Developing an understanding of the relationships between organisational learning and performance measurement systems: the case of Frankfurt airport.

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DEVELOPING AN UNDERSTANDING OF THE RELATIONSHIPS BETWEEN ORGANISATIONAL LEARNING AND PERFORMANCE MEASUREMENT SYSTEMS: THE CASE OF FRANKFURT AIRPORT

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ABSTRACT

The aim of this research was to develop a comprehensive perspective of both, the breadth and depth of the relationships between organisational learning (OL) and performance measurement systems (PMS), theoretically and practically within the context of Frankfurt airport.

A case study approach was adopted and applied at Frankfurt airport, encompassing the hierarchical levels of the top-, senior- and line managers and subject experts. Two different qualitative data collection methods (semi-structured and semi-structured narrative interviews) were applied to achieve the research aim. Content analysis and the narrative schema of Labov and Waletzky (1967) were used to analyse the primary data.

The findings show that within the context of the case study organisation, PMS are initially used diagnostically and are then continued to be used in this manner if the performance anomalies are statistical outliners. Diagnostic PMS usage is most common within the case company and is used for daily performance management. However, in cases where the loss in performance is systematic, the PMS are continued to be used interactively. The interactive usage is found to be initiated by the organisational management and used for strategic long-term or tactical medium-term decision-making. Further, data analysis identifies the potential of diagnostic PMS to generate individual learning while interactive PMS are found to create individual, group, and organisational learning.

In relation to the learning forms of individual, group and organisational learning, the research identifies that these forms are cyclic in their nature. The individual learning cycle is found to be the most robust and frequent cycle within the case company and is able to occur without communication and dialogue. The other learning cycles are found to be dependent upon the drivers of communication and dialogue, which are further determined by the organisational culture, which is largely shaped by the management style of the airport. Another key finding is that the individual learning cycle can produce both, single-loop learning and double-loop learning. Further, another finding is that only the individual double-loop learning cycle is able to trigger the subsequent cycle of group learning and thus organisational learning.

This research provides a significant contribution to the understanding of the relationships between OL and PMS by developing a novel model of how PMS can be used to generate OL for practical application. The research makes a rare contribution as it combines OL and performance measurement into an integrated and holistic framework through examining performance measurement practices and their effect on OL.

Keywords*: Organisational Learning, Performance Measurement, Performance Measurement Systems, Performance Management, Airport.*

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CONTENTS

TABLES

FIGURES

ABBREVIATIONS

A-CDM	Airport Collaborative Decision Making
AVN	Aviation
BIAF	Business Intelligence Architecture Framework
BPC	Business Planning and Consolidation
DFS	Deutsche Flugsicherung
DLL	Double-loop Learning
GH	Ground Handling
KPI	Key Performance Indicator
MCS	Management Control System
NMOC	Network Management Operations Center
OL	Organisational Learning
OLM	Organisational Learning Mechanism
PIS	Performance Information System
PM	Performance Measurement
PMS	Performance Measurement System
SLL	Single-loop Learning

