Evolving Modern Human Resource Management as a Data Science: Integration with Knowledge Management in Saudi ARAMCO

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Doctoral Dissertation

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Abstract

The efforts by Google and Oracle have changed the idea of "modern human resource management (HRM)". Their efforts have reminded us to rethink modern HRM. In addition, the application of artificial intelligence (AI) and data science approaches in modern HRM also influenced us to rethink and reimagine "modern HRM". Therefore, the main purpose of this dissertation is to develop a framework for "evolving modern HRM as a data science through the integration of HRM with KM".

To answer the research objectives, a case study using both qualitative and quantitative approaches of interviews and an online survey was conducted. The qualitative part was carried out by interviewing professionals from Saudi ARAMCO. Furthermore, the interview data were analyzed thematically. In the case of quantitative research, which consisted of both open-ended and close-ended multiple-choice questions, the data were analyzed using SPSS 26.

The results from the qualitative data analysis show that professionals use ShareK platform both traditional and modern HRM. The result reveals that professionals use ShareK platform i.e., training and evaluating, which is broadly considered traditional HRM. On the other hand, the results of this research interestingly show that professionals also use ShareK platform for psychological safety, dependability, and evidence-based decisions which are considered modern HRM in this research. Importantly, the results from interviews show that psychological safety, dependability, and evidence-based decisions—are the most important components of modern HRM which is very important and new findings of this research.

The results from the quantitative analysis show that there are statistically significant differences between HRM and KM professionals regarding traditional HRM and traditional KM, because both groups of professionals namely HRM and KM are different. In addition, they are from two distinctive departments. Furthermore, their job roles are also different. Finally, their educational backgrounds are also different. So, it is expected that there are statistically significant differences between both professional groups of people. Interestingly the results from quantitative analysis also show that there are no statistically significant differences between HRM and KM professionals regarding modern HRM. These are the most unique and significant findings of this research. We also compare our results with the findings from Google's Project Aristotle, Google's Project Oxygen, and People's Analytics (Google, 2022a; 2022b; Duhigg, 2016; Schmidt and Rosenberg, 2014; Vulpen, 2019). Especially, the results from Google's Project Aristotle, Google's Project Oxygen, and People's Analytics showed that psychological safety, dependability, and evidence-based decision—are the component of team dynamics in modern HRM (Google, 2022a; 2022b; Duhigg, 2016; Schmidt and Rosenberg, 2014; Vulpen, 2019). They showed the results qualitatively without comparing among different departments in Google. Therefore, the findings of this research are unique, new, and significant in the HRM and KM community by comparing both professionals regarding modern HRM.

The results were verified by providing evidence. In this research, all professionals supported the results regarding modern HRM and its components. In this phase, the result from the comparison also supports our claims that there are statistically very significant relationships regarding all components of modern HRM. Finally, a framework of harmonization of HRM with KM was developed based on the results of this research which lay down the foundation to evolve modern HRM as a data science. First of all, the result of this research shows that the movement of acceptance of ShareK for modern HRM was led by HRM professionals. Secondly, the results of this research also show that professionals have changed their THRM system to ShareK based more flexible system for modern HRM. But the result of this research indicates that KM professionals are worried about the flexibility of the ShareK system for modern HRM, because KM professionals feel that there is needed for rigidity in the ShareK. Finally, in the future KM professionals will collaborate more with HRM and ICT professionals to have more flexibility and rigidity in their system. As a result, the concept of "VCS" will help KM professionals to change, update, and re-update the new system more flexibly with rigidity through collaboration with HRM, ICT, and other professionals. Through these collaborative ways, a new system will evolve in which modern HRM will emerge as a data science in the near future with more flexibility and rigidity.

This research provides future research directions. A qualitative study covering more interviewees from different departments of the same organization should be conducted. Secondly, the interview was conducted of Saudi ARAMCO. Therefore, qualitative research covering more departments in Saudi ARAMCO should be conducted which will provide more generalized findings. Thirdly, a comparison among more groups of professionals should be conducted. So, another detailed survey should be conducted by comparing all the departments of Saudi ARAMCO which will provide a more fine-grained generalized version of the comparison. This will eventually help to evolve HRM as a scientific discipline. Finally, our proposed framework of harmonization of HRM with KM was developed based on the results of a case analysis of one company. Therefore, another research should be conducted by covering cases from the United States, Europe, and Japan to develop a more generalized version of modern HRM as a data science.

Keywords: human resource management (HRM), modern HRM, knowledge management (KM), psychological safety, dependability, evidence-based decisions, traditional HRM, traditional KM, modern HRM, HRM as a data science.

Acknowledgments

In the beginning, I should start with his blessings He has bestowed on me throughout my life and academic career. With that, I want also to express my gratitude to King Abdulaziz University for giving me the support, my gratitude extends to my supervisors, advisors, teachers, and the whole department of Knowledge Science School that support me to complete my work. I will remain thankful to Japan Advanced Institute of Science and Technology: JAIST, I could not complete this research work without their true guidance.

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Finally, thanks to my parents, my wife, my daughter, my son, and all my loved ones who have provided the confidence and support to me that I need to complete this work. I would say that without their patience and sacrifice, it would have been very difficult for me to work with complete dedication to accomplish my goal.

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Chapter 1 Introduction

1. Introduction

This chapter provides the background of this study, problem statements, research objectives, research questions, research methodology, and significance of this research. Finally, it concludes with an outline of the dissertation.

1.1 Background of the study

1.1.1 Human resource management (HRM)

Human resource management (HRM) is very important for the success of any organization. Traditionally, HRM is the process of selecting and recruiting humans, training and developing humans, evaluating their performance, rewarding them, and creating a culture of learning (Edvardsson, 2008; Armstrong, 2000). But with recent efforts by Google have influenced us to re-think HRM (Google, 2022a; 2022b; Duhigg, 2016; Schmidt and Rosenberg, 2014). In addition, the application of artificial intelligence (AI) and data science in HRM have also motivated us to reconceptualize and re-think HRM in the era of AI (Schmidt and Rosenberg, 2014; Vulpen, 2019; Kohda, 2022). Therefore, in this research, ***HRM is defined as the recruitment of people, training them, evaluating their performance, rewarding them, and creating a culture where anyone can share his or her ideas and knowledge without any hesitations using technology***.

1.1.2 HRM as data science

Different efforts taken by Google remind us to re-think HRM as a data science (Google, 2022a; 2022b; Duhigg, 2016; Schmidt and Rosenberg, 2014). Especially, Google's Project Aristotle greatly influences to re-think and re-birth of HRM as a data science. The

project was about what makes a team more effective in the organization. They found that psychological safety, dependability, structure and clarity, meaning, and impact—are the important identity dynamics of team effectiveness (Google, 2022b; Duhigg, 2016). In addition, Google's Project Oxygen shows that managers matter and have a significant impact on organizational performance (Google, 2022a). Furthermore, people analytics using the modern AI and data science approaches provide HRM people with an evidence based HRM (Vulpen, 2019; Schmidt and Rosenberg, 2014). Therefore, it is considered that HRM evolves as a data science.

1.1.3 Knowledge management (KM)

Knowledge management (KM) is a part of HRM (Edvardsson, 2008). As knowledge resides inside the human brain, human is considered the most important resource in the knowledge society (Nonaka and Takuechi, 1995). Traditionally, KM is the process of creating, processing, transferring, and applying knowledge within the firm to gain and sustain a competitive advantage (Nonaka, 1994; Nonaka and Takuechi, 1995; Alavi and Leidner, 2001). But modern technologies play the most important role in creating, sharing, and applying knowledge in an organization (Kankanhalli, Teo, Tan, and Wei, 2003; Saito, Umemoto, and Ikeda, 2007; Hansen, Nohria, and Tierney, *1999;* Nonaka and Takuechi, 2019; Kohda, 2022). According to H*ansen*, Nohria, and Tierne*y* (1999), technology supports for codification and personalization of KM activities. With the help of technologies, more explicit knowledge is codified and stored in the knowledge database. In this case, technology helps people to share knowledge (Kankanhalli et al., 2003). On the other hand, more tacit knowledge is shared through direct personal communication through using the modern technologies (Kankanhalli et al., 2003).

Similarly, Saito, Umemoto, and Ikeda (2007) described four types of technologies that support KM initiatives namely: collaborative technologies, dissemination technologies, discovery technologies, and repository technologies. Recently, Nonaka and Takuechi (2019) discussed how modern artificial intelligence (AI) technologies could be utilized for KM. More recently, Kohda (2022) described how human professionals can learn from AI like human learns from their masters.

1.2 Research problems

KM is the process of creating, processing, storing, and sharing knowledge whereas HRM is the process of selecting, training, developing human resources and rewarding them as well as creating a learning culture in the organization (Nonaka, 1994; Edvardsson, 2008). Scholars from KM have described different theoretical models/frameworks for creating, capturing, processing, and transferring knowledge (Nonaka and Takuechi, 1995; Alavi, Leidner, 2001; Roknuzzaman, Kanai, and Umemoto, 2009). Similarly, researchers from HRM have also discussed different models/frameworks for selecting, training, and developing human resources as well as evaluating their performance, and providing rewards (Edvardsson, 2008; Armstrong, 2000). But recently, some of them have superficially described how KM and HRM activities could be merged without providing scientific evidence (Trivedi and Srivastava, 2021; Uma, 2014; Ishak, Eze, and Ling, 2010; Yahya and Goh, 2002). In addition, recent efforts by Google influenced us to re-think how HRM can evolve as a data science (Google, 2022a; 2022b; Duhigg, 2016; Schmidt and Rosenberg, 2014). ***Therefore, this research fills the gap in the literature by developing a KM and HRM integration framework analyzing a real-world case which ultimately helps to evolve HRM as a data science***.

Secondly, the scholars from KM have indicated that there are different technologies used for capturing, processing, storing, and transferring knowledge (Kankanhalli et al., 2003; Saito, Umemoto, and Ikeda, 2007; Hansen et al., 1999). Similarly, researchers from HRM have expressed different technologies are used for recruiting, training, and developing human resources as well as evaluating their performances and providing learning opportunities (Marler and Parry, 2016; Parry, 2014; Yusliza and Ramahyah, 2012). More recently, HRM people adopts more AI and data science approaches for people analytics and evidence-based HRM (Schmidt and Rosenberg, 2014; Vulpen, 2019). But there is a need for research on how technologies could be applied for the integration of KM and HRM which helps to emerge HRM as a scientific disciple. ***Therefore, this research fills the gap in the literature by developing an integration framework of KM and HRM using technologies for the emergence of HRM as a data scientific discipline***.

Finally, recent research on modern HRM shows that different factors influence HRM professionals to adopt modern HRM (Schmidt and Rosenberg, 2014; Vulpen, 2019). Their results qualitatively show that psychological safety, dependability, and evidence-based decision influence HRM professionals to adopt modern HRM. But how the same factors influence KM professionals needs to be investigated. **Therefore, this research fills the gap in the literature by developing integration of HRM with KM using technologies that will help modern HRM to emerge as a data science**.

1.3 Research objectives

HRM is the most important resource in the knowledge society. Broadly, KM is part of the HRM. The primary objective of this research is to develop a KM and HR integration

framework via technology by investigating the case of Saudi ARAMCO which helps to evolve HRM as a data science. The secondary objective of this research is to provide suggestions for petroleum companies by generalizing the findings from this research.

1.4 Research questions

To achieve the above research objectives, this research has proposed one major research question (MRQ) and three subsidiary research questions (SRQs):

MRQ: How has the integration of HRM with KM evolved HRM as a data science?

SRQ1: What is the current state of the art of HRM in Saudi ARAMCO?

SRQ2: What is the current state of the art of KM in Saudi ARAMCO?

SRQ3: What are the differences between HRM and KM professionals regarding traditional HRM and KM, and modern HRM?

1.5 Research significance

This research significantly contributes to the academic community, industries, and society by developing a HRM and KM integration framework using technology.

1.5.1 Academic contributions

First of all, academic society greatly benefits through the development of an HRM and KM integration framework via using technology. Specifically, this research contributes to KM, HRM, and service science. Currently, scholars from KM and HRM focused on using different technologies for KM and HRM separately. But this research is a pioneer

in the field of Knowledge Science, Management, and Service Science for describing the integration mechanisms of KM and HRM by using technology in a real-life case setting. Importantly, this research adds knowledge to the academic society by proposing the concept of "HRM as a data science" through the integration of KM and HRM. Secondly, this research also contributes to the HRM community through the management of HRM activities via KM technology. Last but not the least, this research provides a new horizon in KM through the combination of technology and HRM.

1.5.2 Practical contributions

Practically, this research also contributes to the practitioners of HRM, KM, and ICT by suggesting the re-design of their strategies regarding psychological safety, dependability, and evidence-based decisions. In addition, the proposed integration of HRM with the KM framework helps KM managers to collaborate more with HRM, ICT, and other professionals to re-designing a more flexible KM system with rigidity and integrity.

1.5.3 Societal contributions

This research contributes to society by discussing the generalization of the proposed KM and HRM integration framework using technology for more societal purposes.

1.6 Research methodology

1.6.1 Social background

Petroleum is the lifeblood of the Kingdom of Saudi Arabian's national economy (Alkhathlan, 2013). 87% of Saudi's national economy is generated from the petroleum sector (Index Mundi, 2021). ARAMCO is the largest state petroleum company in the

Kingdom of Saudi Arabia (Saudi Aramco, 2021). British Petroleum (BP) is the pioneer in introducing knowledge management in the petroleum sector. In addition, BP is also the pioneer of using technology namely virtual teamwork to knowledge sharing (Davenport, Long, and Beers, 1998). In addition, Collison and Parcell (2004) introduced BP's approach to the KM cycle of "learning before, learning during, and learning after". They also introduced communities of practice and corporate Yellow Pages systems intended to help communities of practice to form and operate. But Edward (2008) shows that petroleum sectors adopt knowledge management (KM) approaches without incorporating seminal works of KM (Nonaka, 1994; Nonaka and Takuechi, 1995). Although Saudi ARAMCO initiated KM activities using technology in 2011 (Khursani, Bazuhair, and Khan, 2011) but recently, Saudi ARAMCO started a certification program on KM for employees to develop a real KM profession in ARAMCO (ARAMCO, 2019).

1.6.2 Case study as the research strategy

A case study adopts as a research strategy for this research. A case study is an appropriate approach given the need to develop an in-depth understanding of the phenomena (Yin, 2014). The Saudi ARAMCO was selected as a case for this research. The case study was conducted by applying qualitative and quantitative research methods consisting of interviews and surveys. In the first step, a qualitative method adopts that can be seen as a suitable method given the need to develop a detailed understanding of a relatively unexplored area (Yin, 2014). A qualitative study is appropriate to create theoretical constructs, propositions and/or midrange theory (Eisenhardth and Graebner, 2007). In this study, I took a descriptive approach in the first step, because qualitative case study research is highly descriptive and stresses the social construction of reality (Gephart,

2004).

More importantly, qualitative research prefers participant observation and unstructured interviewing (Bryman and Bell, 2015). The objective of qualitative research is to illustrate and possibly explain events and experiences, but never to predict (Willig, 2001). Merriam (2009) identifies four key characteristics of qualitative research: that the focus is on the process, understanding, and meaning; the researcher is the primary instrument of data collection and analysis; the process is inductive, and the product is richly descriptive. Therefore, I used the qualitative study as a research methodology in the first step that tends to use an inductive approach rather than deductive reasoning in testing hypotheses or theories. In the second step, quantitative research consists of a survey is the sequence of qualitative research. The main purpose of this phase is to integrate HRM with KM which evolves HRM as a data science. In addition, examining the differences among KM, HRM, and Technological Professionals for using technology for the purpose of KM and KRM—are the secondary purpose of this step. So, a survey method was used to collect data (Bryman and Bell, 2015; Saunders, Lewis, and Thornhill, 2016). In this research, I employed 'data triangulation as shown in Figure 1.1. As part of data triangulation, I collected data in total from three steps that ensure the richness of data triangulation.

1.6.3 Case selection and data collection

The study was conducted in ARAMCO, Saudi Arabia. Saudi ARAMCO, which is widely referred to as ARAMCO, is a state-owned petroleum and gas company in Saudi Arabia (Saudi Aramco, 2021). It has the world's second-largest proven crude oil reserves and the largest daily oil production in the world (OPEC, 2021; The US Energy Information

Administration, 2021). In addition, it is the largest company in the world in 2022 (Wearden, 2022).

In this research, we selected the human resource (HRM) department of Saudi ARAMCO as a case of this study to understand the current state of the art of KM and HRM using technology which is known as ShareK. ShareK is a platform for acquiring, processing, storing, and sharing knowledge across Saudi ARAMCO. A total of 20 interviews were conducted at the headquarters of Saudi ARAMCO. The interviewees were selected after having a discussion with Saudi ARAMCO's HRM. After having a successful discussion with the HRM department in Saudi ARAMCO, I started to interview KM and HRM professionals from January 2020 to March 2020. The interview data were analyzed thematically. In addition, an online survey was conducted from January 2020 to March 2020. The data was analyzed using SPSS version 26. For details about the research methodology, see chapter 3,

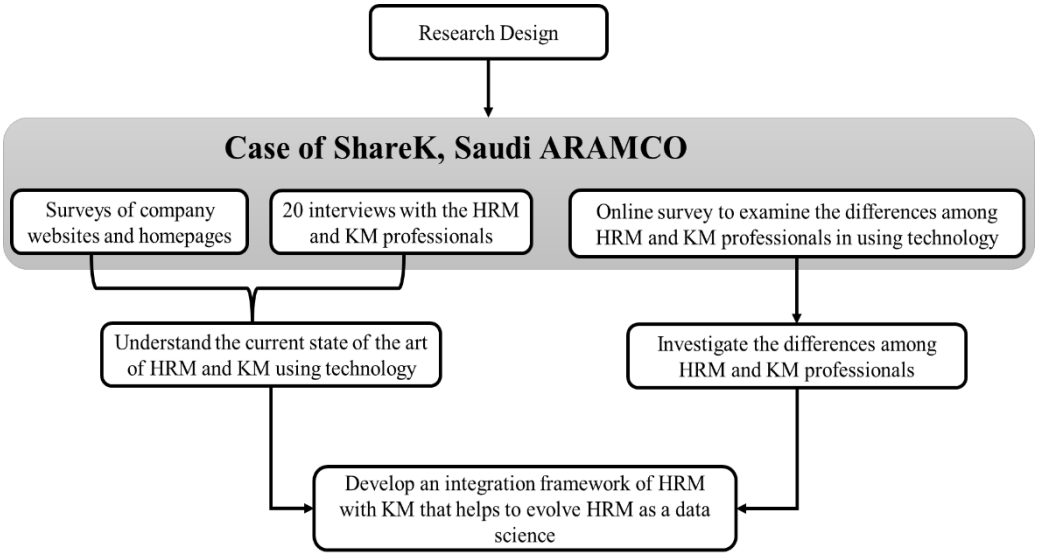

Figure 1.1: Data triangulation

1.7 Organization of the dissertation

This dissertation is organized into seven chapters. Figure 1.2 shows the structure of the dissertation. This introductory chapter provides the research background, problem statements, research objectives and questions, significance, and research methodology.

Chapter 2 provides an extensive review of literature on HRM, theories of HRM, technologies used for HRM, KM, theories of KM, and technologies used for KM. In addition, this chapter also provides a conceptualization of the integration of HRM and KM using technologies based on existing literature from different disciplines.

Chapter 3 presents the methodology of the dissertation. First of all, this chapter starts with the case organization and provides the justification for selecting the case. Secondly, this chapter provides qualitative data collection and analysis processes. Finally, this chapter describes the quantitative data collection and analysis processes.

Chapter 4 shows the analysis of results from qualitative data covering the current state of the art of HRM, KM, and technologies used for HRM and KM. This chapter also shows the factors that help HRM to evolve as a data science.

Chapter 5 shows the results of the quantitative data analysis. It describes factors that influence KM and HRM professionals in Saudi ARAMCO for the integration of KM and HRM by using technology. In addition, this chapter also describes the descriptive analysis of survey data.

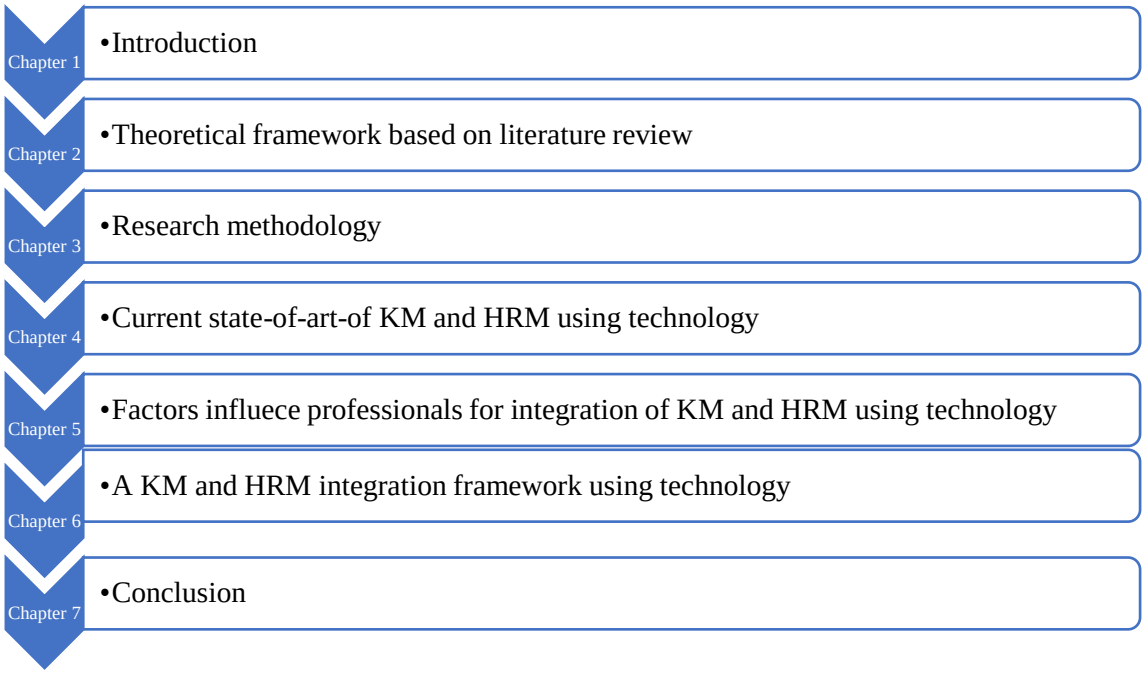

Figure 1.2: Structure of dissertation

Chapter 6 answers the research questions for elucidating an HRM and KM integration framework using technology that helps to evolve HRM as a data science.

Chapter 7 concludes with the summarization of the major findings of this research; discusses the limitations of this research, and finally provides future research directions.

Chapter 2

Theoretical Framework

2. Introduction

This chapter begins with the conceptualization of traditional human resource management (THRM) followed by traditional knowledge management (TKM). Secondly, the chapter also describes the different theoretical models of THRM and TKM. Thirdly, the use of technologies for HRM and KM is presented. Fourthly, this chapter conceptualizes modern HRM and its important components. Fifthly, this chapter describes the integration of modern HRM with different disciplines which will help to emerge modern HRM as a data science. Finally, this chapter concludes with a summary of the literature review.

2.1 Traditional human resource management (THRM)

The role of human resource management (HRM) is very important and unique for the success of any organization (Yahya and Goh, 2002). Traditionally, HRM is the process of selecting and recruiting humans, training and developing humans, evaluating their performance, rewarding them, and creating a culture of learning (Edvardsson, 2008; Armstrong, 2000). Similarly, Yahya and Goh (2002) defined HRM as the process of recruiting people, training them, evaluating their efforts for the organizations, and finally rewarding them. But the recent efforts by Google and ORACLE have influenced us to re-think HRM (Google, 2022a; 2022b; Duhigg, 2016; Schmidt and Rosenberg, 2014). In addition, the application of artificial intelligence (AI) and data science in HRM have also motivated us to reconceptualize and re-think HRM in the era of AI (Schmidt and Rosenberg, 2014; Vulpen, 2019; Kohda, 2022). As a result, in this research, ***HRM is defined as the recruitment of people, training them, evaluating their performance,***

rewarding them, and creating a culture where anyone can share his or her ideas and knowledge without any hesitations using technology.

2.1.1 Hiring and recruiting

Recruiting people is one of the core and the most important activities of HRM (Yahya and Goh, 2002). The success of an organization mostly depends on its employees (Edvardsson, 2008). So, hiring suitable people is very important for keeping competitive advantage for any organization (Soliman and Spooner, 2000). Traditionally, hiring and recruiting new professionals takes more time and effort (Yahya and Goh, 2002). But currently, the processes of recruitment and hiring become easier and more convenient with the application of modern IT in HRM (Yusliza and Ramayah, 2012). In addition, now IT is playing a more crucial role in HRM than before (Vulpen, 2019). Almost all the recruiting activities including identifying the skill gaps and filling the skill gaps by recruiting talented and smart people are done by using modern IT (Yusliza and Ramayah, 2012; Vulpen, 2019; ORACLE, 2019; Schmidt and Rosenberg, 2014). Furthermore, modern IT supports the HRM professionals to receive a huge number of applications and select the best candidate by using modern IT (ORACLE, 2019; Schmidt and Rosenberg, 2014). Different social network tools like LinkedIn and other professional-oriented platforms play a significant role to judge and evaluate the skills of the people which helps HRM professionals to select and recruit the best candidate for their organization (Siddike, Islam, and Banna, 2015). Recently, artificial intelligence (AI)—based techniques like people analytics play a significant role in recruiting the most suitable and talented people for the organization (Duhigg, 2016; Schmidt and Rosenberg, 2014; Vulpen, 2019; Kohda, 2022; Bankins et al., 2022). Importantly, AI and people analytics could identify the best

talent based on their personal experience and data available (ORACLE, 2019).

