

**A Critical Analysis of Key Factors  
Influencing Knowledge Sharing  
Processes: A Case Study of Bahrain  
Public Security Forces**

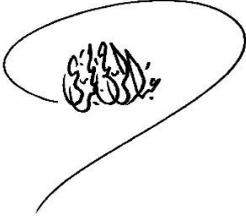
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A Thesis Submitted in Partial Fulfilment of the Requirements of  
Liverpool John Moores University for the Degree of Doctor of  
Philosophy

**August 2018**

## DECLARATION

I hereby declare that no portion of this work has been submitted in support of an application for any other degree or qualification at this or any other university or institution of learning. In addition, I hereby confirm that, this thesis is solely my work and all work of others cited in this thesis have been acknowledged.

A handwritten signature in black ink, enclosed within a large, hand-drawn oval. The signature is stylized and appears to be the name 'Abdulrahman Bahar'.

Signed: Abdulrahman Bahar

## DEDICATION

### *I Dedicate this Thesis*

*To the Souls of my Father and Mother. Your passion, understanding, love and unshakable faith in me were a constant source of my strength.*

*May Allah Almighty have a mercy on you and grant you the highest place in Jannah. Ameen.*

*To my beloved wife, for her patience, compassion and willingness to be there for me at all the times. She provided me the strength, support and engorgement, which helped me to accomplish the intimidating task.*

*To my Sons (Mohamed, Khaled, Ghanim, Nasser and Faisal) and my sweet daughter (Sara). This research project would not be possible without remarkable help and support from you. I love you all from the bottom of my heart, may you all grow up to be successful and prosperous in this world and the next.*

## ACKNOWLEDGEMENTS



*In The Name of Allah, The Most Beneficent, The Most Merciful*

First and foremost, I am unendingly thankful to Almighty Allah, who gave me the will, wisdom and ability to complete this project.

I would like to acknowledge that completing this thesis would not be possible without remarkable help and support from many individuals.

Firstly, I would like to express my special thanks and appreciation to *His Excellency Lieutenant-General Sheikh Rashid bin Abdullah Al-Khalifa (Minister of Interior-Bahrain)*. I would also like to acknowledge the support and encouragement provided by *His Excellency Mr. Ali Bin Mohamed Alromaihi (Minister of Information-Bahrain)*. Moreover, I am grateful to Public Security Officers for their participation in the research.

I would like to extend my utmost gratitude and appreciation to my supervisory team; particularly, *Dr Scott Foster* and *Dr Muhammad Kamran Nawaz* for their valuable feedback. I owe them a big appreciation with deepest gratitude for their spectacular supervision, patience, constant encouragement and guidance. Without their continuous optimism concerning, this study would hardly have been completed.

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*Abdulrahman*

## ABSTRACT

In these times of globalisation, knowledge is viewed as a source of competitive advantage and knowledge sharing (KS) as a characteristic of organisational success. In particular, KS has become a key factor for public organisations, which are searching for appropriate ways to manage and use their knowledge efficiently and effectively. This study contributes to the limited research base on knowledge sharing in public sector organisations, particularly police forces, and organisations in the Gulf region through an empirical investigation into the factors that influence knowledge sharing processes (Knowledge Donating and Knowledge Collecting) in the Bahrain Public Security Forces (BPSF).

In order to achieve the research objectives, prior studies, relevant literature and theories were reviewed which led to the development of a theoretical framework and set of hypotheses that were used to test the influence of the proposed factors on KS processes. For this purpose, a quantitative approach using a questionnaire-based survey was conducted within the BPSF. Responses from 312 BPSF officers were analysed using sophisticated statistical techniques and software. Initially, Statistical Packages for Social Sciences (SPSS 24) was used to analyse demographic variables and exploratory factor analysis. Later, analysis of moment structure (AMOS 24) was used to conduct confirmatory factor analysis (CFA) and structural equation modelling (SEM) in order to evaluate the model fit of the study and to test the hypothesised relationships.

The results revealed that most factors showed a statistically significant relationship with KS processes. In terms of knowledge donating (KD), organisational structure centralisation (SC), personal benefit (PB) and organisational structure formulisation showed the most significant and positive relationships. However, reciprocity (RC) and rewards (RW) were found to have an insignificant relationship with KD. On the other hand, in the case of knowledge collecting (KC), the results revealed that social interaction (SI), organisational structure centralisation (SC) and rewards (RW) had a significant positive association with KC whereas RC did not show any statistical relationship with KC. This study will contribute to the literature on knowledge sharing in public organisations, particularly for the Gulf countries such as Bahrain, and will assist the public sector managers to develop a knowledge sharing culture within their organisations. Moreover, this study contributes to the knowledge through developing and testing a new model that portrays factors affecting KS processes.

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## LIST OF ABBREVIATIONS

<b>AGFI</b>	Adjusted Goodness-of-Fit Index (Model appropriateness measure)
<b>AMOS</b>	Analysis of Moment Structures (Quantitative data analysis software)
<b>AVE</b>	Average Variance Extracted
<b>BPSF</b>	Bahrain Public Security Forces
<b>CFA</b>	Confirmatory Factor Analysis
<b>CFI</b>	Comparative Fit Index (Model appropriateness measure)
<b>CMIN</b>	Normed Chi Square
<b>CR</b>	Critical Ratio
<b>DF</b>	Degree of Freedom
<b>EFA</b>	Exploratory Factor Analysis
<b>GCC</b>	The Gulf Cooperation Council
<b>GFI</b>	Goodness-of-Fit Index (Model appropriateness measure)
<b>KC</b>	Knowledge Collecting (Dependent Variable)
<b>KD</b>	Knowledge Donating (Dependent Variable)
<b>KM</b>	Knowledge Management
<b>KMO</b>	Kaiser-Meyer-Olkin (Sampling adequacy measure)
<b>KS</b>	Knowledge Sharing
<b>MI</b>	Modification Indices (SEM measure)
<b>MOI</b>	Ministry of Interior
<b>NFI</b>	Normed fit index
<b>PB</b>	Personal Benefits (Independent Variable)
<b>RC</b>	Reciprocity (Independent Variable)
<b>RMR</b>	Root Mean Square Residual (Model appropriateness measure)
<b>RMSEA</b>	Root Mean Square Error of Approximation (Model appropriateness measure)
<b>RW</b>	Rewards (Independent Variable)
<b>SC</b>	Structure Centralisation (Independent Variable)
<b>SCT</b>	Social Capital Theory
<b>SECI</b>	Socialisation, Externalisation, Combination and Internalisation
<b>SEM</b>	Structural Equation Modelling
<b>SET</b>	Social Exchange Theory
<b>SF</b>	Structure Formalisation (Independent Variable)
<b>SI</b>	Social Interaction (Independent Variable)
<b>SMC</b>	Squared Multiple Correlations (SEM measure)
<b>SNA</b>	Social Network Analysis
<b>SPSS</b>	Statistical Package for Social Science (Quantitative data analysis software)
<b>SR</b>	Standardised Residuals (SEM measure)
<b>SRMR</b>	Standardised Root Mean Square Residual (Model appropriateness measure)
<b>SRW</b>	Standardised Regression Weights (SEM measure)
<b>ST</b>	Support (Independent Variable)
<b>TLI</b>	Tucker-Lewis index
<b>TPB</b>	Theory of Planned Behaviour
<b>TRA</b>	Theory of Reasoned Action
<b>TT</b>	Trust (Independent Variable)
<b>VIF</b>	Variance Inflation Factor
<b><math>\alpha</math></b>	Cronbach Alpha
<b><math>\chi^2</math></b>	Chi-Square

# **Chapter 1: Introduction**

## **1.1 Introduction**

This chapter begins by introducing the background of the topic under investigation (section 1.2). Then, an overview of research context was given (section 1.3), and proceeds to outline the research problem and purpose of the study (sections 1.4 and 1.5). It then highlights the general aim of the study, presents a clear statement of the objectives and research questions (section 1.6 and 1.7), and gives a brief indication of the methodology adopted to answer those questions (section 1.8). Next, the significance of the research is identified before the chapter ends (section 1.9) with an overview of the structure of the thesis (section 1.10).

## **1.2 Background of the Study**

The recent era of globalisation and dynamic changes in the business environment have attracted the attention of practitioners and scholars and led them to focus on knowledge as a main driver of competitive advantage (Sandhu et al., 2011; Jain et al., 2015; Youssef et al., 2017). Successful organisations depend on how well they enable knowledge to be shared, how well they learn from the knowledge they hold, and how they use it to create new value (Noor and Salim, 2011; Noor et al. 2014). As a result, both, the public and the private sectors emphasise the importance of knowledge sharing (KS) for organisational performance and effectiveness (Kim and Lee 2005). Knowledge sharing is widely recognised to be a central component of successful knowledge management (Huo et al., 2018), and one of the central characteristics of a healthy knowledge culture is that knowledge sharing is embedded in the way in which the organisation works (Seba et al., 2012a). Knowledge sharing is essential to generate new ideas and develop new opportunities through the socialisation and learning process of employees (Lin, 2007; Asrar-ul-Haq and Anwar, 2016). However, employees only share knowledge if they feel that it is in their interest to do so (Seba et al., 2012a). Employees' willingness to share knowledge can be affected by a range of internal organisational and environmental factors (Al-Alawi et al., 2007; Lin et al., 2008; Sandhu et al., 2011; Titi Amayah, 2013; Youssef et al., 2017). Recently, there has been an increasing emphasis on studying the factors that

might affect KS in public and private sectors (Zhang et al., 2006; Leidner and Alavi, 2008; Al-Adaileh and Al-Atawi, 2011).

In the context of police organisations, knowledge sharing acts as the lifeblood (Gottschalk, 2010; Ratcliffe, 2008) and has an important impact on organisational performance (Tangaraja et al., 2015). Because of the limited amount of KS research in Middle Eastern countries, and in police organisations in particular (Seba et al., 2012b; Wang and Noe, 2010; Massaro et al., 2015), this research aims to explore the KS phenomenon in the Bahrain Public Security Forces (BPSF).

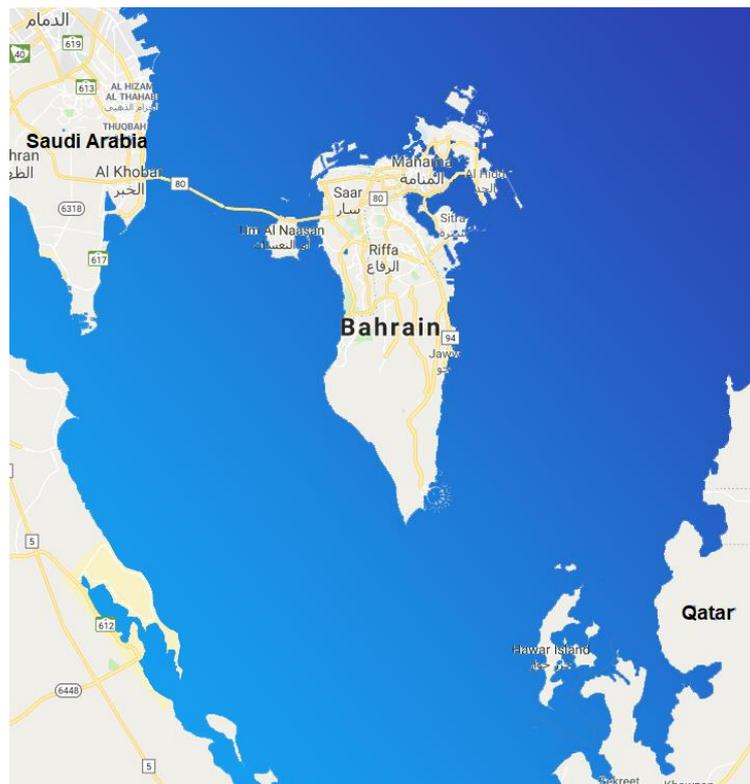
This study endeavours to contribute to KM practice and theory by highlighting and addressing three key research issues. First, there is a lack of research about KS in developing countries particularly Middle Eastern countries. (Abou-Gamila et al., 2015; Massaro et al., 2015; Seba et al., 2012a). Secondly, compared with the private sector, there are limited studies related to public organisations, particularly police organisations (Sandhu et al., 2011). Finally, in terms of studying KS behaviour, previous studies generally tend to focus more on 'knowledge donating' and ignore 'knowledge collecting' behaviour, which leads to a limited assessment of KS behaviour (Jain et al., 2015, p.56). However, this research has assessed KS behaviour from a broader viewpoint based on the two forms of behaviours, 'Donating' and 'Collecting' (Van Den Hooff and Van Weenen, 2004).

### **1.3 The Research Context (Bahrain)**

The Kingdom of Bahrain is a Middle-Eastern archipelago made up of 33 islands located in the Arabian Gulf to the east of the Kingdom of Saudi Arabia and north-west of the State of Qatar, as shown in Figure 1. Administratively, the country is divided into four governorates with the city of Manama as its capital (EDB, 2015). Islam is the main religion and Arabic is the official language of the nation; however, English is widely spoken.

Bahrain gained independence from British rule in 1971. The Kingdom of Bahrain is divided for administrative purposes into four separate districts, each controlled by a governor. These are the Capital governorate, the Muharraq

governorate, the Northern governorate, and the Southern governorate (EDB, 2015). The country operates as a constitutional monarchy, governed by the Al Khalifa Royal family. The present Head of State is His Majesty King Hamad bin Isa Al Khalifa., while the Prime Minister serves as the Head of the Government. The Council of Ministers is appointed by the King and presided over by the Prime Minister, a position that has been held by HRH Prince Khalifa bin Salman Al Khalifa since Bahrain's independence. The King enjoys broad executive powers, which he exercises both directly and through his ministers, who are appointed and dismissed by Royal Decree (Constitution of Bahrain, art 33d, 2002). The King is the Supreme Commander of the Bahrain Defence and Security Forces (Constitution of Bahrain, art 33g, 2002). Moreover, Bahrain has a mixed two-house parliament. The first legislative body, Chamber of Deputies, is composed of officials elected by nationwide ballot and is responsible for passing laws (UN, 2002).



Source: Google Maps, 2018

Figure 1 Map of the Kingdom of Bahrain

While its population, land area and resources are relatively small, Bahrain has achieved a high level of social and economic development in a short period. Bahrain's public sector consists of many ministries such as the Ministry of Health, Ministry of Education and Ministry of the Interior (MOI). According to the United Nations Development Programme Human Development Index, Bahrain ranks above the Arab regional average, being ranked 39 out of 169 countries (UNDP, 2011). Bahrain was the first country in the GCC to introduce formal education, in 1919, and thus the literacy rate is nearly 90%. There are three public universities in the country. In addition, Bahrain has 15 private universities, as well as local branches of foreign universities.

### **1.3.1 Bahrain Public Security Forces (BPSF)**

The history of the police in Bahrain goes back to the year 1869 in the era of the late Shaikh Isa bin Ali Al Khalifa, who founded police patrols to keep discipline and order. At that time they were called Fedawea. After establishment of the Manama municipality in 1919, the first regular police force in Bahrain was set up and the first law for police was issued. The police at the time consisted of a civil force who had the task of keeping the peace, such as camel riders and cavalymen. Later, in 1926, Bahrain created the organised State Police. In the year 1937, Shaikh Khalifa bin Mohamed bin Isa Al Khalifa was appointed as the chief of police and greatly developed the force. In the same year, the Coastguard was established and it was located on Muharraq island. Then, the Motorbike section was established and assigned certain police work like the delivery of correspondence and conducting patrols. In 1942, the first traffic system was created and the marine patrols were established. Then, in 1954, the first coastguard centre was established in Manama sea port and it was called Marine section. From 1961 to 1970, an enormous development was made to modernise the police force directorate ending with establishing the women police section In November 1970.

At the time of Bahrain's independence from Britain in 1971, the name of the Police Directorate was changed to the Ministry of Interior (MOI). It is the main organ responsible for the maintenance of security, general order and safety,

and law enforcement in Bahrain. The Ministry contained under its flag the police and public security body. In January 1977, the Civil Defence and Fire Division separated from the central Municipality and joined with the Ministry of Interior. Moreover, the MOI has set up a strategy and policies related to its mission, relying on the development to enhance the efficiency and improve the quality of services given to stakeholders (MOI, 2017). For instance, nowadays, the Ministry of Interior has adopted a policy of modernisation and development to improve efficiency and, by using the latest technology, in order to save time and effort and improve the quality of its services and mission and fulfil its duties. These policies include formulating plans that take into account all aspects of security work and improvement of the preparedness in dealing with the latest happenings and changes locally and regionally. Knowledge attainment and sharing of knowledge are at the heart of these developments. These plans are reviewed and evaluated regularly to prevent crimes and create a safer environment.

According to the BPSF Law (1982), the Public Security Forces provides that the Public Security Forces are a “regular armed service within the Ministry of Interior that is responsible for the maintenance of public order, security and morals inside Bahrain, and the protection of lives, persons and property” (p.33). This means that the BPSF is the main armed force that is assigned the primary responsibility of maintaining order, peace and security in Bahrain. These forces operate under the direction of the Commander of the Public Security Forces, who reports directly to the Minister of Interior. The following units and departments are among those that report directly to the BPSF command: the police departments of the four governorates of Bahrain (Manama, Muharraq, Shamaliyah, and Janubiyah); the Special Forces Department; the Special Protections Department; the Counter Terrorism Centre; the Traffic Police; the Operations Department; and the Coast Guard. The organisational structure of the MOI has been revised on a number of occasions. According to BPSF Law (1982), the MOI is headed by the Minister of Interior, an office currently held by Lieutenant General Sheikh Rashed bin Abdulla Al Khalifa. A number of division chiefs report directly to the Minister of Interior, the most important of whom is the Commander of the Public

Security Forces. The other MOI divisions that report to the Minister of Interior are the General Directorate of Criminal Investigations and Forensic Evidence (CID), the General Directorate for Nationality, Passports and Residency, the Customs Directorate, the Inspector General and the Undersecretary of the Ministry of Interior.

Based on knowledge sharing activities, the main objectives of MOI are to develop human resources, police characteristics, and the ability to respond and attain higher levels of skills. In order to achieve these objectives, the MOI works through the following principles (MOI, 2017):

- Achieving a balance between maintaining security and stability and respecting human rights and freedoms.
- Commitment to legal and ethical standards and implementation of the principles of equality and transparency.
- Achieving a high level of readiness through preparation, improved qualifications and training.
- Cooperating and coordinating with other official authorities.
- Deploying high technology and advanced systems in the field of security-related work.
- Building channels to connect with all sections of society, embodying the concept of community partnership.

Therefore, from this it can be seen that the Government of Bahrain is committed to improving the BPSF in order to provide security, sustainability and improved services. However, policy makers must consider that knowledge is the main source of competitive advantage and knowledge sharing (KS) is a characteristic of organisational success.

#### **1.4 Purpose of the Study**

This study is set to provide fresh insight into the knowledge sharing in the public sector of Bahrain. The primary aim is to investigate factors that may affect the KS process (donating and collecting) in the Bahrain Public Security

Forces (BPSF). In addition, the purpose is to provide guidelines to leaders on how to overcome and manage the encountered forces that affect knowledge sharing process within the BPSF. This will be accomplished in part through the development of a suitable knowledge sharing model.

As a starting point, the research will explore the phenomenon of knowledge sharing as a part of the knowledge management process in the Bahrain public sector through the experiences of the police officers in the Bahrain Public Police Forces (BPSF), and assess their attitudes towards KS. The focus on this initiative will provide an opening to discover the impact of factors on both knowledge donating and knowledge collecting.

Several studies have suggested that public sector organisations differ from the private sector in respect of the knowledge sharing aspect (Milner, 2003; Al-Alawi et al. 2007; Sandhu et al. 2011; Seba et al. 2012b; Tangaraja et al. 2015). However, most theories related to KS are developed from the private sector experiences. Moreover, despite similarities between most government organisations around the world, there is no unique knowledge sharing model/framework that fits all countries (Al-Alawi et al., 2007; Titi Amayah, 2013). Each country must find its own model that fits the local requirements.

Based on the above, this research examines the critical factors that may impact the knowledge sharing process (donating and collecting) in the Bahraini public sector context. A better understanding of the factors that may influence police officers' knowledge sharing behaviour in the Bahrain Public Police Forces (BPSF) will be useful for policy makers at both the government and organisational level.

### **1.5 Statement of the Problem**

Despite the police organisation being one of the key public service organisations, where knowledge is key to protecting citizens and saving lives (Filstad and Gottschalk, 2011), there is a lack of KM research in this particular sector. Only a few studies have examined knowledge sharing in police organisations as one of the public sector organisations in Arab Middle Eastern contexts, exploring the factors that influence it (Massaro et al., 2015; Abou-

Gamila et al., 2015; Seba et al., 2012a; Al-Alawi et al., 2007; Al-Adaileh, 2011; Biygautane and Al-Yahya, 2011). Many research studies have focused on knowledge sharing (KS) in the private sector (Hara and Foon Hew, 2007; Li et al., 2010; Sandhu et al., 2011; Rashid and Ahmad, 2016). However, police forces around the world face several challenges related to crime fighting and crime prevention (Gravelle and Rogers, 2009). Moreover, these forces are making great efforts to be more proactive towards these challenges (Seba et al., 2012a). In recent years, knowledge has become a major concern for many public sector organisations (Abou-Gamila et al., 2015). Police forces recognise knowledge as a crucial element and a strategic asset to develop and maintain the sustainability of the security services in the community by ensuring a high level of effectiveness to fight crime and reinforce prevention efforts (Bell et al., 2010). Although previous studies have focused on studying the influence of some factors on KS in Bahraini public organisations (Abou-Gamila et al. 2015; Al-Alawi et al. 2007), limited research has been conducted on Bahrain's Public Security Forces (BPSF) in the KS area. Hence, this study also responds to the call from other scholars (for example, Massaro et al. 2015; Abou-Gamila et al. 2015; Seba et al. 2012a; Al-Alawi et al. 2007; Al-Adaileh, 2011; Biygautane and Al-Yahya, 2011; Li et al. 2010; Sandhu et al. 2011; Rashid and Ahmad, 2016) who emphasise that there is a lack of empirical studies on KS, especially in a non-Western context.

The proposed study will attempt to fill the gap by exploring the critical factors that may affect the KS processes within the context of a non-Western country (Bahrain). The next section further explains the aims and objectives of the study.

## **1.6 Research Objectives**

Guided by the problem statement, the following are the research objectives of this study:

1. To empirically examine and determine the impact of organisational factors on the employee's knowledge sharing behaviours.
2. To empirically investigate the impact of individual factors on the employee's knowledge sharing behaviours.

3. To assess the impact of demographic characteristics and their variance on employee's perceptions towards knowledge sharing behaviours.
4. To develop and test a conceptual model that portrays the critical factors that influence the knowledge sharing process (donating and collecting) in the BPSF and Bahrain public sector in general.

### **1.7 Research Questions**

In furtherance of the research objectives, the following research questions have been developed:

1. Do the proposed organisational factors (Support, Rewards, Structure Centralisation and Structure Formalisation) affect BPSF officers' knowledge donating and collecting behaviours?
2. Do the proposed individual factors (Reciprocity, Social Interaction, Personal Benefits and Trust) affect BPSF officers' knowledge donating and collecting behaviours?
3. What is the impact of the demographic characteristics (Position, Rank, Age, Qualification and Work experience) on the knowledge donating and collecting behaviours?

### **1.8 Overview of the Research Methodology and Methods Used**

In the present research, two main research phases are conducted, namely an exploratory phase and explanatory phase. At the first (exploratory) phase, an investigation process is conducted to gain a deep understanding of the phenomenon via a literature review and an exploratory investigation. Based on the exploratory phase's findings, research constructs are identified; and the study framework is formulated in a design process. In the second (explanatory) phase, a testing process intends to empirically test the research framework. It is followed by an analysis process, in which various analytical techniques are employed. After secondary data collection, primary data was collected and analysed using quantitative approaches at the final stages of the study.

The analysis of quantitative data (Survey) for the study consists of three major stages. In the first stage, the content and the relevance of the multi-item scales

were refined on the basis of quantitative data gathered from the sample populations. In the second stage, scales were validated using confirmatory factor analysis (CFA). Finally, theories were tested using analysis of moment structure (AMOS) version 24.0 software in a structural equation model. A comprehensive discussion and justification of the research methodology and methods used in the study is provided in Chapter 4.

### **1.9 Significance of the Study**

Knowledge sharing is identified as one of the most significant processes to improve an organisation's performance (Blankenship and Ruona, 2009) because it helps the organisation to exploit and capitalise on knowledge-based resources (Rahman et al., 2017). However, despite the various implications of knowledge sharing, researchers have pointed out that knowledge sharing in an organisation is a complex task, mainly due to employees' lack of desire to share their knowledge with other members of the organisation, which affects the organisation's performance (Denning, 2006; Rahman et al., 2017). Therefore, determining factors that can help to promote the sharing of knowledge within organisations is a significant area of research (Van Den Hooff and De Ridder, 2004). Learning about the forces that can either slow or accelerate the development of a knowledge sharing culture in the Bahrain public sector represents an opportunity for leaders and decision makers. This study thus will help to improve the quality of decision making associated with promoting and implementing a knowledge sharing culture.

In addition, it is anticipated that this study will extend the understanding of knowledge sharing in developing countries by exploring the range of factors influencing the knowledge sharing behaviour in Bahrain. In particular, the project is expected to identify issues such as individual and organisational factors. Moreover, the study is set to develop a model that could help Bahrain, as well as other countries with a similar context, in the decision-making process for planning and implementing knowledge sharing practices.

Many researchers such as Wang and Noe (2010) have emphasised that more studies are needed regarding KS in the Middle East, as the majority of studies

have been carried out in the Western world. In addition, the bulk of the previous research is focused on profit-oriented private organisations and little is known about factors that may affect KS in the public sector (Sandhu et al., 2011). This study aims to make a contribution to what is currently a limited amount of empirical research on KS in public sector organisations such as police forces in the kingdom of Bahrain, the Gulf Cooperation Council (GCC) region, the Middle East and developing countries in general. Finally, this study will contribute to the Bahrain Economic Vision 2030, which is focused on improving the functioning of the organisations.

### **1.10 Structure of the Research**

The study presents a detailed discussion related to the purpose, structure, methodology, analysis, findings and recommendations of the critical factors related to the KS process. This study is conveniently divided into six chapters, the contents of which are summarised below.

#### **Chapter One: Introduction**

The first chapter provides an overview of the research with a clear statement of: the research problem, objectives and research questions. The chapter also highlights the significance of the research and contribution to knowledge. Finally, the outline of the study is provided.

#### **Chapter Two: Literature Review**

This chapter explains the theoretical background of the research and provides a review of the literature in the field of knowledge management, particularly knowledge sharing. In general, this chapter focuses on the theoretical and empirical aspects of knowledge sharing processes in the public sector and in police forces in specific. The chapter also provides the conceptual framework and set of hypotheses for the study, which are based around critical factors influencing KS behaviour in the context of public organisations. Finally, a gap in the research is identified and discussed.

### **Chapter Three: Methodology and Methods**

This chapter briefly outlines the methodological framework and process of research design utilised to accomplish the aims and objectives of the research. It describes and explains the research design and research procedure that are employed to investigate the area of knowledge sharing process and the impact of individual and organisational factors on it. The chapter starts by explaining the philosophical stance of the research with the choice of the survey method in relation to methods and approaches. Second, the rationale and employability of research methods and research approach are illustrated. This chapter also addresses the quantitative approach using a questionnaire-based survey (questionnaire development, pilot study, translation and the sample techniques) and data collection procedure. The chapter ends by discussing ethical considerations made in the study.

### **Chapter Four: Data Analysis and Findings**

This chapter outlines the data collection process and quantitative analysis techniques used to test the proposed conceptual model. The researcher uses the Statistical Package for Social Sciences (SPSS v.24) to run tests on the questionnaire answers. The chapter begins with data management, data screening, demographic characteristics, factor loading, exploratory factor analysis and confirmatory factor analysis. It then presents structural equation modelling followed by assessment of model fit and hypothesis testing.

### **Chapter Five: Discussion**

This chapter provides an interpretation of the main findings of the quantitative data analysis. It concentrates on how these findings provide answers to the research questions, and thus satisfies the objectives of the study. Throughout the chapter, results of the study are compared with previous studies and a possible explanation for surprising results is provided.

## **Chapter Six: Research Conclusions**

This chapter summarises the results and conclusions of the thesis, discusses the theoretical and managerial implications of the findings, highlights the limitations of the study, and makes suggestions for further areas of research.

## **Chapter 2: Literature Review**

## **2.1 Introduction**

Chapter 1 clearly defined the research problem addressed by this study, outlined the research scope and gave a clear, brief description of how the research for the thesis was planned. Chapter 2 has the purpose of defining knowledge and establishing the importance of KS; this is done through consideration of what knowledge means and how it is managed. This chapter then considers the theories that are relevant to the study and the factors that have a bearing upon the process of KS before examining the conceptual model that is proposed for this research. So that KS can be studied, it is vital for a deep understanding to be established of knowledge's nature and how that impacts upon the way it is shared. Therefore, the section that follows has a discussion of the primary knowledge concept and the management of knowledge to serve as a foundation for studying KS within the police organisation.

## **2.2 The Knowledge Debate**

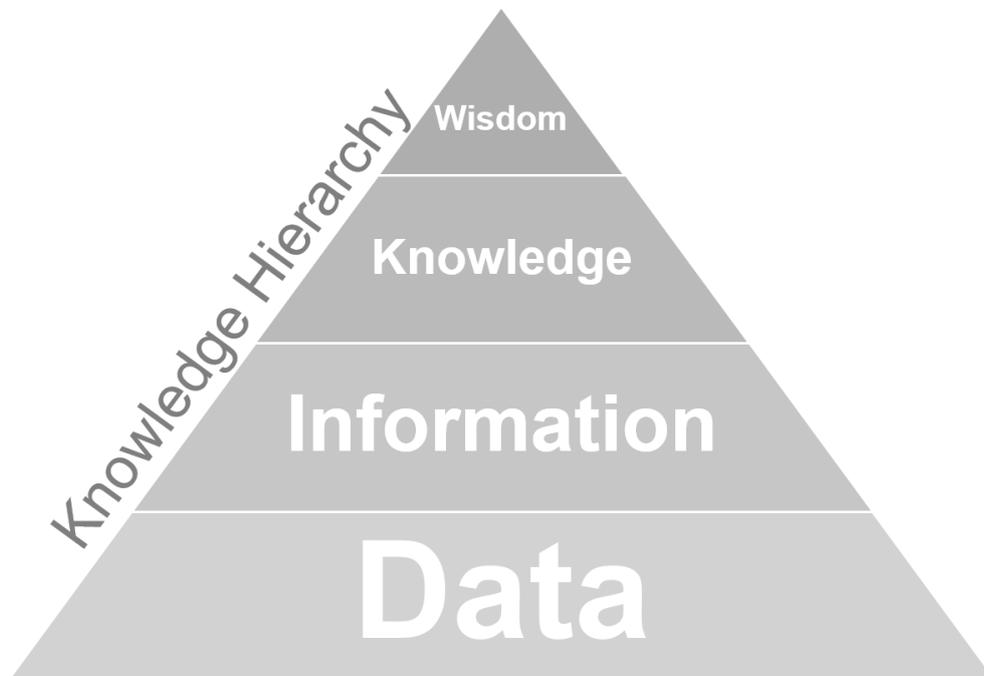
As a concept, knowledge has been a focus of interest and reflection for millennia. Many philosophers and researchers were known to make inquiries into knowledge back in the times of ancient Greece and quite probably many years before (Edwards, 2009). There have, of course, been many different views and arguments over the concept over the years and different definitions put forward. According to Nonaka (1994), knowledge can be considered as a concept that is multidimensional. It can be defined as being a true belief that is justified (Nonaka et al., 2006; Von Krogh et al., 2012). Such a definition has a focus upon truthfulness as being a knowledge attribute that is essential. It was noted by Cook and Brown (1999) that 'possession' and 'practice' are two perspectives on the theory of knowledge, or epistemologies. An epistemology of possession considers knowledge from the standpoint of it being an object or entity that is possessed by individuals or people; reference in studies is made to resources, capacity and aspects of cognition that may be employed in improving workplace effectiveness (Ichijo and Nonaka, 2007; Newell et al. 2009). Alavi and Leidner (2001, p.109) concur with such a perspective and consider knowledge as being "Information possessed in the mind of

individuals, which may or may not be unique, useful or accurately related to facts, procedures, and judgments”. A perspective that views knowledge from an epistemology based in practice, however, has a definition for knowledge wherein it is seen as a thing that people do; as such, knowledge is referred to as being subjective, negotiated and constructed that is practised by way of forms of social interaction (Nonaka, 2005; Hislop, 2002; Newell et al. 2009; Hislop, 2016).

The concept of knowledge has been explained by Alavi and Leidner (2001) from numerous perspectives such as considering it as a condition with access to relevant information, as a capability, as a process, as an object or even as a type of mind state. Briefly taking these perspectives in turn: in a perspective with knowledge seen as being a condition with access to information, there is organisation of organisational knowledge in order for facilitation of content access and its retrieval. A capability perspective suggests that having knowledge is having capacity for interpretation and employment of information, experience and learning in order to make decisions. A process perspective has a focus upon the application of expertise, whereas an object perspective has the assumption that knowledge can be seen as something that may be stored. A perspective that sees knowledge as a state of mind considers there to be something that is known which, with focus, enables an individual to undergo expansion of personal knowledge for application to the needs of their organisation.

Knowledge was described by Armstrong and Taylor (2017) as having understanding of theories, concepts, things and people and the manner in which things are done. For David et al. (2000), it is vital that a distinction is made between knowledge, information and data so that there can be effective consideration of the challenges for knowledge management; they argued that there may be organisation of knowledge hierarchically. A hierarchy of knowledge is a lens that is logical and systematic for illustration and categorisation of the attributed meanings (Uriarte, 2008). As a concept, knowledge hierarchy originates in the work of Ackoff (1989) with the suggestion of a hierarchy model of information, knowledge, data and wisdom. There is widespread use of a knowledge hierarchy for the conceptualisation

of knowledge. A hierarchy is considered representational of a common idea for the development of knowledge through which there is conversion of data into information and then conversion of information to knowledge and, finally, development of knowledge to wisdom (Hick et al., 2007; Joia and Lemos, 2010). As Figure 2 shows, each hierarchy phase has dependency upon the lower-lying phase.



Source: (Newell et al., 2009)  
Figure 2. Knowledge Hierarchy

Data was defined by Ackoff (1989, p.3) as “symbols that represent properties of objects, events and their environment”. In a more pragmatic way, data was described by Carayannis (1999) as facts or text like those that have been generated within a report. Information was defined by Turban et al. (2018) as data both organised and analysed in a way that is meaningful. It was stated by Alavi and Leidner (2001) that there was no radical difference between information and knowledge; however, a difference was highlighted in the work of Pearlson et al. (2016), who defined knowledge as a combination of experience, values, rules and contextual information. Data was viewed by David et al. (2000) as being unabridged or raw observations or descriptions with regard to the states of future, present or past worlds. They viewed

knowledge as being a product of human experience and reflection and information as being patterns that are found or imbued in data by individuals. Distinction has been made between the terms by a number of authors (see, for example, Blackler, 1995; Nonaka and Takeuchi, 1995; Davenport and Prusak, 2004; Pemberton, 1998). Other authors, such as Kogut and Zander (1992) and Stewart (2010), however, use terms in a synonymous way.

For this research, a distinction is recognised between knowledge and information. Knowledge is seen by Al-Alawi et al. (2007) as having greater complication than information, with information seen as being a result from organisation and analysis of data into a form that has meaning. Knowledge was also seen as something that led to information that produced data by Braganza (2004). It was stated by Vandaie (2008) that raw facts are represented by data from which there is processing to create information; they considered information as a reflection of individual experience that may be considered as knowledge. Furthermore, Tuomi (1999) considered knowledge to be in existence prior to the articulation of information, and that information exists prior to data; so, from such a viewpoint, there cannot be separation of knowledge, information and data. The work of Smith (1998) aligned with that view and also provided an explanation that there needed to be understanding and translation of information so that it could become knowledge. Hislop (2016) noted that information could be considered as data that has been filtered and summarised, with knowledge being the meaning that is translated from that information.

The scope of the knowledge definition of Nonaka and Takeuchi (1995, p.58) is much broader and they stated that knowledge is “a dynamic human process of justifying personal belief toward the truth”. They saw information as a ‘flow of messages’ with the creation of knowledge occurring when the flow interacts with the commitments and beliefs of the information holders. Nonaka and Takeuchi (1995) identified three different characteristics that could make a distinction between knowledge and information. Firstly, knowledge can be considered as always having some end, and so can be seen as being related to action. Secondly, knowledge can be considered as being a function for a specific intention, stance or perspective that an individual takes, and so, unlike

information, knowledge relates to commitment and beliefs. Thirdly, knowledge is relational and context-specific and, therefore, relates to meaning.

In relation to the final hierarchy phase of expertise/wisdom, Carayannis (1999) gives the example of accurate and fast advice, result justification and reasoning. Knowledge has been also considered as a concept that is broad to include the expertise, experience, values, ideas and information that help the development of organisations and people (Bartol and Srivastava, 2002; McMurray and David, 2002). Knowledge has been defined by Davenport and Prusak (2004, p.5) as: “a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information”. Even though there is a variety of definitions for knowledge as noted above, researchers and scholars do share the perspective that knowledge is a combination and interrelationship of information, data, experiences and skills. A number of researchers do use the terms knowledge and information interchangeably (Huber, 2001; Bartol and Srivastava, 2002; Wang and Noe, 2010).

### **2.2.1 Types of Knowledge**

The literature review has noted a great range of classifications for knowledge. Hansen et al. (1999), for instance, suggested two knowledge classifications, i.e. codified knowledge and non-codified knowledge; the former is that which is available within written manuals, documents and procedures, and the latter is knowledge that is obtained by way of experience. Conklin (1996) takes a similar standpoint and divides knowledge into a formal type, obtained from manuals and books and that can be shared easily, and an informal type that is acquired by way of social interaction of workplace employees. A number of other authors, however, have made the distinction of ‘individual knowledge’, made by and existing in the individual based upon his or her attitudes, beliefs and opinions and factors that have a bearing upon the formation of personality, and ‘social knowledge’, which is made by and resides within collective group actions and relates to norms that guide coordination and communication within a group (see, for example, Nonaka, 1994; Nonaka and

Takeushi, 1995; DeLong and Fahey, 2000; Alavi et al. 2005; Popadiuk and Choo, 2006).

When consideration is given to a specific context, there can be consideration for the relationship of collective knowledge to cultural knowledge. Furthermore, knowledge has been further categorised in the work of Grant (1996), Zack (2012), Carayannis (1999), Alavi and Leidner (2001), Becerra-Fernandez et al. (2004) and Anand et al. (2010), with a variety of different categories identified such as relational (know-with), declarative (know-about), causal (know-why), procedural (know-how) and conditional (know-when). Blackler (1995) and Zack (2012) and others, however, have considered knowledge from five other kinds of classification, as follows: embodied (obtained through doing), endbrain (conceptual abilities and skills), embedded (organisational routine), encoded (symbols and signs) and encultured (obtained by way of socialisation). On the other hand, four kinds of knowledge were suggested by Christensen (2007), i.e. know-how knowledge, object-based knowledge, coordinating knowledge and professional knowledge. Also, knowledge was viewed by Yahya and Goh (2002) as comprising two dimensions, i.e. organisational knowledge and individual knowledge. Organisational knowledge relates to that formed through interactional means of people, techniques and technology, whereas individual knowledge is in relation to cognitive understanding. Comprehension of individual knowledge (also known as personalised knowledge) can be problematic, however, because it is tacit in nature, as opposed to organisational knowledge, which is more easily comprehended because of its explicit nature. In the work of Mathew (2008), knowledge was divided into three categories, i.e. social knowledge (with an emphasis upon social issues, relationships and networks), situational knowledge (obtained with regard to a particular circumstance) and factual knowledge (with a basis in the knowing of facts). From the perspective of Lundvall and Johnson (1994), there can be classification of knowledge into 'know why' (related to laws and principles), 'know how' (related to actions and skills required for tasks), 'know what' (related to facts) and 'know who' (related to who has knowledge of how and what). Other research has undertaken exploration of

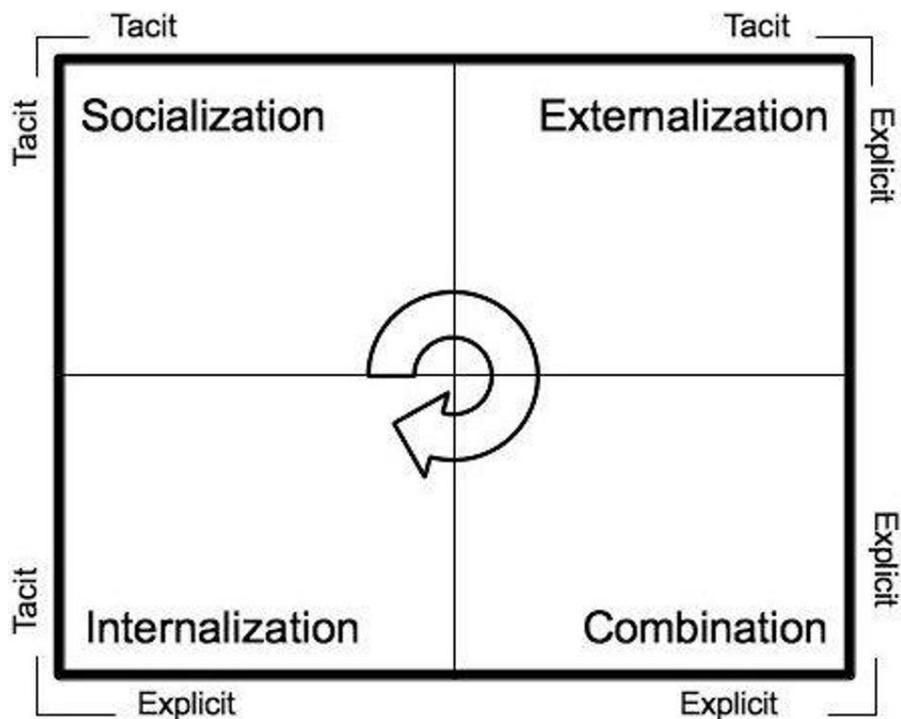
other knowledge properties. In the work of Marouf (2007) and Uzzi and Lancaster (2003), for instance, it was argued that it is possible for knowledge to be classified into either private or public knowledge. Private knowledge has been defined as the kind that is not available publicly or third-party guaranteed; it is instead information that is 'soft' that deals in non-standard or idiosyncratic information in relation to an organisation, such as unpublished features of the organisational strategy, product capabilities that are undocumented, distinctive competencies, knowledge internal to management conflicts and so on. Public knowledge, on the other hand, can be defined as knowledge that has been reported by way of standard instruments such as regulatory filings, audited financial statements, company reports, advertised bids, ask prices and quotes and other kinds of information that is prepared to be accessible within the public domain. Whilst, as can be seen above, there are a variety of perspectives that can be taken on knowledge, it is commonly agreed by researchers and scholars that the distinction between explicit and tacit knowledge is a practical one (Nonaka and Takeuchi, 1995; Fernie et al., 2003). The classifications of tacit and explicit knowledge stem from the Polanyi and Sen work (2013) and were employed later in the contexts of organisations in the work of Nonaka and Takeuchi (1995); the distinction between the two categorisations is of particular interest for this study.

Tacit knowledge may be characterised as being intuitive, subjective and difficult to communicate and pass on to others (Yahya and Goh, 2002; Hislop, 2016). Polanyi and Sen (2013) noted that tacit knowledge is embedded within people's minds and is intangible and highly personal. Tacit knowledge can be acquired by way of experience and learning, practical application and practice in the workplace and social interactions amongst individuals. Tacit knowledge may also be transferred and can be demonstrated through observation (Polanyi and Sen, 2013; Nonaka and Hedlund, 1991; Sanderson, 2001, Gibbert et al., 2002; Von Krogh et al., 2012). A dimension that is tacit has its basis in thinking, feelings and experience within a particular context, and it is made up of both technical and cognitive components. Technical components are those related to skills and know-how that are applicable within a particular context. Cognitive components are those related to the mental maps, beliefs,

models, viewpoints and paradigms of the individual (Nonaka et al., 2000; Nonaka et al., 2006; Popadiuk and Choo, 2006). As Nonaka et al. (2000) noted, tacit knowledge is internalised within the knowledge holders and dynamic, and embedded in commitments, ideals, values and actions. Tacit knowledge can have great value for an organisation (Koulopoulos and Frappaolo, 2000; Marwick, 2001; Michailova and Minbaeva, 2012). Tacit knowledge may prove essential in helping companies sustain a competitive advantage (Olaniran, 2017; Jashapara, 2003; Chen and Edgington, 2005). Tacit knowledge is considered to hail from experiential learning which leads onto forms of intellectual capital and improved performance (Sternberg et al. 1993; Nonaka and Takeuchi, 1995; Armstrong and Mahmud, 2008). Tacit knowledge is considered essential for achieving things and carrying out organisational tasks such as the generation of new knowledge, improvement of procedures and the creation of new products; such processes can lead to workplace innovation (Seidler-de Alwis and Hartmann, 2008). The explicit knowledge dimension is a kind of knowledge that may be articulated, stored systematically and formally and disseminated easily amongst workplace individuals by way of certain codified records and forms such as reports, guidelines, checklists, protocols, files and other forms that are tangible (Polanyi and Sen, 2013; Choi and Lee, 2003; Uriarte, 2008; Von Krogh et al., 2012). Explicit knowledge is considered by scholars to be easily shared and may be reused in order for similar problems to be solved (Kumar et al., 2013). The complementary natures of explicit and tacit knowledge have been noted with both of them considered essential for the creation of knowledge (Seidler-de Alwis and Hartmann, 2008; Kamasak and Bulutlar, 2010). Nonaka and Takeuchi (1995) devised a model containing four core processes for knowledge creation, namely socialisation, externalisation, combination and internalisation (SECI). According to the SECI model, the enterprises create knowledge by way of interaction between tacit and explicit knowledge (Richtner and Ahlsrom, 2010). During a process of conversion of knowledge, both tacit and explicit knowledge grow in terms of quantity and quality (Esterhuizen et al., 2012). Conversion of explicit and tacit knowledge is a process of communication and social interaction amongst individuals who

have expertise and those who wish to use that expertise (Jackson and Erhardt, 2004; Popadiuk and Choo, 2006).

For instance, the four modes of SECI are now considered briefly in turn. Externalisation is a process by which tacit knowledge is articulated into explicit concepts. Dialogue amongst employees triggers externalisation within an organisation, with models or concepts created in order to generate understanding of what is to be in development (Richtner and Ahlstrom, 2010). Using metaphors and creating concepts are examples of externalisation. Internalisation of knowledge is a process by which explicit knowledge is embodied into tacit knowledge, and this can occur with the sharing of technical know-how and mental models by different employees. For knowledge that is explicit to be converted into knowledge that is tacit, it is frequently useful for knowledge to be verbalised within documents, oral stories or manuals. Internalisation is also known as a 'learning by doing' process. The combination process (explicit to explicit) is the way in which various types of explicit knowledge are combined by way of sorting, adding and re-categorising for the creation of new forms of knowledge. Examples of combination include the creation of documents, manuals and databases (Richtner and Ahlstrom, 2010). Finally, socialisation (tacit to tacit) is a process within which individuals obtain tacit knowledge through the sharing of experiences by way of imitation, observation and practice; tacit knowledge is created that way by the sharing of technical skills and mental models. There is a need for socialisation in order for appropriate interaction amongst individuals (Richtner and Ahlstrom, 2010). Common examples of socialisation are seminars, informal meetings, discussions and training 'on the job'. Figure 3 illustrates the SECI model as adapted from the work of Nonaka and Takeuchi (1995).



Source: (Nonaka and Takeuchi, 1995)  
 Figure 3. The SECI Model

Having now outlined the concept and types of knowledge based on existing theories, the next section discusses knowledge management within organisations.

### 2.3 Knowledge Management within Organisations

Traditionally, the knowledge management (KM) field has been dominated by perspectives on technology and information technology (Davenport and Guest, 2001; Gourlay, 2001). There is, however, a growing recognition of the role played by individuals within processes of KM and more people-oriented perspectives in relation to organisational knowledge (Earl, 2001; Stenmark, 2001). Nowadays, the successful management of knowledge is considered as having dependence upon connections amongst the individuals in an organisation (Brown and Duguid, 2000; McDermott, 1999). There is an increasing amount of empirical evidence that notes the importance of factors related to people as being critical for the processes related to knowledge in

an organisation (see, for example, Quinn et al., 1999; Andrews and Delahaye, 2000). Whilst the concept of KM has received a lot of attention from practitioners and academics alike, there is no definition of KM that has been generally accepted. A number of researchers (see, for example, Yahya and Goh, 2002; Egbu, 2004) have argued that there is a great deal of complexity in defining the KM concept since differing perspectives may give up differing meanings and dimensions.

KM was defined by Jashapara (2011, p.12) as “the effective learning processes associated with exploration, exploitation and sharing of human knowledge (tacit and explicit) that use appropriate technology and cultural environments to enhance an organisation’s intellectual capital and performance”. Such an integrated approach has emerged as one with considerable relevance for the perspective taken for this research given the phenomena being investigated and since the approach is considered most helpful with its representation of a perspective on processes related to human resources. This research, then, has the argument that both human resources and information technology perspectives are required for effective KS within the workplace. Researchers such as Lee and Choi (2003), Jashapara (2011) and Anumba et al. (2005) have noted a broad acceptance of the integration of IT and human resources within the literature which is now commonly considered as offering the biggest scope for delivery of real values and benefits for an organisation. As Lee and Choi (2003) and Jashapara (2011) have argued, there is a need for a symbiosis of tacit and explicit knowledge aligned with both technology and human resource practice in order for there to be effective KM. The primary objective for most practice and research related to KM, however, is facilitation of efficient and effective KS amongst the members of an organisation (Nonaka and Konno, 1998; Davenport and Prusak, 2010; Shin, 2004). Furthermore, KS, as a prime enabler for KM, is considered a strategy that is competitive for the sustaining of organisations, and an element of core organisational competence and facilitator of a competitive edge (Nonaka and Takeuchi, 1995; Skyrme and Amidon, 1997; Betz, 1998; Alavi and Leidner, 2001). Since the focus of the study is mainly

on Bahrain's public sector, the next section discusses KM within public organisations.

### **2.3.1 Knowledge Management within the Public Sector**

Organisations may be split into three different societal sectors, i.e. private sector, public sector and the 'not for profit' sector. Normally, organisations in the public sector are in state ownership and their governance is operated with a basis in national governmental policies and direction. Organisations in the public sector often provide services that are essential and that are often considered an express responsibility of national government by way of official agencies. According to Carvalho et al. (2006), essential services are those that citizens expect to be provided or regulated by the state. Examples of services that are considered essential include defence, education, health, policing and the system for criminal justice.

KM has only recently begun to be considered within the context of organisations within the public sector that are seen as desperately in need of greater efficiency, and the creation of innovative products and approaches to service delivery. KM for the public sector is a key and particular context for research. As Edge (2005, p.45) stated, knowledge management "has the potential to influence greatly and improve the public sector renewal processes". Indeed, as Mcadam and Reid (2000, p.328) noted, KM in public sector organisations can be "a powerful enabler in the current drive for increased efficiency in all areas". It was argued by Edge (2005, p.45) that development of a culture for KM is less challenging for the private sector than for the public sector; this argument was supported by Titi Amayah (2013, p. 456) in outlining that "organisational goals in public organisations are typically more difficult to measure and more conflicting than in private organisations, and they are affected differently by political influences".

There are specific divisions of labour within the public sector that can act as disincentives for KS and, as noted by Gau (2011, p.2), "this situation makes knowledge delivery in the public sector more difficult than that in the private

sector". As such, study of the KM in the public sector calls for a quite separate agenda of research. Further justification for a separate approach comes from the specific organisational issues for the public sector in terms of its effectiveness, responsiveness, accountability and representativeness. KM can be considered organisationally-specific, as exemplified in the words of Jones and Mahon (2012, p.774) in stating "in a military environment knowledge is sometimes needed in more mission-critical situations like a battlefield, where real-time decisions can have life or death consequences and where knowledge delivered late is useless". Likewise, as Nordin et al. (2009, p.9) noted for the context of law enforcement, knowledge management "is not a linear sequence of actions but a more complex process, which involves mental and physical aspects of the investigator". Thus, it is clear that KM within the public sector has particular challenges because of the specific characteristics of the organisation in question.

Also, there are inextricable links between the effectiveness of certain organisations in the private sector with those of the public sector. Research centres and universities are examples that are mainly public sector in lots of countries; however, as noted by Gertner et al. (2011, p.626), "the degree of impact of university activities on industrial innovation and the nature of the linkage used depend on the industry concerned, as well as the provision of appropriate policy for knowledge transfer". Thus, an understanding of how KM in the public sector impacts upon the private sector has importance. In addition, as outlined by Jain and Jeppesen (2013, p. 347), "it is often argued that public sector organisations face greater pressures for representativeness, accountability and responsiveness than private sector firms". It was stated by De Angelis (2013, p. 1) that there are impacts upon the public sector due to an increasing need for "competition, performance standards, monitoring, measurement, flexibility, emphasis on results, customer focus and social control".

Accordingly, organisations in the public sector ought not to import models and tools of KM from companies in the private sector if their development was without due consideration for the context within which the public sector operates (UN, 2003). There has to be a recognition amongst practitioners in

the public sector that there is a unique context for their organisations – within which there are significant differences in the accountability and stakeholders involved when compared to the situation for private sector organisations. Indeed, blind application of models and tools of KM from the private sector within the public sector can be counterproductive. There are fewer studies with a focus on KM in the public sector than studies with a focus upon KM within the private sector despite the integration of initiatives for KM within governmental tasks in ways that are inseparable for consultation, planning, strategy and implementation (Riege and Lindsay, 2006; Ringel-Bickelmaier and Ringel, 2010; Oluikpe, 2012). Thus, an understanding of the evolution of KM is needed for the context of organisations working in the public sector. As such, this research study has a review and critique of literature related to KM in the public sector and puts forward a potential agenda for future research for the sector.

### **2.3.2 Knowledge Management within the Police Force**

Government sectors have recently turned towards KM since public sector clients demand higher levels of service quality (Dean and Gottschalk, 2013). KM can serve as a solution for improved procedures and increased service for customers. It was suggested by Luen and Al-Hawamdeh (2001) that the volume of information used by officers within their fields of activity can be vast; they consider the large amount of knowledge used for fulfilment of responsibilities makes officers into knowledge directors who must access knowledge effectively and absorb and use it in order for their knowledge to be discharged effectively. Police force departments are environments that are extremely time sensitive and have an extreme amount of knowledge (Hughes and Jackson, 2004). A police force can be considered as an element of the public sector and, so that an examination can be undertaken of KS within one, there is a need for a focus upon KS studies relevant to the public sector. Policies and strategies within the public sector are different to those for the private sector and its shareholders.

Official relations exist between a manager and an employee within the public sector (Seba and Rowley, 2010). Lots of employees working within the public

sector consider that their power comes from their knowledge and seek to protect it so that their positions can be maintained (Al-Athari and Zairi, 2001). For police officers, however, knowledge is of great importance and availability of it has a great impact upon whether they are successful or not (Luen and Al-Hawamdeh, 2001; Hughes and Jackson, 2004). Knowledge that is tacit includes the skills, experience and abilities of police officers and, in comparison with knowledge that is explicit, tacit knowledge is rapidly changing and dynamic (Nonaka, 2005). Knowledge that is explicit, on the other hand, may be defined as knowledge that is expressed and that may be encoded, written and transmitted easily. Explicit knowledge within the police force can be registered within documents, principles, standardised operating procedures and general police orders, and verified and documented for its police officers (Glomseth et al., 2007).

Within the domain of KM for police force tasks, both explicit and tacit knowledge are considered (Luen and Al-Hawamdeh, 2001). Both tacit and explicit knowledge have to be managed by police forces. There is a variety of forms of information and knowledge for police organisations that range from the personal experience of police officers to machine utilisation cases. As Gottschalk and Holgersson (2006) noted, the principles of KM may help knowledge to be achieved for an organisation. Whilst there is an agreement among researchers that an effective KM strategy is a key driver to enhance public sector performance, particularly police organisations (Glomseth et al., 2007), there are only a few KM-related studies that have focused on police organisations.

## **2.4 Knowledge Sharing**

The review of literature has highlighted that the concept of KS is frequently used in an interchangeable way with other types of concepts. For instance, a number of authors have used KS in an interchangeable way with the term 'knowledge flows' (Gupta and Govindarajan, 2002; Schulz, 2001). Other authors, meanwhile, have described KS as a form of 'knowledge exchange' (see, for example, Cabrera et al., 2006; Wang and Noe, 2010; Nam Nguyen and Mohamed, 2011). Some researchers have used term 'knowledge

conversion' (see, for example, Gold et al., 2001; Liao and Wu, 2009; Allameh et al., 2012). KS has been explained in several other studies using the 'dissemination' concept (see, for example, Bhatt, 2001; Gowen et al., 2009; Mehrabani and Shajari, 2012). However, in the field of knowledge management processes, most researchers have used the term 'knowledge sharing' (see for example: Allee, 1997, Bock et al., 2005; Cui et al., 2005; Hsu et al., 2007; Massa and Tsesta, 2009, Huang and Li, 2009; Ling and Nasurdin, 2010; Awang et al., 2011; Andreeva and Kianto, 2011; Ferraresi et al., 2012 and Howell and Annansingh, 2013). Still further, a number of authors within the literature have argued for synonymy of KS with the term 'knowledge transfer' (see for example: Yahya and Goh, 2002; Yang, 2007; Uriarte, 2008; Massa and Tsesta, 2009); however, for Wang and Noe (2010), there is a difference between the two terms. Indeed, a number of authors have attempted to make a distinction between KS and knowledge transfer (see, for example, Argote and Ingram, 2000; Boyd et al., 2007; Kang et al., 2008; Rhodes et al., 2008; Wang and Noe, 2010; Berggren et al., 2011); it was argued that there is a tendency for knowledge transfer to be considered as linked to application of knowledge that is existing to another, different context. There is the implication that the primary knowledge source is its owner and knowledge transfer occurs in a particular direction to a recipient from the owner. Knowledge sharing, however, is a concept that is broader, comprising interaction and absorption and new knowledge creation; as such, there is the postulation that KS occurs two ways between a minimum of two participants (Boyd et al., 2007).

