resonate and impact my practice related to the curation of information.

As discussed, the Project Sponsors declination of the KMS Team recommendations, in favor of a narrative that blamed the vendor, reinforced in my mind a cultural bias towards curating information to create a positive narrative that will foster political success in the organization. And this is probably not unique to PEPP or to public agencies. Yet how can you hope to succeed if you're unwilling to confront the causes of failure? My response has been to embrace reports and analyses, even if they don't make me look good, and share them with the team. People tend to bristle if it makes *them* look bad, but they are okay if you're making *yourself* look bad. As an example, I recently shared an analysis I conducted that showed several funds that I had underwritten performed poorly on a risk-adjusted return basis mostly due to foreign exchange depreciation. But it did beg the question, "are we getting compensated for risk going overseas?" A colleague approached me afterward and said she would have never shown that report if she were me. The key to success is to find data that makes you look good.

This mentality is also evident in fund recommendations from my peers that parrot marketing materials designed to sell the investment to the team, which always mitigating any admitted weaknesses with many positive qualities. I take a different path, listing the several risks and acknowledging ambiguity. My

colleagues are content to vote no on my proposals. Understanding the cultural context, I think it's important to ask tough questions, even of yourself, and have a public discourse,

I.   Dissemination Process

The process of extracting the era-transition discourse and clarifying the methods used and their integration permitted me an opportunity to re-think the role of quantitative data in the thesis. I held fast to a notion that the use of quantitative methods necessarily propelled the research into the mixed methods category. For both the survey data and the qualitative content analysis data, that led me to undertaking detailed analysis at micro levels to unearth patterns in the data. But extrapolating significance from a pool of eighteen respondents based on two administrative assistants, or three managers defied logic. The quantitative data, while adhering to sound collection techniques, nevertheless served to inform qualitative aspects of the case. The numerical survey data rating utility of features served as a mechanism for respondents to clarify the expected impact the feature would have on their jobs. The counts of different themes helped to identify clusters of voices.

The resolution for me came in discarding any notions of a positivist mindset for this research. There are no claims of scientific validity based on numerical data. This is a constructivist qualitative research project that uses mixed methods. There is no philosophical incompatibility.

Part of the maturation process for a researcher is determining, from the plethora of information captured, what needs to be included in the final publication based on the audience. That does lead into another question, "why should anyone care about this research?"

J.   Next Steps in the Journey

I was recently talking to an industry colleague and mentor of fifteen years who is a partner at a leading private equity firm. When I told him about the dissertation topic, he was incredibly supportive. Any research that can help pensions make better decisions and manage change should be widely published. His firm sponsors a podcast that hosts Nobel laureates and publishes research relevant to management firms, investors, and companies. He connected me with the leader of that organization, and I look forward to more discussions in the coming months. But the conversation took me back to the first question that launched the KMS research project. "Why is it so hard to make change in public organizations?" To the extent that this research sheds light on some of those causes, thereby helping practitioners and academics, then the undertaking would be proven relevant and that would be a great reward for the effort undertaken.

I was also heartened by discovering the body of literature that this research belongs a part of. Practitioner research in the public sector forms a small cohort. That the KMS vendor selection process failed and there is now another case study with rich detail from an insider seems an incredibly valuable addition to the corpus. The research validates many earlier studies, provides nuanced understanding of motives, and forges new ground. The opportunities to package that knowledge and assist other practitioners in their change management activities would be a worthwhile undertaking.

Should the research meet the requirements of the Committee, these opportunities would allow me to well-represent the research and the University of Liverpool in the years ahead.

IX.   Conclusion

The impetus for this research was a simple question, "How is it that we can manage $50 billion but my web browser is three generations old and doesn't really work anymore? Why is change so hard?" With the launch of the KMS project, an opportunity presented itself to explore the change process in my organization. What is it that people are aiming to change? What are the impediments to that change?

As a member of the team assembled to lead the KMS vendor selection process, I acted as an inside researcher integrating action-oriented research methods with fundamental managerial research methods of surveys and interviews to explore change.

An iterative, albeit circuitous, literature review ultimately focused on the three pillars of the case study: knowledge management, public sector, and an emphasis on practitioner research. This literature informed methodology, data collection and interpretation, and ultimately findings.

The participative reflective sessions with the KMS Team generated several findings related to why the vendor selection process ultimately failed:

- Team member constitution and engagement were not sustained,
- Requisite technical and project management skill sets were lacking,
- The application testing environment and process proved inadequate,
- Project scope widened to address broad array of unmet needs.

In revisiting the literature, I learned that as many as 80 percent of KMS implementations fail to achieve their objectives, and that the drivers of PEPP's failure were not unique for KMS or broader IS projects. The list of failure factors is long, generally falling into one of three stages (planning, implementation, integration) and one of four areas (technology, culture, content, project management). Given the dearth of public sector practitioner research on knowledge management, this paper may be a contribution to the body of knowledge, yet one cannot conclude that PEPP's challenges were a function of being a government agency.

The participatory reflective exercises generated actionable knowledge in the form of concrete recommendations that were presented to the senior management team that sponsored the project. The recommendations included:

- A holistic assessment of business needs,
- Integration of KMS within the larger technological vision (that needed to be developed),
- Development of technical requirements,
- A mapping of the vendor landscape with a cost benefit analysis (to include build/buy discussion),
- Leveraging expertise of consultant in vendor selection process and legal negotiations, and
- Bring aboard project management expertise for development/testing/implementation phases.

The KMS Team's message was to bring aboard consultant expertise that was not inside the organization. The project Sponsors rejected the recommendations, opting to avoid bureaucracy related to hiring consultants, the high costs with unclear value-add (especially as consultants' mandates expand), and the appearance of a department lacking technical proficiency. The project Sponsors' exercise of power had also constrained the team in other areas:

- Mandating that a solution satisfy both the Investments and Legal division;
- Determining in advance that a third-party off-the-shelf solution, not needing internal IT support, must prevail; and
- Requiring use of internal resources without the guidance of a consultant.

While the reasons listed for the KMS vendor selection failure were not unique to the public sector, we did see evidence during the case of avoidance decision-making. I would argue that PEPP leaders made sub-optimal decisions to avoid the bureaucracy attending vendor purchases, engaging in potentially contentious debate, or being subject to performance scrutiny in the public arena. As a mid-level role employee, I am not normally privy to the decision-making rationale of senior management, yet in the very quick rejection of the KMS Team's recommendations, the reasoning was articulated in front of the group. These insights invite a research quandary of sorts: how do you research public sector leadership decisions to not do something? In any event, I put forth a few recommendations to alleviate the friction between public sector senior management and their governing bodies and policies:

- Instead of hiring one consultant at a time through an RFP process, approve a bench of consultants and give management discretion to engage tactically within certain parameters.
- Pursue opportunities to engage in authentic dialog in closed session.