2.1.2 Training and learning

Training and learning—are very important for the continuous development of the capabilities and skills of employees in the organization (Edvardsson, 2008; Yahya and Goh, 2002). Especially, newly recruited employees need training for improving their knowledge (Edvardsson, 2008). Importantly, proper training helps employees to gain the right skill sets which ultimately helps them to provide competitive advantages in the organization (Soliman and Spooner, 2000). In addition, training and learning support the development and improvement of competencies and skills of employees in the organization (Garavan, Morley, Gunnigle, and Collins, 2001). Furthermore, training provides learning opportunities for the employees which also helps them to keep updating their knowledge and continuously developing their specialization in the organization (Zaim, Keceli, Jaradat, and Kastrati, 2018). Importantly, training and learning help to develop the collective intelligence or knowledge of the employees in the organization (El-Farr and Hosseingholizadeh, 2019).

Recently, technologies have changed the idea of learning opportunities, especially through the massive open online courses (Siddike and Kohda, 2016). Technologies support HRM departments to provide plenty of training and learning opportunities for their employees (Marler and Parry, 2016; Yusliza and Ramayah, 2012). In addition, modern AI and VR technologies greatly support HRM professionals in learning and updating their knowledge by identifying the gaps between their existing knowledge and the future knowledge to be learned (Schmidt and Rosenberg, 2014; Vulpen, 2019;

ORACLE, 2019; Rijmenam, 2022). Specifically, modern AI and data analytics help HRM managers to identify the skills needed to be delivered to their employees (Vulpen, 2019). Amazingly, AI-based digital assistants can recommend job-related learning recommendations for their employees and offer related content including books and journal articles as well as online videos (ORACLE, 2019). In addition, AI and VR technologies could offer personalized learning, and collaborative learning, and optimize learning administration in the organization (ORACLE, 2019; Rijmenam, 2022).

2.1.3 Evaluating performance

Evaluating performance is another important function of HRM (Garavan et al., 2001; Whicker and Andrew, 2004). It is directly related to the success of an organization (Edvardsson, 2008). Specifically, evaluating performance is about who delivers what to the organization (Ishak, Eze, and Ling, 2010; Edvardsson, 2008). In addition, it is about giving emphasis on long-term targets for evaluating the performance of the employees (Whicker and Adrew, 2004). Furthermore, Garavan et al. (2001) provided the importance of developing a balanced score system for evaluating the performance of the employees by ensuring fairness at the levels of the organization. But technologies make performance evaluation easier and more convenient for the HRM professionals in the organizations (Yusliza and Ramayah, 2012).

Now-a-days, modern platform and AI-based technologies support the evaluation of employees' performance by tracking their performance, judging their activities, and judging the overall performance of the employees in the organization (Schmidt and Rosenberg, 2014; Vulpen, 2019; ORACLE, 2019; Hamouche, 2021). Especially, AI and

data analytics support HRM professionals to continuously monitor and judge the performance of the employees in the organization (Vulpen, 2019; Hamouche, 2021). Specifically, digital assistants help to evaluate the performance of the employees by simultaneously tracking the working behaviors of the employees in the system (ORACLE, 2019). In addition, technologies also support HRM professionals to identify the most active employees in the team as well as in the organization (Schmidt and Rosenberg, 2014).

2.1.4 Rewarding

Rewarding employees based on their performance propels the success of the organization (Edvardsson, 2008). Especially, rewarding motivates employees to contribute more to the organization (Yahya and Goh, 2002). Traditionally, there are both monetary and non-monetary rewards for the employees in the organization (Ishak, Eze, and Ling, 2010). Especially, non-monetary rewards for the employees play a significant role in contributing more to the organization which includes recognition, praise, acknowledgment, and independency for their work (Schmidt and Rosenberg, 2014). To some extent, it is about ensuring psychological safety as a reward for the employees which helps them to engage and collaborate with other members of the organization (Duhigg, 2016).

Especially, technologies play a significant role for HRM departments in rewarding their employees based on their performances (Schmidt and Rosenberg, 2014; Vulpen, 2019; ORACLE, 2019; Hamouche, 2021), because modern platform technologies support the HRM departments to evaluate the performance of the people in real-time which plays a

significant role in decision-making for providing rewards for the employees in the organization (Vulpen, 2019; Hamouche, 2021).

2.2 Modern HRM

Different efforts taken by Google, ORACLE, and Amy C. Edmondson as well as her colleagues remind us to re-think HRM as a data science (Google, 2022a; 2022b; Duhigg, 2016; Schmidt and Rosenberg, 2014; ORACLE, 2019; Garvin, Edmondson, and Gino, 2008; Edmondson, 1999; Edmondson, 2003). Specifically, the journey of modern HRM has been initiated by management and HRM scholars (Garvin, Edmondson, and Gino, 2008; Edmondson, 1999; 2003; Edmondson and Lei, 2014). Importantly, they introduced the concept of "***psychological safety***" in the organization (Edmondson, 1999; 2003). In addition, they also described the organization as a learning organization (Garvin, Edmondson, and Gino, 2008; Edmondson, 1999; 2003; Edmondson and Lei, 2014).

In addition, Google's Project Aristotle greatly influences to re-think and re-birth of HRM as a data science. The project was about what makes a team more effective in the organization. (Google, 2022a; 2022b; Duhigg, 2016). In this connection, Horii, Jin, and Levitt (2005) clearly demonstrated the differences between western style and Japanese-style in modern HRM. Especially, the western style is about a more decentralized team whereas the Japanese style is about a more centralized team in an organization (Horii, Jin, and Levitt, 2005). Figure 2.1 shows the differences between Western and Japanese-style teams in the organization.

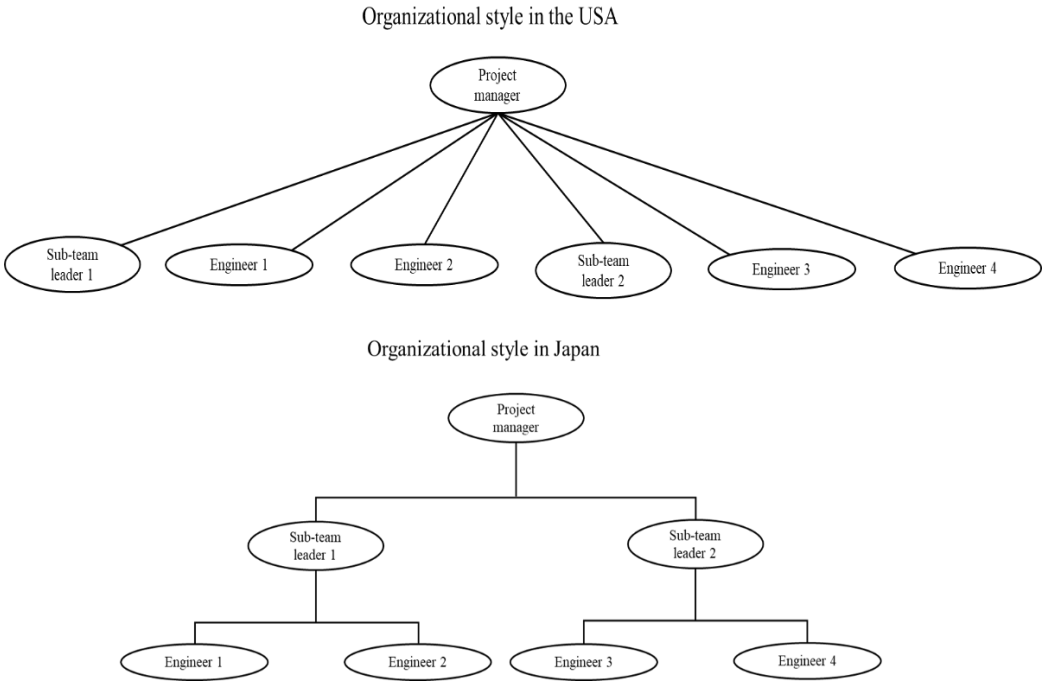

Figure 2.1: Differences between western style and Japanese style teamwork in the organization (Adapted from Horii, Jin, and Levitt, 2005)

Practically, Schmidt and Rosenberg (2014) gave the importance of managers as coaches in teams in modern HRM. They especially gave importance to the managers by citing that if a player needs a coach why an employee does not need a manager in the organization—which lays down the concept of modern HRM (Schmidt and Rosenberg, 2014). Inspired by Schmidt and Rosenberg's book in 2014, Google's Project Aristotle was initiated in 2016 and found that psychological safety, dependability, structure, clarity, meaning, and impact—are the important identity dynamics of team effectiveness (Google, 2022b; Duhigg, 2016). Figure 2.2 shows the dynamics of team effectiveness in the organization.

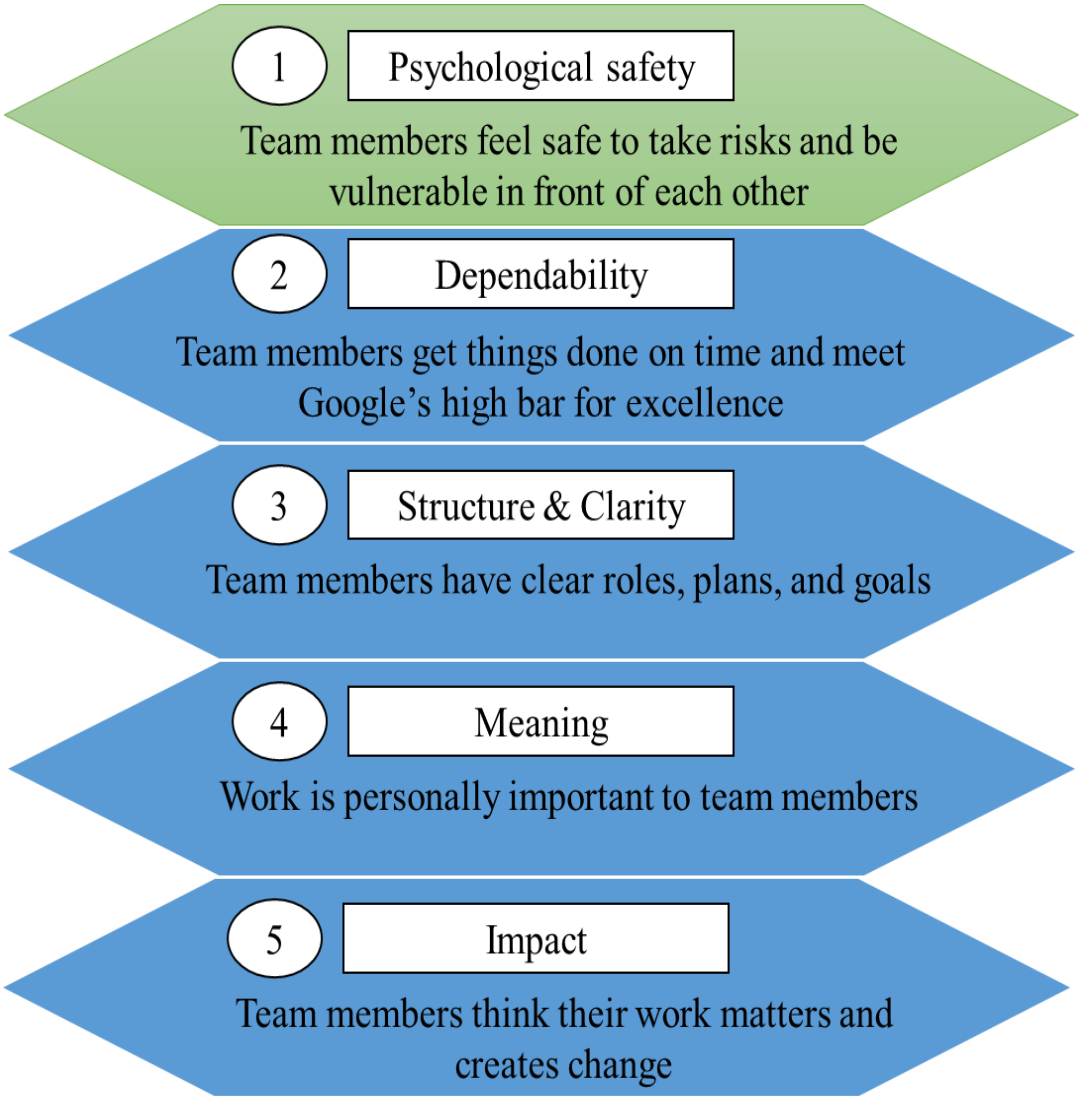

Figure 2.2: Dynamics of team effectiveness in the organization (Adapted from (Google, 2022b; Duhigg, 2016)

In addition, Google's Project Oxygen shows that managers matter and have a significant impact on organizational performance (Google, 2022a). Furthermore, people analytics using the modern AI and data science approaches provide HRM people with an evidence-based HRM (Vulpen, 2019; Schmidt and Rosenberg, 2014). Therefore, the concept of

"***psychological safety, dependability, and evidence-based decision***"—are the main components of modern HRM in this research. Table 2.1 provides a detailed summary of the components of modern HRM,

Table 2.1: Summary of components of modern HRM

Components of modern HRM	Sub-components of modern HRM	Sources
Psychological safety	-No fear of punishments	(Garvin, Edmondson, and Gino, 2008; Edmondson, 1999; 2003; Edmondson and Lei, 2014)
	-Learning	(Garvin, Edmondson, and Gino, 2008; Edmondson, 1999; 2003)
	-Speaking freely	(Garvin, Edmondson, and Gino, 2008)
	-Feeling safe	(Google 2022a; Duhigg, 2016; Schmidt and Rosenberg, 2014)
	-No risks of sharing anything	(Duhigg, 2016)
	-No fear of embarrassing	(Duhigg, 2016; Schmidt and Rosenberg, 2014)
	-Open Culture	(Schmidt and Rosenberg, 2014)
Dependability	-Relationship with others	(Schmidt and Rosenberg, 2014; Edmondson, Kramer, and Cook, 2004)
	-Depend on other employees	(Schmidt and Rosenberg, 2014; Edmondson, Kramer, and Cook, 2004)
	- Proactive communication	(Google 2022a; Duhigg, 2016; Schmidt and Rosenberg, 2014)
	-Rely on information	(Duhigg, 2016; Edmondson, Kramer, and Cook, 2004)
	-Trust the recommendations provided by AI	(Siddike and Kohda, 2018a; 2018b; 2018c)
Evidence-based decision	-Making decisions based on the data, information, and knowledge provided by AI	(Vulpen, 2019; ORACLE, 2019; Hamouche, 2021)
	-Making decisions based on the suggestions or recommendations provided by digital assistants	(Siddike and Kohda, 2019; Siddike and Kohda, 2018a; Siddike et al., 2018a; Siddike et al., 2018b)

2.2.1 Psychological safety

The psychological safety of the employees plays a vital role in the success of modern

organizations (Google 2022a; Duhigg, 2016; Schmidt and Rosenberg, 2014; Garvin, Edmondson, and Gino, 2008; Edmondson, 1999; 2003; Edmondson and Lei, 2014). It is about the interpersonal risks taken by people in modern organizations (Edmondson and Lei, 2014). ***Psychological safety is a belief that one will not be punished or humiliated for sharing his or her ideas, asking questions, expressing concerns, or doing mistakes in the organization*** (Garvin, Edmondson, and Gino, 2008; Edmondson, 1999; 2003; Edmondson and Lei, 2014). This group of scholars is the pioneer in advocating the concept of psychological safety in the organization (Edmondson, 1999; 2003; Edmondson and Lei, 2014). Importantly, they described psychological safety as a critical factor for the success of the modern organization which includes voice, teamwork, team learning, and organizational learning (Garvin, Edmondson, and Gino, 2008; Edmondson, 1999; 2003; Edmondson and Lei, 2014). Furthermore, they mainly identified trust, voice, teamwork, and learning are the main components of psychological safety at the individual level, group level, and organizational level.

In the case of the Google Aristotle project, ***psychological safety is defined as the interpersonal belief that an employee is safe for providing or sharing his or her knowledge, ideas and concepts in the organization*** (Google 2022a; Duhigg, 2016; Schmidt and Rosenberg, 2014). In addition, employees feel safe taking risks around their colleagues within an organization with psychological safety (Duhigg, 2016). Furthermore, it is about a feeling of confidence that no one in the organization will embarrass or punish anyone else for committing mistakes, asking questions, and providing new ideas or concepts (Google 2022a; Schmidt and Rosenberg, 2014).

In this research, ***psychological safety is defined as the interpersonal beliefs of the professionals in the organization that no one will punish or harass anyone in the organization for sharing knowledge or information, or ideas on the platform by ensuring the open and sharing culture in the organization at any levels at the organization.***

2.2.2 Dependability

In general, dependability is a psychological construct relating to how people depend on each other (Deutsch, 1960; Pentland, 2008). Some scholars described it as how people trust each other which generates dependability in the interpersonal relationship (Jones, James, and Bruni, 1975). But in the case of modern HRM, dependability is another important component. So, dependability is defined as how the employees of an organization can dependent each other for their organizational success (Schmidt and Rosenberg, 2014; Edmondson, Kramer, and Cook, 2004). In addition, it is also about proactive communication, relationships, and relying on information provided by the employees of the organization (Google 2022a; Duhigg, 2016; Schmidt and Rosenberg, 2014; Edmondson and Lei, 2014). Furthermore, it is about relationships among the people in the organization (Schmidt and Rosenberg, 2014). It is also about how people rely on the information provided by the people in the organization (Duhigg, 2016; Edmondson, Kramer, and Cook, 2004). So, in this research, d***ependability is defined as the relationship and connections developed over time through the use of technologies among the people in the organization and people depend on the information and knowledge generated through the continuous interactions via the technology***.

2.2.3 Evidence-based decision

The evidence-based decision is the most important component of modern HRM. Specifically, modern AI, data science, and VR technologies support HRM professionals to make evidence-based decisions (Vulpen, 2019; Schmidt and Rosenberg, 2014; ORACLE, 2019; Hamouche, 2021; Rijmenam, 2022). First, modern AI technologies help HRM professionals continuously collect, and data about people in the organization for making decisions (Vulpen, 2019; ORACLE, 2019; Hamouche, 2021). In addition, AI technologies also support people in the organization by providing high-quality recommendations (Spohrer, Siddike, and Kohda, 2017; Siddike and Kohda, 2018a; 2018b; 2018c). Furthermore, AI technologies help people make data-driven decisions while understanding the context around the people (Siddike and Kohda, 2019; Siddike and Kohda, 2018a; Siddike et al., 2018a; Siddike et al., 2018b). So, in this research, evidence-based decision is defined as making decisions based on the accurate data, information, and knowledge provided by the technologies in the organization.

2.3 Traditional knowledge management (TKM)

Knowledge management (KM) is a part of HRM (Edvardsson, 2008). As knowledge resides inside the human brain, human is considered the most important resource in the knowledge society (Nonaka and Takuechi, 1995). Traditionally, KM is the process of creating, processing, transferring, and applying knowledge within the firm to gain and sustain a competitive advantage (Nonaka, 1994; Nonaka and Takuechi, 1995; Alavi and Leidner, 2001). Scholars from KM have described different theoretical models/frameworks for creating, capturing, processing, and transferring knowledge (Nonaka and Takuechi, 1995; Alavi, Leidner, 2001; Roknuzzaman, Kanai, and Umemoto,

2009). But modern technologies play the most important role in creating, sharing, and applying knowledge in an organization (Kankanhalli, Teo, Tan, and Wei, 2003; Saito, Umemoto, and Ikeda, 2007; Hansen, Nohria, and Tierney, 1999; Nonaka and Takuechi, 2019; Kohda, 2022). Especially, technology supports for codification and personalization of KM activities (Hansen, Nohria, and Tierney, 1999). Specifically, technologies help to codify and store more knowledge in the database in which people share those codified knowledge knowledge (Kankanhalli et al., 2003). On the other hand, more tacit knowledge is shared through direct personal communication using the modern technologies (Kankanhalli et al., 2003). In addition, Saito, Umemoto, and Ikeda (2007) described four types of technologies that support KM initiatives namely: collaborative technologies, dissemination technologies, discovery technologies, and repository technologies. Recently, Nonaka and Takuechi (2019) discussed how modern artificial intelligence (AI) technologies could be utilized for KM. More recently, Kohda (2022) described how AI could be applied in KM.

There are different components of KM. In this research, knowledge creation, knowledge organization, knowledge sharing, and knowledge application—are identified as the main components of KM (Nonaka, 1994; Nonaka and Takuechi, 1995; Alavi and Leidner, 2001; Yahya and Goh, 2002; Edvardsson, 2008). So, the components of KM are conceptualized in the following ways:

2.3.1 Knowledge creation

Creating new knowledge is very important for the success of any organization (Nonaka and Takeuchi, 1995). Traditionally, knowledge is created through continuous interactions

among the individuals, groups, and teams in the organization (Nonaka, 1994; Nonaka and Takeuchi, 1995). Now, modern technologies support the creation of new knowledge through the harmonious collaboration and interactions between technology and human (Saito, Umemoto, and Ikeda, 2007; Siddike, Iwano, Hidaka, Kohda, and Spohrer, 2017; Nonaka and Takeuchi, 2019; Kohda, 2022). Specifically, the platform technology is considered as virtual Ba which supports the creation of new knowledge via the continuous interactions and collaborations between people and the technology (Nonaka and Takeuchi, 2019). Interestingly, both humans and technology can learn from each other and create new knowledge for their own discipline (Kohda, 2022). However, ***knowledge creation is defined as the process of creating new knowledge through the interaction between people with the platform*** in this research. Both tacit and explicit knowledge creation is supported by the platform technology.

2.3.2 Knowledge organization

Knowledge organization is another important component of KM. Specifically, organizing knowledge for use and reuse by the employees of an organization is very important for the success of the organization (Nonaka and Takuechi, 1995; Yahya and Goh, 2002; Edvardsson, 2008). Different technologies support the organization or storage of knowledge (Saito, Umemoto, and Ikeda, 2007; Benbya, Passiante, and Belbaly, 2004; Deloitte, 2018; Nonaka and Takuechi, 2019). As a result, knowledge organization or storage is very essential to the organization. In this research, ***knowledge organization is defined as the storage of the created new knowledge using database technologies***.

2.3.3 Knowledge sharing

Knowledge sharing is one of the most important functions of KM. Sharing knowledge by the employees with other employees in the organization provides competitive advantages for the organization (Edvardsson, 2008; Nonaka, 1994). Traditionally, new knowledge is shared among the people in the organization at the individual level, group level, and organizational level (Nonaka and Takuechi, 1995). But modern technologies make it easy and convenient to share knowledge with a wider number of people irrespective of boundaries (Nonaka and Takuechi, 2019). Importantly, social network technologies also change the world by sharing knowledge with a wider audience (Siddike, Islam, and Banna, 2015). However, ***knowledge sharing is defined as the dissemination of knowledge among the people in the organization using technologies*** in this research.

2.3.4 Applying knowledge

Applying knowledge by the employees of an organization for developing their own skills and improving knowledge which certainly plays important role in the development and innovation of the organization (Nonaka and Takeuchi, 1995; Yahya and Goh, 2002). Specifically, the application of acquired knowledge and skills by the employees of an organization propels the success of that organization (Schmidt and Rosenberg, 2014). Importantly, creating, storing, and sharing knowledge makes an organization as a learning organization (Soliman and Spooner, 2000; Garavan et al., 2001). As a result, gained knowledge and skills work as a competitive advantage for the organization (Barney, 1991). Nowadays, modern technologies make it easy for employees to learn from different sources which play a significant role to update their knowledge and enhancing their knowledge and skills (Siddike and Kohda, 2016). More specifically, the recent application

of AI and data science approaches play a significant role to gain new knowledge and apply that knowledge to enhance the performance of the people in the organization (Kohda, 2022; Siddie et al., 2018a; 2018b; Schmidt and Rosenberg, 2014). In this research, ***the application of knowledge is defined as the use of gained knowledge, skills, and experience for enhancing the performance of the employees of an organization***.

2.4 Integration of HRM with KM in the organization

The researchers from KM and HRM have described the integration of KM and HRM in organizations without providing evidence (Fl-Far and Hosseingholizadeh, 2019; Edvardsson, 2008; Yahya and Goh, 2002; Uma, 2014; Soliman and Spooner, 2000; Hansen et al., 1999). First of all, scholars identified codification and personalization strategies for the KM and HRM theoretically (Hansen et al., 1999; Gloet and Berrell, 2003). Based on the codification and personalization strategies, several researchers proposed different strategies for KM and HRM. For example, Edvardsson (2008) identified an exploitative and explorative strategy for the integration of HRM and KM from the behavioral point of view. In addition, Uma (2004) identified different roles of HR in KM which includes knowledge facilitator, human capital stewardship, and relationship builder. Recently, Fl-Far and Hosseingholizadeh (2019) mapped the role of HRM in supporting various KM strategies using both codification and personalization points of view. But scholars pointed out that technology plays an important role which works as a mechanism for codification and personalization of KM (Armstrong, 2000; Soliman and Spooner, 2000).