CHAPTER ONE: INTRODUCTION

1.1 Purpose of the study

This research examines the relationships between PMS and OL within Frankfurt airport. Organisational learning (OL) is recognised as highly beneficial for organisations adapting to the shifting demands and situations of the external environment (Park and Kim 2018). In fact, numerous scholars agree on the critical role of OL in enabling organisations to gain competitive advantage and thus to adapt to the changing environment (Patky 2020; Kim and Park 2019; Odor 2018; Park and Kim 2018; Mitic et al. 2017; Guinot, Chiva and Mallén 2016; Nafei 2015). In order for OL to take place, knowledge needs to be attained by acquiring, interpreting and sharing knowledge among individual actors in the organisation (Park and Kim 2018; Huber 1991; Crossan et al. 1999). Performance measurement (PM) plays a critical role in this process. In fact, the literature highlights PM as pre-requisite for the improvement of organisational performance (Goshu and Kitwa 2017; Shurafa and Mohamed 2016; Newcomer, Baradei, and Garcia 2013; Lynch-Cerullo and Cooney 2011; Herranz 2010; Arie 2005) and is a necessity in today´s complex environment full of competition and fast-changing economic needs (Polese et al. 2017; Manning and White 2014). PM enhances efficiency and effectiveness concerning resources and organisational strategy and therefore improves an organisation`s outcomes (Nudurupati, Garengo and Bititci 2021; Polese et al. 2017; Li 2015; Manning and White 2014). Performance measurement systems (PMS) as learning mechanisms translate individual learning into organisational learning (Henri 2006a) and are therefore crucial for organisations, which strive for learning and knowledge. Literature acknowledges that PMSs facilitate learning and the improvement of organisational processes and thus are regarded as triggers for learning and change (Hatane et al. 2020; Zhang and Yu 2020; Cestari et al. 2018; Bourne 2005). Concluding, PMSs enable learning, communication and knowledge-sharing when used and applied in a suitable manner (Guenther and Heinicke 2019; Shurafa and Mohamed 2016; Simons 2014; 1995a; Pinheiro de Lima et al. 2012; Franco-Santos et al. 2007; Henri 2006a; Tuomela 2005; Bisbe and Otley 2004).

Airports as complex service providers are under continuous pressure to optimise performance in order to secure advantage in a highly competitive field due to the ever-increasing demands of stakeholders for cost effectiveness (Bezerra and Gomes 2018; 2016). As companies strive for economic and competitive advantages, there is the need for them to adjust and align their PMS and to understand how they can be used to generate OL (Canonico et al. 2015).

The relationships between OL and PMS are highly complex and occur in multiple facets; however, research on their interconnectedness is scarce. Indeed, existing literature remark a lack of theoretical and practical research regarding the relationships between OL and PMS (Zhang and Yu 2020; Robles 2019; Shurafa and Mohamed 2016). Actually, the holistic interconnectedness of PMS and OL has neither been evaluated within literature nor in practice (Zhang and Yu 2020).

Therefore, this research examines the relationships between PMS and OL within Frankfurt airport. This thesis strives to develop a deeper understanding of the interconnectedness between PMS and OL, with a specific focus on understanding how PMS may help to support OL at Frankfurt airport. Within the academic literature, there is currently no model, which illustrates the integral relationships of these two constructs. Thus, this research attempts to shed light onto the interplay between these two distinct research areas by developing a holistic framework. The aim of the study can be described as developing a comprehensive perspective of both, the breadth and depth of the relationships of the research fields OL and PMS, theoretically and practically (see Chapter 1.3). The research focuses on Frankfurt airport as a case company and examines its performance measurement and learning processes. As will be discussed further in the literature review (Chapter two), there is a need to examine how OL occurs in practice and how PMS can be used to promote learning within the case organisation.

1.2 Background of the study and research problem

1.2.1 Company portrait Fraport AG

The owner and operator of Frankfurt airport is Fraport AG. The company has been founded in 1924 under the name “Südwestdeutsche Luftverkehrs AG” and operated the Rebstock site of Frankfurt airport (Fraport AG 2020b). In 1936, the airport was extended to its current sites. However, by the end of World War II, 77% of the airport had been destroyed and the airport was operated under US control (Fraport AG 2020b). Ten years later, the civil aviation business resumed as “Flughafen Frankfurt/Main AG”. However, it was not until the IPO in 2001 that the airport was renamed as “Fraport AG” (Fraport AG 2020b).

The company owns and manages the airport, as well as renting airport facilities to airlines, external service providers and authorities. More than 500 businesses are located at the airport and Fraport

AG aims to further expand the airport city into an essential national economic business location (Fraport AG 2022). Thus, currently more than 81,000 employees work at Frankfurt airport, of which 21,000 work for Fraport AG directly, operating the airport. Frankfurt airport has the largest employer in Germany (Fraport AG 2022).