Yogi Berra once said, "If you don't know where you're going, you might end up somewhere else." For the PEPP's of the world, if we're unable or unwilling to stop the car and ask for directions, that could be us. As a postscript, in many ways, the pandemic forced PEPP's hand. We're working from home, collaborating on Microsoft SharePoint and Teams applications, meeting virtually, our files in the cloud. Our new CEO replaced the technology leadership, brought aboard consultants, and is building out a project management office. This KMS research project engages the rigor of academic research to add to the body of knowledge with relevance to practice, resulting in actionable knowledge.

X.　References

Adam, S., Riegel, N. and Koch, M. (2013) 'A Methodological Framework with Lessons Learned for Introducing Business Process Management', in Nurcan et al. (eds.) *Enterprise, Business-Process and Information Systems Modeling*. Heidelberg, Dordrecht, London, New York: Springer, pp. 78-93.

Alavi, M. A. and Leidner, D. E. (2001) 'Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues', *MIS Quarterly,* 25(1), pp. 107-136.

Alazmi, A. M. (2003) 'An empirical study of IT based knowledge management systems implementation: a comparative study with the Kuwait and the UK public sectors and proposed model for best practice knowledge management.' PhD Thesis. University of Bradford. Available at: https://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.492678 (Accessed 3 January 2023).

Aleksic, V. S., Zivkovic, S. and Boskovic, A. (2015) 'Organizational Change Resistance: Experience from Public Sector', *Journal of Social and Economic Development*, 2(1), pp. 109-24.

Alvesson, M. and Karreman, D. (2001) Odd Couple: Making Sense of the Curious Concept of Knowledge Management, *Journal of Management Studies*, 38(7), pp. 995-1018.

Andriani, M., Samadhi, A., Siswanto, J. and Suryadi, K. (2019) 'Knowledge management strategy: an organisational development approach', *Business Process Management Journal,* 25(7), pp. 1474-1490.

Antonacopoulou, E. P. (2006) 'Actionable Knowledge', in Clegg, S. and Bailey, J. (eds.) *International Encyclopaedia of Organization Studies*, pp. 14–17. London: SAG.

Applebaum, S. H., Habashy, S., Malo, J-L. and Shafiq, H. (2012) 'Back to the future: revisiting Kotter's 1996 change model', *Journal of Management Development*, 31(8), pp. 764-782.

Attwood, M. (2007) 'Challenging from the margins into the mainstream – improving renal services in a collaborative and entrepreneurial spirit', *Action Learning: Research & Practice*, 4(2), pp. 191-198.

Awad, E.M and Ghaziri, H.M. (2010) *Knowledge Management*. New Jersey: Person Education Inc.

Bahrami, H. and Evans, S. (1997) 'Human Resource Leadership in Knowledge-Based Entities: Shaping the Context of Work', *Human Resource Management*, 36(1), pp. 23-28.

Bandyopadhyay, R. (2015) 'Qualitative Research and Its Application in Organizational Management and Social Research', In: Hedge, D.S. (Ed.) *Essays on Research Methodology.* New Delhi: Springer India, pp. 123-158.

Bishop, F. L. (2015) 'Using mixed methods research designs in health psychology: An illustrated discussion from a pragmatist perspective', *British Journal of Health Psychology',* 20(1), 5-20.

Brockner, J. and James, E.H. (2008) 'Toward an understanding of when executives see crisis as opportunity', *Journal of Applied Behavioral Science*, 44(1), pp. 94–115.

Burnes, B. (2004) 'Kurt Lewin and the Planned Approach to Change: A Re-appraisal', *Journal of Management Studies,* 41(6), pp. 977-1002.

Cameron, K. S. and Quinn, R. E. (2011) *Diagnosing and Changing Organizational Culture – Based on the Compating Values Framework*, San Francisco: Jossey-Bass.

Castro, F. G., Kellison, J. G., Boyd, S. J. and Kopak, A. (2010) 'A Methodology for Conducting Integrative Mixed Methods Research and Data Analyses', *Journal of Mixed Methods Research,* 4(4), pp. 342-360.

Cavaleri, S. (2008) 'Are learning organizations pragmatic?', *The Learning Organization*, 15(6), pp. 474-485.

Chua, A. and Lam, W. (2005) 'Why KM projects fail: a multi-case analysis', *Journal of Knowledge Management*, 9(3), pp. 6–17.

Coakes, E., Bradburn, A. and Sugden, G. (2004) 'Managing and leveraging knowledge for organisational advantange', *Knowledge Management Research and Practice*, 2(2), pp. 118-128.

Coghlan, D. (2009) 'Toward a Philosophy of Clinical Inquiry/Research', *Journal of Applied Behavioral Science'*, 45(1), pp. 106-121.

Coghlan, D. and Brannick, T. (2014) *Doing Action Research In Your Own Organization.* 4th edn. London: Sage Publications.

Common, R. (2004) 'Organisational learning in a political environment' *Policy Studies*, 25(1), pp. 35-49.

Coram, R. and Burners, B. (2001) 'Managing organisational change in the public sector - Lessons from the privatisation of the Property Service Agency', *International Journal of Public Sector Management*, 14(2), pp. 94-110.

Cox, H., Mowatt, S. and Prevezer, M. (2002) 'The firm in the Information Age: organizational responses to technological change in the processed foods sector', *Industrial & Corporate Change*, 11(1), pp. 135-158.

Creswell, J. W. (2013) *Qualitative Inquiry & Research Design – Choosing Among Five Approaches.* 3rd edn. Los Angeles: Sage Publications.

Darwish, R. (2019) *The Missing link: Business Models Lock-in in Sociotechnical Transitions.* PhD thesis. KTH, School of Industrial Engineering and Management. Available at: http://www.diva-portal.org/smash/record.jsf?pid=diva2:1305099 (Accessed 7 March 2020).

Davidson, W. and Davis, S. M. (1990) 'Management and Organization Principles for the Information Economy', *Human Resource Management*, 29(4), pp. 365-383.

DeLone, W. H. and McLean, E. R. (2003) 'The DeLone and McLean Model of Information Systems Success: A Ten-Year Update', *Journal of Management Information Systems*, 19(4), pp. 9-30.

Dikotla, M. A. (2021) 'Remodeling public sector knowledge management system using key knowledge management processes', *Collection and Curation*, 40(4), pp. 158-165.

Dwivedi, Y. K., Wastell, D., Laumer, S., Henriksen, H., Myers, M. D., Bunker, D., Elbanna, A., Ravishankar, M. N. and Srivastava, S. C. (2015) 'Research on information systems failures and successes: status update and future directions', *Information Systems Frontiers*, 17(10), pp. 143-157.

Easterby-Smith, M., Thorpe, R. and Jackson, P. (2012) *Management Research*. Los Angeles: Sage Publications Ltd.

Ehin, C. (2008) 'Unmanaging Knowledge Workers', *Journal of Intellectual Capital*, 9(3), pp. 337-350.

Emerson, R. (2004) 'Working with Key Incidents', in Seale, C., Gobo, G., Gubrium, J. F., and Silverman, D. (eds) *Qualitative Research Practice.* London: Sage Publications, pp. 427-442.