2.4.1 Codification and personalization strategy for HRM and KM

The codification and personalization strategy for HRM and KM was by Hansen et al. in 2003. Codification is related to the storage or organization of explicit knowledge which is created, shared, and disseminated by the people in the organization recruiting them, training them, and evaluating their performance (Hansen et al., 1999; Gloet and Berrell, 2003; Fl-Far and Hosseingholizadeh, 2019). On the other hand, personalization is about the dissemination and creation of tacit knowledge in the organization while sharing knowledge through training or other technological platforms (Hansen et al.,1999; Soliman and Spooner, 2000; Fl-Far and Hosseingholizadeh, 2019).

2.4.2 Exploitative and explorative strategy for HRM and KM

The strategy of exploitative and explorative for HRM and KM was introduced based on the idea of codification and personalization strategy of HRM and KM. The exploitative strategy is about the storage of knowledge and distribution of explicit knowledge via technology. On the other hand, the explorative strategy is about the creation of knowledge through human interactions which are directly related to the creation of new knowledge through the sharing of tacit knowledge (Edvardsson, 2008).

2.4.3 Role of HRM in KM

Recently, Uma (2014) described the different roles of HR in KM based on the idea of personalization and codification of HRM and KM strategy. Specifically, HR professionals can play the role of knowledge facilitators training and developing HR professionals for the organization. Secondly, HR professionals can play the role of human capital stewardship while recruiting talented professionals through the creation of knowledge.

Finally, HR professionals can play a significant role in relationship building through the dissemination and accumulation of knowledge.

2.5 Evolving modern HRM as a data science

Broadly, HRM is the sub-discipline of management science. Modern management science starts with the idea of "scientific management" (Taylor, 2005). The HRM evolves from personal management to scientific management to traditional HRM (Taylor, 2005; Mayson and Barrett, 2006; Edvardsson, 2008). Previously, scholars discussed HRM as a science, but they failed to provide experimental evidence in the case of HRM as a science rather than considering HRM as a practice (Mayson and Barrett, 2006). Some of them considered HRM to be both art and science. As HRM uses a scientific approach to inquiry to investigate the issues in HRM and they considered HRM as science because HRM is the same all over the world. They also argued that it is an art because it deals with the practices of HRM, and it is context-oriented (Sparrow, Brewster, and Harris, 2004).

But "modern HRM" evolves as a data science—is conceptualized in this research. Why? Because different efforts taken by Google, ORACLE, and Amy C. Edmondson as well as her colleagues remind us to re-think modern HRM as a data science (Google, 2022a; 2022b; Duhigg, 2016; Schmidt and Rosenberg, 2014; ORACLE, 2019; Edmondson, 1999; Edmondson, 2003). Academically, scholars introduced, tested, and validated the idea of psychological safety and organization as a learning organization in modern HRM (Garvin, Edmondson, and Gino, 2008; Edmondson, 1999; 2003; Edmondson and Lei, 2014).

Importantly, the detailed experiments conducted by Google on the dynamics of the teams in Google, especially remind us to rethink HRM as a data science. Specifically, Google's Project Aristotle greatly influences to re-think and re-birth of HRM as a data science. The project was about what makes a team more effective in the organization. (Google, 2022a; 2022b; Duhigg, 2016). Google conducted the experiments inside Google for several years and found the team dynamics—psychological safety, dependability, and evidence-based decisions (Google, 2022a; Google, 2022b, Duhigg, 2016). In addition, modern AI and data science approach are also applied in modern HRM to make evidence-based decisions that are more experimental and helps to evolve HRM as a data science (Vulpen, 2019). Specifically, Google's efforts as "people analytics" and its HRM name encourage us to rethink modern HRM (Vulpen, 2019). More recently, ORACLE also started to use more data scientific approaches to its HRM (ORACLE, 2019).

2.6 Summary

The summarization of this chapter is presented in the following ways:

- Recruiting, training, evaluating, and rewarding—are conceptualized as the components of traditional HRM.

- Psychological safety, dependability, and evidence-based decision—are conceptualized as the components of modern HRM.

- Knowledge creation, knowledge storage, knowledge sharing, and knowledge application—are conceptualized as the components of traditional KM.

- Codification, personalization, exploitation, and exploration—are the main approaches to the integration of HRM and KM.

- Finally, modern HRM evolves as a data science—is conceptualized based on the efforts taken by Google and ORACLE as well as the application of modern AI and data science approaches in HRM.

Chapter 3

Research Methodology

3. Introduction

This chapter describes the research methodology and research design to answers the research questions. Firstly, this chapter begins with the justification to the chosen research methodology followed by the description of the case organization. Secondly, the chapter discusses the qualitative data collection and analysis process. Thirdly, this chapter describes the quantitative data collection analysis process. Finally, the chapter concludes with a summary.

3.1 Research design

A case study adopts as a research strategy for this research. A case study is an appropriate approach given the need to develop an in-depth understanding of the phenomena (Yin, 2014). The Saudi ARAMCO was selected as a case for this research. The case study was conducted by applying qualitative and quantitative research methods consisting of interviews and surveys. In the first step, a qualitative method adopts that can be seen as a suitable method given the need to develop a detailed understanding of a relatively unexplored area (Yin, 2014). A qualitative research is suitable for developing a theory (Eisenhardth and Graebner, 2007). In this reach, I took a descriptive approach in the first step due to the power of construction of the theory (Gephart, 2004).

In the second step, quantitative research consists of a survey is the sequence of qualitative research. The main purpose of this phase is to examine whether is there any differences

between HRM and KM professionals' perceptions on HRM and KM activities. So, a survey method was used to collect data (Bryman and Bell, 2015; Saunders, Lewis, and Thornhill, 2016).

3.2 Case organization

Petroleum is the lifeblood of the Kingdom of Saudi Arabian's national economy (Alkhathlan, 2013). 87% of Saudi's national economy is generated from the petroleum sector (Index Mundi, 2021). ARAMCO is the largest state petroleum company in the Kingdom of Saudi Arabia (Saudi Aramco, 2021). The study was conducted in ARAMCO, Saudi Arabia. Saudi ARAMCO, which is widely referred to as ARAMCO, is a state-owned petroleum and gas company in Saudi Arabia (Saudi Aramco, 2021). It has the world's second-largest proven crude oil reserves and the largest daily oil production in the world (OPEC, 2021; The US Energy Information Administration, 2021). In addition, it is the largest company in the world in 2022 (Wearden, 2022). In this research, we selected the human resource (HRM) department of Saudi ARAMCO as a case of this study to understand the current state of the art of KM and HRM using technology which is known as ShareK. ShareK is a platform for acquiring, processing, storing, and sharing knowledge across Saudi ARAMCO. In this research, I only focused on ShareK platform for KM and KRM.

3.2.1 ShareK platform

ShareK is a platform for creating, processing, sharing, and applying knowledge across ARAMCO. Figure 3.1 shows the feature of ShareK platform.

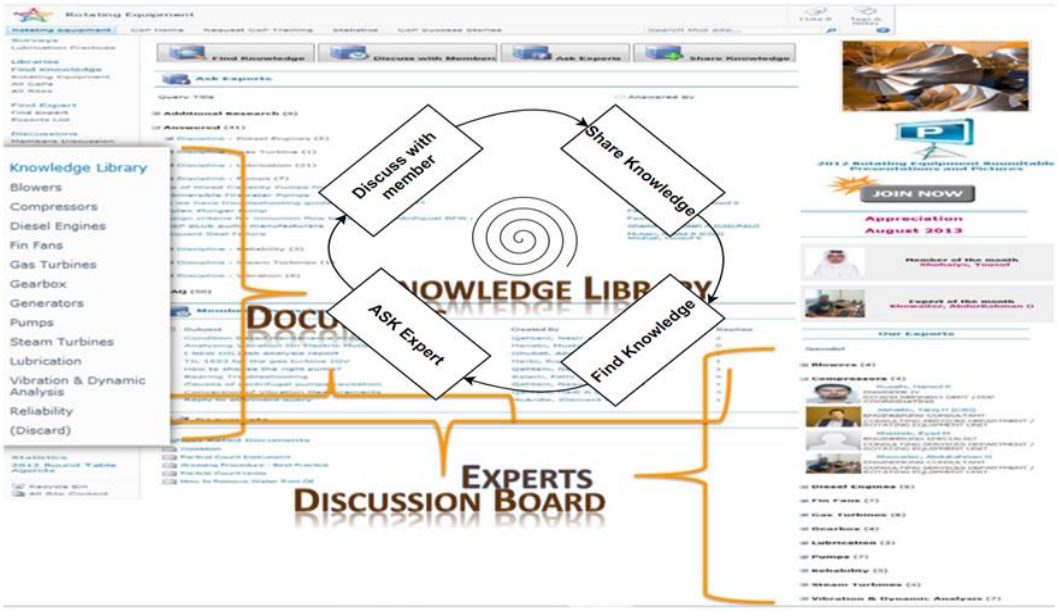

Figure 3.1: Features of ShareK platform(Source: An interviewee, ARAMCO)

It is a corporate knowledge sharing platform to promote knowledge creating and sharing and exploiting innovation, knowledge and skills. It focuses on linking people to people and linking people to knowledge. The ShareK platform is compatible with Saudi ARAMCP's information technology infrastructure. It has organization of workspaces, people connectors, and collaboration tools. Specially, ShareK is designed for supporting KM activities in Saudi ARAMCO. There are several features of ShareK which are discussed in the following ways:

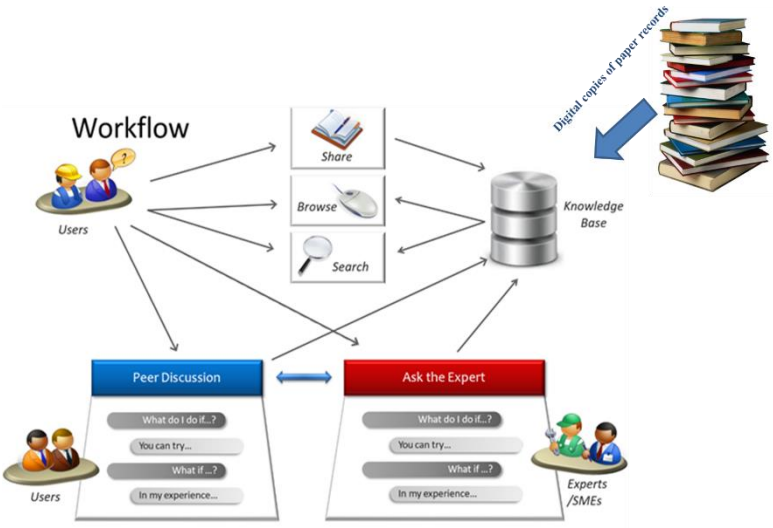

Figure 3.2: Database of ShareK for searching and browsing information (Source: an interviewee, ARAMCO)

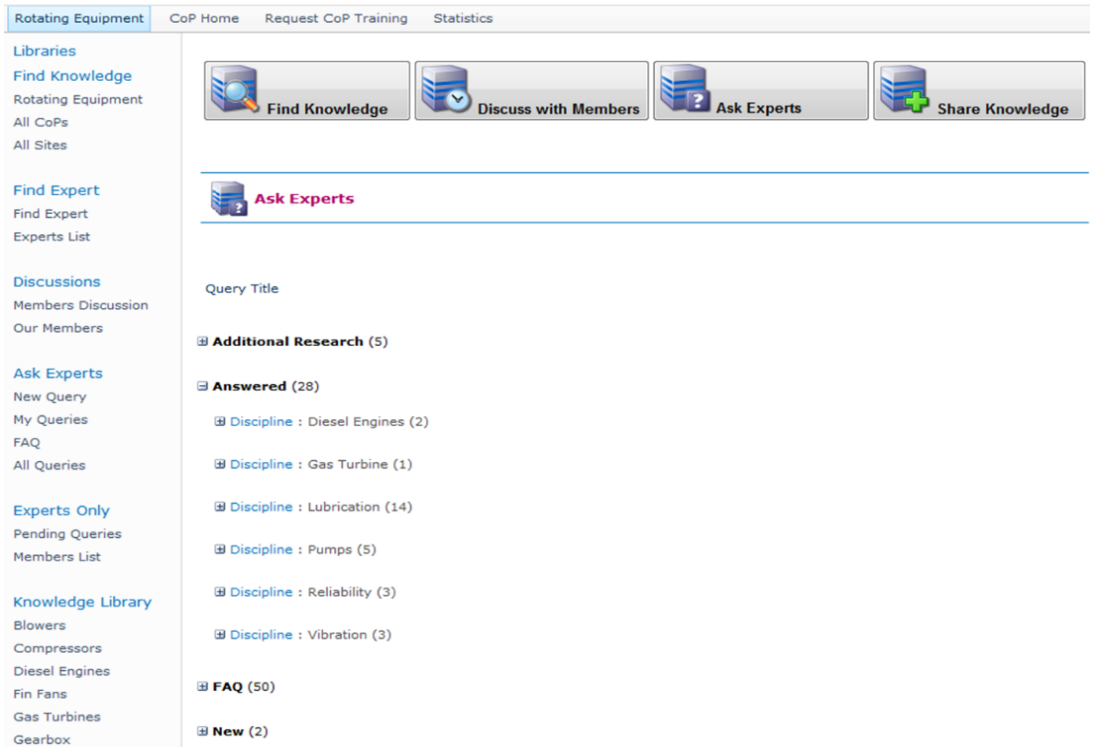

Figure 3.3: A screenshot of ask experts feature of ShareK (Source: an interviewee of ARAMCO)

3.2.1.1 Finding knowledge

Finding knowledge is one of the main features of ShareK platform. Especially, people from ARAMCO can search and browse in ShareK databases for finding knowledge. Figure 3.2 shows how the database of ShareK could be used for finding and sharing knowledge.

3.2.1.2 Asking experts

Asking experts is another important core features of ShareK. This function allows anyone from Saudi ARAMCO to ask and answer the questions. Specifically, experts are the groups of people who come together to share and to learn from one another. They are held together by a common interest in a body of knowledge through sharing, creating, processing and applying in their own departments. It helps to develop a set of shared practices by sharing knowledge and experience. In addition, asking experts ensure the collaboration to gain insight and accelerate solutions with the organization by solving work related problems. Figure 3.3 shows the features of asking experts of ShareK platform. Especially, any users post questions (which is mainly from the various plants across the Saudi Kingdom), which are answered by Experts.

3.2.1.3 Discuss with members

Discussing with members through a discussion board is another key feature of ShareK. Especially, the discussion board shows the display of the newest knowledge items added by an employee of Saudi ARAMCO (users). This also displays the documents that have been highly rated by the experts the rom community of practice. Figure 3.4 shows a screenshot the of discussion board feature of ShareK.

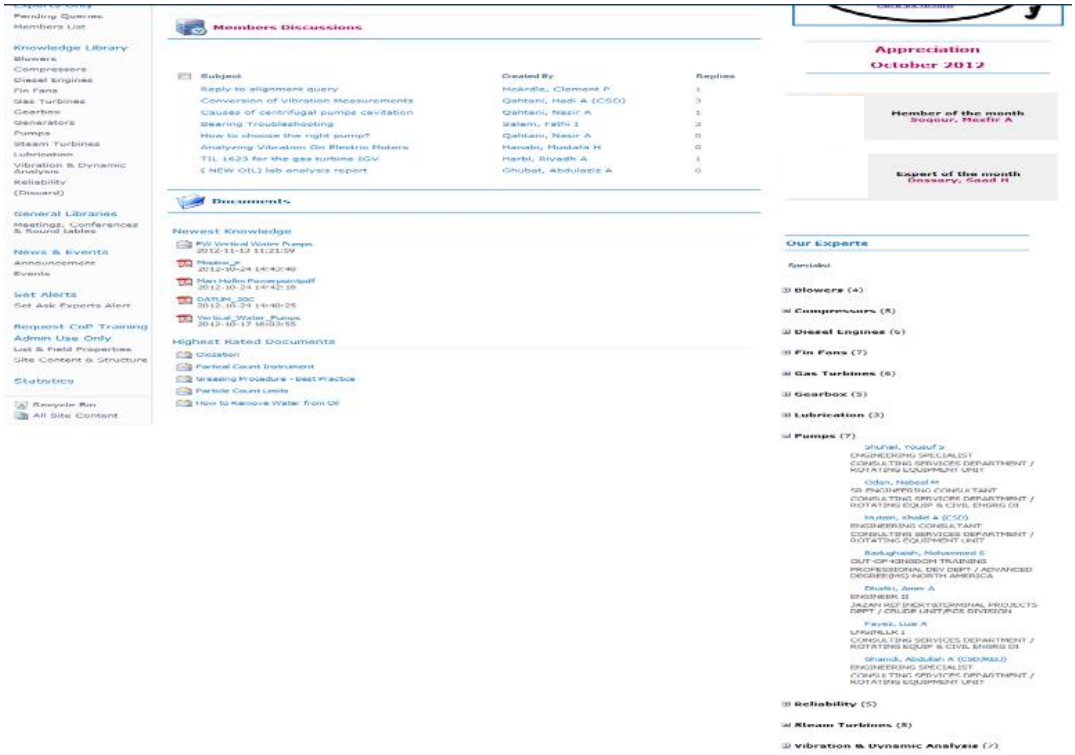

Figure 3.4: A screenshot of discussion board of ShareK (Source: an interviewee of ARAMCO)

The discussion board also shows the information related to who contribute the most (the most active members and experts) in the previous month. It also contains the information related to their expertise and specialization.

3.2.1.4 Knowledge sharing

Knowledge sharing is one of the key and important features of ShareK. ShareK is a knowledge sharing platform in which the knowledge is shared through one may ways, not like one-to-one way. Anyone in ARAMCO can share knowledge using the ShareK platform. Figure 3.5 shows a snapshot of how knowledge is shared in ARAMCO.

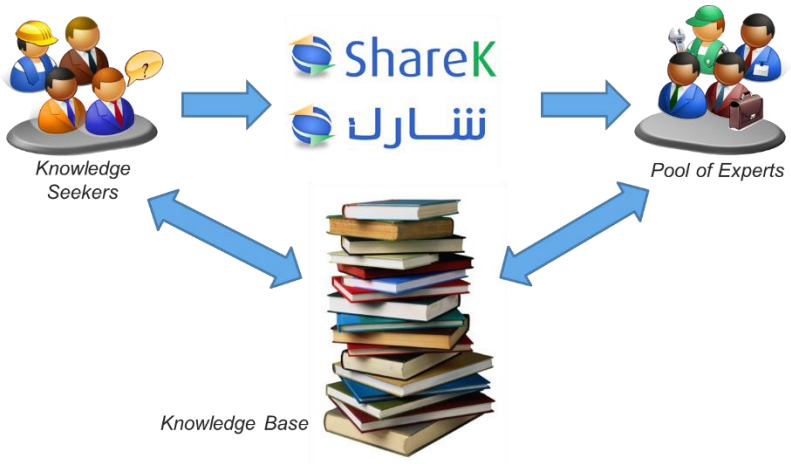

Figure 3.5: A snapshot of knowledge sharing in ShareK

3.3 Qualitative research method

In this step, qualitative research consisting of interviews was applied to understand the HRM and KM activities (Yin, 2014; Corbin and Strauss, 2015). Qualitative research is very suitable for building theory (Eisenhardth and Gaebner, 2007). Therefore, I chose qualitative research, because researcher like Gephart (2004) described that qualitative research is highly suitable for describing the social phenomena for construction the theory. As a result, qualitative research aims to describe the social phenomena rather than predict it (Willig, 2001).

3.3.1 Data collection

The data was collected by interviewing with the HRM and KM professionals in Saudi ARAMCO. A total of 20 face-to-face interviews were conducted using semi-structured interview protocols (see appendix 1). All the interviews were conducted from January

2020 to March 2020 in Saudi ARAMCO. The interviews were conducted into three phases. At the first phase, five interviews were conducted with KM professionals in Dhahran, Saudi Arabia during January. At the second phase, 5 interviews were conducted with KM professionals in Dhahran, Saudi Arabia during February 2020. Finally, 10 interviews were conducted with HRM professionals in Dhahran, Saudi Arabia in March 2020 (See appendix 4). Table 3.1 shows the information about the interviewees.

Table 3.1: Categorization of interviewees

Categorization	Frequency
KM manager	5
KM Assistant	5
HR officer	5
HR assistant	3
HR manager	1
HR business partner	1
Total	20

3.3.2 Communication with Saudi ARAMCO's HRM

For getting access to Saudi ARAMCO's HRM department, I contacted the Deputy Managing Director of Business Origination Technology in ARAMCO (See appendix 2). After having positive reply from him, I directly visited to the head office of Saudi ARAMCO in Dhahran. Having a successful meeting with him, he recommended me to the possible interviewees from KM and HRM professionals. Then, I contacted with the respective KM and HRM professionals' over mobile phone. After having appointment with the interviewee, I started conducting interview from January 2020 and continued till March 2020.

3.3.3 Interview participants

A total of 20 interviews were conducted in three steps. The interview participants were selected based on the discussion with the head office of HRM in Saudi ARAMCO. In the first phase, I interviewed five KM managers. In the second phase, I also interviewed with 5 KM assistants. In the final phase, I interview RM professionals which include HR managers, HR officers, HR assistants, and HR business partner.

3.3.4 Invitation to interviews

After having a successful discussion with the HRM department in ARAMCO, I got the communication details of KM and HRM professionals. In addition, the HRM department also informed those people about my research and the possibility of my visiting them for conducting interviews. After that, I contacted them over the mobile phone. Having an appointment, I have started interviewing them. After that all 20 interviews were conducted from January 2020 to March 2020 by using a semi-structured interview protocol. All the interviews ran for an average of 45 minutes, and all the interviews were recorded using iPhone. In addition, additional notes were also taken. To ensure the standard in handling the "human subject research", I obtain consent from the interviewees (see appendix 3).

3.3.5 Data analysis

The interview data was analyzed thematically by step-by-step procedures which include open coding, axial coding, selecting coding, and constant comparison (Glaser and Strauss, 1967). Thematic analysis is about generating for themes that to describe the phenomena (Daly, Kellehear and Gliksman, 1997). So, the process of thematic analysis includes

identifying themes by carefully reading and re-reading of data in which emerging themes become the categories and core-categories for analysis. As Lapadat (2009) described that thematic analysis is widely used due to its power of generating insightful interpretation of data.

3.3.5.1 Procedures of data analysis

The data analysis was done into several steps. Figure 3. 6 shows the step-by-step data analysis procedures followed in this research.

3.3.5.2 Conversion of recorded data into Word file

At the first step, the recorded interview data was converted into MS Word file by listening again and again by verifying the contents of the recorded interview several times. It is ensured that any important and essential information was not missing.

3.3.5.3 Open coding

Figure 3.7 shows an example of open, axial, and selective coding of interview script and its constant comparison. So, the open coding was done by reading line by line and sentence by sentence. I generate the open coding by reading and re-reading the interview several times. In addition, I read each interview word-by-word, sentence-by-sentence, and paragraph-by-paragraph,

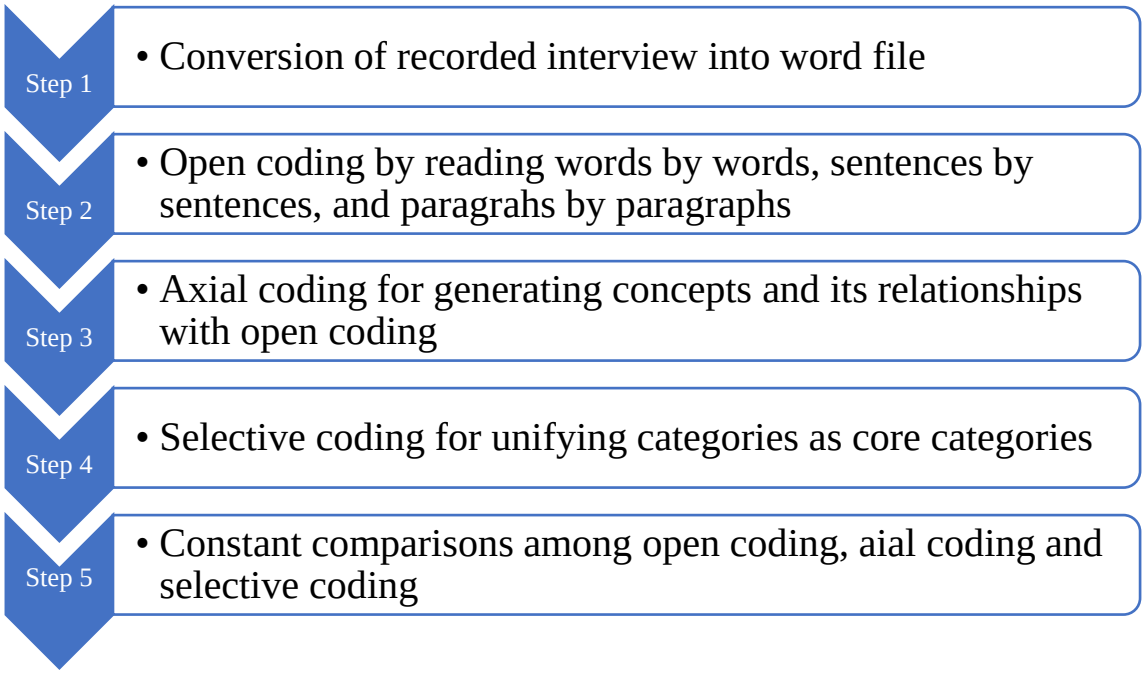

Figure 3.6: Step-by-step data analysis procedures

3.3.5.4 Axial coding for generating concepts and its relationship with open codes

All the concepts were generated by looking back at the data after open coding. I also generated connections among all the codes and concepts. In this phase, I verified all the relationships and connections among codes and concepts repeatedly.