This review is motivated by a desire for a deeper understanding to be developed through a distinction between KS and other concepts. This research, then, uses the 'knowledge sharing' term in the discussions for the study. Conceptually, KS has been a topic of study and debate for many years; however, there is no agreement on a definition for the term. Most academics studying KS have a preference for its meaning in relation to their particular study area. For instance, some KS definitions describe it as a process from an organisation, group or individual to another one (Davenport, 1997; McDermott, 1999; Darr and Kurtzbery, 2000; Bartol and Srivastava, 2002;

Argote et al., 2003; Ipe, 2003; Van Den Hooff and De Ridder, 2004; Abdullah et al., 2009; Masrek et al., 2011). Other researchers have defined it as a behaviour or culture that can happen formally amongst workplace members or informally by way of social interaction amongst employees (see, for example, Bock et al., 2005; Lin, 2007; Xiong and Deng, 2008; Sohail and Daud, 2009). Other authors have defined KS as a form of activity (see, for example, Garvin, 1993; Dyer and Nobeoka, 2000; Lee, 2001; Bartol and Srivastava, 2002; Lee et al., 2010; Jahani et al., 2011; Hitam and Mahamad, 2012; Kim et al., 2013). Table 2 provides a summary of potential definitions showing multiple viewpoints with which to consider KS that have been identified within the literature.

Within the knowledge management literature, authors have provided confirmation of the importance of the KS role for organisational development (Shin, 2004). Within KM, KS is a key focal point and a process that has great importance for the knowledge life cycle (Holsapple and Jones, 2004; Bock et al., 2005; Halawi et al., 2008; Tong et al., 2015). It has been shown by Yang and Farn (2009) that a most significant issue for the success of KM is tacit KS amongst members of an organisation. Tacit KS plays a key role in enhancing organisational competitive advantage and is essential for the enhancement of creativity (Davenport and Prusak, 2004; Saenz et al., 2009; Tan et al., 2010; Camelo-Ordaz et al., 2011). It has been argued that achievement of effectiveness and innovation for KM are more likely if consideration is given to KS (Cummings, 2004; Zheng et al., 2009). Likewise, it was discovered by Sohail and Daud (2009) that an outcome from KS is enhanced organisational innovation through new knowledge being generated. Organisations are able to develop competence and skills through KS and therefore increase organisational value (Renzi, 2008). It was found by Xiong and Deng (2008) that there is an increase in accumulation of knowledge for an organisation through having effective KS, and this also leads to development of employee capacity for increasing self-knowledge and capacity for doing their jobs well. Bartol and Srivastava (2002) noted that KS is important amongst members of an organisation since it leads to an increase in the value of utilisation of knowledge. Likewise, it has been argued by Willem and Buelens (2007) and

Liao and Wu (2010) that there can be enhancement of various organisational parts if members share insights and experiences, communicate information and share lessons learned. Indeed, as Behery (2008) noted, KS is effective for indicating efficiency and profit measurements.

Through the practice of activities related to KS, there can be benefits to be gained for an organisation such as reductions in the time required for enhancement of services and products (O'Dell and Grayson, 1998; Alavi and Leidner, 2001; Yang and Chen, 2007). Also, as Song (2002) noted, uncertainty and risk can be reduced and training costs decreased through effective KS. It has been argued that capacity to solve complicated and unstructured problems can be improved amongst individuals, along with increased learning and reduction in mistakes, by way of KS (Reid, 2003; Kharabsheh, 2007; Saenz et al., 2009; Mughal, 2010). KS is a key way in which individual knowledge can be translated and channelled into strategic organisational resources (Hendriks, 1999). KS is considered crucial to managers as it aids in decision making and can encourage an organisation to have a change culture (Vaccaro et al., 2010; Al-Omari et al., 2013). Moreover, the positive relationship between several outcomes for an organisation and KS have been emphasised within lots of empirical studies. For example, a link has been found by scholars between KS and the capacity for innovation within an organisation (Liao, 2006; Lin, 2007; Saenz et al., 2009; Chen et al., 2010; Yang, 2011; Mehrabani and Shajari, 2012). A link has been found between KS and organisational performance (Darroch, 2005; Kang et al., 2008; Gowen et al., 2009; Liao et al., 2011; Wang and Wang, 2012; Kim et al., 2013). A relationship has been shown between KS and organisational effectiveness (Pai, 2006; Yang, 2007; Zheng et al., 2009). A link has been shown between KS and job satisfaction (Tong et al., 2015). Organisational learning has also been shown to be effected by KS (Yang, 2007; Massingham and Diment, 2009; Liao and Wu, 2009). The importance of KS in institutions for education like universities has been asserted by John (2010). Likewise, it was indicated by Mathew (2010) that innovation can be generated and educational performance enhanced through knowledge existence and promotion of a culture of KS amongst teaching staff. Exchanging opinions, experiences and

ideas amongst members of a faculty was found by Daud et al. (2008) to be critical for the development of the process of learning. Additionally, in a study of a Malaysian context, Cheng (2012) showed that KS enables the learning capacity of a school to be enhanced at both the organisational and individual levels. Likewise, it was argued by Ma and Yuen (2011) that interaction and promotion of a culture of KS amongst students are essential elements for their process of learning. In another study in the context of Malaysia, it was found by Zaqout and Abbas (2012) that explicit and tacit knowledge enhance educational performance by way of exchange of notes, lessons, projects and experiences within a faculty.

## **2.5 Individual Perspective and Knowledge Sharing**

KS literature that explores the perspective on individuals tends to have a focus upon the psychological and social drivers that have a bearing on KS. In the section that follows, sociological theories that are used for the provision of explanations are briefly described. Aspects that are given consideration include the intention of KS, knowledge sharing behaviour and motivation. In the work of Chen et al. (2012a), for instance, there is a listing of factors that are considered to have a bearing on the attitudes of individuals towards KS. Factors included are those considered intrinsic to an individual, i.e. concern for personal reputation, self-efficacy, enjoyment derived from helping others, trust that an organisation has fair procedures, and trust that others will be reciprocal in practising sharing. Interpersonal factors are also included since they have an effect upon an individual; these include the networks and social norms within which an individual and the practice of KS are situated, and calculations of the benefits and costs (in terms of effort and time) and the effectiveness that is apparent for knowledge sharing. Such aspects of KS have been posited as examples of social dilemmas in relation to the ownership of knowledge, whereby there is a conflict between individuals wishing to avoid losing standing through divulging their knowledge, and the result of greater good due to KS (Cabrera and Cabrera, 2002; Nobeoka et al. 2002). Hsu et al. (2007) investigated perceived costs and benefits of KS for an individual and the effects upon self-efficacy for an individual; their study included self-

belief and the influence and impact it could have upon a willingness to share. Numerous studies have highlighted some of the factors that influence the solution to the aforementioned dilemma, with insights into procedural justice and interpersonal trust and the perception of fairness in organisational practices that reward or acknowledge knowledge owners (see, for example, Chiu et al., 2006; Collins and Smith, 2006). Research into structures of opportunity, care and community show similarities (Easterby-Smith and Lyle, 2011).

## **2.6 Knowledge Sharing Theories**

Many authors have worked within the positivist research tradition and, in expressing insights from the functionalist approaches of psychology and sociology, have attempted to validate claims with regard to KS characteristics. Based on the work of Durkheim, it was proposed that social realities were composed of social structures that acted upon individuals and that law-like patterns that were universal could be deduced and explanations for those patterns sought (Checkland, 2003, p.267). As stated in the 7<sup>th</sup> thesis of Popper, “in social science, an explanation will usually consist of a model of a situation and a 'rationality principle' which define action rational in that situation” (Checkland, 2003, p. 266). Within the literature of KS, several theories have been invoked from psychology and sociology (Abzari et al., 2011; Okyere-Kwakye et al., 2011; Chen et al., 2012b).

The approaches and theories from sociology range from those operating at the analysis unit of the group or organisation to those seeking explanation for individual perspectives. Whilst the insights and ideas from theory are suggestive and can be helpful in providing explanations for various aspects of KS, issues remain with regard to empirically testing them. There are claims by authors in relation to the validation of social theory in respect to KS with uncritical cooption of theory using mainly quantitative methods of data collection with the aim of providing research frameworks in order to both discover and explain patterns; in doing so, claims can be made with regard to the universality of their findings. Since theories can address similar elements of human thought and activity, much of what may be said could be interrelated;

it can appear that the desired outcome can impact upon the decisions of authors in relation to the choice of theory espoused within a particular research work on KS. The theories that are most commonly used are briefly discussed below to see what insights they can provide and to show, from the literature on KS, how attempts have been made to utilise them.

### **2.6.1 The Theory of Reasoned Action**

Theory on Reasoned Action (TRA) is a theory related to cognitive decision making that aims to provide explanations for human behaviour resulting from processes of psychology that are rational (Fishbein and Ajzen, 1980; Ajzen and Fishbein, 1980). TRA puts forward the position that people make rational and logical choices over whether or not to perform acts; TRA sees the choice as reflecting the attitude of a person towards the action in question and/or his or her perception of a sense of social support or social norms in relation to certain behaviour. There is an assumption with TRA that the key predictor for behaviour is intention; as such, there is the suggestion that behavioural intentions are able to drive the behaviour of individuals and intentions may be determined by subjective norms and attitudes. With regard to KS, the behavioural beliefs of a person are those beliefs that KS-type behaviour results in certain kinds of outcomes. Influencing factors in relation to behavioural beliefs, as shown by the model of Constant et al. (1994), can be self-interest or incentive systems. In the main, behavioural beliefs are related to factors of personal expectancy. Subjective norms are one kind of expectancy factor and can be defined as the perceptions of an individual with regard to how people judge or perceive a particular behaviour. Normative beliefs can also have an impact upon behaviour – normative beliefs are the beliefs that certain behaviours ought to be performed in accordance with social standards. Normative beliefs are affected by factors such as organisational attributes like fairness, perceived openness, leadership, motivation to follow direction and perceived pressure.

TRA has been employed broadly within research into social psychology in order to explain many types of behaviour. If TRA is applied to KS, the theory predicts links between subjective norms with regard to KS and attitudes, the

intentions for knowledge sharing and the actual knowledge sharing itself (Kim and Hunter, 1993; Cabrera and Cabrera, 2005). Within information systems research, TRA is highlighted as the intention-behaviour model that is preferred for the study of human behaviours related to KM since TRA is useful for prediction of a broad range of behaviour within social settings (Sheppard et al., 1998). TRA is used by Lin (2007) for examination of different motivations for explaining the intentions for KS, and found that enjoyment in giving help to others and knowledge self-efficacy had a positive relationship to KS intentions and attitudes. There has been extensive adoption of TRA in practice and it has been shown to be effective for investigation of KS behaviour within a variety of contexts (Bock and Kim, 2002; Bock et al. 2005; Bircham-Connolly et al. 2005). With work based upon TRA, Bock and Kim (2002) undertook an examination of factors that limit or support the KS behaviour of an individual within an organisation. The researchers employed expected associations, expected contributions and expected rewards from social cognitive, economic exchange and social exchange theories, respectively, in order to provide an explanation for directions of relationships between factors and the intention that a person has for sharing their knowledge. It was also discovered by Bock et al. (2005) that social-psychological forces, organisational climate and extrinsic motivators are factors that may have an influence upon intentions in relation to KS.

It is argued by TRA that, initially, people consider the potential outcomes of actions prior to deciding to act, and such considerations are captured within a distinction between intentions, attitudes, behaviours and beliefs (Ajzen and Fishbein, 1980); as such, attitudes towards belief and behaviour determine the intentions over whether to behave in a certain way and these, in turn, determine the decisions of individuals over whether or not to conduct particular behaviours. Since KS occurs at the level of the individual in a way related to rational exchange, the application of the TRA concept may help identify the beliefs that are salient in relation to impacts upon knowledge sharing behaviour as focused upon within this research.

### **2.6.2 The Social Network Analysis**

Social Network Analysis (SNA) is a strategy rather than a bona fide theory (Otte and Rousseau, 2002). It is an application of network theory, used in the context of social theory, suggesting that individuals are linked by a mesh of connections, an "intertwining of social relations" (Scott, 2017, p.109). Simmel (1908) had used 'social fabric' as a metaphor to mark the ties or interconnectedness of individuals, and the analysis of social networks began to be used within a variety of sociological settings such as within organisations. Various concepts used within social network analysis include 'connectedness or density' in reference to the relative amount of connections for an individual, 'centrality' in reference to how central an actor is within their networks, and 'clique' in reference to dense clusters that could indicate different activities such as a number of people within an organisation that an individual has awareness of or with whom he or she works. Other terms that may be applied to activities within an organisation include 'reciprocity' in reference to perceived mutual advantage, 'tie strength', which is influenced by reciprocity, emotional attachment and time, and 'propinquity', which relates to a tendency for more ties amongst individuals who are closer in geographical terms. Insights from approaches from mathematics, i.e. topology and graph theory, have also been employed in suggesting that there may be measurement of certain aspects of a social network. Whilst the analogy of a network has power, they have been criticised since an individual has great complexity rather than solely being a point within a network (Scott, 2017); such a realisation has resulted in further developments within mathematics with the aim of overcoming the criticism, such as the use of numerous dimensions with algebraic topology. Since the data required may be collected relatively easily, a number of researchers of KS have applied their analyses in ways that are rather mechanistic without giving a great deal of consideration for the implications or meanings of their findings (see below).

### **2.6.3 The Social Capital Theory**

Bourdieu (2002) developed social capital theory (SCT) in proposing that a combination of economic, cultural and social capital shaped the actions of

people. Furthermore, social capital was defined by Bourdieu and Wacquant (2014, p. 119) as “the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalised relationships of mutual acquaintance and recognition”. Social capital has also been defined by Baron et al. (2010) as the norms, trust and networks that enable people to perform effectively together in the pursuit of objectives that are shared. For De Carolis and Saporito (2006), social capital has multidimensionality. For Nahapiet and Ghoshal (1998), social capital could be considered as usually being in three different dimensions: relational, cognitive and structural. The relational dimension of social capital is the part that is affective and that describes the relationships of networks in terms of their interpersonal trust, the identification with other network participants and the existence of norms that are shared; as such, the relational dimension of social capital deals with the quality or nature of the connections within networks (Cabrera and Cabrera, 2005). The dimension of social capital that is cognitive is acquired by the sharing of language and narratives amongst members of a network that lead to increased levels of mutual understanding and more effective communication. The structural dimension of social capital is in reference to patterns of interaction amongst individuals that include connections or ties amongst the members of a network in addition to the configuration of a network overall.

In relation to KS, cognitive and structural dimensions for social capital are discovered at the level of the firm or the inter-firm level, whereas factors that underlie the relational dimension of social capital, in the context of KS, are discovered at the level of the individual. It was suggested by Cabrera and Cabrera (2005) that cognitive and structural social capital are ‘tools’ as they provide a shared language, network or codes for knowledge to be shared by individuals; with those tools, more time can be spent by individuals in communication, interaction and the sharing of knowledge between one another. Cognitive and structural social capital help in facilitating KS though they do not motivate it. The relational dimension of social capital may, however, influence the motivation of individuals for the sharing of their knowledge. Individuals that have cognitive and/or structural social capital may

perhaps not interact, communicate or share knowledge between themselves if they do not have a willingness to do that. The relational dimension of social capital may be able to bridge such a gap through provision of a qualitative element that provides groups with the motivation to share amongst one another founded upon trust and the prevailing norms; the relational dimension offers a better way of appreciating the rationale that lies behind the decision of individuals as to whether they share knowledge or not.

#### **2.6.4 The Social Exchange Theory**

The social exchange theory (SET) was developed back in the 1950s. A key proponent of SET was George Homans, who proposed that exchanges amongst people or groups were a fundamental kind of behaviour that are always founded upon principles of perceived benefits and costs (Homans, 2013). Moreover, Homans incorporated psychology concepts into SET, such as reward and expectation. However, Blau (2017) sought to bridge a gap between society and humans and introduced the social reward concept to provide an explanation for behaviour within social exchange. In order to help in explaining the wider social phenomenon, the concepts of criterion and power, intrinsic reward and extrinsic rewards were introduced in SET. Social exchange theory is one of the most influential of the conceptual paradigms for providing an understanding of KS behaviour and explaining it.

Bock et al. (2005) consider knowledge sharing as a type of social exchange among people who share skills and knowledge with colleagues and, through regulation of trust, expect to receive the knowledge of others in return in a reciprocal way (see Gouldner, 1960). From such a perspective, KS was analysed by Davenport and Prusak (2004), who outlined a number of expected benefits that were perceived as being able to regulate behaviour, such as status, future reciprocity, promotional prospects and job security. Expected reciprocity can encourage a positive attitude and have a positive relationship with KS intentions and behaviours.

Weir and Hutchings (2005) suggested that personal networks and relationships function by way of social exchange. As social exchanges are

complicated activities, various research projects related to knowledge sharing have highlighted various aspects. SET has been used by a number of researchers, for example, in order to provide examination of how fairness/justice and trust as key aspects of interpersonal relationships relate to knowledge sharing (Organ 1990; Robinson, 2006). Wu et al, (2009) pointed out that examination of fairness and trust has importance since knowledge sharing involves the provision of knowledge to another individual or in a collective way to a practice community or team with the expectation that there is reciprocity. Constant et al. (1994) emphasised context and self-interest, and the reciprocity of KS was emphasised by Chua (2003). SET has also been used by a number of researchers in order to analyse how there can be more effective rewarding of KS behaviour (Bartol and Srivastava, 2002). SET could well be the prime way of understanding sense of fairness in the workplace and relationships between effort and reward.

### **2.6.5 The Social Cognitive Theory**

In the knowledge sharing literature, motivation models provide an explanation of individual behaviour at an organisational level, and create motivation structures encouraging employees' behaviour to share their knowledge. Accordingly, social cognitive theory is one that is often referenced; it relates to the manner in which behavioural patterns are acquired and maintained by people (Bandura, 1989). Behaviour related to learning occurs within social contexts and is affected significantly by three factors – i.e. environment (physical and social), behaviour and personal factors – that interact with each other in a reciprocal way. In a later work, Bandura (2001) suggested that human engagements such as self-belief and ability for acting in a particular situation (self-efficacy) are essential to attain and share knowledge. Moreover, reflection, self-efficacy and learning through observation influence behavioural acquisition. Various human agency levels were identified by Bandura (2001) including personal agency that is direct, proxy forms with a reliance on others acting, and collective forms, where there is a dependence on social coordination and interdependence. There have been other types of motivation models related to skill-based reward or involvement of employees;

however, such perspectives are not found within the literature related to knowledge sharing. On the other hand, there has been criticism of social cognitive theory by those who consider it to be too complex. In practice, the expectation that behaviour will change due to environmental factors has not been validated. Likewise, through having a focus on cognitive aspects of individuals, there is a neglect of influences that are biologic or genetic. In a quantitative study on knowledge sharing intentions among software programmers, Tsai et al. (2010) asserted that social cognitive theory was used for the identification of the personal factors of outcome expectation and self-efficacy, though solely with a focus upon social cognition at the level of the individual. According to Bock et al. (2005) and Lin (2007), such is commonly used for theory of studies related to knowledge sharing since it does contribute ideas in relation to individual efficacy and agency.

It can be summarised that theories referenced within the KS literature tend to show a variety of explanatory power. Cross et al. (2001b) used social network analysis for the calculation of degree of connectedness amongst subgroups with an advice network with a basis in knowledge quality with a conceptualisation as a form of social relations. Social capital theory has been considered by Woolcock (2003) as dealing with networks and norms that facilitate collective actions for the sake of mutual benefit; dimensions taken into account in work on motivation for KS include the type and purpose of benefit, trust and reciprocity, and collective and personal efficacy (Huysman and Wulf, 2006). Social interdependence theory aims at explaining how accomplishment of the goals of an individual is influenced by the behaviour of others; this was cited in the work of Shoghi et al. (2013) related to contingency in behaviour related to knowledge sharing. Other kinds of theory cited within the literature see individuals as rational beings; social exchange theory, for instance, has the assumption that humans have rationality in their decision making and seek to maximise likelihood of achievement of their personal aims within social exchanges. Motivation models have been employed in explaining the attitudes of individuals towards KS. For instance, within social cognitive theory, the manner in which behavioural patterns are maintained by individuals is related to interactions between them, the behaviour and the

environment within which behaviour is acted out. A number of authors have tried to make combinations of ideas from various theories within models that are unified; social cognitive theory and social capital were integrated, for instance, in the work of Chiu et al. (2006) in order to provide an examination of the motivations that lay behind the sharing of knowledge within virtual communities.

## **2.7 Approaches to Sharing Knowledge**

Various approaches may be employed in sharing knowledge within organisations. Personalisation and codification are the two opposing, distinct strategies of knowledge management that were offered by Hansen et al. (1999). The former is believed to have a high level of effectiveness if dealing with explicit knowledge, whereas the latter is considered so when it comes to tacit knowledge. Due to the fact that such forms of knowledge are intertwined, an organisation must consider which strategy is best for the integration of the two forms with an emphasis on one for best results. Moreover, utilisation of these knowledge forms ought to be determined with a basis on the dominant form within the organisation, as they each contain contrasting aspects and features.

In order to create unique solutions for strategic issues that do not have a precedent that is appropriate, the form of personalisation was used through disseminating tacit knowledge. Accomplishment of this dissemination is through facilitation of communication between individuals, directed by issues of the kind of solution being sought and who may have awareness of that solution. Moreover, the result can be enhanced quality and increased frequency of communication since it is individualistic in nature and does not require a great deal of investment (Hansen et al., 1999; Wyatt, 2001). Codification, on the other hand, involves the acquiring, organising and labelling of knowledge, and making it available for routine troubleshooting. Codification ensures that explicit knowledge is uniform and reusable for decision making, and provides justification for the intensive investment needed by the strategy. The codification strategy ought to be used by

organisations to encourage their employees to contribute to and utilise information repositories.

Moreover, based on knowledge management strategy taxonomy established by Earl (2001), Bartol and Srivastava (2002) have identified four main approaches for knowledge sharing within organisations. The approaches identified are: informal interactions; formal interactions taking place within units, teams or between employees working in different departments or teams; practice communities; and databases through which employees are able to participate and put forward their experiences and ideas. The last approach listed has consistency with the strategy of codification; the other three involve strategies of personalisation for knowledge sharing (Bartol and Srivastava, 2002).

An alternative taxonomy for approaches to KS is that based on nature of channels, be they either informal or formal (Pan and Scarbrough, 1999; Ipe, 2003). In addition, formal channels can, in particular, be very supportive for the sharing of explicit knowledge (Nonaka and Takeuchi, 1995). Moreover, great importance has also been attached, to formal access to the sharing of knowledge such as through team work, training programmes and systems based in technology that offer employees environments that are structured so that their experiences and knowledge can be shared (Pan and Scarbrough, 1999). However, knowledge sharing effectiveness can occur through informal access such as social networks, practice communities and personal relationships (Pan and Scarbrough, 1999; Ipe, 2003; Cummings and van Zee, 2005). Indeed, Al-Hawamdeh (2003) has argued that social interactions and informal learning processes such as conversation, apprenticeship, coaching and storytelling are the best ways for knowledge sharing. Therefore, based on the above discussion, it is essential to outline how knowledge sharing is significant for organisations.

## **2.8 The Significance of Knowledge Sharing**

The ability of organisations and employees to share knowledge with each other, particularly organisational knowledge, is identified as one of the key

factors to organisational success (Pangil and Nasurddin, 2013). Knowledge sharing in an organisation is vital as it creates general awareness, acceptance of new ideas, increases corporation and thus improves organisational performance (Bulchandani, 2015; Nadason et al., 2017). Within the KM literature, the importance of the role of KS for organisational development has been confirmed by many authors. For example, Knowledge sharing founded as a key focal point for knowledge management and a key process within the knowledge life cycle (Bock et al., 2005, Halawi et al., 2008, Tong et al., 2015). In addition, Yang and Farn, (2009) found that knowledge sharing between members of an organisation has been shown to be a key issue for the success of knowledge management. Furthermore, Knowledge sharing is considered as playing a major role in enhancing competitive advantage of organisations and improving levels of creativity (Saenz et al., 2009; Tan et al., 2010; Camelo-Ordaz et al., 2011). In the same vein, Zheng et al., (2009) assert that effectiveness and innovation are more likely to occur for KM if consideration is given to knowledge sharing. Likewise, Sohail and Daud (2009) discovered that new knowledge is generated as an outcome of KS and, thus, innovation in an organisation is enhanced. Moreover, Renzl (2008) argues that skills and competence can be developed and values can be increased through KS within organisations.

Effective KS has been found to increase accumulation of knowledge within an organisation and to develop employee capacity for doing jobs properly and increasing self-knowledge (Xiong and Deng, 2008). It was noted by Bartol and Srivastava (2002) that knowledge sharing amongst members of an organisation is instrumentally important since it leads to increases in the value of the utilisation of knowledge. Likewise, it has been argued by Willem and Buelens (2007) that performance within various organisational sections may be enhanced if members, communicate and exchange their experiences, lessons and insights with their colleagues. Knowledge sharing effectively indicates measurement of efficiency and profit (Behery, 2008). Through the practice of activities related to KS, there can be benefits gained by an organisation such reductions in the time required for enhancement of services and products (Alavi et al. 2005; Yang and Chen, 2007).

It was stated by Song (2002) that effective knowledge sharing leads to decreasing training costs and reductions in the levels of uncertainty and risk. It has also been argued that, by way of KS, individuals are able to improve capacity for solving problems that are complicated and unstructured; the KS helps to increase learning and reduce mistakes (Reid, 2003; Kharabsheh, 2007; Saenz et al., 2009; Mughal, 2010). Knowledge sharing is a channel that is significant for the translation of individual knowledge into strategic organisational resources (Hendriks, 1999). The crucial nature of KS for management has been recognised as it helps in decision-making and encourages a culture of change within an organisation (Vaccaro et al., 2010; Al-Omari et al., 2013).

Moreover, numerous empirical studies have noted a significant relationship between KS and organisational performance (see for example: Darroch, 2005; Kang et al., 2008 and Gowen et al., 2009; Nadason et al., 2017). In summary, Knowledge and particularly the sharing of knowledge are recognised as important factors in an organisation's performance and to gain competitive advantage (Nadason et al., 2017). Therefore, it can be seen that KS not only plays a significant role in organisational operational activities but also helps to achieve strategic goals.

## **2.9 Knowledge Sharing within Organisations**

In organisations, knowledge is today considered the most important strategic asset, and it is believed that the management of this knowledge is critical to the success of these organisations (IPE, 2003). Moreover, in recent years, knowledge has been recognised as an organisation's most important resource and the concept of knowledge in organisations has become gradually common in the literature (Nahapiet and Ghoshal, 1998; Spender and Grant, 1996; Alvesson and Karreman, 2001). However, although knowledge has always been a significant aspect and critical to the long-term sustainability of organisations (Nonaka and Takeuchi, 1995), it has only been considered as a crucial source of competitive advantage in the last few years (Stewart, 2010).

According to Becerra-Fernandez and Sabherwal (2001), the recognition of knowledge as an organisation's key resource encourages the need to manage the individual and collective knowledge through processes that facilitate creation, leveraging and sharing. In addition, Ipe (2003) asserts that many studies have discussed the reputation of knowledge in organisations, and more organisations are attempting to establish systems to manage their knowledge effectively through knowledge sharing activities.

Knowledge sharing is a process in which acquired skills and expertise are transferred between individuals (Davenport, 1997). Moreover, skilled and experienced employees can be considered as a human capital pool, which can help organisations to enhance their performance effectively (Spender and Grant, 1996). Accordingly, a number of studies have been proposed and tested the factors that affect knowledge sharing within a variety of organisational contexts, and in the public sector organisational context in particular (Lin, 2007).

For example, Titi Amayah (2013) examined the impact of community-related considerations, normative considerations, personal benefits, social interaction, rewards, organisational support, degree of courage, degree of empathy and organisational structure on knowledge sharing. Likewise, Sandhu et al. (2011) investigated the influence of factors of IT systems, use of information, communication technology and support from top management on KS behaviour. Similarly, Seba et al. (2012) tested the impact of rewards, organisational structure, information technology, leadership, time and trust on knowledge sharing attitudes and intentions. However, because the current research targets public sector organisations, it is vital to understand the factors that influence KS in the public sector context.

### **2.9.1 Knowledge Sharing in Public Sector Organisations**

Nowadays, public sector practices are known as knowledge-based organisations, and to exploit their knowledge it is important to implement knowledge sharing among employees and departments effectively (Willem and Buelens, 2007). In addition, KS in the public sector is extremely

dependent on the employees. However, organisations can start to manage knowledge resources effectively only when employees are willing to share their knowledge with colleagues (Kim, 2018). According to Luen and Al-Hawamdeh (2001), public sector organisations emphasise developing and providing knowledge services, and hence they can be considered as knowledge-intensive organisations. Moreover, Seba et al. (2012) assert that knowledge sharing is currently attracting an increasing level of interest in the public sector compared with the private sector.

Several scholars have also argued that public sector organisations differ from private organisations in a number of ways. First, organisational goals in public organisations are typically more difficult to measure and more conflicting than in private organisations, and they are affected differently by political influences (Pandey and Wright, 2006). Second, public organisations can be very different from one another, based on ownership of the organisation, funding and control (Willem and Buelens, 2007). Other differences include fragmented authority and less incentive for efficiency (Heffron, 1989; Willem and Buelens, 2007; Titi Amayah, 2013). Moreover, Seba et al. (2012) argued that knowledge sharing in the public sector can be viewed as a social behaviour, and as an incentive among employees; however, it is difficult to encourage in the private sector. Furthermore, many scholars assert that there are many differences between the private and public sectors in terms of approaches to knowledge sharing rewards, because of the negative effect of bureaucracy on knowledge sharing behaviour, and the lack of implementation of KM strategies in the public sector (Chiem, 2001; Cong and Pandya, 2003; Cong et al., 2007).

Several studies have investigated the factors that influence individuals' knowledge sharing behaviours in the public and private sectors. For example, Bock and Kim (2002) found that KS among employees in Korean organisations was related to their positive attitude towards KS. Similarly, Lin and Lee's (2004) research concerned perceptions of public sector senior managers towards knowledge sharing. Moreover, Kim and Lee (2004) investigated the effects of IT application and reward systems on employee knowledge sharing in large public sector firms in South Korea. Their findings

showed the importance of knowledge sharing in the public sector, and suggested that managers need to identify driving forces that may encourage knowledge sharing behaviour in order to improve government services. Likewise, Hock et al. (2009) investigated the influence of trust on employees' knowledge sharing in public organisations. The findings revealed that knowledge sharing among employees in the workplace can be improved by trust. Furthermore, in a study conducted on 137 public university students in Saudi Arabia, Mustafa and Abubakar (2009) revealed that a learning culture and IT use can increase knowledge sharing among students.

Another survey, conducted by Islam et al. (2010) on 355 managers of Malaysian public service organisations, pointed out that knowledge sharing behaviour was affected positively by organisational climate including decentralisation and innovative supportive atmosphere. In the same vein, Tohidinia and Mosakhani (2010) revealed that anticipated reciprocal relationships, perceived self-efficacy and organisational climate were positively related to knowledge sharing within Iran's public sector organisations. In a study of large public sector firms in Hong Kong, Tong et al. (2015) studied the effects of organisational culture, knowledge donating and collecting and job satisfaction. The study results revealed that knowledge donating and collecting acted as a lever between the employees' job satisfaction and the organisational culture. Similarly, in a study conducted on the Dubai police force, Seba et al. (2012) found that leadership, organisational structure, trust and time allocation could act as obstacles to knowledge sharing activities. Likewise, in a survey study on 461 participants from public academic institutions in the United States, Titi Amayah (2013) demonstrated that social capital, organisational culture, organisational climate, organisational structure and trust had a significant influence on knowledge sharing behaviour.

Although knowledge sharing has been studied in various public sector organisations, it is argued that little is known about factors that influence knowledge sharing in police forces as a part of public sector organisations (Seba et al., 2012). Therefore, the following section will demonstrate an overview of knowledge sharing in police organisations.

### **2.9.2 Knowledge Sharing in Police Organisations**

Knowledge is literally the lifeblood of policing (Gottschalk, 2010; Ratcliffe, 2016). It is considered as the most important source in police work and police officers' success depends on the availability of knowledge (Hughes and Jackson, 2004; Luen and Al-Hawamdeh, 2001). Knowledge sharing is considered as a critical component to the success of knowledge management in the police context (Seba et al., 2012). However, the review of literature on knowledge sharing in police organisations highlighted a number of factors that influence knowledge sharing in police forces. For example, in a survey study conducted on New Jersey State police officers in the United States of America, Hu (2010) examined the differences in perceptions regarding the loss of knowledge, and found that knowledge was being lost from the police force as officers retired. In addition, the study found that police forces were failing to capture and retain retirees' knowledge before they left, and the types of knowledge being lost were described as mostly person or experience orientated – those aspects of knowledge which are not taught in traditional police officer training but which are learnt by officers through experience gained throughout their police career.

In order to capture and retain knowledge properly, Hu (2010) recommends that – before initiating any knowledge management strategy – decision makers should perform several steps in this regard. First, identify what knowledge is being lost. Second, determine what knowledge is critical to the organisation. Third, ensure the existence of effective management and leadership to confirm the success of such a KS strategy, and retain the vital knowledge.

Another theme emerging from the literature was around the police force occupational cultural issues which impact upon the sharing of knowledge. For example, Glomseth et al. (2007) pointed out that occupational culture affects KS in police forces, while Seba et al. (2012b) argued that team culture is the highest factor influencing KS and police performance. In addition, in a survey study conducted on senior investigation officers in Norway, Berg et al. (2008) argued that police leaders need to stimulate and encourage knowledge sharing among the police force. Moreover, the study highlighted the

significance of managers' support to encourage police investigators towards knowledge sharing. Additionally, the research found that the networking role of police managers is significantly related to knowledge sharing attitudes.

Similarly, Glomseth et al. (2007) found that senior investigation officers are not encouraged or do not have good enough routines for knowledge sharing with their colleagues within the department or across departments, which affects the results of investigations, and important knowledge for investigations is not always available when needed.

Encouragement to share knowledge may also be impacted by a tendency within the police in which knowledge is associated with power. Papers from three countries (Bell et al., 2010, Norway; Ram, 2000, Netherlands; Seba and Rowley, 2010, UK) describe that individuals recognise that having knowledge equals having power, for, by having knowledge, individuals have access to information which others do not. Knowledge in this sense can be seen as a strong differentiator in officers achieving their career ambitions. However, knowledge as power may become a barrier for sharing knowledge and may make individuals reluctant to share their knowledge with others. Several studies give recommendations for how police organisations can encourage officers to share knowledge. For example, in a research study on the Singapore Police Force, Luen and Al-Hawamdeh (2001) found that an enhanced sharing culture is the key to enhancing police officers' ability to recognise the value of knowledge and knowledge sharing, and therefore making them willing to share knowledge within the organisation. In the same vein, Abrahamson and Goodman-Delahunty (2013) found that team culture has a significant influence on the extent of knowledge sharing, for team culture stimulates detectives to work together to solve crimes.

It was highlighted in the literature that inconsistency in strategies within the force concerned with knowledge management has an impact on the sharing of knowledge. For example, in a study on head police officers across three UK forces, Seba and Rowley (2010) concluded that none of the organisations had an overarching knowledge management strategy or policy, even though it was widely recognised that successful policing was based upon sound intelligence and the sharing of knowledge. Likewise, research with Dutch forces has

shown that each force develops its own instruments for sharing intelligence and this depends on the expertise and commitment of individual officers (Openbare Orde en Veiligheid, 2008). However, knowledge has always been the main tool in police hands to fight crimes and solve problems (Gravelle and Rogers, 2009). Although maintaining knowledge is important in the police environment, KS is limited among police force employees (Luen and Al-Hawamdeh, 2001). However, investigating the factors that affect the KS of public sector employees towards KS will lead to enhancing the management of knowledge resources (Titi Amayah, 2013). Therefore, improving KS in police organisations might positively affect their performance towards state security (Hughes and Jackson, 2004; Luen and Al-Hawamdeh, 2001; Cowper, 2000). Before explaining the factors that affect the KS, it is important to illustrate KS processes.

## **2.10 Knowledge Sharing Process**

According to Lin (2007) and Kim and Lee (2013), the term knowledge sharing process refers to how an organisation's employees share their work-related experience, expertise, know-how and contextual information with other colleagues. Broadly speaking, the extant literature shows that there are several types of knowledge sharing processes within an organisation. Haas and Hansen (2007), for example, conceptualised knowledge sharing processes, when one person advises another about how to complete a specific task. In addition, Hendriks (1999) categorised KS processes into knowledge owners who have the knowledge, and the knowledge receivers who receive the knowledge.

However, other researchers such as Kim and Lee (2004; 2006), Bock et al. (2005) and Taminiau et al. (2009) distinguished between formal and informal knowledge sharing process. Ardichvili et al. (2003) suggested that KS consists of a supply of new knowledge and a demand for new knowledge. In the same vein, Reid (2003) differentiated KS processes through the knowledge seller and the knowledge buyer. Lin (2007) explained KS as the person carrying the knowledge (knowledge carrier) and the one asking for that knowledge (knowledge requester). Hsu et al. (2007) and Xue et al. (2010) supported this

view by suggesting KS processes as knowledge transmission (sending or presenting knowledge to a potential recipient). In addition, Gupta and Govindarajan (2002) defined KS processes as sourcing knowledge and absorbing knowledge. Others such as Sandhu et al. (2011) and Chen and Hung (2010) explained KS processes as knowledge contributing and knowledge collecting.

Furthermore, other authors such as Chen and Hung (2010) identified a three-dimensional knowledge sharing process that consists of knowledge contributing, collecting and utilising. Wei et al. (2009) made a distinction between knowledge seeking and knowledge contribution. In line with such thinking, Ipe (2003) and Kuo and Young (2008) discussed knowledge sharing processes as involving both the transmission of knowledge, which includes sending knowledge to the recipients, and the absorption of knowledge, which reflects the effectiveness of knowledge use. In contrast, Davenport and Prusak (2010), Kankanhalli et al. (2005) and Wei et al. (2009), divided KS processes into knowledge seeking and knowledge contributors. Vong et al. (2016) suggested the processes of knowledge sharing based upon the possession and acquisition of knowledge. Tong and Song (2011), on the other hand, differentiated between voluntary knowledge and solicited knowledge.

Accordingly, two key processes of KS i.e. donating and collecting can promote trust and mutual respect as well as facilitate the flow of people's knowledge assets to be capitalised for performance development (Kamasak and Bulutlar, 2010). It is argued that knowledge donating and collecting are linked with organisational learning because learning from others can help generate ideas and enhance organisational performance (Seba et al., 2012; Kim and Lee, 2013).

Drawing on the above discussions for different perspectives related to knowledge sharing processes, it is important to distinguish between knowledge donating on the one hand and knowledge collecting on the other. KS can be explained as a two-dimensional process, with employees sharing and exchanging their tacit and explicit knowledge in daily interaction through the process of knowledge sharing, donation and collection. Therefore, unlike previous studies, this study separates KS perspectives into two central

processes (knowledge donating and knowledge collecting). The following sections explain both processes in detail.

### **2.10.1 Knowledge Donating**

Knowledge donating (KD) is defined as the process of individuals communicating their personal intellectual capital to others (Van Den Hooff and De Ridder, 2004; De Vries et al. 2006; Kim and Lee, 2013; Kim et al., 2013; Yesil and Dereli, 2013). This means that KD is the motivation of individuals to pass on their own intellectual capital to others (Kim et al., 2013; Kim and Lee, 2013). Additionally, knowledge donating refers to the owner of knowledge, and includes listening, talking to and observing others, and providing them with information in order to help them develop their self-knowledge and solve job-related problems and improve work efficacy (Reid, 2003; Cummings, 2004). According to Lin (2007), knowledge donating aims to see individual knowledge become group and organisational knowledge over time. Thus, the organisation that creates an atmosphere that encourages organisational members to exchange their knowledge within the group is likely to develop new ideas and enhance organisational outcomes such as performance (Van Den Hooff and Van Weenen, 2004; Nonaka et al., 2006; Von Krogh et al., 2012; Hislop, 2016).

### **2.10.2 Knowledge Collecting**

Knowledge collecting is defined as the process of consulting colleagues to encourage them to share their intellectual capital (Van Den Hooff and De Ridder, 2004; Yesil and Dereli, 2013). In addition, knowledge collecting occurs when individuals ask for advice from each other in order to gain intellectual capital (Kim and Lee, 2013). It is also defined as the recipient of knowledge who must consult colleagues through listening, observing or practising to encourage them to share their intellectual capital (Van Den Hooff and Van Weenen, 2004; De Vries et al. 2006). It implies that the person must be willing to ask for, accept and adopt new intellectual capital and know-how. Furthermore, it also refers to collective beliefs or behavioural routines related

to the spread of learning among colleagues (Kim et al., 2013). According to Lin (2007), knowledge collecting consists of processes and mechanisms for gathering information and knowledge from internal and external sources, and it represents a key aspect of an organisation's success because an organisation with proficiency in gathering knowledge is more expected to be unique. Moreover, De Vries et al. (2006) and Kim and Lee (2013) assert that knowledge collecting takes place when individuals are willing to learn from others.

It is clear that the processes of knowledge donating and knowledge collecting have attracted a significant amount of attention from scholars but perhaps not enough and not in all contexts. Therefore, in line with the objectives stated in Chapter 1, the researcher finds the definition presented by Van Den Hooff and Van Weenen (2004) and Kim et al. (2013) to be the most relevant for this study. The next section explains the factors that may influence KS.

### **2.11 Factors Influencing Knowledge Sharing**

An organisation plays an important role in creating and enabling an environment for KS practices among its employees (Titi Amayah, 2013). Thus, studying the factors that affect KS behaviour is crucial to enhance that environment. Various studies have been developed to determine the major determinants that affect the level of KS in public and private institutions (Tangaraja et al., 2015; Titi Amayah, 2013; Willem and Buelens, 2007; Yusof et al., 2012). Accordingly, several sources have been reviewed in this section to establish the conceptual foundation for each construct under study in the current research.

For example, Park and Gabbard (2018) identified five determining factors (reciprocal benefit, anticipated relationship, reputation, altruism and fear of being scooped) that impact scientists' intention to share explicit and implicit knowledge. Their results suggested that reciprocal benefit and fear of being scooped were significant in influencing implicit and explicit KS behaviour. In addition, they found that reputation had the main effect on scientists' intention to share explicit knowledge and anticipated relationship had an impact on

scientists' intention to share implicit knowledge. Similarly, in a study to explore the factors influencing people's health knowledge adoption from social media in the context of China, Huo et al. (2018) found that knowledge source credibility and knowledge quality influenced knowledge adoption behaviour. They concluded that perceived knowledge quality, perceived knowledge consensus and perceived source credibility have positive effects on health knowledge adoption via the mediator of trust and knowledge richness. Moreover, in a survey study on 506 employees from the South Korean public sector, Kim (2018) determined the impact of trust, motivation, associability and commitment on KS. The study revealed that commitment and trust are both positively related to KS. Likewise, Khoza and Pretorius (2017) conducted a quantitative study seeking to identify factors that negatively influence knowledge sharing in software development in the developing country context (South Africa). Research results reveal that job security, motivation, time constraints, physiological factors, communication, resistance to change and rewards are core factors negatively influencing KS in developing organisations.

Based on the data obtained from more than 230 companies operating in five different industries in an emerging economy in the Gulf area, Youssef et al. (2017) illustrated the impact of three independent latent variables – openness and trust, top management support and the reward system – on KS behaviour. The study found a moderate relationship between the knowledge sharing behaviour and the three independent latent variables. Furthermore, in a survey-based study including 413 research participants, Bany-Baker and Yusof (2016) identified the factors affecting knowledge sharing among the users of an enterprise resource planning system in Jordanian small- and medium-sized enterprises. They found that factors such as absorptive capacity, organisational culture, top management support and effective communication have a significant influence on users' knowledge sharing behaviour. Similarly, in a quantitative research study conducted on 685 police officers in a law enforcement agency in the UAE, Hussein et al. (2016) investigated the impact of factors such as self-efficacy and top-management support on KS, and found that these two factors had a positive impact on the

knowledge-sharing process. Likewise, in a study aiming to find the general drivers and barriers to knowledge sharing within organisations, Razmerita et al. (2016) found that enjoying helping others, monetary rewards, management support, and management encouraging and motivating knowledge sharing behaviour are the most significant drivers of employees' knowledge sharing in Danish enterprises.

In selected multinational firms in the Malaysian emerging market, Jain et al. (2015) found that affiliation as one of the organisational climate dimensions was positively related to both KS process, while fairness dimensions of organisational climate were negatively related to KS process. In addition, the study found that the two dimensions of trust (cognitive and affective) have different impacts on the KS process. For instance, the results show that cognitive trust was positively related to knowledge donating behaviour, while affective trust was positively related to knowledge collecting.

In research to understand causal relationships among knowledge sharing enablers (social capital factors), and the mechanism of forming KS behaviours (knowledge collecting and knowledge donating) through individuals' KS intention within research and development teams in multiple companies in Iran, Akhavan and Hosseini, (2016) found that social interaction ties, trust, reciprocity and team identification were significantly associated with KS intention. KS intention, in turn, was significantly related to KS behaviours (knowledge collecting and knowledge donating). In addition, findings revealed that members' willingness to collect and donate knowledge can affect team innovation capability.

Exploring the differences in the level of knowledge sharing in high versus low trust situations, for cognition-based trust and for affect-based trust as well as implicit and explicit knowledge among professionals working for a financial organisation in The Netherlands, Rutten et al. (2016) found that the level of knowledge sharing in high versus low trust situations is significant. In addition, the effect is larger for affect-based trust and for implicit knowledge. In the same vein, Tangaraja et al. (2015) identified that intrinsic motivational factors, extrinsic motivational factors and organisational socialisation factors are potential predictor groups of knowledge sharing behaviour among Malaysian

public sector managers. Moreover, the study found that organisational commitment acted as the mediating variable between the identified predictors and knowledge donating and knowledge collecting.

Based on the theory of reasoned action (TRA) as the underlying research framework, Jolaei et al. (2014) defined only attitude as positively and significantly related to Malaysian public university academic staff's knowledge sharing intention. Furthermore, the findings also illustrated that factors of social network and self-efficacy significantly affect attitude. Likewise, organisational support showed a strong influence on subjective norms towards knowledge sharing intention.

Titi Amayah (2013) investigated the factors that affect knowledge sharing in US public sector organisations. Community-related considerations, normative considerations and personal benefits were determined as motivators, and found to have a unique contribution to the variance in knowledge sharing activities. In addition, the study found that factors of social interaction, rewards and organisational support were acting as enablers and had a significant influence on KS activities. Furthermore, two barriers were identified to hinder KS activities: degree of courage and degree of empathy. Moreover, interaction of normative consideration with social interaction, personal benefit with organisational support, and normative considerations with degree of courage, had a moderating effect on the relationship between motivating factors and knowledge sharing.

Seba et al. (2012) investigated six factors (trust, organisational structure, leadership, reward, time and information technology) to identify the factors affecting attitudes and intentions towards knowledge sharing in the Dubai Police Force. The study contributes to the limited research base on knowledge sharing in public sector organisations in the Middle East, specifically police forces. Their results revealed a strong relationship between attitude to knowledge sharing and intention to share knowledge. In addition, influences of leadership, trust, organisational structure, time and information technology on attitude to knowledge sharing, were upheld. However, rewards did not influence attitude to knowledge sharing.

Sandhu et al. (2011) conducted a study to identify the views of public sector employees towards the importance of KS; identify the barriers to KS; and identify initiatives that may encourage KS among Malaysian public sector employees. They found that the respondents were very positive in their views regarding the importance of KS. In addition, the results showed self-serving biases when it came to employees' willingness to share knowledge compared with their perception of their colleagues' willingness to share knowledge. Factors such as IT systems, lack of rewards and recognition, lack of time, lack of interaction and lack of interpersonal skills were identified as the main individual barriers. Similarly, Yu et al. (2010) examined the factors that facilitate voluntary knowledge sharing in a virtual community through the lens of sharing culture (fairness, identification and openness). Fairness and openness were found to have a positive effect on sharing culture. In addition, the results revealed that enjoying helping, sharing culture and usefulness/relevancy were strongly linked to knowledge sharing behaviour.

In order to foster the determinants of knowledge sharing in professional virtual communities, Lin et al. (2009a) investigated and explained the relationships between contextual factors, personal perceptions of knowledge sharing, knowledge sharing behaviour and community loyalty. The results demonstrate that trust significantly influences knowledge sharing. In addition, self-efficacy, perceived relative advantage and perceived compatibility were found to positively affect knowledge sharing behaviour. Furthermore, the study found that knowledge sharing behaviour is not affected by the norm of reciprocity.

Al-Alawi et al. (2007) investigated the role of certain factors in organisational culture in the success of knowledge sharing in Bahraini private and public organisations. Factors included trust, communication among employees, information systems, rewards and organisation structure. The study revealed that rewards, communication, trust, organisation structure and information systems were positively related to knowledge sharing in organisations. Kim and Lee (2006) investigated employees' perceptions of knowledge sharing capabilities in five private sector and five public sector organisations in South Korea. The study found that performance-based reward systems, centralisation, usage of IT applications, social networks and user-friendly IT

systems were found to significantly affect employee knowledge sharing capabilities in the organisations.

Thus, it can be seen that various studies have identified factors that act as drivers and barriers for employees' knowledge sharing behaviour. Key factors from the literature review have been summarised from pre-existing studies in Table 1.

Factors	References																			
	Kim and Lee, (2006)	Al-Alawi et al. (2007)	Lin et al. (2009a)	Yu et al. (2010)	Sandhu et al. (2011)	Seba et al. (2012a)	Titi Amayah (2013)	Jolaei et al. (2014)	Tangaraja et al. (2015)	Jain et al. (2015)	Razmerita et al. (2016)	Akhavan and Hosseini, (2016)	Ruffen et al. (2016)	Hussein et al. (2016)	Bany-Baker and Yusof, (2017)	Youssef et al. (2017)	Khoza and Pretorius, (2017)	Park and Gabbard, (2018)	Kim, (2018)	Huo et al. (2018)
Time					•	•					•						•			
Reward		•			•	•	•				•						•	•		
Organisation Design																				
Trust		•	•		•				•		•	•							•	•
Formalisation	•								•											•
Centralisation								•												
Knowledge Sharing	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Reciprocal Benefits																		•		
Shared Values, Vision, Goals	•						•	•			•									
Technology Infrastructure	•		•																	
Leadership						•														
Self-Efficacy			•					•												
Organisational Structure						•														
Social Interaction					•										•					
Social Networks	•		•					•							•					
Fairness									•											
Sharing Culture				•																
Subjective Norms							•	•												
Enjoyment in Helping											•									
IT Systems					•	•														
Communication		•													•		•			
Reciprocation Reputation											•							•		
Organisational Support						•	•				•			•	•	•				
Perceived Relative Advantage			•																	
Motivation											•						•		•	
Degree of Empathy							•													
Degree of Courage							•													
Personal Involvement									•											
Normative Considerations								•							•					
Organisational Culture															•					
Affiliation										•										
Anticipated Relationship																		•		
Trust Type										•										
Knowledge Quality																				•
Trust Levels													•							
Knowledge Self-Efficacy													•							
Innovativeness									•											
Reputation				•																
Associability																				•
Commitment																				•
Others								•							•					•
Job Security																		•		•
Resistance to Change																	•			
Identification				•																

Table 1. Factors in Knowledge Sharing Studies

In addition, the suggested variables have been critically studied at different levels and dimensions. For instance, Riege (2005) classifies three main dimensions of factors that affect KS among employees: firstly, the individual dimension, such as differences in gender, age, experience level, education level and trust. Secondly, the organisational dimension, which includes lack of leadership, lack of motivation and the size of units in the organisation. The third dimension relates to technology including factors such as lack of technical support and familiarity with IT systems. Similarly, Ardichvili (2008) categorised main factors that affect employees' willingness to share knowledge in three dimensions. First is the motivation dimension, which includes individual gains, benefits and merits to the involved communities. The second dimension includes barriers such as interpersonal attitudes, complex structural organisation, and technological and cultural obstacles. Finally, the study categorised supportive mechanisms from the organisational structures and trust among the employees as an enabler dimension. It can be seen that the previous studies have categorised the factors based on theories and their research aim perspectives. Therefore, this study has grouped the factors that may influence KS in the BPSF into an organisational dimension and an individual dimension (see Table 2 below).

Dimensions	Constructs	Definitions	Source
Organisational Factors	Rewards	"A measure of how well the organisation recognises employee performance with rewards" (p. 360).	Janz and Prasarnphanich (2003)
	Organisational Support	"Support is a measure of the organisation's interest in the welfare of the employee" (p. 360).	Janz and Prasarnphanich (2003); Lin (2006)
	Organisational Structure / Centralisation	"Degree to which power and authority are concentrated at the organisation's higher levels" (p. 373).	Kim and Lee (2006)
	Organisational Structure / Formalisation	"The degree to which are manifest in written documents regarding procedures, job descriptions, regulations, and policy manuals" (p. 374).	Kim and Lee (2006)
Individual Factors	Reciprocity	"Actions that are contingent on rewarding reactions from others and that cease when these expected reactions are not forthcoming" (p. 1877).	Chiu et al. (2006)
	Trust	"A set of specific beliefs dealing primarily with the integrity, benevolence, and ability of another party" (p. 1877).	Chiu et al. (2006)
	Social Interaction	"Social interaction ties represent the strength of the relationships, and the amount of time spent, and communication frequency among members of communities" (p. 1876-7).	Chiu et al. (2006)
	Personal Benefits	"Knowledge contributor's judgment of likely consequences that his or her knowledge sharing behaviour will produce to him or herself" (p. 1876).	Chiu et al. (2006)

Table 2. Factors' Dimensions and Definitions

This section has identified many factors that may affect employees' KS behaviour in relation to the organisational and individual context. Although various factors exist in the literature, as highlighted in Table 2, three issues were considered before determining the final constructs: the context of developing countries, the nature of bureaucratic organisations and the researcher's knowledge about local settings. The final constructs/factors used in the study are explained below.

## **2.12 Organisational Factors**

### **2.12.1 Rewards**

Rewards can be defined as “a measure of how well the organisation recognises employee performance with rewards” (Janz and Prasarnphanich 2003, p.360). Rewards are considered as one of the main components of human resource management practices that can enhance employees' motivation to share knowledge. Buckman (1999) emphasises that the activities for sharing knowledge cannot be forced, and employees cannot share their knowledge without an effective rewarding motivator (Syed-Ikhsan and Rowland, 2004; Al-Alawi et al., 2007).

It can be seen that the existence of an organisational reward system is vital in motivating knowledge sharing activities within organisations (Lin, 2007). In addition, Youssef et al. (2017) found a moderate relationship between rewards and knowledge sharing behaviour among employees of five emerging economy industries in the Gulf area. Similarly, Titi Amayah (2013) investigated the factors that affect knowledge sharing in USA public sector organisations and found that rewards had a significant effect on knowledge sharing. In addition, Hansen et al. (2005) and Liebowitz and Megbolugbe (2003) assert that recognition and rewards can build a supportive culture in the organisation, and therefore it facilitates knowledge sharing among the employees. Similarly, Minbaeva (2008) found that extrinsic rewards encourage employees' knowledge sharing behaviours. Likewise, Durmusoglu et al. (2014) found that organisational rewards interact to influence knowledge collection, which leads to the conclusion that knowledge collecting can be encouraged by rewards. In the same vein, Bartol and Srivastava (2002) suggested that KS in the

organisation will be enhanced when using monetary organisational reward systems such as merit pay plans, profit sharing and gain sharing. However, non-monetary rewards such as praise and public recognition, dinner, gifts and certificates also tend to be effective in creating a feeling of cooperation, ownership and commitment among employees and therefore encourage them to share their knowledge. According to Andriessen (2008) and Aulawi et al. (2009), an organisational reward system can create knowledge access inside an organisation. Moreover, Smith and McKeen (2003) state that attitudes towards sharing knowledge incentives within an organisation will be strengthened by establishing a bonus system and promotion based on knowledge sharing. In the same vein, Song (2009) asserted that individuals can create a sense of legal obligation to share their personal knowledge with other members when they are rewarded. Similarly, Davenport and Prusak (2004) found that knowledge-based rewards positively influence an employee's loyalty, and therefore their motivation to share their knowledge with the organisation.