Federal Reserve System (2019) Financial Accounts of the United States-Z.1 l.120.b States and Local Government Employee Retirement Funds Defined Benefit Plans. Available at: https://www.federalreserve.gov/releases/z1/20191212/html/l120b.htm (Accessed: 16 April 2020).

Feilzer, M. Y. (2010) 'Doing Mixed Methods Research Pragmatically: Implications for the Rediscovery of Pragmatism as a Research Paradigm', *Journal of Mixed Methods Research,* 4(1), pp. 6-16.

Fernandez I. B. and Sabherwal, R. (2010) *Knowledge Management: System and Processes*. England: M.E. Sharpe.

Finnegan, D.J. and Currie, W. L. (2010) 'A Multi-layered Approach to CRM Implementation: An Integration Perspective', *European Management Journal,* 28, pp. 153-167.

Fogarty, D. J. (2016) 'The Evolution of Competing Using Analytics', *Research in Economics and Management, 1*(2), pp. 103-112.

Fowler, F. and Mangione, T. (1986) 'Reducing Interviewer Effects on Health Survey Data: Executive Summary', *National Center for Health Research and Healthcare Technology Assessment*, pp. 1-22. Available at: https://eric.ed.gov/?id=ED271437.

Fowler, J. W. and Rose, O. (2004) 'Grand Challenges in Modeling and Simulation of Complex Manufacturing IT', *Simulation*, 80(9), pp. 469-476.

Furlong, S. and Al-Karaghouli, W. (2009) 'Delivering professional projects - The effectiveness of project management in transformational e-government initiatives', *Transforming Government: People, Process and Policy*, 4(1), pp. 73-94.

Gabrynowicz, J. I. (1992) 'Bringing space policy into the Information Age', *Space Policy*, pp. 167-175.

Galbreath, J. (2002) 'Success in the Relationship Age: building quality relationship assets for market value creation', *TQM Magazine*, 14(1), pp. 8-24.

Galli, B. J. (2018) 'Change Management Models: A Comparative Analysis and Concerns', *IEEE Engineering Management Review*, 46(3), pp. 124-132.

Gartner Group (2007) 'Why Knowledge Management Is No Longer on the Gartner Hype Cycles'. Available at: https://www.gartner.com/en/documents/517706 (Accessed: 30 October 2022).

Gentle, P. (2010) 'The influence on an action learning set of affective and organizational cultural factors', *Action Learning: Research and Practice*, 7(1), pp. 17-28.

George, R., Massey, A., King, A. and Roddis, E. (2019) 'A New Mindset for Public Sector Leadership'. Available at: https://www2.deloitte.com/global/en/insights/industry/public-sector/public-sector-leadership-changing-mindset.html (Accessed 31 December 2020).

Ghiara, V. (2020) 'Disambiguating the Role of Paradigms in Mixed Methods Research', *Journal of Mixed Methods Research,* 14(1), pp. 11-25.

Gourova, E. and Toteva, K. (2014) 'Design of Knowledge Management Systems', *Proceedings of the 8th Nordic Conference on Pattern Languages of Programs*, Vihula, Estonia, April. doi: 10.1145/2676680.2676685.

Greenwood, D. J. and Levin, M. (2007) *Introduction to Action Research: Social Research for Social Change.* 2nd edn. Thousand Oaks: Sage Publications.

Guan, M., Shan, J., Ming, W., Hui, Z. and Chen, Q. (2012) 'Design and Implement of Enterprise Knowledge Management System', *Proceedings of International Conference on Information Technology and Management Science,* Chongqing, China, 25-27 June. doi: 10.1007/978-3-642-34910-2_12.

Guetterman, T. C., Molina-Azorin, J. F. and Fetters, M. D. (2020) 'Virtual Special Issue on "Integration in Mixed Methods Research"', *Journal of Mixed Methods Research,* 14(4), pp. 430-435.

Gunn, B. (1995) 'The paradigm shift in university management', *International Journal of Educational Management*, 9(1), pp. 28-40.

Harris, M. C. (1997) 'Leadership Will Prevail', *Quality Progress*, 30(9), pp. 83-88.

Holmgren, M. (2018) 'Partisan Politics and Institutional Choice in Public Bureaucracies: Evidence from Sweden', *Journal of Public Administration Research and Theory,* 28(3), pp. 355-370.

http://www.knowledge-management-tools.net/knowledge-management-systems.php (2018) (Accessed: 30 June 2022).

https://techterms.com/definition/ict#:~:text=Stands%20for%20%22Information%20and%20Communication%20Technologies.%22%20ICT%20refers,wireless%20networks%2C%20cell%20phones%2C%20and%20other%20communication%20mediums, (2010) Accessed: 30 June 2022).

Huber, G.P. (2001) 'Transfer of knowledge in Knowledge Management Systems: unexplored issues and suggested studies', *European Journal of Information Systems,* 10(2), pp. 72–79.

Hur, J. Y., Cho, W., Lee, G, and Bickerton, S. H. (2019) 'The "Smart Work" Myth: How Bureaucratic Inertia and Workplace Culture Stymied Digital Transformation in the Relocation of South Korea's Capital', *Asian Studies Review',* 43(4), pp. 691-709.

Ilkiw, J. H. (2004) 'Investment Policies, Processes and Problems in U.S. Public Sector Pension Plans: Some Observations and Solutions from a Practitioner' in World Bank Staff and Palacios, R. J. (eds), Public Pension Fund Management: Governance, Accountability, and Investment Policies, World Bank Publications: Washington, pp. 211-240. Available from: ProQuest Ebook Central (Accessed: 22 June 2023).

Jacobius, A. (2021) 'CalSTRS' Ehnes looks back on 20 years of challenges; CEO delayed planned retirement last year to help during pandemic.', Pensions & Investments, 49(9), pp. 0003.

Jafari, M., Fathian, M., Akhavan, P. and Hosnavi, R. (2007) 'Exploring KM features and learning in Iranian SMEs', *VINE*, 37(2), pp. 207-218.

Joe, C., Yoong, P. and Patel, K. (2015) 'Knowledge loss when older experts leave knowledge-intensive organisations', *Journal of Knowledge Management*, 17(6), pp. 913-927.

Johnson-Lenz, P. and Johnson-Lenz, T. (1990) 'Rhythms, Boundaries, and Containers: Creative Dynamics of Asynchronous Group Life', *Awakening Technology*. Available at: http://nexus.awakentech.com:8080/at/awaken1.nsf/UNIDs/CFB70C1957A686E98825654000699E1B?OpenDocument (Accessed: 25 December 2022).

Jones, M. and Vines, R. (2016) 'Cultivating capability: The socio-technical challenges of integrating approaches to records and knowledge management', *Records Management Journal*, 26(3), pp. 242-258.

Kalpic, B. and Bernus, P. (2006) 'Business process modeling through the knowledge management perspective', *Journal of Knowledge Management*, 10(3), pp. 40-56.

Kennedy, M. M. (1998) 'Revealing questions', *Across the Board*, 35(10), pp. 1-4.