3.3.5.5 Selective coding for unifying categories as core-categories

The selective coding processes were carried out to merge all the categories as core categories. The core categories present the main theoretical constructs of this research. This selective coding helps to unify the categories as core categories in this research. Finally, the theoretical framework of modern HRM practices and KM practices were developed.

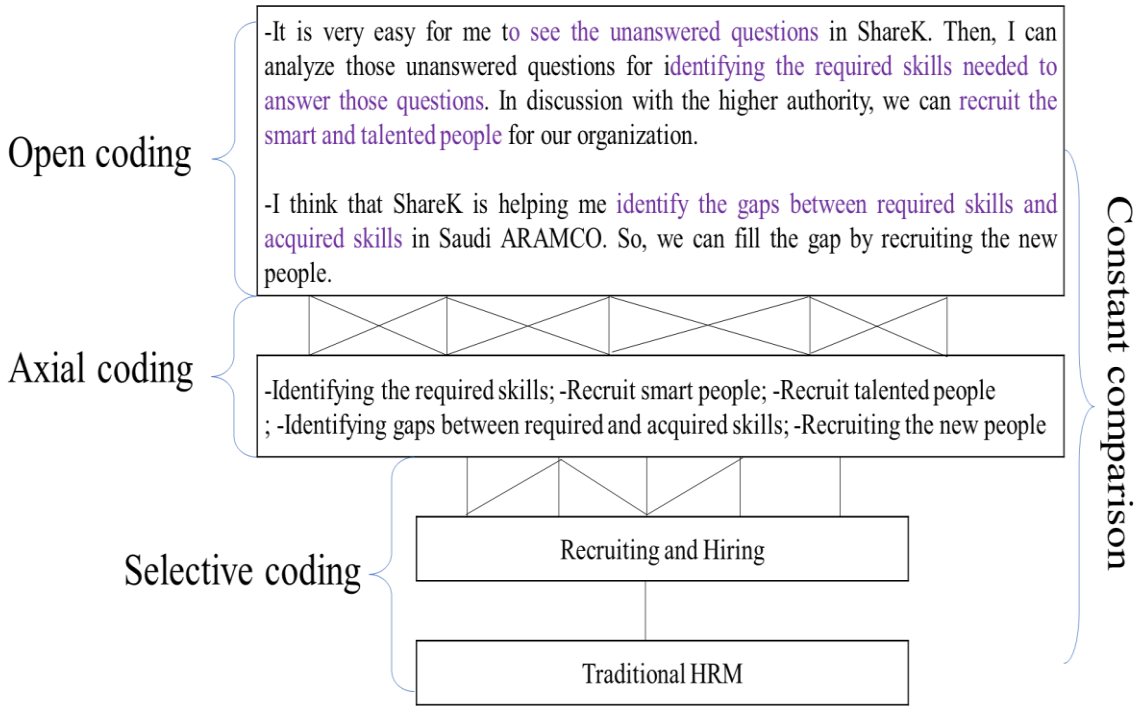

Figure 3.7: An example of open, axial, and selective coding from interview script and its comparison

3.3.5.6 Constant comparison among the codes, concepts, categories, and core-categories

In this phase, I constantly compare the codes, concepts, categories, and core-categories to verify all the theoretical constructs again and again. I compared all the relevant data and its codes, concepts, categories, and core categories from 20 interviews to reach the theoretical saturation.

3.4 Quantitative research

The purpose of this quantitative research is to examine if there are any differences between HRM and KM professionals' perceptions of HRM and KM activities. An online

survey was conducted to collect data to investigate the differences between HRM and KM professionals (Bryman and Bell, 2015).

3.4.1 Survey population

To examine the differences between HRM and KM professionals, the participants are the HRM and KM professionals from Saudi ARAMCO. This online survey covers the population across ARMCO, because everyone has an equal opportunity to response the online questionnaire.

3.4.2 Sampling in this research

In this research, a simple random sampling technique was applied. As in simple random sampling technique, everyone in the population has the same opportunity to be included in the sample (Bryman and Bell, 2015). This survey was conducted online in Saudi ARAMCO. The link to the questionnaire was sent to the HRM and KM departments of Saudi ARAMCO. Then, the HRM and KM department sent the link of the questionnaire to all the KM and HRM professionals of ARAMCO via email. So, every HRM and KM professional has the opportunity to response the survey. Therefore, simple random sampling technique was applied in this research.

3.4.3 Survey instruments

The survey instruments were designed and developed based on previous research on HRM, KM, and technologies for HRM and KM (Edvardsson, 2008; Yahya and Goh, 2002; Saito, Umemoto, and Ikeda, 2007). I adapted the HRM functions-related questions

from the study of Edvardsson (2008), Yahya and Goh (2002). In addition, I also developed questions related to modern HRM activities from the book written by Schmidt and Rosenberg (2014). In addition, I also adapted questions from the study of Saito, Umemoto, and Ikeda (2007) on using technologies for HRM and KM activities. Finally, I adapted the questions related to KM activities from the study of Edvardsson (2008), Armstrong (2000), as well as Saito, Umemoto, and Ikeda (2007). For detailed about the questionnaire, see Appendix 5.

3.4.4 Administered the survey

The link of the online questionnaire was sent to the head office HRM and KM department of Saudi ARAMCO. Then, the head office of HRM and KM of Saudi ARAMCO sent the link of the online questionnaire to every KM and HRM professionals through the internal email. The survey was conducted from January 2020 and continued to March 2020.

Table 3.2: Background information about survey respondents

Variables	Frequency (n)	Percent (%)
Gender		
Male	227	80.0
Female	57	20.0
Age group (years)		
18 to 24	73	26.0
25 to 34	162	57.0
35 to 44	32	11.0
45 to 54	16	8.0
Education level		
High school	13	7.0
College level	169	60.0
Bachelor level	42	15.0

Masters and above	51	18.0
Level of experience		
Less than 6 months	90	32.0
1 - 2 years	65	23.0
More than 2 years	126	45.0
Profession		
HRM	204	72.0
KM	80	28.0

3.4.5 Data analysis

The survey data was analyzed by using IBM SPSS 26. First, we conducted descriptive statistical analysis to see the frequencies of HRM and KM activities by using technologies. Then, non-parametric test was conducted to examine the differences between HRM and KM professionals' perceptions about HRM and KM activities using technologies.

3.5 Summary

This chapter describes the methods applied to carry out the research. This chapter is summarized in the following ways:

- This chapter describes the procedures of data collection and analysis.
- This chapter discusses the qualitative research method applied in this research.
- It describes the quantitative research approach used in this research.

Chapter 4

Current State-of-Art of HRM and KM

4. Introduction

This chapter describes the results of interview data analysis. Firstly, this chapter shows the background of the interviewees. Secondly, it presents the current state-of-art of traditional and modern HRM practices. Thirdly, this chapter describes the current practices of KM. Fourthly, it presents the factors that influence HRM to evolve as a data science through the integration of HRM and KM. Finally, this chapter concludes with a summary.

4.1 Background of the interviewees

A total of 20 face-to-face interviews were conducted. All the interviews were conducted from January 2020 to March 2020 in Saudi ARAMCO. The interviews were conducted in three phases. In the first phase, five interviews were conducted with KM professionals in Dhahran, Saudi Arabia during January. In the second phase, 5 interviews were conducted with KM professionals in Dhahran, Saudi Arabia during February 2020. Finally, 10 interviews were conducted with HRM professionals in Dhahran, Saudi Arabia in March 2020 (see appendix 4 for detailed background of the interviewees).

In chapter 3, Table 3.1 shows the categorization of interviewed HRM and KM practitioners. The results show that the HRM and KM practitioners include HR manager (1), HR officer (3), HR assistant (5), HR business partner (1), KM manager (5), and KM assistant (5).

A total of 20 interviews were conducted. Table 4.1 shows the details of the interviewees. The interviews were digitally recorded and transcribed. Only the relevant data and information from the interviews were used for the analysis. The collected data were analyzed using the techniques of ***"grounded theory"*** (Glaser and Strauss, 1967; Corbin and Strauss, 2015).

4.2 Current state-of-art of HRM practices

The current state-of-art of HRM practices is described in this section. The results of this research show that the functions of the platform technology namely ShareK used by HRM professionals for traditional and modern HRM activities. Some of the interviewees reported that the platform ShareK used for selecting and recruiting, training and education, evaluating performance, and rewarding people in Saudi ARAMCO which are considered as very basic and traditional activities of HRM. On the other hand, some of the interviewees stated that ShareK applied for supporting psychological safety, dependability, and evidence-based decision in Saudi ARAMCO which are considered as modern HRM activities. Figure 4.1shows the categories and core-categories of the current state-of-art of HRM activities.

4.2.1 Hiring and recruiting

Recruiting people is one of the core activities of HRM. Hiring suitable people is very important for keeping competitive advantage for any organization. The results of this research show that ShareK supports the recruiting activities by identifying the skill gaps and filling the skill gaps by recruiting the talented and smart people. The result indicates that ShareK helps HRM people to identify the unanswered questions in the platform

which help them to determine the talented and smart people who can answer those questions asked by other employees in the platform of ShareK. In this connection, an interviewee reported that:

> *It is very easy for me to see the unanswered questions in ShareK. Then, I can analyze those unanswered questions for identifying the required skills needed to answer those questions. In discussion with the higher authority, we can recruit the smart and talented people for our organization (HRMP1).*

> *I think that ShareK is helping me identify the gaps between required skills and acquired skills in Saudi ARAMCO. So, we can fill the gap by recruiting the new people (HRMP3).*

4.2.2 Training and learning

Training and learning—are very important for continuous development of the capabilities and skills of employees in the organization. It helps the employees to keep update their knowledge. The results of this research show that ShareK platform used for training and learning purposes. Especially, the database of ShareK contains all the information related to different answers provided by different employees in Saudi ARAMCO which could be used as resources for providing training to the newly recruited employees and advancing the learning opportunities for the employees in the organization. In this connection, an HRM manager described:

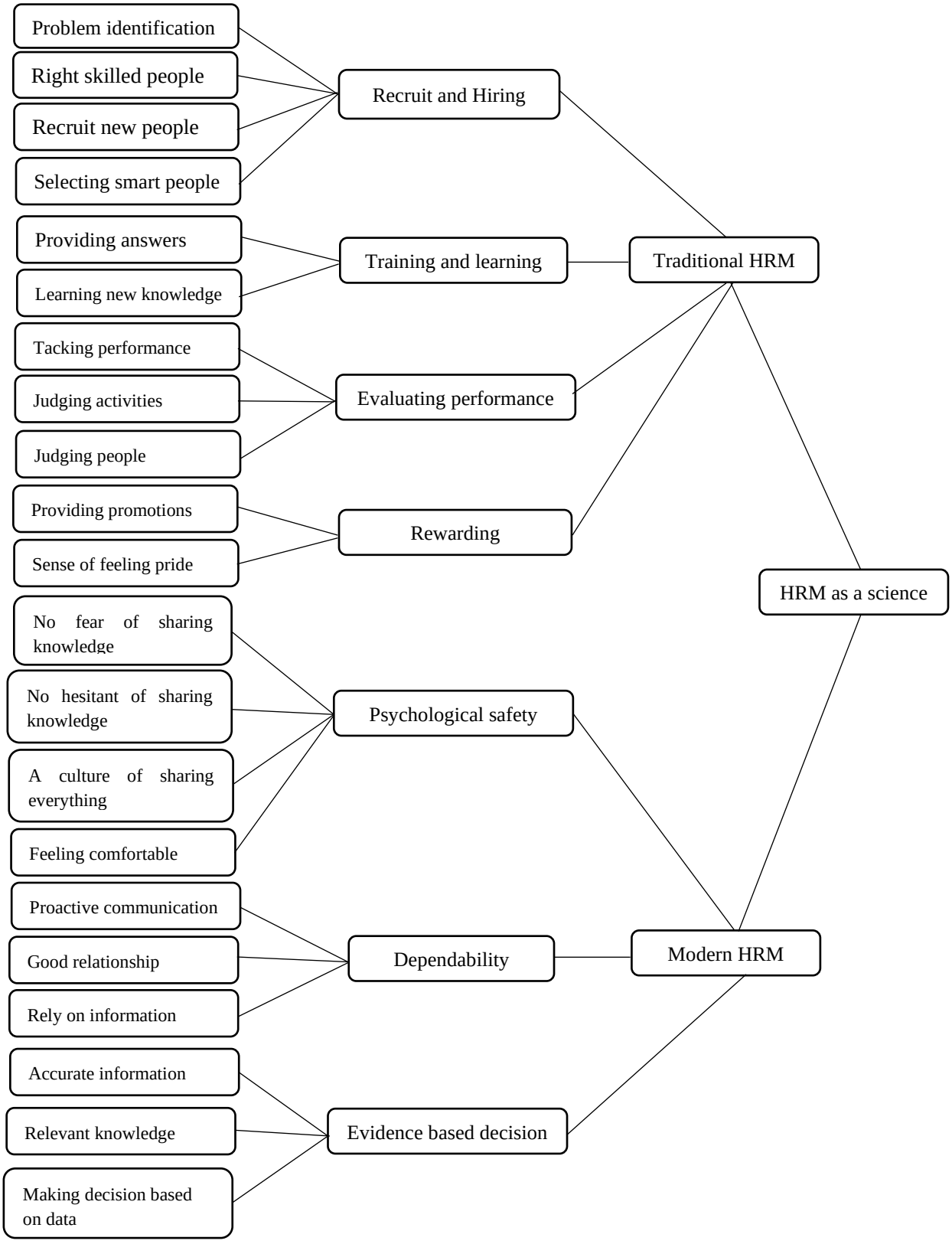

Figure 4.1: Categories and core-categories of HRM activities

> *I think that the answers provided by other employees in the ShareK platform could be searched like we do search in Google. So, the newly recruited employees could use those contents for the learning purposes (HRMP2).*

Another HRM professional stated:

> *I personally use ShareK platform for learning purposes. Because I think that I can use this platform just like Google. I can search any required information for professional reasons. As a result, I believe that this platform could be use for learning purposes by other employees in ARAMCO (HRMP5).*

4.2.3 Evaluating performance

Evaluating performance is another important function of HRM. It is directly related to the success of an organization. The results show that ShareK supports the evaluation of employees' performance by tracking their performance, judging their activities, and judging employees. Some of the HRM professionals indicated that ShareK helps them to track the performance of the employees of their organization. In this regard, an HRM professional stated that:

> *I can easily see the person who is answering questions most of the times in the ShareK platform. It helps me to determine the most active and dynamic employees in our organization (HRMP1).*

Some of the HRM professionals reported that ShareK platforms helps them to identify the most active employees in the organization by exploring who is providing the answers most of the times, who is providing feedbacks, and who is asking most of the questions in the platform. In this connection, an HRM professional described:

> *ShareK helps me to track the performance of the employees. For example, I can easily see in the database who is providing answers several times, who is asking questions several times, and who is providing feedback. It helps me to determine the most active employees in our organization (HRMP6).*

4.2.4 Rewarding

Rewarding the employees based on their performance propel the success of the organization. Especially, rewarding motivates employees to contribute more to the organization. The results of this research show that ShareK platform helps HRM people to determine the employees for rewarding them by promotion or providing a sense of feeling pride in the organization. The result shows that some of the HRM professionals stated that ShareK helps them to determine the employees for providing them promotion. In this connection, an HRM professional reported that:

> *I think that I can determine the employees for providing promotions based on his/her performance in ShareK platform. Though it is not everything but the performance of employees on ShareK platform plays an important role for providing them*

promotions (HRMP1).

The results reveal that some of the HRM professionals reported that the employee can feel a sense of pride by sharing knowledge, answering questions, and providing feedbacks in ShareK platform. In this regard, an HRM professional stated:

> *I think that the employees may feel a sense of pride. Because all the employees of Saudi ARAMCO can see who is providing most of answers and feedbacks in ShareK platform. So, I personally believe that it is a matter of pride in the ARAMCO community. Because the employees who share and provide most of the answers will be well-known to the organization. Therefore, a sense of feeling pride motives them to share more answers and provide more feedback in the platform (HRMP8).*

4.2.5 Psychological safety

Psychological safety of the employees plays a vital role for the success of an organization. It is about the personal risk or a belief that an employee is safe for providing or sharing his or her knowledge, ideas and concepts in the organization (Google 2022a; Duhigg, 2016; Schmidt and Rosenberg, 2014). In an organization with psychological safety, employees safe to take risks around their colleagues in the organization (Duhigg, 2016). It is about feeling confident that no one in the organization will embarrass or punish anyone else for committing mistakes, asking questions, and providing new ideas or concepts (Google 2022a; Schmidt and Rosenberg, 2014).

The results of this research show that the psychological safety of the employees of Saudi ARAMCO is ensured by encouraging them that ShareK is a platform for sharing knowledge without feeling any fear of punishments in the organization. In addition, the result reveals that there is no need for any sort of feeling hesitation for sharing knowledge in ShareK. In this connection, HRM professionals indicated that:

> *I personally believe that anyone in ARAMCO can share his or her knowledge in ShareK without any fear of punishments or embarrassing in the organization (HRMP1).*

> *I can ask any questions in ShareK platform without any hesitations (HRMP9).*

> *I don't feel any hesitation for asking questions and providing answers to questions in the ShareK platform (HRMP3).*

The result of this research shows that ShareK platform is a virtual place where anyone from Saudi ARAMCO can share anything, because some of the HRM professionals reported that ShareK is an online platform in where anyone can share their knowledge, experience, and skills. More importantly, some of the HRM professionals stated that it is a culture of sharing anything via ShareK. In this regard, HRM professionals described in the following ways:

I think that now it becomes a culture of sharing anything in ShareK platform without feeling fear or hesitation or fear of embarrassment in the organization (HRMP4).

I believe that I can share my knowledge and experience in ShareK. Because now it becomes a culture of sharing anything in ARAMCO (HRMP6).

I think that it is now a global phenomenon of engaging through online platforms. Similarly, we can engage and share anything in our organization via ShareK (HRMP8).

The results of this research show that employees comfortably can share knowledge and skills as well as experience in ShareK platform, because some of the HRM professionals indicated that employees can comfortably share knowledge and skills without worrying anything in the organization. In this connection, some of the HRM stated:

I can comfortable share anything in ShareK. I think that anyone can comfortably share knowledge, and experience with other employees without fear of punishments or embarrassment in ARAMCO (HRMP1).

I feel comfortable while sharing my knowledge in ShareK. I also think that anyone from ARAMCO can also feel the same (HRMP9).

4.2.6 Dependability

Dependability is another important component of modern HRM. It is about how the employees of an organization can dependent each other for their organizational success. The results of this research show that ShareK provides the opportunity of proactive communications, relationship and relying on information provided by the employees in the organization. These ultimately help employees to depend on each other for their organizational success. The results show that some of the HRM professionals stated that ShareK provides them the opportunity to proactively communicate with other employees in the organization. In this connection, an HRM professional described that:

> *Thanks to ShareK! I can communicate with any employees of Saudi ARAMCO via ShareK (HRMP7).*

> *I think that I can communicate with almost all the employees in Saudi ARAMCO via ShareK. Otherwise, communicating with them via face to face or other means is bit difficult for me (HRMP5).*

The results also reveal that ShareK helps them to make relationship with wider number of people in the organization. In this connection, some of the HRM professionals reported that ShareK platforms enables them to connect with people and make relationship with them. In this regard, HRM professionals stated:

> *I feel that ShareK provides us to make relationship with wider people in our organization. This relationship also fosters trust*

between us and depending more among the employees (HRMP3).

The results of this research also reveal that sharing accurate information and knowledge by the employees to foster dependability among people in the organization. In this connection, HRM professionals stated in the following ways:

> *I think that the knowledge and information shared in ShareK platform is accurate which tell us that we can depend on the information provided by other employees. Broader sense, I can say that I am depending on the person who is sharing information and knowledge in ShareK platform (HRMP1).*

4.2.7 Evidence-based decision

Evidence-based decision is about making decision based on data and use of modern technologies. The results of this research show that ShareK support HRM people to make evidence-based decision based on accurate information, relevant knowledge, and data. Some of the HRM professionals reported that ShareK help them to make decision based accurate information shared by the employees of Saudi ARAMCO. In this connection, HRM professionals stated that:

> *Well, I think that I can make decision based on the information shared on ShareK platform. Because the employees of Saudi ARAMCO shared that information which is accurate. So, I can certainly make decision based on the shared information on*

ShareK (HRM1).

The result of this research also reveals that HRM people make decision based on the relevant knowledge shared by the people in the organization. In this regard, an HRM people described that:

> *I can make decision based on the knowledge shared on ShareK platform. There is huge knowledge available on ShareK platform. So, I only search the required knowledge for making decision (HRMP7).*

The results show that ShareK helps HRM people to make decision based on data on the ShareK platform, because they believe that ShareK itself is a huge database which consists of data across Saudi ARAMCO. So, making decision based on data provided by ShareK is helpful for us. In this connection, HRM professionals reported that:

> *I can check on ShareK that what kind of skill sets are necessary for the future recruitment in ARAMCO? I can easily identify the skill sets based on the information provided on ShareK. So, I think that it helps me to make decision based on data (HRMP9).*

4.3 Current state-of-art of KM

The current state-of-art KM activities using ShareK platform is described in this section. The results of this research show that ShareK platform facilitates knowledge creation,

knowledge organization, knowledge sharing, and application knowledge. The current state of the art of KM is described in the following ways:

4.3.1 Knowledge creation

Creating new knowledge is very important for the success of any organization. In this research, knowledge creation is defined as the process of creating new knowledge through the interaction between people with ShareK platform. The results show that new knowledge is created through the answering of questions by employees. And the answers were given by the employees of Saudi ARAMCO. In this regard, ShareK platform works as an online space or ***virtual Ba*** for creating new knowledge. Anyone from the Saudi ARAMCO can ask anything related to their work and post on ShareK platform. The post can be seen by all the employees of the organization. If anyone has the right skills, knowledge, and experience, they post their knowledge and experience on the platform. Figure 4.2 shows the categories and core-categories of the state of art of KM activities.

In this connection, anyone from the organization can see the answers which are considered new knowledge. In this regard, KM professional expressed:

> *Certainly, it is the creation of new knowledge. Because the employees are answering the questions asked by other employees. So, the role of ShareK is like a virtual space where anyone can post and share their knowledge and experience (KMP1).*

> *I think that it is very difficult for meeting with all the employees.*

> *In addition, it is also very difficult to identify the people who have the knowledge, experience, and skills on a particular topic. But I think that it is very easy that anyone can express their inquisitive about knowing new things on ShareK platform. In response, other employees who have the knowledge and experience can post on the platform which I think that new knowledge (KMP4).*

The results show that some of the KM professionals reported that both codified tacit (personalized) and explicit knowledge are created through the interaction between employees and ShareK (platform). In addition, the results indicate that employees give the answers based on their knowledge, experience, and skills—which are tacit knowledge. But it is available to all employees in the form of codified or personalized tacit knowledge. In this connection, KM professionals stated that:

> *I think that personalized tacit knowledge is created through the interactions between people and the platform. Because the employees who gave answers on the platform provide their own experience, knowledge, and skills (KMP8).*

The results show that feedback is tacit knowledge created through the interactions between people and the platform. In this connection, a KM professional expressed that:

> *I think that a lot of feedback was received from the other employees on a particular answer given by an employee on*

ShareK. I believe that feedback is considered another form of tacit knowledge. Because feedbacks are the original thoughts and ideas from the employees of ARAMCO, they share via ShareK (KMP10).