This research uses Frankfurt airport as a case study (see Chapter 3.4.2) and investigates the core process of the airport, which are operated and managed by Fraport AG (see Chapter 3.6 and Chapter 3.7). Fraport AG is partially state owned, as the State of Hesse and Stadtwerke Frankfurt am Main Holding GmbH hold 51.34% of shares in 2019 (Fraport AG 2022). Other significant shareholders are Deutsche Lufthansa AG (8.44%) and Lazard Asset Management (5.01%). The other shares are held by private investors (Fraport AG 2022). In 2019, the biggest customers were Deutsche Lufthansa, Condor, Ryanair, United Airlines and Austrian Airlines, which together provided 72.6% of the total passengers at the airport (Fraport AG 2022).

Frankfurt airport is highly important for Germany as the biggest hub airport and largest employment site in the country (Fraport AG 2022). The company is divided into four divisions: aviation, retail and real estate, ground handing and international activities and services (Fraport AG 2020a). The area of aviation encompasses all processes around flights and the terminals, both landside and airside, such as planning the flights, flight position allocation, guiding and instructing the aircrafts, wildlife control, airport slot management, checking in passengers, airside coordination among many more. Additionally, this division deals with the airport charges, which are regulated in Germany. These charges encompass passenger charges, landing and take-off, security, and parking fees (Fraport AG 2020a). Further, the division ensures the alignment of the airport's safety processes with the legal requirements and authorities. The division of retail and real estate deals with the corresponding services and activities at Frankfurt airport, which encompass the rental of buildings, offices, and stores, providing maintenance for the buildings, managing the car parks and managing marketing (Fraport AG 2020a). The ground handling services provide the infrastructure such as the baggage transfer system, airmail, passenger, and freight transportation, determine the fees for the ramp and passage infrastructure, provide passenger and loading services and much more (Fraport AG 2020a). The division of international activities and services deals with the acquisition and management of international airports (Fraport AG 2020a).

Currently, the company fully owns one airport in Slovenia and two airports in Brazil. Additionally, the company operates and holds the majority of shares for 14 airports in Greece, two airports in Bulgaria, one airport in Peru and one in Turkey (see Table 1). Furthermore, Fraport AG holds

shares in airports in St. Petersburg, Russia, Xi´an, China and Delhi, India. An overview of the Fraport group airports is presented in the table below:

Table 1: Fraport Group airports

Continent	**Site**	**Airport**	**Company**	**Share in %**	**Term**	
Europe	Germany	Frankfurt	Fraport AG Frankfurt Airport Services Worldwide	100	1924	No time limits
	Slovenia	Ljubljana	Fraport Slovenija, d.o.o.	100	2014	No time limits
	Greece	14 airports	Fraport Regional Airports of Greece A S.A.	73,4	2017	2057
			Fraport Regional Airports of Greece B S.A. (Below collectively referred to as Fraport Greece)	73,4	2017	2057
	Bulgaria	Varna	Fraport Twin Star Airport Management AD	60	2006	2041
		Burgas		60	2006	2041
	Russia	St. Petersburg	Northern Capital Gateway LLC/Thalita Trading Ltd.	25	2010	2040
South America	Brazil	Fortaleza	Fraport Brasil S.A. Aeroporto de Fortaleza	100	2017	2047
		Porto Alegre	Fraport Brasil S.A. Aeroporto de Porto Alegre	100	2017	2047
	Peru	Lima	Lima Airport Partners S.R.L.	80,1	2001	2041
Asia	Turkey	Antalya	Fraport TAV Antalya Terminal İşletmeciliği A.Ş. (Hereinafter: Group company Antalya)	50/51	199	2024
	China	Xi'an	Xi'an Xianyang International Airport Co., Ltd.	24,5	2008	No time limits
	India	Delhi	Delhi International Airport Private Ltd.	10	2006	2036

(Source: Fraport AG 2020a p.36)

The airports in both Lima and in Delhi have the option of term extensions. With regard to the airport in Antalya, Faport AG holds a 51% share of voting rights while holding 50% of dividend shares. Lastly, Fraport owns and operates retail areas for six airports in the USA: Baltimore, Cleveland, Pittsburgh, Nashville, JetBlue Airways Terminal 5 at JFK Airport, New York and Terminal B at Newark Airport, New Jersey (Fraport AG 2020a).