Konetski, L. C. (1970) 'Instruction on Questioning', *43rd Annual Meeting of the National Association of Research in Science Teaching*, Minneapolis, MN, March 5-9. Available at: https://eric.ed.gov/contentdelivery/servlet/ERICServlet?accno=ED040040 (Accessed: 7 March 2020).

Korn Ferry Insights (2022) Available at: https://www.kornferry.com/insights/featured-topics/organizational-transformation/4-elements-of-organizational-culture-transformation (Accessed: 11 November 2022).

Kozloski, R. (2018) 'Largest U.S. retirement funds set record at $10.3 trillion in assets', *Pensions&Investments*, 5 February. Available at: https://www.pionline.com/article/20180205/PRINT/180209922/largest-u-s-retirement-funds-set-record-at-10-3-trillion-in-assets (Accessed: 16 April 2020).

Krefting, L. (1991) 'Rigor in Qualitative Research: The Assessment of Trustworthiness', *American Journal of Occupational Therapy*, 45, pp. 214-222.

Kuo, R.-Z., Lai, M.-F. and Lee, G.-G. (2011) 'The impact of empowering leadership for KMS adoption', *Management Decision*, 49(7), pp. 1120-1140.

Lam, L., Nguyen, P., Le, N. and Tran, K. (2021) 'The relation among organizational culture, knowledge management, and innovation capability: Its implication for open innovation', *Journal of Open Innovation: Technology, Market, and Complexity,* 7(1). doi: 10.3390/joitmc7010066.

Laihonen, H. and Mantyla, S. (2018) 'Strategic knowledge management and evolving local government', *Journal of Knowledge Management*, 22(1), pp. doi: 10.1108/JKM-06-2017-0232.

Lee, R.W., Yip, J.Y. and Shek, V.W. (2021) Knowledge Elicitation for Unstructured Business Process, in *Knowledge Risk and its Mitigation: Practices and Cases.* Bingley: Emerald Publishing, pp. 105-124.

Levallet, N. and Chan, Y. E. (2019) 'Organizational knowledge retention and knowledge loss', *Journal of Knowledge Management*, 23(1), pp. 176-199.

Levin, M. (2003) 'Action Research and the Research Community', *Concepts and Transformations,* 8(3), pp. 275-280.

Lewis, J. (2014) 'ADIIEA: An Organizational Learning Model for Business Management and Innovation', *Electronic Journal of Knowledge Management*, 12(2), pp. 98-107.

Lianga, Y., Qia, G., Weia, K. and Chena, J. (2017) 'Exploring the determinant and influence mechanism of e-Government cloud adoption in government agencies in China', *Government Informational Quarterly*, 34, pp. 481-495.

Lim, A. and Chai, D. S. (2015) 'Action Research Applied with Two Single Case Studies', in Strang, K. D. (ed.) *The Palgrave Handbook of Research Design in Business and Management*. New York: Palgrave MacMillan, pp. 375-392.

Lincoln Y. and Guba E. (1985) *Naturalistic Enquiry*. Beverly Hills: Sage.

Linderman, K., Schroeder, R. G., Zaher, S., Liedtke, C. and Choo, A. (2004) 'Integrating quality management practices with knowledge creation processes', *Journal of Operations Management*, 22(6), pp. 589-607.

Lipscomb, M. (2011) 'Critical realism and realist pragmatism in mixed methods research: the problematics of event identity and abductive inference', Proceedings of American Educational Research Association conference, New Orleans, LA, 8-12 April. Available at: http://eprints.uwe.ac.uk/19304/ (Accessed: 29 July 2020).

Lorenzon, A. and Pilotti, L. (2008) 'The Role of Social and Cultural Contexts for the Implementation of CRM Projects', *The Icfai University Journal of Knowledge Management*, 6(6), pp. 79-96.

Lyso, I. H., Mjoen, K. and Levin, M. (2011) 'Using collaborative action learning projects to increase the impact of management development', *International Journal of Training and Development*, 15(3), pp. 210-224.

Malhotra, Y. (1996), *Organizational learning and learning organizations: an overview.* Available at: http://brint.com/papers/orglrng.htm (Accessed: 27 December 2020).

Massaro, M., Dumay, J. and Garlatti, A. (2015) 'Public sector knowledge management: a structured literature review', *Journal of Knowledge Management*, 19(3), pp. 530-558. doi: 10.1108/JKM-11-2014-0466.

McAdams, D. P., Jackson, R. J. and Kirshnit, C. (1984) 'Looking, laughing, and smiling in dyads as a function of intimacy motivation and reciprocity', *Journal of Personality*, 52(3), pp. 261-273.

McDonald, D. (2010) 'Survey Research: Questionnaires and Interviews'*, Salem Health: Psychology and Mental Health, 5,* pp. 1929-1932.

McDonald, P. (2011) 'It's time for management version 20: Six forces redefining the future of modern management', *Futures*, 43, pp. 797-808.

McKay, J. and Marshall, P. (2001) 'The dual imperatives of action research', *Information Technology & People,* 14(1), pp. 46-59.

McLagan, P. (2000) 'Portfolio Thinking', *Training and Development*, 54(2), pp. 44-51.

Merker, C.K., Peck, S.W. (2019). 'Good Governance' in The Trustee Governance Guide. Palgrave Macmillan: Cham, pp. 21-31. doi: 10.1007/978-3-030-21088-5_4.

Mertens, D. M. (2007) 'Transformative Paradigm – Mixed Methods and Social Justice', *Journal of Mixed Methods Research,* 1(3), pp. 212-225.

Middlestadt, S. E., Bhattacharyya, K., Rosenbaum, J., Fishbein, M. and Shepherd, M. (1996) 'The Use of Theory Based Semi-Structured Elicitation Questionnaires: Formative Research for CDC's Prevention Marketing Initiative', *Public Health Reports*, 111(Supplement 1), pp 18-27.

Miller, S. (2017) '114 Multi-employer Pension Plans Projected to Fail Within 20 Years', *SHRM,* 29 August. Available at: https://www.shrm.org/resourcesandtools/hr-topics/benefits/pages/multiemployer-pension-fail.aspx (Accessed 30 August 2020).

Miyazaki, A. and Taylor, K. (2008) 'Researcher Interaction Biases and Business Ethics Research: Respondent Reactions to Researcher Characteristics', *Journal of Business Ethics*, 81, pp 779-795.

Mohelska, H. and Sokolova, M. (2018) 'Management Approaches for Industry 4.0 – The Organizational Culture Perspective', *Technological and Economic Development of Economy*, 24(6), pp. 2225-2240.

Molina-Azorin, J. F. and Fetters, M. D. (2020) 'Virtual Special Issue on "Paradigms in Mixed Methods Research"', *Journal of Mixed Methods Research,* 14(1), pp. 6-10.

Momcilovic, O. and Rajakovic, J. (2009) 'Knowledge Management as Indispensable Factor in the Organizational Changes', *Analele Universitatii 'Eftimie Murgu' Resita*, 16(1) pp. 191-202.

Monk, A. and Howard, S. (1998) 'Methods and tools, the rich picture: A tool for reasoning about work context', *Interactions*, 5(2), pp. 21-30.