On the other hand, numerous studies have shown that, unlike the developed world, a reward system is not an effective motivator for knowledge sharing in the Middle East (Seba et al., 2012b; Al-Adaileh and Al-Atawi, 2011; Youssef et al., 2017). For example, Seba et al. (2012b) examined factors affecting attitudes and intentions towards knowledge sharing in the Dubai Police Force, and their results revealed that rewards did not influence attitude to knowledge sharing. Likewise, in their study to determine the success factors that affect the knowledge management system in Omani organisations, Al-Busaidi and Olfman (2005) revealed that conducting a reward policy is not feasible to promote a knowledge management system in these organisations. Several studies have also revealed that there is no relationship between rewards and knowledge sharing among organisation members (Kwok and Gao, 2005; Lin, 2007; Chang et al., 2007; Jolaee et al., 2014). Similarly, in an investigation of factors affecting knowledge sharing among academic staff in Malaysian universities, Jolaee et al. (2014) found that rewards negatively affect knowledge sharing intention. In addition, Bock et al. (2005) and Lin (2007) concluded that monetary incentives (extrinsic rewards) deter the formation of

positive attitudes towards knowledge sharing in organisations. Likewise, some authors revealed that rewards and motivations have a negative effect on attitudes towards KS (Bock and Kim, 2002; Bock et al., 2005; Lin, 2007). Moreover, rewards may emphasise competition between employees and so may pose a barrier to KS and cooperation between teams (Schepers and Van den Berg, 2007). However, an adequate reward system is generally seen as a driving force for employees' intention to share knowledge (Bock et al., 2005; Youssef et al., 2017). Based on the above discussion, the following hypotheses can be suggested:

***H1A: There is a statistically significant relationship between rewards (RW) and knowledge donating (KD) among BPSF officers.***

***H1B: There is a statistically significant relationship between rewards (RW) and knowledge collecting (KC) among BPSF officers.***

### **2.12.2 Organisational Support**

According to Janz and Prasarnphanich (2003), "Support is a measure of the organisation's interest in the welfare of the employee" (p. 360). The support of management is recognised as one of the factors that has a significant potential impact on organisational knowledge (Connelly and Kelloway, 2003). Lin (2006) suggested that management support is vital to creating a supportive climate and considered as a significant driver of knowledge sharing. Along the same lines, other researchers state that management support determines the success or failure of knowledge sharing (Daghfous, 2004; King and Marks, 2008; Lin and Lee, 2006). Moreover, organisational support nowadays is recognised as one of the critical factors fostering KS in government and private organisations towards improving their ability, efficiency and enhancing the quality of their delivered services (Lee et al., 2015a; Vong et al., 2016; Youssef et al., 2017). Likewise, Davenport and Prusak (2010) assert that the role of managers in knowledge sharing activities cannot be ignored, particularly when managers observe knowledge-related activities such as knowledge accessibility and knowledge sharing. In addition, a supportive climate attracts participation from employees in initiation and dissemination of important knowledge to other employees in the organisation

(Darroch, 2003; O'Dell and Grayson, 1998). Accordingly, it can help to convert employees' knowledge into practical information, which can act to encourage innovation capability (Stoddard and Jarvenpaa, 2000). Thus, support is recognised as one of the factors that have a significant potential impact on knowledge sharing within organisations (Connelly and Kelloway, 2003).

Many researchers have recognised the impact of organisational support on knowledge sharing behaviour. For example, research by Jolaei et al. (2014) investigated factors affecting KS among academic staff in universities in Malaysia, and implied that organisational support showed an indirect influence on knowledge sharing intention. A similar study, conducted by Hussein et al. (2016), linking knowledge sharing enablers, processes and outcome dimensions in law enforcement in the United Arab Emirates (UAE) found that management support was affecting knowledge sharing. Similarly, a study conducted by Youssef et al. (2017) confirmed the impact of organisational support on knowledge sharing behaviour in private sector organisations in the Gulf area. Likewise, Vong et al. (2016) established that organisational support influenced knowledge sharing within Cambodian public sector organisations. It is thus essential for the public sector organisations to secure a supportive climate to facilitate knowledge sharing in order to maintain organisation knowledge and improve their performance. However, this component has only been found to critically influence different knowledge sharing aspects in developed countries' public and private sectors, as few studies have focused on this in the developing countries context (Titi Amayah, 2013; Jolaei et al., 2014; Hussein et al., 2016; Razmerita et al., 2016). Therefore, the following hypotheses can be suggested:

***H2A: There is a statistically significant relationship between support (ST) and knowledge donating (KD) among BPSF officers.***

***H2B: There is a statistically significant relationship between support (ST) and knowledge collecting (KC) among BPSF officers.***

### **2.12.3 Organisational Structure/Centralisation**

Organisational structure/centralisation can be defined as the "Degree to which power and authority are concentrated at the organisation's higher levels" (Kim

and Lee, 2006, p. 373). In other words, centralisation refers to the locus of decision-making authority lying in the higher levels of a hierarchical relationship (Robbins et al. 2017; Tsai, 2002). It creates a non-participatory environment that reduces communication, commitment and involvement with tasks and projects among participants (Damanpour, 1991; Sivadas and Dwyer, 2000). A high level of centralisation appears to restrict channels of communication, and inhibit employees' capacity to generate ideas and share knowledge and expertise with others, therefore arguably stifling an organisation's capacity for improved knowledge sharing. However, under the increasingly dynamic and competitive pressure, knowledge workers who have wider skills, expertise and work responsibilities would need greater autonomy and self-regulation. Moreover, if individuals have freedom, independence and discretion to determine what actions are required and how best to execute them (Janz et al., 1997), they will accept the resulting decision because they have the opportunity to provide inputs and further communicate their ideas during the decision-making process (Yap et al., 1998). The more autonomy organisational members possess, the more responsibility they will feel for the work role and context (Janz et al., 1997; Spreitzer, 1995). Furthermore, it is believed that employees can be capable of self-organising social interaction networks to solve new or existing problems if they are allowed to do so (Gold et al., 2001; Janz and Prasarnphanich, 2003). Thus, interpersonal exchange and social interaction would increase in decentralised organisations. Consequently, decentralisation is preferred in improving knowledge sharing. Fostering learning and sharing of good practices involves cultivating an environment where employees can exchange knowledge freely, and where structures are flexible and decentralised.

Sharratt and Usoro (2003) found that a centralised organisational structure with a bureaucratic management style could stifle the creation of new knowledge, whereas knowledge sharing will be encouraged with a flexible decentralised organisational structure, particularly tacit knowledge. Similarly, Tsai (2002) found that a centralised organisational structure could reduce individuals' interest in sharing knowledge with others within the organisation. In addition, many researchers emphasise that centralisation creates a non-

participatory environment that reduces communication, commitment and involvement with tasks and projects among employees (Damanpour, 1991; Sivadas and Dwyer, 2000; Kim and Lee, 2006). Furthermore, it is believed that employees can be capable of organising social interaction networks to solve new or existing problems and share their knowledge (Gold et al., 2001; Janz and Prasarnphanich, 2003). A high level of centralisation appears to restrict channels of communication, and inhibit employees' capacity to generate ideas and share knowledge and experience with others (Mohd nor, 2013).

Several researchers have investigated the influence of this construct on knowledge sharing behaviour. For example, a study conducted by Al-Alawi et al. (2007) on Bahrain's public and private sectors found that structure centralisation (SC) was positively related to knowledge sharing in Bahrain organisations. A similar finding was established in a qualitative study conducted on the Dubai police force by Seba et al. (2012a) which examined factors affecting KS among police officers, and revealed that the centralisation of the hierarchical organisational structure was significantly related to knowledge sharing, and identified as a potential barrier to knowledge sharing. Likewise, Rahman et al. (2017) investigated factors affecting knowledge sharing to find a conceptual framework of knowledge sharing for Bangladesh's business organisations. This study revealed a positive relationship between SC and KS behaviour.

On the other hand, the results differ from some prior studies. In contrast, in her study to determine the factors that affect knowledge sharing in USA public sector organisations, Titi Amayah (2013) found a negative relationship between organisational structure centralisation and knowledge sharing activities. In addition, Vong et al. (2016) concluded that organisational structure centralisation did not influence knowledge sharing in Cambodian public sector organisations. However, although this structure has been critically investigated in different knowledge sharing aspects in several disciplines, there are few studies focusing on Bahrain and on police organisations in particular (Al-Alawi et al. 2007; Friesl et al. 2011; Titi Amayah,

2013; Seba et al. 2012a; Vong et al. 2016). Therefore, the following hypotheses can be suggested:

***H3A: There is a statistically significant relationship between organisational structure centralisation (SC) and knowledge donating (KD) among BPSF officers.***

***H3B: There is a statistically significant relationship between organisational structure centralisation (SC) and knowledge collecting (KC) among BPSF officers.***

#### **2.12.4 Organisational Structure/Formalisation**

According to Kim and Lee (2006), organisational structure/formalisation can be defined as “the degree to which processes are manifest in written documents regarding procedures, job descriptions, regulations, and policy manuals” (p. 374). In other words, this refers to the degree to which jobs within the organisation are standardised and the extent to which employee behaviour is guided by rules and procedures (Andrews and Kacmar, 2001; Robbins et al. 2017). Furthermore, Tolbert and Hall (2016) revealed that the formal structure refers to the official, explicit division of responsibilities, definitions of how work is to be done, and specifications of relationships involving the members of an organisation. Moreover, in organisations with high formalisation, there are explicit rules and procedures, which are likely to impede the spontaneity and flexibility needed for internal innovation (Bidault and Cummings, 1994). In addition, formalisation would eliminate the possibility that members engage in alternative behaviours and remove the willingness for members to have discussions on considering alternatives (Robbins et al. 2017). Conversely, in organisations with low formalisation, job behaviours are relatively unstructured and members have greater freedom in dealing with the demands of their relevant tasks (Sivadas and Dwyer, 2000). In this case, social interactions among organisational members are more frequent and intensive for implementing the tasks. Therefore, the less formalised work process is likely to stimulate the social interactions among organisational members. In contrast, formalisation was considered to have a positive impact on knowledge sharing because it encouraged an atmosphere

of trust (Willem and Buelens, 2005). Therefore, a less formalised work process is likely to stimulate the social interactions among organisational members (Lin, 2008). Gold et al. (2001) stated that a flexible structure could be advantageous to sharing.

Several studies have examined the influence of this construct on knowledge sharing behaviour. For instance, Egbu (2000) highlighted that centralisation, complexity, stratification and formalisation influence knowledge sharing. Similarly, a study conducted by Al-Alawi et al. (2007) on Bahrain's public and private sectors found that structure formalisation (SF) was positively related to knowledge sharing in Bahrain public and private sector organisations. A similar finding was established in a qualitative study conducted on the Dubai police force by Seba et al. (2012a), who examined factors affecting KS among police officers, and found that the formalisation of police organisational structure was significantly related to knowledge sharing, and identified as potential barriers to knowledge sharing. Likewise, Ali and Dominic (2016) examined factors affecting KS practice in association with cost reduction in oil and gas industry organisations and revealed a relationship between SF and KS practice. In the same vein, Rahman et al.'s (2017) study revealed a positive relationship between SF and KS behaviour in Bangladesh's business organisations.

Conversely, the results of this study are contrary to some previous studies. For example, Titi Amayah (2013) found that USA public sector organisations' employees' knowledge sharing activities were negatively influenced by organisational structure formalisation. In addition, Vong et al. (2016) inferred that KS in Cambodian public sector organisations did not affect organisational structure formalisation. However, although this structure has been critically investigated in different knowledge sharing aspects in several disciplines, few studies have looked at in the context of Bahrain as a developing country, and in its police organisation in particular (Al-Alawi et al., 2007; Friesl et al. 2011; Titi Amayah, 2013; Seba et al. 2012a; Vong et al. 2016). Therefore, the following hypotheses can be suggested:

***H4A: There is a statistically significant relationship between organisational structure formalisation (SF) and knowledge donating (KD) among BPSF officers.***

***H4B: There is a statistically significant relationship between organisational structure formalisation (SF) and knowledge collecting (KC) among BPSF officers.***

## **2.13 Individual Factors**

### **2.13.1 Reciprocity**

According to Chiu et al. (2006), reciprocity (RC) can be defined as “Actions that are contingent on rewarding reactions from others and that cease when these expected reactions are not forthcoming” (p. 1877). For instance, it refers to the belief that current knowledge contribution or receipt will lead to future help from others (Lin, 2007b). In addition, Kankanhalli et al. (2005) considered individuals’ perception of reciprocity in KS as the belief that current contributions lead to future requests for knowledge being met. Moreover, reciprocity behaviour has been seen to be a benefit to individuals engaging in social exchange (Blau, 2017). The concept of reciprocity is important in understanding why people share knowledge (Chen and Hung, 2010; Di Gangi et al. 2012). In the context of Taiwanese organisations, Lin (2007) discovered that employees who expected reciprocity is positively related to knowledge sharing attitudes and intentions. Moreover, Rheingold (2000) and Kankanhalli et al. (2005) confirmed that people who regularly help others will receive help quickly from others.

Despite the theoretical proposition that receiving reciprocal knowledge should motivate knowledge sharing, reciprocity has received moderate attention in knowledge sharing literature (Chen and Hung, 2010; Cho et al., 2007; Di Gangi et al., 2012; Kankanhalli et al., 2005; Lin, 2007; Lin et al, 2009a; Wasko and Faraj, 2005; Zhang et al., 2009). Few studies have investigated the direct effects of expected reciprocity on knowledge sharing (Chen and Hung, 2010; Lin, et al 2009a; Lin et al., 2009a; Wasko and Faraj, 2005; Titi Amayah, 2013). For example, in a study of the impact of social capital and individual motivations on knowledge sharing, Chang and Chuang (2011) found that reciprocity had a significant and positive effect on KS through Internet

communications. Another study, conducted by Tangaraja et al. (2015), on Malaysian public sector managers found that RC was positively related to knowledge sharing behaviour.

Looking at the online community, Wasko and Faraj (2005) and Cho et al. (2007) found that expected reciprocity was reported to increase as knowledge sharing was higher, while, in the same community, Chen and Hung (2010) found that expected reciprocity negatively affected individual knowledge collecting, or donating. A similar finding was recognised in the Iranian private sector by Akhavan and Hosseini (2016), who examined social capital factors affecting KS, and found that reciprocity was positively related to knowledge sharing. In the same vein, Kwahk and Park's (2016) study revealed that RC positively influenced knowledge sharing activities particularly using social media as a medium of communication. Likewise, in a mixed method designed study, Mosala-Bryant and Hoskins (2017) examined factors affecting KS; the results revealed a positive relationship between RC and KS. On the other hand, Titi Amayah (2013) found that public sector employees' knowledge sharing activities in the USA were negatively influenced by reciprocity. Similarly, Huang et al. (2011) found that reciprocal relationships did not influence employees' knowledge sharing in the Chinese context. Based on the literature discussion above, this structure has been critically investigated in different knowledge sharing aspects in several disciplines (Titi Amayah, 2013; Tangaraja et al., 2015; Akhavan and Hosseini, 2016; Mosala-Bryant and Hoskins, 2017). However, there are a limited number of such studies in Bahrain as a developing country, and in its police organisation in particular. Therefore, the following hypotheses can be suggested:

***H5A: There is a statistically significant relationship between reciprocity (RC) and knowledge donating (KD) among BPSF officers.***

***H5B: There is a statistically significant relationship between reciprocity (RC) and knowledge collecting (KC) among BPSF officers.***

### **2.13.2 Trust**

Trust can be defined as “A set of specific beliefs dealing primarily with the integrity, benevolence, and ability of another party” (Chiu et al., 2006, p.

1877). McAllister (1995, p. 25) defines trust among individuals as “the extent to which a person is confident in, and willing to act on the basis of the words, actions, and decisions of another”. Accordingly, Nguyen et al. (2005) view trust as a psychological state characterised by confidence in the partner’s capability and integrity to perform certain actions.

According to Adler and Kwon (2002), the concept of trust can be traced back to social capital theory (SCT), a theory where capital is created from social relationships and via social networking. Hoffman et al. (2005) consider social capital as a structure that promotes development of ‘collective intellectual capital’. Others view social capital as an enabler of efficient collective action, as it cultivates ‘cooperative behaviour’ (Coleman, 2003; Nahapiet and Ghoshal, 1998). Social capital is also considered as a purposeful relationship that can generate tangible and intangible benefits in the long run (Lin, 1986). Moreover, trust has been examined by numerous social science fields of study, including history, anthropology, psychology, political science, economics, sociology, information studies and knowledge management, with each of these disciplines applying their own perspectives and approaches.

Trust is an essential ingredient for establishing a solid knowledge base in organisations that enables interaction and knowledge sharing. For example, Tsai and Ghoshal (1998) assert that trust leads to increased overall knowledge exchange. Additionally, trust increases the likelihood that knowledge shared is sufficiently understood (Mayer et al., 2007). Sandhu et al. (2011) found that trust (TT) is a key factor for establishing and maintaining relationships between the members within and across work groups. For example, trust within the workplace engenders cooperation and plays a significant role in whether people decide to cooperate or not and whether people share or conceal knowledge within and across the organisation’s realms (Morgan and Hunt, 1994).

According to the literature, trust appears to be a multidimensional construct (Moorman et al., 1992; Barney and Hansen, 1994; McAllister, 1995). Specifically, interpersonal trust is derived from affective and cognitive components (Lewis and Weigert, 1985) which are known in the literature as affective trust and cognitive trust. Affective-based trust is based on personal

emotional bonds between individuals (Chowdhury, 2005) and permits the assessor (the one who judges) to constantly interact with the counterpart (the one being judged) based on positive feelings and emotion (Parayitam and Dooley, 2007). When the assessor feels emotionally happy in the relationship, he or she is more willing to exchange personal information and knowledge (Chowdhury, 2005). Previous studies have shown that, as individuals grow closer in their personal relationship to one another, they are increasingly motivated to act in ways that benefit the other (Messick et al., 1983; Brann and Foddy, 1987; Organ, 1990; Nonaka and Takeuchi, 1995; Epstein, 2000). On the other hand, cognitive-based trust is based on the evaluation of capability and reliability of the one being assessed by the assessor (McAllister, 1995; Levin and Cross, 2004). For example, individuals who are perceived to be highly capable in their work and possess outstanding credentials (such as professional recognition, distinguished educational background and experience) are more likely to develop higher cognition-based trust by the assessor (Chowdhury, 2005).

Trust is a construct that has been examined by numerous social science fields of study, including history, anthropology, psychology, political science, economics, sociology, information studies and knowledge management, with each of these disciplines applying their own perspectives. For example, Lewicki and Bunker (1996) pointed out that “little effort has been made to integrate these different [trust] perspectives or articulate the key role trust plays in critical social processes (e.g. cooperation, coordination, performance)” (p. 115). Even though several studies have been conducted since, the role trust plays in social processes remains an important area of research needing exploration.

Although the concept of trust has been covered extensively in management literature, there is a paucity of empirical research examining the impact of trust on knowledge sharing (Chowdhury, 2005; Bakker et al., 2006; Hsu and Wang, 2008; Chen and Hung, 2010; Titi Amayah, 2013). In fact, most of the recent research that has examined the impact of TR on KS has considered it as a one-dimensional construct (Al-Alawi et al., 2007; Chen and Huang, 2007; Renzl, 2008). Moreover, it has been frequently tested as a factor for

knowledge sharing in the virtual setting (Ardichvili et al., 2003; Wang et al., 2006; Hsu et al., 2007), in the manufacturing sector, for consultancy (Renzi, 2008), among MBA students (Huang et al., 2008), in the banking sector (Julibert, 2008) and in green manufacturing firms (Cheng et al., 2008). Few empirical studies are available that involve TR and KS in the police context. As such, there is a dearth of research that examines the impact of trust on knowledge sharing behaviour in police force organisations.

However, the influence of trust on knowledge sharing has been investigated by several studies. For example, Al-Alawi et al. (2007) found that the factor of trust has played an important role in defining the relationships between staff and, in turn, provided possibilities to break down obstacles to knowledge sharing among Bahrain's public and private sectors. Likewise, Seba et al. (2012a) revealed that the lack of TT has been identified repeatedly as a potential barrier to knowledge sharing in the Dubai police force. Al-Adaileh and Al-Atawi's (2011) findings revealed that the cultural attributes of trust have an impact on knowledge exchange within the context of the Saudi Telecommunication sector. Similarly, Tangaraja et al. (2015) identified that TT was a potential predictor factor that impacted Malaysian public sector managers' knowledge sharing behaviour (knowledge donating and knowledge collecting). Moreover, in context of the Danish enterprises, Razmerita et al.'s (2016) findings confirmed that trust influenced employees' knowledge sharing behaviours, and the lack of TT was recognised as a barrier to KS. Likewise, Bany-Baker and Yusof (2016) revealed that the factor of trust was significantly associated with private sector employees' knowledge sharing in Jordan. Following these results, Youssef et al. (2017) also found that trust was positively associated with knowledge sharing behaviours among private sector employees in the Gulf area. Accordingly, Kim (2018) revealed that trust was positively related to knowledge sharing in the South Korean public sector organisations.

On the other hand, Titi Amayah (2013) investigated trust as a predicted factor that affected knowledge sharing in USA public sector organisations. The outcomes found that TT did not act as a knowledge sharing motivator in these organisations. Not far from this result, in a survey study among public

universities' academic staff in Malaysia, Jolaei et al. (2014) found that trust was negatively associated with employees' knowledge sharing intention. However, there is limited research on the impact of trust on KS in Bahrain as a developing country, and in its police organisation in particular. Therefore, the following hypotheses can be suggested:

***H6A: There is a statistically significant relationship between trust (TT) and knowledge donating (KD) among BPSF officers.***

***H6B: There is a statistical significance relationship between trust (TT) and knowledge collecting (KC) among BPSF officers.***

### **2.13.3 Social Interaction**

According to Chiu et al. (2006), social interaction ties “represent the strength of the relationships, and the amount of time spent, and communication frequency among members of communities” (pp. 1876-1877). In other words, Yli-Renko et al. (2001) defined social interaction (SI) as “the extent of social relationships between the focal firm and customers” (p. 590). Accordingly, social interaction ties can be considered as channels for information and resource flow (Nahapiet and Ghoshal (1998). However, these definitions show that social networks involve communication, dialogue and individual or group interaction that enhances and encourages knowledge sharing among the employees in an organisation (Leonard and Sensiper, 1998).

Empirical evidence in social literature shows numerous advantages of social interaction relevant to knowledge sharing in organisations. For example, people who have a history of interaction with others are more helpful and accessible (Cross and Sproull, 2004), and provide more assistance and support to one another (Seibert et al., 2001). Another group of researchers affirmed that social networks can be used for a variety of individual and organisational functions, involving enhancing decision-making practices, providing messaging consistency and setting up social linkages (Mehra et al., 2006; Mischen and Jackson, 2008). These functions help people to become better connected so the organisation can gain the true advantages of their knowledge more quickly (Cross et al., 2001a). In a quantitative study, Noorderhaven and Harzing (2009) found that face-to-face social interaction

forms a channel of communication which makes the sharing of tacit knowledge in particular easier. Even in the most bureaucratic organisations, individuals do, on every occasion, interact with others using an extremely high number of methods unspecified by the organisation charter (Cross et al., 2004). Taken to the extreme, this perspective means that there will be no knowledge to share if there is no social interaction between employees.

Knowledge sharing is organised via certain channels that act as links between those sharing, and expedite the transfer of knowledge from source to object (O'Dell and Grayson, 1998; Kwok and Gao, 2005). On the basis of these channels, five basic kinds of social networking can be discerned. The first kind of social interaction is through informal networks. In such interaction, groups of staff have a common area of interest which is generally not very formalised and, frequently, closely related to their practice (Verburg and Andriessen, 2011). The second kind of social interaction is through formal networks. Ibarra (1992) and Allen et al. (2007) define formal networks as a set of formally specified relationships between superiors and subordinates, and among functionally distinguished groups which must communicate to achieve an organisationally defined task. In formal social networks, a team of diversely skilled members works for a limited period of time to create custom and complex products and services (Jones, 1996). The third kind of social interaction is through personal networks. Such networks can be defined as a subset in egocentric network analysis, in which there is a person who is in frequent contact with the others and the network members surrounding this ego (Marin and Hampton, 2007). The fourth kind of social interaction is through strategic networks. These generally involve a limited number of institutionalised experts whose activities are concentrated on organisational learning (Verburg and Andriessen, 2011). These groups are strongly supported with resources and are expected, implicitly or explicitly, to achieve highly for the organisation, improve best practices, or even develop innovative solutions (Verburg and Andriessen, 2011). The fifth kind of social interaction is online networks. This kind of network involves low to intermediate proximity to the organisation and low levels of institutionalisation (Verburg and Andriessen, 2011).

It has been found that the frequency of business interactions predicted the sharing of public non-codified knowledge, while the closeness of the working relationship allowed prediction of the sharing of public codified knowledge (Marouf, 2007). Thus, when an organisation's employees strongly encourage coworkers to communicate openly, they are expected to succeed in holding attention in extensive and frequent interaction with one another, involving, for example, sharing of skills, information, knowledge, or expertise with each other. The growth of social network practices has been supported by three significant improvements in the business world (Cross et al., 2002). The first is the development of a concept of the significance of the informal structure within an organisation that exists together with the formal one. Second is the changeover in the late twentieth century to an organisation model that is flatter, more flexible, team-oriented and more dependent on knowledge assets. Third is the quick growth in closely cooperative relationships across the organisation's boundaries. According to Kilduff and Tsai (2011), "The study of such relationships is therefore the study of human nature itself" (p. 131). Cross, (2004) go on to argue that research on social networks in organisations can enhance organisational cognition, behaviour, theory, strategy and leadership at all layers in the organisation and between organisations.

The literature on social networks suggests that social interaction ties can play a key role in enhancing organisational learning since social networks can be a source of information (Liebeskind et al., 1996). Thus, there is a growing body of research focusing on social networks as a locus of learning (McEvily and Zaheer, 1999; Rhee, 2004). It has been argued that social networks facilitate learning by promoting the rapid transfer of information among members (Rhee, 2004). However, individuals may find social networks to be less useful as a source of information when the information available in them is not relevant to their interests (Rhee, 2004). Moreover, social interaction ties provide access to individuals' knowledge integration and exchange (Chiu et al., 2006). Social interaction ties were found to influence significantly the extent to which KS occurs (Nahapiet and Ghoshal, 1998; Tsai and Ghoshal, 1998; Chiu et al. 2006). This is because social interaction enables individuals

to enhance the depth, breadth and efficiency of the knowledge they share with one another (Titi Amayah, 2013). Thus, social capital may be considered as a contributing factor to one's intention to share knowledge.

Empirically, several studies have examined the influence of social interaction, and they have found a positive relationship between this construct and knowledge sharing behaviour. For example, in a study of factors that influence knowledge sharing in Bahrain's public and private sectors, Al-Alawi et al. (2007) found that the factor of communication is positively related to knowledge sharing. Likewise, Titi Amayah (2013) investigated the factors that affect knowledge sharing in USA public sector organisations and found that SI was an enabler for knowledge sharing activities, and had a significant main effect on KS. Similarly, Jolaei et al. (2014) found that social interaction was positively and significantly related to knowledge sharing intention among Malaysian public universities' academic staff. Following these results, Tangaraja et al. (2015) also found that SI had positively affected Malaysian public sector managers' knowledge sharing behaviours. Not far from these results, Akhavan and Hosseini (2016) and Bany-Baker and Yusof (2016) revealed that social interaction ties were significantly associated with knowledge sharing in the Iranian and Jordanian private sectors. It can be seen from the previous studies that there are limitations in understanding the impact of this construct on knowledge sharing in Arab cultures in general and in Bahrain's public sector in particular. Therefore, it is pertinent to suggest the following hypotheses:

***H7A: There is a statistically significant relationship between social interaction (SI) and knowledge donating (KD) among BPSF officers.***

***H7B: There is a statistically significant relationship between social interaction (SI) and knowledge collecting (KC) among BPSF officers.***

#### **2.13.4 Personal Benefits**

Personal benefits (PB) can be defined as the “Knowledge contributor’s judgment of likely consequences that his or her knowledge sharing behaviour will produce to him or herself” (Chiu et al., 2006, p. 1876). These benefits as identified in the literature include status and career advancement, emotional benefits, a better professional reputation and intellectual benefits (Titi Amayah, 2013). Personal benefits have been recognised in prior research as an important factor to motivate employees’ knowledge sharing (Bakker et al., 2006; Foss et al., 2009; Chang and Chuang, 2011).

Several studies have confirmed that personal benefits significantly affect knowledge sharing. For example, Bock and Kim (2002) and Yang and Wu (2008) found that the individual would be unlikely to share her or his knowledge with others to maximise personal benefits, such as increased job security and continued possession of a unique and strong position in the organisation. In the same vein, employees were found to hoard knowledge from others as a rational choice in order to reduce the risk of getting fired or to conserve power and thereby remain valuable to the organisation (Cabrera and Cabrera, 2002; Kimmerle et al., 2008; Casimir et al., 2012). Likewise, in their review of the factors influencing knowledge sharing, Wang and Noe (2010) found that perceived benefits are positively associated with knowledge sharing. Similarly, Paroutis and Al Saleh (2009) and Hung et al. (2011) identified perceived personal benefits as one of the key factors that influence employees’ knowledge sharing. Moreover, Titi Amayah (2013) found that USA public sector organisations’ employees’ knowledge sharing activities were positively influenced by personal benefits. Similarly, Mukamala and Razmerita (2014) found that lack of perceived benefits acts as a barrier to knowledge sharing. On the other hand, some researchers such as Lai and Chen (2014) and Hung et al. (2015) have found that personal benefits have an insignificant effect on knowledge sharing intention.

Based on the above literature, an employee may be motivated to share knowledge with other employees if there are significant advantages and benefits from the work (Hall, 2001). However, it can be seen from the previous studies that there are limitations in understanding the impact of this construct

on knowledge sharing in an Arab organisational context in general and in Bahrain's public sector in particular. Therefore, the following hypotheses can be drawn:

***H8A: There is a statistically significant relationship between personal benefits (PB) and knowledge donating (KD) among BPSF officers.***

***H8B: There is a statistically significant relationship between personal benefits (PB) and knowledge collecting (KC) among BPSF officers.***

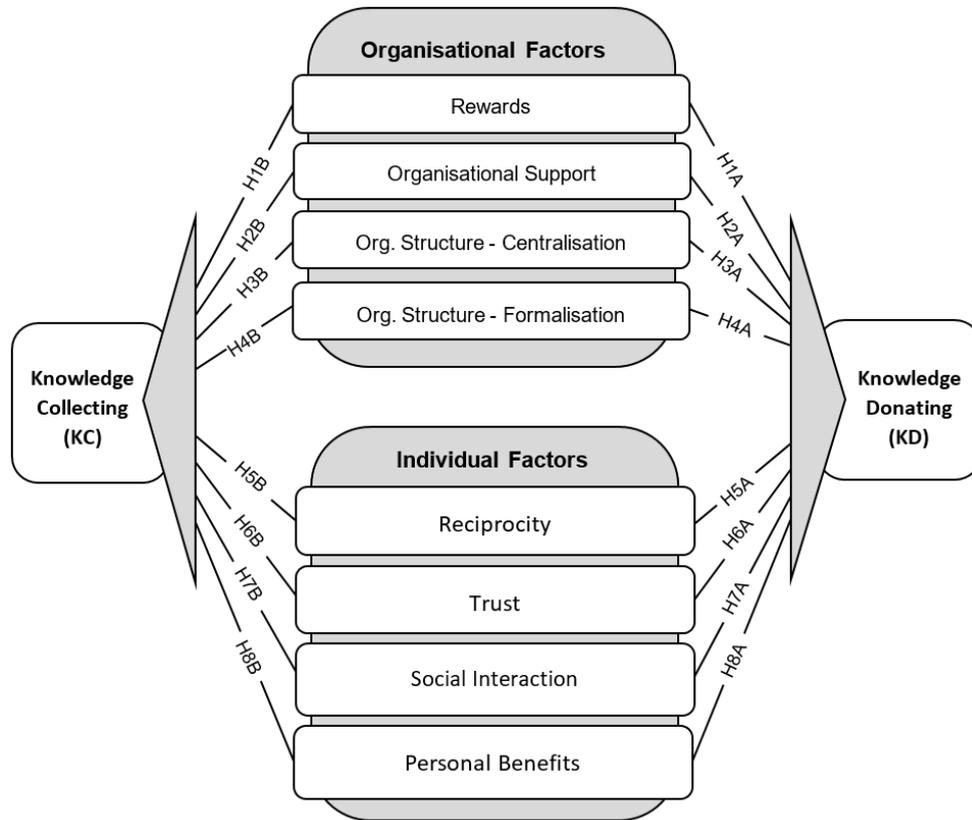
## **2.14 Research Conceptual Framework**

According to Maxwell (2013) and Miles et al. (2014), building a conceptual framework is important to explain the main factors and variables under study and their proposed relationships. It represents the investigation road map for the researcher. However, this section draws on the previous sections to shape a conceptual framework to investigate the influences of the proposed factors on knowledge sharing processes. For instance, based on a focused literature review, the conceptual framework proposes 16 hypotheses related to eight constructs to be tested and analysed. The studies reviewed above have illustrated the relevant linkages between variables from which the hypotheses were developed. In addition, the hypotheses were drawn up through the use of the literature review to identify the gaps. However, this study provides a new conceptual framework that identifies the factors that can affect knowledge sharing processes (donating and collecting). Moreover, this conceptual framework is expected to make a significant contribution to the knowledge sharing literature. In addition, it is also expected to help the public sector decision makers to identify new ways of improving knowledge sharing in their organisations.

In this conceptual framework, knowledge sharing processes involve knowledge donating and knowledge collecting which were predicted to have an association with the organisational factors (the first set of hypotheses from H1 to H4). In addition, the second group of hypotheses (H5 to H8) is assumed to have relationships between the individual factors and both knowledge

sharing processes (donating and collecting). The following research conceptual framework (Source: Designed by the researcher

Figure 4) shows the hypothesised relationship between the independent and dependent variables.



Source: Designed by the researcher

Figure 4. Research Conceptual Framework

The conceptual framework consists of eight factors – personal benefits, social interaction, trust, reciprocity, structure formalisation, structural centralisation, support and rewards – that may influence employees’ knowledge donating and knowledge collecting behaviours. As shown in the above figure, these factors are classified into two categories based on the nature of their influence: individual factors and organisational factors.

## 2.15 Summary and Gaps

This chapter began with an overview of knowledge management. Then it laid emphasis on knowledge sharing in public organisations and topics related to it, such as theories of knowledge sharing, approaches to knowledge sharing and factors related to knowledge sharing behaviour within organisations. This chapter has also examined the available body of literature on knowledge sharing in Middle Eastern public organisations, which is the research context of the study.

As shown from the literature, there are conflicting views and theories related to knowledge management and particularly knowledge sharing (Lin and Hwang, 2014; Noaman and Fouad, 2014; Ramayah et al., 2013), though there has been an increase in the research, which reflects the high demand for knowledge sharing development in organisations (Tangaraja et al., 2015). However, the literature review shows that there is limited knowledge management (KM) research in general and knowledge sharing research in particular in Middle East countries' public sector organisations (Abou-Gamila et al., 2015; Al-Adaileh, 2011; Biygautane and Al-Yahya, 2011). Moreover, compared to private sector organisations, the review of literature revealed a lack of KS studies focusing on the public sector, particularly in the context of developing countries. In addition, there is a lack of research in this regard in Bahrain's public sector (Al-Alawi et al., 2007). Particularly in the context of Bahrain's police organisation, little is known about the factors that may affect employees' knowledge sharing behaviour (Seba et al., 2012a).

Although several studies have considered the factors influencing knowledge sharing (Al-Alawi et al., 2007; Seba et al., 2012a; Jolaee et al., 2014; Rutten et al., 2016; Youssef et al., 2017; Kim, 2018), their focus has mainly been on knowledge sharing without distinguishing between knowledge donating and knowledge collecting. Therefore, measuring the impact of different factors on knowledge sharing remains blurred and empirical evidence is still questionable (Jain et al., 2015). In summary, despite the above-mentioned studies, the influence of the proposed factors on the main components of knowledge sharing (Donating and Collecting) is not fully answered. This indicates that research is needed to better understand the process of

knowledge sharing within public sector organisations particularly in the context of developing countries. Therefore, in order to address the current research gap and enhance the understanding of knowledge sharing practices in the BPSF, this study investigates the factors that can influence knowledge sharing processes. The following chapter discusses the methodology and methods employed in the study in order to achieve the research aim and objectives.

## **Chapter 3: Methodology and Methods**

### **3.1 Introduction**

According to Eldabi et al. (2002), methodology is a guide for the researcher to achieve the research goals and objectives. In order to investigate the relationship among the research variables, it is important to define the methods and methodology that will be conducted in this research to achieve the research objectives. This chapter provides discussion and justification for the research methodology adopted by this study. The main purpose of this chapter is to suggest a research framework that will ensure that the research problem is addressed, and is suitable to achieve the research aim and objectives and verify the hypotheses. Therefore, this chapter firstly reviews the different research philosophies, approaches and strategies available and selects and justifies the most appropriate ones for this research. Secondly, the chapter includes a review and discussion of the available research methods and a selection of the appropriate method that was applied in this research. Thirdly, the process of questionnaire development and data collection is explained. Finally, the ethical consideration and results of the pilot study are provided.

Prior to the discussing the adopted research methodology and methods, it is vital at this stage to recap the research objectives, questions and development of the hypothesis, which will form the foundation for the data collection section of the study. Table 3 provides summary of the development process for the research objectives, questions and the hypothesis.

Research Objectives	Research Questions	Research Hypothesis
<p><b>To empirically examine and determine the impact of organisational factors on the employee's knowledge sharing behaviours.</b></p>	<p>Do the proposed organisational factors (Support, Rewards, Structure Centralisation and Structure Formalisation) affect BPSF officers' knowledge donating and collecting behaviours?</p>	<p><b>H1A:</b> There is a statistically significant relationship between rewards (RW) and knowledge donating (KD) among BPSF officers.  <b>H1B:</b> There is a statistically significant relationship between rewards (RW) and knowledge collecting (KC) among BPSF officers.  <b>H2A:</b> There is a statistically significant relationship between support (ST) and knowledge donating (KD) among BPSF officers.  <b>H2B:</b> There is a statistically significant relationship between support (ST) and knowledge collecting (KC) among BPSF officers.  <b>H3A:</b> There is a statistically significant relationship between organisational structure centralisation (SC) and knowledge donating (KD) among BPSF officers.  <b>H3B:</b> There is a statistically significant relationship between organisational structure centralisation (SC) and knowledge collecting (KC) among BPSF officers.  <b>H4A:</b> There is a statistically significant relationship between organisational structure formalisation (SF) and knowledge donating (KD) among BPSF officers.  <b>H4B:</b> There is a statistically significant relationship between organisational structure formalisation (SF) and knowledge collecting (KC) among BPSF officers.</p>
<p><b>To empirically investigate the impact of individual factors on the employee's knowledge sharing behaviours.</b></p>	<p>Do the proposed individual factors (Reciprocity, Social Interaction, Personal Benefits and Trust) affect BPSF officers' knowledge donating and collecting behaviours?</p>	<p><b>H5A:</b> There is a statistically significant relationship between reciprocity (RC) and knowledge donating (KD) among BPSF officers.  <b>H5B:</b> There is a statistically significant relationship between reciprocity (RC) and knowledge collecting (KC) among BPSF officers.  <b>H6A:</b> There is a statistically significant relationship between trust (TT) and knowledge donating (KD) among BPSF officers.  <b>H6B:</b> There is a statistical significance relationship between trust (TT) and knowledge collecting (KC) among BPSF officers.  <b>H7A:</b> There is a statistically significant relationship between social interaction (SI) and knowledge donating (KD) among BPSF officers.  <b>H7B:</b> There is a statistically significant relationship between social interaction (SI) and knowledge collecting (KC) among BPSF officers.  <b>H8A:</b> There is a statistically significant relationship between personal benefits (PB) and knowledge donating (KD) among BPSF officers.  <b>H8B:</b> There is a statistically significant relationship between personal benefits (PB) and knowledge collecting (KC) among BPSF officers.</p>
<p><b>To assess the impact of demographic characteristics and their variance on employee's perceptions towards knowledge sharing behaviours.</b></p>	<p>What is the impact of the demographic characteristics (Position, Rank, Age, Qualification and Work experience) on the knowledge donating and collecting behaviours?</p>	<p>Demographic variables such as age, Rank, and Position have an impact on employees' KS behaviour.</p>

Table 3 Research Objectives, Questions and Hypothesis

### **3.2 Research Philosophy**

There are various research philosophies that enhance the researcher's way of viewing the phenomena, and these philosophies reflect the research strategies and methods which need to be considered in order to achieve the research objectives appropriately (Saunders et al., 2016). Selecting research philosophical paradigm is a crucial step to start the research journey (Bryman and Bell, 2016; Hussey and Hussey, 1997). According to Hussey and Hussey (1997), the paradigm can be defined as a scientific practice process based on people's philosophies and their assumptions about the world and nature of knowledge, and it offers the structure of accepted theories, methods and ways of outlining data. According to the definition given by Saunders et al. (2016), a paradigm is a way of thinking about conducting a piece of research and it is not strictly a methodology, but more of a 'philosophy' that guides how the research is to be conducted. In addition, Burrell and Morgan (2017) suggest that the philosophical paradigm should be selected based on explicit rules by considering the nature of knowledge, research interests and the researcher's suited way of working.

To achieve the proposed research objectives and investigate the hypothesis, researchers need to choose the right research paradigm which suits their study. A paradigm can be explained as "a set of basic beliefs (or metaphysics) that deals with ultimates or first principles. It represents a worldview that defines, for its holder, the nature of the 'world', the individual's place in it, and the range of possible relationships to that world and its parts" (Guba and Lincoln, 1998, p. 107). Positivism and interpretivism are the two most commonly used research paradigms (Neuman, 2014; Bryman and Bell, 2016). Positivism is often associated with precise quantitative data that is derived from experiments, statistics and surveys. It is an organised method for combining deductive logic with precise empirical observations of individual behaviour in order to discover and confirm a set of probabilistic causal laws that can be used to predict general patterns of human activity (Neuman, 2018). Deduction begins with a theoretical proposition and then moves towards concrete empirical evidence (Cavana et al. 2001, p. 35). Alternatively, interpretivism requires participant observation and field research. It is a

systematic analysis of socially meaningful action through the direct detailed observation of people in natural settings in order to arrive at understandings and interpretations of how people create and maintain their social worlds (Neuman, 2014, p. 71). The interpretivism paradigm involves induction to observe certain phenomena and arrive at certain conclusions (Cavana et al., 2001, p. 36).

Before conducting any research, it is also necessary to consider research paradigms, ontological and epistemological assumptions, as these understandings and considerations would help the researcher to understand all the stages and phases of the research, from assumptions and nature of the reality to the conclusion of the research. Blaikie (2007) argued that if the chosen philosophies and aims and objectives are not well interlinked then the research report will be challengeable due to lack of appropriate logic and coherence. To look at the fundamental differences of positivism and interpretivism, the next section discusses the epistemology, ontology and methodology in justifying positivism as the chosen research paradigm for testing the proposed hypotheses.

According to Saunders et al. (2016), there are three major philosophical assumptions, known as Ontology, Epistemology and Axiology. In addition to these assumptions, Creswell (2014) has added one more assumption, i.e. Rhetoric. However, the majority of writers consider only two of these philosophical assumptions, Ontology and Epistemology (Blaikie, 2009 and Hatch and Cunliffe, 2013), as explained below.

### **Epistemology**

The most suitable philosophies are those labelled as epistemology assumptions (Myers, 2013). Easterby-Smith et al. (2018) argued that epistemology is closely paired with ontology, which is the way to measure reality. Eriksson and Kovalainen (2016) further argued that the epistemological approach refers to the methodological approach and epistemological position which helps the researcher in defining his or her

methods which should be adopted for data collection either qualitatively or quantitatively.

Epistemology involves “what is regarded as acceptable knowledge in a discipline” (Bryman, 2008, p. 13). Epistemology is further diverted into two main paradigms: positivistic and phenomenological or interpretive (Kumar, 2014). The positivism philosophy is based on the approach used in the natural sciences, which assumes that social reality is independent of human perception, existing regardless of our awareness of it. This approach holds the belief that there are facts about the social world that can be collected and analysed to obtain the facts required (Saunders et al., 2016). Another aspect of the positivism philosophy is that the social world exists externally and that objective methods should be employed to measure the positivist properties (Creswell, 2014).

Moreover, positivism research generally assumes that reality is objectively given and can be described by measurable properties, which are independent of the researcher and his or her instruments. Saunders et al. (2016) also mentioned that the researcher acts as an objective analyst who interprets data in an apparently value-free manner. Accordingly, a positivist paradigm is about numbers, accuracy, neutrality and severity (Jupp, 2009). Positivism philosophy seeks to quantify variables of interest and the quality of research is commonly assessed in terms of statistical measures of reliability and validity and through the rigour with which quantitative analyses are conducted including sampling considerations, researchers’ objectivity and the correctness with which statistical techniques are applied (Bryman and Bell, 2016).

The philosophical issue is about choosing a particular epistemological foundation in determining the preference for more suitable research methods (Bryman, 2016; Drisko, 1997). As “the investigator and the invested ‘object’ are assumed to be independent entities, and the investigator to be capable of studying the object without influencing it or being influenced by it” (Guba and Lincoln, 1998, p. 110), the positivist paradigm is described as dualist and objectivist. Researcher and objects under investigation are independent entities that do not influence each other during the investigation. Quantitative

research lacks qualitative richness and cannot delve deeply into human-oriented matters that are "complex, messy, and involve a range of stakeholders with different concerns and perceptions" (Skinner et al., 2004, p. 163).

On the other hand, epistemology of the interpretivist paradigm is described as transactional and subjectivist. As "the investigator and the object of investigation are assumed to be interactively linked so that the 'findings' are literally created as the investigation proceeds" (Guba and Lincoln, 1998, p. 111), knowledge is generated once there is interaction between researcher and respondents. Although interpretivism can create new and exploratory knowledge, it sometimes contributes to epistemological and methodological confusion (Denzin and Lincoln, 2018; Prasad and Prasad, 2002). Moreover, interpretivism is often criticised as being difficult to replicate, impossible to generalise, having a lack of transparency and overly subjective (Bryman, 2008).

## **Ontology**

Saunders et al. (2016) regarded ontology as the nature of reality and later discussed the two aspects of ontology (objectivism and subjectivism). Many researchers consider both of these aspects appropriate for producing valid knowledge. Kumar (2014) added that in objectivism the researcher is always separate and external to the reality; however, in subjectivism, phenomena are developed from the perceptions and consequent actions of social actors who are concerned with their existence.

Ontology involves "the nature of social entities" (Bryman, 2008, p. 18). Quantitative and qualitative research can produce different knowledge and understanding based on respective ontological foundations (Draper, 2004). As "an apprehendable reality is assumed to exist, driven by immutable natural laws and mechanisms" (Guba and Lincoln, 1994, p. 109), the ontology of the positivist paradigm is defined as a critical realism in which objective reality is hypothesised upon imperfect apprehension. By hypothetical deduction, the aim of quantitative research is to test hypotheses in the constitution of

universal laws of causes and effects (Draper, 2004). Establishing new quantitative theories can start from looking at existing theories and theory verification takes place when theory building is complete (Sarantakos, 2013). In contrast, the ontology of the interpretivist paradigm is described as relativist. “Realities are apprehendable in the form of multiple, intangible mental constructions, socially and experientially based, local and specific in nature (although elements are often shared among many individuals and even across cultures), and dependent for their form and content on the individual persons or groups holding the constructions” (Guba and Lincoln, 1998, p. 110). Relativism in apprehending conflicting and multiple realities is assumed to be changeable and complex products of human intellects (Guba and Lincoln, 1998). It emphasises the phenomenological base in which human and the social worlds constitute knowledge through lived experience of reality that is inconsistent to be justified based on objectivist epistemology and ontology (Sandberg, 2005). However, subjectivity elements shall be treated as assets because they can absorb the core of a phenomenon without disfiguring its genuine nature (Gummesson, 2006).

This study implies the possibility of generalisation within the BPSF. Accordingly, the philosophical approach that is relevant to the level of generalisation required is a positivist analysis that tests numerical statistics for an accessible reality (Bryman and Bell, 2016). Moreover, in order to achieve the research objectives and to understand the influence of the factors on KS behaviours in the BPSF, a positivist paradigm is chosen to be the philosophical framework of this research investigation.

### **3.3 Justification for a Positivism Paradigm**

There are a few reasons that justify the research using a positivist paradigm. First, the main principle of positivism is the ability to create hypotheses that could be tested through data collecting. Second, positivism can analyse the causality among variables that are essential to investigate the predictability of independent variables on dependent variables in the hypotheses. Third, the use of positivism can test the hypotheses and establish the universal laws of

causes and effects in the logic of hypothetical deduction (Draper, 2004). Fourth, critical factors, and demographic variables have been measured statistically, using different sets of techniques, which will help to see if the collected data supports the research hypotheses. Finally, a positivist paradigm is also justified as the direction of quantitative theory building begins from an existing theory and verification takes place when theory building is complete (Sarantakos, 2013).

In summary, the positivist paradigm has the relative strengths to illustrate replication, causality, generalisation, scientific measurement and objectivity that can meet the research objectives and answer the research question through hypothesis testing. Thus, the philosophy of positivism is selected as a suitable and more appropriate research philosophy to examine the factors that may influence knowledge sharing, and the research approach and design will be established on the basis of this paradigm.

### **3.4 Research Approach**

In management sciences, importance is given to the research approach because it determines the type of research design to adopt in the quest to uncover hidden phenomena of interest to researchers (Wilson, 2017). Saunders et al. (2016) suggest that conducting research commonly follows two types of approaches, the deductive approach and inductive approach. Babbie (2016, p. 53) underscores the importance of the research approach, stating that “research entails making a choice between induction and deduction; and both approaches and routes involve the use of physical observation and logic in different ways”. Since both are modes of reasoning, they are vital determinants of how researchers relate to the development of new theories and the sustenance of existing theories in research (Singh and Bajpai, 2017). Further explanations are provided below.

#### **Inductive Approach**

Neuman (2018) describes the inductive approach as a process of reasoning which begins with critical observations of the world, and then moves

systematically towards abstraction and generalisations about the phenomena or ideas observed. Bernard (2018, p. 7) asserts that the inductive approach is a form of reasoning that “involves the search for pattern from observation and the development of explanations – theories for those patterns through a series of hypotheses”. From the explanations above, an inductive approach starts with a topical issue from which the researcher develops generalisations and then moves further to the stage of identification of causal relationships among the phenomena being investigated, and then ends with theory development (Creswell, 2014). This viewpoint is supported by Goddard and Melville (2011) that the inductive approach commences with observations of phenomena and finishes with formulation of theory at the end of the research. In contrast to the deductive approach, no theory would apply at the beginning of inductive reasoning, because it is a methodological process that gives the researcher the opportunity to alter the direction of the study even after the research has commenced.

In short, Burney (2008) and Lodico et al. (2010) described the inductive approach as reasoning from the more specific to the more general in the quest to find answers to an enquiry; a method commonly called the bottom-up approach in research, because the steps involved are like hill climbing. The researcher moves chronologically from observation, pattern, tentative hypothesis and theory, which if viewed critically is a reverse of the reasoning in the deductive approach (Lancaster, 2008).

### **Deductive Approach**

Saunders et al. (2016) define the deductive approach as a manner of reasoning whereby the research conclusions logically flow from the tentative premises, propositions or assumptions drawn from existing theories. Ketokivi and Mantere (2010) expatiate that once the conclusion emanating from deductive reasoning has been justified as factual all the premises or underlining propositions would also be factual. However, some scholars are of the opinion that the deductive approach confines itself to the domain of reasoning from the general research context to the particular (Pelissier, 2008;

Gulati, 2009; Snieder and Lerner, 2014). The reasoning process in the deductive approach begins with problem identification which leads to the development of a single hypothesis or set of hypotheses on the basis of known theory or propositions of theory, which are then subjected to empirical testing on the basis of which the research findings are upheld or rejected (Monette, 2014; Wilson, 2017) Put differently, Babbie (2016) describes the deductive approach as a form of reasoning which starts with a tentative pattern of assumptions which are tested against real-world observations on the basis of which conclusions are drawn (Babbie, 2016).

### **3.5 Justification of Research Approach**

In a simple argument, Burney (2008) considers the deductive approach as a logical and systematic process of reasoning from the more general to the more specific; the approach is commonly called the top-bottom approach in the field of research because the methodical process is like a waterfall. The researcher moves step-by-step from theory, hypothesis, observation and confirmation/rejection (Burney, 2008; Snieder and Lerner, 2014). In this regard, the aim of this study is to identify the factors that may influence BPSF officers' KS donating and collecting through testing a number of hypothesised relationships that have been previously recognised in the KS literature context. Therefore, the deductive research approach was selected to conduct the present study. Moreover, Saunders et al. (2016) assert that the deductive research approach is considered important for three reasons: firstly, it involves the analysis of causal relationships among the research variables; secondly, through operationalising the research concepts, it offers better understanding of the research problems by reducing them into simple elements; and, finally, if its findings are based on a sufficient and representative sample, they are generalisable to the whole research population. As mentioned previously, the main purpose of the research was to investigate the causal relationship between factors that may affect knowledge sharing behaviour within the BPSF; therefore, in line with the advice from Saunders et al. (2016), the study used a deductive approach.

### **3.6 Research Methods**

After selecting the research paradigm and approach, the next logical step is to explain the research methods. The term research methods can be defined as – “how data are collected and analysed - and the types of generalisation and representations derived from the data” (Schumacher and McMillan, 2014, p.12). There are many methods for collecting research data. The chosen method generally depends upon the research paradigm and the nature of the data. Creswell and Clark (2018) asserted that there are three methods that can be used by researchers in conducting their research: quantitative, qualitative, and mixed methods.

The quantitative method tends to emphasise quantifications in the data collection and data analysis (Collis and Hussey, 2014). A Quantitative approach is a mean for testing objective theories by examining the relationship among variables. These variables, however, can be measured typically on instruments, thus, the numbered data can be analysed using statistical procedures (Creswell, 2014). Moreover, because results from a representative sample can be generalised to the population, the quantitative approach requires large samples and highly specific and precise data. This technique is often associated with deductive reasoning. Unlike the quantitative method, the qualitative method can be defined as data represented through words, pictures, or icons analysed using thematic exploration, which includes action research, case studies, interviews and focus groups, believes in the existence of multiple truths that are socially constructed (Lincoln and Guba, 2011; Kumar, 2014). Moreover, Collis and Hussey (2014) argue that qualitative research method tends to understand personal perception as the observation being the first step in theory building. Likewise, Creswell (2018) assert that researchers who adopt the qualitative research method believe that this approach involves emerging questions and procedures, data typically collected in the participant’s setting, data analysis inductively built from particulars to general themes, and the researcher therefore develops an interpretations of the meaning of collected data. The following Table 4 provides a summary of the comparison of both approaches.

<b>Quantitative Methods</b>	<b>Qualitative Methods</b>
Associated with positivism paradigm	Associated with interpretivism paradigm
Objective and Deductive approach	Subjective and Inductive approach
Applied to confirm or reject theories	Applied to explore new phenomena
Testing Hypotheses	Generating Hypotheses
Uses statistical analysis with a relatively larger sample size	Use in-depth orientation with a smaller sample size
More related to scientific research	Viewed as unscientific
Using structured techniques	Using unstructured or semi-structured techniques
More generalisable results	Less generalisable results

Source: (Creswell, 2018; Bryman and Bell, 2016)

Table 4 Comparison of Quantitative and Qualitative Research Methods

It can be seen from above discussion that both quantitative and qualitative are different approaches and have different strengths and weaknesses. In order to overcome the issues associated with using quantitative or qualitative approach, some researchers suggest using a combination of both quantitative and qualitative data (Kumar, 2014). The mixed method combines the strengths of quantitative and qualitative approaches for triangulation, fortification and thus improves the research results (Saunders et al., 2016). However, mixed method approach is difficult to manage and requires much more analysis, rendition, time and resources (Creswell , 2014).

As explained above, quantitative research seeks to test theories by examining the causal relationships among variables (Bryman and Cramer, 2012, Saunders et al., 2016). The main characteristics of this approach are as follows: the deductive approach that is attached to the positivism paradigm; it is confirmative; it uses theory/hypothesis testing; it is explorative and predictive; and it uses data collection techniques such as questionnaires and statistical analysis (Creswell and Clark, 2018). The choice of data collection methods is influenced by four issues, these being: researcher's skills, ensuring credibility, time and cost constraints (Frechtling and Sharp, 1997). As mentioned above, the main purpose of the study is to establish relationships among variables related to knowledge sharing process. Punch (2014) argues that quantitative research allows the researcher to establish

relationships amongst variables. In line with the advice from Punch (2014) and Creswell and Clark (2018), the researcher used the quantitative approach using a Questionnaire-Based Survey. Moreover, the researcher's knowledge and expertise related to quantitative analysis encouraged the use of quantitative data (questionnaire). In addition, qualitative method were not possible due to the nature of the organisation (BPSF). BPSF officers are not allowed to participate in interviews during service due to force security policy. Therefore, the research was limited to survey based quantitative data only.

Research design requires making decisions about "how to measure relevant factors and what research techniques to use such as questionnaires..." (Neuman, 2014, p14). Moreover, for the purposes and objectives of the current research, testing the proposed hypotheses requires statistical analysis to offer proof to accept or reject hypotheses, and explore the correlations between research variables. In addition, in their review of Knowledge management and knowledge sharing studies in practice, Kim and Lee, (2006), and Van Den Hooff and Huysman, (2009) noticed that quantitative methods were the most commonly used in this area of research. Later, another review by Kim et al. (2013) confirmed the popularity of such methods within the Knowledge management and knowledge sharing empirical literature. Accordingly, Creswell (2014), asserts that a mathematically based method is the most suitable for statistically examining hypotheses, and to analyse the correlations.

As a result, the justification behind this selection is that in the quantitative method, data is obtained from numbers and calculation, the findings are based on well-known theory and researchers and subjects are separated. In addition, collecting valid data by this approach will help to meet the main objectives of this study. Therefore, the quantitative approach seemed the logical way to pursue and a suitable research method.

In order to collect quantitative data, Saunders et al. (2016) highlight that surveys are most commonly used by researchers, because they allow researchers to collect a considerable amount of data by investigating a large number of subjects in a highly efficient manner, which will enhance the

generalisability of the findings for the whole research population. The next section discusses the survey process in detail.