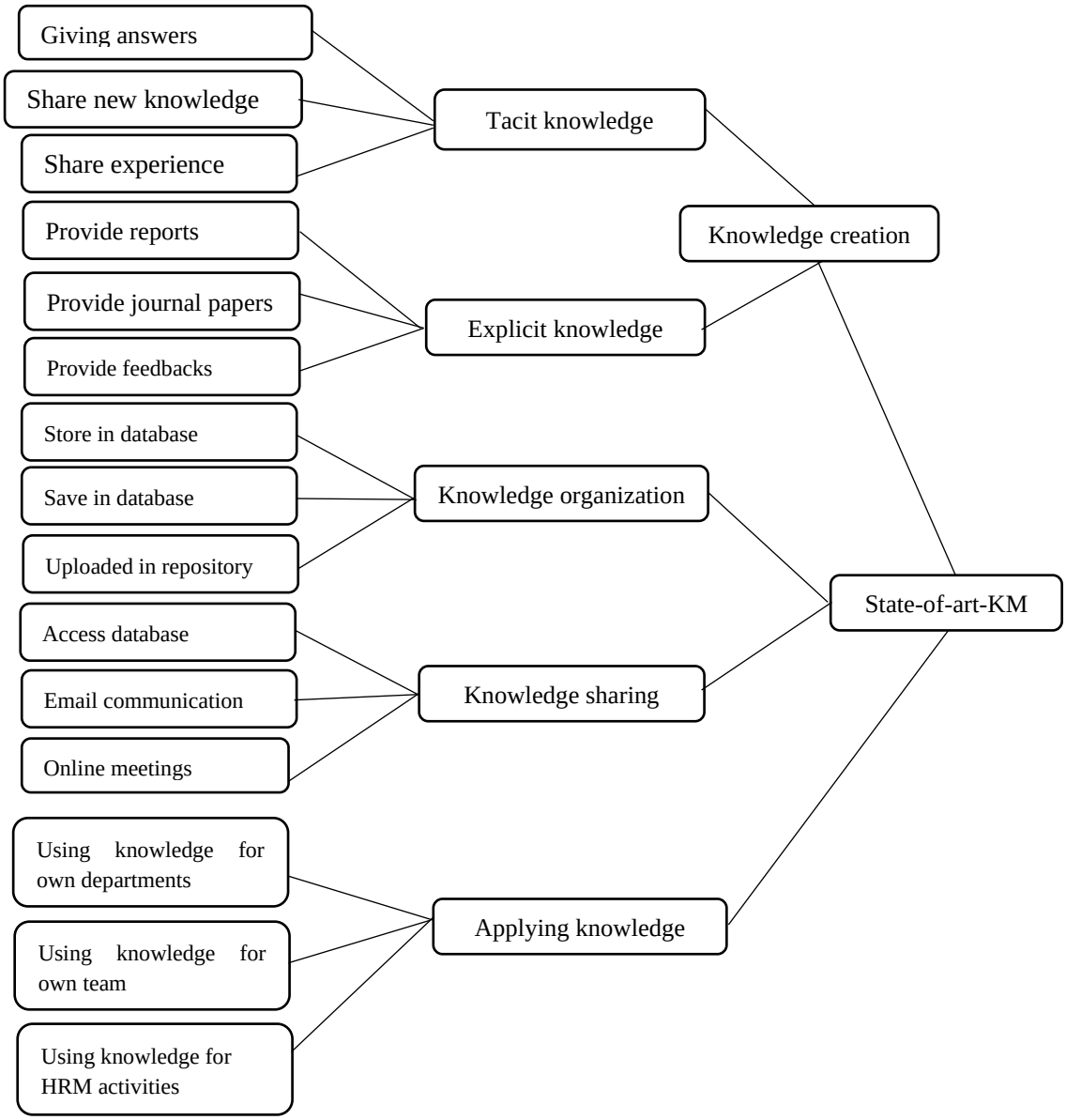

Figure 4.2: Categories and core-categories of KM activities

The results also reveal that explicit knowledge is also created through the interactions between people in the organization and ShareK (the platform), because some of the KM professionals expressed that they also upload reports, magazines, journal papers, and other necessary items which might be helpful for the people in the organizations. Here the reports, magazines, and journal papers are the explicit form of knowledge created. In this connection, KM professional shared that:

> *As a KM professional, I myself gave reports, magazines, and journal papers to the persons who asked questions on ShareK platform. So, I believe that it is the form of explicit knowledge (KMP9).*

4.3.2 Knowledge organization

Organizing knowledge for use and reuse by the employees of an organization is very important for the success of the organization. So, knowledge organization or storage is very essential to the organization. The knowledge organization is defined as the storage of the created new knowledge using database technologies. The results of this research show that ShareK uses the latest database technologies for the storage of a vast amount of knowledge created on the ShareK platform. In this connection, some of the KM professionals expressed that the database is the most essential components of ShareK. In this regard, KM professionals stated that:

> *All the provided answers and questions are stored in our database*

so that people of our organization can use it like the Google search engine (KMP1).

I think that all the feedbacks are also saved in our database so that anyone from ARAMCO can use it (KMP6).

The results of this research stated that the explicit knowledge which includes business reports, magazines, journal papers, and books are uploaded for the purpose of providing repository services for the employees of the organization. In this connection, KM professionals expressed that:

I think that anyone can upload books, journals, business reports, and magazines into the repository database of ShareK through proper authentication (KMP5, KMP9).

4.3.3 Knowledge sharing

Knowledge sharing is one of the most important functions of KM. Sharing knowledge by the employees with other employees in the organization provides competitive advantages for the organization. Knowledge sharing is defined as the dissemination of knowledge among the people in the organization using technologies in this research. The results of this research show that the created and stored new knowledge is freely open to all the employees of the organization so that anyone can access it. In this connection, KM professionals stated in the following ways:

I think that anyone can access the database of ShareK anytime and anywhere in the world after authentication of their identity (KMP3).

I think that all the created new knowledge is stored in the database of ShareK which are open anytime for anyone of ARAMCO (KMP5, KMP8).

The results of this research show that almost all the modern communication technologies like emails, video conferences, and online meetings are supported by ShareK. In this connection, KM professionals indicated:

I think that employees can communicate with each other via emails supported by ShareK. In addition, they can also have video conferences for their necessity which are also supported by ShareK platform (KMP7).

The employees of ARAMCO who posted questions and received answers from another employee can have an online meeting by themselves using the online meeting services supported by ShareK (KMP10).

4.3.4 Applying knowledge

Applying knowledge by the employees of an organization for their necessary is very

important, because the organization is supporting to create, store, and share knowledge within the organization for their employees. But it is very important for the people of the organization to use the shared knowledge for their own departments or divisions or teams for innovations or assignments. As a result, applying knowledge is the most important component of KM. The result of this research shows that the people of Saudi ARAMCO apply their gained knowledge, experience, and skills supported by ShareK platform for their respective areas of business (see more details in appendix 7). In this connection, KM and HRM professionals expressed that:

> *I think that the employees are getting benefited. Because I can easily understand to see the feedback provided by them on ShareK platform (KMP1, KMP4, and KMP6).*

In the earlier section, the results of this research show that ShareK platform supports HRM professionals for recruiting, training, evaluating, rewarding, psychological safety, dependability, and evidence-based decision making. The summary of the quotations is re-written in the following ways:

> *ShareK supports recruiting, training, evaluation, rewarding, as well as modern HRM activities like psychological safety of employees, dependability, and evidence-based decision (HRM1, HRM3, and HRM5).*

4.4 Harmonization of HRM and KM

Initially, the platform ShareK was designed and develop for creating, capturing, storing, and sharing knowledge. It was especially designed for KM professionals. But other employees of the organization can also use their own purposes. For example, people from HRM, mining, and other departments also use ShareK. Though it was not designed for them but the people from other departments use ShareK's different functions for their own purposes. So, in this section, the results of this research how ShareK could be used by people from other departments as a harmonization and collaboration among different departments.

The result shows that all the interviewees use ShareK platform. The results of this research also reveal that ShareK platform was originally developed for KM activities. More exactly, the platform was designed for knowledge creation, organization of knowledge, sharing and applying of knowledge. So, it is obvious that the platform supports and facilitates all the functions of KM. In this connection, a KM manager stated that:

> *I use ShareK platform for acquiring new knowledge. I believe that it is specially designed for KM activities. In addition, I can also share knowledge through this platform (KMP1).*

Other KM professionals stated in the following ways:

Oh! ShareK is designed for us to capture, process, and share knowledge on the platform so that the people of Saudi Aramco can share knowledge and apply the new knowledge for the new innovations (KMP3, KMP5).

I think that ShareK is designed for us. But anyone can access the database of ShareK for searching any types of knowledge they need (KMP7).

In addition, the result also reveals that most of the HRM professionals use ShareK platform subjectively. Especially, the results show that HMR professionals use ShareK's database for accessing knowledge, understanding the skills sets need to acquire to face the challenges, to evaluate performance of the employees, to train them and provide learning opportunities. The results also show that ShareK platform supports smooth collaboration and cooperation among other employees which ensure them to depend on each other. In addition, the results also show that ShareK supports the HRM people's psychological safety. Last but not the least, the platform supports evidence-based decision making based on data, information, and knowledge on the platform (for detailed, see appendix 6). The HRM professionals indicated in the following ways:

The information and knowledge I got from ShareK platform which helps me to get knowledge about what kind of people I need to hire, because I can see some unanswered questions which help me to determine the skilled persons need to be required for the company

(HRMP2).

I can easily understand that the people who share knowledge several times help me to determine to recommend him/her for promotion (HRMP3).

ShareK platforms ensure the psychological safety of us by ensuring that anyone will not be harm or harass for sharing their knowledge on the platform (HRMP6).

Oh! I believe that the collaboration and interactions with different people in ARAMCO foster good relationship which foster dependability with each other in the long term (HRMP8).

ShareK helps anyone in ARAMCO to make decision based on huge data and knowledge available on the platform (HRMP1, HRMP10).

The results of this research show that both HRM and professionals indicate that harmonization of HRM and KM provide more opportunities for collaboration, sharing of knowledge, more dependability among the employees, and bring more innovations in the organization. In this connection, the HRM and KM professionals indicated in the following ways:

I can personally communicate with HRM people and share my knowledge and experience with them (KMP5).

I can ask my KM colleagues to organize training for the newly hired employees (HRMP1).

I think that I can communicate anyone in ARAMCO by using ShareK including the people in HRM departments (KMP1, KMP3, KMP5).

I believe that if the authorities of ShareK open their mind to incorporate more departments while designing ShareK, because I know that ShareK was designed for KM activities, but we use the databases and other communication tools. But I believe that it will be better if the authorities harmonize almost all the departments' purposes with ShareK platform for its' wider acceptance inside the organization (HRM1).

4.5 Summary

This chapter describes the state of art-of-HRM, and KM activities based on the interview data analysis. The results of this the interview data are summarized in the following ways:

- The results of this this research shows that the platform namely ShareK supports all the traditional HRM activities which include recruiting, training and learning,

evaluation of performance, and rewarding.

- The result reveals that ShareK platform also facilitates the modern HRM activities which include psychological safety, dependability, and evidence-based decision making.

- The results of this research show that ShareK platform supports knowledge creation, knowledge organization, knowledge sharing, and applying knowledge for organizational innovation.

- The results of this research also indicate that harmonization of different departments with ShareK provide more opportunities for collaboration and learning which provide innovations.

Chapter 5

Measuring Differences between HRM and KM Professionals regarding Traditional HRM, KM, and Modern HRM

5. Introduction

This chapter shows the results of the survey data analysis. The purpose of this chapter is to measure the differences between HRM and KM professionals regarding traditional HRM and KM, as well as modern HRM. Firstly, this chapter describes the data collection and analysis procedures followed by the testing of null hypotheses. Finally, this chapter summarizes the hypothesis testing.

5.1 Data collection

The data was collected using an online questionnaire (see appendix 5). The link to the online questionnaire (https://www.surveymonkey.com/r/LTYKPK2) was sent to the head HRM and KM department of Saudi ARAMCO's head office. Then, the responsible person from HRM and KM departments from Saudi ARAMCO sent the link to the online questionnaire to every KM and HRM professional via the organizational email. The survey was conducted from January 2020 and continued to March 2020. The collected data was converted into MS Excel and analyzed using SPSS 26. First of all, a descriptive analysis was conducted to describe the background information of the respondents. Then, a non-parametric test namely the Mann-Whitney U test was conducted to examine the differences between HRM and KM professionals regarding the traditional HRM, KM, and modern HRM. Two hundred eighty-four (284) responses were received which consisted of HRM (204) and KM (80) professionals. Out of 284 responses, 274 responses

were used for analysis in this research.

5.2 Background of the respondents

In this research, a total of 284 professionals from HRM (204) and KM (80) were used for the analysis. In chapter 3, Table 3.2 presents the summary of the background information of the HRM and KM professionals. The results show that there are 80% of male professionals and 20% of female professionals. In addition, the result also reveals that 25 to 34 years are the highest age group (58%) followed by the 18 to 24 years age group (26%), 35 to 44 years age group (11%), and 45-54 years age group (6%). Furthermore, For the education level, High school was (13=5%), the respondents were mostly college level (n=169; 60%), followed by master level and above (n=51; 18%), followed by employees with bachelor level (n=42;15%). The result also shows that almost 45% of the professionals have more than 2 years of experience followed by less than 6 months (32%), and 1-2 years (23%). Finally, the results reveal that there is 72% (204) of HRM professionals and 28% (80) of KM professionals. In this research, these professional groups namely HRM and KM are very important because we compare these professionals with traditional HRM, traditional KM, and modern HRM.

5.3 Testing hypotheses

One of the research questions of this research was to examine the differences between HRM and KM professionals regarding traditional HRM and KM, as well as modern HRM. There are broadly three null hypotheses that were generated to investigate the differences between HRM and KM professionals in traditional HRM and KM as well as modern HRM. But three alternative hypotheses were also generated which are as follows:

Alternative hypothesis 1: There is a statistically significant difference between HRM and KM professionals regarding traditional HRM.

Alternative hypothesis 2: There is a statistically significant difference between HRM and KM professionals regarding traditional KM.

Alternative hypothesis 3: There is a statistically significant difference between HRM and KM professionals regarding modern HRM.

To test the above alternative hypotheses, three main null hypotheses are also generated which are as follows:

Null hypothesis 1: There are no statistically significant differences between HRM and KM professionals regarding traditional HRM.

> ***Null hypothesis 1(a):*** *There are no statistically significant differences between HRM and KM professionals in recruiting.*
>
> ***Null hypothesis 1(b):*** *There are no statistically significant differences between HRM and KM professionals in training.*
>
> ***Null hypothesis 1(c):*** *There are no statistically significant differences between HRM and KM professionals in evaluation.*
>
> ***Null hypothesis 1(d):*** *There are no statistically significant differences between HRM and KM professionals in rewarding.*

Null hypothesis 2: There are no statistically significant differences between HRM and KM professionals regarding traditional KM.

> ***Null hypothesis 2(a):*** *There are no statistically significant differences between HRM and KM professionals in knowledge creation.*
>
> ***Null hypothesis 2(b):*** *There are no statistically significant differences between HRM and KM professionals in knowledge storing.*
>
> ***Null hypothesis 2(c):*** *There are no statistically significant differences between HRM and KM professionals in knowledge sharing.*
>
> ***Null hypothesis 2(d):*** *There are no statistically significant differences between HRM and KM professionals in knowledge application.*

Null hypothesis 3: There are no statistically significant differences between HRM and KM professionals regarding modern HRM.

> ***Null hypothesis 3(a):*** *There are no statistically significant differences between HRM and KM professionals in psychological safety.*
>
> ***Null hypothesis 3(a-1):*** *There are no statistically significant differences between HRM and KM professionals in a knowledge-sharing environment.*
>
> ***Null hypothesis 3(a-2):*** *There are no statistically significant differences between HRM and KM professionals in an open culture.*
>
> ***Null hypothesis 3(b):*** *There are no statistically significant differences between HRM and KM professionals in dependability.*
>
> ***Null hypothesis 3(b-1):*** *There are no statistically significant differences between HRM and KM professionals in trust in information.*

Null hypothesis 3(b-2): *There are no statistically significant differences between HRM and KM professionals in the relationship.*

Null hypothesis 3(c): *There are no statistically significant differences between HRM and KM professionals in the evidence-based decision.*

Null hypothesis 3(c-1): *There are no statistically significant differences between HRM and KM professionals in the relevant information.*

Null hypothesis 3(c-2): *There are no statistically significant differences between HRM and KM professionals in making decisions based on data.*

To test the above hypotheses, a non-parametric test namely Mann-Whitney U was conducted.

5.4 Mann-Whitney U test for testing hypotheses

The Mann-Whitney U Test is a test for measuring the differences between two groups. For example, do males and females differ in terms of loneliness? In this research, the Mann-Whitney U Test is used to measure the differences between HRM and KM professionals regarding traditional HRM and KM as well as modern HRM. To interpret the result of the Mann-Whitney U Test, the **Z** value, and the significance level, which is given as **Asymp.Sig. (T-tailed)**, need to be looked at in Table 5.1 The Z value is an approximation test that includes a correction for ties in the data. The value of **Asymp.Sig. (T-tailed)** is the significance level which is known as the **P** (probability) value.

5.4.1 Testing null hypothesis 1 and 2

To test alternative hypotheses 1 and 2 (there is a statistically significant difference between HRM and KM professionals regarding traditional HRM and KM), first, we examine all the sub-hypotheses (Null hypothesis 1 (a-d) and null hypothesis 2 (a-d)). Then, we examine our null hypotheses 1 and 2 as well as alternative hypothesis 1 and hypothesis 2.

Table 5.1: Results of Mann-Whitney U test for traditional HRM and KM

	Recruiting	Training	Evaluating	Rewarding	Knowledge creating	Knowledge storing	Knowledge sharing	Knowledge applying
Mann-Whitney U	5559.500	6254.500	6327.000	6038.500	6359.000	6475.000	5938.500	6017.500
Wilcoxon W	23704.500	25169.500	25242.000	24183.500	24504.000	26375.000	24659.500	23595.500
Z	-2.932	-2.575	-2.415	-2.527	-1.995	-2.592	-2.578	-2.375
Asymp. Sig. (2-tailed)	.003	.010	.016	.012	.046	.010	.010	.018
a. Grouping Variable: Profession								

5.4.1.1 Differences between HRM and KM professionals in recruiting

To test the null hypothesis 1(a), the result from the analysis in Table 5.1 shows that the Z value is -2.932 (rounded) with a significance level (p) of the P value of .003. The P value is less than or equal to.05 indicating that the result of the test is significant, which means there are statistically significant differences between HRM and KM professionals regarding recruiting. But in this research, our null hypothesis 1(a) is not supported which means null hypothesis 1(a) is rejected.

5.4.1.2 Differences between HRM and KM professionals in training

The result from the analysis in Table 5.1 shows that the Z value is -2.575 (rounded) with

a significance level (p) of the P value of .010. So again, the P value is less than .05 which indicates that the result of the test is significant, which means there are statistically significant differences between HRM and KM professionals regarding training. But in this research, our null hypothesis 1(b) is not supported which means null hypothesis 1(b) is also rejected in this research.

5.4.1.3 Differences between HRM and KM professionals in the evaluation

Table 5.1 shows that the Z value and P value for evaluation are -2.415 (rounded) with a significance level (p) of the P value of .016. In this research, the P value for evaluation is less than .05 which indicates that the result of the test is significant, which means there are statistically significant differences between HRM and KM professionals regarding evaluation. But our null hypothesis 1(c) was –there are no statistically significant differences between HRM and KM professionals regarding evaluation in this research. So, in this research, null hypothesis 1(c) is not supported.

5.4.1.4 Differences between HRM and KM professionals in rewarding

To test the null hypothesis 1(d), the result from the analysis in Table 5.1 shows that the Z value is -2.527 (rounded) with a significance level (p) of the P value of .012. The P value is less than.05 indicating that the result of the test is significant, which means there are statistically significant differences between HRM and KM professionals regarding rewards. But in this research, our null hypothesis 1(d) is not supported which means null hypothesis 1(d) is rejected.

5.4.1.5 Differences between HRM and KM professionals in knowledge creation

The result from the analysis in Table 5.1 shows that the Z value is -1.995 (rounded) with a significance level (p) of the P value of .046. So again, the P value is less than .05 which indicates that the result of the test is significant, which means there are statistically significant differences between HRM and KM professionals regarding knowledge creation. But in this research, our null hypothesis 2 (a) is not supported which means null hypothesis 2(a) is also rejected in this research.

5.4.1.6 Differences between HRM and KM professionals in knowledge storing

Table 5.1 shows that the Z value for knowledge storing is -2.592 (rounded) with a significance level (p) of the P value of .010. In this research, the P value for knowledge sharing is less than .05 which indicates that the result of the test is significant, which means there are statistically significant differences between HRM and KM professionals regarding knowledge storing. But our null hypothesis 2(b) was –there are no statistically significant differences between HRM and KM professionals regarding knowledge storing in this research. So, in this research, null hypothesis 2(b) is not supported.

5.4.1.7 Differences between HRM and KM professionals in knowledge sharing

To test the null hypothesis 2(c), the result from the analysis in Table 5.1 shows that the Z value is -2.578 (rounded) with a significance level (p) of the P value of .010. The P value is less than.05 indicating that the result of the test is significant, which means there are statistically significant differences between HRM and KM professionals regarding knowledge sharing. But in this research, our null hypothesis 2(c) is not supported which means null hypothesis 2(c) is rejected.

5.4.1.8 Differences between HRM and KM professionals in knowledge application

The result from the analysis in Table 5.1 shows that the Z value is -2.375 (rounded) with a significance level (p) of the P value of .018. So again, the P value is less than .05 which indicates that the result of the test is significant, which means there are statistically significant differences between HRM and KM professionals regarding knowledge application. But in this research, our null hypothesis 2(d) is not supported which means null hypothesis 2(d) is also rejected in this research.

5.4.1.9 Differences between HRM and KM professionals in traditional HRM and KM

To test our hypothesis 1 and hypothesis 2, we need to test our null hypothesis 1 (there are no statistically significant differences between HRM and KM professionals in traditional HRM and KM), we transformed variables namely recruiting, training, evaluating, and rewarding into traditional HRM in the SPPS. In addition, we also transform the variables namely knowledge creating, knowledge storing, knowledge sharing, and knowledge applying into traditional KM to test our null hypothesis 2. Then, we again run Mann-Whitney U Test. The results from the analysis in Table 5.2 show that the Z value is -3.338 (rounded) with a significance level (p) of the P value of .001. The P value is less than .05 indicating that the result of the test is significant, which means there are statistically significant differences between HRM and KM professionals regarding traditional HRM. It means our alternative hypothesis 1 is supported in this research. But our null hypothesis 1 is not supported.

Table 5.2: Mann-Whitney U Test for Traditional HRM and Traditional KM

	Traditional_HRM	**Traditional_KM**
Mann-Whitney U	4827.500	4382.500
Wilcoxon W	20227.500	19260.500
Z	-3.338	-3.754
Asymp. Sig. (2-tailed)	.001	.000
a. Grouping Variable: Profession		

The result from the analysis in Table 5.2 shows that the Z value is -3.754 (rounded) with a significance level (p) of the P value of .000. So again, the P value is less than .05 which indicates that the result of the test is significant, which means there are statistically significant differences between HRM and KM professionals regarding traditional KM. It means our alternative hypothesis 2 is also supported in this research. But our null hypothesis 2 is not also supported in this research.

5.4.1.10 Summary

The summary of the results for hypotheses testing in this section is presented in Table 5.3. Our result shows that there are statistically significant differences between HRM and KM professionals regarding the traditional HRM and KM though null Hypotheses 1 and 2 are not supported in this research. But our alternative hypotheses 1 and 2 (there is a statistically significant difference between HRM and KM professionals regarding traditional HRM and KM) are supported, because both groups of professionals namely HRM and KM are different. They have different departments, and their jobs are distinctive.

Table 5.3: Summary of the results of hypotheses tests

Null hypotheses	Significance level	Decisions
Alternative hypothesis 1: There are statistically significant differences between HRM and KM professionals regarding traditional HRM		Supported
Null hypothesis 1: There are no statistically significant differences between HRM and KM professionals regarding traditional HRM.	.001	
Null hypothesis 1(a): *There are no statistically significant differences between HRM and KM professionals in recruiting.*	.003	
Null hypothesis 1(b): *There are no statistically significant differences between HRM and KM professionals in training.*	.010	
Null hypothesis 1(c): *There are no statistically significant differences between HRM and KM professionals in evaluation.*	.016	
Null hypothesis 1(d): *There are no statistically significant differences between HRM and KM professionals in rewarding.*	.012	
Alternative hypothesis 2: There are statistically significant differences between HRM and KM professionals regarding traditional KM		Supported
Null hypothesis 2: There are no statistically significant differences between HRM and KM professionals regarding traditional KM.	.000	
Null hypothesis 2(a): *There are no statistically significant differences between HRM and KM professionals in knowledge creation.*	.046	
Null hypothesis 2(b): *There are no statistically significant differences between HRM and KM professionals in knowledge storing.*	.010	
Null hypothesis 2(c): *There are no statistically significant differences between HRM and KM professionals in knowledge sharing.*	.010	
Null hypothesis 2(d): *There are no statistically significant differences between HRM and KM professionals in knowledge application.*	.018	

5.5 Testing null hypothesis 3

To test our alternative hypothesis 3, and null hypothesis 3 (there are no statistically significant differences between HRM and KM professionals regarding modern HRM), first, we measure all the sub-null hypotheses (null hypothesis 3 a (a1-a2), 3b (b1-2), and 3c (c1-c2). Then, we examine our null hypothesis 3.

5.5.1 Differences in HRM and KM professionals in psychological safety

To test the null hypothesis 3(a), the result from the analysis in Table 5.4 shows that the Z value is -1.069 (rounded) with a significance level (p) of the P value of .285. The P value is not less than or equal to.05 indicating that the result of the test is not significant, which means there are no statistically significant differences between HRM and KM professionals regarding psychological safety. Therefore, in this research, our null hypothesis 3(a) is supported.

Table 5.4: Mann-Whitney U Test for Modern HRM (components)

	Open culture	Sharing environment	Psychological_ safety	Trust on information	Rlationship	Dependability	Relevant information	Making decision based on data	Evidence_base d_decisions
Mann-Whitney U	6810.000	6409.000	5926.000	6313.500	7408.000	6247.000	6842.000	7660.000	6620.500
Wilcoxon W	24388.000	21809.000	20122.000	24268.500	10568.000	22718.000	25952.000	10820.000	24956.500
Z	-.880	-.643	-1.069	-1.595	-.271	-1.194	-1.528	-.083	-1.363
Asymp. Sig. (2-tailed)	.379	.521	.285	.111	.786	.233	.127	.934	.173
a. Grouping Variable: Profession									

5.5.1.1 Differences between HRM and KM professionals regarding open culture

The result from the analysis in Table 5.4 shows that the Z value is -.880 (rounded) with a significance level (p) of the P value of .379. The P value is not less than or equal to.05 which indicates that the result of the test is not significant, which means there are no statistically significant differences between HRM and KM professionals regarding open culture. As a result, our null hypothesis 3(a-1) is supported which means null hypothesis 3(a-1) is also supported in this research.