Morse, J. M. (2006) 'Reconceptualizing Qualitative Evidence', *Qualitative Health Research*, 16(3), pp. 415-422.

Mourtada, R., Habib, S., Felden, F., Turpitz, A. and Carrasco, M. (2018) 'How to Supercharge Your National Digital Transformation'. Available at: https://www.bcg.com/publications/2018/how-supercharge-your-national-digital-transformation (Accessed: 31 December 2020).

Muhlburger, M., Oppl, S. and Stary, C. (2017) 'KMS re-contextualization – recognizing learnings from OMIS research', *VINE Journal of Information and Knowledge Management Systems*, 47(3), pp. 302-318.

Nass, C. I. (1986) 'Bureaucracy, Technical Expertise, and Professionals: A Weberian Approach', *Sociological Theory*, 4(1), pp. 61-70.

Newell, S., Robertson, M., and Swan, J. (2006) 'Interactive Innovation Processes and the Problems of Managing Knowledge', in Renzl, B., Matzler, K., and Hinterhuber, H. (eds.) *The Future of Knowledge Management*. London: Palgrave Macmillan, pp. 115-136.

Nonaka, I. (2008) *The Knowledge-Creating Company*, Boston: Harvard Business Press.

Nutt, P. and Backoff, R. W. (1996) 'Walking the Vision and Walking the Talk: Transforming Public Organizations with Strategic Leadership', *Public Productivity & Management Review*, 19(4), pp. 455-486.

O'Neil, J. W., Beauvais, L.L. and Scholl, R. W. (2001) 'The Use of Organizational Culture and Structure to Guide Strategic Behavior: An Information Processing Perspective', *Institute of Applied and Behavioral Management,* pp. 132-152. Available at: file:///C:/Users/David/Downloads/816-the-use-of-organizational-culture-and-structure-to-guide-strategic-behavior-an-information-processing-perspective.pdf. (Accessed 27 March 2021.)

Orenga-Roglá, S., Chalmeta, R. (2019) 'Methodology for the Implementation of Knowledge Management Systems 2.0: A Case Study in an Oil and Gas Company', *Business & Information Systems Engineering*, 61(2), pp. 195-213. doi: 10.1007/s12599-017-0513-1.

Patton, M.Q. (2002) 'Book Review: Learning in the Field: An Introduction to Qualitative Research', *American Journal of Evaluation*, 23(1), pp. 115-116.

Petrescu, I. (2020) 'Knowledge Theories Involved in the Study of Interinfluence Between Management and Management Scientific Research', *Review of General Management,* 31(1), pp. 5-40.

Pryor, M. G., Tanjea, S., Humphreys, J., Anderson, D., and Singleton, L. (2008) 'Challenges Facing Change Management Theories and Research', *Delhi Business Review,* 9(1), pp. 1-20.

Purnomo, C. A. and Hadi, Y. (2017) 'MSMEs Performance Measurement Using Performance Prism', *Industrial Spectrum*, 15(2), pp. 121-255.

Quinn, J. B. and Finkelstein, S. (1996) 'Managing professional intellect: Making the most of the best', *Harvard Business Review*, (Mar-Apr), pp. 71-78.

Rahimi, R. and Gunlu, E. (2016) 'Implementing Customer Relationship Management (CRM) in Hotel Industry from Organizational Culture Perspective', *Customer Relationship Management,* 28(1), pp. 89-112.

Ramsey, M. and Barkhuizen, N. (2011) 'Organisational design elements and competencies for optimising the expertise of knowledge workers in a shared services centre', *South African Journal of Human Resource Management*, 9(1), pp. e1-e15.

Razmerita, L., Kirchner, K. and Nabeth, T. (2014) 'Social Media in Organizations: Leveraging Personal and Collective Knowledge Processes', *Journal of Organizational Computing and Electronic Commerce*, 24(1), pp. 74-93. doi: 10.1080/10919392.2014.866504.

Reason, P. (2006) 'Choice and Quality in Action Research Practice', *Journal of Management Inquiry,* 15(2), pp. 187-203.

Reck, R. (1987) 'Implications of Transition from an Industrial Era to One of Information', *Industrial Management & Data IT*, 87(1/2), pp. 3-4.

Revans, R. (1981) 'Worker Participation as Action Learning: A Note'*, Economic and Industrial Democracy: An International Journal,* 2(4), pp. 521-541.

Riege, A. and Lindsay, N. (2006) 'Knowledge management in the public sector: stakeholder partnerships in the public policy development', *Journal of Knowledge Management*, 10(3), pp. 24–39.

Rogers, B. (2016) 'Why 84% of Companies Fail at Digital Transformation', *Forbes,* 7 January. Available at: https://www.forbes.com/sites/brucerogers/2016/01/07/why-84-of-companies-fail-at-digital-transformation/?sh=616dd883397b (Accessed: 11 August 2022).

Rogers, C. (1979) 'The Foundations of the Person-Centered Approach', *Education,* 100(2), pp. 98-107.

Roman-Velazquez, J. (2005) 'An Empiric Study of Organizational Culture Types and their Relationship with the Success of a Knowledge Management System and the Flow of Knowledge in the U.S. Government and Nonprofit Sectors', in Stankosky, M. (ed.) *Creating the Discipline of Knowledge Management: The Latest in University Research*, Burlington, Oxford: Elsevier, pp. 66-91.

Roy, M.-C., Mosconi, E., Sager, M. and Ricard, J.-F. (2014) 'Knowledge Audit Approach for a Large-Scale Government KM Strategy', *Journal of Information & Knowledge Management*, 13(4), pp. 1450029 1-10.

Rubin, J. Z. and Brockner, J. (1975) 'Factors affecting entrapment in waiting situations: the Rosencrantz and Guildenstern effect', *Journal of Personality and Social Psychology*, 31, pp. 1054-1063.

Ryan, H. (1988) 'Keynote paper: trends, probabilities and tomorrow in information technology', *Aslib Proceedings*, 40(10), pp. 261-264.

Saari, E. and Talja, H. (2009) 'Towards communication and learning based leadership: Observations in Finnish public research organizations', *The Learning Organization*, 16(3), pp. 251-260.

Saldana, J. (2016) *The Coding Manual for Qualitative Researchers.* Third Edition. London: Sage Publications.

Schein, E. H. (1989) 'Organizational Development: Science, Technology, or Philosophy', *Invited Address to the Academy of Management, Organization Development Division,* New Orleans, 15 August. Available at: https://dspace.mit.edu/bitstream/handle/1721.1/2267/SWP-3065-20496876.pdf?sequence (Accessed: 7 March 2021).

Schoonenboom, J. (2019) 'A Performative Paradigm for Mixed Methods Research', *Journal of Mixed Methods Research,* 13(3), pp. 284-300.

Schreier, M., Stamann, C., Janssen, M., Dahl, T., and Whittal, A. (2019) 'Qualitative Content Analysis: Conceptualizations and Challenges in Research Practice—Introduction to the FQS Special Issue "Qualitative Content Analysis I"', *Forum: Qualitative Social research, 20(3),* Art. 38. doi: http://dx.doi.org/10.17169/fqs-20.3.3393.