### **3.6.1 Research Survey**

Surveys represent one of the most common data collecting types of quantitative social science research. The research strategy that is based on a survey has been proven to provide a good mechanism for collecting a large amount of data from a sizeable population efficiently in an economical way which allows for more control over the research process (Creswell, 2014; Saunders et al, 2016). A survey is the most popularly used quantitative data collection method especially when the research objective is to collect data associated with self-reported behaviour, attitude, characteristic, classification, expectation and knowledge (Neuman, 2014). It can be “an easier, quicker, less expensive, or more accurate way” to collect data (Alreck and Settle, 2004, p. 3). By creating a broad data collection channel in a large population economically, a survey is “logical, deterministic, general, parsimonious and specific” to conform to scientific specifications (Hart, 1987, p. 187).

The survey strategy depends upon the collection of the data in order to answer the research questions or support the research arguments (Jankowicz, 2007). According to Gable (1994), “the survey approach refers to a group of methods which emphasise quantitative analysis, where data for a large number of organisations are collected through methods such as mail questionnaires, telephone interviews, or from published statistics, and these data are analysed using statistical techniques”. In addition, the survey strategy allows for generalisable findings since the drawn sample is a representative sample of the population (Gable, 1994).

The survey strategy aims to answer the various research questions by comparing different features with each other and revealing the relationship between various characteristics and categories (Remenyi, 2010; Kumar, 2014). It allows facts to be obtained for one or more purposes such

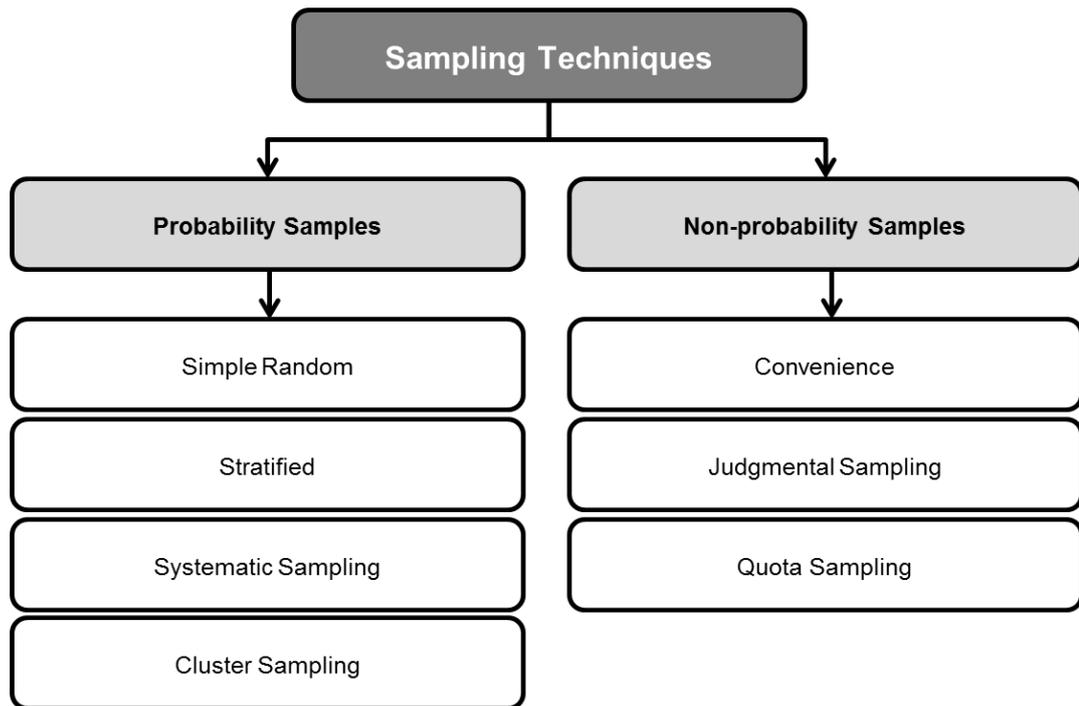
as explanatory, descriptive or hypothesis testing. The survey is the most appropriate method for obtaining personal, self-reported information that is not accessible elsewhere and if generalisation of results to a wider population is wanted (Rea and Parker, 2014). According to Remenyi, (2010) survey-based questionnaires are used as measuring instruments for collecting large amounts of data and answering the research questions. They provide true and concrete opportunities for obtaining facts. In essence, the reason for choosing questionnaires as a specific survey strategy is basically due to the association of this strategy with the deductive approach (Creswell , 2014; Saunders et al., 2016). The rationale for using a survey emerges from the nature of the research which aims at investigating critical factors that influence knowledge sharing. A survey design is the only method that can be used to describe the characteristics of a large population (Weisberg et al., 1999). In addition, the survey strategy is appropriate for examining a large number of variables as they occur in their realistic settings without the need to manipulate them as in experiments (Kothari and Garg, 2016). The reason behind the decision to apply this type of strategy can be justified based on the type of research objectives in this study, such as revealing the status of the relationship between proposed factors and both KS donating and collecting, and the conceptual framework should be addressed in regard to the factors influencing knowledge sharing behaviours. Additionally, the participants in this research are police officers (interviews are not allowed for security purposes), and, based on the research's ethical commitment, the best strategy to investigate their perceptions regarding the factors related to knowledge sharing is the survey questionnaire method as the study sample depends on the number of participants. Many studies in the knowledge sharing field have used the survey as a strategy for data collection (Titi Amayah, 2013; Chumg et al., 2016; Areekkuzhiyil, 2016). Therefore, this research follows the same strategy for data collection and a questionnaire will be employed to collect primary research data.

### **3.6.2 Sampling**

Sampling is “the process of selecting a sufficient number of elements from the population so that by studying the sample, and understanding the properties or characteristics of the sample subjects, it would be possible to generalise the properties or characteristics to the population elements” (Cavana et al., 2001, p. 253). The first purpose of selecting a sample is that it makes the research participants more representative of the targeted population; the second is to avoid bias in the selected sample (Kumar, 2014; Schutt, 2017). As mentioned previously, a quantitative approach is adopted in this research, and questionnaires are to be used to collect data. To utilise the questionnaire, proper sample size and sampling technique are required to locate respondents who are qualified to answer the questionnaire. Cavana et al. (2001) argued that locating a suitable sample and using an appropriate sampling technique can generally increase the representativeness and generalisation of the research findings. By employing a positivist paradigm, the researcher used a sample size of 300 police officers in the Bahrain Public Security Forces (BPSF), which is about 38% of the population out of a total population of 1255 officers. A sample size of 30% or more is generally a good representation of the research population (Creswell , 2014; Saunders et al., 2016).

Sampling can be divided into three categories: probability sampling, non-probability sampling and mixed sampling (Bryman and Bell, 2016; Easterby-Smith et al., 2018; Kumar, 2014; Creswell , 2014). Probability sampling is applied when the probability of each sample unit being chosen from the population is known and the chance of being selected is fairly equal. The approach is “often associated with survey and to a lesser extent experiment research” (Saunders et al., 2016, p. 152). Non-probability sampling is applied when the probability of each sample unit being chosen from the population is unknown, making it impossible to answer the research questions, address the research objectives and analyse the statistical characteristics within the population. In the research, probability sampling will be used because the probability of each sample unit being chosen from the target population is already known and there is a fairly equal chance of being selected. Moreover,

probability sampling is more suitable for research that is conducted in a survey design. As shown in Figure 5, simple random sampling, systematic sampling, stratified random sampling, multi-stage sampling and cluster sampling are several sampling techniques that are associated with probability sampling (Saunders et al., 2016).



Source: Adopted from Sekaran and Bougie (2016)

Figure 5. Sampling Techniques

From all of the probability sampling techniques, this research will employ the stratified sampling technique to locate potential respondents as the sample. Moreover, this offers the researcher the chance to deal with the strata of the research population based on their values or characteristics (Creswell, 2014; Saunders et al., 2016). The stratified random sampling method is more efficient than other probability sampling methods (Fink, 2017; Kumar, 2014; Schutt, 2017). In addition, it can increase sample efficiency, decrease cost and enable quick access to obtain a large sample (Malhotra, 2010). However, it also has a tradeoff of losing precision when investigating naturally occurring groups. Due to the time constraint for data collection, stratified sampling is

suitable for the research to gain quick access to a large sample size within a short period of time.

### 3.6.3 Research Population

The population of this research study can be defined as all in-service police officer ranks. They are randomly selected from databases provided by the officers' affairs directorate in the human resources department at the Ministry of Interior (MOI). According to the Bahrain Public Security regulation, police officer ranks are Second Lieutenant, First Lieutenant, Captain, Major, Lieutenant Colonel, Colonel, Brigadier and General (BPSF Law, 1982). Therefore, this research population (police officers) is distinguished based on their ranks. Research population details are shown in Source: (MOI, 2016)

Table 5. The sample will include all working police officer ranks.

Officers Ranks		Gender	
		Male	Female
1	General	7	-
2	Brigadier	16	-
3	Colonel	77	1
4	Lieutenant Colonel	79	-
5	Major	91	2
6	Captain	176	35
7	First Lieutenant	430	92
8	Second Lieutenant	184	65
<b>Total</b>		<b>1060</b>	<b>195</b>
<b>Grand Total</b>		<b>1255</b>	

Source: (MOI, 2016)

Table 5 Research Population

### 3.6.4 Research Sample Size

It is necessary to determine an appropriate sample size before collecting and estimating the characteristics of a large population. Several researchers have pointed out that sample size is influenced by many factors that need to be taken into consideration, namely: population characteristics, the availability of resources, accuracy, the confidence that is needed in the findings, time and the deadline for submitting the thesis, and likely categories

for analysis (Bradley, 1999; Saunders et al. 2016; Sekaran and Bougie, 2016). In addition, this study will use Structural Equation Modelling (SEM) as one of the data analysis techniques.

Consequently, the decision regarding the sample size in this study was based on the factors mentioned above and on the selected statistical analysis method, Structural Equation Modelling (SEM). Like other statistical techniques, SEM requires an appropriate sample size in order to obtain reliable estimates (Hair et al., 2014), and not less than 200 is recommended as being appropriate by different authors to guarantee robust SEM and to provide parameter estimates with any degree of confidence (Boomsma, 1985; Boomsma and Hoogland, 2001; Byrne, 2016; Gerbing and Anderson, 1993; Hair et al. 2014; Harris and Schaubroeck, 1990; Kline, 2011).

Many scholars like Bryman and Cramer (2012), De Vaus (2014), Sekaran and Bougie (2016) and Bryman and Bell (2016) argue that a large and adequate sample size is the main method to ensure that the data collected would provide a reliable basis for drawing inferences, making recommendations and supporting decisions. Within this respect, a large and adequate sample size would remove bias and meet the criteria required by the analytical methods used within the research. However, Bryman and Cramer (2012) highlighted that the sample size has to be related to the size of the population. Moreover, Malhotra (2010) highlighted that the required sample size depends on factors such as the proposed data analysis techniques used to analyse the data. On the other hand, according to De Vaus (2014), the required sample size depends on two key factors, namely the degree of accuracy the researcher requires for the sample, and the extent to which there is variation in the population in regard to the key characteristics of the study.

Meanwhile, Aaker et al. (2011) point out that a common approach in determining the sample size is to find similar studies and use their sample size as a guide. In light of their argument, many scholars within the field of social sciences like Michael and Beck (1995) argue that simple random sampling yields a sampling fraction of 1/10. In line with that, De Vaus (2014) considers that having a population of 50 using the sample of 10 is sufficient

and that the sampling fraction would be 1/5. Within this respect, a sample size of 20% of the total population is accepted by most researchers within the field.

Based on the argument of Malhotra (2010), a researcher has to consider data analysis techniques used within the study when determining the study sample size. Within this respect, the most demanding proposed data analysis technique for this study is Structural Equation Modelling (SEM), which is sensitive to sample size and less stable when estimated from small samples (Garson, 2012; Tabachnick and Fidell, 2014). By reviewing the literature, it was found that there are no generally accepted criteria for determining a specific sample size for using structural equation modelling (Hair, 2010; Garson, 2013; MacCallum et al., 1996; Chin, 2003; Mitchell, 1992 and Wei Khong, 2005). However, there are some general guidelines that have been proposed by some researchers with regards to the suitable sample size to be used when using SEM in data analysis. Within this respect, Hair et al (2014) suggested that a sample with a size of less than 100 is considered to be a small sample. They also suggested that a medium sample size is between 100 and 200, and a large sample size is more than 200. On the other hand, Garson (2012) suggested that a sample size has to be more than 100. Moreover, many researchers have used a sample size of around 100 to conduct research using structural equation modelling (e.g. Wei Khong, 2005; Graham, 2005; Eid 2003; Battor et al. 2008). However, according to Somekh and Lewin (2011), a larger sample size leads to less error in research population characteristics. Therefore, a sample size of 300 plus seems appropriate for the research.

The sample size was also determined using the sample size equation suggested by Aaker et al. (2011). According to Aaker et al. (2011), the sample size can be determined according to the following equation:

$$S = Z \sqrt{\frac{p(1-p)}{n}} \sqrt{\frac{N-n}{N-1}}$$

Where:

$Z$  = degree of required confidence (95%)

$S$  = sample error (5%)

$p$  = ratio of population characteristics available in the sample (50%)

$N$  = population size

$n$  = sample size

To apply the stratified sampling technique, the research framed the target sample by identifying all the 1255 police officers working in the BPSF from the MOI HR lists (see Source: (MOI, 2016)

Table 6 below). Based on the above calculation, the sample size was 300.

Officers by Ranks	Gender		Main Sample size= ±300		Pilot Sample size 30= ±10%	
	Male	Female	Male	Female	Male	Female
1 General	7	-	2	-	1	-
2 Brigadier	16	-	4	-	1	-
3 Colonel	77	1	18	-	2	-
4 Lieutenant Colonel	79	-	18	-	2	-
5 Major	91	2	22	-	2	-
6 Captain	176	35	42	9	4	1
7 First Lieutenant	430	92	102	23	9	2
8 Second Lieutenant	184	65	44	16	4	2
<b>Total</b>	<b>1060</b>	<b>195</b>	<b>252</b>	<b>48</b>	<b>25</b>	<b>5</b>
<b>Grand Total</b>	<b>1255</b>		<b>300</b>		<b>30</b>	

Source: (MOI, 2016)

Table 6: Pilot Study Sample Size

### 3.7 Questionnaire Development

The questionnaire is one of the most widely-used methods for gathering primary data and it remains the only method involving direct contact with individuals that can make some claim to being representative as it is understood by numerical criteria (Creswell, 2014). It is one of the basic

research techniques for gathering structured information from the targeted research sample and it is also a product of quantitative research. The quality of the research related to the designing of the questionnaire is important for it leads to collecting precise data in order to answer the research questions and attain the research objectives (Saunders et al., 2016). Usually, questionnaires are constructed for a specific research topic and tend to gather various kinds of data such as current opinions or patterns of behaviour.

This study tests the conceptual framework with a larger sample and the main purpose of the questionnaire-based survey is to support or refute theoretical propositions. Therefore, it is important to develop a valid and reliable instrument (questionnaire) to achieve research objectives.

Consistent with the positivistic approach, closed-ended questions with a proposed set of possible answers were adapted (Collis and Hussey, 2014). Bryman and Bell (2016) and Collis and Hussey (2014) indicated that this type of question enables the researcher to obtain comparable data and considerably facilitates the coding, tabulation and interpretation of the data. As shown in Table 8, the scale has, in total, 42 statements (the English version of the questionnaire is found in Appendix 1 and the Arabic version is provided in Appendix 2). These statements were constructed to measure the variables of interest. A five-point Likert scale was used to measure the responses. According to Kuei and Madu (2003), a Likert scale consists of a scaling procedure which allows the respondents to express their views and opinions on a scale ranging from low and negative answers to high and positive ones.

Scholars (e.g., McNabb, 2016; Monette, 2014) have indicated that there are indeed considerable advantages of using the Likert scale tool. Firstly, according to Collis and Hussey (2014) and Monette (2014), the Likert scale consists of an ordinal level which allows the researcher to employ powerful statistical tools (such as SEM). Secondly, this type of scale enables the researcher to evaluate the responses' strength. Thirdly, Kuei and Madu (2003) pointed out that the Likert scale provides greater reliability than using the categorical system (Yes or No). Lastly, it has been argued that the Likert

scale is easier and quicker for the respondent to answer and simpler for the researcher to construct (Ghuman and Aswathappa, 2010).

In addition, several authors have shown that Likert scales can indeed be five-, seven- or ten-point scales. Nonetheless, Kuei and Madu (2003) argued that a marginal advantage in terms of reliability requires use of a Likert scale with more than five points. In this respect, Dawes (2008, p. 75) conducted a study where five-point, seven-point and 10-point scales were compared, and found that “none of the three formats is less desirable from the perspective of obtaining data that will be used for regression analysis”. Hence, a Likert scale ranging from 1 to 5 representing ‘strongly disagree’ and ‘strongly agree’ respectively was used to measure all the 42 dependent and independent variable items in the questionnaire in order to provide simplicity and consistency purposes. The following points provide a description of the measurement scales.

In order to ensure the instrument reliability, the researcher used the previous validated instrument (questionnaire). Table 7 provides a summary of the sources that were used to finalise constructs (both dependent and independent variables) and items related to each construct.

Dimensions	Constructs	Definitions	Source
Dependent Variable 1	Knowledge Donating	“Communicating to others what one’s personal intellectual capital is” (p. 118).	van den Hooff and Ridder (2004)
Dependent Variable 2	Knowledge Collecting	“Consulting colleagues in order to get them to share their intellectual capital” (p.118).	van den Hooff and Ridder (2004)
Organisational Factors	Rewards	“A measure of how well the organisation recognises employee performance with rewards” (p. 360).	Janz and Prasarnphanich (2003)
	Organisational Support	“Support is a measure of the organisation’s interest in the welfare of the employee” (p. 360).	Janz and Prasarnphanich (2003); Lin (2006)
	Organisational Structure / Centralisation	“Degree to which power and authority are concentrated at the organisation’s higher levels” (p. 373).	Kim and Lee (2006)
	Organisational Structure / Formalisation	“The degree to which are manifest in written documents regarding procedures, job descriptions, regulations, and policy manuals” (p. 374).	Kim and Lee (2006)
Individual Factors	Reciprocity	“Actions that are contingent on rewarding reactions from others and that cease when these expected reactions are not forthcoming” (p. 1877).	Chiu et al. (2006)
	Trust	“A set of specific beliefs dealing primarily with the integrity, benevolence, and ability of another party” (p. 1877).	Chiu et al. (2006)
	Social Interaction	“Social interaction ties represent the strength of the relationships, and the amount of time spent, and communication frequency among members of communities” (p. 1876-7).	Chiu et al. (2006)
	Personal Benefits	“Knowledge contributor’s judgment of likely consequences that his or her knowledge sharing behaviour will produce to him or herself” (p. 1876).	Chiu et al. (2006)

Table 7. Research Constructs Definitions and Sources

The above table summarises the constructs used in the study and the following section explains these constructs (both dependent and independent variables) in detail.

### **Dependent Variables (DVs)**

This study has measured knowledge sharing process through knowledge donating (KD) and knowledge collecting (KC) behaviours using 10 items. The first six items were included in the questionnaire to measure participants' perceptions in relation to knowledge donating (DV1). The second four items were used to measure Bahraini police officers' knowledge collecting behaviour (DV2). The scale that was used to measure those two variables was adopted from previous validated study scales (Van Den Hooff and De Ridder, 2004) (see Table 7). Minor modifications have been conducted on the items to ensure that all the criteria within the study meet the research purpose and requirements, and are suited to the nature of the sample and context.

### **Independent Variables (IVs)**

The other 32 items were included in the questionnaire to measure participants' perceptions towards the 12 independent variables. Fifteen items were used to measure the factors of trust, social interaction, reciprocity and personal benefits. These items were used in Chiu et al. (2006). Ten items were used to measure the participants' perceptions towards organisational support, and the factor of rewards was measured by eight items. Both factors' scales were adapted from Janz and Prasarnphanich, (2003). Then, the factors of centralisation and formalisation of the organisational structure were measured by eight items borrowed from Kim and Lee (2006).

#### **3.7.1 Questionnaire Layout**

The layout of the questionnaire may have an impact on the interest level of the respondents and the amount of time they are willing to devote to filling it in. Cavana et al. (2001) suggested that the layout and the general appearance

of the questionnaire are important to ensure that it looks attractive. For this reason, Cavana et al.'s (2001) recommendation to include an appropriate introduction and instructions about the research was adopted. The questionnaire layout included the following:

a. *Covering Letter*: As stated by Bryman (2008), an introductory paragraph giving information about the research and assuring confidentiality is an important aspect in encouraging participants to complete a questionnaire. Accordingly, the questionnaire was accompanied by a cover letter (a sample of the English and Arabic versions of this letter is found in Appendix 1 and Appendix 2). This letter briefly explained the identity of the researcher, who was disclosed as a student from Liverpool John Moores University (LJMU) studying for his PhD. In addition, the letter indicated the purpose of the study, assuring moreover the confidentiality and anonymity of the information provided by the respondents, and an invitation to them to voluntarily participate. Other information included the respondents' eligibility to participate in the research, the time needed to complete the questionnaire and the definitions of concepts. This letter ended with an expression of thanks to the respondents for taking the time to respond to the questionnaire and for their kind co-operation, followed by the researcher's contact details in case the participants should have any further enquiries. Other criteria such as the design of the cover page including the colour scheme, the line spacing and selection of font size were also applied so that the questionnaire appeared neat and attractive, which would enhance questionnaire completion by the respondents.

b. *Section Layout*: The questions were numbered and preceded the responses. Moreover, instructions were offered on how to fill in the questionnaire to aid the respondents in answering the questions without difficulty (e.g. the majority were simply: Circle the suitable answer). In order to separate the questions, white spaces were used between them. Page numbers were provided at the bottom of each page to help the researcher.

c. *Structure of the Questionnaire*: As a way of helping the respondents to easily answer the questions, the questionnaire's questions were organised in such a way as to make sense to the respondents and to reduce their need

to page back and forth. The importance of logically organising the questions in appropriate sections is also suggested for this stage (Cavana et al., 2001). In order to guide this step, Cavana et al.'s recommendation on the sequencing of questions was taken into consideration. They suggest using a funnel approach. This means that the order of items within each section of the questionnaire should be determined by moving from the general to the specific and from items that are relatively easy to answer to those that are progressively more difficult. Therefore, this study's questionnaire structure was divided into three sections as described briefly below and in Table 8:

**Section One** (*the demographic information*): This section was developed to gain background and demographic details to provide information about the profile of the study sample. It requested general information about the respondents' demographics such as their profession position, which includes all officers' work choices, gender, age group, which was categorised in nine groups starting from 21 years old, and the last category was over 60 years. Then, the rank subsection covers all officer-rank levels in Bahrain's public security forces (BPSF) starting from the rank of general down to the rank of lieutenant. The qualifications subsection focused on the common and expected highest qualifications of research participants, starting with the high diploma or equivalent, and ended with a choice of 'other' for uncommon qualifications. The demographic section ended with the respondents' work experience in the Bahrain police forces. This sub-section was divided into eight expected groups starting from less than one year up to over 35 working years. Most of the questions were closed-ended with multiple options to choose from (see Appendix 1 and Appendix 2).

**Section Two** (*research dependent variables*): This section of the questionnaire was developed to allow the researcher to measure the dependent variables (DVs) of the study. The first dependent variable (DV1) attempts to investigate police officers' perceptions towards their Knowledge Donating (KD) behaviour measured by six closed-ended statements with five-

point Likert scales adapted from Van Den Hooff and De Ridder (2004). The second dependent variable (DV2) involves exploring the perception of participants regarding their knowledge sharing collecting (KC) behaviour; it was measured based on four validated statements adapted from Van Den Hooff and De Ridder (2004). Those two variables deal with exploring the potential perception of participants regarding knowledge sharing behaviours that might be influenced by the independent variables (see Table 8, Appendix 1 and Appendix 2).

**Section 3** (*research independent research variables*): The statements in this section allowed the researcher to measure the independent variables of the study. This section was split up into the following eight subsections. The first subsection relates to the respondents' perceptions of their trust, and four statements measure it. The second subsection is associated with organisational support, and is measured by four statements. Then, four statements were used to measure the respondents' perceptions of their social interaction in the third subsection. In the fourth subsection, four statements were developed to measure police officers' perceptions towards rewards. Reciprocity was measured by four statements in subsection five. The sixth subsection is associated with the personal benefits variable, measured by three statements. Then, the questionnaire ended with the seventh subsection that relates to the respondents' perceptions of their community, associated with the centralisation and formalisation of the organisational structure, and measured by four statements for each respectively (see Table 8, Appendix 1 and Appendix 2).

<b>Sections</b>	<b>Constructs</b>	<b>No. Of Items</b>	<b>Scale Used</b>
<b>Demographic Variables</b>	<b>Gender, Position, Rank, Age, Education Level, Experience</b>	Multiple Options	Multiple Choices
<b>Dependent Variables</b>	<b>Knowledge Donating (DV1)</b>	6	Close-Ended 5-Point Likert
	<b>Knowledge Collecting (DV2)</b>	4	Close-Ended 5-Point Likert
<b>Independent Variables</b>	<b>Social Interaction (SI)</b>	4	Close-Ended 5-Point Likert
	<b>Personal Benefits (PB)</b>	3	Close-Ended 5-Point Likert
	<b>Rewards (RW)</b>	4	Close-Ended 5-Point Likert
	<b>Organisational Support (ST)</b>	5	Close-Ended 5-Point Likert
	<b>Reciprocity (RC)</b>	4	Close-Ended 5-Point Likert
	<b>Trust (TT)</b>	4	Close-Ended 5-Point Likert
	<b>Organisational Structure / Centralisation (SC)</b>	4	Close-Ended 5-Point Likert
	<b>Organisational structure / Formalisation (SF)</b>	4	Close-Ended 5-Point Likert

Table 8. Research Constructs Items and Scale Used

Before proceeding to explain how the questionnaire of this study was piloted, it is worth highlighting the steps that were followed in order to ensure the sound translation of the questionnaire. This objective will be the aim of the next section.

### 3.7.2 Questionnaire Translation

The main questionnaire was designed in the English language (Appendix 1), while the Arabic language is the first language of the targeted research

sample (BPSF police officers). According to Saunders et al. (2016), translating the questionnaire into another language requires the researcher to take care over grammar, syntax, and lexical, idiomatic and experiential issues. In addition, Lewis-Beck and Bryman (2007, p. 375) stated that “translating questions and associated instructions into another language requires care, especially if your translated or target questionnaire is to be decoded and answered by respondents in the way you intended”. There are four techniques that can be used (Usunier, 1988): 1) In direct translation, the questionnaire is translated directly without any help. Although this method is easy and inexpensive, it may lead to many discrepancies in meaning between source and target questionnaire. 2) In back-translation, the researcher has the source questionnaire translated into a target language and then translated back into the original language by two independent translators, and then makes a comparison of the two new questionnaires in the original language in order to create the final version. 3) In parallel translation, the original questionnaire is translated into the target language by two or more independent translators. Then, these two questionnaires are compared in order to create the final version. 4) The mixed technique involves using back translation undertaken by two or more independent translators, and then comparing the two new original-language questionnaires to create the final version in the target language.

In spite of the fact that the mixed technique shares advantages with the back-translation method, such as discovering problems of mistranslation, lost words, or incorrect meaning, it is expensive and requires more than two independent translators. Therefore, this study employed the back-translation technique to translate the original English questionnaire into Arabic.

To meet the adequacy and accuracy requirements for the back-translation technique, three steps of the translation process were conducted. At the first step, the English version of the questionnaire (Appendix 1) was sent to two independent translators at two professional translation services located in Bahrain, in order to ensure the validity of the primary translation process and to translate the questionnaire from English to Arabic.

Secondly, the two translated versions of the questionnaire were reviewed by eight bilingual academic experts, five from LJMU and three different ranks from the targeted research population (police officers in the BPSF) to ensure the clarity of the statements, suitability with research context, to enable the participants to convey their views clearly, and to achieve the comprehension of construct measurement in this initial stage.

Finally, after receiving academic experts' feedback and suggestions, two copies of the edited Arabic version of the questionnaire were sent back to the two independent translators to translate them back into English to compare translations with the original English version for adequacy and accuracy to ensure there were no variations from the original English and the Arabic versions of the questionnaire, and discuss how to achieve the most reliable results. Then, both translated versions of the Arabic questionnaire were finalised by one of the two translators and refined into one version (Appendix 2) with consideration of the other independent translator and the academic experts' feedback.

### **3.7.3 Validity and Reliability of the Questionnaire**

Validity and reliability are mutually inclusive terms, as both deal with clarity of understanding and ability of instruments/constructs to provide answers to research questions the way they are intended (Obalola, 2010; Saunders et al., 2016). The reliability and validity tests were carried out to establish that the study instrument and its constructs had internal consistency and had actually measured what they were designed to measure. Moreover, those tests help to ensure that the research instrument is at an acceptable level, which indicates that the instrument will be ready to be implemented on the full sample (Bryman and Bell, 2016; Easterby-Smith et al., 2018; Saunders et al., 2016). In addition, scholars have suggested a number of statistical techniques which enable the researcher to assess both the reliability and validity of the measures used in the research. However, the research outcome is described as valid when the procedure followed and instruments used are reliable, and, when validity is established, reliability is assured (Hardy and Bryman, 2009; Bryman, 2008; Creswell, 2014).

## **Validity**

Instrument validity is considered a critical stage to confirm the data's representation of the real world (Straub et al. 2004; Dwivedi et al. 2006). In fact, validity is critical to all types of academic research (Oliver, 2014). In general, the validity is known as the extent to which the real-world conditions have been translated in research finding and results. In addition, it confirms the data collection tool's (survey questionnaire) ability to measure what is planned to be measured in the research as well as how genuine the research outcomes are (Golafshani, 2003; Joppe, 2001). However, Straub et al. (2004, p. 68) defined the form of construct validity as "one of a number of subtypes of validity that focuses on the extent to which a given test/instrumentation is an effective measure of a theoretical construct".

Validity is attached to research propositions because research measures, samples and designs on their own do not have validity; at most, it could be stated that a measure leads to valid conclusions or that a sample allows for valid inferences about the population or that the research design chosen enhances the validity of the research (Trochim and Donnelly, 2008). The validity of the instrument can be determined by many forms of validity tests (Dwivedi et al. 2006; Bryman and Bell, 2016). However, validity can be viewed by two perspectives, internal and external. The internal validity is to confirm that the tool and items are suitable to investigate the targeted sample, and the external validity test is to measure to what extent that research findings can be widely generalised (Cook and Campbell, 1979; Winter, 2000). Validity typologies include criterion-related validity, construct validity, internal validity, external validity, concurrent validity and face validity (Cohen, 2013). Kirk and Miller (1986), however, identified construct validity, internal validity and external validity as dominant validity types. Trochim and Donnelly (2008) discussed five types of validity with cumulative meanings and linkages: conclusion validity, internal validity, construct validity, external validity and content validity. However, the most common type is face and content validity (Bryman and Bell, 2016).

According to Straub et al. (2004), content validity can be defined as the degree to which items in an instrument reflect the content universe to which the instrument will be generalised. This validity is generally established through literature reviews and experts feedback. Content validity can be enhanced through various ways. First, the researcher should comprehensively review the literature to outline the research topic. Second, advice should be sought from experts who can judge the suitability of the instrument to measure the research's proposed concepts. Finally, the instrument should be pre-tested on a small sample, allowing respondents to make comments and suggestions (Creswell , 2014; Saunders et al., 2016).

The research instrument was developed based on previously validated questionnaires in the related KS literatures. In this study, the following steps have been taken to ensure an adequate general and content validity of this research: the validity of the survey questionnaire was determined by discussing and reviewing the questionnaire with seven lecturers/senior lecturers/professors in the Liverpool Business School at Liverpool John Moores University (LJMU), with different specialisations (including the researcher's supervisors) and who are interested and experts in the area of this research. Moreover, two key people in knowledge strategy management development at the University of Bahrain and Bahrain Public Security Forces were involved in this stage. At the same time, the instrument was checked by four doctorate researchers specialising in business management. The comments and notes they provided were taken into consideration to achieve content validity.

In the second step, a revised version of the questionnaire was distributed to be completed by a small number of respondents selected from among the population. Many previous studies in the knowledge sharing literature have pre-tested their questionnaires with employees. The pre-tests were conducted with a number of employees ranging from 10 to 30. For instance, Kim and Lee (2006) pre-tested their questionnaire with 30 employees in public and private organisations, Huang et al. (2011) did so with 19 managers from different organisations, Holste and Fields (2010) with 15 respondents. Therefore, in

light of these previous studies, the questionnaire was pre-tested with 30 police officer participants from the research context.

### **Reliability**

According to Bollen (2014), the reliability refers to the consistency and the stability of measurements over time. In other words, reliability is the extent to which measurements are repeatable if another researcher conducted the research in different conditions to measure the same thing (Creswell and Clark, 2018; Drost, 2011). Bryman and Cramer (2012) subsequently identified two forms of reliability, external and internal. External reliability is the degree of consistency of the measure over time. Internal reliability, on the other hand, questions whether the scales used are measuring a single idea (Bryman and Cramer, 2012). As for the validity, it addresses the extent to which items reflect the concept that they are being used to measure (Cooper and Schindler, 2014; Collis and Hussey, 2014).

Scholars have suggested a number of statistical techniques which enable the researcher to assess both the reliability and validity of the measures used in the research. Nevertheless, at this phase of the study process, the researcher confirmed the validity of the measures and constructs through using instruments that have already been used in the same context and published in highly ranked journals. In this vein, researchers stated that the right direction is increasing the use of measures with relatively well-known validity and reliability (Bryman, 2016). To confirm the consistency of an instrument's output, various reliability tests are usually employed; nevertheless, the most common method for measuring reliability is the internal consistency method which can be examined through the inter-item consistency reliability test. For instance, internal consistency measures to what extent the instrument items correlate with each other (Sekaran and Bougie, 2016).

Inter-item consistency reliability is commonly tested by Cronbach's alpha coefficient test, which is the most commonly used test used to measure scale reliability (Bryman and Cramer, 2012; Li et al., 2011; Kumar, 2014). In general, a good measurement instrument is higher coefficients (closer to 1) indicate an

accepted inter-item reliability. However, the values of Cronbach's alpha range from 0 to 0.6 are considered to show poor reliability (Field, 2009; Hair, 2010). In this regard, Hinton et al. (2014) suggested four different points of reliability: excellent range (0.90 and above), high (0.70 - 0.90), high moderate (0.50 - 0.70) and low (0.50 and below). Hair et al. (2014) reported that Cronbach's alpha ought to be equal to or above 0.70, which represents a satisfactory reliability. Table 9 shows the reliability for this study. Thus, this study is considered to reveal the appropriate level of internal consistency.

According to Field (2018), Cronbach's alpha is the most important coefficient to check the constructs' reliability and report the same threshold. In order to assess the internal consistency of this research questionnaire, Cronbach's alpha test was carried out by running the data using the Statistical Package for the Social Science software (SPSS) IBM version 24. Table 9 below shows the summary of these results.

	<b>Construct</b>	<b>No. of items</b>	<b>Cronbach's Alpha</b>	<b>Comments</b>
1	Knowledge Donating (KD)	6	.727	Accepted
2	Knowledge Collecting (KC)	4	.795	Accepted
3	Trust	4	.742	Accepted
4	Support	5	.697	Accepted
5	Social Interaction	4	.844	Accepted
6	Reward	4	.707	Accepted
7	Reciprocity	4	.840	Accepted
8	Personal Benefits	3	.850	Accepted
9	Centralisation	4	.720	Accepted
10	Formalisation	4	.730	Accepted
11	Overall (all constructs' statements)	42	.917	Accepted

Table 9. Primary Results of the Questionnaire Reliability Test

### 3.7.4 Questionnaire Administration

The questionnaire completed by the respondents can either be administered personally, by post, by internet or it can be completed by the interviewer (Yin, 2003). The questionnaire is delivered directly to the respondents and then subsequently collected. The postal questionnaire can be distributed by the researcher, who gives the questionnaire to the respondent and on completion it is returned to them. One of the main advantages of e-mailing questionnaires is the ability to reach respondents in numerous locations; it is more cost

effective than visiting locations and generally easier to administer (Grix, 2018). In addition, e-mailed questionnaires are more pertinent when the questionnaire is sent internally within an organisation, providing that all of the selected sample has access to it (Easterby - Smith *et al.*, 2002).

There are, however, disadvantages to this approach, which can be low response rates, lack of clarification of questions and no opportunity to check incomplete questionnaires (Lee and Lings, 2013). Furthermore, Hoang (2011) suggested that not handing out questionnaires face-to-face could present less interaction between the researcher and the respondents; for that reason, this method could mean a lack of a friendly, open and trusted process, therefore allowing for a lower chance of the questionnaire being completed in full. Walliman (2011) and Creswell (2014) argued that the lack of personal interaction when handing out questionnaires may cause the response rate to be lower, which in turn could possibly create an unacceptable reduction of the sample size, which may cause an element of bias.

Lee and Lings (2013) pointed out that, prior to administering and collecting any questionnaires, a series of stages should be employed. Firstly, it should be ensured that all questionnaires and covering letters are printed and a collection box is ready. Then, the respondents must be contacted, advising them to attend a meeting, held preferably within the organisation's time. At the meeting, a questionnaire should be handed out together with a covering letter to each respondent and an explanation provided as to the anonymity and confidentiality of the information provided. The researcher must then allow participants the time to complete the questionnaire before making sure that respondents place their completed questionnaire in a collection box prior to them leaving the meeting.

To ensure that respondents feel confident answering the questionnaires, the researcher should provide a permission letter from the organisation, explaining that the collected data will be used for academic purposes and for this research only (Henning *et al.*, 2004). As pointed out by Walliman (2011), failure to convey the correct terminology in the questionnaire covering letter may affect the response rate. Once the questionnaires have been received, it

is important to thank the participants for completing them and for providing contact details in case of any queries.

However, a hard copy of the self-administrated questionnaire was distributed in sealed envelopes to the police officers between July 2017 and November 2017 by the MOI HR dispatch office with a covering letter containing questionnaire completion procedures. Support was given from assigned staff from the organisation if aid was required and if respondents needed motivation to complete the survey. In addition, the respondents were asked to return the completed questionnaire by returning it to the same sender.

### **3.7.5 Questionnaire Data Analysis Strategy**

According to Bryman and Bell (2016), unanalysed data cannot be understood by the majority of people; in order to make it comprehensible, data should be processed, analysed and interpreted. This section briefly illustrates the analysis strategy of the preliminary data collected through the questionnaire. Generally, there are two kinds of statistical techniques that are used to analyse data, parametric and non-parametric testing (Lee and Lings, 2013). However, Kumar (2014) pointed out that, although there are two techniques, the parametric approach is foremost. Lee and Lings (2013) highlighted that parametric techniques can only be used on data that exceeds 30 people or more, whereas non-parametric techniques are more general and can be used on data that shows a normal distribution. Two statistical software packages were used in this study, namely Statistical Package for Social Science (SPSS) version 24.0 and Analysis of Moment Structures (AMOS) version 24.0, to code and analyse the quantitative empirical data gathered by the questionnaire, data screen and test the hypotheses, and to ensure high accuracy, credibility and reliability of the results.

The analysis started initial data screening by eliminating the unusable responses and checking the outliers and the type of sample distribution, using SPSS. The next step is the reliability assessment, which was carried out using Cronbach's alpha to ensure the internal consistency of the variables in each construct. The reliability coefficients for the research constructs were internally

consistent and above the commonly accepted level of 0.7 (Nunnally, 1975; Bryman and Cramer, 2012). Based on the normality of data distribution, parametric techniques were used to analyse data of this study. The researcher employed eight analysis techniques to analyse the data: descriptive statistics, mean scores, one-way ANOVA, Pearson Correlation and the independent *t*-test. Descriptive analysis of the results was used to provide the frequency and the percentages from the data collected, followed by exploratory factor analysis (EFA) conducted and confirmatory factor analysis (CFA) on the basis of structural equation modelling (SEM). After that, AMOS was applied to evaluate the model fit of the study. The following Table 10 explains the software and statistical techniques used in the study. Further detailed explanation of each analysis is provided in the next chapter.

<b>Statistical Techniques</b>	<b>Software Used</b>	<b>Purpose</b>
<b>Cronbach's Alpha Test</b>	<b>SPSS 24</b>	<ul style="list-style-type: none"> <li>•To assess construct internal consistency of the current study questionnaire (Inter-item consistency reliability).</li> </ul>
<b>Descriptive Statistics</b>		<ul style="list-style-type: none"> <li>•To create a profile data of the surveyed respondents' characteristics.</li> <li>•To summarise the results in a form of easy-to-understand tables and charts.</li> </ul>
<b>Data Management</b>		<ul style="list-style-type: none"> <li>•To check the normality of the quantitative data in the current research (the extent to which data distribution is close to normal distribution).</li> <li>•To check the missing data and potential outliers, which can affect the results of the analysis.</li> </ul>
<b>ANOVA</b>		<ul style="list-style-type: none"> <li>•To compare the attitudinal mean difference between more than two groups. For example, Positions, Age group, levels of education, Qualifications and Work Experience.</li> </ul>
<b>Exploratory Factor Analysis (EFA)</b>		<ul style="list-style-type: none"> <li>•To identify the underlying structure of the research model constructs and the observable variables for these constructs.</li> <li>•To summarise and reduce the number of study variables to a smaller and more manageable set of variables.</li> <li>•To explain the variance in the observed variables in terms of underlying latent factors.</li> </ul>
<b>Kaiser-Meyer-Olkin (KMO) Bartlett's Test</b>		<ul style="list-style-type: none"> <li>•To assess the suitability of the data set for EFA, sample size, and the pattern of relationships among the variables.</li> </ul>
<b>Confirmatory Factor Analysis (CFA)</b>	<b>AMOS 24</b>	<ul style="list-style-type: none"> <li>•To assess the goodness-of-fit for the measurement model in the present study.</li> <li>•To validate relationships between the observed and latent variables.</li> <li>•To confirm the validity and reliability of the scales and measures derived from EFA.</li> </ul>
<b>Structural Equation Modelling (SEM)</b>		<ul style="list-style-type: none"> <li>•To assess the goodness-of-fit for the structural model of the present study.</li> <li>•To test the relationships among the different constructs in the proposed model.</li> </ul>

Table 10 Software and Statistical Techniques Used in the Research

### 3.8 The Pilot Study

The pilot study is a small investigative study designed to examine logistics and collect relevant and important information prior to a larger study, in order to enhance the quality and efficiency of the research in context (Perry, 1998). The foremost objective of a pilot study is to test the clarity of the instrument questions before carrying out the main study (Yin, 2009). Accordingly, the purposes of piloting the questionnaire of this thesis include the following: an

assessment of individual questions and their sequence, gaining confidence that no essential issues have been missed, determining the degree of accuracy in questions and getting feedback regarding the wording, predicting the response rate, discovering difficulties with understanding instructions or layout, and increasing the ease of analysis, ensuring the reliability and validity of the measures used to measure the variables of interest and the appearance of the questionnaire in general (Remenyi, 2010; Fowler, 2015).

Zikmund et al. (2012) defined the pilot study as a small-scale research study that gathers data from a small sample drawn from the same population from which the final sample of the study is drawn. Some researchers have stated that the pilot testing helps to assess the validity of the instruments used to measure the variables, testing the validity ensures that the questionnaire can be administered without variability to the experimental group (Creswell, 2018). On the other hand, many researchers such as Oppenheim (2009), Kalof et al. (2008), Sekaran and Bougie (2016) and McNabb (2016) have argued that a pilot testing assists the researcher to identify and eliminate potential problems related to the research questions and research instrument before deploying the questionnaire to the intended participants. Other scholars such as Kothari and Garg (2016) and Yin (2015) perceived pilot testing as a practice run of the main questionnaire.

The pilot study is used to explore any possible difficulties and problems that might face the questionnaire respondents. In this study, it was conducted on 30 BPSF police officers as a sample from the targeted main sample. Before conducting the pilot test, the respondents were informed that the survey was voluntary and that anyone who wished to leave could do so. They were gently encouraged to begin and it was explained that all items were in simple and short sentences and would not require a long time to complete. The researcher also allowed respondents to ask any questions for clarification if they found it necessary to do so. While the length of the overall questionnaire was a matter of concern, the respondents said that all items in the questionnaire were understandable. All of the respondents took between 10 to 15 minutes to complete the questionnaire.

The purpose of the questionnaire items analysis was to find those items that formed an internally consistent scale and to eliminate those items that did not. Respondents' comments, suggestions and the average time to complete the questionnaire were taken into consideration to prepare the final questionnaire. Most of the comments from the pilot study revealed that most of the questions were easy to understand and were related directly to the topic. However, four items (RW5, RW6, PB4 and PB5) were excluded because the participants and experts found the wordings of the items confusing and unclear. Therefore, final 42 items remained for the main study.

Before the final survey distribution, reliability testing was carried out to ensure that each factor obtained the desired level of internal consistency. The purpose of the questionnaire items' analysis was to find those items that formed an internally consistent scale and to eliminate those items that did not (Spector, 1992). Based on the results from the pilot study, no items had to be dropped due to an acceptable reliability. The questionnaire completion time was calculated and it was found that it took approximately 10 minutes to complete each questionnaire, and respondents emphasised that the questions and wording in most statements were easy to understand and clear.

Although the Cronbach's alpha reliability was based on a small sample of respondents (N=30), it indicates that the scales were consistent in measuring the intended constructs. Table 11 below shows the summary of these results. Consequently, all 42 items were used in the final questionnaire for data collection.

	Construct	N of Items	Cronbach's Alpha	Comments
1	Trust (TT)	4	.742	Accepted
2	Structure Formalisation (SF)	4	.730	Accepted
3	Social Interaction (SI)	4	.844	Accepted
4	Structure Centralisation (SC)	4	.720	Accepted
5	Rewards (RW)	4	.707	Accepted
6	Personal Benefits (PB)	3	.850	Accepted
7	Support (ST)	5	.703	Accepted
8	Reciprocity (RC)	4	.840	Accepted
9	Knowledge Collecting (KC)	4	.727	Accepted
10	Knowledge Donating (KD)	6	.795	Accepted
11	Over all Reliability	42	.890	Accepted

Table 11 Pilot Study results

### 3.9 Ethical Considerations

The research complies with all ethical implications set by Liverpool John Moores University. Under ethical concerns, all respondents shall be protected without being harmed physically or psychologically. By respecting the dignity of the respondents, the research avoids causing any legal harm, career harm, income harm, anxiety, discomfort, stress, or loss of self-esteem to them (Neuman, 2014). None of the respondents will receive any reward, payment, or reimbursement for participating in the research. Moreover, there is no conflict of interest, funding, sponsorship, or affiliation that may impact the research findings. After all, the research aims to be honest and transparent without any deception or misrepresentation (Bryman and Bell, 2016).

The research information statement will clearly explain the academic purpose and emphasise the implied consent of the anonymous paper survey. Implied consent is confirmed once the respondents submit the self-completed questionnaire because of the anonymous nature of the survey. All respondents will be reminded by the information statement that participation is voluntary, and they have the right to withdraw from the survey at any stage of the survey and at any time, with their written data and information being destroyed accordingly. The access, storage and disposal of the collected data will also be explained in the information statement. In addition, the information statement will state the contact details of the researchers and Liverpool John

Moore's University in case the respondents have any enquiry or complaint about the research.

Anonymity and privacy of the respondents, as well as the confidentiality of the collected data, will be carefully protected without being invaded or abused (Bryman, 2008). Only the declared researchers and the examiners of the thesis are authorised to access the collected data that is stored in the primary researcher's personal computer with password protection. The electronic data will be copied to a compact disc as backup data and locked in the primary researcher's safekeeping for at least five years before disposal. Upon expiry of the five-year period, the gathered electronic data that is stored in the primary researcher's personal computer will be deleted permanently and the backup compact disc will be destroyed accordingly by a shredder.

Many ethical obligations may arise during the data collection stage (Creswell, 2014). In addition, Bryman and Bell (2016) claimed that numerous ethical issues may arise during the research process as well. Therefore, in line with the advice from Sieber (1973), the researcher has ensured the participants that no physical, psychological, social, economic or legal threats are associated with participation in the study. Some ethical issues also may arise during data analysis and interpretation (Creswell, 2014). It has been suggested that the researcher must have to provide accurate information and avoid factual exaggeration (Berg, 2004). Meanwhile, researchers also have to ensure the confidentiality and privacy of respondents and not reveal information that might identify respondents (Guthrie, 2012). Therefore, for this study, the researcher has taken all professional responsibility to protect respondents' culture, emotions, and moral and legal standards.

### **3.10 Research Limitations**

The study is expected to be affected by three limitations. One is the specific forms of organisational structures in the public sector (Wettenhall, 2003; Willem and Buelens, 2007). This study will focus on the police organisation and will not provide satisfactory results that can be used by other organisations. This is because research studies have revealed that the factors

that influence KS vary from one sector to another. Alternatively, if the study is to be extended by increasing the sample size, having fair representation will be the most appropriate strategy, although with awareness that there may be limitations on the data due to poor responses from some sectors.

Second, attitudes towards KS and behaviours vary across different cultural settings. There are a number of subcultures within a national culture, which can make it difficult to generalise the results of a study (Michailova and Hutchings, 2006). This may limit the applicability of the findings to other countries or regions. Although it may be felt that a good research study's results should be applicable to all sectors, in this study, due to the nature of the sample and techniques in the collection of data, it will be biased and only applicable in some sections.

Third, the study will use self-reporting information gathered via questionnaires. This may create room for inaccurate information. The study will be developed from personal responses. Although an efficient technique for collecting data, it is subject to personal bias. This may limit the relevance of these research findings to other sectors. There is a tendency towards inaccurate information when the information collected is not monitored. This type of information gathering is generally based on trust and all the necessary information should be well monitored.

Although the research may be affected by these limitations, the merits of this study outweigh the limitations. The study is expected to be of great importance and will be used as a turning point in studies relating to KS in the public sector and police organisations in particular.

### **3.11 Summary**

This chapter was carried out to identify a suitable methodology for this thesis. The research methodology was designed to understand the influence of the proposed factors on KS donating and collecting in the BPSF at the MOI as one of the Bahraini public sector organisations in the Arab context. Different paradigms of research approaches have been discussed in this chapter. Furthermore, the philosophical issues of ontology, epistemology and

paradigms were discussed in this chapter. Positivism was determined as the research philosophy and it was explained that the deductive approach would be used as the research approach in this study, followed by justifications for each selection.

In addition, it has been argued that the quantitative method is the most appropriate technique due the nature of this research and as found in a few studies that had investigated the factors that influence KS. Moreover, it enables a large number of participants within each organisation to be surveyed in a short amount of time. Moreover, the chapter discussed in brief the tests that are required to prepare the data, measures and variables. In addition, the sampling design and sample size were discussed and determined. Moreover, the pilot study findings illustrated the suitability of the research instrument to the study aim and objectives. Lastly, the chapter concluded with an overview of ethical issues in the research. Further details of description and analysis of data gathered from the quantitative methods will be provided in Chapter 4.

## **Chapter 4: Data Analysis and Findings**

## **4.1 Introduction**

In the previous chapter, research methodology details were provided; also, a significant portion was dedicated to research methods employed in the study. Since quantitative methods were adopted in this study, a survey was applied to obtain the primary data; this chapter presents results collected by the survey (questionnaire) which forms the foundation of the investigation. This study employed various statistical techniques to analyse the quantitative data in order to achieve the research objectives. Mainly, the Statistical Package for Social Sciences software (SPSS) version 24.0 and analysis of a moment structures software (AMOS) version 24 were used to analyse the preliminary data.

This chapter contains three main sections. The first section reports the descriptive data analysis results, and starts with initial data consideration; this involves the process of data management and data screening. The preliminary reliability check for the main constructs is conducted and the demographic profiles of the participants are discussed. In the second section, factor analysis (data-reduction/factor-extraction) is applied, and reported through the exploratory factor analysis (EFA) and the confirmatory factor analysis (CFA). Accordingly, the procedures and the findings relating to the measurement model validation and the structural equation model (SEM), and the causal relationships among the proposed model variables are reported. Based on the hypothesis test results, an alternative structural model achieved through SEM is presented. Finally, one-way analysis of variance (ANOVA) is presented to determine whether there are any statistically significant differences between the means of demographic groups.

## **4.2 Data Management**

As mentioned above, this study employed SPSS for the data management and analysis. Data collected from all the participants' responses was entered in SPSS according to the numeric response value. However, before entering the data into the SPSS spreadsheet, item/variable coding was developed in all spreadsheet columns and rows. Then, questionnaire items were coded in SPSS with numbers along with an abbreviation of the variable. Thus, any

information about the case can be identified across the data editor. Accordingly, the missed information value section of the column was developed as '99', and the five-point Likert scale used in the questionnaire labelled as '1' for 'Strongly Disagree' to '5' 'Strongly Agree'. Finally, frequency tests were used to confirm that the correct figures had been entered in the spreadsheet and to gauge the responses to each statement according to each column section entry.

#### **4.2.1 Data Screening**

Prior to the analysis, the data was screened to ensure that it was suitable for further analysis and that no errors had occurred during data entry, because errors can mislead the statistical analyses (Pallant, 2016). Data screening and cleaning are very critical, particularly when the intention is to use multivariate analysis (Hair et al., 2014). There are a few steps such as checking for missing data and outliers that are required to avoid errors in the data. The process of data screening (missing data, outliers, reliability and normality) are explained next.

#### **4.2.2 Missing Data**

If any data on any variable from any participant is not present, the researcher is dealing with missing or incomplete data (Osborne, 2013). Missing data can affect data analysis, in terms of the results of analysis, sample size, generalisation and bias when data is not random and the application of the remedies is inappropriate (Hair, 2010). Missing data can be dealt with in different ways. One common way of dealing with this sort of data could be using analyses that do not require (or can deal effectively with) incomplete data (Osborne, 2013). Another common way of dealing with missing data is to exclude questionnaires with missing data. In order to avoid missing data in this study, the researcher excluded 26 questionnaires that were incomplete. The excluded questionnaires are a very small percentage (8%) of the total responses (338) which means that their exclusion does not affect the overall results (see Figure 6 below). Finally, the frequency test used for the 312

useable questionnaires confirmed that there was no missing data issue that could affect the analysis.

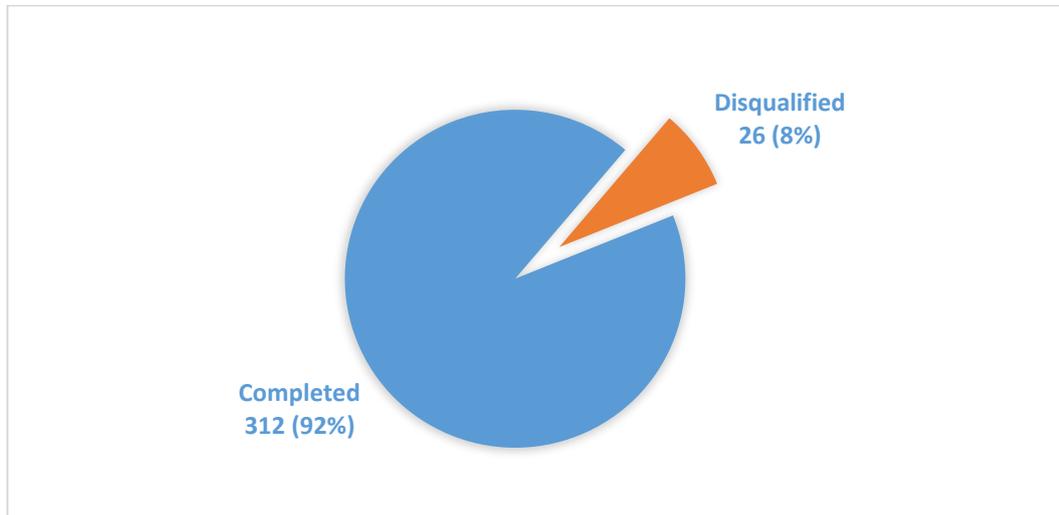


Figure 6. Total Number of Questionnaires

#### 4.2.3 Outliers

The outliers describe the abnormal data behaviour, i.e. data that deviates from the natural data variability (Filzmoser, 2004). In statistics, outliers are cases having scores that are substantially different from the rest (Hair et al., 2014). For this reason, it is very important to screen the data to detect outliers, as they can potentially bias the mean and inflate the standard deviation (Field, 2005). Hair (2010) classified outliers into four categories, namely procedural error, extraordinary events, extraordinary observations and unique combinations. Procedural errors, data errors or mistakes in coding should be identified in the data cleaning stage. The objective of identifying outliers is to determine whether the unusual data should be deleted or retained to match with research objectives. Lastly, there may be outliers in a combination of values across several variables that fall within the ordinary range of values on each of the variables. There are combinations of high and low amounts that are unique across values. Thus, this kind of outlier should be retained in the data unless there is evidence of its invalidity to the population (Hair et al., 2014). Ultimately, the determination of whether to retain or delete the data

depends on the researcher's identification of whether the data is helpful or harmful (Hair, 2010).

In line with the advice from Hair et al. (2014), this study detected outliers through univariate and multivariate perspectives. Univariate outliers were identified from the value of z-scores from the dataset of the questionnaire. Tabachnick and Fidell (2014) suggest that, if the z-score value is more than ( $\pm 3.29$ ), the data is considered as univariate outliers, and will be eliminated from further analysis. However, based on z-score, no item was found to have univariate outliers in the current dataset.