1.2.2 Airport situation at the start of the study (before COVID-19)

Airports have changed significantly since the start of the 21st century, turning from big facilities into commercially operating and highly complex service organisations (Bezerra and Gomes 2016; Skouloudis et al. 2012; Zakrzewski 2008). Today´s airports are under enormous pressure as the highly competitive and fast-changing environment in the air transport field presents a growing need to adapt rapidly and change proactively (Bezerra and Gomes 2016; Green 2014; Fry et al. 2005).

Measurement of airports' performance has grown in importance as they seek to determine competitive performance and position in the aviation industry. However, many organisations do not effectively transform performance information into knowledge (through learning) to enable the organisation to make use of it (Gamo-Sanchez and Cegarra-Navarro 2015; Ribeiro De Almeida 2012). Thus, the ability to effectively use PMS to generate learning and apply any knowledge created to the organisation to enhance and support decision-making and strategy, is a key opportunity for organisations (Gamo-Sanchez and Cegarra-Navarro 2015; Ribeiro De Almeida 2012). However, effectively using PMS to generate learning and produce knowledge is a challenging task for airports. Specifically, turning PMS information into learning, and collecting and condensing the breadth of employee knowledge into an accessible format for the organisation, is a pre-requisite for effective competitive behaviour (Gamo-Sanchez and Cegarra-Navarro 2015; Ribeiro De Almeida 2012).

The academic literature identifies a general lack of research into PMS at airports, but also highlights the need for airports to efficiently use PMS (Bezerra and Gomes 2018; Enoma and Allen 2007). Measuring performance is a prerequisite for efficient process management and cost saving. Although the relevance of performance measurement within airports is acknowledged, there is a lack of research exploring this area in more detail (Bezerra and Gomes 2018). The growing challenge for airports to provide high quality products and services and to operate efficiently, not only requires the effective use of PMS, but also its alignment with OL to transform performance results into knowledge for improved decision-making (Gamo-Sanchez and Cegarra-Navarro 2015;

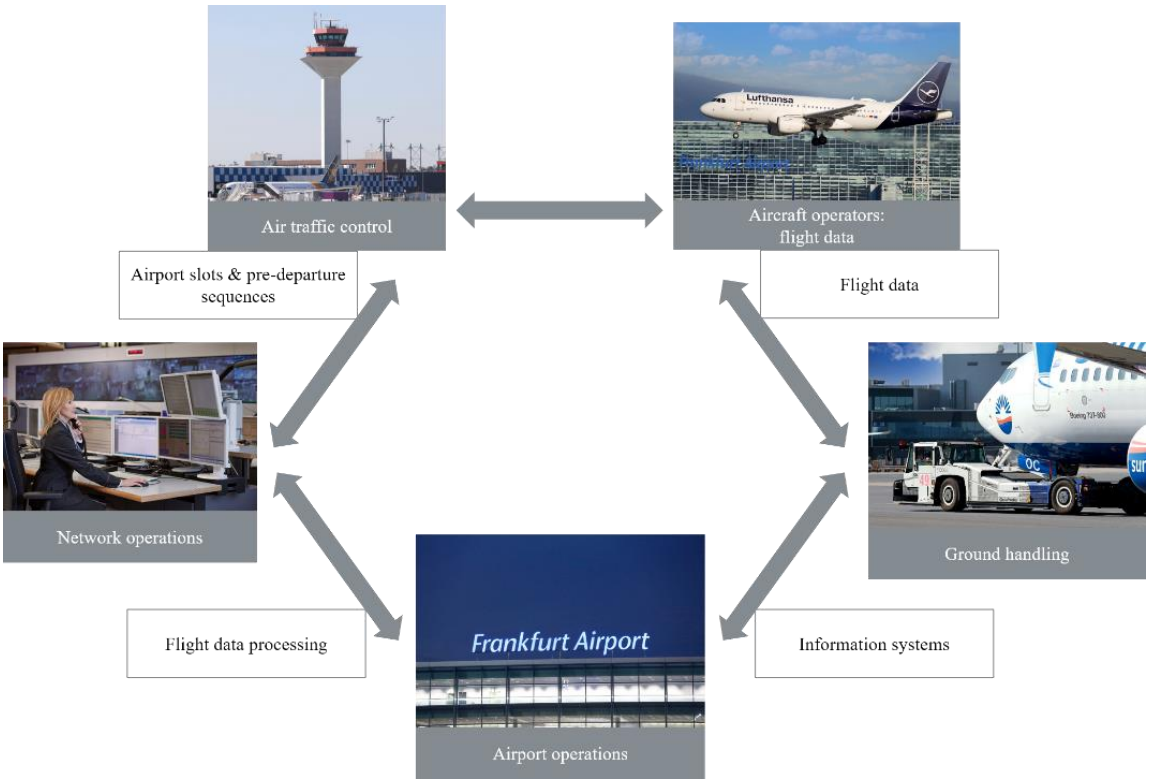
Ribeiro De Almeida 2012). The necessity for airports to enhance their PMS usage to enable OL is undoubtedly clear, however there is a paucity of theoretical and practical research regarding the relationships between these two fields (see Chapter two) (Robles 2019; Shurafa and Mohamed 2016).