5.5.1.2 Differences between HRM and KM professionals in sharing environment

Table 5.4 shows that the Z value and P value for evaluation are -.643 (rounded) with a significance level (p) of the P value of .521. In this research, the P value for sharing environment is not less or equal to .05 which indicates that the result of the test is not significant, which means there are no statistically significant differences between HRM and KM professionals regarding sharing environment. Therefore, our null hypothesis 3(a-2) was –there are no statistically significant differences between HRM and KM professionals regarding sharing environment in this research. So, in this research, null hypothesis 3(a-2) is supported.

5.5.2 Differences between HRM and KM professionals in dependability

To test the null hypothesis 3(b), the result from the analysis in Table 5.4 shows that the Z value is -1.528 (rounded) with a significance level (p) of the P value of .233. The P value is not less than or equal to.05 indicating that the result of the test is not significant, which means there are no statistically significant differences between HRM and KM professionals regarding dependability. Therefore, in this research, our null hypothesis 3(b) is supported.

5.5.2.1 Differences between HRM and KM professionals regarding trust in information

The result from the analysis in Table 5.4 shows that the Z value is -1.595 (rounded) with a significance level (p) of the P value of .111. The P value is not less than or equal to.05 which indicates that the result of the test is not significant, which means there are no statistically significant differences between HRM and KM professionals regarding trust in information. As a result, our null hypothesis 3(b-1) is supported in this research.

5.5.2.2 Differences between HRM and KM professionals regarding the relationship

Table 5.4 shows that the Z value and P value for evaluation are -.271 (rounded) with a significance level (p) of the P value of .786. In this research, the P value for sharing environment is not less or equal to .05 which indicates that the result of the test is not significant, which means there are no statistically significant differences between HRM and KM professionals regarding the relationship. Therefore, our null hypothesis 3(b-2) was –there are no statistically significant differences between HRM and KM professionals regarding the relationship in this research. So, in this research, null hypothesis 3(b-2) is supported.

5.5.3 Differences between HRM and KM professionals regarding evidence-based decisions

To test the null hypothesis 3(c), the result from the analysis Table 5.4 shows that the Z value is -1.363 (rounded) with a significance level (p) of the P value of .173. The P value is not less than or equal to.05 indicating that the result of the test is not significant, which means there are no statistically significant differences between HRM and KM professionals regarding evidence-based decisions. Therefore, in this research, our null hypothesis 3(c) is supported.

5.5.3.1 Differences between HRM and KM professionals regarding relevant information

The result from the analysis in Table 5.4 shows that the Z value is -1.528 (rounded) with a significance level (p) of the P value of .127. The P value is not less than or equal to.05 which indicates that the result of the test is not significant, which means there are no

statistically significant differences between HRM and KM professionals regarding relevant information. As a result, our null hypothesis 3(c-1) is also supported in this research.

5.5.3.2 Differences between HRM and KM professionals regarding making decisions based on data

Table 5.4 shows that the Z value and P value for evaluation are -.083 (rounded) with a significance level (p) of the P value of .934. In this research, the P value for sharing environment is not less or equal to .05 which indicates that the result of the test is not significant, which means there are no statistically significant differences between HRM and KM professionals regarding the relationship. Therefore, our null hypothesis 3(c-2) was –there are no statistically significant differences between HRM and KM professionals regarding making decisions based on data in this research. So, in this research, null hypothesis 3(c-2) is supported.

5.5.4 Differences between HRM and KM professionals regarding modern HRM

To test our alternative hypothesis 3 and null hypothesis 3, we transformed variables namely open culture and sharing environment as psychological safety, trust in information and relationship as dependability, and relevant information and making decision-based on data as the evidence-based decision in the SPPS. In addition, we transformed the variables namely psychological safety, dependability, and evidence-based decisions as modern HRM in the SPSS to test our null hypothesis 3. Then, we again run Mann-Whitney U Test. The results from the analysis in Table 5.5 show that the Z value is -1.409 (rounded) with a significance level (p) of the P value of .159. The P value is less or equal

to .05 indicating that the result of the test is not significant, which means there are no statistically significant differences between HRM and KM professionals regarding modern HRM. As a result, our alternative hypothesis 3 is not supported but our null hypothesis 3 is supported (there are no statistically significant differences between HRM and KM professionals regarding modern HRM) in this research.

Table 5.5: Mann-Whitney U Test for modern HRM

	Modern HRM
Mann-Whitney U	5345.000
Wilcoxon W	18711.000
Z	-1.409
Asymp. Sig. (2-tailed)	.159
a. Grouping Variable: Profession	

5.5.5 Summary

The summary of the results for hypotheses testing in this section is presented in Table 5.6. Our result shows that there are no statistically significant differences between HRM and KM professionals regarding modern HRM. As a result, our alternative hypothesis 3 is not supported but our null Hypothesis 3 is supported in this research, because both groups of professionals shared the same philosophy of team dynamics namely psychological safety, dependability, and evidence-based decisions which are the key components of modern HRM.

Table 5.6: Summary of hypotheses test for modern HRM

Null hypotheses	Significance level	Decisions
Alternative hypothesis 3: There are statistically significant differences between HRM and KM professionals regarding modern HRM.		Not supported
Null hypothesis 3: There are no statistically significant differences between HRM and KM professionals regarding modern HRM.	.159	
Null hypothesis 3(a): ***There are no statistically significant differences between HRM and KM professionals in psychological safety.***	.285	
Null hypothesis 3(a-1): *There are no statistically significant differences between HRM and KM professionals in a knowledge-sharing environment.*	.379	
Null hypothesis 3(a-2): *There are no statistically significant differences between HRM and KM professionals in an open culture.*	.521	
Null hypothesis 3(b): There are no statistically significant differences between HRM and KM professionals in dependability.	.233	
Null hypothesis 3(b-1): *There are no statistically significant differences between HRM and KM professionals in trust in information.*	.111	
Null hypothesis 3(b-2): *There are no statistically significant differences between HRM and KM professionals in the relationship.*	.786	
Null hypothesis 3(c): There are no statistically significant differences between HRM and KM professionals in the evidence-based decision.	.173	
Null hypothesis 3(c-1): *There are no statistically significant differences between HRM and KM professionals in the relevant information.*	.127	
Null hypothesis 3(c-2): *There are no statistically significant differences between HRM and KM professionals in making decisions based on data.*	.934	

5.6 Differences between HRM and KM professionals regarding traditional HRM, KM, and modern HRM

To measure the differences between HRM and KM professionals regarding traditional HRM, KM, and modern HRM, we generated three alternative hypotheses and three null hypotheses. To test our alternative hypothesis 1 and null hypothesis 1, we transformed variables namely recruiting, training, evaluating, and rewarding into traditional HRM in

the SPPS. Secondly, we also transform the variables namely knowledge creating, knowledge storing, knowledge sharing, and knowledge applying into traditional KM to test our alternative hypothesis 2 null hypothesis 2. Finally, to examine our alternative hypothesis 3 and null hypothesis 3, we transformed variables namely open culture and sharing environment as psychological safety, trust in information and relationship as dependability, and relevant information and making decision-based on data as the evidence-based decision in the SPPS. Then, we transformed the variables namely psychological safety, dependability, and evidence-based decisions as modern HRM in the SPSS. We again run Mann-Whitney U Test. The results from the analysis in Table 5.7 show that the Z value is -3.338 (rounded) with a significance level (p) of the P value of .001. The P value is less than .05 indicating that the result of the test is significant, which means there are statistically significant differences between HRM and KM professionals regarding traditional HRM (Alternative hypothesis 1 is supported). But in this research, our null hypothesis 1 is not supported (see figure 5.1).

The result from the analysis in Table 5.7 shows that the Z value is -3.754 (rounded) with a significance level (p) of the P value of .000. So again, the P value is less than .05 which indicates that the result of the test is significant, which means there are statistically significant differences between HRM and KM professionals regarding traditional KM (alternative hypothesis 2 is supported). But in this research, our null hypothesis 2 is not supported (see figure 5.1).

Table 5.7: Mann-Whitney U Test for Traditional HRM, KM, and Modern HRM

	Traditional HRM	Traditional KM	Modern HRM
Mann-Whitney U	4827.500	4382.500	5345.000
Wilcoxon W	20227.500	19260.500	18711.000
Z	-3.338	-3.754	-1.409
Asymp. Sig. (2-tailed)	.001	.000	.159
a. Grouping Variable: Profession			

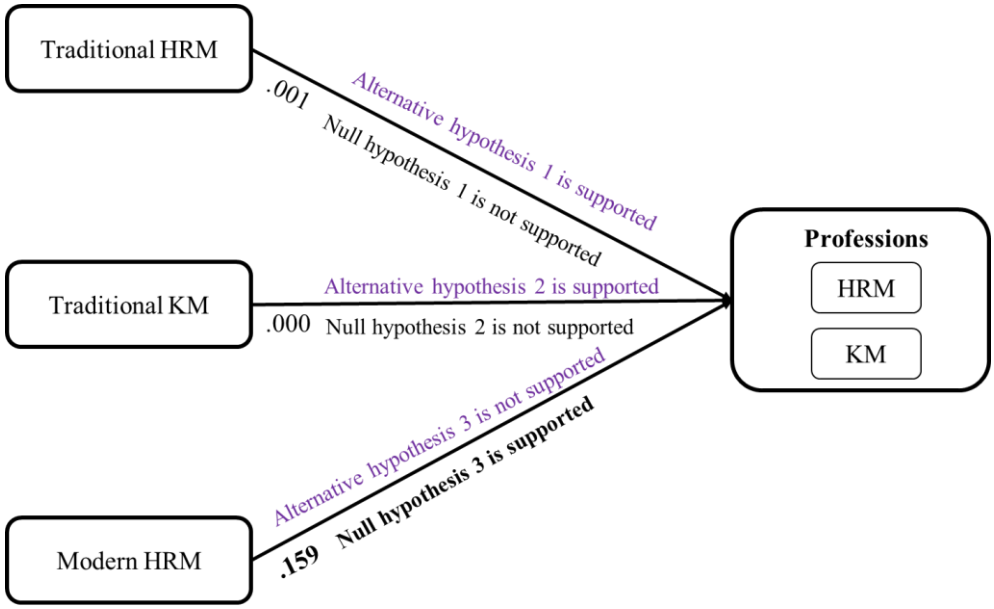

Figure 5.1: Testing of hypotheses

The results from the analysis in figure 5.5 show that the Z value is -1.409 (rounded) with a significance level (p) of the P value of .159. The P value is less or equal to .05 indicating that the result of the test is not significant, which means there are no statistically significant differences between HRM and KM professionals regarding modern HRM. As a result, our alternative hypothesis 3 is not supported but our null hypothesis 3 is

supported (there are no statistically significant differences between HRM and KM professionals regarding modern HRM) in this research (see figure 5.1).

5.7 Effect size

The **significance (2-tailed)** is 1.59 and thus above the significance level of 0.05. Therefore, no difference between HRM and KM professionals can be determined within our analysis. We use this formula to calculate the effect size:

$$\eta^2 = \frac{Z^2}{N-1}$$

Here r^2 is the effect size;

Z^2 is the Z statistics taken from the SPSS analysis;

N is 237 (HRM 163 and KM 74 professionals);

So,

$$r2 = \frac{(-1.409)2}{237-1}$$

$$r2 = \frac{1.985}{236}$$

$$r2 = 0.008$$

So, the effect size for modern HRM using real data is **0.008** which indicates that the effect size is very small in my dissertation. According to Cohen's (1988) criteria .1 = Small Effect, .3 = Medium Effect, and .5 = Large Effect. In this scenario, the effect size is small. **So, regarding the effect size of the Mann-Whitney U test in my dissertation, it can be said that the effect size of HRM professionals is not larger than KM professionals vice versa. Because it is almost zero and which are acceptable.**

5.8 Important findings as summary

The important findings from the quantitative data analysis of this research are summarized in the following ways:

- The results of this research show that there are statistically significant differences between HRM and KM professionals regarding traditional HRM and traditional KM, because both groups of professionals namely HRM and KM are different. In addition, they are from two distinctive departments. Furthermore, their job roles are also different. Finally, their educational backgrounds are also different. So, it is expected that there are statistically significant differences between both professional groups of people. The findings from this research are unique in the context of comparing HRM and KM professionals to measure the differences between traditional HRM and KM, because the previous research conceptualized and showed the different functions of traditional HRM without comparing different professional groups (Edvardsson,

2008; Armstrong, 2000). Similarly, a larger number of researchers showed how knowledge is created, processed, shared, and applied in different disciplines without comparing two groups of professional people (Nonaka and Takuechi, 1995; Alavi, Leidner, 2001; Roknuzzaman, Kanai, and Umemoto, 2009). The findings of this research are new to the HRM and KM research community.

- The results of this research show that there are no statistically significant differences between HRM and KM professionals regarding modern HRM. These are the most unique and significant findings of this research. Why it is unique and the most significant findings? Because this research adopted and conceptualized the concept of "modern HRM" based on Google's Project Aristotle, Google's Project Oxygen, and people's analytics based on AI and data science (Google, 2022a; 2022b; Duhigg, 2016; Schmidt and Rosenberg, 2014; Vulpen, 2019; Kohda, 2022). Especially, the results from Google's Project Aristotle, Google's Project Oxygen, and People's Analytics showed that psychological safety, dependability, and evidence-based decision—are the component of team dynamics in modern HRM (Google, 2022a; 2022b; Duhigg, 2016; Schmidt and Rosenberg, 2014; Vulpen, 2019). They showed the results qualitatively without comparing among different departments in Google. Therefore, the findings of this research are unique, new, and significant in the HRM and KM community by comparing both HRM and KM professionals regarding modern HRM.

Chapter 6

Evolving HRM as a Data Science

6. Introduction

This chapter starts with the summarization of results from interviews and surveys by answering subsidiary research questions (SRQs). Secondly, to answer the major research question (MRQ), we summarize the findings from interviews with HRM and KM professionals regarding modern HRM. Thirdly, to answer the MRQ, we also added the findings of open-ended questions from the ICT professionals. Subsequently, we also compare HRM and ICT professionals about modern HRM. Fourthly, we presented a framework for evolving MRM as a data science. Finally, the chapter concludes with the possible practical implications.

6.1 Answering research questions

The major research findings are described based on the analysis of data through answering the subsidiary research questions (SRQs) and major research question (MRQ).

6.1.1 Answer to SRQ1: What is the current state of the art of HRM in Saudi ARAMCO?

The results from the qualitative data analysis show that HRM professionals use ShareK platform both traditional and modern HRM. The result reveals that HRM professionals use ShareK platform for recruiting, training, evaluating, and training which is broadly considered traditional HRM. On the other hand, the results of this research interestingly show that HRM professionals also use the ShareK platform for psychological safety, dependability, and evidence-based decisions which are considered modern HRM.

The results of this research show that ShareK supports the recruiting activities by identifying the skill gaps and filling the skill gaps by recruiting talented and smart people. In addition, the result indicates that ShareK helps HRM people to identify the unanswered questions on the platform which help them to determine the talented and smart people who can answer those questions asked by other employees on the platform of ShareK.

The results of this research indicate that ShareK platform is used for training and learning purposes. Especially, the database of ShareK contains all the information related to different answers provided by different employees in Saudi ARAMCO which could be used as resources for providing training to the newly recruited employees and advancing the learning opportunities for the employees in the organization.

The results show that ShareK supports the evaluation of employees' performance by tracking their performance, judging their activities, and judging employees. Some of the HRM professionals indicated that ShareK helps them to track the performance of the employees of their organization. Some professionals reported that ShareK platforms help them to identify the most active employees in the organization by exploring who is providing the answers most of the time, who is providing feedback, and who is asking most of the questions on the platform.

The results of this research reveal that ShareK platform helps HRM people to determine the employees by rewarding them with promotions or providing a sense of feeling pride in the organization. The result shows that some of the HRM professionals stated that ShareK helps them to determine the employees by providing them promotions. The

results reveal that some of the HRM professionals reported that the employee can feel a sense of pride by sharing knowledge, answering questions, and providing feedback on ShareK platform.

The results of this research state that the psychological safety of the employees of Saudi ARAMCO is ensured by encouraging them that ShareK is a platform for sharing knowledge without feeling any fear of punishment in the organization. In addition, the result reveals that there is no need for any sort of feeling hesitation in sharing knowledge in ShareK.

The result of this research shows that ShareK platform is a virtual place where anyone from Saudi ARAMCO can share anything, because some of the HRM professionals reported that ShareK is an online platform in where anyone can share their knowledge, experience, and skills. More importantly, some of the HRM professionals stated that it is a culture of sharing anything via ShareK. The results of this research show that employees comfortably can share knowledge and skills as well as experience in ShareK platform, because some professionals indicated that employees can comfortably share knowledge and skills without worrying about anything in the organization.

Dependability is another important component of modern HRM. It is about how the employees of an organization can dependent each other for their organizational success. The results of this research show that ShareK provides the opportunity for proactive communications, relationship and relying on information provided by the employees in the organization. These ultimately help employees to depend on each other for their

organizational success. The results show that some of the HRM professionals stated that ShareK provides them the opportunity to proactively communicate with other employees in the organization. The results also reveal that ShareK helps them to make relationships with a wider number of people in the organization. In this connection, some of the HRM professionals reported that ShareK platforms enable them to connect with people and make relationships with them. The results of this research also revealed that sharing accurate information and knowledge by employees fosters dependability among people in the organization.

The evidence-based decision is about making a decision based on data and the use of modern technologies. The results of this research show that ShareK support HRM people to make an evidence-based decision based on accurate information, relevant knowledge, and data. Some of the HRM professionals reported that ShareK helps them to make decision-based accurate information shared by the employees of Saudi ARAMCO.

The result of this research also reveals that HRM people make the decision based on the relevant knowledge shared by the people in the organization. The results show that ShareK helps HRM people to make a decision based on data on the ShareK platform, because they believe that ShareK itself is a huge database that consists of data across Saudi ARAMCO. So, making decisions based on data provided by ShareK is helpful for us.

6.1.2 Answer to SRQ2: What is the current state of the art of KM in Saudi ARAMCO?

The results of this research show that KM professionals use ShareK for the purpose of

creating, storing, sharing, and applying knowledge. The results show that new knowledge is created through the answering of questions by employees. And the answers were given by the employees of Saudi ARAMCO. In this regard, ShareK platform works as an online space or ***virtual Ba*** for creating new knowledge. Anyone from the Saudi ARAMCO can ask anything related to their work and post on ShareK platform. The post can be seen by all the employees of the organization. If anyone has the right skills, knowledge, and experience, they post their knowledge and experience on the platform.

The results indicate that some of the KM professionals reported that both codified tacit (personalized) and explicit knowledge are created through the interaction between employees and ShareK (platform). In addition, the results indicate that employees give the answers based on their knowledge, experience, and skills—which are tacit knowledge. But it is available to all employees in the form of codified or personalized tacit knowledge. The results show that feedback is tacit knowledge created through the interactions between people and the platform. The results also reveal that explicit knowledge is also created through the interactions between people in the organization and ShareK (the platform), because some of the KM professionals expressed that they also upload reports, magazines, journal papers, and other necessary items which might be helpful for the people in the organizations. Here the reports, magazines, and journal papers are the explicit form of knowledge created.

The results of this research reveal that ShareK uses the latest database technologies for the storage of a vast amount of knowledge created on the ShareK platform. In this connection, some of the KM professionals expressed that the database is the most

essential components of ShareK. The results of this research stated that explicit knowledge which includes business reports, magazines, journal papers, and books is uploaded for the purpose of providing repository services for the employees of the organization.

The results of this research show that the created and stored new knowledge is freely open to all the employees of the organization so that anyone can access it. The results of this research show that almost all the modern communication technologies like emails, video conferences, and online meetings are supported by ShareK. The result of this research shows that the people of Saudi ARAMCO apply their gained knowledge, experience, and skills supported by ShareK platform for their respective areas of business.

6.1.3 Answer to SRQ3: What are the differences between HRM and KM professionals regarding traditional HRM, traditional KM, and modern HRM?

The results of this research show that there are statistically significant differences between HRM and KM professionals regarding traditional HRM and traditional KM, because both groups of professionals namely HRM and KM are different. In addition, they are from two distinctive departments. Furthermore, their job roles are also different. Finally, their educational backgrounds are also different. So, it is expected that there are statistically significant differences between both professional groups of people. The findings from this research are unique in the context of comparing HRM and KM professionals to measure the differences between traditional HRM and KM since the previous research conceptualized and showed the different functions of traditional HRM without comparing different professional groups (Edvardsson, 2008; Armstrong, 2000). Similarly, a larger

number of researchers showed how knowledge is created, processed, shared, and applied in different disciplines without comparing two groups of professional people (Nonaka and Takuechi, 1995; Alavi, Leidner, 2001; Roknuzzaman, Kanai, and Umemoto, 2009). The findings of this research are new to the HRM and KM research community.

The results of this research show that there are no statistically significant differences between HRM and KM professionals regarding modern HRM. These are the most unique and significant findings of this research. Why it is unique and the most significant findings? Because this research adopted and conceptualized the concept of "modern HRM" based on Google's Project Aristotle, Google's Project Oxygen, and people's analytics based on AI and data science (Google, 2022a; 2022b; Duhigg, 2016; Schmidt and Rosenberg, 2014; Vulpen, 2019; Kohda, 2022). Especially, the results from Google's Project Aristotle, Google's Project Oxygen, and People's Analytics showed that psychological safety, dependability, and evidence-based decision—are the component of team dynamics in modern HRM (Google, 2022a; 2022b; Duhigg, 2016; Schmidt and Rosenberg, 2014; Vulpen, 2019). They showed the results qualitatively without comparing among different departments in Google. Therefore, the findings of this research are unique, new, and significant in the HRM and KM community by comparing both HRM and KM professionals regarding modern HRM.

6.2. Answer to MRQ: How has the integration of HRM with KM evolved modern HRM as Data Science?

The results of this research show that modern HRM is integrated with KM via the ShareK KM system. Figure 6.1 shows the integration of HRM with KM via ShareK. From the

functional point of view, the results of this research show that HRM and KM have very similar opinions about the modern HRM on ShareK platform. It means that both professional group people use ShareK platform for the activities of modern HRM. Both interviews and survey results support it, because both professional groups consider that ShareK platform is very flexible. The flexibility of ShareK platforms attracts both professional groups to use and accept it for the purpose of modern HRM.

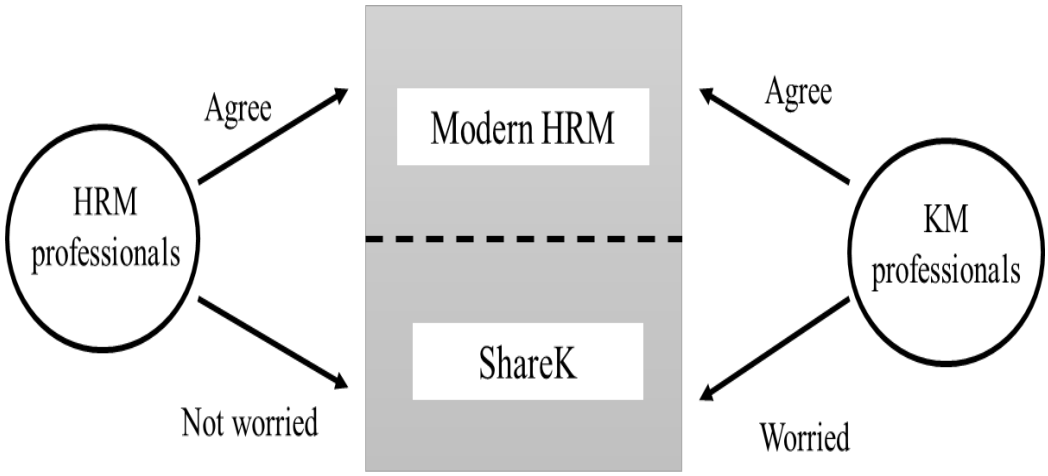

Figure 6.1: Integration of HRM with KM

This is very unique and significant findings of this research, because the previous research from Google showed qualitatively that psychological safety, dependability, and evidence-based decisions—were the most important components of team dynamics of modern HRM (Google, 2022a; 2022b; Duhigg, 2016; Schmidt and Rosenberg, 2014; Vulpen, 2019; Kohda, 2022). They described and discussed the components of modern HRM qualitatively without comparing among different departments in Google (Google, 2022a; 2022b; Duhigg, 2016; Vulpen, 2019). Therefore, the findings of this research are unique, new, and significant in the HRM and KM community by comparing both HRM and KM professionals regarding modern HRM.

On the other hand, from the usages point of view, HRM and KM professionals have different opinions regarding the flexibility of ShareK. From this point of view, HRM professionals use and accept it. Furthermore, HRM professionals like it due to its nature of flexibility, because they do not have any ideas about the risks of this platform. So, they are not worried about it. But KM professionals have different views. As the system is originally developed by KM professionals. As a result, KM professionals are worried about the risks of the ShareK platform regarding its flexibility feature, as KM professionals consider that it is too flexible from their point of view. It is to be informed that both HRM and KM are different and distinctive disciplines. In addition, both HRM and KM professionals have their distinctive job roles and responsibilities.