Next, multivariate outliers were detected. The basis for multivariate outlier detection is the Mahalanobis distance. The standard method for multivariate outlier detection is robust estimation of the parameters in the Mahalanobis distance and the comparison with a critical value of the  $\chi^2$  distribution (Rousseeuw and Van Zomeren, 1990). Therefore, values of Mahalanobis distance were compared with a critical value, which is the Chi-squared distribution ( $\chi^2$ ) value that corresponds with degrees of freedom of 50, which equals the number of the current study variables, and probability of  $p < 0.001$ . The results revealed that only five multivariate outliers were found in the dataset, i.e. values of probability were greater than  $p = 0.001$ . Compared to total number of cases (312), the number of these outliers (5) is very small. Therefore, in line with the advice from Kline (2011), who suggests that a few outliers within large samples should be seen as less problematic and may not affect the data analysis and interpretations, the researcher decided to retain these outliers (see Table 12).

Case ID.	Mahalanobis distance ( $D^2$ ) MD	Probability MD 1-CDF.CHISQ (MD, 42)	Outliers Probability MD < .001
83	89.06016	0.00029	1
145	93.89688	0.00008	1
253	115.46323	0.00000	1
270	93.21822	0.00010	1
214	91.01757	0.00018	1

Note: CDF.CHISQ is cumulative distribution function for Chi-Square and DF (42) is degrees of freedom, which is the total number of variables.

Table 12. Multivariate Outliers

#### 4.2.4 Reliability

Internal consistency (reliability) refers to the degree to which responses are consistent across the items (variables) within a single measurement scale. It is commonly measured by Cronbach's alpha coefficient, which is the estimated correlation of a set of items and true scores. Cronbach's alpha coefficient equal to or greater than 0.70 is considered as reliable for research purposes, while alpha values less than 0.6 indicate that variables may be so heterogeneous that they perform poorly in representing the measure (Bland and Altman, 1997).

Many researchers argue that Cronbach's alpha should be the 'first measure' calculated to assess the quality of the measurement scale (see, for example, Hair et al., 2014; Kline, 2011). An alpha coefficient around 0.90 is considered as excellent, around 0.80 is very good, and around 0.70 is adequate (Kline, 2011). Additionally, Hair et al. (2014) recommend that values of 0.60 to 0.70 are at the lower limit of acceptability. Table 13 presents the values of the alpha coefficient of all seven scales, ranging from 0.700 to 0.990, which were well above the acceptable lower limit and fell in a range that is between very satisfactory and excellent. As a result, the measurement scales appear to consist of a set of consistent variables for capturing the meaning of the model constructs.

	Construct	N of Items	Cronbach's Alpha	Comments
1	Trust (TT)	4	.716	Accepted
2	Structure Formalisation (SF)	4	.700	Accepted
3	Social Interaction (SI)	4	.739	Accepted
4	Structure Centralisation (SC)	4	.757	Accepted
5	Rewards (RW)	4	.831	Accepted
6	Personal Benefits (PB)	3	.911	Accepted
7	Support (ST)	5	.741	Accepted
8	Reciprocity (RC)	4	.990	Accepted
9	Knowledge Collecting (KC)	4	.979	Accepted
10	Knowledge Donating (KD)	6	.771	Accepted
11	Over all Reliability	42	.841	Accepted

Table 13. Data Reliability

#### 4.2.5 Normality

The assessment of normality was necessary because the current study employed multivariate analysis techniques that required an assumption of normality (Kline, 2011; Tabachnick and Fidell, 2014). This section presents an examination of normality to enable a preliminary demonstration of the data distribution for each variable in order to justify the use of specific statistical analysis procedures. Skewness and Kurtosis are two ways of considering data that will indicate the normality of a given dataset distribution (Doornik and Hansen, 2008; Thulin, 2014). Skewness demonstrates the symmetry of distribution, while kurtosis refers to how much the distribution is peaked or flat compared with the normal distribution (Hair et al., 2014).

Variables		N	Skewness		Kurtosis		
			Statistic	Std. Error	Statistic	Std. Error	
Dependent Variables	1	KC1	312	-.586	.138	-.419	.275
	2	KC2	312	-.591	.138	-.427	.275
	3	KC3	312	-.596	.138	-.417	.275
	4	KC4	312	-.591	.138	-.414	.275
	5	KD1	312	-.449	.138	-.439	.275
	6	KD4	312	-.612	.138	-.158	.275
	7	KD2	312	-.430	.138	-.536	.275
	8	KD3	312	-.456	.138	-.436	.275
	9	KD6	312	.151	.138	-1.496	.275
	10	KD5	312	-.404	.138	-.687	.275
Valid N (list wise)		312					

Table 14. Data Normality for Dependent Variables

For a distribution to be considered normal, its skewness and kurtosis should fall between +2.00 and -2.00 (Garson, 2013). Table 14 and Table 15 show that skewness of all dependent and independent variables, ranging from .409 to -1.040, and for kurtosis values ranging from .689 to -1.496, fell within the recommended range from +2.00 to -2.00.

Variables		N	Skewness		Kurtosis		
			Statistic	Std. Error	Statistic	Std. Error	
Independent Variables	1	TT1	312	-.493	.138	-.560	.275
	2	TT2	312	-.481	.138	-.767	.275
	3	TT3	312	-.491	.138	-.139	.275
	4	TT5	312	-.461	.138	-.890	.275
	5	SF1	312	-.603	.138	-.195	.275
	6	SF2	312	-.805	.138	.689	.275
	7	SF4	312	-.506	.138	-.409	.275
	8	SF3	312	-.457	.138	-.890	.275
	9	SI1	312	-1.040	.138	.415	.275
	10	SI2	312	-.849	.138	.270	.275
	11	SI3	312	-.430	.138	-.506	.275
	12	SI4	312	-1.040	.138	.092	.275
	13	SC1	312	-.433	.138	-.543	.275
	14	SC2	312	-.506	.138	-.750	.275
	15	SC4	312	-.363	.138	-.946	.275
	16	SC5	312	-.438	.138	-.725	.275
	17	RW4	312	-.143	.138	-.432	.275
	18	RW2	312	-.111	.138	-.714	.275
	19	RW1	312	-.614	.138	.655	.275
	20	RW3	312	-.018	.138	-.684	.275
	21	PB1	312	-.564	.138	-.613	.275
	22	PB2	312	-.810	.138	-.015	.275
	23	PB3	312	-.460	.138	-.707	.275
	24	ST1	312	-.456	.138	-1.104	.275
	25	ST2	312	-.323	.138	-.570	.275
	26	ST3	312	-.507	.138	-.756	.275
	27	ST4	312	.409	.138	-.118	.275
	28	ST5	312	-.356	.138	-.490	.275
	29	RC1	312	-.125	.138	-.419	.275
	30	RC2	312	-.134	.138	-.481	.275
	31	RC3	312	-.171	.138	-.495	.275
	32	RC4	312	-.146	.138	-.482	.275
Valid N (list wise)		312					

Table 15. Data Normality for Independent Variables

### 4.3 Description of the Sample

This data collection activity was undertaken at the Ministry of Interior – Bahrain in a period of 16 weeks, from the 1st of December 2016 to the end of March 2017. The survey questionnaires were distributed by post through the dispatch unit in the human resources department at the Ministry of Interior to 470 participants who were selected by random sampling from different

departments in the Bahrain Public Security Forces (BPSF). BPSF police officers of different ranks, qualifications, positions and experience were included to form the research population. Out of 470 distributed questionnaires, only 338 questionnaires were returned, which shows a high response rate (72%). The high response rate for BPSF police officers show the interest of the research population (police officers) in the current study. The response rate could have been higher; however, many of the randomly selected participants were on leave or on training courses abroad.

Different demographic characteristics of the respondents such as Gender, Position, and Rank, Qualification, Age group and Work experience in the Bahrain police force were sought in the questionnaire. The following subsections illustrate the demographic characteristics of the participants in detail.

#### 4.3.1 Respondents' Gender

Figure 7 below illustrates the analysis of respondents' gender profile. It shows that 84% of the participants are male, while the remaining 16% are female. This result reflects the overall gender diversity of the police officer workforce in the BPSF, which is 79.9% and 20.1% for males and females respectively (MOI, 2016).

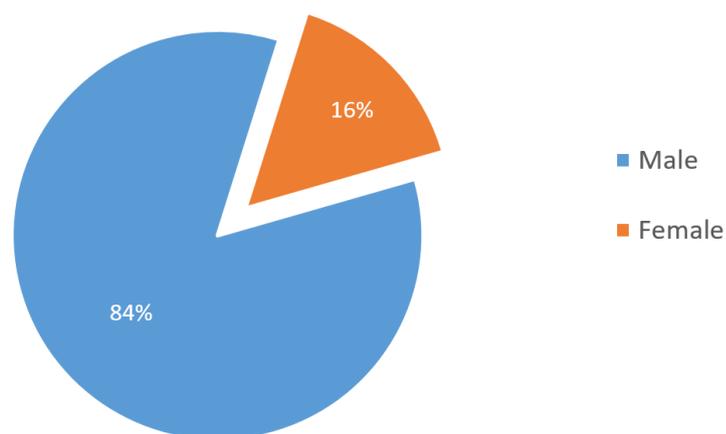


Figure 7. Respondents' Gender

#### 4.3.2 Respondents' Work Experience in the BPSF

As seen in Figure 8 below, the study revealed that the respondents represent different lengths of work experience in the BPSF. Only 11 (3.5%) officers had started working less than a year to five years ago. In addition, nine (2.8%) have 31 years' experience and above. The majority of the respondents, 292 (93.5%), have six to 30 years' work experience, which reflects the situation in the BPSF where the majority of employees fall within this range (MOI, 2016).

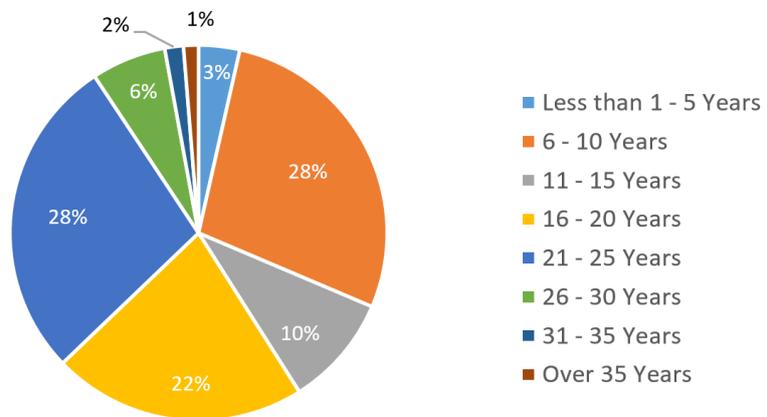


Figure 8. Respondents' Work Experience

#### 4.3.3 Respondents' Age

In the MOI, the minimum recruitment age for officers is 21 years and the age of retirement is 60 years (MOI, 2016). Based on the nature of the job, the vast majority of the police force is young, i.e. 26 to 40 years old. The participants' demographic profile based on the age group reflects the actual ground reality (see Figure 9). As shown in the Figure 9, the majority (66.6%) of the respondents' are 21-40 years old.

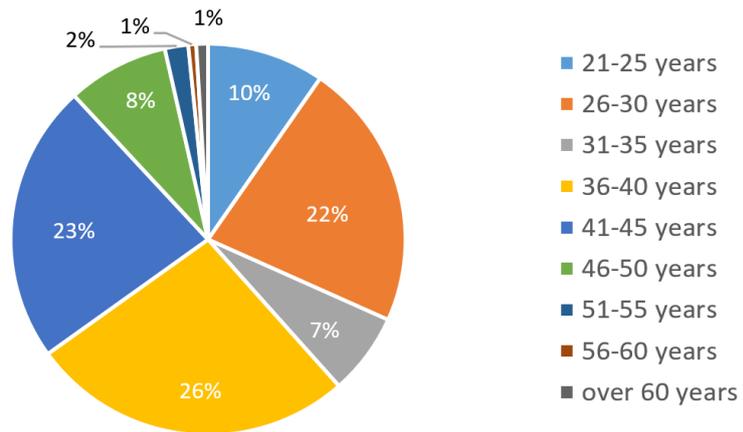


Figure 9. Respondents' Age Groups

#### 4.3.4 Respondents' Qualifications

In terms of education level, the results revealed that more than two-thirds of participants (76%) are Bachelor's degree holders or equivalent. The high percentage of officers holding a Bachelor's degrees refers to the minimum requirement to join the officer ranks in the BPSF (Law, 1982). Respondents with postgraduate degrees are the second largest group, which consists of those with a Master's or PhD degree. It can be seen that the majority of the respondents are well educated, which is a basic requirement to be in the force (see Figure 10 below).

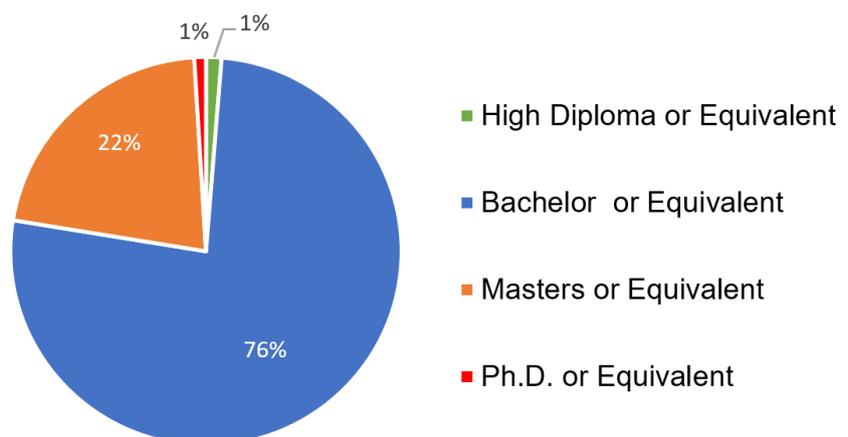


Figure 10. Respondents' Qualifications

#### 4.3.5 Respondents' Positions

As shown in Figure 11, 12% of the respondents are Directors, while 19% are the Head of section or equivalent. The results also revealed that 22% of the respondents are at Head of Branch or equivalent positions. Moreover, Head of Division or equivalent positions are represented by 15% of the study sample, and Officer for other tasks represents 30% of the respondents. Finally, only 2% of the respondents are at the General Director or equivalent level. Thus, it can be seen from the results that the majority of the respondents (98%) are in managerial positions. Participants from different managerial positions were chosen to obtain a comprehensive picture of knowledge sharing behaviours.

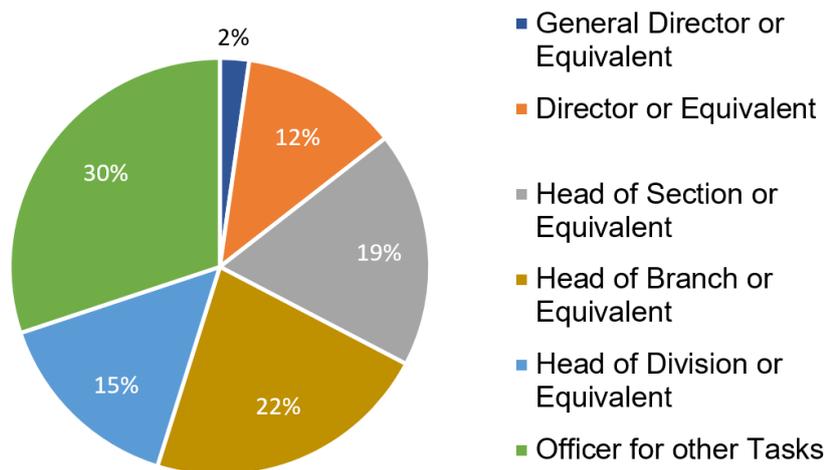


Figure 11. Respondents' Positions

#### 4.3.6 Respondents' Ranks

In terms of participants' ranks, the results revealed that more than 50% of participants are in lower ranks in the BPSF (Lieutenant, First Lieutenant and Captain), whereas 31% are from the middle ranks (Major and Lieutenant colonel). However, only about 11% of the study sample are in a high executive rank (Colonel, Brigadier and General) (see Figure 12). The researcher ensured the participation of employees from different pay scales to obtain wide-ranging responses.

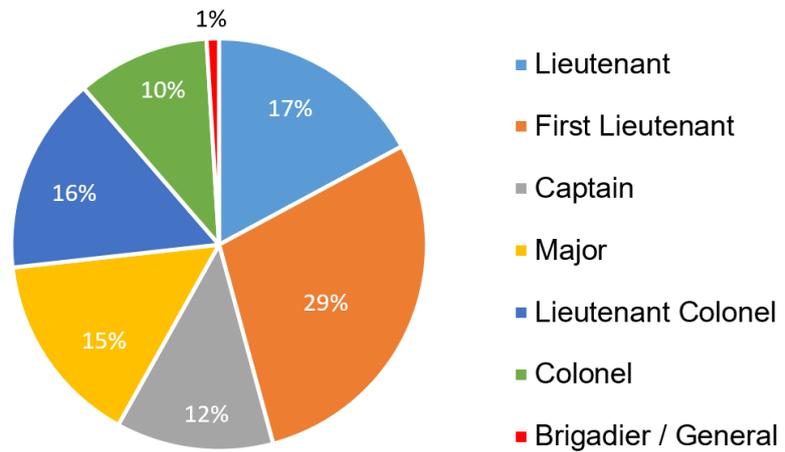


Figure 12. Respondents' Ranks

In summary, since all respondents who answered the survey questionnaire are BPSF professionals and practitioner officers, and represent various genders, managerial levels, ranks, age, levels of education and years of work experience in BPSF, therefore, their responses can be used to investigate the influence of the proposed factors on their KS behaviours. The demographic characteristics of the survey respondents are summarised in Table 16.

Demographic	Category	Frequencies	Percentage
<b>Gender</b>	Male	263	84.3
	Female	49	15.7
	<b>Total</b>	<b>312</b>	<b>100.0</b>
<b>Position</b>	General Director or equivalent	7	2.2
	Director or equivalent	38	12.2
	Head of Section or equivalent	57	18.3
	Head of Branch or equivalent	69	22.1
	Head of Division or equivalent	47	15.1
	Officer for other tasks	94	30.1
	<b>Total</b>	<b>312</b>	<b>100.0</b>
<b>Rank</b>	Lieutenant	53	17.0
	First Lieutenant	89	28.5
	Captain	38	12.2
	Major	47	15.1
	Lieutenant Colonel	48	15.4
	Colonel	32	10.3
	Brigadier	3	1.0
	General	2	.6
<b>Total</b>	<b>312</b>	<b>100.0</b>	
<b>Highest Qualification</b>	Secondary School Certificate or equivalent	0	0
	High Diploma or equivalent	4	1.3
	Bachelor's degree or equivalent	238	76.3
	Master's degree or equivalent	67	21.5
	Doctorate or equivalent	3	1.0
<b>Total</b>	<b>312</b>	<b>100.0</b>	
<b>Age Group</b>	21-25 Years	30	9.6
	26-30 Years	69	22.1
	31-35 Years	21	6.7
	36-40 Years	83	26.6
	41-45 Years	72	23.1
	46-50 Years	26	8.3
	51-55 Years	6	1.9
	56-60 Years	2	.6
	over 60 Years	3	1.0
<b>Total</b>	<b>312</b>	<b>100.0</b>	
<b>Work Experience at Bahrain Police Forces</b>	Less than 1 - 5 Years	11	3.5
	6 - 10 Years	87	27.9
	11 - 15 Years	30	9.6
	16 - 20 Years	68	21.8
	21 - 25 Years	87	27.9
	26 - 30 Years	20	6.4
	31 - 35 Years	5	1.6
	Over 35 Years	4	1.3
	<b>Total</b>	<b>312</b>	<b>100.0</b>

Table 16. Demographic Information Summary

#### 4.4 Descriptive Analysis of Participants' Responses

As mentioned earlier, the questionnaire consists of 42 items (statements) categorised in 10 constructs. Respondents were asked about their level of agreement/disagreement with each statement, by answering a five-point

Likert scale ranging from 1 as 'strongly disagree' to 5 as 'strongly agree'. In order to make a distinction between the respondents' agreement and disagreement, number 3 was chosen as the midpoint on the scale. A descriptive analysis of the data (responses from the sample on the constructs) obtained from the sample is presented next.

#### 4.4.1 Trust (TT)

Respondent perceptions towards trust in the BPSF were measured by four items. Variables' mean scores were 3.85, 3.97, 3.86 and 3.96, and the average mean score was 3.90 on the five-point scale. These reflect respondents' agreement perceptions with the trust items. Therefore, respondents' level of agreement indicated the presence of trust among officers of the Bahrain Public Security Forces (see Table 17).

Variables	N	Mean		Average Mean	Std. Deviation	Variance
		Statistic	Statistic	Std. Error		
TT1	312	3.8558	.05396	3.9087	.95310	.908
TT2	312	3.8397	.05014		.88573	.785
TT3	312	3.9776	.05283		.93321	.871
TT4	312	3.9615	.05611		.99118	.982

Table 17. Descriptive Analysis for Trust (TT)

#### 4.4.2 Structure Formalisation (SF)

In this study, four items were used to measure the organisational structure formalisation (SF) construct. All SF variables' mean scores were 3.54, 3.60, 3.58 and 3.43 above the midpoint of 3 on the five-point Likert scale (Table 18). The average mean score was 3.54, which indicated the participants' general agreement with SF-related statements. These results illustrate that the majority of the respondents believed that there is a structural formalisation within the BPSF organisational structure.

Variables	N	Mean		Average Mean	Std. Deviation	Variance
		Statistic	Statistic	Std. Error	Statistic	Statistic
SF1	312	3.5417	.04820	3.5417	.85144	.725
SF2	312	3.6058	.04680		.82663	.683
SF3	312	3.4359	.05063		.89428	.800
SF4	312	3.5833	.04781		.84457	.713

Table 18. Descriptive Analysis for Structure Formalisation (SF)

#### 4.4.3 Social Interaction (SI)

Four questions (items) were used to examine respondents' attitudes towards the existence of social interaction (SI) in the Bahrain Public Security Forces. The results revealed that the SI variables' mean scores were 3.66, 3.67, 3.86 and 3.63, and the average mean for the four items was greater than 3 (above the midpoint scale). The results suggest that employees tend to agree with the existence of social interaction in MOI. Table 19 summarises these findings.

Variables	N	Mean		Average Mean	Std. Deviation	Variance
		Statistic	Statistic	Std. Error	Statistic	Statistic
SI1	312	3.6699	.04437	3.4631	.78367	.614
SI2	312	3.6795	.04448		.78562	.617
SI3	312	2.8654	.05545		.97944	.959
SI4	312	3.6378	.04697		.82966	.688

Table 19. Descriptive Analysis for Social Interaction (SI)

#### 4.4.4 Structure Centralisation (SC)

Regarding the organisational structure centralisation (SC) construct, respondents were presented with four statements in order to measure the extent of their observation of this construct. SC variables' mean scores were 3.57, 3.62, 3.32 and 3.61, and the total mean score revealed an average of 3.53, indicating a high level of agreement about this construct's statements among Bahrain public security forces officers (see Table 20).

Variables	N	Mean		Average Mean	Std. Deviation	Variance
		Statistic	Statistic			
SC1	312	3.5737	.04935	3.5369	.87168	.760
SC2	312	3.6282	.05475		.96710	.935
SC3	312	3.6186	.05349		.94480	.893
SC4	312	3.3269	.04681		.82691	.684

Table 20. Descriptive Analysis for Structure Centralisation (SC)

#### 4.4.5 Rewards (RW)

Four items were used to measure the rewards construct in this study. Items' mean scores were 3.46, 3.48, 3.74 and 3.47, which indicated that all mean scores are greater than the midpoint of 3 on the five-point Likert scale. The total average mean score was 3.54, which indicated the participants' agreement with the rewards' statements on the scale measures. The results revealed that the majority of the respondents identified the existence of a reward system in the Bahrain Public Security Forces organisation. Table 21 summarises these findings.

Variables	N	Mean		Average Mean	Std. Deviation	Variance
		Statistic	Statistic			
RW1	312	3.7436	.03737		.66004	.436
RW2	312	3.4808	.04993		.88191	.778
RW3	312	3.4776	.04951		.87451	.765
RW4	312	3.4615	.04735		.83635	.699

Table 21. Descriptive Analysis for Rewards (RW)

#### 4.4.6 Personal Benefits (PB)

Three statements (items) were used to measure the personal benefits (PB) construct. The results revealed that the PB variables' mean scores were 3.38, 3.52 and 3.42, and the total average mean for the three items was 3.44 (higher than midpoint 3) indicating a relatively high level of agreement about this construct among survey respondents (see Table 22).

Variables	N	Mean		Average Mean	Std. Deviation	Variance
		Statistic	Statistic			
PB1	312	3.3846	.05215	3.4455	.92108	.848
PB2	312	3.5288	.04929		.87064	.758
PB3	312	3.4231	.04912		.86770	.753

Table 22. Descriptive Analysis for Personal Benefits (PB)

#### 4.4.7 Support (ST)

In this study, five items were used to measure the support (ST) construct. The majority of the five ST variables' mean scores were above the midpoint of 3 on the five-point Likert scale (3.28, 3.22, 3.29, 2.45 and 3.40). The average mean score was 3.13, which indicated that most participants agreed with ST statements on the scale measures. These results illustrate that the majority of the respondents felt that there was a supportive climate in the BPSF (see Table 23).

Variables	N	Mean		Average Mean	Std. Deviation	Variance
		Statistic	Statistic			
ST1	312	3.2853	.05052	3.1321	.89229	.796
ST2	312	3.2212	.05154		.91036	.829
ST3	312	3.2949	.05064		.89456	.800
ST4	312	2.4583	.06018		1.06306	1.130
ST5	312	3.4006	.05624		.99342	.987

Table 23. Descriptive Analysis for Support (ST)

#### 4.4.8 Reciprocity (RC)

Reciprocity (RC) was measured using four statements related to reciprocity behaviour. The results revealed that the RC variables' mean scores were 3.27, 3.26, 3.28 and 3.27, and the average mean for the four items was greater than midpoint 3 (3.27). This indicates a relatively large level of agreement about this construct among Bahraini public security force officers. Table 24 summarises these findings.

Variables	N	Mean		Average Mean	Std. Deviation	Variance
		Statistic	Statistic			
RC1	312	3.2788	.05530	3.2756	.97681	.954
RC2	312	3.2628	.05546		.97961	.960
RC3	312	3.2853	.05575		.98479	.970
RC4	312	3.2756	.05563		.98264	.966

Table 24. Descriptive Analysis for Reciprocity (RC)

#### 4.4.9 Knowledge Donating (KD)

In this study, there are two dependent variables (DV1 and DV2). Knowledge donating is the first dependent variable (DV1). Six items were used to measure the KD construct. The mean scores of four items were above the midpoint of 3 on the five-point Likert scale (3.47, 3.45, 3.39, and 3.45), whereas two of them are on the scale midpoint or below (2.96 and 2.39). However, the total average mean score was 3.19 (higher than midpoint 3), which indicated the positive attitude of most participants towards knowledge donating. These results illustrate that the majority of the respondents agreed with the presence of knowledge donating within the BPSF (see Table 25).

Variables	N	Mean		Average Mean	Std. Deviation	Variance
		Statistic	Statistic			
KD1	312	3.4776	.04716	3.1923	.83308	.694
KD2	312	3.4519	.04775		.84351	.712
KD3	312	3.4519	.04840		.85487	.731
KD4	312	2.9647	.01385		.24463	.060
KD5	312	3.4167	.04888		.86339	.745
KD6	312	2.3910	.06736		1.18985	1.416

Table 25. Descriptive Analysis for Knowledge donating (KD) DV1

#### 4.4.10 Knowledge Collecting (KC)

Knowledge collecting (KC) is the second dependent variable (DV2) used in this study. To measure the KC construct, four variables (items) were used. All KC variables' mean scores were greater than the value of midpoint on the five-point Likert scale (3.67, 3.66, 3.67, and 3.68). Moreover, the total average means score was 3.67, which indicated that the majority of the participants

agreed with KC statements on the measurement scale. These results illustrate that the participants believe in the presence of knowledge collecting behaviour at the BPSF. Table 26 summarises these findings.

Variables	N	Mean		Average Mean	Std. Deviation	Variance
		Statistic	Statistic	Std. Error	Statistic	Statistic
KC1	312	3.6795	.05116	3.6771	.90363	.817
KC2	312	3.6731	.05123		.90489	.819
KC3	312	3.6699	.05106		.90194	.813
KC4	312	3.6859	.05129		.90589	.821

Table 26. Descriptive Analysis for Knowledge Collecting (KC) DV2

#### 4.5 Factor Analysis

Factor analysis (FA) is a statistical procedure for investigating the relation between a set of observed and latent variables (Byrne, 2016). FA is mostly used to analyse the structure of all correlated variables among a large number of measurements by defining a large set of common observed and latent variables or underlying dimensions within the same group of items or separate them from other factors (Hair et al., 2014). Generally, factor analysis is divided into two main techniques: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) (Field, 2009; Tabachnick and Fidell, 2014; Blunch, 2013). EFA is designed to determine whether the factors are correlated or not. It is conducted without knowing how many factors really exist. Thus, EFA involves determining the number of factors and the pattern of the factor loadings. As a result, EFA is used to define the relationships between factors and then uses multivariate techniques to estimate the relationships. Hence, it is considered to be more of a theory generator than a theory procedure (Blunch, 2013). However, CFA is a more advanced technique to be performed when factor structure is known or at least theorised. This analysis is for testing generalisation of factor structure of the data, through the Structural Equation Modelling (SEM) method. This study initially applied exploratory factor analysis (EFA) and then applied confirmatory factor analysis (CFA) and structural equation modelling (SEM) to confirm correlations and infer causal relationships among factors. The next sections explain each process in detail.

## **4.6 Exploratory Factor Analysis**

According to Pallant (2011), exploratory factor analysis (EFA) is a method used to keep the set of factors more manageable, and minimise a large number of variables into a smaller number by grouping correlated variables to extract primary latent factors. In other words, exploratory factor analysis is used to determine whether questionnaire items were measuring what they were intended to (Stapleton, 1997).

EFA is mostly useful as a preliminary analysis when there is a lack of detailed theory about the variables' relations to the underlying constructs (Gerbing and Anderson, 1993). Although most measured variables in the constructs were derived from previous research and an extensive literature review, the EFA was deemed worthwhile since these variables had not been operated extensively within the police context (Panuwatwanich et al., 2017). Therefore, EFA was used to verify the pattern of loadings and the number of factors underlying the model constructs.

Prior to EFA, a reliability test using Cronbach's alpha was conducted to measure the internal consistency of the items in the survey instrument. This test was conducted on all independent and dependent variables. The result of Cronbach's alpha demonstrates an alpha of 0.7 and above (see Table 13, on page 134), which is acceptable within the normal context of a statistical test where the general guideline says that an alpha value above 0.7 indicates good reliability (Field, 2009). Moreover, as suggested by Tabachnick and Fidell (2014), the preferable case number for applying EFA and for generalisation purposes is over 300 cases. This study, however, collected data from 312 cases (research participants). Finally, the factorability of all items was examined. Several well-recognised criteria for the factorability of a correlation such as Kaiser-Meyer-Olkin (KMO) and Bartlett's Test of Sphericity were used. According to Coakes, (2013) and Pallant (2010), the Kaiser-Meyer-Olkin measure of the sampling adequacy (KMO) and Bartlett's Test of Sphericity could be generally applied to determine the factorability of such a matrix. As shown in Table 27, the results from SPSS indicated that the factorability of all items was examined and the value of the Kaiser-Meyer-Olkin

(KMO) measure of sampling adequacy was .792. According to Coakes, (2013) and Tabachnick and Fidell (2014), the minimum recommended value is .600. In addition, Bartlett's Test of Sphericity indicated that the Chi-squared value was 13793.201 with 1225 df, and reached statistical significance ( $p < 0.01$ ) (Hair, 2010). These results indicated that all initial variables were supporting the factorability of the correlation matrix. Thus, the value obtained in the current study reflects that all variables are valid for the exploratory factor analysis process.

**KMO and Bartlett's Test<sup>a</sup>**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.792
Bartlett's Test of Sphericity	Approx. Chi-Square	13793.201
	df	1225
	Sig.	.000

a. Based on correlations

*Table 27. KMO and Bartlett's Test*

A suitable approach to EFA was then determined. This involved establishing the factor extraction method, factor retention criteria, factor rotation method and the interpretation of the resulting factor loadings, which are explained in the next sections.

#### **4.6.1 Factor Extraction and Rotation**

Several researchers argue that EFA must follow three basic steps in order to generate the proper solution needed to clarify an adequate number of factors representing a construct (Pallant, 2016; Field, 2009). These steps include factor extraction and factor rotation and interpretation. Factor extraction refers to removing the common variance that is shared among a set of variables (Kieffer, 1999). There are currently several different techniques available for the extraction of common variance such as principal component analysis (PCA) and principal factor analysis (PFA). The results generated by the PCA and PFA can differ based on the particular method of extraction utilised. Of

the techniques available, principal component analysis is the most widely used extraction method in EFA (Hair et al., 2014). To perform the factor extraction, this study used principal component analysis (PCA), which is an extraction method used widely for defining the factors needed to represent the structure of the variables. Several studies related to this study also used PCA to extract the factors. For example, in the context of information technology organisations, De Oliveira et al. (2015) used PCA to investigate the relationship between knowledge sharing behaviour and innovation. Similarly, Pirkkalainen et al. (2018) used PCA to assess engaging in knowledge exchange in open innovation communities. To achieve adequate principal component analysis results, a combination of the following criteria must be met (Hair et al. 2014) (see Table 28):

<b>Criterion / Test</b>	<b>Explaining</b>
<b>Latent Root (Eigenvalue)</b>	Where the factors with an eigenvalue >1 are important while those with <1 should be discarded.
<b>Catell's Scree Test</b>	This test employs a graphical plot of eigenvalues against the number of factors in their order of extraction. The point where there is a sudden change of slope in the curve indicates the maximum number of factors to be extracted.
<b>Percentage of Variance</b>	Ensures practical significance for the derived factors, by which the specific amount of variance is explained. where Hair et al. (2006) suggest that a solution that accounts for $\leq 60\%$ of the total variance in social science research is quite common, since the information in this area, by nature, is often less precise.
<b>Priori Criterion</b>	A simple criterion where the number of factors is known prior to undertaking the factor analysis. It is a particularly appropriate criterion if the purpose of the analysis is to replicate another researcher's findings by extracting the same number of factors.

Table 28. Factor Extraction and Rotation Criteria

More importantly, however, the researcher should combine the conceptual foundation with some empirical evidence to determine the appropriate number of factors to extract or retain, rather than relying solely on the results produced from the specific criterion (Hair et al., 2006).

After the factor extraction, determining the degree to which the variables load onto these factors becomes possible and can be conducted through factor rotation methods (Field, 2009). In most cases, the initial factor solution does not provide an adequate interpretation, since most variables will have high loadings on the most important factors and small loadings on the other factors (Field, 2009; Hair, 2010). Therefore, a factor rotation is conducted to achieve simpler and more meaningful solution.

The rotation methods are either orthogonal or oblique (Tabachnick and Fidell, 2014). Orthogonal rotation methods assume that the factors in the analysis are uncorrelated (Brown, 2009). Four orthogonal rotation techniques are equamax, orthomax, quartimax and varimax. In contrast, oblique rotation methods assume that the factors are correlated (Brown, 2009). Version 24 of SPSS offers five rotation methods: varimax, direct oblimin, quartimax, equamax and promax, in that order. Three of those are orthogonal (varimax, quartimax, and equimax), and two are oblique (direct oblimin and promax). However, the most simple and commonly used rotation technique is the varimax orthogonal rotation (Tabachnick and Fidell, 2014). In addition, other studies related to knowledge sharing such as Oliveira et al. (2015) and Pirkkalainen et al. (2018) used the varimax rotation method. This study thus used the varimax rotation method to generate the final constructs.

After the factors have been rotated, specific criteria are employed to justify the significance of the factor loadings, thus ensuring a meaningful correlation between the variable and the factor (Hair, 2010; Tabachnick and Fidell, 2014). To ensure that the variables in each factor had practical significance, the recommended cut-off factor loading of 0.60 was used (Hair et al., 2014). The results of the EFA are presented next.

#### **4.6.2 EFA Results**

In this study, Factor Extraction, Retention and Rotation were used for data reduction (EFA). Kieffer (1999) defined factor extraction as a remover for the common variance that is shared among a set of variables. Principal component analysis and principal factor analysis are the two most widely used extraction techniques in EFA (Hair et al., 2014). However, the results generated by the analysis can differ based on the particular method of extraction utilised. Although some researchers have argued that the difference between these extraction methods is negligible, other researchers have contended that the difference is substantial enough to warrant careful consideration (Kieffer, 1999). PCA is the most common strategy used in social sciences for factor extraction (Alexander and Colgate, 2000; Henson and Roberts, 2006).

The principal component analysis (PCA) was run with eigenvalues exceeding 1 and a maximum of 25 iterations for convergence. Table 29 shows these results together with the total explained variance. This resulted in the identification of 10 components, which accounted for 88.67% of total variance in the dataset. The first 10-factor solution emerged from PCA when applying Kaiser's criterion 'eigenvalue-greater-than-one' rule. It is also clear that the first factor contributed 21.20% alone, while the remaining factors fluctuated in contribution from 14.64% for the second factor to only 3.16% for factor number 10. Accordingly, Kieffer (1999) asserts that it is important to examine more than one factor retention method, since different retention methods may generate conflicting results. Therefore, an inspection of Cattell's scree test plot (see Figure 13) also reveals a clear break after the tenth component and confirms the Kaiser's criterion result. In addition, the factors on the curve of the plot line prove the accuracy of the earlier 'eigenvalue-greater-than-one' rule.

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.210	21.207	21.207	7.210	21.207	21.207	3.969	11.674	11.674
2	4.978	14.640	35.847	4.978	14.640	35.847	3.775	11.103	22.777
3	4.169	12.263	48.110	4.169	12.263	48.110	3.714	10.923	33.699
4	2.712	7.978	56.087	2.712	7.978	56.087	3.188	9.378	43.077
5	2.559	7.526	63.614	2.559	7.526	63.614	2.682	7.888	50.965
6	2.145	6.308	69.922	2.145	6.308	69.922	2.668	7.846	58.811
7	2.119	6.231	76.153	2.119	6.231	76.153	2.629	7.732	66.544
8	1.808	5.319	81.472	1.808	5.319	81.472	2.578	7.583	74.126
9	1.372	4.034	85.506	1.372	4.034	85.506	2.531	7.445	81.571
10	1.077	3.168	88.674	1.077	3.168	88.674	2.415	7.102	88.674
11	.447	1.313	89.987						
12	.400	1.178	91.165						
13	.336	.987	92.152						
14	.306	.899	93.051						
15	.286	.840	93.892						
16	.259	.763	94.655						
17	.229	.673	95.328						
18	.191	.560	95.888						
19	.177	.521	96.410						
20	.173	.509	96.919						
21	.145	.427	97.346						
22	.133	.390	97.736						
23	.107	.315	98.051						
24	.103	.302	98.353						
25	.087	.257	98.610						
26	.080	.237	98.846						
27	.073	.214	99.060						
28	.063	.185	99.245						
29	.060	.176	99.421						
30	.053	.157	99.578						
31	.051	.150	99.728						
32	.041	.122	99.850						
33	.033	.097	99.946						
34	.018	.054	100.000						

Table 29. Total Variance Explained

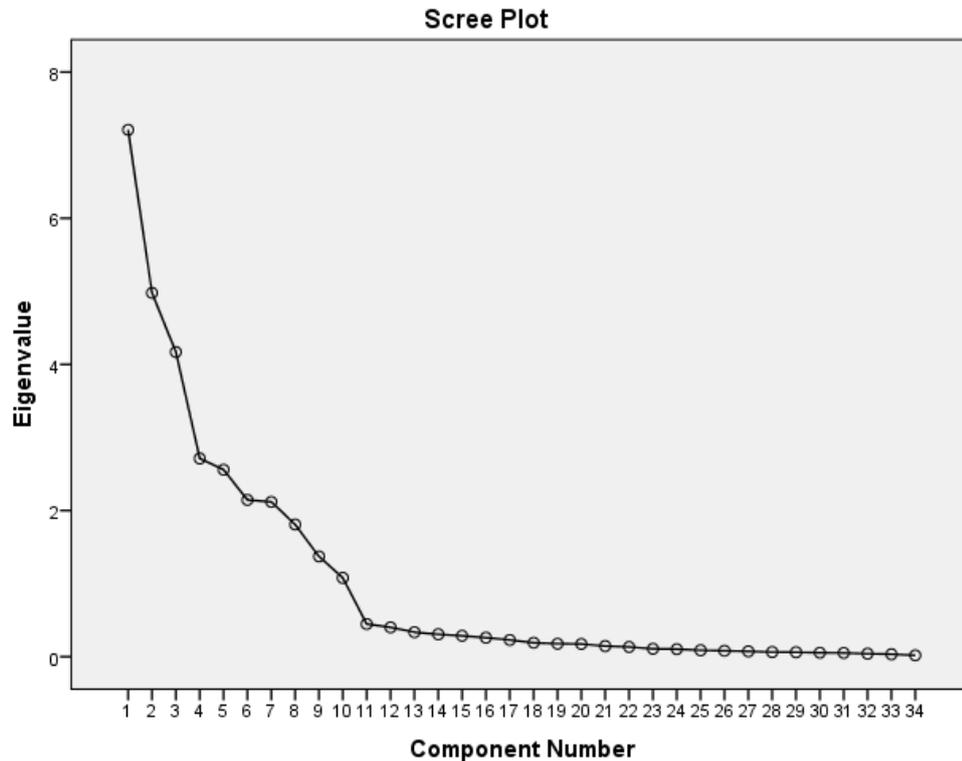


Figure 13. Scree Plot

After factors have been extracted, it is essential to identify to what degree variables load on them by rotation technique. PCA/EFA literature defines rotation as performing arithmetic to obtain a new set of factor loadings (Jennrich, 2006; Yamamoto and Jennrich, 2013). Rotation is thus important for improving the interpretability and scientific utility of the solution. Moreover, it is used to maximise the significant correlations between factors and variables and minimise weak ones. Similarly, it is commonly used to rotate the factors to formulate a better solution that is more interpretable (Kieffer, 1999). Different techniques can be used to develop factors from variables, but the rotation method is the most important to arrange them in more meaningful order (Field, 2006).

There are two major rotation strategies available for researchers: orthogonal and oblique rotation (Kieffer, 1999; Field, 2006). However, the most commonly used method is varimax rotation of orthogonal techniques. Since, in many situations, it is unnatural for factors to be orthogonal to one another, a number of oblique rotation methods have been developed (Yamamoto and Jennrich,

2013). However, Tabachnick and Fidell, (2014) assert that different methods of extraction give similar results with a suitable dataset; in addition, different methods of rotation tend to provide similar results if the correlations pattern of the data is objectively clear.

Employing varimax as one of orthogonal rotation strategies has several advantages. First, the factors are inherently easier to interpret and remain perfectly uncorrelated with one another. Secondly, according to Kieffer (1999), the factor structure matrix and the factor pattern matrix are equivalent; therefore, only one matrix of association has to be estimated. This means that the solution is more parsimonious and thus, in theory, is more replicable. However, orthogonal rotation of factor solutions may oversimplify the relationships among the factors and the variables, and may not represent these relationships accurately (Kieffer, 1999). Nevertheless, in studies related to social sciences, varimax orthogonal techniques are most commonly used for rotation (Alexander and Colgate, 2000). Therefore, the researcher decided to use the varimax rotation technique for this study.

The varimax rotation technique was developed by Kaiser (1960); it produces factors that have large pattern/structure coefficients for a small number of variables or very low pattern/structure coefficients with the other group of variables (Kieffer, 1999). According to Hair et al. (2014), the purpose of varimax rotation is to maximise the variance of factor loading by higher the high loadings for each factor and lower the small ones.

Tabachnick and Fidell (2014) suggest that if the factor loadings cut-offs from +0.50 or greater are considered highly significant, and can be used for further analysis. Principal component analysis revealed that 34 of 42 items had factor loadings of more than 0.50 in 10 components. However, some components had cross loadings or only had one item loaded. In addition, the items RW1 and SC4 did not load at all. Thus, problematic items/variables such as KD4, KD6, TT2, SI3, ST4 and SF4 were identified and excluded from the rotation process. After removing the problematic items, a clean rotated component matrix with high loadings was achieved as shown below (Table 30). The result of the final matrix shows the 10 factors with fewer but highly correlated items, and 34 items that were subject to further analysis. In addition, the results are

shown along with Cronbach's alpha and the percentage of variance explained for each factor. These final factors are explained in the following section.

Rotated Component Matrix <sup>a</sup>											
Factors	Items	Component									
		F1 (RC)	F2 (KD)	F3 (KC)	F4 (ST)	F5 (RW)	F6 (SI)	F7 (SC)	F8 (PB)	F9 (TT)	F10 (SF)
Reciprocity	RC2	.968									
	RC1	.962									
	RC4	.961									
	RC3	.960									
Knowledge Donating	KD2		.958								
	KD3		.956								
	KD1		.931								
	KD5		.927								
Knowledge Collecting	KC2			.889							
	KC1			.889							
	KC4			.889							
	KC3			.874							
Support	ST3				.920						
	ST1				.866						
	ST2				.848						
	ST5				.822						
Rewards	RW2					.920					
	RW3					.905					
	RW4					.840					
Social Interaction	SI1						.945				
	SI4						.898				
	SI2						.870				
Structure Centralisation	SC3							.924			
	SC2							.876			
	SC1							.874			
Personal Benefits	PB3								.910		
	PB2								.894		
	PB1								.882		
Trust	TT3									.926	
	TT1									.883	
	TT4									.867	
Structure Formalisation	SF3										.903
	SF1										.872
	SF2										.838
Reliability Analysis		.990	.975	.979	.904	.956	.927	.922	.911	.899	.868
% of Variance Explained		21.207	14.640	12.263	7.978	7.526	6.308	6.231	5.319	4.034	3.168
<p><b>Extraction Method:</b> Principal Component Analysis; <b>Rotation Method:</b> Varimax with Kaiser Normalization.<sup>a</sup></p> <p>a. Rotation converged in 7 iterations.</p>											

Table 30. Factor Loadings

### 4.6.3 Explanation of Factors after Rotation

Generally, it is hard to name the components generated from the factor analysis process. Thus, the second crucial step after the rotation process, is labelling each of the factors based on a general theme that can be established from the items within the component. In addition, the study hypothesis model/framework will be affected by the result of the final factor extraction. However, each of these final factors is explained in the following tables and paragraphs:

#### Reciprocity (RC)

The first factor as displayed in Table 31 illustrates four items that have the greatest factor loadings. All responses to the Reciprocity (RC) factor show positive feedback, with the mean for each item recorded greater than 3.0 (Neutral). Details of the responses are shown in Table 31. In addition, reliability of the new construct (RC) remained the same (0.990) as no item was reduced during the EFA process.

Descriptive Statistics for Reciprocity (RC) N=312				
Items	Factor Loadings	Mean	Std. Deviation	Cronbach's Alpha
RC1	.962	3.278	.97681	0.990
RC2	.968	3.262	.97961	
RC3	.960	3.285	.98479	
RC4	.961	3.275	.98264	

Table 31. Descriptive Statistics Results for Factor 1 (RC)

#### Knowledge Donating (KD)

The second factor generated from EFA is knowledge donating (KD). There were four items presented in this component. All of them relate to DV1 (KD). The overall response to the items/statements was rated positive. The highest mean rating is 3.45 for the item KD2, while the lowest mean rating, 3.41, is for the item KD5, which is nevertheless greater than the midpoint of the Likert scale used in this study. Details of the responses are shown in Table

32. In addition, the reliability of the new construct (KD) with fewer items also improved, as shown in the table below.

Descriptive Statistics for Knowledge Donating (KD) N=312				
Items	Factor Loadings	Mean	Std. Deviation	Cronbach's Alpha
KD1	.931	3.4776	.83308	.975
KD2	.958	3.4519	.84351	
KD3	.956	3.4519	.85487	
KD5	.927	3.4167	.86339	

Table 32. Descriptive Statistics Results for Factor 2 (KD)

### Knowledge Collecting (KC)

The knowledge collecting factor as one of the two dependent variables was third on the loading list. All four items are loaded in this factor, all of which have been answered very positively by the respondents, with the highest mean rating of 3.68 for the item KC4, which is greater midpoint 3.0. This shows the participants' belief and high confidence in their colleagues when collecting knowledge from them. Details of the responses are shown in Table 33. In addition, the reliability of the new construct (KC) remained the same, as shown in the table below.

Descriptive Statistics for Knowledge Collecting (KC) N=312				
Items	Factor Loadings	Mean	Std. Deviation	Cronbach's Alpha
KC1	.889	3.6795	.90363	.979
KC2	.889	3.6731	.90489	
KC3	.874	3.6699	.90194	
KC4	.889	3.6859	.90589	

Table 33. Descriptive Statistics Results for Factor 3 (KC)

### Support (ST)

As shown in Table 34 below, a supportive climate (ST) within the organisation was in the fourth loading position. For instance, the outline results illustrate that the majority of responses positively agreed or strongly agreed about the

presence of a supportive climate among bosses and co-workers and organisational supportive efforts towards sharing knowledge. It can be seen from the same table that all items' means are higher than a rating of 3.0 (Neutral). In addition, the reliability of the new construct (ST) also improved, as shown in the table below.

Descriptive Statistics for Support (ST) N=312				
Items	Factor Loadings	Mean	Std. Deviation	Cronbach's Alpha
ST1	.866	3.2853	.89229	.904
ST2	.848	3.2212	.91036	
ST3	.920	3.2949	.89456	
ST5	.822	3.4006	.99342	

Table 34. Descriptive Statistics Results for Factor 4 (ST)

### Rewards (RW)

The majority of the responses positively agreed or strongly agreed that there are motivation efforts and policies in the BPSF in terms of rewarding excellent performance and the existence of rewards. The outline results illustrate that all rewards factor means are over the rating of 3.0 (Neutral). Details of the responses are shown in Table 35. In addition, the reliability of the new construct (RW) also improved, as shown in the table below.

Descriptive Statistics for Rewards (RW) N=312				
Items	Factor Loadings	Mean	Std. Deviation	Cronbach's Alpha
RW2	.920	3.4808	.88191	.956
RW3	.905	3.4776	.87451	
RW4	.840	3.4615	.83635	

Table 35. Descriptive Statistics Results for Factor 5 (RW)

### Social interaction (SI)

The sixth factor is Social Interaction (SI), in which most of the items are related to the police officers' communications with their colleagues in Bahrain's police

force. There are three items in this component, which are maintaining close social relationships with colleagues, time spent on interacting with colleagues, and communication frequency with colleagues towards knowledge donating and collecting. The mean scores suggest that most respondents tend to agree with their social interaction behaviour, as all mean scores are greater than the rating of 3.0 (Neutral). Details of the results are shown in Table 36. In addition, the reliability of the new construct (SI) also improved, as shown in the table below.

<b>Descriptive Statistics for Social Interaction (SI) N=312</b>				
<b>Items</b>	<b>Factor Loadings</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Cronbach's Alpha</b>
SI1	.945	3.6699	.78367	.927
SI2	.870	3.6795	.78562	
SI4	.898	3.6378	.82966	

Table 36. Descriptive Statistics Results for Factor 6 (SI)

### **Structure Centralisation (SC)**

The seventh factor generated from factor analysis is labelled Structure Centralisation (SC). Three items fall into this component, all of which relate to the extent to which the organisational structure is centralised, i.e. centralised decision making in the force. Generally, items have been answered positively by the respondents; all items are greater than a rating of 3.0 (Neutral), and the highest mean rating of 3.62 was for the item SC2. In addition, the reliability of the new construct (SC) also improved, as shown in Table 37 below.

<b>Descriptive Statistics for Structure Centralization (SC) N=312</b>				
<b>Items</b>	<b>Factor Loadings</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Cronbach's Alpha</b>
SC1	.874	3.5737	.87168	.922
SC2	.876	3.6282	.96710	
SC3	.924	3.6186	.94480	

Table 37. Descriptive Statistics Results for Factor 7 (SC)

### **Personal Benefits (PB)**

The factor labelled Personal Benefits (PB) has been loaded as the eighth factor. This factor related to knowledge contributor's judgement of likely consequences that his or her knowledge sharing behaviour will produce to him or herself. There are three items in this factor. First, the belief that the knowledge contributor can build up his/her reputation in the organisation; second, the belief that knowledge contribution can strengthen the ties between him/her and other colleagues in the organisation; and third, the belief that knowledge contribution will enable him/her to gain better cooperation from the outstanding members in the force – all of which have been answered positively by the respondents, which shows the majority of the respondents agree or strongly agree with all items' statements for this factor. Moreover, the reliability of the new construct (PB) also improved, as shown in the Table 38 below.

<b>Descriptive Statistics for Personal Benefits (PB) N=312</b>				
<b>Items</b>	<b>Factor Loadings</b>	<b>Mean</b>	<b>Std. Deviation</b>	<b>Cronbach's Alpha</b>
PB1	.882	3.3846	.92108	.911
PB2	.894	3.5288	.87064	
PB3	.910	3.4231	.86770	

Table 38. Descriptive Statistics Results for Factor 8 (PB)

### **Trust (TT)**

The ninth factor is labelled Trust (TT). This factor has been named as such since all of the three items that fall into this component are related to a set of specific beliefs dealing primarily with the integrity among employees: the continuity of keeping promises among police officers, consistent manner of behaviour of organisation members and truthfully dealing with force members. The respondents showed a very positive response to all items. About two-thirds of responses agreed or strongly agreed with all items' statements for this factor. In addition, the reliability of the new construct (TT) also improved, as shown in Table 39.

Descriptive Statistics for Trust (TT) N=312				
Items	Factor Loadings	Mean	Std. Deviation	Cronbach's Alpha
TT1	.883	3.8558	.95310	.899
TT3	.926	3.9776	.93321	
TT4	.867	3.9615	.99118	

Table 39. Descriptive Statistics Results for Factor 9 (TT)

### Structure Formalisation (SF)

The last factor has been named Structure Formalisation (SF). This factor's items are related to the regulations, procedures, policy manuals and job descriptions. All three items in this factor are loaded and have been answered positively by the respondents, which means all are greater than a rating of 3.0 (Neutral). This mean that the majority of respondents' belief in the formalisation of their organisational structure. Moreover, the reliability of the new construct (SF) also improved, as shown in Table 40 below.

Descriptive Statistics for Structure Formalization (SF) N=312				
Items	Factor Loadings	Mean	Std. Deviation	Cronbach's Alpha
SF1	.872	3.5417	.85144	.868
SF2	.838	3.6058	.82663	
SF3	.903	3.4359	.89428	

Table 40. Descriptive Statistics Results for Factor 10 (SF)

### 4.7 Confirmatory Factor Analysis

As demonstrated in the previous section, EFA revealed factor structures (the number of factors) and confirmed the reliability of the measurement scales that underpin the model constructs. In line with the advice from Hair (2010), based on the results of exploratory factor analysis, CFA was employed in order to validate the underlying structure of the main constructs in the study, examine the reliability of the measurement scales and assess the factorial

validity of the theoretical constructs. In this research, CFA using AMOS 24 was examined twice, in first order and second order, to examine the measurement model.

According to Fornell and Larcker (1981), factor loadings (the strength of relationship between the indicator variables and latent factors) should be at least 0.70, and this is a major factor in deciding which indicator variables to retain for the final model. Factor loadings in excess of 0.5 can also sometimes be considered (Johnson and Stevens, 2001). Since in learning environments a standardised factor loading of 0.5 and above is considered acceptable (Johnson, and Stevens, 2001), a cut-off value of 0.6 and above is considered in this study. In addition, Segars and Grover (1998) suggested that the measurement model should be tested and if necessary amended in order to produce the best fit. These can be first order (directly measured by the indicator variables) or second order, where first-order latent factors are related to a single second-order factor (Byrne, 2016).

#### **4.7.1 First-order CFA Model**

The measurement model in this study was evaluated using the Maximum Likelihood estimation techniques. The CFA technique has the ability to find how well any factor represents the data. This can be done by examining the model fit indices. In general, if the fit indices prove to be good, the model is consistently accepted. However, instead of rejecting fit indices that are not good, a model with unsatisfactory fit indices will be modified until it reaches acceptable fit indices.

In order to decide whether or not the model adequately represents the set of causal relationships, each of the measurement and structural model was subjected to the assessment of overall model fit. AMOS, however, generates 25 different goodness-of-fit measures and the choice of which to report is a matter of dispute among methodologists. Hair et al. (2014) recommend reporting Chi-squared statistics in addition to another absolute index such as RMSEA and an incremental index such as CFI. They also recommended reporting the goodness-of-fit index (GFI) and the adjusted goodness of fit

index (AGFI). Therefore, the fit indices used to assess model fit in this study were:

**Chi-square** ( $\chi^2$ ) is one of the most basic indices of absolute fit indices that include, in general, the degree of freedom (df) value and (p-value) (Kline, 2011).

**Comparative fit index** (CFI) is also a commonly used measurement model fit index, where ranges between 0 and 1 with higher values indicate better fit. Values less than .90 are not usually associated with a model that fits well (Byrne, 2016; Hair et al., 2014; Kline, 2011).

**Root mean square error of approximation** (RMSEA) takes into account the error of approximation in the population. Generally, values less than 0.05 indicate good fit and values as high as .08 represent reasonable errors of approximation in the population (Byrne, 2016).

**The goodness-of-fit index** (GFI) was developed by Jöreskog and Sörbom (1984) for Maximum Likelihood estimation. A GFI closer to 1 indicates a better fit. Values more than .80 are usually associated with a model that fits well (Byrne, 2016; Hair et al., 2014; Kline, 2011).

**The adjusted goodness-of-fit index** (AGFI) takes into account the degrees of freedom available for testing the model. An AGFI greater than 0.9 indicates a good fit (Holmes-Smith 2000).