Therefore, this study addresses noted gaps in the body of research by investigating the relationships between PMS and OL in Frankfurt airport. By examining Frankfurt airport´s management practices, the aim of this research is to develop a comprehensive perspective of both the breadth and depth of the relationships of OL and PMS, theoretically and practically within the context of Frankfurt airport. The research seeks to address organisational challenges of airports by optimising PMS usage in order to create OL.

1.2.3 Situation at Frankfurt airport (without COVID-19 implications)

The airport management process at Frankfurt airport entails several different partners and entities, which are depicted in the following diagram:

Figure 1: Airport management and responsible organisations involved



(Source: adapted from EUROCONTROL 2017 p.3)

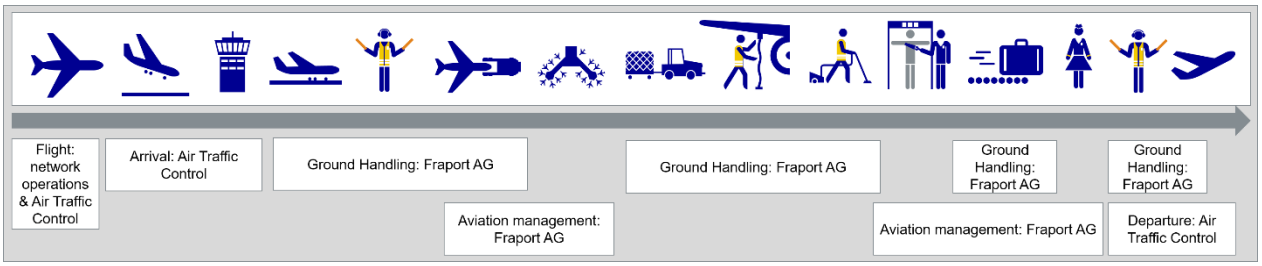
Air traffic management at Frankfurt airport, involves five different organisations (not all of which are based at Frankfurt airport): air traffic control, aircraft operators, ground handling, aviation operation and the network operations (EUROCONTROL 2017). Air traffic control is responsible for different services, such as the management of air traffic and the avoidance of air traffic bottlenecks. In German, the air traffic control is known as 'DFS Deutsche Flugsicherung GmbH'. The DFS controls the flight traffic (according to the German air traffic act §27c section 2). In line with the German air traffic act, it aims to ensure the secure, organised, and smooth handling of air traffic (§ 27 c deutsches LuftVG). The goals and strategies of the DFS are in alignment with all other European air traffic controls due to EU Government legislation. Air traffic control provides and manages the airport slots and pre-departure sequences and navigates the aeroplanes. The aircraft operators provide and manage flights for passengers and freight, with the combined aims of punctuality and economic efficiency.