6.2.1 Verification of modern HRM

To support the claim of the results of this research, firstly, more evidence is provided through the verification of the results of interviews with HRM and KM professionals about modern HRM. Secondly, answers to open-ended questions of the survey from ICT professionals are incorporated to provide more evidence about modern HRM. Finally, a comparison between HRM and ICT professionals regarding modern HRM is also conducted using non-parametric statistical analysis.

6.2.1.1 Evidence from HRM, KM, and ICT professionals regarding modern HRM

The results of this research provide evidence that HRM professionals use ShareK platform, because it ensures their psychological safety in terms of no fear of punishment or embarrassment. In addition, the results also show that it is a knowledge-sharing culture where anyone can share their knowledge comfortably (See table 6.1). For more details

see appendix 8, 9, and 10.

Table 6.1: Comparison among HRM, KM, and ICT professionals regarding modern HRM

Modern HRM	HRM professionals	KM professionals	ICT professionals	Summary
Psychological safety	-I personally believe that anyone in ARAMCO can s**hare his or her knowledge** in ShareK without **any fear of punishment or embarrassment** (HRMP1). -I think that now it becomes **a culture of sharing anything on ShareK platform….** (HRMP4). -I feel **comfortable sharing** my knowledge in ShareK… (HRMP9).	-I think that ShareK is a **knowledge-sharing platform**. So, anyone from Saudi ARAMCO can share his/her knowledge **without any fear of harassment** (KMP1) -Certainly, we ensure the **psychological safety of the people** by sharing their knowledge, experiences, and new ideas on our platform (KMP4)	-The open organizational platform like ShareK encourages us to **share anything** (ICTP3). -I can **comfortably share my knowledge** on ShareK (ICTP12). -I feel **psychologically confident** to share knowledge on ShareK (ICTP25).	-Share knowledge without any fear
Dependability	-I feel that ShareK provides us to make a **relationship with wider people in our organization..** (HRMP3). -I think that the knowledge and information shared in ShareK platform are accurate …….. **I am depending on the person** …….. (HRMP1).	-I believe that **people can depend on the knowledge shared on ShareK**. …… (KMP7). -Oh! ShareK platform is equipped with many communication channels. So, employees …….. making **relationships with other employees of our organization** (KMP10).	-I **trust the information** (ICTP37). -I **rely on the knowledge** shared on ShareK (ICT45).	-Depend on the knowledge
Evidence-based decision	-Well, I think that I can **make the decision based on the information shared on ShareK platform**. ……. (HRM1). -I can **make decisions based on the knowledge shared on ShareK platform**. …….. (HRMP7).	-….. can **make decisions based on the knowledge shared on our platform**…… (KMP5). -I think that the knowledge shared on our platform not only helps employees to **make decisions** based on the shared knowledge ……. (KMP3).	-I make **decisions based on the knowledge shared** on ShareK (ICT49). -ShareK helps me to **update my existing knowledge** (ICT67).	-Make decisions based on the knowledge

Secondly, the result reveals that HRM professionals depend on the information shared on ShareK platform. In addition, they can make relationships with a wider number of people

in the organization using the platform. Finally, the result also provides evidence that HRM professionals use ShareK platform for making evidence-based decision in the form of making decisions based on the data and information shared on the platform.

The results of this research provide very positive evidence regarding modern HRM by KM professionals. The result shows that KM professionals believe that ShareK platform is specially designed and developed for the sharing of knowledge in the organization by ensuring the psychological safety of the professionals. Table 6.1 shows the interview scripts from the KM professionals regarding modern HRM. Secondly, the results show that KM professionals also express that people from the Saudi ARAMCO can depend on the knowledge shared on ShareK platform. In addition, KM professionals also believe that ShareK platform helps employees to make relationships among themselves using different communication channels supported by ShareK platform. Finally, the result shows that KM professionals strongly believe that anyone from ARAMCO can make decisions based on shared knowledge on ShareK platform, because ShareK is designed and developed to disseminate knowledge in the organization for supporting decision making, learning, and continuously improving their knowledge and skills.

I also added quotations from the open-ended survey by the ICT professionals to provide more evidence about modern HRM. The results from the analysis of open-ended questions show that ICT professionals also provide very positive statements about modern HRM which are shown in Table 6.1. The results show that ICT professionals feel psychological safety in the form of comfortably sharing knowledge on the platform. In addition, ICT professionals also feel psychologically confident to share knowledge on

ShareK platform. Secondly, the result shows that ICT people feel dependable on ShareK platform in the form of trusting information and relying on the knowledge shared on the platform. Finally, the results reveal that ShareK platform supports ICT people to make evidence-based decisions based on knowledge shared on the platform.

6.2.1.2 Evidence from the differences between HRM and ICT professionals regarding modern HRM

In this phase, I provided more evidence as verification by comparing HRM and ICT professionals regarding modern HRM. I added 80 responses from ICT professionals in SPSS to compare with HRM professionals. I conducted Mann-Whitney U Test to measure the relationship between HRM and ICT professionals regarding modern HRM. Table 6.2 shows that there are statistically significant relationships between HRM and ICT professionals regarding open culture, knowledge-sharing environment, trust in information, relationship, relevant information, and making decisions based on data, because the p-value is more than 0.05.

Table 6.2: Mann-Whitney U Test regarding the sub-components of modern HRM

	Open culture	**Knowledge sharing environment**	**Trust on information**	**Relationship**	**Relevant information**	**Making decisions based on data**
Mann-Whitney U	7411.500	7113.500	7635.000	7864.500	7898.000	7963.000
Wilcoxon W	28321.500	10353.500	10875.000	11104.500	28808.000	28873.000
Z	-1.247	-1.728	-.868	-.512	-.436	-.325
Asymp. Sig. (2-tailed)	.212	.084	.385	.608	.663	.745
a. Grouping Variable: Profession						

Now in this phase, I transformed open culture and knowledge-sharing environment into psychological safety in the SPSS. Secondly, I also transformed trust in information and

relationship into dependability in the SPSS. Finally, I transformed relevant information and made decisions based on data into evidenced-based decisions in the SPSS. The result shows that there is a statistically significant relationship between HRM and ICT people regarding psychological safety, dependability, and evidence-based decisions (see Table 6.3).

Table 6.3: Mann-Whitney U Test regarding components of modern HRM

	Psychological_safety	**Dependability**	**Evidence_based_ decisions**
Mann-Whitney U	7763.000	8152.000	7607.500
Wilcoxon W	11003.000	11392.000	28517.500
Z	-.643	-.013	-.899
Asymp. Sig. (2-tailed)	.520	.990	.369
a. Grouping Variable: Profession			

Table 6.4: Mann-Whitney U Test regarding modern HRM

	Modern_HRM
Mann-Whitney U	8042.500
Wilcoxon W	11282.500
Z	-.189
Asymp. Sig. (2-tailed)	.850
a. Grouping Variable: Profession	

In the final phase, I converted psychological safety, dependability, and evidence-based decision into modern HRM in the SPSS. The result shows that there is no statistically significant difference between HRM and ICT professionals regarding modern HRM (see Table 6.4).

6.3 Theoretical implications

In this section, a framework of integration of modern HRM with KM was developed in which modern HRM will evolve as a data science as a theoretical implication of this research. The findings of this research suggest that it is necessary to understand three types of movements and their relationship to evolve modern HRM as a data science in the near future. These are rigidity, flexibility, and integrity—which lay down the foundation to evolve modern HRM as a data science. Figure 6.2 shows the theoretical model of integration of modern HRM with KM in which modern HRM will evolve as a data science in the near future.

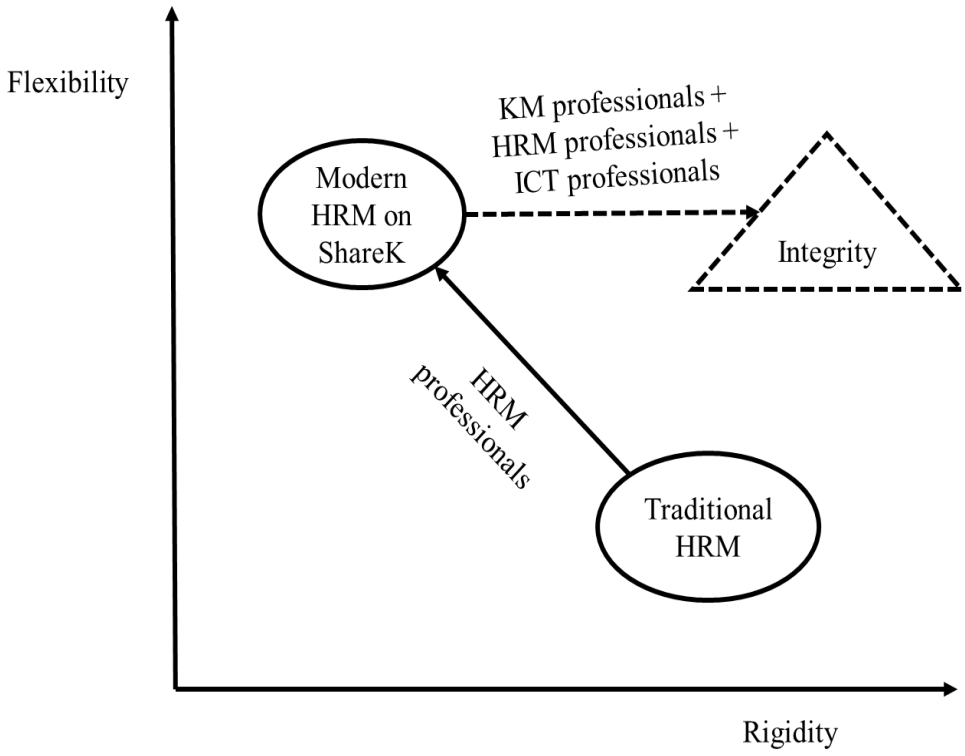

Figure 6.2: A framework of harmonization of modern HRM with KM in which modern HRM evolve as a data science

6.3.1 Rigitdity

The concept of "rigidity" is defined in terms of the reliability of the information and knowledge shared on the platform. In addition, how much the system is free from risks and uncertainties. First of all, the result of this research shows that the movement of acceptance of ShareK for modern HRM was led by HRM professionals. As a result of this decision by the HRM professionals, possibly lead to a loss of rigidity for their own traditional (THRM) system, because their THRM system has rigidness in terms of risks of losing data on their platform. In this regard, HRM professionals stated that:

> *I think that nowadays, we are using more ShareK platform for receiving knowledge about the skills which new professionals should have. In addition, you know that we have our own system for our own department. So I believe that some of our colleagues might think about the risks of losing data while using ShareK platform. But I am more optimistic about receiving more data and information from other sources (HRMP1).*

6.3.2 Flexibility

The concept of flexibility is about how the professionals share knowledge without any fear, how they make relationships with others, and how make decisions based on the information shared on the platform. The results of this research also show that HRM professionals have changed their THRM system to ShareK based more flexible system for modern HRM. In addition, the result of this research uniquely shows that all the functions of modern HRM are supported by the ShareK-based modern HRM system,

because the ShareK-based modern HRM is very flexible. But the result of this research indicates that KM professionals are worried about the flexibility of ShareK system for modern HRM, since KM professionals feel that there is needed for rigidity in the ShareK. As a result, a new type of KM system will evolve in which modern HRM will be considered as a data science. In this connection, both HRM and KM professionals stated in the following ways:

> *I think that the ShareK platform is very convenient for getting knowledge. Frankly speaking, ShareK platform is very flexible. I receive all almost all the information and knowledge related to the functions of HRM (HRMP6).*

> *I am so happy that professionals from the HRM department use the ShareK platform for their activities. But I am concerned about the risks and security issues of our platform. So I firmly believe that in the future, we will work hard for making the ShareK platform more flexible and more secured (KMP1 and KMP3).*

6.3.3 Integrity

The concept of "integrity" is all about integrating all changes in the KM systems and keeping track of those changes in the system collaboratively with KM professionals with HRM professionals or ICT professionals or others. The results of this research show that KM professionals are worried about the flexibility of the current ShareK system. So, the KM professionals are willing to have rigidity in their ShareK system in the near future.

As a result, in the future KM professionals need to collaborate more with HRM and ICT professionals to have more flexibility and rigidity in their system. Therefore, a new KM system will be evolved in the near future in which flexibility and rigidity will be there. At that time, professionals from KM, ICT, HRM, and others will collaborate and cooperate more to provide integrity for the new evolved KM system. As the version control system (VCS) suggested that software development can be updated and re-updated by many programmers all over the world. It is also possible to keep the history of the changes in the codes and sometimes return back to the older version of the codes for the development of the software (Loeliger and McCullough, 2012). As a result, the concept of "VCS" will help KM professionals to change, update, and re-update the new system more flexibly with rigidity through collaboration with HRM, ICT, and other professionals. So, the concept of "integrity" is very important for this phase, because it is all about integrating all changes in the KM systems and keeping track of those changes in the system. Through these collaborative ways, a new system will evolve in which modern HRM will emerge as a data science in the near future with more flexibility and rigidity. In this regard, both HRM and KM professionals indicated in the following ways:

> *I am so happy that professionals from the HRM department use the ShareK platform for their activities.* ***But I am concerned about the risks and security issues of our platform****. So, I firmly believe that in the future,* ***we will work hard for making the ShareK platform more flexible and more secure*** *(KMP1 and KMP3).*

> *I also believe* ***that anyone will be able to manage our system in the***

future from anywhere in our organization *(KMP9).*

6.4 Practical implications

Theoretically, this is the first research designed and developed a framework of harmonization of HRM with KM in which modern HRM will evolve as a data science. This research uniquely broadens the field of HRM and KM. Briefly, modern HRM will evolve as a data science in which different professionals will experiment, use and accept modern HRM, because professionals will feel more psychologically safe, dependable, and make evidence-based decisions. However, there are several practical implications of this research for contributing to management science (HRM), knowledge science (KM), and organizational science all over the world.

First of all, this research broadens the area of management science, especially HRM and knowledge science (knowledge management). The proposed framework of harmonization of HRM with KM in which modern HRM will evolve as a data science—provides a new way of rethinking traditional HRM and traditional KM by using a knowledge management system. Uniquely, the framework broadens the areas of HRM and KM by explaining how a KM system supports psychological safety, dependability, and evidence-based decisions. Ultimately, the verification part of the framework ensures the evolution of HRM as a data science. More broadly, over time, more professionals from different departments in the organization will use and accept modern HRM, and at that time modern HRM emerges as a data science.

Secondly, this research also uniquely contributes to knowledge science especially KM,

because the results of this research show how KM technology could be experimented with by HRM professionals for traditional and modern HRM. As a result, the harmonization framework uniquely contributes to knowledge science, as the result of this research shows that the KM system also helps KM professionals with modern HRM.

Thirdly, this research identified and verified that psychological safety, dependability, and evidence-based decisions—are the main components of modern HRM by comparing among HRM, KM, and ICT professionals. But previous research only qualitatively described psychological safety, dependability, and evidence-based decisions—are the components of team dynamics of modern HRM. But in this research, we evaluated and verified these components of modern HRM by comparing HRM, KM, and ICT professionals.

Fourthly, this research proposed the concept of "modern HRM as a data science" which is unique and new to the academic community.

Last but not the least, this research presents a new way of collecting, processing, sharing, and applying knowledge through the use of KM technology which uniquely contributes to knowledge science. Especially, KM technology supports psychological safety, dependability, and evidence-based decisions for different professionals in the organization which is very new to the knowledge science community.

Chapter 7

Conclusion

7. Introduction

This chapter summarizes the results of this research followed by the significance and limitations of the research. Finally, it concludes with future research directions.

7.1 Summary of the research

First, I conducted a detailed review of literature in chapter 2 that includes traditional HRM and traditional KM as well as their different approaches. Secondly, the review shows the differences between western style HRM and Japanese style HRM. Thirdly, how modern HRM evolves with different initiatives taken by Google. Fourthly, I conceptualized the most important components of modern HRM through the use and application of modern technologies. Finally, I summarized the chapter.

To answer the research questions, secondly, I conducted a case study using both qualitative and quantitative approaches of interviews and an online survey. The qualitative part was carried out by interviewing 20 (10 HRM and 10 KM) professionals from Saudi ARAMCO. The interview was conducted from January to March 2020. The interview data were analyzed thematically. In the case of quantitative research, which consisted of both open-ended and close-ended multiple-choice questions, a large-scale online survey was conducted. These data were analyzed used SPSS 26.

Thirdly, the results from the qualitative data analysis show that HRM professionals use

ShareK platform both traditional and modern HRM. The result reveals that HRM professionals use ShareK platform for recruiting, training, evaluating, and training which is broadly considered traditional HRM. On the other hand, the results of this research interestingly show that HRM professionals also use the ShareK platform for psychological safety, dependability, and evidence-based decisions which are considered modern HRM. Importantly, the results from interviews show that psychological safety, dependability, and evidence-based decisions—are the most important components of modern HRM which is very important and new findings of this research.

Fourthly, the results of this research show that there are statistically significant differences between HRM and KM professionals regarding traditional HRM and traditional KM, because both groups of professionals namely HRM and KM are different. In addition, they are from two distinctive departments. Furthermore, their job roles are also different. Finally, their educational backgrounds are also different. So, it is expected that there are statistically significant differences between both professional groups of people.

Fifthly, the results of this research show that there are no statistically significant differences between HRM and KM professionals regarding modern HRM. These are the most unique and significant findings of this research. We also compare our results with the findings from Google's Project Aristotle, Google's Project Oxygen, and People's Analytics (Google, 2022a; 2022b; Duhigg, 2016; Schmidt and Rosenberg, 2014; Vulpen, 2019). Especially, the results from Google's Project Aristotle, Google's Project Oxygen, and People's Analytics showed that psychological safety, dependability, and evidence-

based decision—are the component of team dynamics in modern HRM (Google, 2022a; 2022b; Duhigg, 2016; Schmidt and Rosenberg, 2014; Vulpen, 2019). They showed the results qualitatively without comparing among different departments in Google. Therefore, the findings of this research are unique, new, and significant in the HRM and KM community by comparing both HRM and KM professionals regarding modern HRM.

Sixthly, I verified the results by providing evidence from HRM professionals, KM professionals, and ICT professionals. In this research, all the professionals including HRM, KM, and ICT supported the results regarding modern HRM and its components. In this phase, a comparison between HRM and ICT professionals was carried out. The result from the comparison also supports our claims that there are statistically very significant relationships between HRM and ICT professionals regarding all the components of modern HRM.

Finally, a framework of harmonization of HRM with KM was developed based on the results of this research which lay down the foundation to evolve modern HRM as a data science. First of all, the result of this research shows that the movement of acceptance of ShareK for modern HRM was led by HRM professionals. Secondly, the results of this research also show that HRM professionals have changed their THRM system to ShareK based more flexible system for modern HRM. But the result of this research indicates that KM professionals are worried about the flexibility of ShareK system for modern HRM, because KM professionals feel that there is needed for rigidity in the ShareK. Finally, in the future KM professionals will collaborate more with HRM and ICT professionals to have more flexibility and rigidity in their system. As a result, the concept of “VCS” will

help KM professionals to change, update, and re-update the new system more flexibly with rigidity through collaboration with HRM, ICT, and other professionals. Through these collaborative ways, a new system will evolve in which modern HRM will emerge as a data science in the near future with more flexibility and rigidity.

7.2 Significance of the research

This research broadly contributes to management science, knowledge science, HRM, and technology management. This is the first research designed and developed a framework of harmonization of HRM with KM and ICT in which modern HRM will evolve as a data science. This research uniquely broadens the field of HRM and KM. Briefly, modern HRM will evolve as a data science in which different professionals will experiment, use and accept modern HRM, because professionals will feel more psychologically safe, dependable, and make evidence-based decisions. However, there are several practical implications of this research for contributing to management science (HRM), knowledge science (KM), and organizational science all over the world.

First of all, this research broadens the area of management science, especially HRM and knowledge science (knowledge management). The proposed framework of harmonization of HRM with KM in which modern HRM evolve as a data science—provides a new way of rethinking traditional HRM and traditional KM by using a knowledge management system. Uniquely, the framework broadens the areas of HRM and KM by explaining how a KM system supports psychological safety, dependability, and evidence-based decisions. Ultimately, the verification part of the framework ensures the evolution of HRM as a data science. More broadly, over time, more professionals

from different departments in the organization will use and accept modern HRM, and at that time modern HRM emerges as a data science.

Secondly, this research also uniquely contributes to knowledge science especially KM, as the results of this research show how KM technology could be experimented with by HRM professionals for traditional and modern HRM. As a result, the harmonization framework uniquely contributes to knowledge science, because the result of this research shows that the KM system also helps KM professionals with modern HRM.

Thirdly, this research identified and verified that psychological safety, dependability, and evidence-based decisions—are the main components of modern HRM by comparing among HRM, KM, and ICT professionals. But previous research only qualitatively described psychological safety, dependability, and evidence-based decisions—are the components of team dynamics of modern HRM. But in this research, we evaluated and verified these components of modern HRM by comparing HRM, KM, and ICT professionals.

Fourthly, this research proposed the concept of "modern HRM as a data science" which is unique and new to the academic community. Last but not the least, this research presents a new way of collecting, processing, sharing, and applying knowledge through the use of KM technology which uniquely contributes to knowledge science. Especially, KM technology supports psychological safety, dependability, and evidence-based decisions for different professionals in the organization which is very new to the knowledge science community.

7.3 Limitations and suggestions for future research

This research is not free from limitations. There are several limitations of this research. First, a total of 20 interviews with both HRM and KM professionals were conducted from Saudi ARAMCO. It does not cover all the groups of professionals inside HRM and KM. Therefore, more detailed qualitative research should be conducted by covering different groups of professionals from HRM and KM departments.

Secondly, the interview was conducted only by two departments of Saudi ARAMCO. Therefore, qualitative research covering almost all the departments in Saudi ARAMCO should be conducted which will provide more generalized findings.

Thirdly, this research provides verification from the interviews with HRM and KM professionals. But in the case of ICT professionals, this research only provides the summarization of results from open-ended questions from the online survey. Therefore, another qualitative research should be conducted by interviewing ICT and other departments to provide more evidence about modern HRM.

Fourthly, only non-parametric analysis was conducted from the online survey. So more detailed quantitative research should be carried out to identify the factors that influence modern HRM to evolve as a data science.

Fifthly, a comparison among three groups of professionals was conducted in the quantitative part of this research. So, another detailed survey should be conducted by

comparing all the departments of Saudi ARAMCO which will provide a more fine-grained generalized version of the comparison. This will eventually help to evolve HRM as a data scientific discipline.

Finally, our proposed framework of harmonization of HRM with KM was developed based on the results of a case analysis of one company. Therefore, another research should be conducted by covering cases from the United States, Europe, and Japan to develop a more generalized version of modern HRM as a data science.

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Appendix 1: Semi-structured interview protocols

Section 1: Basic Understanding.

Part I: Personal and professional Background

Describe your Educational Background?

What is your current job position and role at Saudi ARAMCO?

What is your department at Saudi Aramco?

How long have you worked at the company?

On a scale of 1-10 rate your general experience at your work.

Part II: Basic understanding about ICT

On a general note do you know about Information and Communication Technologies?

Identify any Information and Communication Technologies available at your department?

Have you ever interacted directly with any of these technologies?

Part III: Basic understanding about Human Resource

Do you know what human resource is?

Name some of the roles of Human Resource

Have you ever been involved in any of the roles surrounding Human Resource?

Identify any Technologies used at Human Resource.

Part IV: Basic understanding About Knowledge Management.

Do you know Knowledge Management?

Identify any roles or practices that concerns acquisition and distribution of knowledge around the company.

Have you ever been involved in any roles or practices on Knowledge Management?

Identify any technologies used in Knowledge Management.

Section 2: Tracing Knowledge Management Efforts by Saudi Aramco.

Were you taken though orientation on the first time you joined the Saudi Aramco?

On a scale of 1-10, how effective was the orientation?

Have you ever received any other training organized or sponsored by the company?

Are there any definite and regular programs set by the company to train workers in your department, for example, annual training?

Do you think there are any of your colleagues at your department that are more skilled than you are?

What is the attitude of senior management with reference to KM in your company?

Is there a platform or medium in your department or company that you can refer to when you want to know about a particular subject within your responsibilities?

Have you ever been requested by the company to share your knowledge to another employees?

Does the company produce any publication to inform or teach its employees?

Have you ever received any of the publications?

On a scale of 1 – 10, what is the amount of effort your department has set to manage knowledge?

Do you think there is any advantage of using the technologies?

Part IV: Relationship of Knowledge Management with Human Resource

Are there technologies that track individual performance used by human resource in your section?

Identify any advantages of technologies used by the human resource.

Section for Management only

Have you adopted knowledge management in your department?

What plans do you have to knowledge in your department?

What are the effect technologies on knowledge management?

Describe the effects of knowledge management in your department.

Where you apply knowledge Management?

Section for ICT experts only:

Describe how the technologies work

How do the technologies used in Knowledge Management integrate with HR?

Describe the effect of the technologies

Identify any limitations of the technologies used in HR and KN

Suggest better suggestions for better integration of KN management with Human Resource.