**Model comparison indices** (also known as incremental indices) compare the fit of a given model to the fit of another baseline model that assumes uncorrelated measurement variables, where all factor loading scores are fixed to 1, and all errors values are fixed to 0. Examples of incremental indices include Comparative Fit Index (CFI), Normed Fit Index (NFI) and Non-Normed Fit Index (NNFI), which is also known as the Tucker-Lewis Index (TLI) (Schermelleh-Engel et al., 2003; Kenny, 2011; Byrne, 2016). Based on the above discussion, this study used the following 'Rules of Thumb' criteria for an acceptable model fit (see Table 41).

<b>Goodness of fit (GOF) Measure</b>	<b>Model Fit Thresholds</b>	<b>Sources</b>
RMSEA	<0.10	Davaraj et al., 2002; Byrne,2001
GFI	>0.9	Hu and Bentler (1999)
AGFI	>0.8	Etezadi-Amoli and Farhoomand,1996
RMR	< 0.05	Hair et al., 2010; Kline, 2010
NFI	> 0.9	Wang and Wang, 2012
TLI	> 0.9	Hair,et al. 2010
CFI	>0.8	Kline, 2010; Lau, 2011
$\chi^2/df$ (degrees of freedom)	$\leq 3$	Hair,et al. 2010
p-value	>.05	Hair et al. (2006)

Table 41. 'Rules of Thumb' for Measurement Model Fit Indices

Figure 14 below shows the output path diagram of the first-run CFA, and is followed by the overall goodness-of-fit statistics in Table 42. The full model-fit summary for the first-run of CFA appears in Appendix 3 on page 316.

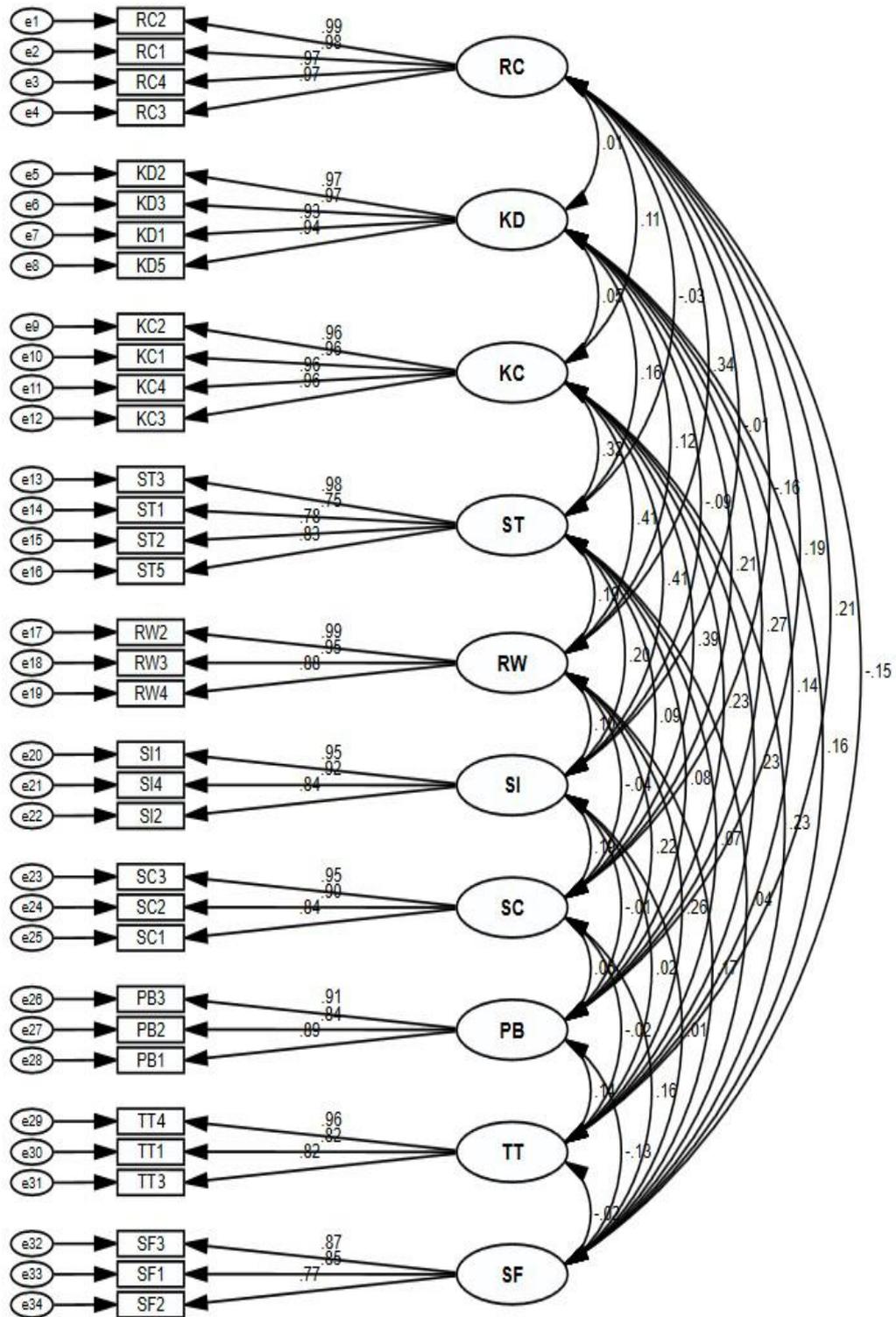


Figure 14. First-Run CFA Output Path Diagram

Goodness of fit (GOF) Measure	Conceptual Model First-Run	Model Fit Thresholds	Result	Sources
RMSEA	.054	<0.05	Unaccepted	Davaraj et al., 2002; Byrne,2001
GFI	.861	>0.9	Unaccepted	Hu and Bentler (1999)
AGFI	.828	>0.8	Accepted	Etezadi-Amoli and Farhoomand,1996
RMR	.030	< 0.05	Accepted	Hair et al., 2010; Kline, 2010
NFI	.929	> 0.9	Accepted	Wang and Wang, 2012
TLI	.959	> 0.9	Accepted	Hair,et al. 2010
CFI	.965	>0.8	Accepted	Kline, 2010; Lau, 2011
$\chi^2/df$ (degrees of freedom)	1.917	$\leq 3$	Accepted	Hair,et al. 2010
p-value	.000	>.05	Accepted	Hair et al. (2006)

Table 42. Measurement Model (first run)

It can be seen from Table 42 that, while most fit indices indicated a satisfactory level of model adequacy, GFI was below the recommended value. Therefore, there was room for further model adjustments in order to achieve a better model fit. The process of the measurement model enhancement is explained next.

#### 4.7.2 Modification of the Measurement Model

Researchers often re-specify their model when parameter estimates are statistically insignificant (Schreiber et al., 2006). That procedure typically improves the fit of the model to the data. Re-specification of the structural model is driven most often by modification indices (Byrne, 2016). These indices indicate the effect of freeing pre-fixed parameters on Chi-square ( $\chi^2$ ). Therefore, checking these values would help the researcher to determine which path should be added to the model in order to decrease the Chi-square ( $\chi^2$ ) statistic, which in turn improves the model fit. Large modification indices (usually more than 4) determine which parameters should be set free in order to achieve better model suitability. A common practice in this regard is to

correlate parameter errors that are part of the same factor (Schreiber et al., 2006). Moreover, parameters that show high covariance between their errors and at the same time have high regression weights, are candidates for deletion.

Covariance Path			M.I.	Covariance Path			M.I.
e31	<-->	e34	5.188	e11	<-->	e24	6.416
e27	<-->	e29	5.293	e11	<-->	e23	5.153
e25	<-->	e33	5.481	e11	<-->	e16	5.755
e25	<-->	e32	7.959	e10	<-->	e29	5.618
e25	<-->	e28	5.608	e9	<-->	e29	4.103
e22	<-->	e34	8.254	e9	<-->	e24	4.623
e22	<-->	e33	12.369	e8	<-->	e34	5.739
e22	<-->	e27	9.158	e8	<-->	e33	9.521
e22	<-->	e26	8.469	e8	<-->	e32	34.449
e21	<-->	e33	7.449	e7	<-->	e32	6.382
e20	<-->	e34	4.459	e6	<-->	e34	15.337
e20	<-->	e27	17.596	e5	<-->	e33	6.888
e20	<-->	e26	16.193	e5	<-->	e28	4.557
e18	<-->	e20	4.431	e5	<-->	e15	6.049
e17	<-->	e20	5.036	e3	<-->	e31	4.747
e15	<-->	e16	34.162	e3	<-->	e30	4.440
e14	<-->	e29	4.221	<b>e3</b>	<-->	<b>e4</b>	<b>29.623</b>
<b>e14</b>	<-->	<b>e15</b>	<b>37.464</b>	e2	<-->	e21	7.968
e13	<-->	e24	5.002	e2	<-->	e3	11.381
e13	<-->	e16	4.917	e1	<-->	e30	7.109
<b>e13</b>	<-->	<b>e14</b>	<b>12.557</b>	e1	<-->	e4	7.508
e11	<-->	e26	4.068	e1	<-->	e2	8.399

Table 43. Modification Indices for CFA (First Run)

An inspection of modification indices presented in Table 43 above showed several large values that were correlated effectively to enhance the measurement model goodness-of-fit. As shown in Figure 15, covariance of six error terms (e3 with e4, e13 with e14 and e14 with e15), based on the Modification Indices improved the measurement model.

### 4.7.3 Second-order CFA Model

Once the above model modifications have been introduced, second-order CFA model analysis is required to complete the assessment of the measurement model. At this stage of CFA model analysis, the same first-order analysis steps are followed. The overall goodness-of-fit statistics that resulted from the second run of CFA can be seen in Table 40 and the related output path diagram for the measurement model is depicted in Figure 14. In addition, the full model-fit summary for the second-run of CFA can be found in Appendix 4 on page 318.

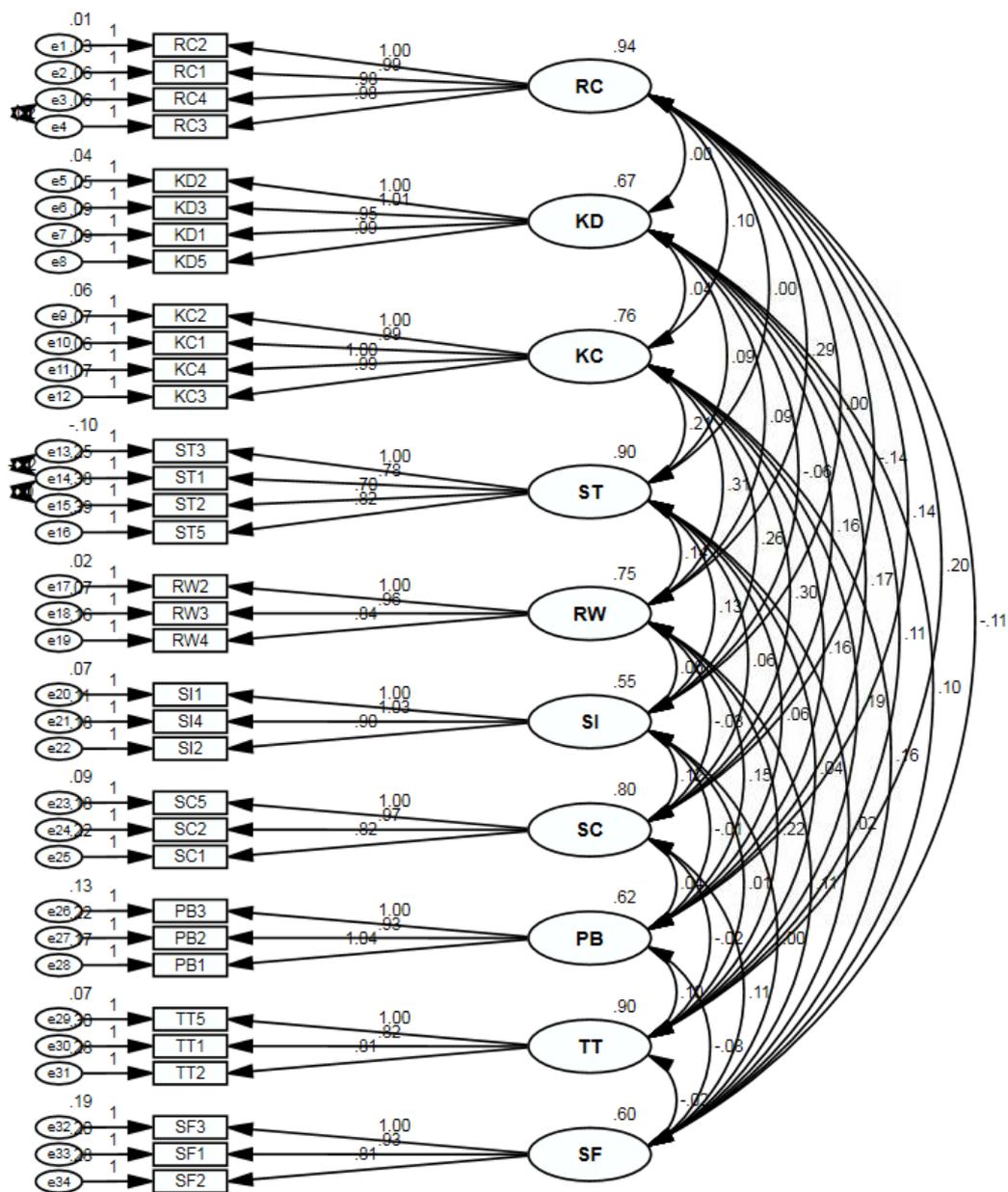


Figure 15. Second-Run CFA Output Path Diagram

Goodness of fit (GOF) Measure	Conceptual Model First-Run	Model Fit Thresholds	Result	Sources
RMSEA	.048	<0.05	Accepted	Davaraj et al., 2002; Byrne,2001
GFI	.901	>0.9	Accepted	Hu and Bentler (1999)
AGFI	.845	>0.8	Accepted	Etezadi-Amoli and Farhoomand,1996
RMR	.033	< 0.05	Accepted	Hair et al., 2010; Kline, 2010
NFI	.937	> 0.9	Accepted	Wang and Wang, 2012
TLI	.968	> 0.9	Accepted	Hair,et al. 2010
CFI	.973	>0.8	Accepted	Kline, 2010; Lau, 2011
$\chi^2/df$ (degrees of freedom)	1.703	$\leq 3$	Accepted	Hair,et al. 2010
p-value	.000	>.05	Accepted	Hair et al. (2006)

Table 44. Measurement Model (Second-Run)

As shown in Table 44 above, the second-run CFA showed a good model fit. Once a good model fit is achieved, the next logical step is to ensure the validity of the final measurement model, which is discussed next.

#### 4.8 Construct Reliability and Validity

The next step after establishing the goodness-of-fit for the measurement model is conducting the Construct reliability test, which is considered as an assessment of the internal consistency of the construct (Hair, 2010). Many researchers have identified two major measurements to assess reliability, namely composite reliability and Cronbach's alpha coefficients (e.g. Ruiz et al., 2008; Ketkar et al., 2012; Kock, 2015). According to Peterson and Kim (2013), using Composite Reliability (CR) is considered to provide better reliability estimation than using Cronbach's alpha coefficient to use SEM. Therefore, in this study CR was employed to provide another reliability test to evaluate the accuracy of the Cronbach's alpha coefficient test results. Fornell and Larcker (1981) suggest the following formula to calculate the CR.

Therefore, the suggested formula was applied for all model constructs in this study:

$$CR = \frac{(\sum \lambda_i)^2}{(\sum \lambda_i)^2 + (\sum \epsilon_i)}$$

Where,

$\lambda$  Represents the standardised regression weight

$\epsilon$  Represents the error

	Construct	No. of Items	Composite Reliability CR*	Cronbach's Alpha $\alpha^*$	Comment
1	Reciprocity (RC)	4	.989	.990	Accepted
2	Knowledge Donating (KD)	4	.975	.975	Accepted
3	Knowledge Collecting (KC)	4	.979	.979	Accepted
4	Support (ST)	4	.916	.904	Accepted
5	Rewards (RW)	3	.958	.956	Accepted
6	Social Interaction (SI)	3	.930	.927	Accepted
7	Structure Centralisation (SC)	3	.925	.922	Accepted
8	Personal Benefits (PB)	3	.912	.911	Accepted
9	Trust (TT)	3	.902	.899	Accepted
10	Structure Formalisation (SF)	3	.870	.868	Accepted

\*Accepted  $\geq 0.7$

Table 45. Composite Reliability Results

Table 41 above shows the results of Cronbach's alpha and the composite reliability CR for the final constructs obtained from CFA. The results indicate that all constructs showed high CR coefficients that were all above the cut-off point of 0.7, thereby indicating suitable internal consistency for the final constructs. The reliability estimations acknowledged high coefficient values ranging from 0.870 for SF construct to 0.989 for the RC construct.

#### 4.8.1 Construct Validity of the CFA Model

According to Hair et al. (2014), construct validity of the reflective indicators can be evaluated through convergent and discriminant validity tests for further confirmation.

#### 4.8.2 Convergent Validity of the CFA Model

Convergent validity refers to the extent to which the measured variables of a specific construct indicate a high proportion of variance in common (Hair et al., 2014). The convergent validity assessment focuses on the magnitude of the standardised factor loadings and their significance level. Commonly, it is estimated by Composite Reliability (CR), Standardised Regression Weights (SRW) and Average Variance Extracted (AVE). As a guideline, Hair et al. (2014) suggested that the estimated values for each should be as follows: CR >0.7 and AVE >0.5. Moreover, Fornell and Larcker (1981) recommended the following formula to estimate the AVE for each construct In order to report the convergent validity:

$$AVE = \frac{\sum_{i=1}^n \lambda_i^2}{n}$$

Where,

$\lambda_i$  is factor loadings (standardised regression weights)

$i$  is total number of items

$n$  is the sample size

Construct		CR	AVE
1	Trust (TT)	0.902	0.756
2	Reciprocity (RC)	0.989	0.959
3	Knowledge Donating (KD)	0.975	0.908
4	Knowledge Collecting (KC)	0.979	0.922
5	Support (ST)	0.916	0.737
6	Rewards (RW)	0.958	0.883
7	Social Interaction (SI)	0.930	0.815
8	Structure Centralisation (SC)	0.925	0.804
9	Personal Benefits (PB)	0.912	0.776
10	Structure Formalisation (SF)	0.870	0.690

Table 46. Convergent Validity of CFA Model

As shown in Table 42 above, CR values are greater than the recommended 0.7 and AVE values are higher than the threshold value of 0.5, which confirmed the convergent validity of the measurement model.

#### 4.8.3 Discriminant Validity of the CFA Model

For further validity confirmation, discriminant validity was conducted. According to Hair et al. (2014), discriminant validity refers to the extent to which a construct is accurately distinct from other constructs. In other words, it is usually given as evidence of the correlation coefficients between measures of a construct and the conceptuality measures of different constructs (Lewis-Beck, 2010). For example, if the correlation coefficients are high, this means a lack of discriminant validity; while, if the correlations are moderate or low, that demonstrates that the measure has discriminant validity. However, it depends on the theoretical relationship and the magnitude of the coefficient (Carless, 1998). This test can also be calculated by conducting the AVE (average variance extracted) formula (Fornell and Larcker, 1981; Hair et al., 2014).

In order to confirm the discriminant validity, Kline (2011) and Hair et al. (2014) suggest that the square root of AVE for each pair of constructs should be greater than the correlation estimates. In Table 43, the diagonal elements in bold represent the squared root value of AVEs and off-diagonal elements are the correlation estimates. It can be seen that each diagonal element is higher

than the respective off-diagonal elements. Therefore, the discriminant validity for each construct was established.

Construct	TT	RC	KD	KC	ST	RW	SI	SC	PB	SF
<b>TT</b>	<b>0.870</b>									
<b>RC</b>	0.211	<b>0.979</b>								
<b>KD</b>	0.144	0.005	<b>0.953</b>							
<b>KC</b>	0.233	0.115	0.052	<b>0.960</b>						
<b>ST</b>	0.046	0.005	0.121	0.255	<b>0.859</b>					
<b>RW</b>	0.261	0.344	0.123	0.406	0.165	<b>0.940</b>				
<b>SI</b>	0.020	-0.006	-0.094	0.409	0.191	0.097	<b>0.903</b>			
<b>SC</b>	-0.023	-0.158	0.213	0.386	0.066	-0.039	0.186	<b>0.897</b>		
<b>PB</b>	0.139	0.187	0.270	0.230	0.075	0.225	-0.010	0.053	<b>0.881</b>	
<b>SF</b>	-0.023	-0.148	0.158	0.231	0.031	0.167	0.008	0.164	-0.126	<b>0.831</b>

Table 47. Discriminant Validity

In addition, discriminant validity can be confirmed if the maximum shared variance (MSV) is lower than Average variance extracted (AVE) (Hair, 2010; Fornell and Larcker, 1981). As shown in Table 48 below, AVE values are higher than MSVs which further confirmed the discriminant validity of each construct.

Construct	AVE	MSV	AVE > MSV
<b>TT</b>	0.756	0.068	Accepted
<b>RC</b>	0.959	0.118	Accepted
<b>KD</b>	0.908	0.073	Accepted
<b>KC</b>	0.922	0.167	Accepted
<b>ST</b>	0.737	0.065	Accepted
<b>RW</b>	0.883	0.165	Accepted
<b>SI</b>	0.815	0.167	Accepted
<b>SC</b>	0.804	0.149	Accepted
<b>PB</b>	0.776	0.073	Accepted
<b>SF</b>	0.690	0.053	Accepted

Table 48. Construct AVE and MSV Values

#### 4.9 Structural Equation Modelling (SEM)

The SEM approach is an extension of the multivariate assessment techniques, such as multiple regression analysis, that allow the use of multiple indicators to measure the model constructs whilst taking into account the measurement errors when statistically analysing data (Hair et al., 2014). SEM is generally employed to determine the validity of a theoretical conceptual

framework by estimating and evaluating the relationships among a set of observed and unobserved variables (Shah and Goldstein, 2006). According to Byrne (2016) and Hair et al. (2014), SEM is used to test the hypotheses and causal effect of independent variables (IVs) on dependent variables (DVs). Therefore, in order to determine the relationships between the constructs of the hypothesised conceptual framework (Figure 4 on page 81), SEM was applied.

The main objective of using SEM was to reveal if these constructs were associated with each other and, if they were, whether these associations were strong enough so that the variance of one or two constructs could be used to predict that of another. Therefore, the final model will predict the hypothesised relationships among the constructs (factors) under investigation.

In this study, the SEM procedure followed the two-step approach suggested by Hair et al. (2014): firstly, specifying and assessing the measurement model in order to establish the validity and then examining the structural model to assess the relationships between the constructs (Hair, 2010). Both steps required an assessment of the model fit indices and parameter estimates, which were based on the similar procedures and criteria to those used in the CFA analysis in the previous section.

#### **4.9.1 Structural Model Results**

The results of the structural model assessment were evaluated against the criteria listed above (Table 41 on page 166) and are presented in the following figures (Figure 16, Figure 17, Appendix 5 and Appendix 6).

Goodness-of-fit indices and other parameter estimates were examined to assess the hypothesised structural model. The fit indices show that the hypothesised structural model provided a good fit with the data. The absolute fit measures and the incremental fit measures indicate goodness-of-fit of the model. Table 49 and Table 50 show the goodness-of-fit statistics of the structural model.

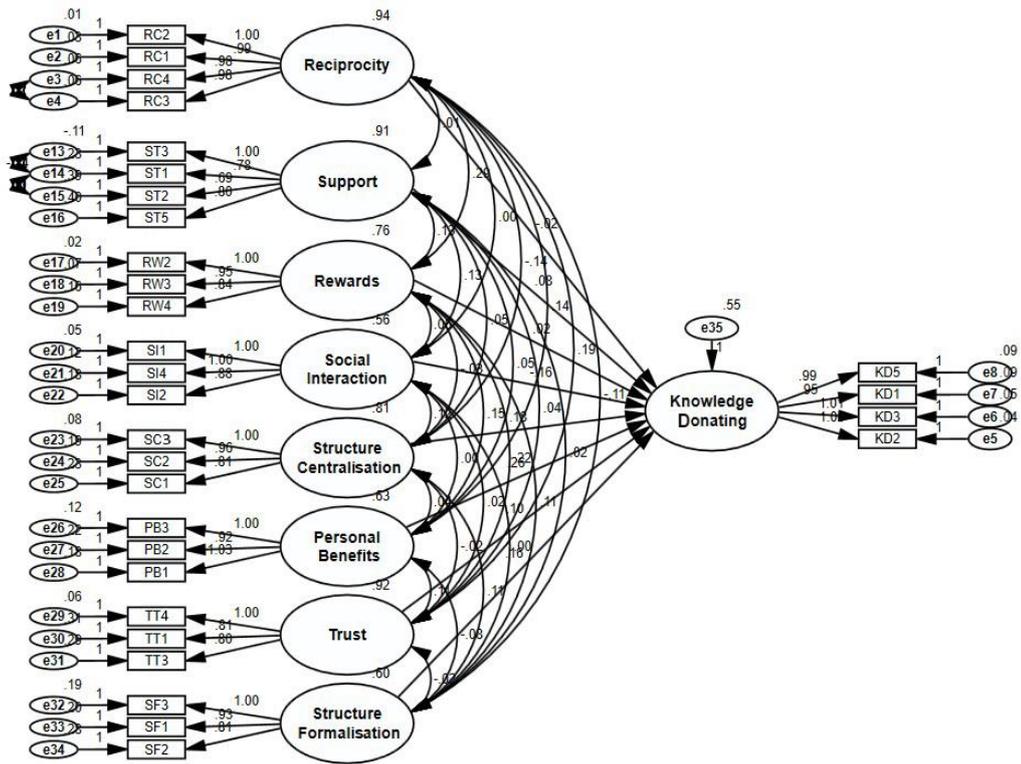


Figure 16. Model Fit for DV1 (Knowledge Donating)

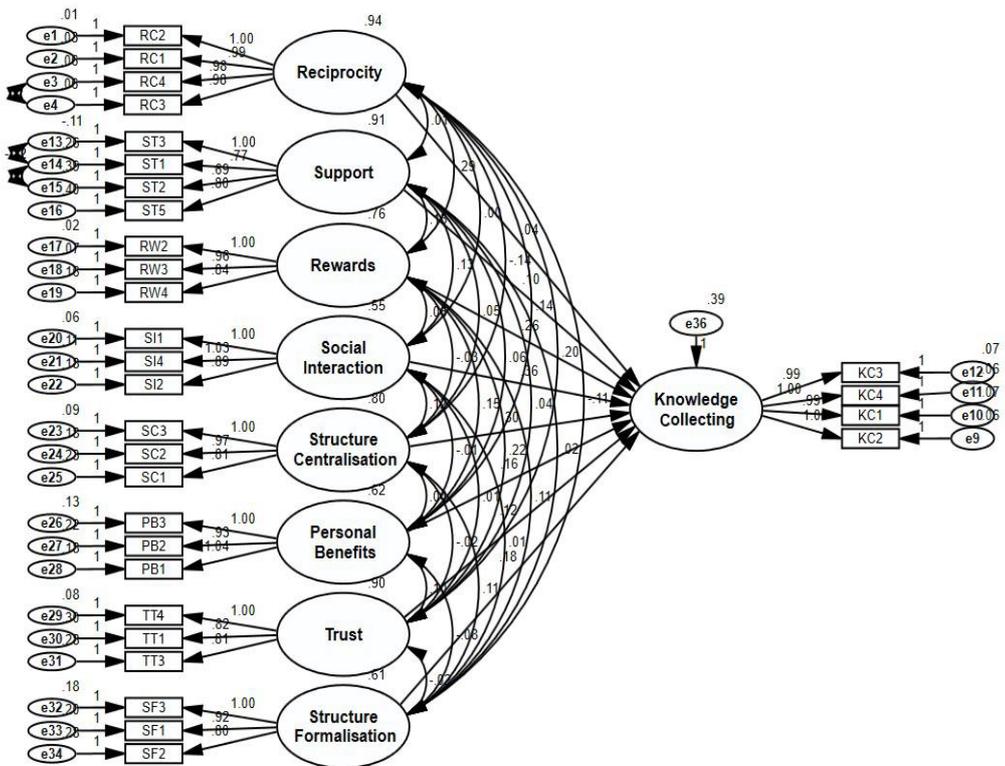


Figure 17. Model Fit for DV2 (Knowledge Collecting)

<b>Fit indices</b>	<i>CFI</i>	<i>GFI</i>	<i>CMIN/DF</i>	<i>TLI</i>	<i>RMSEA</i>	<i>AGFI</i>	<i>NFI</i>
<b>Model Fit Thresholds</b>	>0.9	>0.9	≤ 3	> 0.9	<0.05	>0.8	> 0.9
<b>Results</b>	.977	.894	1.639	.973	.045	.865	.944

Table 49. Model Fit Results for DV1 (Knowledge Donating)

<b>Fit indices</b>	<i>CFI</i>	<i>GFI</i>	<i>CMIN/DF</i>	<i>TLI</i>	<i>RMSEA</i>	<i>AGFI</i>	<i>NFI</i>
<b>Model Fit Thresholds</b>	>0.9	>0.9	≤ 3	> 0.9	<0.05	>0.8	> 0.9
<b>Result</b>	.977	.892	1.669	.972	.046	.862	.944

Table 50. Model Fit Results for DV2 (Knowledge Collecting)

#### 4.10 Hypothesis Results

Having successfully validated the structural models' goodness-of-fit to the data, the next step was to examine the research hypotheses using path measurement coefficients (regression weight estimates and critical ratios) from the SEM analysis performed with AMOS 24. Table 51 and Table 52 summarise these results. In the case of DV1 (Knowledge donating), six of the eight hypothesised causal paths in the structural model were found to be significant at the 0.05 level (see Table 51). On the other hand, seven of the eight hypothesised causal paths showed a significant effect on DV2 (knowledge collecting) (see Table 52).

Independent Variables	Path	Dependent Variable	Estimate	S.E.	C.R.	P	Comment
Reciprocity (RC)	→	Knowledge Donating (KD)	-.019	.050	-.389	.697	Not Significant <i>P</i> > (0.05)
Support (ST)	→	Knowledge Donating (KD)	.085	.043	1.980	.048	Significant <i>P</i> < (0.05)
Rewards (RW)	→	Knowledge Donating (KD)	.022	.058	.383	.702	Not Significant <i>P</i> > (0.05)
Social Interaction (SI)	→	Knowledge Donating (KD)	-.159	.062	-2.571	.010	Significant <i>P</i> < (0.05)
Structure Centralisation (SC)	→	Knowledge Donating (KD)	.176	.052	3.383	***	Significant <i>P</i> < (0.05)
Personal Benefits (PB)	→	Knowledge Donating (KD)	.262	.061	4.321	***	Significant <i>P</i> < (0.05)
Trust (TT)	→	Knowledge Donating (KD)	.099	.048	2.038	.042	Significant <i>P</i> < (0.05)
Structure Formalisation (SF)	→	Knowledge Donating (KD)	.160	.065	2.471	.013	Significant <i>P</i> < (0.05)

\*\*\* *p* < 0.001, \*Cut off (C.R >±1.96) (Hair et al., 2010)

Table 40 Path Coefficient Weights for Structural Model DV1 (Knowledge donating)

Table 51. Path Coefficient Weights for Structural Model DV1

Independent variables	Path	Dependent Variable	Estimate	S.E.	C.R.	P	Comment
Reciprocity (RC)	→	Knowledge Collecting (KC)	.038	.043	.882	.378	Not Significant <i>P</i> > (0.05)
Support (ST)	→	Knowledge Collecting (KC)	.098	.038	2.600	.009	Significant <i>P</i> < (0.05)
Rewards (RW)	→	Knowledge Collecting (KC)	.263	.051	5.189	***	Significant <i>P</i> < (0.05)
Social Interaction (SI)	→	Knowledge Collecting (KC)	.355	.056	6.362	***	Significant <i>P</i> < (0.05)
Structure Centralisation (SC)	→	Knowledge Collecting (KC)	.300	.046	6.539	***	Significant <i>P</i> < (0.05)
Personal Benefits (PB)	→	Knowledge Collecting (KC)	.159	.052	3.023	.003	Significant <i>P</i> < (0.05)
Trust (TT)	→	Knowledge Collecting (KC)	.124	.043	2.906	.004	Significant <i>P</i> < (0.05)
Structure Formalisation (SF)	→	Knowledge Collecting (KC)	.177	.054	3.254	.001	Significant <i>P</i> < (0.05)

\*\*\* *p* < 0.001, \*Cut off (C.R >±1.96) (Hair et al., 2010)

Table 41 Path Coefficient Weights for Structural Model DV2 (Knowledge Collecting)

Table 52 Path Coefficient Weights for Structural Model DV2

### **Hypothesis H1A Results**

***H1A: There is a statistically significant relationship between reciprocity (RC) and knowledge donating (KD) among BPSF officers.***

This hypothesis tested the impact of reciprocity (RC) on knowledge donating (KD) in the context of the Bahrain Public Security Forces (BPSF). As shown in parameter estimates in Table 47, the results revealed unsupported values for hypothesis H1A. The estimated regression weight and critical ratio for the causal path between the two constructs RC on KD are -.019 and -.389 respectively, while  $p$  value illustrates an insignificant influence at a level of  $p > 0.05$ . Therefore, hypothesis H1B that reciprocity (RC) has a statistically significant relationship to knowledge donating (KD) is rejected. That is, any increase in RC would positively influence knowledge donating within the Bahrain police force organisation.

### **Hypothesis H1B Results**

***H1B: There is a statistically significant relationship between reciprocity (RC) and knowledge collecting (KC) among BPSF officers.***

This hypothesis tested the impact of reciprocity (RC) on knowledge donating (KC) in the context of the Bahrain Public Security Forces (BPSF). As shown in parameter estimates in Table 48, the results revealed unsupported values for hypothesis H1B. The estimated regression weight and critical ratio for the causal path between the two constructs RC on KC are 0.038 and .882 respectively, while  $p$  value illustrates an insignificant influence at a level of  $p > 0.05$ . Therefore, hypothesis H1B that reciprocity (RC) has a statistically significant relationship to knowledge collecting (KC) is rejected. That is, any increase in RC would positively influence knowledge collecting within the BPSF.

### **Hypothesis H2A Results**

***H2A: There is a statistically significant relationship between support (ST) and knowledge donating (KD) among BPSF officers.***

This hypothesis tested the impact of support (ST) on knowledge donating (KD) in the context of the Bahrain Public Security Forces (BPSF). As shown in parameter estimates in Table 47, the results revealed unsupported values for hypothesis H2A. The estimated regression weight and critical ratio for the causal path between the two constructs ST on KD are .085 and 1.980 respectively, while  $p$  value illustrates a significant relationship at a level of  $p < 0.05$ . Therefore, hypothesis H2B that support (ST) has a statistically significant relationship to knowledge donating (KD) is accepted.

### **Hypothesis H2B Results**

***H2B: There is a statistically significant relationship between support (ST) and knowledge collecting (KC) among BPSF officers.***

This hypothesis tested the impact of support (ST) on knowledge collecting (KC) in the context of the Bahrain Public Security Forces (BPSF). As shown in parameter estimates in Table 48, the results revealed unsupported values for hypothesis H2B. The estimated regression weight and critical ratio for the causal path between the two constructs ST on KC are .098 and 2.600 respectively, while  $p$  value indicates a significant relationship at a level of  $p < 0.05$ . Therefore, hypothesis H2B that support (ST) has a statistically significant relationship to knowledge collecting (KC) is accepted.

### **Hypothesis H3A Results**

***H3A: There is a statistically significant relationship between rewards (RW) and knowledge donating (KD) among BPSF officers.***

This hypothesis tested the impact of rewards (RW) on knowledge donating (KD) in context of the Bahrain public security forces (BPSF). As shown in parameter estimates in Table 47, the results revealed unsupported values for hypothesis H3A. The estimated regression weight and critical ratio for the causal path between the two constructs RW on KD are .022 and .383 respectively, while  $p$  value illustrates an insignificant influence at a level of  $p > 0.05$ . This infers that RW has no positive influence on knowledge donating

in the Bahraini police force. Therefore, hypothesis H3A is rejected. That is, any increase in RW would positively influence knowledge donating within the BPSF.

### **Hypothesis H3B Results**

***H3B: There is a statistically significant relationship between rewards (RW) and knowledge collecting (KC) among BPSF officers.***

This hypothesis tested the impact of rewards (RW) on knowledge collecting (KC) in the context of the Bahrain Public Security Forces (BPSF). As shown in parameter estimates in Table 48, the results revealed unsupported values for hypothesis H3B. The estimated regression weight and critical ratio for the causal path between the two constructs RW on KC are .263 and 5.189 respectively, while  $p$  value indicates a highly significant correlation at a level of  $p < 0.05$ . Therefore, hypothesis H3B that rewards (RW) have a statistically significant impact on knowledge collecting (KC) is accepted.

### **Hypothesis H4A Results**

***H4A: There is a statistically significant relationship between social interaction (SI) and knowledge donating (KD) among BPSF officers.***

This hypothesis tested the impact of social interaction (SI) on knowledge donating (KD) in the context of the Bahrain Public Security Forces (BPSF). As shown in parameter estimates in Table 47, the results revealed supported values for hypothesis H4A. The estimated regression weight and critical ratio for the causal path between the two constructs SI on KD are -.159 and -2.571 respectively, while  $p$  value shows a significant relationship at a level of  $p < 0.05$ . Thus, hypothesis H4A that social interaction (SI) has a statistically significant influence on knowledge donating (KD) is accepted.

### **Hypothesis H4B Results**

***H4B: There is a statistically significant relationship between social interaction (SI) and knowledge collecting (KC) among BPSF officers.***

This hypothesis tested the impact of social interaction (SI) on knowledge collecting (KC) in the context of the Bahrain Public Security Forces (BPSF). As shown in parameter estimates in Table 48, the results revealed supported values for hypothesis H4B. The estimated regression weight and critical ratio for the causal path between the two constructs SI on KC are .355 and 6.362 respectively, and  $p$  value indicates a highly significant relationship at a level of  $p < 0.05$ . This infers that SI has a positive influence on knowledge collecting among BPSF officers. Therefore, hypothesis H4B is accepted.

### **Hypothesis H5A Results**

***H5A: There is a statistically significant relationship between Organisational Structure Centralisation (SC) and knowledge donating (KD) among BPSF officers.***

This hypothesis tested the impact of organisational structure centralisation (SC) on knowledge donating (KD) in the context of the Bahrain Public Security Forces (BPSF). As shown in parameter estimates in Table 47, the results revealed supported values for hypothesis H5A. The estimated regression weight and critical ratio for the causal path between the two constructs SC on KD are .179 and 3.383 respectively, while  $p$  value shows a highly significant relationship at a level of  $p < 0.05$ . Thus, hypothesis H5A that organisational structure centralisation (SC) has a statistically significant influence on knowledge donating (KD) is accepted.

### **Hypothesis H5B Results**

***H5B: There is a statistically significant relationship between Organisational Structure Centralisation (SC) and knowledge collecting (KC) among BPSF officers.***

This hypothesis tested the impact of organisational structure centralisation (SC) on knowledge collecting (KC) in the context of the Bahrain Public Security Forces (BPSF). As shown in parameter estimates in Table 48, the results revealed supported values for hypothesis H5B. The estimated regression weight and critical ratio for the causal path between the two constructs SC on KC are .300 and 6.539 respectively, while  $p$  value indicates also to a highly significant relationship at a level of  $p < 0.05$ . Therefore, hypothesis H5B that organisational structure centralisation (SC) has a statistically significant impact on knowledge collecting (KC) is accepted.

### **Hypothesis H6A Results**

***H6A: There is a statistically significant relationship between personal benefits (PB) and knowledge donating (KD) among BPSF officers.***

This hypothesis tested the impact of personal benefits (PB) on knowledge donating (KD) in the context of the Bahrain Public Security Forces (BPSF). As shown in parameter estimates in Table 47, the results revealed supported values for hypothesis H6A. The estimated regression weight and critical ratio for the causal path between the two constructs PB on KD are .262 and 4.321 respectively, and  $p$  value shows a highly significant relationship at a level of  $p < 0.05$ . Thus, hypothesis H6A that personal benefits (PB) have a statistically significant influence on knowledge donating (KD) is accepted.

### **Hypothesis H6B Results**

***H6B: There is a statistically significant relationship between personal benefits (PB) and knowledge collecting (KC) among BPSF officers.***

This hypothesis tested the impact of personal benefits (PB) on knowledge collecting (KC) in the context of the Bahrain Public Security Forces (BPSF). As presented in parameter estimates in Table 48, the results revealed supported values for hypothesis H6B. The estimated regression weight and critical ratio for the causal path between the two constructs PB on KC are .159 and 3.023 respectively, while  $p$  value indicates to a significant relationship at

a level of  $p < 0.05$ . Therefore, hypothesis H6B that personal benefits (PB) have a statistically significant impact on knowledge collecting (KC) is accepted.

### **Hypothesis H7A Results**

***H7A: There is a statistically significant relationship between trust (TT) and knowledge donating (KD) among BPSF officers.***

This hypothesis tested the impact of personal trust (TT) on knowledge donating (KD) in the context of the Bahrain Public Security Forces (BPSF). As shown in parameter estimates in Table 47, the results revealed supported values for hypothesis H7A. The estimated regression weight and critical ratio for the causal path between the two constructs TT on KD are .099 and 2.038 respectively, while  $p$  value shows a significant relationship at a level of  $p < 0.05$ . Thus, hypothesis H7A that trust (TT) has a statistically significant influence on knowledge donating (KD) is accepted.

### **Hypothesis H7B Results**

***H7B: There is a statistically significant relationship between trust (TT) and knowledge collecting (KC) among BPSF officers.***

This hypothesis tested the impact of trust (TT) on knowledge collecting (KC) in the context of the Bahrain Public Security Forces (BPSF). As shown in parameter estimates in Table 48, the results revealed supported values for hypothesis H7B. The estimated regression weight and critical ratio for the causal path between the two constructs TT on KC are .124 and 2.906 respectively, while  $p$  value indicates a significant correlation at a level of  $p < 0.05$ . Therefore, hypothesis H7B that trust (TT) has a statistically significant impact on knowledge collecting (KC) is accepted.

### **Hypothesis H8A Results**

***H8A: There is a statistically significant relationship between organisational structure formalisation (SF) and knowledge donating (KD) among BPSF officers.***

This hypothesis tested the impact of organisational structure formalisation (SF) on knowledge donating (KD) in the context of the Bahrain Public Security Forces (BPSF). As shown in parameter estimates in Table 47, the results revealed supported values for hypothesis H8A. The estimated regression weight and critical ratio for the causal path between the two constructs SF on KD are .160 and 2.471 respectively, and  $p$  value shows a highly significant relationship at a level of  $p < 0.05$ . Thus, hypothesis H8A that organisational structure formalisation (SF) has a statistically significant influence on knowledge donating (KD) is accepted.

### **Hypothesis H8B Results**

***H8B: There is a statistically significant relationship between organisational structure formalisation (SF) and knowledge collecting (KC) among BPSF officers.***

This hypothesis tested the impact of organisational structure formalisation (SF) on knowledge collecting (KC) in the context of the Bahrain Public Security Forces (BPSF). As presented in parameter estimates in Table 48, the results revealed supported values for hypothesis H8B. The estimated regression weight and critical ratio for the causal path between the two constructs SF on KC are .177 and 3.254 respectively, while  $p$  value indicates also to a highly significant relationship at a level of  $p < 0.05$ . Therefore, hypothesis H8B that organisational structure formalisation (SF) has a statistically significant impact on knowledge collecting (KC) is accepted. Hypothesised relationships between IVs and DVs were summarised in Table 49 and Table 50 below.

Dimension	Hypothesis	Path	Estimate	S.E.	C.R.	P	Results
Organisational Factors	H1A: There is a statistically significant relationship between <b>rewards</b> and knowledge donating among BPSF Officers.	RW ↓ KD	.022	.058	.383	.702	Rejected
	H2A: There is a statistically significant relationship between <b>Support</b> and knowledge donating among BPSF Officers.	ST ↓ KD	.085	.043	1.980	.048	Accepted
	H3A: There is a statistically significant relationship between <b>organisational structure centralisation</b> and knowledge donating among BPSF Officers.	SC ↓ KD	.176	.052	3.383	***	Accepted
	H4A: There is a statistically significant relationship between <b>organisational structure formalisation</b> and knowledge donating among BPSF Officers.	SF ↓ KD	.160	.065	2.471	.013	Accepted
Individual Factors	H5A: There is a statistically significant relationship between <b>reciprocity</b> and knowledge donating among BPSF Officers.	RC ↓ KD	-.019	.050	-.389	.697	Rejected
	H6A: There is a statistically significant relationship between <b>trust</b> and knowledge donating among BPSF Officers.	TT ↓ KD	.099	.048	2.038	.042	Accepted
	H7A: There is a statistically significant relationship between <b>social interaction</b> and knowledge donating among BPSF Officers.	SI ↓ KD	-.159	.062	- 2.571	.010	Accepted
	H8A: There is a statistically significant relationship between <b>personal benefits</b> and knowledge donating among BPSF Officers.	PB ↓ KD	.262	.061	4.321	***	Accepted

Note: Estimate = regression weight; S.E = standard error; C.R = critical ratio, P = significance value  
Note: p\* < 0.05, p\*\* < 0.01, p\*\*\* < 0.001

Table 53. Hypothesised Relationships in the Structural Model for DV1

Dimension	Hypothesis	Path	Estimate	S.E.	C.R.	P	Results
Organisational Factors	H1B: There is a statistically significant relationship between <b>rewards</b> and knowledge collecting among BPSF Officers.	RW ↓ KC	.263	.051	5.189	***	Accepted
	H2B: There is a statistically significant relationship between <b>Support</b> and knowledge collecting among BPSF Officers.	ST ↓ KC	.098	.038	2.600	.009	Accepted
	H3B: There is a statistically significant relationship between <b>organisational structure centralisation</b> and knowledge collecting among BPSF Officers.	SC ↓ KC	.300	.046	6.539	***	Accepted
	H4B: There is a statistically significant relationship between <b>organisational structure formalisation</b> and knowledge collecting among BPSF Officers.	SF ↓ KC	.177	.054	3.254	.001	Accepted
Individual Factors	H5B: There is a statistically significant relationship between <b>reciprocity</b> and knowledge collecting among BPSF Officers.	RC ↓ KC	.038	.043	.882	.378	Rejected
	H6B: There is a statistically significant relationship between <b>trust</b> and knowledge collecting among BPSF Officers.	TT ↓ KC	.124	.043	2.906	.004	Accepted
	H7B: There is a statistically significant relationship between <b>social interaction</b> and knowledge collecting among BPSF Officers.	SI ↓ KC	.355	.056	6.362	***	Accepted
	H8B: There is a statistically significant relationship between <b>personal benefits</b> and knowledge collecting among BPSF Officers.	PB ↓ KC	.159	.052	3.023	.003	Accepted

Note: Estimate = regression weight; S.E = standard error; C.R = critical ratio, P = significance value  
Note: p\* < 0.05, p\*\* < 0.01, p\*\*\* < 0.001

Table 54 Hypothesised Relationships in the Structural Model for DV2

#### 4.11 Analysis of Variance (ANOVA)

In order to analyse the relationships between demographic variables such as respondents' positions, ranks, qualification, age and work experience in the BPSF, and the two dependent variables (knowledge donating (DV1) and

knowledge collecting (DV2), the one-way analysis of variance (ANOVA) was conducted. The main purpose of using one-way ANOVA is to determine whether there are any statistically significant differences between the means of the above-mentioned groups.

#### 4.11.1 Positions

The result of the ANOVA (Table 55) indicates that both dependent variables (DV1 and DV2) differed significantly when factored by the respondents' positions,  $F(6,312) = 83.231$ ,  $p < .05$  for DV1 (knowledge donating), whereas  $F(6,312) = 2.264$ ,  $p = .048$  (below 0.05) for DV2 (knowledge collecting). The post hoc results (Figure 18) supported the view that leaders in high positions in the BPSF act as coaches for their employees, which makes them more donative in their environment. In contrast, officers in lower positions are more collective than donative actors in their organisation.

Table 55. ANOVA Results for Positions in relation to DV1 and DV2

Compared Variables	ANOVA	Sum of Squares	df	Mean Square	F	Sig.
<b>Positions vs. DV1</b>	Between Groups	60.742	5	12.148	83.231	.000
	Within Groups	44.664	306	.146		
	<b>Total</b>	<b>105.406</b>	<b>311</b>			
<b>Positions vs. DV2</b>	Between Groups	8.536	5	1.707	2.264	.048
	Within Groups	230.743	306	.754		
	<b>Total</b>	<b>239.279</b>	<b>311</b>			

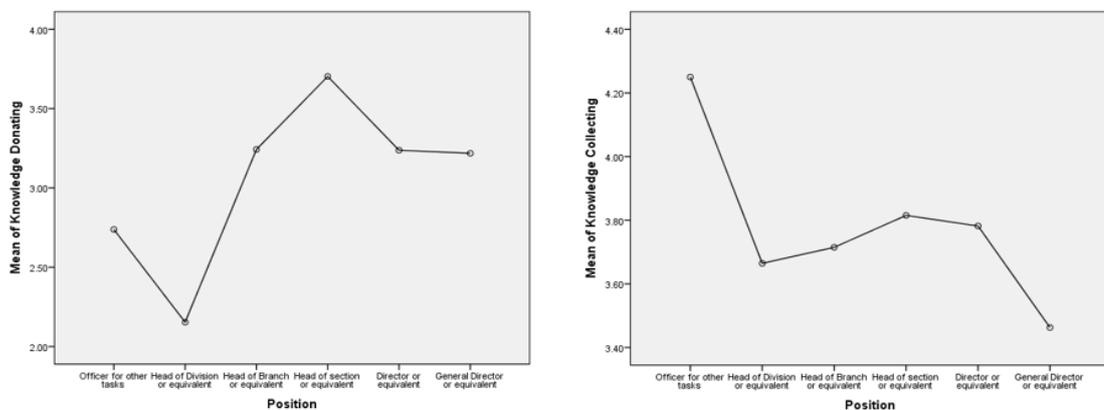


Figure 18. Post Hoc Results for Position in relation to DV1 and DV2

#### 4.11.2 Ranks

The result of the ANOVA (Table 56) indicates that both dependent variables (DV1 and DV2) differed significantly when factored by the respondents' ranks,  $F(8,312) = 124.322, p < .05$  for DV1 (knowledge donating), whereas  $F(8,312) = 2.429, p = .020$  (below 0.05) for DV2 (knowledge collecting). The post hoc results (Figure 19) illustrate that, in the case of DV1 (KD), lower-ranked participants generally disagreed with the presence of knowledge donating behaviour within the BPSF. On the other hand, higher-ranked employees showed general agreement with the existence of knowledge donating behaviour within the BPSF.

In terms of DV2 (knowledge collecting), lower-ranked participants showed agreement with the presence of knowledge collecting behaviour in the BPSF. In contrast, the higher-ranked employees mostly disagreed with the presence of KC behaviour in the BPSF. Particularly, senior participants (lieutenant colonel and above) tended to disagree the most.

Compared Variables	ANOVA	Sum of Squares	df	Mean Square	F	Sig.
Ranks vs. DV1	Between Groups	78.118	7	11.160	124.322	.000
	Within Groups	27.288	304	.090		
	<b>Total</b>	<b>105.406</b>	<b>311</b>			
Ranks vs. DV2	Between Groups	11.420	7	1.631	2.429	.020
	Within Groups	204.143	304	.672		
	<b>Total</b>	<b>215.562</b>	<b>311</b>			

Table 56. ANOVA Results for Ranks in relation to DV1 and DV2

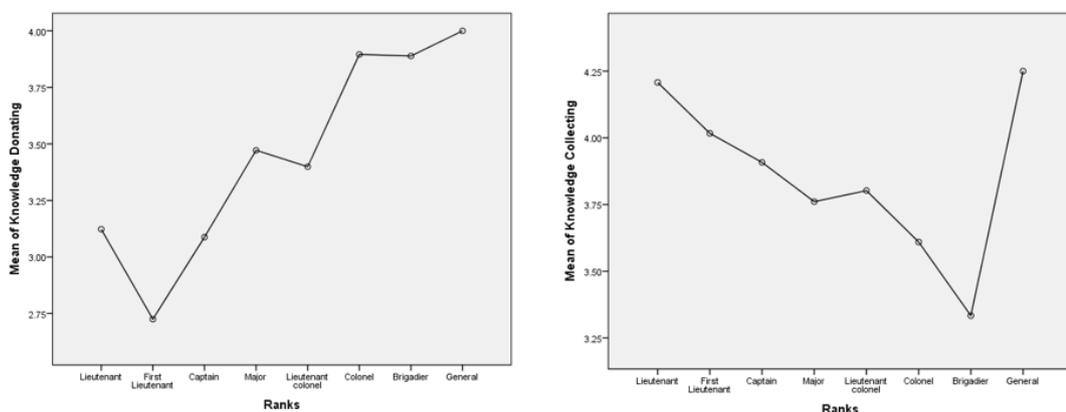


Figure 19. Post Hoc Results for Rank in relation to DV1 and DV2

### 4.11.3 Qualifications

The result of the ANOVA (Table 57) indicates that both dependent variables (DV1 and DV2) differed significantly when factored by the respondents' qualifications,  $F(4,312) = 4.090$ ,  $p < 0.05$  for DV1 (knowledge donating), whereas  $F(4,312) = 3.423$ ,  $p < .05$  for DV2 (knowledge collecting). In the case of both DV1 and DV2, the results (Figure 20) revealed that participants with a lower educational level had a higher mean, while highly educated participants (masters and above) had a lower mean. This suggests that less well-educated people tend to agree with the presence of knowledge sharing behaviour in the force. However, the better-educated participants showed general disagreement with the presence of knowledge sharing (donating and collecting) behaviour in the BPSF.

Compared Variables	ANOVA	Sum of Squares	df	Mean Square	F	Sig.
Qualification vs. DV1	Between Groups	4.038	3	1.346	4.090	.007
	Within Groups	101.368	308	.329		
	<b>Total</b>	<b>105.406</b>	<b>311</b>			
Qualification vs. DV2	Between Groups	7.720	3	2.573	3.423	.018
	Within Groups	231.558	308	.752		
	<b>Total</b>	<b>239.279</b>	<b>311</b>			

Table 57. ANOVA Results for Qualification in relation to DV1 and DV2

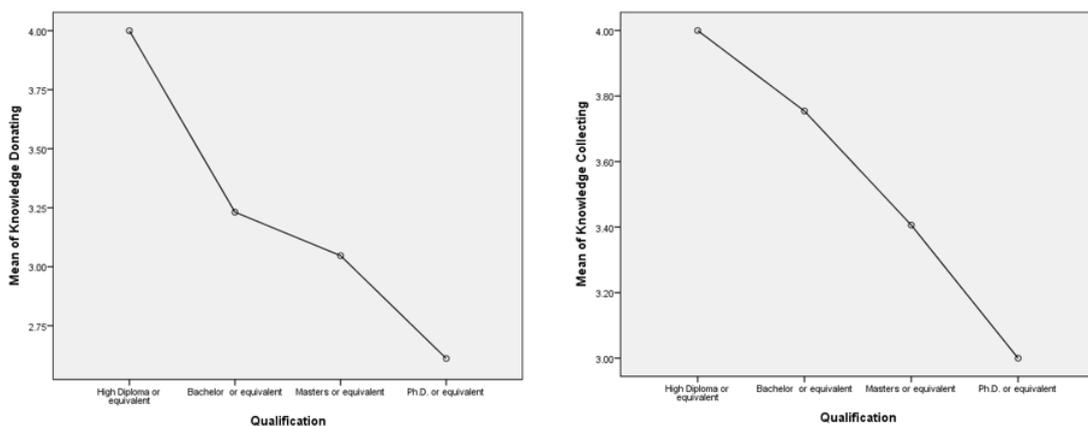


Figure 20. Post Hoc Results for Qualification in relation to DV1 and DV2

#### 4.11.4 Work Experience

The result of the ANOVA (Table 58) indicates that both dependent variables (DV1 and DV2) differed significantly when factored by the respondents' work experience;  $F(8,312) = 76.855$ ,  $P < .05$  for DV1 (knowledge donating), whereas  $F(8,312) = 2.816$ ,  $P = .048$  (below 0.05) for DV2 (knowledge collecting).

Post Hoc comparisons using Duncan's test for DV1 (Figure 21) revealed that officers with 16 years' work experience and above in the BPSF had a significantly higher mean than those with fewer years of work experience. This shows that more experienced participants feel positive about the presence of knowledge donating in the BPSF compared to less experienced employees.

In the case of DV2, participants with less experience (16 years or less) had a higher mean than more experienced people (Figure 21). This shows that less experienced participants agree with the presence of knowledge collecting behaviour in the BPSF. However, more experienced participants tend to disagree with the presence of KC behaviour in the BPSF.