There are many different aircraft operators at Frankfurt airport, all of whom are in competition with each other. Financial negotiations between the airport and the airlines can be challenging and highly political due to the different financial positions of both.

The ground handling division is responsible for managing turnarounds. This involves a number of different processes such as providing gangways to arriving airlines and passengers, handling the baggage, and cleaning the aircrafts. This service is provided by Frankfurt airport, and has the combined aims of customer satisfaction with regards to timing, cost effectiveness and punctuality. The airlines communicate their flight plans as well as other data such as passenger numbers, type of aeroplane and registration details. The ground handling division works closely together with the aviation operation. Aviation operation provides airside and terminal management and has the aims of being efficient, punctual, and having satisfied customers.

There is only one network operator in Europe, the Network Management Operations Centre (NMOC) which is operated by 'EUROCONTROL' and is located in Brussels (EUROCONTROL 2017). It manages and optimises air traffic flow within the European airspace. Frankfurt airport communicates flight data to the network operator so that the NMOC can compare these with flight plans to determine capacities within the airports and balance supply and demand. The aircraft operations process, from departure to landing of an aircraft, is presented in Figure 2:

Figure 2: Aircraft operations process



(Source: adapted from EUROCONTROL 2017 p.3)

The process is highly dependent upon punctuality (EUROCONTROL 2017). However, punctuality is reliant upon the availability of slots, airport staffing, as well as the arrival and departure of aircrafts. The network operation manages the flight plans in European airspace and communicates them to the DFS (EUROCONTROL 2017) (see Figure 2 above). If an aeroplane arrives at Frankfurt airport, the DFS navigates the aircraft by instructing the exact flight heights, times, and the direction of landing at the airport (see Figure 2). As soon as the aircraft has landed, the ground handling service of Frankfurt airport instructs the aircraft regarding its parking position. These parking positions have been planned and assigned in advance by the aviation management of Fraport AG. The ground handling service manages the baggage transportation, the cleaning and refueling of the aeroplane and takes over many other services depending on how many services the airline requests Fraport AG to handle. Aviation management thus takes care of departing passengers as well as the arrival of new passengers by providing check-in and other related services. Finally, when the aircraft departs again, ground handling takes care of departing services such as pushing back the aeroplanes . Lastly, the DFS takes over by assigning departure slots and runways to the aeroplanes and navigates them.

This process of aircraft operations (illustrated in Figure 2) provides a first insight into the complex environment of Frankfurt airport, in which several different entities are involved. Indeed, Frankfurt airport secured the rank of Germany´s biggest hub-airport and is ranked (according to the International Airport Review, 2019) the fourteenth biggest airport in the world, and the fourth of Europe's biggest airports following London Heathrow, Paris Charles de Gaulle Airport and Amsterdam Airport Schiphol (International Airport Review, 2019). In 2020, however, Frankfurt airport dropped in the rank to number six with 18.8 million passengers, behind Moscow Domodedowo, Amsterdam Schipol, London Heathrow, Paris Charles de Gaulle and Istanbul Sabiha Gökçen. However, with regard to air freight, Frankfurt airport continued to stay in first place among all airports within Europe. The competitive situation is depicted in the following:

Figure 3: Competitive situation of airports

Rank	2020	2019	Airport	Passengers	Rank	2020	2019	Airport	Air freight
↑	1.	5.	IST – Istanbul	23,308,071	→	1.	1.	FRA – Frankfurt	1,856,965
→	2.	2.	CDG – Paris	22,260,920	→	2.	2.	CDG – Paris	1,636,428
↓	3.	1.	LHR – London	22,111,265	↑	3.	4.	AMS – Amsterdam	1,441,598
↓	4.	3	AMS – Amsterdam	20,887,144	↑	4.	5.	IST – Istanbul	1,396,596
↑	5.	8.	SVO – Moscow	19,783,957	↓	5.	3.	LHR – London	1,141,258
↓	6.	4.	FRA – Frankfurt	18,768,601	→	6.	6.	LGG – Liège	1.113.990
↓	7.	6.	MAD – Madrid	17,092,693	→	7.	7.	LUX – Luxembourg	905,852
↑	8.	13.	SAW – Istanbul	16,982,457	↑	8.	8.	CGN – Cologne	814,906
↑	9.	24.	DME – Moscow	16,389,427	↑	9.	10.	MXP – Milan	511,292
↓	10.	7.	BCN – Barcelona	12,724,607	↑	10.	11.	BRU – Brussels	506,201

(Source: adopted from Fraport AG 2020a p.38)

Frankfurt airport's main competition with other airports relates to the number of originating and transfer passengers (see Figure 3). Frankfurt airports main customer is Deutsche Lufthansa, which handled 60% of the passengers in 2020 (Fraport AG 2020a). The major competitors for Frankfurt airport were identified as London Heathrow, Paris Charles de Gaulle, Istanbul Atatürk, Amsterdam Schiphol, and Munich due to their hub status and large amount of transfer passengers (see Figure 3). These high numbers of transfer passengers can be traced to the competing airports main customers: British Airways, Air France, KLM, Turkish Airlines, and Deutsche Lufthansa (Fraport AG 2020a).

Baxter, Bloice and Gray (2021 p.313) state that the reason why the performance measurement literature focuses on large airports is due to their "*tangible, and measurable, economic impacts*". This is evident from the benchmarks and measurement indicators used in large airports. At Frankfurt airport there are numerous PMS which are used to measure the Key Performance Indicators (KPIs). The operative departments mainly use the IT system BIAF (Business Intelligence Architecture Framework), in which all the operational figures are centralised. BIAF is a central information platform, providing a holistic view on relevant business objects such as passengers, flights and ground handling. System users can produce various reports and analysis based on real-time data with a discrepancy of 15 minutes. The IT system is crucial for the airport with regards to process monitoring, improvement, analyses, and modelling. Processes can be simulated and forecasts made. For example, the monitoring and analysis of passenger flows within the airport may be used to determine the time passengers need from check-in to the terminal, or determine the potential buying behaviour of ethnic groups. For example passengers from Asia are more likely to

buy luxurious goods than for example Germans, the passenger flows can be planned to locate the gates in a way that the passengers from Asia will walk through the luxurious shopping area.

The latest BIAF system analysis, 'PaxFinder' was produced in December 2021. Based on extant data within BIAF, this analysis predicts if and when a missing passenger will arrive at the gate. This enables the aircraft personnel at the gate to assess if the missing passenger is able to make the flight or not. Due to data protection, passenger information is coded and pseudonymised and access is highly restricted. Only personnel from the airlines are allowed to have insights into the data one hour before departure.

The administrative departments use multiple different IT systems. For KPI purposes, there are three important systems: SAP R/3, SAP BPC and SAP BW. SAP R/3 is the main administrative booking system. All bookings are made in the SAP R/3 system and are transferred in a time-based interval into the SAP BW system (Business Warehouse). The systems contain and evaluate numerous different KPIs, measured by PMS and bundled into reports. Additionally, the data is then transferred into the SAP BPC system (Business Planning and Consolidation) in which the financial closures are done, and group results are consolidated.