How does Knowledge Management technologies integrate with Human Resource Technologies

For any comments about the questionnaire, you can write them in the comment box below:

Appendix 2: Communication email from ARAMCO

Alkhateib, Saad S <s********** @aramcoasia.com> Tue, Oct 20, 2020 at 5:00 PM
To: Nabil Almalky <n********** @kau.edu.sa>
Cc: "ikeda@jaist.ac.jp" <ikeda@jaist.ac.jp>, "ume@jaist.ac.jp" <ume@jaist.ac.jp>

Classification: **Non-Business**

Classification: **Non-Business**

To whom it my concern,

We confirm that Mr.Almalky Nabil has conducted the questionnaire in Saudi ARAMCO Headquarter, Dhahran, Saudi Arabia. And the questionnaire has been filled by (Knowledge Management team).

The questionnaire topic was: ICT-Driven Human Resource Knowledge Management: A Case Study of Interfunctionalization at Saudi Aramco.

Kind regards,

Dr. Saad Alkhateib(Engineering)

aramco Executive Officer

Deputy Managing Director
Business Origination and Technology

Tel: (81 3) 6367 7822
Fax: (81 3) 3211 3567

Appendix 3: Consent form

Invitation and Consent

The researcher is conducting a survey of HR, KM and IT departments which have adopted ICT. As a partial fulfillment of the requirements for the degree of Doctor of Philosophy. You are being invited to participate in the study and to provide your responses from the viewpoint of your department's experience. The survey will take around 15 minutes to complete, your cooperation in completing this questionnaire is very much appreciated.

1. **Confidentiality:** Your responses will remain strictly confidential. To ensure confidentiality and integrity of responses, the questionnaire will be coded so that only the researcher will be able to identify the respondents and their institution. Data will be aggregated and incorporated into the narrative analysis portion of the study.

    - I Approve

Appendix 4: Background information of interviewees

Phases	Code	Position	Interview type	Duration	Date
First phase	KMP1	KM manager	Face-to-face	40 minutes	08/01/2020
	KMP2	KM manager	Face-to-face	35 minutes	15/01/2020
	KMP3	KM manager	Face-to-face	45 minutes	16/01/2020
	KMP4	KM manager	Face-to-face	40 minutes	21/01/2020
	KMP5	KM manager	Face-to-face	35 minutes	30/01/2020
Second phase	KMP6	KM assistant	Face-to-face	30 minutes	5/02/2020
	KMP7	KM assistant	Face-to-face	45 minutes	11/02/2020
	KMP8	KM assistant	Face-to-face	40 minutes	12/02/2020
	KMP9	KM assistant	Face-to-face	40 minutes	18/02/2020
	KMP10	KM assistant	Face-to-face	50 minutes	26/02/2020
Third phase	HRMP1	HR manager	Face-to-face	55 minutes	02/03/2020
	HRMP2	HR officer	Face-to-face	30 minutes	03/03/2020
	HRMP3	HR officer	Face-to-face	35 minutes	04/03/2020
	HRMP4	HR officer	Face-to-face	30 minutes	10/03/2020
	HRMP5	HR officer	Face-to-face	30 minutes	11/03/2020
	HRMP6	HR officer	Face-to-face	30 minutes	12/03/2020
	HRMP7	HR assistant	Face-to-face	30 minutes	12/03/2020
	HRMP8	HR assistant	Face-to-face	27 minutes	17/03/2020
	HRMP9	HR assistant	Face-to-face	28 minutes	19/03/2020
	HRMP10	HR business partner	Face-to-face	40 minutes	26/03/2020

Appendix 5: Survey questionnaire

Section 1: Which seek to know the respondent's personal as well as institutional information.

2.What is your Nickname?

.....

3.What is your gender?

A. Female B. Male

.....

4.What is your age?

A. 18 to 24, B. 25 to 34, C. 35 to 44, D. 45 to 54, E. 55 to 64, F. 65 to 74, J. 75 or older

.....

5.What is the highest level of education you have completed?

.....

6.What is your nationality?

.....

7.How many languages do you speak?

.....

8. How long have you worked at the company?

A. Less than 6 months, B. 1 - 2 years, C. More than 2 years

.....

9.What is your job?

.....

10.About how many years have you been in your current position?

1. Less than 1 year, 2. At least 1 year but less than 3 years, 3. At least 3 years but less than 5 years

4. At least 5 years but less than 10 years, 5. 10 years or more

.....

11.What department do you work in?

.....

12.Is your employer's work environment positive, neither positive nor negative, or negative?

1. Extremely positive, 2. Moderately positive, 3. Neither positive, 4. nor negative

5. Moderately negative, 6. Extremely negative

.....

13.Please indicate the attachment of your Department to each one below: rate on a scale of Strongly

disagree and Strongly agree

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
Human Resource					
Information Technology					
Communication					
Planning					
Upstream					
Engineering services					
Downstream					
Public relations					
Project management					
Management services					
Law					
Operations Services					
Industrial relations					
Other (please specify)					

.....

14.Please rate the major focus of your job to each one below: rate on a scale of Strongly disagree
and Strongly agree.

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
Database and archives					
Information Technology					
knowledge Management					
Recruitment					
Strategy					
Performance					
Maintenance					
Environmental					

Research & Development					
Planning					
Evaluation					
Exploration and production					
Policies					
archiving documents					
Other (please specify)					

.....

15. In your opinion which of the following down below **does well** and which **needs improvement**?

	Does well	Needs Improvement
Providing challenging work		
Perks and benefits		
Opportunities for career development		
Communication with direct manager		
Communication with senior management		
Job training		
Work/Life balance		
Managing workload		
Competitive compensation package		
Creating Knowledge		
Sharing Knowledge		
Storing Knowledge		
Transferring Knowledge		
Other (please specify)		

.....

SECTION 2: Part 1: This part is dedicated to capture ICT tools used in the different departments
especially in human resources functions.

16.Please rate **ICT tools usage** on a scale of Strongly agree and Strongly not agree.

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
Advertise through internet (E recruitment)?					
Use an Online application platform for reception of candidatures?					
Computerized evaluation of training progress of staff members?					
Use of Computerized machine during training?					
Strategy					

.....

Section 2: Part 2: This part deals with the appraisal of HR efficiency, it seeks to evaluate how the
HR perform due to the use of ICT tools at the different levels of HR functions.

17.Please rate **the appraisal of HR efficiency** on a scale of Strongly agree and Strongly not agree.

	Strongly disagree	Disagree	Neither	Agree	Strongly agree
You have a computerized systematic **evaluation of workers performance**?					
They use Technology **to recruit people?**					
You have a computerized system for evaluation and **reward management**?					
You have a computerized system for **learning from others**?					

.....

Section 2: Part 3; Existing status of knowledge management: This part is about KM concepts, its
relation to ICT, details of the process of your involvement in KM, your impression about KM, reasons for your involvement in KM, and the benefits achieved through the introduction of KM in

your Dept.

18. Do you know about knowledge Management?

A. Yes. B. No

.....

19.What is your opinion about Knowledge Management (KM)?

1. Extremely valuable, 2. Very valuable, 3. Somewhat valuable, 4. Not so valuable, 5. Not at all valuable

.....

20.Do you consider your firm as a knowledge-based firm?

A. Yes, B. No

.....

21.Does your company recognize knowledge as a part of their asset base?

A. Yes, B. No

.....

22.Please rate on a scale of Not in existence at all and Growth stage.

	Not in existence at all	Intermediate stage	Introduction stage	Growth stage
How will you rate the Knowledge Management practice in your company?				
What is the current status of Knowledge Management Practices in your department?				

.....

Section 2: Part 4: About Training, Culture, Policies and Strategies.

23.What is the attitude of senior management with reference to KM in your company?

1. Sees it as very important and provides full support, 2. Sees it as very important but hardly supports it,

3. Sees it useless and hardly affects, 4. Was very supportive in the beginning but now lost interest

.....

24.Which one of the following best describes your company culture?

1. Basic values & purpose emphasizes on sharing of knowledge Open, 2. encouraging & supportive culture

3. Knowledge management exists in each and everybody's job and so everybody has the best of knowledge. 4. Knowledge management is the task of a few designated ones and there is no need for knowledge sharing.

.....

25.Have you received any knowledge-management training for new technologies?

A. Yes, B. No

.....

26. If yes, do you think it is helpful or not?

1. Extremely useful, 2. Very useful, 3. Somewhat useful, 4. Not so useful, 5. Not at all useful

.....

27. How much knowledge management training have you had within this company?

A. None, B. 1-10 hours, C. 11-25 hours, D. 26-50 hours, E. 51+ hours

.....

28. Which of the following is the main channel that you prefer to use to obtain information?

1. Sharek, 2. Colleagues, 3. Information resources within the department, 4. Intranet, 5. Internet

6. Other (please specify)

.....

29.What is the primary reason for your preference for that particular channel?

1. They are easily accessible, 2. The information they have is relevant, 3. The information they have is of high quality

.....

30. Is there a written knowledge management policy or strategy in your organization?

A. Yes, B. No

.....

31. Is there policies or programs intended to improve worker retention?

A. Yes, B. No

.....

32. At which level of the organization it is most suitable to implement a knowledge management strategy?

1. Company Level, 2. Business Unit/Division Level, 3. Department Level, 4. At all Levels

.....

33. Out of 19 identified knowledge management practices which organization is adopting which practice or which practices were most commonly used in the organization.

Please rate, Knowledge Management checklist.

	Strongly	agree	Neutral	Least	Very least

	agree			agree	agree
Knowledge Sharing: Useful knowledge can be easily shared and acted upon					
People at workplace share their experiences and knowledge willingly					
Formal channels for knowledge sharing (like meeting, courses, tours and similar activities)					
Providing incentives for knowledge sharing					
Knowledge Transfer: Well defined processes for creation, capture, and acquisition of knowledge.					
Much time is taken by an employee to get the relevant knowledge					
I trust, give & take and openness of participants are key elements for KT					
I am sure it is feasible that we can make **relationships and learn from others**					
Documented procedures centrally stored for ease of access across the firm					
Stored knowledge is quite important, relevant and latest					
Record of all your informal discussion or meeting It is the job of R&D department only					
View as everyone's job and everybody contributes to it					
Encourage people to share relevant information					
Encourage people to make decision based on knowledge shared					
Hardware and software technologies are **available to support learning**					
Culture: Corporate open culture					
Knowledge sharing in my company culture					
A virtual platform where people can contact each other is a suitable option					

……..

Section 2: Part 5: About Knowledge Management Technologies.

34.Which technologies are presently being used by employees in your organization for Managing Knowledge? Please rate.

	Strongly agree	agree	Neutral	Least agree	Very least agree
Technology: Image processing technology					
Sensor's technology					
3D technology					
Internet					
Intranet					
Customer relationship management					
Management Information System					
Expert Networks					
E-mail					
Video conferencing					
Data warehousing					
Browsers					
Content Management					
Knowledge Portals					
Data support system					
Information Technology: E-Learning					
Groupware					
Data management system					
Story Telling					

…….

SECTION 3: Part 1: This section is related to the issues of implementing KM programs in HR. Also, has three Dimensions First: People Questions, Second: Process Questions and Third: Technology Questions.

35.People Questions: Which Department needs to participate in the KM program?

	Strongly agree	agree	Neutral	Least agree	Very least agree
Departments: Human Resource					
Information Technology					
Planning					
Communication					
Upstream					
Engineering services					
Downstream					
Public relations					
Project management					
Management services					
Law					
Operations Services					
Industrial relations					
Finance					

.....

36.What is the current status of Knowledge Management Practices in your company?

	Very Least agree	Least agree	Neutral	agree	Strongly agree
leader: defines and communicates the core values of the organization, sets and communicates direction and goals, and inspects and ensures performance					
community member or leader: participates in or leads communities of practice					
employees, trainer, or training developer: takes, teaches, or develops training courses					
reader or author: reads or writes user documentation					
methodology user or developer: uses or designs standard methodologies					
inventor or innovator: **creates new knowledge**					
reuser, contributor, or content owner:					

reuses, shares, or provides knowledge					
reporting consumer or provider: uses or creates metrics reports					
process user or provider: uses or creates work processes					
inquirer or searcher: asks questions or searches for content					
storyteller: uses narrative to motivate others to take action, build trust, transmit values, get others working together, share knowledge, tame the grapevine, and create and share a vision of the future					
tool user or provider: uses or creates tools and systems					
threaded discussion participant or moderator: participates in or leads threaded discussions					
expertise locator or provider: locates expertise or serves as an expert for others					
taxonomy governor: defines and maintains a standard classification system used for metadata, navigation, and searching					
tagger: applies metadata tags to content so that searches and aggregators will find it					
archiver: archives content so that it is preserved					
blogger: publishes blog entries, links to other blogs, and responds to comments					
podcaster: records and distributes audio or video broadcasts					
Knowledge sharing culture					
A **virtual platform where people can contact each other is a suitable o**ption					

.....

37. Who are the key stakeholders and leaders to line up in support of the new initiatives? The

success of the program will depend on having leaders and respected individuals playing active roles in communicating, inspecting, and reinforcing its goals. Please rate.

	Strongly agree	agree	Neutral	Least agree	Very least agree
Stakeholders and leaders Senior executive					
The human resources leader					
The Knowledge management leader					
The chief technical officer					
eadership categories, e.g., all managers, all senior technical fellows, or all program managers.					

.....

38. **Process Questions:** What existing processes need to be modified to incorporate KM activities? From the following list, identify all processes which already exist and need to be part of the KM program.

Here is a list of processes: Please rate.

	Strongly agree	agree	Neutral	Least agree	Very least agree
Processes: methodologies					
creation					
capture					
reuse					
lessons learned					
proven practices					
collaboration					
content management					
classification					
metrics and reporting					
management of change					
workflow					
valuation					
social network analysis					
Content Management					

appreciative inquiry and positive deviance					
storytelling					

.....

39.Technology Questions: Using all such existing tools as part of the KM program will save money, accelerate implementation, and demonstrate the important concept of reuse. What existing tools can be used in support of the new initiatives? From the following list: Please rate.

	Strongly agree	agree	Neutral	Least agree	Very least agree
Query: user interface					
intranet					
virtual meeting rooms, web/video/audio conferencing, and telepresence					
portals					
repositories					
threaded discussions and Enterprise Social Networks (ESNs)					
expertise locators and ask the expert					
metadata and tags					
search engines					
archiving					
blogs					
podcasts and videos					
external access					
cognitive computing and artificial intelligence					
gamification applications					
process automation					
workflow applications					
syndication, aggregation, and subscription management systems					

.....

40.What integration of tools and systems will be required? Please rate.

	Strongly agree	agree	Neutral	Least agree	Very least agree
Purchase or develop suites of products which work well together?					
Developing a series of standalone tools?					

.....

41.Please indicate the extent to which you have incorporated the type of KM skills and competencies into your knowledge. (Point out more skills if needed).

	extremely limited extent	limited extent	moderate extent	high extent	extremely high extent
KM skills and competencies: Information Management skills					
Information Technology skills					
Strategic/Business skills					
Management skills					
Human and Organizational skills					
Interpersonal and Communication					
Personal behavioral skills					
Other (please specify)					

.....

SECTION 4: The final section contains 2 questions regarding the problems of introducing KM in HR.

42. How do you rate the following factors as the major barriers to the incorporation of KM into HR? (Point out more barriers as you encountered during the incorporation of KM).

	highly unimportant	unimportant	neither	important	highly important
KM skills and competencies: Lack of initiation					
Psychological problem					

(especially for those who are highly traditional)					
Lack of knowledge in determining appropriate KM contents for HR					
Lack of resources (Financial, staff, teaching & learning materials, etc.)					
Lack of collaboration and cooperation with other disciplines					
Existing environment of HRKM practices					
Other (please specify)					

.....

Appendix 6: Interview quotations for the current state of art of HRM

HRM Activities	Interviewees' quotations
Hiring and recruiting	-It is very easy for me to see the unanswered questions in ShareK. Then, I can analyze those unanswered questions for identifying the required skills needed to answer those questions. In discussion with the higher authority, we can recruit the smart and talented people for our organization (HRMP1). -I think that ShareK is helping me identify the gaps between required skills and acquired skills in Saudi ARAMCO. So, we can fill the gap by recruiting the new people (HRMP3).
Training and learning	-I think that the answers provided by other employees in the ShareK platform could be searched like we do search in Google. So, the newly recruited employees could use those contents for the learning purposes (HRMP2). -I personally use ShareK platform for learning purposes. Because I think that I can use this platform just like Google. I can search any required information for professional reasons. As a result, I believe that this platform could be used for learning purposes by other employees in ARAMCO (HRMP5).
Evaluating performance	-I can easily see the person who is answering questions most of the times in the ShareK platform. It helps me to determine the most active and dynamic employees in our organization (HRMP1). -ShareK helps me to track the performance of the employees. For example, I can easily see in the database who is providing answers several times, who is asking questions several times, and who is providing feedback. It helps me to determine the most active employees in our organization (HRMP6).
Rewarding	-I think that I can determine the employees for providing promotions based on his/her performance in ShareK platform. Though it is not everything but the performance of employees on ShareK platform plays an important role for providing them promotions (HRMP1). -I think that the employees may feel a sense of pride. Because all the employees of Saudi ARAMCO can see who is providing most of answers and feedbacks in ShareK platform. So, I personally believe that it is a matter of pride in the ARAMCO community. Because the employees who share and provide most of the answers will be well-known to the organization. Therefore, a sense of feeling pride motives them to share more answers and provide more feedback in the platform (HRMP8).
Psychological safety	-I personally believe that anyone in ARAMCO can share his or her knowledge in ShareK without any fear of punishments or embarrassing in the organization (HRMP1). -I can ask any questions in ShareK platform without any hesitations (HRMP9). -I don't feel any hesitation for asking questions and providing answers to questions in the ShareK platform (HRMP3). -I think that now it becomes a culture of sharing anything in ShareK

	platform without feeling fear or hesitation or fear of embarrassment in the organization (HRMP4). -I believe that I can share my knowledge and experience in ShareK. Because now it becomes a culture of sharing anything in ARAMCO (HRMP6). -I think that it is now a global phenomenon of engaging through online platforms. Similarly, we can engage and share anything in our organization via ShareK (HRMP8). -I can comfortable share anything in ShareK. I think that anyone can comfortably share knowledge, and experience with other employees without fear of punishments or embarrassment in ARAMCO (HRMP1). -I feel comfortable while sharing my knowledge in ShareK. I also think that anyone from ARAMCO can also feel the same (HRMP9).
Dependability	-Thanks to ShareK! I can communicate with any employees of Saudi ARAMCO via ShareK (HRMP7). -I think that I can communicate with almost all the employees in Saudi ARAMCO via ShareK. Otherwise, communicating with them via face to face or other means is bit difficult for me (HRMP5). -I feel that ShareK provides us to make relationship with wider people in our organization. This relationship also fosters trust between us and depending more among the employees (HRMP3). -I think that the knowledge and information shared in ShareK platform is accurate which tell us that we can depend on the information provided by other employees. Broader sense, I can say that I am depending on the person who is sharing information and knowledge in ShareK platform (HRMP1).
Evidence based decision	-Well, I think that I can make decision based on the information shared on ShareK platform. Because the employees of Saudi ARAMCO shared that information which is accurate. So, I can certainly make decision based on the shared information on ShareK (HRM1). -I can make decision based on the knowledge shared on ShareK platform. There is huge knowledge available on ShareK platform. So, I only search the required knowledge for making decision (HRMP7). -I can check on ShareK that what kind of skill sets are necessary for the future recruitment in ARAMCO? I can easily identify the skill sets based on the information provided on ShareK. So, I think that it helps me to make decision based on data (HRMP9).

Appendix 7: Interview quotations for the current state of art of KM

KM Activities	Interviewees' quotations
Knowledge creation	-Certainly, it is the creation of new knowledge. Because the employees are answering the questions asked by other employees. So, the role of ShareK is like a virtual space where anyone can post and share their knowledge and experience (KMP1). -I think that it is very difficult for meeting with all the employees. In addition, it is also very difficult to identify the people who have the knowledge, experience, and skills on a particular topic. But I think that it is very easy that anyone can express their inquisitive about knowing new things on ShareK platform. In response, other employees who have the knowledge and experience can post on the platform which I think that new knowledge (KMP4). -I think that personalized tacit knowledge is created through the interactions between people and the platform. Because the employees who gave answers on the platform provide their own experience, knowledge, and skills (KMP8). -I think that a lot of feedback was received from the other employees on a particular answer given by an employee on ShareK. I believe that feedback is considered another form of tacit knowledge. Because feedbacks are the original thoughts and ideas from the employees of ARAMCO, they share via ShareK (KMP10). -As a KM professional, I myself gave reports, magazines, and journal papers to the persons who asked questions on ShareK platform. So, I believe that it is the form of explicit knowledge (KMP9).
Knowledge organization	-All the provided answers and questions are stored in our database so that people of our organization can use it like the Google search engine (KMP1). -I think that all the feedbacks are also saved in our database so that anyone from ARAMCO can use it (KMP6). -I think that anyone can upload books, journals, business reports, and magazines into the repository database of ShareK through proper authentication (KMP5, KMP9).
Knowledge sharing	-I think that anyone can access the database of ShareK anytime and anywhere in the world after authentication of their identity (KMP3). -I think that all the created new knowledge is stored in the database of ShareK which are open anytime for anyone of ARAMCO (KMP5, KMP8). -I think that employees can communicate with each other via emails supported by ShareK. In addition, they can also have video conferences for their necessity which are also supported by ShareK platform (KMP7). -The employees of ARAMCO who posted questions and received answers from another employee can have an online meeting by themselves using the online meeting services supported by ShareK

	(KMP10).
Applying knowledge	-I think that the employees are getting benefited. Because I can easily understand to see the feedback provided by them on ShareK platform (KMP1, KMP4, and KMP6). -ShareK supports recruiting, training, evaluation, rewarding, as well as modern HRM activities like psychological safety of employees, dependability, and evidence-based decision (HRM1, HRM3, and HRM5).

Appendix 8: Interview scripts from HRM professionals regarding modern HRM

Modern HRM	Quotations from Interviewees
Psychological safety	-I personally believe that anyone in ARAMCO can s**hare his or her knowledge** in ShareK without **any fear of punishment or embarrassment in the organization** (HRMP1).
	-I can ask any questions on the ShareK platform **without any hesitations** (HRMP9).
	-I think that now it becomes **a culture of sharing anything on ShareK platform** without feeling fear or hesitation or fear of embarrassment in the organization (HRMP4).
	-I think that it is now a global phenomenon of **engaging through online platforms.** Similarly, we can engage and share anything in our organization via ShareK (HRMP8).
	-I feel **comfortable sharing** my knowledge in ShareK. I also think that anyone from ARAMCO can also feel the same (HRMP9).
Dependability	-Thanks to ShareK! I can **communicate** with any employees of Saudi ARAMCO via ShareK (HRMP7).
	-I feel that ShareK provides us to make a **relationship with wider people in our organization**. This relationship also fosters trust between us and depends more on the employees (HRMP3).
	-I think that the knowledge and information shared in ShareK platform are accurate which tells us that we can depend on the information provided by other employees. Broader sense, I can say that **I am depending on the person** who is sharing information and knowledge on ShareK platform (HRMP1).
Evidence-based decision	-Well, I think that I can **make the decision based on the information shared on ShareK platform**. Because the employees of Saudi ARAMCO shared that information which is accurate. So, I can certainly make a decision based on the shared information on ShareK (HRM1).
	-I can **make decisions based on the knowledge shared on ShareK platform**. There is huge knowledge available on ShareK platform. So, I only search for the required knowledge for making decisions (HRMP7).

Appendix 9: Interview scripts from KM professionals regarding modern HRM

Modern HRM	Quotations from Interviewees
Psychological safety	-I think that ShareK is a **knowledge-sharing platform**. So, anyone from Saudi ARAMCO can share his/her knowledge **without any fear of harassment** (KMP1)
	-Certainly, we ensure the **psychological safety of the people** by sharing their knowledge, experiences, and new ideas on our platform (KMP4)
Dependability	-I believe that **people can depend on the knowledge shared on ShareK**. Because it is an organization. The people will not share anything unnecessary. Therefore, I believe that employees of ARAMCO can depend on the knowledge share on the platform (KMP7).
	-Oh! ShareK platform is equipped with many communication channels. So, employees from ARAMCO can use those channels of communication for making **relationships with other employees of our organization** (KMP10).
Evidence-based decision	-Definitely, employees from ARAMCO can **make decisions based on the knowledge shared on our platform**. Because supporting employees of ARAMCO through the dissemination of accurate knowledge is one of the prime goals of ShareK (KMP5).
	-I think that the knowledge shared on our platform not only helps employees to **make decisions** based on the shared knowledge but also **improves their knowledge**. It is basically helping employees to continue learning and to improve their skills and knowledge (KMP3).

Appendix 10: Open-ended answers from ICT professionals regarding modern HRM

Modern HRM	Quotations from open-ended questions
Psychological safety	-The open organizational platform like ShareK encourages us to **share anything** (ICTP3).
	-I can **comfortably share my knowledge** on ShareK (ICTP12).
	-I feel **psychologically confident** to share knowledge on ShareK (ICTP25).
Dependability	-I **trust the information** (ICTP37).
	-I **rely on the knowledge** shared on ShareK (ICT45).
Evidence-based decision	-I make **decisions based on the knowledge shared** on ShareK (ICT49).
	-ShareK helps me to **update my existing knowledge** (ICT67).