Compared Variables	ANOVA	Sum of Squares	df	Mean Square	F	Sig.
<b>Work Experience vs. DV1</b>	Between Groups	67.349	7	9.621	76.855	.000
	Within Groups	38.057	304	.125		
	<b>Total</b>	<b>105.406</b>	<b>311</b>			
<b>Work Experience vs. DV2</b>	Between Groups	11.118	7	1.588	2.816	.007
	Within Groups	171.494	304	.564		
	<b>Total</b>	<b>182.612</b>	<b>311</b>			

Table 58. ANOVA Results for Work Experience in relation to DV1 and DV2

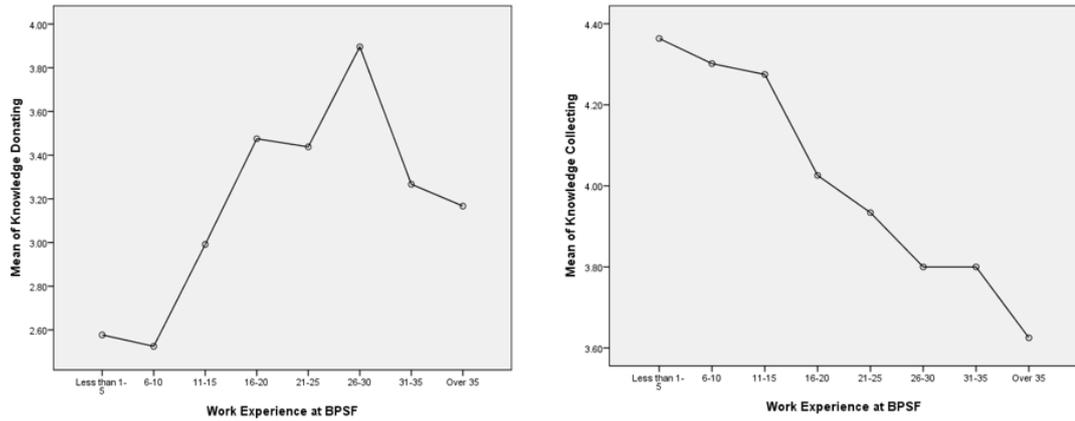


Figure 21. Post Hoc Results for Work Experience in relation to DV1 and DV2

The result of the ANOVA (Table 59) indicates that both dependent variables (DV1 and DV2) differed significantly when factored by the respondents' age groups;  $F(9,312) = 77.662$ ,  $p < 0.05$  for DV1 (knowledge donating), whereas  $F(9,312) = 3.639$ ,  $p = .000$  (below 0.01) for DV2 (knowledge collecting).

Post Hoc comparisons using Duncan's test for DV1 (Figure 22) revealed that young officers (35 years and under) in the BPSF had a significantly lower mean than older officers (36 and above). This shows that senior participants feel positive about the presence of knowledge donating in the BPSF compared to younger employees.

In the case of DV2, young participants had a higher mean than senior people (Figure 22). This shows that younger participants agree with the presence of knowledge collecting behaviour in the BPSF. However, senior participants tended to disagree with the presence of knowledge collecting behaviour in the BPSF.

Compared Variables	ANOVA	Sum of Squares	df	Mean Square	F	Sig.
Age Groups vs. DV1	Between Groups	70.852	8	8.857	77.662	.000
	Within Groups	34.554	303	.114		
	<b>Total</b>	<b>105.406</b>	<b>311</b>			
Age Groups vs. DV2	Between Groups	15.783	8	1.973	3.639	.000
	Within Groups	164.277	303	.542		
	<b>Total</b>	<b>180.060</b>	<b>311</b>			

Table 59. ANOVA Results for Age Groups in relation to. DV1 and DV2

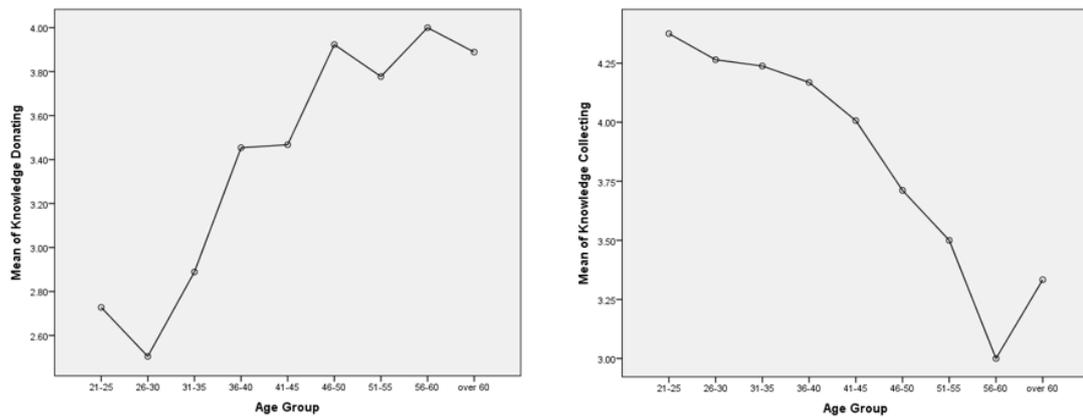


Figure 22. Post Hoc Results for Age in relation to DV1 and DV2

#### 4.12 Summary

This chapter has presented the findings from the final purified scales and hypothesis testing. Initially, data was screened to identify missing data and outliers, and data accuracy was assessed through normality and reliability tests to ensure that accurate results were portrayed by the data. This section was followed by an explanation of factor loading to identify the groups or clusters of items/variables. Principal component analysis technique was used to show the relationship of items within factors. Factors were extracted with the help of eigenvalues and scree plot. Applying the Varimax of orthogonal technique, factors were rotated, which showed maximum variance of factor loading. The findings showed significant results in which 10 factors were extracted. The measurement scale for this research was subjected to confirmatory factor analysis and construct reliability including convergent and discriminant validity. The results showed good model-fit and acceptable reliability. Once acceptable model-fit was achieved, SEM was used to test the inferred relationship of independent factors on dependent factors. In the case of DV1 (KD), six out of eight hypotheses were accepted. On the other hand, only one factor (Reciprocity) showed an insignificant effect on DV2 (KC). The results of significant relationships between constructs were mostly in line with the theoretical expectation. However, data analysis showed a few surprising results which are discussed in detail in the next chapter. In the final section, one-way analysis of variance (ANOVA) was used to determine whether there

were any statistically significant differences between the means' demographic groups such as age, qualification and rank.

## **Chapter 5: Discussion**

## **5.1 Introduction**

This chapter summarises and discusses the findings of Chapter four in relation to the literature, research questions and objectives, and the hypotheses presented in Chapter two. It also discusses the hypothesised framework (see Source: Designed by the researcher

Figure 4 on page 81) and the eight hypotheses regarding the relationships between the constructs in the structural model.

This chapter's structure is based on the following sections: the second section explains the research population and sample issues. The third section covers study scale refinement procedures. The fourth section provides a comparison of current findings with previous studies. The fifth section discusses the demographic characteristics results and their impact on knowledge donating and collecting. Finally, the chapter concludes with a summary of the discussion and key findings.

## **5.2 Research Sample and Response Rate**

This study was conducted in one of the public sector organisations in the Kingdom of Bahrain. The data was collected from a large sample from the Ministry of Interior - Bahrain Public Security Forces (BPSF) officers. The population of the current study is 1255 on-service police officers. The questionnaire was distributed to 470 participants randomly. According to Comery and Lee (1992), a sample size of 50 - 100 can be considered as poor, 200 as fair, 300 as good and 500 as very good. Out of 470 distributed questionnaires, although only 338 questionnaires were returned, this is a high response rate (72%). The response rate could have been higher; however, many of the randomly selected participants were on leave or on training courses abroad. After a careful analysis of these responses, 26 (8%) of the total responses were found to be incomplete and thus excluded. Norusis (2007) suggested that respondents who do not respond to all questions must be excluded. Hence, the numbers of valid, usable questionnaires was reduced to 312. This therefore reduced the responses rate to 66% of the overall number of distributed questionnaires. Scholars suggest that the range of a

minimum of 5% to a maximum of 95% with a response rate of 20% can be considered as satisfactory (Cornford and Smithson, 1996; Fowler, 2015). The response rate acquired from this study survey is therefore considered acceptable.

In order to avoid data outliers and bias the mean and standard deviations (Field and Hole, 2014; Hair et al. 2014), the researcher used univariate and multivariate analysis to detect outliers by using the z-score and Mahalanobis distances test (Hair, 2010). However, based on the results, no item was found to have univariate outliers in the current study dataset.

Further, the frequency test used for the 312 useable questionnaires confirmed that there is no missing data issue that can affect analysis. In addition, the final sample is large enough to represent the whole study population. The questionnaire also provided diverse demographic characteristics of the respondents in terms of Gender, Position and Rank, Qualification, Age group and work experience in the BPSF.

### **5.3 Measurement Scale Refinement**

This study examined the factors influencing knowledge sharing processes (knowledge donating and knowledge collecting) in the Bahraini public sector context. The independent factors were theoretically justified to be important for knowledge sharing in organisations based on an extensive review of the related literature. The proposed factors were incorporated into the suggested conceptual framework (Source: Designed by the researcher

Figure 4 on page 81). These factors have been found to influence KS in different contexts in many developed and developing countries (Seba et.al. 2012a; Titi Amayah, 2013; Jolaei et al. 2014; Jain et.al. 2015; Razmerita et.al. 2016; Rahman et al. 2017). A summary of the proposed factors that may influence KD and KC has been provided (see Table 2 on page 61). However, there are limited studies on the impact of these factors on KS in Bahrain's public sector and in its police organisation in particular. In order to examine the effect of these factors, SPSS 24 and AMOS 24 were employed to analyse the primary data.

The measurement scale for the study was developed mainly based on literature related to this study. Initially, 46 items were observed to measure the influence of proposed independent factors on KS processes' behaviours in BPSF. However, based on pilot study results, four items (RW5, RW6, PB4 and PB5) were excluded because: (1). The participants and experts found the wording of the items confusing and unclear; (2). The Cronbach's alphas for the items were below 0.6. Therefore, 42 items remained for the main study. After the main study data collection, two further rounds of data reduction. EFA and CFA, were conducted on the developed scales. Based on the EFA and CFA results, some modifications and enhancements were applied on the scale to improve its reliability and theoretical and operational validation to test the proposed hypotheses (for details see sections 4.5 and 4.8 ). The following table provides a summary of data reduction (item deletion).

Factors	Original Instrument Items	Total	Refined Instrument Items	Total
Knowledge Donating	KD1 KD2 KD3 KD4 KD5 KD6	6	KD1 KD2 KD3 KD5	4
Knowledge Collecting	KC1 KC2 KC3 KC4	4	KC1 KC2 KC3 KC4	4
Reciprocity	RC1 RC2 RC3 RC4	4	RC1 RC2 RC3 RC4	4
Support	ST1 ST2 ST3 ST4 ST5	5	ST1 ST2 ST3 ST5	4
Rewards	RW1 RW2 RW3 RW4	4	RW2 RW3 RW4	3
Social Interaction	SI1 SI2 SI3 SI4	4	SI1 SI2 SI4	3
Structure Centralisation	SC1 SC2 SC3 SC4	4	SC1 SC2 SC3	3
Personal Benefits	PB1 PB2 PB3	3	PB1 PB2 PB3	3
Trust	TT1 TT2 TT3 TT4	4	TT1 TT3 TT4	3
Structure Formalisation	SF1 SF2 SF3 SF4	4	SF1 SF2 SF3	3
	<b>Grand Total</b>	<b>42</b>		<b>34</b>

Table 60 Measurement Scale Refinement

For instance, the exploratory factor analysis was used to determine the possible underlying factor structure based on the observed variables and the results showed that only 34 of 42 items had factor loadings of the 10 components (see Table 30 on page 157). However, some components had

cross loadings or only had one item loaded; these were KD4, KD6, TT3, SI3, ST4 and SF4. In addition, one variable related to the factor of reward (RW1) and another one related to organisational structure centralisation (SC4) did not load at all. In line with the advice from Stamatis (2002), the given extracted data is suitable for testing conceptual scales. Therefore, problematic items/variables were excluded from the rotation process. After removing the problematic items (loading less than 0.5), the results revealed stronger correlations among the 10 final factors and 34 items. In addition, the results revealed that 88.4% of the variance in the study dataset was explained by these 10 factors and the overall value of Cronbach's alpha for all factors was found to be .871, which confirms the reliability of the final constructs, which were subject to further analysis. The results of the factor analysis can be found in Table 13 on page 134.

Based on the EFA results, CFA was used to confirm derived factor structure. This analysis was also applied to assess composite reliability and construct validity for the factors under study. Later, the causal relationships among the study factors were tested. Using SEM, six out of eight independent factors were empirically shown as significant towards knowledge donating (DV1), while seven of them were empirically revealed as significant towards knowledge collecting (DV2) (see Table 53 and Table 54). Defining these factors and the significance of their relationships with DVs is crucial to explain their influence to develop and improve KS strategies and policies in the public sector. Each of these factors and their associated themes are discussed in the following sections.

In summary, this study's measurement scales were adapted from related previous literature and used in the Bahrain public sector context. According to Singh (1995), it is necessary to assess the relevance of the context of the scale when it is adapted and applied to another culture and region to achieve the validity of inferences. For example, a scale that exists in a certain context in one country may have different form and elements in another (Craig and Douglas, 2000). Moreover, internal criteria such as reliability and validity and external validity were assessed to ensure the applicability of the adapted scales (Craig and Douglas, 2000; Clark and Watson, 1995). Therefore, scale

refinement is an essential procedure for further theory testing and development (Reise et al., 2000). Having now outlined the process of scale refinement, the next section explains the research aim and objectives, and how they were achieved.

#### **5.4 Research Aim and Objectives**

Prior to discussing the achievement of the research objectives, it is important to remember that the fundamental aim of this research is to investigate the knowledge sharing practices in Bahrain's public sector organisations, by empirically examining and identifying the influence of the key factors on police officers' knowledge sharing behaviours (knowledge donating and knowledge collecting) in the Bahrain Public Security Forces (BPSF). However, a systematic discussion for the findings of this study will be based on research objectives and questions as discussed below:

#### **5.5 Results of Research Objective 1**

*“To empirically examine and determine the impact of organisational factors on the employee's knowledge sharing behaviours”.*

In order to achieve the above objective, the following research question was formulated:

##### **Research Question 1**

*Do the proposed organisational factors (Support, Rewards, Structure Centralisation and Structure Formalisation) affect BPSF officers' knowledge donating and collecting behaviours?*

In order to answer the above question, the final four significant organisational factors (Support, Rewards, Structure Centralisation and Structure Formalisation) in the Bahrain public sector context are discussed below.

### **5.5.1 Organisational Factors**

#### **5.5.2 Support (ST)**

Management support is the first Organisational factor that was found to influence both dependent variables (knowledge donating and knowledge collecting). Support is recognised as one of the key factors having a significant potential impact on knowledge sharing within an organisation (Connelly and Kelloway, 2003). In addition, many researchers assert that organisational support is vital to create a supportive climate among employees; at the same time, it determines the success or failure of knowledge sharing in the organisation (Daghfous, 2004; King and Marks, 2008; Lin and Lee, 2006; Lin, 2006). The average mean score of 4 items related to this construct was 3.13 (above midpoint 3), which suggests that most participants (58.9%) agreed that support (ST) was being provided in the BPSF. These results illustrate that the majority of the respondents viewed that a supportive climate existed in the BPSF.

The EFA results revealed that four observed variables related to the organisational support construct ST1, ST2, ST3 and ST5 were highly correlated with each other and were loaded on the same factor (see Table 30 on page 157). In addition, ST alone explains 21.2% of the total variance in the data and showed an excellent reliability ( $\alpha=0.904$ ) (Table 29). Moreover, CFA results confirmed that the ST construct has a high level of construct validity (convergent, discriminant and homological) and a high composite reliability coefficient. At the stage of first-order CFA, all four items/variables remained at the same relationship. However, in order to improve the measurement model goodness-of-fit, covariance was conducted among four error terms (e13 with e14 and e14 with e15). In terms of the influence of ST on dependent variables (DVs), research hypotheses H2A and H2B anticipated that ST would have a positive statistically significant influence on research participants' knowledge donating (KD) and knowledge collecting (KC). Path measurement coefficient results revealed the causal path between ST construct and both DVs was significant at a level of  $p < 0.05$ . The Beta values for both DVs were positive ( $\beta=.085$  and  $\beta=.098$  respectively). Therefore, these results infer that management support positively influences officers' knowledge donating and knowledge collecting behaviours in the BPSF.

These results are consistent with findings from prior studies. For example, research by Jolaei et al. (2014) investigated factors affecting KS among academic staff in universities in Malaysia, and implied that organisational support showed a strong influence on knowledge sharing intention. A similar study conducted by Hussein et al. (2016) links knowledge sharing enablers, processes and outcome dimensions in law enforcement in the United Arab Emirates (UAE). It found that management support was positively associated with each KS process (knowledge donating and knowledge collecting). The current study result is also in line with a study conducted by Youssef et al. (2017), which confirmed the positive impact of management support on knowledge sharing behaviour in private sector organisations in the Gulf area and the influence on their competitiveness. Likewise, Vong et al. (2016) established that management support influenced knowledge sharing within Cambodian public sector organisations. It is thus essential for the public sector organisations to secure organisational support to facilitate knowledge sharing in order to maintain their knowledge and improve their performance, which this study considers as a critical influencing factor on both KS processes (knowledge donating and knowledge collecting).

Management support nowadays is recognised as one of the most critical factors that foster KS in government and private organisations towards improving their ability and efficiency and enhancing the quality of their delivered services (Lee et al., 2015b; Vong et al. 2016; Youssef et al. 2017). Moreover, this component has been found to critically influence different KS aspects in developed and developing countries' public sectors (Titi Amayah, 2013; Jolaei et al., 2014; Hussein et al., 2016; Razmerita et al., 2016). However, this study focused more on the impact on knowledge donating and knowledge collecting to derive a logical measure of the impact on KS processes, which has not yet been measured in the context of Bahrain's public sector. In addition, the result of the impact of management support on KS processes offers an understanding for the factors that foster or hinder KS practices in the BPSF.

In summary, the presence of management support in the BPSF is vital for knowledge donating and collecting processes among officers to improve their

abilities and efficiencies. Thus, Bahrain public sector organisations need to maintain and improve their management support policies and capabilities to facilitate KS processes among their employees. In addition, based on this result, managerial skills and abilities towards enabling KD and KC can become part of Bahrain's public sector organisations' human resource management strategies.

### **5.5.3 Rewards (RW)**

Rewards are often used as a tool to encourage knowledge sharing among employees to achieve organisational goals over appropriate performance and behaviour (Seba et al., 2012b; Titi Amayah, 2013; Šajeva, 2014). According to Al-Alawi et al. (2007), rewards should be designed to meet employees' needs and perceptions. Moreover, rewards may also differ due to different organisational context and the different types of knowledge that employees are being encouraged to share (Zhang et al., 2010; Šajeva, 2014). However, the effect of rewards (RW) on knowledge sharing behaviour is still a matter of debate among researchers (Al-Alawi et al., 2007; Titi Amayah, 2013; Šajeva, 2014; Youssef et al, 2017).

To examine the presence of rewards in the BPSF in the context of Bahrain's public sector, four items (RW1, RW2, RW3 and RW4) were observed to understand the impact of rewards on knowledge donating (KD) and knowledge collecting (KC) behaviours among research participants. The descriptive statistics for the measured variables illustrate that the majority of study participants agree or strongly agree with the existence of rewards in the BPSF (see Table 21 on page145). The average mean score of RW-related variables was 3.54 (above the midpoint), which indicated that most participants (76.3%) agreed with RW statements on the scale measures. These results illustrate the wide agreement of research respondents that rewards do exist in the BPSF.

The EFA results revealed that three measurement items (RW2, RW3 and RW4) loaded on this factor. In addition, RW explains 7.52% of the total variance in the data and the reliability of this construct was excellent ( $\alpha=0.956$ )

(Table 30). Accordingly, CFA outcomes confirmed that the RW construct has an elevated level of construct validity (convergent, discriminant, and homological) and has a high composite reliability coefficient (Table 45). Rewards have been proposed in several studies as one of the main components that can enhance employees' motivation to share their knowledge (Al-Atawi, 2011; Seba et al., 2012b; Titi Amayah, 2013; Šajeva, 2014; Youssef et al, 2017). However, the results of path measurement coefficients (Table 51) revealed contrary results to what was expected: the causal paths between the RW construct and DV1 (knowledge donating) were insignificant ( $P > 0.05$ ) and thus this assumption was not supported. These results surprisingly conclude that RW is not a significant positive predictor of knowledge donating in the Bahrain public sector context. Previous studies such as Al-Alawi et.al. (2007), Razmerita et.al. (2016) and Rahman et al. (2017) have confirmed the significant effect of RW on overall knowledge sharing behaviour, i.e. knowledge collecting and knowledge donating. One possible explanation for the surprising result is the lack of a source of motivation in the form of rewards, such as absence of public recognition and financial compensation to motivate BPSF officers to share their knowledge. The surprising outcome is, however, consistent with the fundamental paradigm of the knowledge stickiness theory by Szulanski (1996), which states that a lack of rewards hindered individuals' knowledge transfer and encouraged resistant behaviours. Another possible reason is lack of an 'adequate reward system' for knowledge sharing within the BPSF. In other words, ineffective or insufficient rewards may negatively influence an organisation's efforts to foster knowledge sharing behaviours. Some prior studies, however, are in line with the current outcome. For example, Bock et al. (2005) found that rewards had a negative effect on attitudes towards knowledge sharing behaviour among South Korean organisations' managers. In another context, Alony et al. (2007) observed that employees in the Australian film industry were not motivated by financial reward to donate their knowledge. In addition, Lin and Joe (2012) found that rewards are unlikely to increase individual KS behaviour. In the same vein, Jahani et al. (2013) found that rewards did not demonstrate a significant relationship with knowledge sharing behaviour. In the Dubai police force context, Seba et al. (2012b)

examined factors affecting attitudes and intentions towards knowledge sharing and their results revealed that rewards did not influence participants' attitude to share their knowledge. Similarly, in an investigation of factors affecting knowledge sharing among academic staff in Malaysian universities, Jolaei et al. (2014) found that rewards negatively impacted knowledge sharing intention.

On the other hand, in terms of DV2 (knowledge collecting), the path measurement coefficient results revealed that the causal paths between the RW construct and DV2 (knowledge collecting) were highly significant ( $P < 0.05$ ) and the Beta value was positive ( $\beta = .263$ ) (see Table 52). These results infer that rewards significantly and positively influence employees' knowledge collecting behaviour in the Bahrain public sector context. The result is consistent with previous studies. For example, in a study of factors that influence knowledge sharing in Bahrain's public and private sectors, Al-Alawi et al. (2007) found that rewards are positively related to knowledge sharing. In addition, Youssef et al. (2017) found a moderate relationship between rewards and knowledge sharing behaviour among employees of five emerging economy industries in the Gulf area. Titi Amayah (2013) investigated the factors that affect knowledge sharing in USA public sector organisations and found that rewards had a significant effect on knowledge sharing. Likewise, Durmusoglu et al. (2014) found that organisational rewards interact to influence knowledge collecting, which leads to the conclusion that knowledge collecting can be encouraged by rewards.

These outcomes are more specific than previous studies and the results of this study provide more accurate measurement of the impact of rewards on knowledge sharing behaviours by distinguishing the impact on KS processes, which suggests that organisations should establish a system that rewards both knowledge donating and knowledge collecting. In summary, the existence of a reward system in the BPSF is vital for fostering KS behaviours among officers to improve their knowledge and skills. A surprising and interesting finding of the different impacts of rewards on knowledge donating and collecting leads to further understanding of KS motivators in the BPSF and improving KS strategies and policies in Bahrain's public sector

organisations. Therefore, it can be seen that the effectiveness of both reward and recognition systems could motivate people to share their knowledge. Absence of any transparent rewards and recognition systems may hamper the knowledge sharing.

#### **5.5.4 Structure Centralisation (SC)**

Structure Centralisation (SC) is the third Organisational factor that was found to influence both dependent variables (knowledge donating and knowledge collecting). SC refers to the locus of decision-making authority lying in the higher levels of a hierarchical relationship in the organisational structure (Robbins et al. 2017; Tsai, 2002).

To investigate the presence of the organisational structure centralisation in the BPSF in the context of Bahrain's public sector, four items (SC1, SC2, SC3 and SC4) were observed to understand the impact of SC on knowledge donating (KD) and knowledge collecting (KC) behaviours among research participants. The descriptive statistics for the measured variables revealed that the average mean score for the SC factor was 3.53, which indicated that most participants (73.7%) agreed with SC statements on the scale measures. These results illustrate that the majority of the respondents believed that a centralised organisational structure existed in the BPSF (see Table 20 on page 145).

The EFA results revealed that three measurement items (SC1, SC2, and SC3) were highly loaded on this factor and one item, SC4, did not load. The average mean score (3.60) for these items reflects the respondents' agreement with this latent factor's statements. Moreover, SC explains 6.23% of the total variance in the data and the reliability of this construct was confirmed using Cronbach's alpha ( $\alpha=0.922$ ) (see Table 45).

Moreover, CFA results confirmed that the SC construct has a high level of construct validity (convergent, discriminant and homological) and a high composite reliability coefficient ( $\alpha=0.925$ ). At the stage of first-order CFA, all three items remained at the same relationship. In terms of the influence of SC on dependent variables (DVs), research hypotheses H5A and H5B anticipated

that SC would have a positive statistically significant influence on research participants' knowledge donating (KD) and knowledge collecting (KC). Path measurement coefficient results revealed that the causal path between the SC construct and both DVs was significant at a level of  $p < (0.05)$ . The Beta values for both DVs were positive (respectively  $\beta = .176$  and  $\beta = .300$ ). Therefore, these results infer that organisational structure centralisation positively influences officers' knowledge donating and knowledge collecting behaviours in the BPSF.

These results are in line with and confirm the findings from previous studies. For example, a study conducted by Al-Alawi et al. (2007) on Bahrain's public and private sectors found that SC was positively related to knowledge sharing in Bahrain organisations. A similar finding was established in qualitative study conducted on the Dubai police force by Seba et al. (2012a) which examined factors affecting KS among police officers, and revealed that the centralisation of the hierarchical organisational structure was positively related to knowledge sharing. Likewise, Rahman et al. (2017) investigated factors that affect knowledge sharing to find a conceptual framework of knowledge sharing for Bangladeshi business organisations. This study revealed a positive relationship between SC and KS behaviour.

On the other hand, there are many studies which suggest that a centralised organisational structure has a negative influence on people's knowledge sharing behaviour. For example, Sharratt and Usoro (2003) found that a centralised organisational structure with a bureaucratic management style could stifle the creation of new knowledge, whereas knowledge sharing is encouraged with a flexible decentralised organisational structure, particularly tacit knowledge. Similarly, Tsai (2002) found that a centralised organisational structure could reduce individuals' interest in sharing knowledge with others within the organisation. In addition, many researchers emphasise that centralisation creates a non-participatory environment that reduces communication, commitment and involvement with tasks and projects among employees (Damanpour, 1991; Sivadas and Dwyer, 2000; Kim and Lee, 2006). Furthermore, it is believed that employees can be capable of organising social interaction networks to solve new or existing problems and

share their knowledge (Gold et al., 2001; Janz and Prasarnphanich, 2003). A high level of centralisation appears to restrict channels of communication, and inhibit employees' capacity to generate ideas and share knowledge and experience with others (Mohd Nor, 2013).

Despite the hierarchical structure of the BPSF, knowledge sharing behaviour is common in the organisation. One possible reason could be the presence of an officers' club that helps social interaction and communication among different ranks of officers. Moreover, the top management facilitates knowledge sharing activities such as officers' days where staff sit together and discuss key issues on a monthly basis. A centralised approach ensures maximum participation in social events and occasions like officers' days which help everyone to share knowledge.

In summary, although, the BPSF has a centralised organisational structure, there is a knowledge sharing culture within the organisation that helps them to perform well. However, a more decentralised approach may enhance the knowledge sharing process. According to Wang and Noe (2010), the less centralisation a structure has, the more knowledge sharing is practised within it, which improves the organisational performance. Thus, it is essential for the public sector organisations and particularly police organisations to implement policies that facilitate the flow of knowledge donating and collecting within the hierarchical organisational structure.

#### **5.5.5 Structure Formalisation (SF)**

Formalisation refers to the degree to which jobs within the organisation are standardised and the extent to which employee behaviour is guided by organisational recorded regulations, rules and procedures (Martinez and Jarillo, 1989; Andrews and Kacmar, 2001; Robbins et al. 2017). In other words, in organisations with low formalisation, employees' job behaviours are relatively unstructured and they have greater freedom in dealing with the demands of their relevant tasks (Sivadas and Dwyer, 2000; Lin, 2008).

To study the existence of the organisational structure formalisation (SF) in the BPSF in the context of Bahrain's public sector, four items (SF1, SF2, SF3 and

SF4) were used. The descriptive statistics for the measured items revealed that the average mean score for the SF factor was 2.54 (less than midpoint 3), which indicated that the majority of research participants (76.8%) disagreed with SF statements on the scale measures. These results demonstrate that the majority of the respondents believed that there was no formalised organisational structure in the BPSF (see Table 18 on page 144).

The EFA outcomes revealed that three measurement items (SF1, SF2 and SF3) were loaded together on this construct. The collapsed mean score (2.52) for these variables reflects the respondents' disagreement with this latent factor's statements. In addition, SF explains 3.16% of the total variance in the data and the reliability of this construct was confirmed using Cronbach's alpha ( $\alpha=0.868$ ) (Table 45).

Moreover, CFA results confirmed that the SF construct has a high level of construct validity (convergent, discriminant and homological) and a high composite reliability coefficient ( $\alpha=0.870$ ). At the stage of first-order CFA, all three items remained at the same relationship. In terms of the influence of SF on dependent variables (DVs), research hypotheses H8A and H8B anticipated that SF would have a positive statistically significant influence on research participants' knowledge donating (KD) and knowledge collecting (KC). Path measurement coefficient results revealed the causal path between the SF construct and both DVs was significant at a level of  $p < (0.05)$ . The Beta values for both DVs were positive (respectively  $\beta=.160$  and  $\beta=.177$ ). Therefore, these results infer that organisational structure formalisation positively influences officers' knowledge donating and knowledge collecting behaviours in the BPSF.

The results are in line with previous studies. For example, Damanpour (1991) found that low formalisation in an organisation encourages new ideas and behaviours. In addition, the lack of a formal structure tends to enable employees to communicate and interact with one another to create and share knowledge (Jarvenpaa and Staples, 2000). Formalisation of the organisational structure that emphasises rules and regulations, and control systems may act as a barrier to knowledge sharing within organisations (Kim and Lee, 2006). In contrast, informal coordination was considered to have a

positive impact on knowledge sharing because it encouraged an atmosphere of trust (Willem and Buelens, 2005). Kang and Snell (2009), however, suggest that structure formalisation may facilitate the process of organisational learning and knowledge sharing to enhance the organisational efficiency of internal coordination. According to Michailova and Husted (2003), the hierarchical structures in organisations, particularly those considered by strong internal regulation, create a restricted work environment, and employees perform according to organisational rules and procedures. Therefore, a less formalised work process is likely to stimulate social interactions and encourage employees to share their knowledge with other members in the organisation.

Therefore, it can be seen that a less formalised structure results in more knowledge sharing being practised in the organisation (Nonaka and Takeuchi, 1995; Wang and Noe, 2010). Although the BPSF is a centralised bureaucratic organisation, there is less structural formalisation, which encourages people to interact, communicate and share their knowledge.

## **5.6 Results of Research Objective 2**

*“To empirically examine and determine the impact of individual factors on the employee's knowledge sharing behaviours”.*

In order to achieve the above objective, the following research question was formulated:

### **Research Question 2**

*Do the proposed individual factors (Reciprocity, Social Interaction, Personal Benefits and Trust) affect BPSF officers' knowledge donating and collecting behaviours?*

In order to answer the above question, the final four significant individual factors (Reciprocity, Social Interaction, Personal Benefits and Trust) in the Bahrain public sector context are discussed below.

### **5.6.1 Individual Factors**

#### **5.6.2 Reciprocity (RC)**

For many years, reciprocity (RC) behaviour has been seen to be a benefit to individuals engaging in social exchange (Blau, 2017). In addition, the concept of reciprocity is important in understanding why people share knowledge (Chen and Huang, 2010; Di Gangi et al. 2012). However, only a few studies have investigated the direct effects of expected reciprocity on knowledge sharing (Chen and Hung, 2010; Lin, 2008; Lin et al., 2009a; Wasko and Faraj, 2005; Titi Amayah, 2013). The individuals' perception of reciprocity in KS can be defined as the belief that current contributions lead to future requests for knowledge being met (Kankanhalli et al., 2005). Despite the theoretical proposition that receiving reciprocal knowledge should motivate knowledge sharing, in this study, reciprocity was found to have no influence on either dependent variable (knowledge donating and knowledge collecting).

To examine the existence of reciprocity (RC) in the BPSF in the context of Bahrain's public sector, four items (RC1, RC2, RC3 and RC4) were used to measure the existence of reciprocity within the BPSF. The frequency analysis for the measured items revealed that the average mean score for the RC factor was 3.27 (above midpoint 3), which suggests that the majority of research participants (54.8%) disagreed with items related to RC. These results explain that the majority of BPSF officers believe that RC does not exist in the BPSF (for more details, see Table 24 on page 147).

The EFA results revealed that all four measurement items (RC1, RC2, RC3 and RC4) loaded on final rotated components matrix (see Table 30 on page 157). In addition, RC explains 21.20% of the total variance in the data and the reliability of this construct was confirmed using Cronbach's alpha ( $\alpha=0.990$ ) (Table 45).

Moreover, CFA results confirmed that the RC construct has a high level of construct validity (convergent, discriminant and homological) and scored the highest composite reliability coefficient ( $\alpha=0.989$ ). At the stage of first-order CFA, all four items remained at the same relationship. In terms of the influence of RC on dependent variables (DVs), research hypotheses H1A and H1B

expected that RC would have a positive statistically significant influence on research participants' knowledge donating (KD) and knowledge collecting (KC). Path measurement coefficient results revealed the causal path between the RC construct and both DVs was insignificant at a level of  $p > (0.05)$ . The Beta values for both DVs were respectively  $\beta = -.019$  and  $\beta = .038$ . Therefore, these results conclude that reciprocity was not influencing officers' knowledge donating and knowledge collecting behaviours in BPSF.

Surprisingly, these outcomes are contrary to previous studies. For example, in a study of the impact of social capital and individual motivations on knowledge sharing, Chang and Chuang (2011) found that reciprocity had a significant and positive effect on KS through Internet communications. In another study, conducted by Tangaraja et al. (2015), on Malaysian public sector managers, RC was found to be positively related to knowledge sharing behaviour (knowledge donating and knowledge collecting). A similar study in the Iranian private sector conducted by Akhavan and Hosseini (2016) found that reciprocity is positively related to knowledge sharing. In the same vein, Kwahk and Park's (2016) study revealed that RC positively influenced knowledge sharing activities on social media. Likewise, using a mixed method approach, Mosala-Bryant and Hoskins (2017) examined factors that affect KS; the results revealed a positive relationship between RC and KS. Although not consistent with most of the literature, this result supports Huang et al.'s (2008) finding which concluded that reciprocal relationship does not significantly influence one's willingness to share knowledge. In their study, knowledge was shared to make work more effective, not because individuals expected the same in return. This is also the case in the BPSF, where officers mainly share knowledge because of their oath of service (BPSF Law, 1982, article 37) and not because they expect something in return.

Many scholars have started studying the concept of a work ethic in different cultures, and have found that the key source of these work ethics is religion (Ali, 1992; Yousef, 2001; Parboteeah, et al., 2009; Khan et al., 2013). For instance, the Islamic work ethic puts more emphasis on knowledge sharing (Yousef, 2001). In Islam, the concept of sharing knowledge is an important factor in earning the blessings of Allah. Since Bahrain is an Islamic state, the

Islamic culture has a strong influence on people's behaviour. Muslims are expected to share their knowledge without expectation of any return (Kumar and Che Rose, 2012). Therefore, this could possibly be the reason why RC was found to have an insignificant relationship with knowledge sharing behaviour. In summary, the service oath and the Islamic culture work ethics may play a worthy role in order to enhance officers' knowledge donating and knowledge collecting behaviours.

### **5.6.3 Social Interaction (SI)**

Chiu et al. (2006) defined social interaction ties as the strength of the relationships, and the amount of time spent, and communication frequency among members of communities. This shows that social networks involve communication, dialogue and individual or group interaction that enhances and encourages knowledge-related employee activities (Leonard and Sensiper, 1998).

In this study, four items (SI1, SI2, SI3 and SI4) were used to investigate the existence of social Interaction (SI) in the context of Bahrain's public sector. The results of the descriptive statistics for the measured items revealed that the average mean score for the SI construct was 3.46 (above midpoint 3), which indicated that the majority of research participants (77.5%) agreed with SI statements on the scale measures. These results demonstrate that the majority of the respondents believed that social interaction ties existed within the BPSF (see Table 19 on page 144).

The EFA outcomes revealed that three measurement items (SI1, SI2 and SI4) were loaded together on this construct. The collapsed mean score (3.40) for these variables reflects the respondents' agreement with this latent factor's statements. In addition, the social interaction factor explains 6.30% of the total variance in the data and the reliability of this construct was confirmed using Cronbach's alpha ( $\alpha=0.927$ ) (Table 45).

Moreover, CFA results confirmed that the SI construct has a high level of construct validity (convergent, discriminant and homological) and a high composite reliability coefficient ( $\alpha=0.930$ ). At the stage of first-order CFA, all

three items remained at the same relationship. In terms of the influence of SI on dependent variables (DVs), research hypotheses H4A and H4B anticipated that SI would have a positive statistically significant influence on research participants' knowledge donating (KD) and knowledge collecting (KC). Path measurement coefficient results revealed the causal path between SI construct and both DVs was significant at a level of  $p < (0.05)$ . However, the results revealed that the influence of SI on KD ( $p = .010$ ) is less significant than the SI influence on KC ( $p = .000$ ). The Beta values for both DVs were positive (respectively  $\beta = -.159$  and  $\beta = .355$ ). Therefore, these results infer that social Interaction positively influences BPSF officers' knowledge donating and knowledge collecting behaviours.

These results are consistent with previous studies. For example, in a study of factors that influence knowledge sharing in Bahrain's public and private sectors, Al-Alawi et al. (2007) found that the factor of communication is positively related to knowledge sharing. Likewise, Titi Amayah (2013) investigated the factors that affect knowledge sharing in USA public sector organisations, and found that SI was an enabler for knowledge sharing activities, and had a significant main effect on this. Similarly, Jolaei et al. (2014) found that social Interaction was positively and significantly related to knowledge sharing intention among Malaysian public universities' academic staff. Following these results, Tangaraja et al. (2015) also found that SI had positively affected Malaysian public sector managers' knowledge sharing behaviours. Not far from these results, Akhavan and Hosseini (2016) and Bany-Baker and Yusof (2016) revealed that social interaction ties were significantly associated with knowledge sharing in Iranian and Jordanian private sectors. The most likely justification for the current study outcomes suggests that having more social interaction ties in an organisation provides more opportunities for knowledge sharing among employees. However, the results of this study provided more accurate measurement of the impact of social interaction on knowledge sharing behaviours by distinguishing the impact on KS processes, which suggests that Bahrain's public sector organisations should encourage the social interaction ties among employees

that may enable them to donate and collect knowledge within these organisations.

In summary, the presence of social interaction ties in the BPSF is a considerable finding that may indicate the role of this factor towards improving KS strategies and policies in Bahrain's public sector organisations in order to maintain organisation knowledge, and enhance officers' performance by fostering their knowledge donating and knowledge collecting behaviours, and motivating their social interaction ties. Therefore, the greater the social interaction, the more knowledge sharing is practised in the organisation (Titi Amayah, 2013; Bany-Baker and Yusof, 2016).

#### **5.6.4 Personal Benefits (PB)**

Personal benefits (PB) refers to the "Knowledge contributor's judgment of likely consequences that his or her knowledge sharing behaviour will produce to him or herself" (Chiu et al., 2006, p.1876).

Three items (PB1, PB2 and PB3) were used to study the existence of the personal benefits among research participants in the context of Bahrain's public sector. The descriptive statistics for the measured items revealed that the average mean score for the PB factor was 3.44 (above midpoint 3) and the majority of research participants (70.2%) agreed with PB statements on the scale measures. These results explain that the majority of BPSF officers believe that PB exists within the BPSF (for more details, see Table 22 on page 146).

The EFA results revealed that all three measurement items (PB1, PB2 and PB3) loaded together on the rotated components matrix. In addition, PB explains 5.319% of the total variance in the data and the reliability of this construct was confirmed using Cronbach's alpha ( $\alpha=0.911$ ) (see Table 30 and Table 45).

Moreover, CFA results confirmed that the PB construct has a good level of construct validity (convergent, discriminant and homological) and a high composite reliability coefficient ( $\alpha=0.912$ ). At the stage of first-order CFA, all three items remained at the same relationship. In order to understand the

impact of personal benefits on knowledge donating (KD) and knowledge collecting (KC) behaviours among research participants, research hypotheses H6A and H6B anticipated that PB would have a positive statistically significant influence on research participants' KD and KC. Path measurement coefficient results revealed the causal path between the PB construct and both DVs was significant at a level of  $p < (0.05)$ . Thus, the results revealed that the influence of PB on KD and KC is highly significant ( $p = .001$  and  $p = .003$  respectively). The Beta values for both DVs were positive ( $\beta = .262$  and  $\beta = .159$ ) which suggests a positive relationship. Therefore, these results infer that personal benefits positively influence BPSF officers' knowledge donating and knowledge collecting behaviours.

The outcomes of this study in terms of personal benefits were aligned with and confirmed the results from previous studies. For example, Titi Amayah (2013) found that USA public sector organisations' employees' knowledge sharing activities were positively influenced by PB. In the same vein, Bock and Kim (2002), and Yang and Wu (2008) found that the individuals are more likely to share her or his knowledge with others to maximise personal benefits, such as increased job security and continued possession of a unique and strong position in the organisation. Similarly, Mukamala and Razmerita (2014) found that a lack of perceived benefits acts as a barrier to knowledge sharing. In addition, employees were hoarding knowledge from others as a rational choice in order to reduce the risk of getting fired, to conserve power and thereby remain valuable for the organisation (Cabrera and Cabrera, 2002; Kimmerle et al., 2008; Casimir et al., 2012). This study finding is consistent also with studies conducted by Paroutis and Al Saleh (2009) and Hung et al. (2011) which identified perceived personal benefits as one of the key factors that influence employees' knowledge sharing. Moreover, these positive results confirmed Wang and Noe's (2010) review which shows that perceived benefits are positively associated with knowledge sharing.

However, in some cases the cost of sharing knowledge may outweigh the personal benefits. For instance, individuals willing to share knowledge would lose their unique value to organisations that value expertise but not mentoring

or assisting others (Bock et al., 2005). Thus, the lack of a sufficient personal outcome could constitute a barrier to knowledge sharing.

In summary, individuals may be motivated to share knowledge with others because they expect knowledge sharing to be advantageous to them (Hall, 2001). Personal benefits from knowledge sharing identified in the literature include status and career advancement, a better professional reputation, emotional benefits and intellectual benefits (Wasko and Faraj, 2005; Titi Amayah, 2013). In the context of Bahrain's public sector, a possible explanation for the direct relationship between PB and knowledge sharing behaviour can be that in some cases individuals tend to enjoy helping others and this also could help them to build a better reputation and relationship. Thus, the personal outcome could constitute a driver to knowledge sharing. This finding also indicates that senior managers in the BPSF should promote a culture that encourages officers to share their knowledge with others in their units or departments.

#### **5.6.5 Trust (TT)**

In this study, four items (TT1, TT2, TT3 and TT4) were used to investigate the existence of social trust (TT) within the BPSF in order to understand the impact of TT on knowledge donating (KD) and knowledge collecting (KC) behaviours among research participants in the context of Bahrain's public sector. The results of the descriptive statistics for the measured items revealed that the average mean score of the construct of TT was 3.90 (above midpoint 3), which indicated that the majority of research participants (85.3%) agreed with TT statements on the scale measures. These results demonstrate that the majority of the respondents believe that trust exists within the BPSF (see Table 17 on page 143).

The EFA outcomes revealed that only three measurement items (TT1, TT3 and TT4) loaded together on this construct. The collapsed mean score (3.89) was above midpoint 3 for these variables, which reflects the respondents' agreement with this latent factor's statements. In addition, the factor of trust

explains 4.03% of the total variance in the data and the reliability of this construct was confirmed using Cronbach's alpha ( $\alpha=0.899$ ) (Table 45).

Moreover, CFA outcomes confirmed that the TT construct has a good level of construct validity (convergent, discriminant and homological) and a high composite reliability coefficient ( $\alpha=0.902$ ). At the stage of first-order CFA, all three items remained at a similar relationship. In order to understand the impact of trust on knowledge donating (KD) and knowledge collecting (KC) behaviours, research hypotheses H7A and H7B predicted that TT would have a positive statistically significant influence on research participants' KD and KC. Path measurement coefficient results revealed the causal paths between the TT construct and both DVs were significant at a level of  $p < 0.05$ . The results revealed that the p value of TT on KD and KC is  $p = .042$  and  $p = .004$  respectively, which suggests a highly significant relationship. The Beta values for both DVs were positive ( $\beta = .099$  and  $\beta = .124$ ). Therefore, these results infer that TT positively influences BPSF officers' knowledge donating and knowledge collecting behaviours.

These outcomes of this study are in line with many other studies and confirmed their results. For example, Al-Alawi et al. (2007) found that the factor of trust has played an important role in defining the relationships between staff and, in turn, providing possibilities to break obstacles to knowledge sharing among organisations in Bahrain's public and private sectors. Likewise, Seba et al. (2012a) revealed that the lack of TT was identified repeatedly as a potential barrier to knowledge sharing in the Dubai police force. Al-Adaileh and Al-Atawi's (2011) findings revealed that the cultural attributes of trust have an impact on knowledge exchange within the context of the Saudi Telecommunication sector. Similarly, Tangaraja et al. (2015) identified that TT was a potential predictor factor that impacted Malaysian public sector managers' knowledge sharing behaviour (knowledge donating and knowledge collecting). In addition, Razmerita et al.'s (2016) findings confirmed that trust influenced the knowledge sharing behaviours of employees in the Danish enterprises, and the lack of TT was recognised as a barrier to KS. Likewise, Bany-Baker and Yusof (2016) revealed that the factor of trust was significantly associated with private sector employees' knowledge

sharing in Jordan. Following these results, Youssef et al. (2017) also found that trust was positively associated with knowledge sharing behaviours among private sector employees in the Gulf area. The current study results also aligned with Kim's (2018) findings which revealed that trust was positively related to knowledge sharing in the South Korean public sector organisations.

On the other hand, a few researchers have found that TT has an insignificant effect on knowledge sharing behaviour. For example, Amayah (2013) investigated trust as a predicted factor that affected knowledge sharing in USA public sector organisations. The outcomes found that TT did not act as a knowledge sharing motivator in organisations. Not far from this result, in a survey study among public universities' academic staff in Malaysia, Jolaei et al. (2014) found that trust was negatively associated with employees' knowledge sharing intention. However, despite prior studies conducted on Bahrain's public sector, the results of this study provided a more accurate measurement of the impact of trust on knowledge sharing behaviours by distinguishing the impact on KS processes. Moreover, the possible justification for the trust results in the current study is the existence of the social ties in the BPSF and the trust culture established by the Islamic religion and the oath promises among employees.

Therefore, it can be seen that the more trust there is among police officers, the more knowledge sharing in the organisation is expected (Al-Alawi et al., 2007; Seba et al., 2012a; Tangaraja et al., 2015; Razmerita et al., 2016; Youssef et al., 2017; Kim, 2018). The key to business in the Arab world is social networks; all business activities revolve around these networks (Weir and Hutchings, 2005). Therefore, the success of a manager or business person depends on her/his relationship with the community to the extent that if a manager has a strong relationship with her/his community then s/he will be one of the most successful people in her/his country. Arab people are very respectful of this relationship and some business in Arab countries is conducted under the reign of two values (without any contract) – trust and respect. The importance of relationships is grounded in Islam. The holy book for Muslims mentions many rules that obligate them to respect relationships, and, in addition, the prophet of Islam, Mohammad, recommends his followers

to take care of relationships between all people, including non-Muslims. Arab people respect what their prophet taught and strive all the time to follow his instructions. One of these instructions is about sharing with others what we have even if we need it ourselves; in Islam this is called altruism. Accordingly, in Arab countries it is expected that if a person has a good relationship with another person then those two people could possibly exchange the knowledge they hold without any expectation of reward.

### **5.7 Results of Research Objective 3**

*“To assess the impact of demographic characteristics and their variance on employee's perceptions towards knowledge sharing behaviours”.*

In order to achieve the above objective, the following research question was formulated:

#### **Research Question 3**

*What is the impact of the study participants' demographic characteristics (Position, Rank, Age, Qualification and Work experience) and their variance on their knowledge donating and collecting behaviours?*

In order to achieve the third research objective and answer its question, the following sections discuss the effects of demographic variables such as positions, ranks, qualification level, age groups and work experience in the BPSF on employees' perceptions towards knowledge donating and knowledge collecting. However, only a limited number of studies have been conducted on the impact of demographic factors on knowledge sharing behaviour (Pangil and Nasuridin, 2008). Chi-square and ANOVA tests were conducted as descriptive analysis to discover the role of each demographic variable in the knowledge sharing process, and to examine the differences among research groups in relation to DVs. The results showed that demographic variables such as positions, ranks, qualification level, age groups and work experience in the BPSF have a significant influence on

employees' knowledge donating and knowledge collecting behaviours. The variances are discussed in detail in the following sections.

### **5.7.1 Positions**

In terms of research participants' positions, the results of the current study indicated a significant difference in the BPSF officers' knowledge donating and knowledge collecting based on their position in the organisation. Participants in high managerial positions, such as head of section, directors and general directors, seemed to perform more knowledge donating behaviour than officers in lower positions. Knowledge collecting behaviour was less often performed by participants in the high positions, whereas it was more often performed by those in the lower positions, such as officers for other tasks. The ANOVA result shows that both dependent variables (DV1 and DV2) differed significantly when factored by the respondents' positions.  $F(6,312) = 83.231, p < .05$  for DV1 (knowledge donating), whereas  $F(6,312) = 2.264, p = .048$  (below 0.05) for DV2 (knowledge collecting). The results supported the view that the leaders in high positions in the BPSF act as coaches for their employees, which makes them more donative in their environment, whereas the officers in lower positions are more likely to be knowledge seekers. This may explain the high difference between the less experienced officers and the expert officers.

As mentioned above, in terms of DV1 (knowledge donating), officers in high positions were more likely to be knowledge donators compared to those in low positions (for more details, see Figure 18 on page 189). In terms of the second dependent variable, knowledge collecting (DV2), the results revealed that officers in low positions tend to be more knowledge collectors compared with officers in higher positions.

Position groups included different results with regard to DV2. Unlike the results of DV1, the outcomes revealed that there was a significant dependence/association ( $P < 0.05$ ) between the level of position. For instance, the mean score for position groups ranged from 3.46 for higher positions compared with 4.25 for the lower positions, suggesting that the officers in lower positions were more knowledge seekers than knowledge donators.

Hence, it was inferred that level of position is an influential factor in determining knowledge donating and knowledge collecting in public sector organisations in the Bahraini context.

These outcomes support the research findings of Bakker et al. (2006), who reported a positive correlation between employees' positions and knowledge sharing, indicating that the longer organisation members from different positions have been together, the more likely they are to engage in knowledge sharing behaviour. Collin (2004) and Sackmann and Friesl (2007) indicated that employees in senior positions often act as a coach to those in lower positions; KS often takes place in that coaching relationship. Not far from that, Gumus (2007) emphasised that job positions were influenced by knowledge collecting. Moreover, a qualitative study conducted by Roziana et al. (2013) found that there are differences in the attitude of academics towards knowledge sharing behaviour according to their job level. Unlike Ning et al. (2005) and the current study, these differences between job levels acted as KS barriers. For example, the senior positions such as professors preferred not to share their knowledge with the lower positions. This is similar to the finding of Marouf (2015), which found that job position had a positive and direct effect on KS culture among Kuwaiti companies' employees.

In contrast, Ardichvili et al. (2006), asserted that top and middle managerial positions were not interested in being involved in KS activities. Likewise, Ismail and Yusof (2009) and Pangil and Nasurdinb (2009) concluded that position does not influence the KS process. Similarly, in their study of knowledge sharing behaviour among Malaysian public services officers, Kathiravelu, (2013) revealed that the level of job position has no significant relationship in the KS behaviour. Similarly, Sriramesh (2017) concluded that job position also did not have an impact on knowledge management.

In short, it seems that the impact of position level on KS differs between organisation type and cultures. However, the current study outcome in this regard confirmed the influence of the level of job position on KS process (knowledge donating and knowledge collecting) in the BPSF in the Bahraini public sector context.

### 5.7.2 Ranks

The research participants' (police officers) ranks refer to their managerial level or authority ranking in the BPSF. According to Bahrain Public Security regulations, police officer ranks are Second Lieutenant, First Lieutenant, Captain, Major, Lieutenant-Colonel, Colonel, Brigadier and General (Law, 1982). The ANOVA result shows that both dependent variables (DV1 and DV2) differed significantly when factored by the respondents' ranks,  $F(8,312) = 124.322$ ,  $p < .05$  for DV1 (knowledge donating), whereas  $F(8,312) = 2.429$ ,  $p = .020$  (below 0.05) for DV2 (knowledge collecting) (for more details, see *Figure 19* on page 190).

In terms of DV1 (knowledge donating), the results supported the view that the higher-ranked officers in the BPSF act as trainers for the lower-ranked officers under their command, which leads to them contributing more in the knowledge donating activities in their environment, whereas the lower-ranked officers are more knowledge enquirers. This may explain the high difference in the results among higher-ranked officers and the lower-ranked officers. In terms of DV2 (knowledge collecting), lower-ranked participants showed a positive response towards knowledge collecting behaviour within the BPSF. On the other hand, the higher-ranked officers, particularly Lieutenant Colonel and above, showed a negative attitude towards knowledge collecting.

These outcomes are consistent with the finding of some previous studies. For example, in a study on the role of organisational culture in knowledge management practices in the Pakistani organisational context, Saeed et al. (2010) revealed significant differences with reference to managerial levels and knowledge sharing process. They found that the senior management levels are significantly different from middle and lower levels in the way they create knowledge. In addition, they found that the senior managers are more involved in knowledge sharing processes. Likewise, Kimble et al. (2010) suggested that the knowledge sharing is always influenced by different management levels. In addition, Boer et al. (2011) found that authority ranking has a significant and positive influence on knowledge sharing. Similarly, in their study of knowledge management practices in the Saudi Telecommunications Company, Al-

Adaileh and Al-Atawi (2011) found that managerial supervision as a dimension of organisational culture has a clear impact on the knowledge sharing process. Moreover, Lin et al. (2012) revealed that knowledge sharing behaviour is motivated by power differences. In addition, Van Baalen and Moratis (2013) revealed that people higher in rank have privileges, prestige and better access to knowledge than people lower in rank (subordinates) who are, in exchange, entitled to protection and pastoral care. Likewise, in a study that aimed to explore factors that motivated knowledge sharing practices in a South African public service, Mosala-Bryant and Hoskins (2017) found that organisation members' ranks diversity encouraged knowledge sharing across levels and promoted learning from senior to junior members.

In contrast, some studies showed different outcomes compared to this study. For example, Cook and Cook (2004) revealed that the level of responsibility does not influence knowledge sharing behaviour. In the same way, Salimi et al. (2012) concluded that KM deployment in upper management levels is highly intricate and more difficult than in lower levels, and many senior managers are not eager to share their knowledge. Similarly, in a study aiming to investigate the difference between organisational structure types, and management levels, in terms of perceived levels of knowledge management practices within organisations, Steiger et al. (2014) found that management level has no significant influence on knowledge sharing practices.

There are many possible reasons behind the current study results. The first likely reason is that people in a higher rank would like to share knowledge with their inferiors to show their nobility and largesse and in that way they could also gain authority, respect and status in return. Another possible reason is that the higher ranks in the BPSF may have enough time for knowledge donating compared with lower-ranked officers who are mostly engaged in their daily routine jobs and operational duties. In addition, in the BPSF ranks are often related to and represent other demographic variables, such as age, position and work experience. Therefore, rank outcomes are not far from these demographic variables' results. In summary, it seems that the impact of rank on KS differs between higher and lower managerial levels. Therefore, the current study outcome in this regard confirmed the influence of the level of

employees' rank on KS process (knowledge donating and knowledge collecting) in the BPSF in the Bahraini public sector context.

### **5.7.3 Qualification Level**

In terms of the current research participants' qualification levels, the results of the current study showed a significant difference in the BPSF officers' knowledge donating and knowledge collecting to the educational level of the respondents. The ANOVA result shows that both dependent variables (DV1 and DV2) differed significantly when factored by the respondents' qualification level  $F(4,312) = 4.090, p < 0.05$  for DV1 (knowledge donating), whereas  $F(4,312) = 3.423, p < .050$  for DV2 (knowledge collecting). Regarding DV1, the results revealed that the lower-educated participants showed significant interest towards knowledge donating compared to the more highly educated staff. In terms of the second dependent variable (knowledge collecting), the results revealed that participants with a lower educational level appeared to be more knowledge collectors compared to the highly qualified officers (for more details, see Figure 20 on page 191).

Although a few studies such as Shi-Jer Lou et al. (2007), Grubić-Nešić et al. (2015), Ziemba and Eisenhardt (2016) and Lawal et al. (2017) have suggested a relationship between level of education and knowledge sharing behaviour, these studies mainly suggest that highly educated employees have a more positive attitude towards knowledge collecting and donating. For instance, Constant et al. (1994) found that employees with the highest level of education have positive attitudes towards sharing, and are more likely to share their expertise with their colleagues in the organisation. Thus, the results of the current study were somewhat surprising. In the context of Bahrain's public sector, the results suggest that lower-educated employees have a comparatively better attitude towards knowledge sharing behaviour than more highly educated ones.

On the other hand, there are many studies which suggest that the level of education has no impact on employees' knowledge sharing behaviour. For example, Ojha (2005) reported that level of education did not influence

knowledge sharing among software development managers. In addition, studies undertaken by Ismail and Yusof (2009) and Mogotsi et al. (2011) concluded that demographic variables such as educational level are not significant predictors of knowledge sharing behaviour. Moreover, studies carried out in Jordanian enterprises (Almahamid et al., 2010) and public sector (Hijazi and Salamah, 2014) found that there are no differences in attitudes towards knowledge sharing according to educational qualification. In the same vein, Marouf (2015) asserted that participants with various levels of education did not significantly differ in regard to knowledge sharing perception. Finally, in a study that aimed to identify the role of demographic variables on knowledge sharing behaviour among academics, Omar and Adruce (2017) concluded that education level does not have an effect on knowledge sharing behaviour.