Serenko, A., Bontis, N., Booker, L., Sadeddin, K. and Hardie, T. (2010) 'A scientometric analysis of knowledge management and intellectual capital academic literature (1994-2008)', *Journal of Knowledge Management*, 14(1), pp. 3-23.

Siedle, E. (2020) 'Kiss Your State Pension Goodbye', *Forbes*, 23 April. Available at: https://www.forbes.com/sites/edwardsiedle/2020/04/23/kiss-your-state-pension-goodbye/#1f90fc2961f9 (Accessed: 30 August 2020).

Softwareinsider.com (2018) Available at: http://document-management.softwareinsider.com/l/218/HighQ-Collaborate (Accessed 3 January 2019).

Softwaretestingclass.com (2015) Available at: https://www.softwaretestingclass.com/software-testing-best-practices-into-the-basics-testing/ (Accessed 12 February 2021).

Spasojević, S., Vojnović, B. and Nikolić, A. (2012) 'The Influence of Business Information Systems on Serbian Companies' Business Performances', *Economics of Agriculture / Ekonomika Poljoprivrede*, 59(2), pp. 285-304.

Steyer, R. (2015) 'Public pension plans make strides in staff pay', *Pensions & Investments,* 27 July. Available at: https://www.pionline.com/article/20150727/PRINT/307279973/public-pension-plans-make-strides-in-staff-pay (Accessed: 30 August 2020).

Steyer, R. (2022) 'Politics can take toll on public pension professionals.', Pensions & Investments, 50(17), pp. 0033.

Sukumaran, S. and Chandran, K. (2014) 'Knowledge Management Systems – The End of the Road?: Position Paper', in Uden, L., Fuenzaliza Oshee, D., Ting, I.-H. and Liberona, D. (eds.) *Knowledge Management in Organizations*, Cham, Heidelberg, New York, Dordrecht, London: Springer, pp. 186-194.

Sveiby, K. E. (1997) 'When Knowledge Is Wealth', *Measuring Business Excellence,* 1(3), pp. 62-63.

Teece, D. J. (1998) 'Capturing Value from Knowledge Assets: The New Economy, Markets for Know-How, and Intangible Assets', *California Management Review*, 40(3), pp. 55-79.

Tetenbaum, T. J. (1998) 'Shifting Paradigms: From Newton to Chaos', *Organizational Dynamics*, 26(4), pp. 21-32.

Tharp, B.M. (2009) 'Four Organizational Cultural Types', Philadelphia: Haworth.

Thomas, E. and Magilvy, J. K. (2011) 'Qualitative Rigor or Research Validity in Qualitative Research', *Journal for Specialists in Pediatric Nursing*, 16, pp. 151-155.

Thorpe, R. and Holt, R. (2008) *The Sage Dictionary of Qualitative Management Research*. Reprint, London: SAGE Publications, 2013.

Tjaden, G. (1996) 'Measuring the information age business', *Technology Analysis & Strategic Management*, 8(3), pp. 233-246.

Toby, A. J. (2004) 'Organisational Modelling of Nigerian Banks: Survey Findings', *Journal of Financial Management & Analysis*, 17(2), pp. 12-28.

Torkaman, A. (2018) 'Integrating the Characteristics of the New Coming Technological Age by a Meta-Study', *World Futures Review*, 10(2), pp. 170-183.

Trader-Leigh, K. E. (2002) 'Case study: identifying resistance in managing change', *Journal of Organizational Change Management',* 15(2), pp. 138-155.

Truch, E. (2001) 'Knowledge Management: Auditing and Reporting Intellectual Capital', *Journal of General Management*, 26(3), pp. 26-40.

Turlais, V. and Dubkevics, L. (2012) Comparative Analyss of Organizational Culture Models in Management Science, *XVIII International Scientific Conference – Communication in the Global Village: Interests and Influences,* Turiba University, Latvia, 18 May.

Turner, J. (2006) 'Tyranny, freedom and social structure: Escaping our theoretical prisons', *British Journal of Social Psychology*, 45, pp. 41–46.

Ul Hassan, F. S., Shah, B., Khan, N., Ikramullah, M. and Zaman, T. (2011) 'Exploring the Relationships Among Organizational Life Cycle Stages and Different Traits of Organizational Culture, *Business and Management Review,* 17, pp. 103-112.

Veronesi, G. and Keasey, K. (2012) 'A (new) model of board directors: evidence from the National Health Service', *International Journal of Public Sector Management*, 25(4), pp. 272-286.

Vrincianu, M., Anica-Popa, L. and Anica-Popa, I. (2009) 'Organizational Memory: An Approach from Knowledge Management and Quality Management of Organizational Learning Perspectives', *Amfiteatru Economic Journal,* 11(26), pp. 473-481.

Wall, J. A. and Callister, R. R. (1995) 'Conflict and Its Management', *Journal of Management*, 21(3), pp. 515-558.

Wang, Y-M. and Wang, Y-C. (2016) 'Determinants of firms' knowledge management system implementation: An empirical study', *Computers in Human Behavior*, 64, pp. 829.842. doi: 10.1016/j.chb.2016.07.055.

Watson, W. R., Watson, S. L. and Reigeluth, C. M. (2015) 'Education 30: Breaking the Mold with Technology', *Interactive Learning Environments*, 23(3), pp. 332-343.

Wei, C., Chen, H. and Chen, L. (2009) 'A model for assessing organizational knowledge inventory', *Kybernetes*, 38(9), pp. 1491-1507.

Werr, A. and Styhre, A. (2002) 'Management Consultants – Friend or Foe? Understanding the Ambiguous Client-Consultant Relationship', *International Studies of Management & Organization*, 32(4), pp. 43-66.

Wyton, P. and Payne, R. (2014) 'Exploring the development of competence in Lean management through action learning groups: a study of the introduction of Lean to a facilities management function', *Action Learning: Research and Practice*, 11(1), pp. 42-61.