However, the surprising results obtained in the current study are likely to be due to various reasons. Firstly, the lower-qualified officers in the BPSF usually have more knowledge skills and practical experience. Therefore, they are in a better knowledge sharing position within the BPSF. Secondly, the better-educated officers often hold onto their knowledge to maintain their seniority, authority and respect within the organisation and the BPSF is no different. Thirdly, in the Arab culture, higher-educated employees feel embarrassed to collect knowledge from less-educated colleagues. Finally, in the BPSF context, the officers holding high-level degrees usually also have a high level of job responsibilities in the organisation, which may act as an obstacle to their knowledge donating and collecting behaviour.

#### **5.7.4 Age Group**

A few studies have examined the relation between age diversity and knowledge sharing; however, the empirical evidence of the impact of age on KS still not confirmed (Sammorra et al. 2017; MacCurtain et al. 2010; Lauring and Selmer, 2012; Ellwart et al. 2013). However, the current study provided fresh evidence in terms of the relationship between age diversity and KS behaviours. Analysis of the survey's demographic data shows that age groups have different influences on knowledge donating and knowledge collecting in

the BPSF. For instance, the ANOVA result indicates that both dependent variables (DV1 and DV2) differed significantly when factored by the respondents' age groups:  $F(9,312) = 77.662$ ,  $p < 0.05$  for DV1 (knowledge donating), whereas  $F(9,312) = 3.639$ ,  $p = .000$  (below 0.05) for DV2 (knowledge collecting) (see Table 59).

In terms of DV1 (knowledge donating), older officers were more knowledge donators compared to the younger officers. In terms of the second dependent variable, knowledge collecting (DV2), the results revealed that younger participants tend to be more knowledge seekers compared with older officers.

Garg and Rastogi (2005) revealed that older employees are more pro-social than younger colleagues, with their results showing that the 25-30 age group recorded a lower knowledge sharing behaviour score than the respondents from age groups 31-40, 41-50 and above 50 respectively. Moreover, research findings in the present study appear to be consistent with Lin (2007), who found age to be a critical demographic variable that affects employees' knowledge sharing behaviour. This view is supported partially by Gumus (2007), who writes that there were significant differences between age groups concerning knowledge collecting but not knowledge donating. In addition, in a study conducted on 334 respondents from Indian engineering colleges, Nagamani and Katyayani (2013) revealed that there is a relationship between age group and knowledge sharing behaviour. In the same way, in a survey study applied to Polish prosumers Bencsik et al. (2014) found that age has a significant influence on knowledge sharing. Likewise, in their research to ascertain the role of demographic variables in knowledge sharing among high school teachers, Boateng et al. (2015) asserted that age group is significant in predicting knowledge sharing. Similarly, Marouf (2015) revealed that Kuwaiti companies' employees' perception of knowledge sharing was influenced by age categories. Correspondingly, in their investigation of the influence of demographic factors on knowledge sharing among Nigerian researchers, Lawal et al. (2017) revealed that researchers' age correlated with their knowledge sharing behaviour.

However, the above findings contradict some studies conducted in different fields. For example, Ojha (2005) and Watson and Hewett (2006) asserted that

knowledge sharing behaviour is not affected by age. In addition, Pangil and Nasurdin (2008) indicated that age did not have a significant relationship with any knowledge sharing behaviour. Similarly, in a study of the relationship between knowledge sharing behaviour and demographic variables amongst secondary school teachers in Botswana, Mogotsi et al. (2011) found that age does not appear to play any significant role in relation to knowledge sharing behaviour. Likewise, Baig et al. (2014) found no relationship between the demographic factor of age and online knowledge sharing in Pakistan. In the same way, Baig et al. (2014) revealed that age as one of the demographic diversity dimensions did not have an effect on online knowledge sharing behaviour. Correspondingly, in their survey study of knowledge sharing in Saudi Arabia private companies, Dulayami and Robinson (2015) found that there were no significant relationships between participants' age groups and knowledge sharing behaviour. Likewise, Grubić-Nešić et al. (2015) revealed that the age variable does not have a direct effect on knowledge sharing behaviour.

A possible justification for the current study results is that younger and less experienced BPSF officers were expected to be more engaged in knowledge collecting behaviour, while senior officers are more experienced and are expected to be willing to donate their knowledge to younger and less knowledgeable colleagues. Another possible explanation is that older officers tend to have social effectiveness and better communication skills than younger officers. In addition, the current results may be because older officers already possess the most valuable knowledge that they require, while the younger officers need to learn much and thus induce their older colleagues to share their valuable knowledge with them. This means that the younger officers collect more knowledge than they donate. In summary, the current study outcome in this regard confirmed the influence of educational level on KS process (knowledge donating and knowledge collecting) in the BPSF in the Bahraini public sector context.

### 5.7.5 Work Experience in the BPSF

In terms of research participants' work experience, the results of the current study indicated a significant difference in the BPSF officers' knowledge donating and knowledge collecting in relation to their work experience. Participants with many years of work experience in the BPSF seemed to be more knowledge providers than those with less work experience; the latter are more involved in knowledge collecting behaviour. The ANOVA result shows that both dependent variables (DV1 and DV2) differed significantly when factored by the respondents' work experience  $F(8.312) = 76,855$ ,  $p < 0.05$  for DV1 (knowledge donating), whereas  $F(8.312) = 2,816$ ,  $p < .005$  for DV2 (knowledge collecting) (see Table 58).

As mentioned above, in terms of DV1 (knowledge donating), the descriptive analysis revealed that work experience groups included different perceptions. The findings show a significant difference ( $P < 0.05$ )  $p = 0.000$  among groups, with means at higher levels of 3.16 to 3.70 for officers with 11 years of work experience and above  $N = 214$ . On the other hand, in terms of the second dependent variable, knowledge collecting (DV2), similar to the results of DV1, the results show that there was a dependence/association at significant ( $P < 0.05$ )  $p = .007$  among years of work experience and DV2. Hence, in the BPSF, the longer they have been working, the more involved in knowledge donating behaviour an officer will be, whilst those who have not been working as long could be more engaged in knowledge collecting behaviour.

The findings obtained in the current study further validate the earlier studies on knowledge sharing. For example, Constant et al. (1994) found that individuals with longer work experience are more motivated to make their expertise available and to show positive attitudes towards knowledge sharing. Similarly, in research conducted among design engineers, Collin (2004) reported that employees with longer work experience often share their knowledge with less experienced employees. Likewise, in their study to understand knowledge flows among teachers, Hew and Hara (2007) suggested that teachers with more years of work experience are more likely share their knowledge frequently than teachers with fewer years of work experience. In the same vein, Mogotsi et al. (2011) asserted that the more

experienced individuals were often eager to donate knowledge to younger and less experienced colleagues; conversely, younger and less experienced teachers were expected to eagerly engage in knowledge collecting. Along the same line, Boateng et al. (2015) concluded that work experience categories were found to be significant in predicting knowledge sharing.

On the other hand, Wasko and Faraj (2005) found no relationship between work experience and knowledge sharing. Likewise, studies by Gumus (2007) and Keyes (2008) indicated that experience within the organisation had no effect on knowledge sharing. Furthermore, Pangil and Nasurdin (2008) asserted that work experience did not have a significant impact on employees' knowledge sharing behaviour in Malaysia. Similar to other studies, Mogotsi et al. (2011) concluded that work experience did not have any significant influence on knowledge sharing. In addition, in a study conducted on telecommunication sector workers and managers in Jordan, Al-Sha'ar (2012) found that work experience had no significant effect on knowledge sharing behaviour. In the same vein, in a quantitative approach study conducted at a virtual Taiwanese nongovernmental organisation, Chung et al. (2016) found no statistical difference among employees with different length of work experience towards their knowledge sharing. These outcomes were confirmed by Omar and Aduce (2017) in their study to identify the role of demographic variables on knowledge sharing behaviour among academicians in Malaysia; the study concluded that experience does not influenced knowledge sharing behaviour.

There are various reasons for the significant correlation between work experience and knowledge donating and knowledge collecting. One possible explanation for such findings may lie in the culture of the organisation. Other possible reasons for the current results are that the BPSF officers with less work experience tend to rely on those with more experience and learn from them. In addition, the results could also be related to other demographic characteristics such as age. For example, the younger and less experienced officers were expected to engage more in knowledge collecting behaviour, while older officers are often more experienced and willing to donate their knowledge to younger and less knowledgeable colleagues. The other

possible justification for the current results may be because officers with more work experience already have a wealth of knowledge to donate, while those with less work experience need to learn much from their experienced colleagues. Hence, the results of this study shed new light on the influence of work experience on knowledge donating and knowledge collecting processes in the context of Bahrain's public sector.

In brief, it seems that the influence of work experience on knowledge sharing behaviour in Bahrain is consistent with previous studies from various cultures and countries. However, these results may be due to many reasons, such as the culture of the organisation, reliance on highly experienced officers', and the relation between age and wealth of knowledge. These results have added new knowledge in terms of the influence of work experience on knowledge donating and knowledge collecting in the BPSF in the Bahraini public sector context.

#### **5.8 Results of Research Objective 4**

*To develop and test a conceptual model that portrays the critical factors that influence the knowledge sharing process (donating and collecting) in the BPSF and Bahrain's public sector in general.*

In order to achieve research objective 4, the study developed the final research model (Figure 22) through the process of EFA, CFA and SEM. Initially, this study utilised a proposed conceptual framework presented in Chapter 2. The conceptual framework presented a set of hypotheses that shows a positive and significant relationship between some factors and knowledge sharing processes (donating and collecting).

As mentioned above, the proposed factors in Chapter 2 were investigated and tested using several multivariate data analysis techniques such as exploratory factor analysis and SEM in order to refine the primary study. Based on structural equation modelling results, three out of the 16 hypothesis were rejected. The revised model has taken into account only the significant influencing factors for the BPSF as one of Bahrain's public sector organisations. The revised model will improve the understanding of

knowledge sharing behaviour process in the BPSF, and demonstrates the significant relationships between the proposed independent and dependent factors.

The outcomes indicate that the proposed independent factors in this study are very essential to understanding knowledge sharing behavioural practices at BPSF. The final causal model (Figure 22) can help leaders and stakeholders within the BPSF. In addition, variables examined by SEM produced a set of adequate fit indices that indicated an acceptable fit of the model with the empirical data and confirmed that knowledge donating and knowledge collecting are significantly influenced by numerous latent variables and demographic characteristics.

In terms of the organisational factors, the results of the research's statistical analyses found that the majority of factors such as management support, organisational structure centralisation and organisational structure formalisation influenced knowledge donating (DV1), while knowledge collecting (DV2) was influenced by all the proposed organisational factors. Surprisingly, 'rewards' did not show any significant relationship with DV1. In terms of the individual factors, only 'reciprocity' showed an insignificant relationship with both DV1 and DV. However, social interaction, personal benefits and trust were found to have a significant impact on both DVs. Based on Beta values, the results suggest that factors of PB and SC were the most influential on DV1, while SI, SC and RW were the most influential on DV2. However, ST, TT and SF were found to have the least influential on both DVs (see Table 51 and Table 52 on page 179).

Additionally, demographic characteristics such as participants' positions, ranks, age groups, educational level and work experience showed significant difference within groups (for details, see section 4.11 on page 188). This suggests that demographic factors also have an impact on employees' knowledge sharing behaviour.

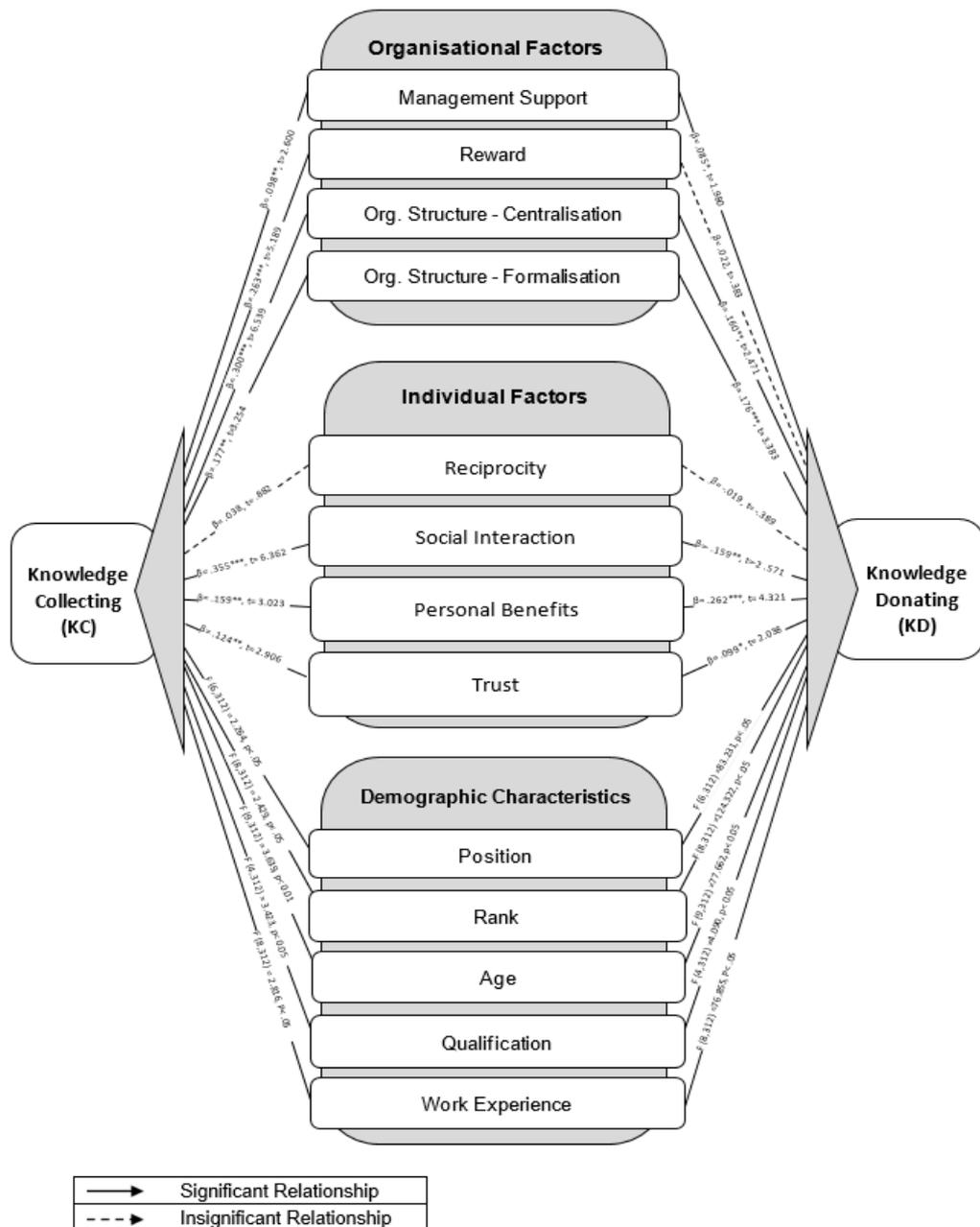


Figure 23. Final Research Model

## 5.9 Summary

This chapter discussed the key findings gathered by the questionnaire. In addition, to show how the research objectives were achieved, the research's key findings have been linked to the related research question and mapped to the literature and findings of previous studies.

In terms of DV1, six out of the eight variables tested in the initial research model were found to have a significant influence on knowledge donating,

whereas seven out of the eight variables tested in the initial research model were found to have a significant influence on DV2, knowledge collecting, in Bahrain's public sector organisation (BPSF). Hence, variables of reciprocity and rewards have not been integrated in the final research model. Moreover, the comparison results among most demographic groups revealed these groups significantly differed from each other in terms of DV1 and DV2. The explanation for these differences was presented.

The final research model proposed in the current study was validated, confirmed and proved to be suitable to explain BPSF officers' behaviour in terms of their knowledge donating and knowledge collecting in the context of Bahrain's public sector. Moreover, the final model presented in this chapter (Figure 23) can be considered as a novel contribution as they condense the following:

- Academics and researchers, to understand and analyse knowledge sharing process (knowledge donating and knowledge collecting) in the public sector context, can use the final model.
- Public sector and police organisations' policy makers in particular can use the final model to understand different factors affecting knowledge donating and knowledge collecting.
- The final model is the first attempt to explore and understand the factors that influence the knowledge sharing process in terms of knowledge donating and knowledge collecting behaviours in Bahrain's public sector organisations.
- This model can be used to understand knowledge donating and knowledge collecting behaviours in developing countries and those with Arabic and Islamic cultures.

- In the light of international security cooperation, understanding knowledge donating and knowledge collecting behaviours through the current final model can improve security sustainability in the Kingdom of Bahrain and therefore the global security.

In the next chapter of this thesis, a conclusion will be drawn by briefly recalling the findings obtained in this research, addressing the research aim, objectives and questions, outlining the contributions made by the study, and highlighting the implications drawn from its results, and acknowledging the limitations of the study and suggesting potential areas of further research.

## **Chapter 6: Research Conclusion**

## **6.1 Introduction**

The main aim of this study was to examine the impact of organisational factors (Support, Rewards, Organisational Structure Centralisation and Organisational Structure Formalisation) and the individual factors (Trust, Social interaction, Reciprocity, Personal benefits) on knowledge sharing processes (knowledge donating and knowledge collecting) in the Bahrain public security forces (BPSF) in the Bahraini public sector context. This aim was followed by exploratory research, and achieved through conducting and analysing a literature review to identify the factors affecting knowledge donating and knowledge collecting. A set of strong overarching themes concerning these factors was identified in a conceptual model framework. A structural model was proposed, based on the thematic analysis and the literature review, to examine the relationships among these factors through using a multivariate analysis using a variance-based statistical technique known as structural equation modelling with the AMOS statistical package.

This chapter summarises the results and conclusions of the thesis by illustrating the overall research and the key findings. Section 6.2 briefly recalls the major findings obtained in this research, which are linked to the research objectives set in Chapter one. Thereafter, research contribution and implications for theory, methodology and practice are discussed in section 6.3. In section 6.4, the research limitations are highlighted, and, finally, suggestions for further areas of future research are presented in section 6.5. The research process of this study is summarised in Figure 24.

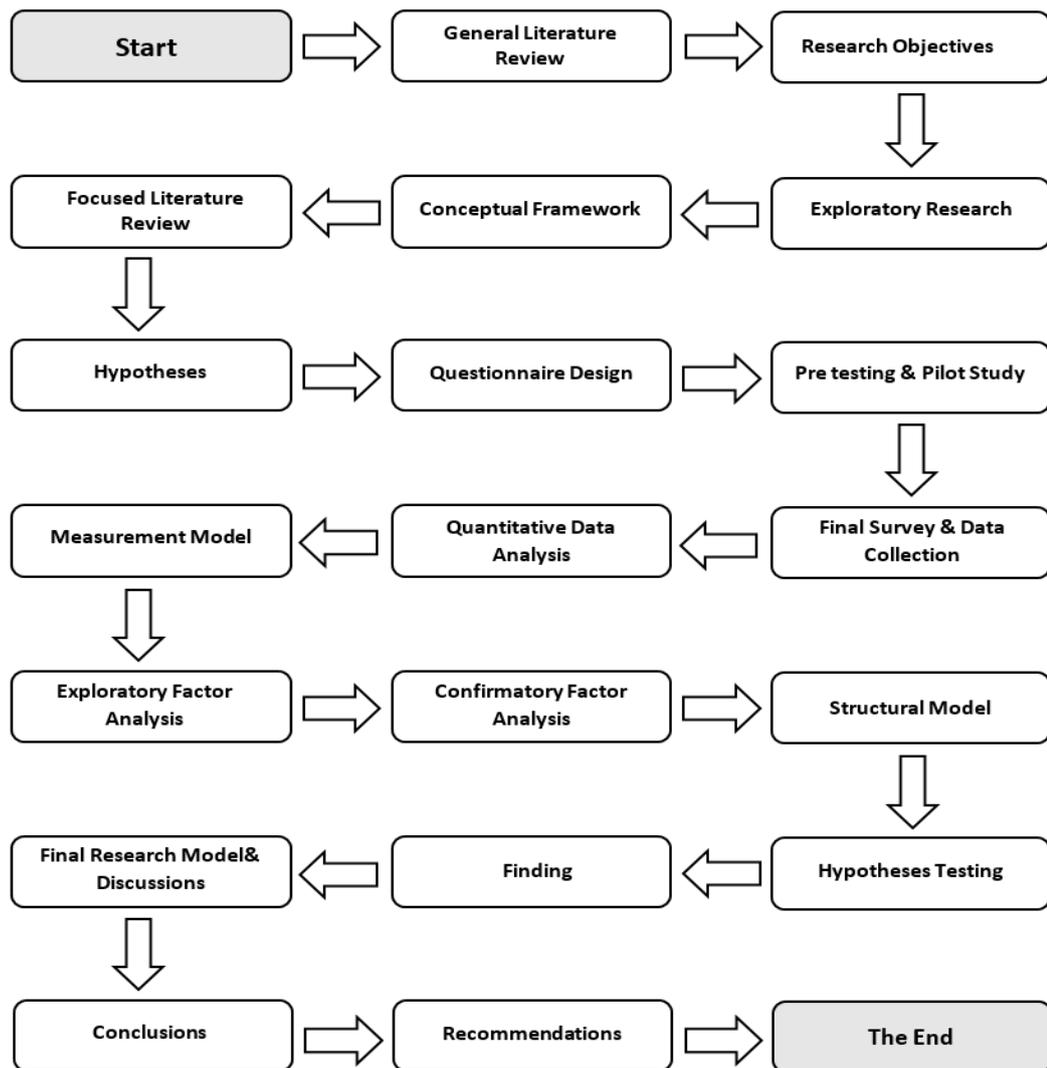


Figure 24. Research Process

## 6.2 Research Summary

Although several studies have considered factors influencing knowledge sharing (Al-Alawi et al., 2007; Seba et al., 2012a; Jolaei et al., 2014; Rutten et al., 2016; Youssef et al., 2017; Kim, 2018), their influence has mainly been on knowledge sharing without distinguishing between knowledge donating and knowledge collecting. Moreover, compared to private sector organisations, the review of literature revealed a limitation in studies in the public sector, particularly in the context of developing countries. In addition, there is a lack of research in this regard in Bahrain's public sector, particularly in the centralised police organisation. Therefore, measuring the impact of

different factors on knowledge sharing remains blurred and empirical evidence is still questionable (Jain et al., 2015). In summary, despite the above-mentioned studies, the influence of the proposed factors on the main components of knowledge sharing (Donating and Collecting) was not fully answered, and the current research has filled this gap.

In order to achieve the research objectives, prior studies, relevant literature and theories were reviewed which identified two main dimensions of factors that affected knowledge sharing. The first group of factors was categorised as the organisational dimension and the second group of factors as an individual dimension. The two types of factors were summarised in a conceptual framework (see Figure 4 on page 81). As shown in the conceptual framework, the proposed organisational factors are support, rewards, organisational structure centralisation and organisational structure formalisation. On the other hand, the proposed individual factors were reciprocity, social interaction, personal benefits and trust. Based on the conceptual framework which was derived from the literature review, a set of hypotheses was developed to test the influence of organisational and individual factors on knowledge sharing processes. To gain more in-depth information, knowledge sharing behaviour was separated into two main components, namely: knowledge donating (DV1) and knowledge collecting (DV2).

Subsequently, the philosophical paradigms within the field of knowledge management and various research approaches, methods and data collecting sources were discussed. In addition, the applied methodology was proposed beside the justifications and the reasons for the choice of the positivist paradigm. Justification for selecting the quantitative approach and the motivations behind the selection of the survey method were provided. Finally, in terms of data collection procedures, data quality was ensured by selecting a representative sample from the BPSF officers from different positions, ranks, departments, educational levels and work experience at the BPSF. In addition, the procedures carried out during the stages of data collection and analysis were also described in detail.

Since quantitative methods were adopted in this study, a survey approach was used to test the proposed conceptual model. This study used the

questionnaire as the main tool for the survey study. The questionnaire was designed based on survey instruments used in previous studies that contain validated and reliable scales. Prior to the final distribution of the questionnaire, it was translated into Arabic, pre-tested and piloted at the BPSF. The survey questionnaires were distributed to 470 participants who were selected by random sampling from different departments in the Bahrain Public Security Forces (BPSF). Out of 470 distributed questionnaires, 338 questionnaires were returned, which shows a high response rate (72%). In addition, all research participant profiles were presented. This study employed various statistical techniques to analyse the quantitative data in order to achieve the research objectives. In addition, the Statistical Package for Social Sciences software (SPSS) and analysis of a moment structures software (AMOS) were used to analyse the preliminary data.

To identify the exact factors that affect knowledge donating and knowledge collecting, a careful assessment procedure was applied to the current study framework. To report the descriptive data analysis results, the study started with initial data consideration to ensure data validation; this involved the process of data management and data screening, and normality assessments and potential bias examinations were addressed. Moreover, the primary reliability for the main constructs was checked, and the demographic profiles of the participants were discussed. The exploratory factor analysis (EFA) and the confirmatory factor analysis (CFA) were applied to report the factor analysis (data-reduction/factor-extraction). Then, the structural equation model (SEM) was used to measure model validation and to determine the causal relationships among the proposed model variables (Figure 16 and Figure 17 on page177). Based on the SEM results, the research hypotheses were accepted/rejected. Finally, one-way analysis of variance (ANOVA) was applied to determine the differences between the means of demographic groups such as age, education level, experience and position. The hypothesis results revealed that the standardised estimates for most of the hypotheses are statistically significant and show support for all hypotheses in terms of the impact of the proposed factors on knowledge donating and knowledge

collecting, except H1a and H3a, which were rejected with regard to KD, and only one hypotheses, H1B, was rejected in terms of KC.

In terms of the impact of the proposed factors on knowledge donating (DV1), the findings showed that three of the organisational factors and three of the individual factors were influencing knowledge donating behaviour in the BPSF. In addition, one factor in each category did not influence DV1. For instance, SC and PB showed a strong positive and significant effect on DV1, while SI has a medium impact. Moreover, factors of ST, TT and SF have the lowest significant impact on the same DV. On the other hand, research results revealed that knowledge donating behaviour was not influenced by RC and RW. In respect of the influence of the proposed factors on knowledge collecting (DV2), the results showed that all organisational factors and three of the individual factors influenced knowledge collecting behaviour in the BPSF, except that one individual factor was found not to influence DV2. For instance, RW, SI and SC have the strongest positive and significant effect on DV2, whereas ST, PB, TT and SF have a medium significant impact on the same DV. On the other hand, similar to DV1 outcome, RC was not found to influence knowledge collecting behaviour in the BPSF.

### **6.3 Research Contributions and Implications**

The findings highlighted in the previous section have made a novel contribution to the theoretical knowledge in the field of knowledge management and organisational development. Research contributions and implications of the findings of the current study are described independently as theoretical and practical contributions. These contributions are discussed in the following sections.

#### **6.3.1 Theoretical Contributions**

The results of this study provide a number of significant theoretical contributions to the field of knowledge.

It has been emphasised in the literature review (Chapter 2) that there is a need for further investigation into the critical factors that influence employees'

knowledge sharing behaviour (Jain et al., 2015; Kim, 2018). Moreover, there is a lack of research that focuses on exploring these factors in the public sector, particularly in the context of developing countries (Kim, 2018). The current study contributes significantly to previous studies by filling a gap through exploring and examining the critical factors that may influence KS processes within the context of a developing country (Bahrain). In addition, although a few studies have been conducted relating to knowledge sharing in the same field and zone, there has been no research to date to consider all the variables used in this study within the specific country setting (Bahrain).

Secondly, the study has developed and validated a 34-item to measure constructs that may influence employees' knowledge sharing behaviour in a new context (Bahrain public sector). The instrument development process included reviewing the related literature for empirically confirmed items, choosing appropriate items, pilot testing and finally testing the instrument empirically. Moreover, several steps were involved in the validation of the developed instrument scales. Initially, EFA was employed to identify the major KS dimensions, and then CFA was used to validate the underlying structure of the main constructs of the instrument as well as to assess the composite reliability and construct validity. High internal consistency levels were reported among all constructs using two reliability indicators (Cronbach's alpha and composite reliability). The constructs of the final proposed instrument also demonstrated high convergent and discriminant validities. Therefore, it is believed that this instrument can be used with conviction by researchers in other developing countries and other regions that have a similar culture and share the same contextual features.

Although there are a few knowledge sharing models available, it has been highlighted in Chapter 2 that the current literature lacks the generic and valid models and frameworks for 'knowledge donation' and 'knowledge collecting' as separate entities. Moreover, the literature review established that 'one size does not fit all' and thus each country needs to have a unique model that fits its environment (Al-Alawi et al., 2007; Titi Amayah, 2013). This study provides a new model that identifies the factors that affect knowledge donating and knowledge collecting. The model will make an important contribution to the

literature, which is considered to add value to the existing body of knowledge, and may help to identify new ways to determine the factors that foster knowledge sharing in organisations. Therefore, the final model developed in the current study extends existing theoretical knowledge. In addition, the conclusions and findings produced from this study will be an original contribution to the knowledge base in the fields of knowledge management and knowledge sharing in particular. In summary, one major contribution of this study to the existing theory is the validation of the research model with empirical data collected from public employees in Bahrain.

In addition, the quantitative approach used in this study provides a rich and in-depth examination of the factors that influence knowledge sharing processes. Prior studies mainly used a qualitative approach to investigate the influence of proposed factors on KS behaviour. Therefore, the use of quantitative data with sophisticated statistical tools such as SEM and AMOS has contributed to the existing literature and understanding about factors that may influence KS behaviour.

Finally, the study has contributed to understanding the differences between demographic groups such as position, age, rank, education level and work experience. Few studies have examined the differences in groups related to the knowledge donating and knowledge collecting behaviours. This study thus provides great insight into the context of the police sector in Bahrain.

### **6.3.2 Practical Implications**

From a practical perspective, the findings of this study can improve the understanding and practice of public sectors in terms of their employees' knowledge sharing behaviour. This study incorporated eight organisational and individual context factors that are essential to develop public sectors' knowledge sharing culture and highlighted the implications of these factors for developing organisational strategies that encourage employees' knowledge sharing (collecting and donating). Based on the results, the following suggestions are offered to help top management enhance process innovation

by establishing appropriate organisational and individual context and a successful knowledge sharing strategy.

The results of the current study illustrate that, in order to ensure the successful development of knowledge sharing in their organisations, managers/leaders should obtain a comprehensive understanding of the factors that may affect employees' knowledge sharing behaviours. The final model of the current study portrays the factors that are significant to enhance knowledge sharing behaviour within the context of Bahrain's public sector, particularly the BPSF. Moreover, the final model could be applied to other Gulf countries with a similar cultural context, thereby providing them with an effective tool to enhance the development of knowledge sharing behaviour.

In addition to that, the researcher has contacted the Ministry of Interior through the chief of the BPSF and offered to present the findings of this research through targeted workshops. This could possibly enable managers to benefit from the research results by examining the identified key forces that can stimulate or impede the development of the knowledge sharing behaviour among employees. It may also give them the opportunity to discuss the proposed recommendations and strategies with the researcher in person, so they can learn how to handle the encountered forces and gain a competitive advantage from the development of KS in public organisations. They have welcomed the idea and agreed to allow the researcher to arrange a number of workshops. This can lead to informing practice within a public organisation.

Understanding the factors influencing knowledge donating and knowledge collecting will enable decision makers and managers to prioritise their knowledge resources in an effective way. For the Bahrain public sector, the results indicate that personal benefit (PB) and structural centralisation (SC) are the most significant predictors of knowledge donating. Therefore, leaders in the BPSF should introduce an adequate rewards system and centralised structure approach to enhance knowledge donating behaviour among members of staff. In the case of knowledge collecting, social interaction (SI) was found to be the strongest predictor of knowledge collecting behaviour. Thus, leaders and top managers should promote social activities in order to motivate employees towards knowledge collecting.

#### **6.4 Research Limitations**

Like any other research, this study is subject to limitations, which need to be taken into consideration when attempting to generalise findings to the whole research population or trying to apply its proposed model to other research contexts. Firstly, the study is limited in focusing on the organisational and individual dimensions only and did not focus on technical factors that may influence the knowledge sharing process. Thus, future research could explore the impacts of all technical factors in an attempt to detect which factor has the most influence on the KS process among BPSF staff.

Secondly, the sample of this study was limited to the public sector, particularly the police organisation, and therefore the results cannot be generalised to other sectors. Further studies should explore such relationships further in other sectors such as private sector to examine whether the results of the current study are supported or not.

Thirdly, in terms of geographical area, the context was developing countries, specifically Bahrain. Hence, the findings may not generalise to other countries, particularly outside the Arab world, since cultural differences may lead to different influences (Hofstede et al., 2010). For further validity, the model could be extended to different cities, countries and cultures, and this may lead to different findings.

Fourthly, since the current study model was developed and validated to predict and explain the variance in employees' knowledge sharing behaviour in a mandatory setting (police force), care should be taken when applying it to voluntary settings where knowledge sharing is not part of an individual's job.

Finally, the research methodology only used survey-based quantitative data. Therefore, one of the main limitations was the absence of qualitative data – which can be obtained through interviews in the future studies.

The acknowledged limitations of this research lead to recommendations for future research. These are described in the following section.

## **6.5 Directions for Future Research**

This study provides various recommendations for future research. For instance, the study examined direct relationships between independent variables such as management support, trust, reward, personal benefit, social interaction, reciprocity, organisational structural centralisation and organisational structure formalisation to the dependent variables knowledge donating and knowledge collecting. One of the key ways for future researchers is to examine more sophisticated relationships between IVs and DVs. In this regard, future research could further develop a theoretical model concerning knowledge sharing for the relationships between different types of predictors. Therefore, it is reasonable to suggest that a variety of more complicated relationships among factors may exist that need further investigation.

Similarly, in order to enhance the external validity of the proposed model of this study, future research could be directed to examine the change in other countries with a similar background to Bahrain, such as the UAE, Saudi Arabia and Oman. Another interesting investigation in this connection would be the replication of this study in one or more countries with different cultural settings such as other developing or developed countries. This would develop the understanding of cross-cultural effects on the knowledge sharing as well as verify the robustness of the research models across different cultural settings.

The present study focused on knowledge donating and collecting behaviour based on organisational and individual factors that may affect employees' knowledge sharing behaviour. It is suggested that future research addresses other variables such as technical advancements and information technology infrastructure.

As mentioned above, the research was limited to quantitative data only. Therefore, future researchers can use qualitative data or a mixed method triangulation approach to investigate the factors that may affect the knowledge sharing processes.

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# Appendices

## Appendix 1: The Questionnaire (English Version)



### LIVERPOOL JOHN MOORES UNIVERSITY PARTICIPANT INFORMATION SHEET

#### **Dear Participant,**

I am currently undertaking research as part of a PhD at Liverpool John Moores University. You are being invited to take part in this research study by completing the following questionnaire. Before you decide to participate, it is important that you understand why the research is being done and what it involves. Please take your time to read the following information.

#### **Title of research: (Investigation of factors influencing knowledge sharing in Bahrain Public Security Forces).**

Your participation is important in this research; I hope that findings of this research will help the Bahrain Public Security Forces by providing recommendations in terms of maintaining the knowledge asset and improving knowledge management strategies, which will enhance the delivered Police services in Bahrain.

Answering the questionnaire will take approximately 10-15 min. it is up to you to decide whether to take part. You are still free to withdraw at any time and without giving a reason. A decision to withdraw will not affect your rights/any-future treatment/service you receive.

The participation is anonymous and no names will be used in the study itself or in any further publications. The collected data will be used strictly for academic research purposes. Therefore, I can confirm that there will be no risks for you due to your participation.

Any personal information collected as a part of the study will be transferred to UK for further analysis and will be treated confidentially, stored securely on password-protected computers or in a locked cabinet. Only the researcher and his supervisory team will have direct access to it. All personal information will be retained for a period of 2-4 years after analysis when it will then be destroyed.

By taking part in this study, you implicitly confirm that you have read the information above and you agree to participate.

If you have any questions regarding this study, please do not hesitate to contact me using the details below. **Thank you in advance for your participation**

#### **Abdulrahman Bahar**

(Researcher at Liverpool JM. University)

Email: BAHARESEARCH@GMAIL.COM

Mobile: 00973 396446280

<b>Demographic Information</b>						
<i>Please tick the box that applies</i>						
<b>Position</b>	1 <input type="checkbox"/>	General Director or equivalent	2 <input type="checkbox"/>	Director or equivalent	3 <input type="checkbox"/>	Head of Section or equivalent
	4 <input type="checkbox"/>	Head of Branch or equivalent	5 <input type="checkbox"/>	Head of Division or equivalent	6 <input type="checkbox"/>	Officer for other tasks
<b>Gender</b>	1 <input type="checkbox"/>	Male	2 <input type="checkbox"/>	Female		
<b>Age</b>	1 <input type="checkbox"/>	21 - 25 Years	2 <input type="checkbox"/>	26 - 30 Years	3 <input type="checkbox"/>	31 – 35 Years
	4 <input type="checkbox"/>	36 - 40 Years	5 <input type="checkbox"/>	41 - 45 Years	6 <input type="checkbox"/>	46 – 50 Year
	7 <input type="checkbox"/>	51 - 55 Years	8 <input type="checkbox"/>	56 - 60 Years	9 <input type="checkbox"/>	Over 60 Years
<b>Rank</b>	1 <input type="checkbox"/>	General	2 <input type="checkbox"/>	Brigadier	3 <input type="checkbox"/>	Colonel
	4 <input type="checkbox"/>	Lieutenant Colonel	5 <input type="checkbox"/>	Major	6 <input type="checkbox"/>	Captain
	7 <input type="checkbox"/>	First Lieutenant	8 <input type="checkbox"/>	Lieutenant		
<b>Qualification</b>	1 <input type="checkbox"/>	High Diploma or equivalent	2 <input type="checkbox"/>	Bachelor	3 <input type="checkbox"/>	Masters or equivalent
	4 <input type="checkbox"/>	Ph.D. or equivalent	5 <input type="checkbox"/>	No qualification	6 <input type="checkbox"/>	Other
<b>Work Experience at BPSF</b>	1 <input type="checkbox"/>	Less than 1 - 5 Years	2 <input type="checkbox"/>	6 - 10 Years	3 <input type="checkbox"/>	11 - 15 Years
	4 <input type="checkbox"/>	16 - 20 Years	5 <input type="checkbox"/>	21 - 25 Years	6 <input type="checkbox"/>	26 - 30 Years
	7 <input type="checkbox"/>	31 - 35 Years	8 <input type="checkbox"/>	Over 35 Years		

<b>Knowledge Donating</b>		<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
1	When I have learned something new, I ensure that colleagues in my department can learn it as well, if it is unrestrained.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
2	I share the information I have with colleagues within my department, if it is unrestrained.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
3	I share my skills with colleagues within my department, if it is unrestrained.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
4	When I have learned something new, I ensure that colleagues outside my department can learn it as well, if it is unrestrained.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
5	I share the information I have with colleagues outside my department, if it is unrestrained.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
6	I share my skills with colleagues outside my department, if it is unrestrained.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

<b>Knowledge Collecting</b>		<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
7	Colleagues within my department tell me what they know, when I ask them about an information.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
8	Colleagues within my department tell me what their skills are, when I ask them about it.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
9	Colleagues outside my department tell me what they know, when I ask them about an information.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
10	Colleagues outside my department tell me what their skills are, when I ask them about it.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

<b>Trust</b>		<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
<b>11</b>	Members in the Force will always keep the promises they make to one another.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>12</b>	Members in the Force would not knowingly do anything to disrupt the conversation.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>13</b>	Members in the Force behave in a consistent manner.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>14</b>	Members in the Force are truthful in dealing with one another.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

<b>Support</b>		<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
<b>15</b>	The philosophy of our management emphasizes the human factor, how people feel, etc.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>16</b>	Management makes an effort to talk with employees about their career aspirations within the Force.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>17</b>	When I am on a difficult assignment, I can usually count on getting assistance from my boss.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>18</b>	When I am on a difficult assignment, I can usually count on getting assistance from my co-workers.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>19</b>	People in this organization trust each other enough.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

<b>Social Interaction</b>		<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
<b>20</b>	I maintain close social relationships with some members in the Force.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>21</b>	I spend a lot of time interacting with some members in the Force.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>22</b>	I know some members in the Force on a personal level.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>23</b>	I have frequent communication with some members in the Force.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

<b>Rewards</b>		<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
<b>24</b>	There is enough rewards given in this Force for doing good work.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>25</b>	In this Force, people are rewarded in proportion to the excellence of their job performance.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>26</b>	We have a promotion system here that helps the best person to rise to the top.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>27</b>	In this Force, the rewards you get usually outweigh the criticism.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

<b>Reciprocity</b>		<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
<b>28</b>	Sharing my knowledge with colleagues will strengthen ties between existing members of the Force and myself.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>29</b>	Sharing my knowledge with colleagues will expand the scope of my association with other Force members.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>30</b>	When I share my knowledge with colleagues, I expect to receive knowledge in return when necessary.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>31</b>	I believe that when I share my knowledge with colleagues, my future requests for knowledge will be answered.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

<b>Personal Benefits</b>		<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
<b>32</b>	Sharing my knowledge will give me a feeling of happiness.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>33</b>	Sharing my knowledge can build up my reputation in the Force.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>34</b>	Sharing my knowledge will strengthen the tie between myself and other officers in the Force.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

<b>Organisational Structure Centralisation</b>		<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
<b>35</b>	Little action can be taken until a supervisor approves a decision.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>36</b>	A person who wants to make his or her own decision without consulting his or her supervisor will be quickly discouraged.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>37</b>	Even small matters have to be referred to someone higher up for a final answer.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>38</b>	Any decision I make has to have my boss approval.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

<b>Organisational Structure Formalisation</b>		<b>Strongly Disagree</b>	<b>Disagree</b>	<b>Neutral</b>	<b>Agree</b>	<b>Strongly Agree</b>
<b>39</b>	Each unit in this Force has well-established formal rules.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>40</b>	Each unit in this Force has well-established formal task procedures guidelines.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>41</b>	There are many rules in this job.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
<b>42</b>	I always carry out my tasks according to the force formal rules/documents.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

*Thank you*

## Appendix 2: The Questionnaire (Arabic Version)

بسم الله الرحمن الرحيم

عزيزي المشارك/ عزيزتي المشاركة،

السلام عليكم ورحمة الله وبركاته، وبعد.

أجري حالياً بحثاً أكاديمياً كمتطلب رئيسي لنيل درجة الدكتوراه. ولتحقيق أهداف هذا البحث تم تصميم هذه الاستبانة. ونظراً لعملكم ضابطاً للشرطة في وزارة الداخلية فقد تم اختياركم ضمن عينة الدراسة. ويدور موضوع هذا البحث حول العوامل التنظيمية والشخصية المؤثرة على عمليات التداول المعرفي بين ضباط قوات الأمن العام في مملكة البحرين.

ومن المتوقع أن تنعكس نتائج هذه الدراسة إيجاباً على تطوير القطاع العام وتطوير سياسات واستراتيجيات التطوير والاستدامة في وزارة الداخلية بشكل خاص.

يستغرق ملئ هذه الاستبانة حوالي 10 الى 15 دقيقة من وقتك. مشاركتك سوف تكون مجهولة الهوية. ولن تستخدم المعلومات التي ستشارك بها إلا لأغراض البحث فقط ولن يطلع عليها أحد غير الباحث.

إذا كان لديك أية استفسارات بخصوص هذا البحث والأسئلة الواردة في هذه الاستبانة لا تردد بالاتصال بي على بيانات الاتصال التالية:

الهاتف: 628044396 (اتصال صوتي ووتساب)

البريد الإلكتروني: BAHARESEARCH@GMAIL.COM

شاكراً ومقدراً لكم اهتمامكم واستجابتكم، وتقبلوا خالص تحياتي.

أخوكم الباحث/ عبد الرحمن محمد بحر

البيانات الشخصية				
المنصب	1	مدير عام أو ما يعادله	2	مدير أو ما يعادله
	4	رئيس فرع أو ما يعادله	5	رئيس قسم أو ما يعادله
	3	رئيس شعبة أو ما يعادله	6	ضابط بمهام أخرى
الجنس	1	ذكر	2	أنثى
السن	1	من 25-21	2	من 30-26
	4	من 40-36	5	من 45-41
	7	من 55-51	8	من 60-56
	3	من 35-31	6	من 50-46
	9	أكبر من 60		
الرتبة	1	لواء	2	عميد
	5	رائد	6	نقيب
	3	عقيد	7	ملازم أول
	4	مقدم	8	ملازم ثاني
المؤهل التعليمي	1	الثانوية العامة	2	الدبلوم العالي أو ما يعادله
	5	الدكتوراه	6	أقل من الثانوية العامة
	3	البكالوريوس أو ما يعادله	7	ليس لدى مؤهل تعليمي
	4	الماجستير أو ما يعادله	8	أخرى
خبرة العمل في الشرطة	1	أقل من سنة إلى 5 سنوات	2	من 6-10 سنوات
	5	من 25-21 سنة	6	من 30-26 سنة
	3	من 11-15 سنة	7	من 31-35 سنة
	4	من 16-20 سنة	8	أكثر من 35 سنة

تقديم المعرفة					
لا أوافق على الإطلاق	لا أوافق	محايد	موافق	موافق بشده	العبارة
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1 عندما اتعلم شيئاً جديداً أرى مدى امكانية نقله إلى زملائي في الإدارة ما لم يكن محظوراً.
1	2	3	4	5	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2 اشارك زملائي في الادارة ما أملك من معلومات ما لم تكن محظورة.
1	2	3	4	5	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3 اشارك زملائي في الادارة ما أملك من مهارات ما لم تكن محظورة.
1	2	3	4	5	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4 عندما اتعلم شيئاً جديداً أرى مدى امكانية أن أعلمه لزملائي من خارج الادارة ما لم يكن محظوراً.
1	2	3	4	5	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 اشارك زملائي من خارج الادارة ما أملك من معلومات ما لم تكن محظورة.
1	2	3	4	5	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6 اشارك زملائي من خارج الادارة ما أملك من مهارات ما لم تكن محظورة.
1	2	3	4	5	
اكتساب المعرفة					
لا أوافق على الإطلاق	لا أوافق	محايد	موافق	موافق بشده	العبارة
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7 عندما أسأل زملائي في الادارة عن معلومة ما، يخبرونني بما يعرفونه من معلومات ما لم تكن محظورة.
1	2	3	4	5	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8 زملائي في الإدارة يعلموني ما يملكون من مهارات غير محظورة عندما أطلب منهم ذلك.
1	2	3	4	5	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9 عندما أسأل زملائي من خارج الادارة عن معلومة ما، يخبرونني بما يعرفونه من معلومات ما لم تكن محظورة.
1	2	3	4	5	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 زملائي من خارج الادارة يعلموني ما يملكون من مهارات غير محظورة عندما أطلب منهم ذلك.
1	2	3	4	5	

الثقة					
لا أوافق على الإطلاق	لا أوافق	محايد	موافق	موافق بشدة	العبارة
<input type="checkbox"/>	11 دائما ما يوفي الضباط بوعودهم لبعضهم البعض.				
<input type="checkbox"/>	12 الضباط لا يتقلوا ما يدور بينهم من أحاديث إلى الآخرين.				
<input type="checkbox"/>	13 الضباط يتصرفون بشكل متناسق مع بعضهم البعض.				
<input type="checkbox"/>	14 الضباط صادقين في التعامل مع بعضهم البعض.				
الدعم					
لا أوافق على الإطلاق	لا أوافق	محايد	موافق	موافق بشدة	العبارة
<input type="checkbox"/>	15 تركز فلسفة الإدارة لدينا على العوامل الإنسانية ومراعاة شعور الموظفين.				
<input type="checkbox"/>	16 تتيح الإدارة المجال للعاملين بها للتحدث حول تطلعاتهم المهنية.				
<input type="checkbox"/>	17 دائما ما أعتد على تلقي المساعدة من مسؤولي عندما أواجه أية صعوبات في أداء عملي.				
<input type="checkbox"/>	18 عندما أواجه أية صعوبات في أداء عملي، دائما ما أعتد على تلقي المساعدة من زملائي.				
<input type="checkbox"/>	19 الضباط يعتمدون على الثقة القائمة فيما بينهم بشكل كاف.				
التفاعل الاجتماعي					
لا أوافق على الإطلاق	لا أوافق	محايد	موافق	موافق بشدة	العبارة
<input type="checkbox"/>	20 أحافظ على علاقات اجتماعية وثيقة مع بعض الزملاء في العمل.				
<input type="checkbox"/>	21 أقضي الكثير من الوقت في التواصل مع بعض الزملاء في العمل.				

<input type="checkbox"/>	22	أعرف بعض الزملاء في العمل على المستوى الشخصي.				
1	2	3	4	5		
<input type="checkbox"/>	23	لدي اتصالات مستمرة مع بعض الزملاء في العمل.				
1	2	3	4	5		

## المكافآت

لا أوافق على الإطلاق	لا أوافق	محايد	موافق	موافق بشده	العبارة	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	24	مكافآت العاملين المجددين في مؤسستنا كافية.
1	2	3	4	5		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25	يكافأ العاملون وفقا لتمييزهم في أدائهم الوظيفي.
1	2	3	4	5		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	26	يوجد لدينا نظام ترقيات يساعد ذوي الكفاءة من الضباط للترقي للمناصب العليا.
1	2	3	4	5		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	27	دائما ما يحظى العاملون بمكافئات تفوق الانتقادات الموجهة إليهم.
1	2	3	4	5		

## التبادلية المتوقعة

لا أوافق على الإطلاق	لا أوافق	محايد	موافق	موافق بشده	العبارة	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	28	مشاركة معرفتي مع الزملاء سوف يعزز الترابط بيني وبين العاملين في المؤسسة.
1	2	3	4	5		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	29	مشاركة معرفتي مع الزملاء سوف يوسع نطاق علاقاتي مع العاملين في المؤسسة.
1	2	3	4	5		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30	عندما أشارك معرفتي مع الزملاء، فإنني أتوقع منهم في المقابل أن يشاركوني معرفتهم عندما احتاجها.
1	2	3	4	5		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	31	أعتقد أن مشاركتي المعرفة مع الزملاء، سيجعلهم يساعدونني بمعرفتهم عندما أطلب منهم ذلك مستقبلا.
1	2	3	4	5		

المنافع الشخصية					
لا أوافق على الإطلاق	لا أوافق	محايد	موافق	موافق بشده	العبارة
1	2	3	4	5	32 مشاركة المعرفة مع الزملاء تشعرني بالسعادة.
1	2	3	4	5	33 سوف أبقى سمعة طيبة لي في المؤسسة، عندما أشارك معرفتي مع الآخرين.
1	2	3	4	5	34 مشاركة معرفتي سوف يقوي الروابط بيني وبين الضباط الآخرين في المؤسسة.
مركزية الهيكل التنظيمي					
لا أوافق على الإطلاق	لا أوافق	محايد	موافق	موافق بشده	العبارة
1	2	3	4	5	35 لا أتخذ الإجراءات كاملة حتى يوافق مسؤولي على قراري.
1	2	3	4	5	36 لا تشجع الإدارة الضباط الذي يتخذ قراره بنفسه دون الرجوع للمسؤول.
1	2	3	4	5	37 يتم الرجوع للمسؤول الأعلى حتى في الأمور الصغيرة لاتخاذ القرار النهائي بشأنها.
1	2	3	4	5	38 يتوجب علي أخذ موافقة مسؤولي المسبقة قبل اتخاذي لأي قرار.
رسمية الهيكل التنظيمي					
لا أوافق على الإطلاق	لا أوافق	محايد	موافق	موافق بشده	العبارة
1	2	3	4	5	39 كل وحدة إدارية في هذه المؤسسة لديها قواعد عمل رسمية واضحة.
1	2	3	4	5	40 كل وحدة إدارية في هذه المؤسسة لديها دليل إجراءات عمل رسمي واضح للمهام.
1	2	3	4	5	41 هناك العديد من التشريعات التي تنظم العمل في مؤسستنا.
1	2	3	4	5	42 دائماً ما أقوم بعملي وفقاً لقواعد العمل الرسمية.

شكراً لكم

### Appendix 3: Model-fit Summary for CFA (first-run)

#### Model Fit Summary

##### CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	113	924.037	482	.000	1.917
Saturated model	595	.000	0		
Independence model	34	13033.944	561	.000	23.233

##### RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.030	.861	.828	.698
Saturated model	.000	1.000		
Independence model	.225	.273	.229	.258

##### Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.929	.917	.965	.959	.965
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

##### Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.859	.798	.829
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

##### NCP

Model	NCP	LO 90	HI 90
Default model	442.037	359.927	531.943
Saturated model	.000	.000	.000

Model	NCP	LO 90	HI 90
Independence model	12472.944	12104.628	12847.633

### FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	2.971	1.421	1.157	1.710
Saturated model	.000	.000	.000	.000
Independence model	41.910	40.106	38.922	41.311

### RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.054	.049	.060	.090
Independence model	.267	.263	.271	.000

### AIC

Model	AIC	BCC	BIC	CAIC
Default model	1150.037	1178.697	1572.997	1685.997
Saturated model	1190.000	1340.906	3417.087	4012.087
Independence model	13101.944	13110.567	13229.206	13263.206

### ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	3.698	3.434	3.987	3.790
Saturated model	3.826	3.826	3.826	4.312
Independence model	42.128	40.944	43.333	42.156

### HOELTER

Model	HOELTER .05	HOELTER .01
Default model	180	188
Independence model	15	16

## Appendix 4: Model-fit Summary for CFA (second-run)

### Model Fit Summary

#### CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	116	815.639	479	.000	1.703
Saturated model	595	.000	0		
Independence model	34	13033.944	561	.000	23.233

#### RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.033	.901	.845	.705
Saturated model	.000	1.000		
Independence model	.225	.273	.229	.258

#### Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.937	.927	.973	.968	.973
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

#### Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.854	.800	.831
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

#### NCP

Model	NCP	LO 90	HI 90
Default model	336.639	261.580	419.568
Saturated model	.000	.000	.000

Model	NCP	LO 90	HI 90
Independence model	12472.944	12104.628	12847.633

### FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	2.623	1.082	.841	1.349
Saturated model	.000	.000	.000	.000
Independence model	41.910	40.106	38.922	41.311

### RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.048	.042	.053	.763
Independence model	.267	.263	.271	.000

### AIC

Model	AIC	BCC	BIC	CAIC
Default model	1047.639	1077.060	1481.828	1597.828
Saturated model	1190.000	1340.906	3417.087	4012.087
Independence model	13101.944	13110.567	13229.206	13263.206

### ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	3.369	3.127	3.635	3.463
Saturated model	3.826	3.826	3.826	4.312
Independence model	42.128	40.944	43.333	42.156

### HOELTER

Model	HOELTER .05	HOELTER .01
Default model	203	212
Independence model	15	16

## Appendix 5: Model Fit Summary for SEM (DV1)

### CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	116	815.639	479	.000	1.639
Saturated model	595	.000	0		
Independence model	34	13033.944	561	.000	23.233

### RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.033	.894	.865	.705
Saturated model	.000	1.000		
Independence model	.225	.273	.229	.258

### Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.944	.927	.973	.973	.977
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

### Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.854	.800	.831
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

### NCP

Model	NCP	LO 90	HI 90
Default model	336.639	261.580	419.568
Saturated model	.000	.000	.000

Model	NCP	LO 90	HI 90
Independence model	12472.944	12104.628	12847.633

### FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	2.623	1.082	.841	1.349
Saturated model	.000	.000	.000	.000
Independence model	41.910	40.106	38.922	41.311

### RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.045	.042	.053	.763
Independence model	.267	.263	.271	.000

### AIC

Model	AIC	BCC	BIC	CAIC
Default model	1047.639	1077.060	1481.828	1597.828
Saturated model	1190.000	1340.906	3417.087	4012.087
Independence model	13101.944	13110.567	13229.206	13263.206

### ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	3.369	3.127	3.635	3.463
Saturated model	3.826	3.826	3.826	4.312
Independence model	42.128	40.944	43.333	42.156

### HOELTER

Model	HOELTER .05	HOELTER .01
Default model	203	212
Independence model	15	16

## Appendix 6: Model Fit Summary for SEM (DV2)

### CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	116	815.639	479	.000	1.669
Saturated model	595	.000	0		
Independence model	34	13033.944	561	.000	23.233

### RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.033	.892	.862	.705
Saturated model	.000	1.000		
Independence model	.225	.273	.229	.258

### Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.944	.927	.973	.972	.977
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

### Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.854	.800	.831
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

### NCP

Model	NCP	LO 90	HI 90
Default model	336.639	261.580	419.568
Saturated model	.000	.000	.000
Independence model	12472.944	12104.628	12847.633

**FMIN**

Model	FMIN	F0	LO 90	HI 90
Default model	2.623	1.082	.841	1.349
Saturated model	.000	.000	.000	.000
Independence model	41.910	40.106	38.922	41.311

**RMSEA**

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.046	.042	.053	.763
Independence model	.267	.263	.271	.000

**AIC**

Model	AIC	BCC	BIC	CAIC
Default model	1047.639	1077.060	1481.828	1597.828
Saturated model	1190.000	1340.906	3417.087	4012.087
Independence model	13101.944	13110.567	13229.206	13263.206

**ECVI**

Model	ECVI	LO 90	HI 90	MECVI
Default model	3.369	3.127	3.635	3.463
Saturated model	3.826	3.826	3.826	4.312
Independence model	42.128	40.944	43.333	42.156

**HOELTER**

Model	HOELTER .05	HOELTER .01
Default model	203	212
Independence model	15	16