XI. Appendices

Appendix A. Knowledge Management System – Detailed Feature List

Feature Category	Feature Description	Feature	% Who Have
Capture	Features pertaining to the functionality of the capture capabilities of the document management system.	PDF Conversion	75%
		Scanning Solution	65%
		OCR Functions	48%
Retrieval	Features pertaining to the functionality of the retrieval capabilities of the document management system.	Import and export of data	82%
		Digital document retrieval	46%
		Assorted retrieval formats	32%
Storage	Features pertaining to the functionality of the storage capabilities of the document management system.	Access and retrieval from anywhere	67%
		Email archiving	46%
		Configurable storage locations	39%
		Centralized or uncentralized document storage	28%
		File compression	28%
		Faz management	16%
		Electronic file chredding	14%
Collaboration	Features pertaining to the collaboration capabilities of the document management system (DMS). Collaboration should be inherent in a DMS. In its basic form, a collaborative DMS should allow documents to be retrieved and worked on by authorized users. Access should be blocked to other users while work is being performed on the document. Other advanced forms of collaboration allow multiple users to view and modify (or markup) a document simultaneously in a collaboration session. The resulting document should be viewable in its final form, while also storing the markups done by each individual user during the collaboration session. Some DMS have a rights management module that allow administrators to provide access to certain documents to specific people or groups, this is referred to as 'User Access Controls'.	User Access Controls	71%
		Functions with e-mail systems	56%
		Collaboration management	54%
		Document check-in/check-out	54%
		Document assembly	52%
		Custom user interface	46%
		Remote document access	44%
		Customizable functionality	43%
		Customizable fields	36%
		Text editing	31%
		Real time updates	25%
		Image editing	22%
		Concurrent multiple user collaboration	16%
Versioning	Features pertaining to the versioning capabilities of the document management system (DMS). Versioning is a process by which documents are checked in or out of the DMS, allowing users to retrieve previous versions and to continue work from a selected point. Versioning is useful for documents that change over time and require updating, and also allows users to view previous versions for reference.	Audit trails	53%
		Document versioning	51%
		Automated version control	39%
		Version tracking	27%
		Document comparison	21%
		Recording of complete document life	19%
		Edits tracking	16%
		New versions do not overwrite	13%
		RSS feeds	11%
		Version rollback	9%
		Version promotion	7%
		Non-repudiation	3%
		Sub-version	3%
Distribution	Features pertaining to the functionality of the distribution capabilities of the document management system.	Remote Document Access	49%
		Mobile access	44%
		View feed of all document activity	30%
		Multiple-channel distribution	30%
		Multi-language	26%
		Multi-currency	10%
Publishing	Features pertaining to the functionality of the publishing capabilities of the document management system.	Customizable reporting	47%
		Multiple document formats	39%
		Configurable user access permissions	36%
		Customizable functionality	35%
		Document publishing	23%
		Multiple delivery formats	17%
		Locking mechanism for document	17%
		Compliant to ISO standards	12%

Feature Category	Feature Description	Feature	% Who Have
Reproduction	Features pertaining to the functionality of the reproduction capabilities of the document management system.	Assorted document delivery formats	33%
		Automatic updates	27%
		Digital watermarking	6%
Indexing	Features pertaining to the functionality of the indexing capabilities of the document management system.	Document indexing	64%
		Archiving and retention	55%
		Custom index templates	26%
		Automatic data format conversion	22%
		Predefined index properties	18%
		Indexing necessary for capture	6%
Metadata	Features pertaining to the functionality of the metadata capabilities of the document management system.	Records management	67%
		Document tagging	57%
		Electronic signatiure capture	27%
Searching	Features pertaining to the functionality of the searching capabilities of the document management system.	Full text searching	76%
		Search by content	70%
		Search by metadata	36%
		Multi-condition queries	32%
		Save frequent searches	30%
		Search preview	27%
		Search by version	20%
Integration	These are features pertaining to the integration capabilities of the document management system. Many document management systems (DMS) attempt to integrate document management directly into other applications so that users may retrieve existing documents directly from the DMS repository, make changes and save the changed document back to the repository as a new version, all without leaving the application. Such integration is commonly available for office suites and e-mail or collaboration/groupware software. Integration often uses open standards such as ODMA, LDAP, WebDAV and SOAP to allow integration with other software and compliance with internal controls.	with MS Office	70%
		with MS Outlook	56%
		API Availability	31%
		w Windows Explorer	30%
		Webservice interface	26%
		with Sharepoint	26%
		Legacy System Inegration	20%
		WebDAV Interface	9%
		GUI Business Process	5%
		GUI Form Builder	3%
Workflow	Features pertaining to the workflow capabilities of the document management system (DMS). Workflow is a complex problem and some DMS have a built-in workflow module. There are different types of workflow. Usage depends on the environment the electronic DMS is applied to. Manual workflow requires a	Workflow management	75%
		Process management	57%
		Rules-based workflow	44%
		Calendar support	22%
Security	These are features pertaining to the security capabilities of the document management system (DMS). Document security is a vital feature in a DMS. Compliance requirements for certain documents can be quite strict. In the United States, for instance, the Health Insurance Portability and Accountability Act (HIPAA) requires medical documents to have certain security requirements. Document marking at the time of printing or PDF-creation is another essential element to prevent alteration or unintended use. "Web Security" refers to a particular document management system's ability to encrypt information	Document encryption	48%
		Password protection	47%
		Web security	47%
		Security reporting	34%
		Compliant with ISO	24%
		Compliant with HIPAA	22%
		Compliant with SEC	13%
		Compliant with Sarbanes-Oxley	11%
Support		24/7	
		Blog	
		Brochures	
		FAQ	
		Forums	
		Help Desk	
		Instructional Videos	
		Knowledge Base	
		Live Chat	
		Normal business hours	
		On-Site	
		Online self serve	
		Owner's/User Manual	
		Recorded demos	
		Remote training	
		Request Form	
		System upgrades	
		Tips and hints	
		Webinars	
		White papers	
		Wiki	
		Email	
		Phone	

Appendix B. PEPP Feature Scoring Sheet

Feature Category	Feature Category Ranking	Feature	Private Equity		Public Equitites		Legal	
			Feature Category Ranking	Feature Ranking	Feature Category Ranking	Feature Ranking	Feature Category Ranking	Feature Ranking
Capture	7.3	PDF Conversion	8	8	9	9	5	5
		Scanning Solution		8		9		5
		OCR Functions		8		10		5
Collaboration	7.3	User Access Controls	6	8	9	9	7	9
		Functions with e-mail systems		10		10		10
		Collaboration management		7		8		8
		Document check-in/check-out		5		6		6
Metadata	7.0	Records management	4	8	8	9	9	10
		Document tagging		8		8		10
		Electronic signatiure capture				6		6
Publishing	8.0	Customizable reporting	8	9	6	4	10	10
		Multiple document formats		7		4		9
		Configurable user access permissions		8		7		9
		Customizable functionality				7		10
		Document publishing		6		6		8
		Multiple delivery formats				6		9
		Locking mechanism for document				8		8
		Compliant to ISO standards				5		5
Legal Matter Management	8.3	Document Mgmt	6	8	9	10	10	10
		Calendaring & Docketing		4		9		9
		Contact Mgmt		8		8		9
		Task Mgmt		8		7		10
		Email Integration		10		9		10
		Document Assembly						9
		Conflict of Interest Checking						7
		Clear Intake Form						9
		Client Portal				8		9
Time and Billing	3.7	Billing & Invoicing	2		2		7	9
		Time Tracking						
		Expense Tracking						8

Appendix C. Project Consent Form

Committee on Research Ethics

PARTICIPANT CONSENT FORM

	Please initial box
Title of Research Project: "Case study: a knowledge management system implementation in a U.S. public pension plan investment department" **Researcher:** David E. Simpson	
1. I confirm that I have read and have understood the information sheet dated December 28, 2018 for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.	
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason, without my rights being affected. In addition, should I not wish to answer any particular interview or survey questions, I am free to decline.	
3. I agree to take part in the above study.	
4. I understand that, I can at any time ask for access to the information I provide and I can also request the destruction of that information if I wish.	
5. I also understand and agree that after I submit my responses, they will become anonymised and I will therefore no longer be able to withdraw my responses.	
6. I understand that my responses will be kept strictly confidential. I give permission for members of the research team to have access to my anonymised responses. I understand that my name will not be linked with the research materials, and I will not be identified or identifiable in the report or reports that result from the research.	
7. I understand that confidentiality and anonymity will be maintained. It will not be possible to identify me in any publications.	
8. The information you have submitted will be published as a report; please indicate whether you would like to receive a copy by circling the appropriate response.	Yes/No

_____   _____   _____
Participant Name   Date   Signature

_____   _____   _____
Name of Person Taking Consent   Date   Signature

_____   _____   _____
Researcher   Date   Signature

Student Researcher – Work Contact Information:
David E. Simpson
300 N Lake Ave, Ste 650 Pasadena CA, 91101
626-564-2303   dsimpson@lacera.com   Version: KMSIR_PCF_12.28.2018

Part I - Demographics

1	Date			
2	Number			
3	Current Level	Administrative	Analyst	Management
4	Tenure (Years)	0-5	5-10	>10

Part II – KMS Feature Rating

The following sixteen questions are multipart questions. I will describe a KMS feature. I will then ask you to rate how useful the feature will be to your job once implemented, on a scale of a 1-10, with 10 being most useful. I will then ask, related to the feature, how you do things today, and then what you envision will change after KMS implementation, if anything. Finally, I will ask you how you believe that functionality will alter your manager's (or direct report's) job, if at all. Note that not all examples of feature functionality may apply to you.

	Functionality/Description/Features	Rating (1-10)
1	**Capture:** PDF conversion, scanning, OCR (optical character recognition)	
2	**Retrieval:** Features include import and export of data, digital document retrieval, and assorted retrieval formats	
3	**Storage**: access and retrieval from anywhere, e-mail archiving, configurable storage locations, file compression	
4	**Collaboration**: Documents retrieved and worked on by authorized users, rights access, document check-in/check-out, document assembly, and remote access	
5	**Versioning:** Document check-in/check-out, allowing users to retrieve previous versions and to continue work from a selected point. Prior versions retained reference; audit trails, document versioning, automated control, tracking, document comparison, recording of document's life, edits tracking, new versions do not overwrite, version rollback	
6	**Distribution:** Remote access, mobile access, multiple-channel distribution	
7	**Publishing:** Customizable reporting, multiple document formats, configurable document access permissions, customizable functionality, multiple delivery formats, and locking mechanism	
8	**Reproduction**: assorted document delivery formats, automatic updates, watermarking	
9	**Indexing:** Document indexing, archiving and retention, automatic data format conversion, and predefined index properties	
10	**Metadata:** Records management, document tagging, and electron signature capture	
11	**Searching:** Full text search, document content search, search by metadata, multi-condition queries, save frequent searches, search preview	
12	**Integration**: Integration with MS Office, Outlook, Contacts, API (example would be Bloomberg), and Windows Explorer	
13	**Workflow:** Workflow management, process management, rules-based workflows, calendar support	
14	**Reporting:** Customizable reports, scheduling, automated distribution, graph integration, on all data elements	
15	**Security**: Document encryption, password protection, web security, security reporting	
16	**Support:** 24/7, blogs, brochure, FAQ, forums, help desk, videos, live chat, demos, manuals, remote training, webinars	

Part III - Open-ended questions

1	Explain your role. Describe a typical day on your job. (extra hours, weekends, vacations)
2	What are the top three activities that you do at work that create the most value for the organization? What are most tedious?
3	What skills/people/structures/systems do you think are needed in the organization for KMS to be successfully implemented? Do they exist now?
4	In terms of PEPP, what elements of culture do you believe will be biggest pluses or minuses in relation to the implementation?
5	If we look a year out, what is the impact if KMS is successful? Not successful?

The example provided below starts as a survey question of Participant D16 seeking a numerical response regarding a feature's utility and then solicits elaboration on the feature's potential impact on the participant's job duties.

The Atlas.ti application allows for multiple codes to be assigned to the (Wreally Studios) transcribed text and allows for those codes to then roll-up into multiple categories. Note that not all codes or categories identified proved relevant or of sufficient quantity to warrant inclusion.

Participant	**D16** Analyst Male Tenure of 5-10 years
Question 4S	"Question four is 'collaboration' which includes documents retrieved and worked on by authorized users, rights access, document check-in/check-out, document assembly, and remote access. On a scale of 1-10, with 10 being the most useful, how useful do you think the collaboration feature would be to your job? How do you do things today? What do you envision will change after implementation, if anything?"
Transcribed response	"Eight. Okay. In an ideal form, idealistically should be a lot better, but I think we have to establish process and be resilient to sticking to the process because. It still means someone has to scan documents, still means maybe someone has to put documents a certain place can still means… I think you should improve collaboration because now everyone had different folders and different locations to get information. So, if it's a central depository that someone has access to and it's labeled correctly, then I don't necessarily need to go ask you for some private documentation because they're right. I know."
Code(s) Assigned	Manual workflow processes Collaboration Inconsistent data capture/storage
Category Roll-up(s)	Productivity Collaboration/Teamwork KMS Resolvable Issue

Appendix F. Information System Failures

(As shown in Dwivedi et al., 2019)

Table 2 IS Failure

Perspective	Category	Factor	Reference
Social and Organizational	Expectation failure	Correspondence Process Interaction	Hirschheim and Newman 1988
	Termination Failure	Termination	Sauer 1993
Project Management	Process	Poor estimation and/or scheduling Insufficient risk management Insufficient planning Shortchanged quality assurance Poor requirements determination Contractor failure Insufficient management controls Wasted time in the fuzzy front end Code-like-hell programming Abandonment of planning under pressure Inadequate design Insufficient resources Planning to catch up later	Nelson 2007
	People	Ineffective stakeholder management Weak personnel and/or team issues Insufficient project sponsorship Inattention to politics Lack of user involvement Unrealistic expectations Undermined motivation Wishful thinking Friction between developers & customers Heroics Adding people to a late project Premature or overly frequent convergence	

		Noisy, crowded offices Uncontrolled problem employees	
	Product	Scope creep Research-oriented development Requirements gold-plating Push-me, pull-me negotiation Developer gold-plating	
	Technology	Silver-bullet syndrome Lack of automated source-code control Overestimated savings from new tools or methods Switching tools in the middle of a project	
Enterprise Systems	Organization-Enterprise System Misfit	Functionality Data Usability Role Control Organizational Culture	Strong and Volkoff 2010
Developing Countries	Archetypes	Country context gaps Hard-soft gaps Public-private sector gaps	Heeks (2002, 2006)
User Resistance	Individual Issues	Uncertainty Input Control/Power Self-Efficacy	Klaus and Blanton 2010
	System Issues	Technical Problems Complexity	
	Organizational Issues	Facilitating Environments Communication Training	
	Process Issues	Jo/Job skills change Workload Lack of Fit	