Both systems include financial KPIs, while the BIAF system mainly deals with non-financial KPIs. Thus, for Frankfurt airport the KPIs can roughly be divided into financial and non-financial KPIs. However, there are also KPIs which are determined in conjunction with important customers (e.g. Lufthansa) and associations (e.g. A-CDM airports). The most important KPIs (excluding the important KPIs in alignment with customers and associations) are summarised below in Table 2:

Table 2: KPIs at Frankfurt airport

Financial performance indicators	- EBIT - EBITDA - Revenues - equity ratio - Group result - net financial debt - Free cash-flow - Personnel expenses - Cost of materials - Depreciation and amortisation - Average number of employees	
Non-financial performance indicators	Punctuality rate	- Arrival punctuality - Departure punctuality
	Passengers	- Transit passengers - Transfer passengers - Originating passengers - Retail revenue per passenger
	Air freight	
	Connectivity	
	Slot	- Capacity - Utilisation
	Customer satisfaction and product quality	- Global satisfaction of passengers - Baggage connectivity
	Attractive and responsible employer	- Employee satisfaction - Women in management positions
	Occupational health and safety:	- Sickness rate
	Climate protection:	- CO_2 emissions

(Source: Fraport AG 2019; 2020a; 2020b)

Table 2 highlights, that the number of passengers, connectivity, slot utilisation and capacity, air freight and the punctuality rate are of major importance for the airport and are regarded as key determinants of the competitive position of the airport (see Table 2). Within the last few years, a significant increase in the punctuality rate of Frankfurt airport has been observed. In 2020, the punctuality rate was 82.9%, whereas the rate in 2019 had been 72.6%. This major increase has been explained by the significant decrease of passengers and thus traffic volume due to the COVID-19 pandemic (Fraport AG 2019).

Investigations regarding the causes of delay within European airports in 2019 were conducted by the DFS. The major causes were found to be due to the delay of the airlines (DFS 2019). However, for Frankfurt airport, the delay caused within the airport is still relatively high in comparison to the other airports, as can be seen in Table 3 (below):

Table 3: Delay causes per airport

Delay cause	Paris Charles-de-Gaulle	London Heathrow	Frankfurt	Madrid Barajas	Amsterdam	Munich
Airlines	62%	67.2%	38.8%	49.3%	42.8%	49%
Airports	12.2%	18.7%	21.2%	22.9%	33.9%	8.8%
Weather	2.5%	4.6%	6.4%	4.7%	3.3%	12.1%
Air navigation service providers	13.8%	5.6%	15.5%	16.3%	15.7%	15.1%
Security	8.2%	3%	9.5%	3.9%	1.6%	8.9%
Other	1.4%	0.9%	8.5%	2.9%	2.7%	6.1%

(Source: DFS 2019 p.29)

The figures from Table 3 suggest that for Frankfurt airport there is a need to improve processes to increase punctuality.

The KPI strategy of Fraport AG is to produce the KPIs for the departments from the overarching KPIs described above. These KPIs are broken down hierarchically. In addition to these KPIs, there are also other performance indicators which may be used such as emission, particulate matter,

passengers, average number of employees, total workforce, total workforce women, average age, fluctuation rate, borrowed capital.

It is important to note that a more detailed investigation of the IT systems and KPIs available does not directly contribute to this research project, and as such is beyond the scope of the study. Thus, a detailed investigation is not provided here. The study rather focuses on the measurement of the KPIs and how the PMSs are used to generate learning out of the measured KPIs.

Currently, the airport is facing a number of issues and in September 2019, the board of directors identified major factors, risks and challenges for the company. In an internal press release, the board of directors stated that the company was facing hard times and predicted challenging and turbulent times for the future of the airport. The major external risks are summarised in the following (SCHULTE, S., personal communication by email. 29 September 2019):

- Minimal growth rate: Trade disputes between USA, Europe and China caused an economic downturn. As a result, cargo rates are declining and only a minimal growth in passenger numbers is expected for the upcoming flight schedules.
- Rapidly increasing competition: not only between the hub airports, but also between the airlines which in return put pressure on airports as the airlines demand more flexibility and are constantly switching their fleet between the big hub airports like Frankfurt, Munich and Zurich.
- Expensive investments: in order to be successful in the long-term a new terminal is needed. However, construction costs and prices skyrocket and there is little prospect of decline.
- Climate protection: prospectively there will be a change in travel behaviour and the pressure on airports is high. Also, an intervention of the politics in terms of tax on CO_2 emission is expected for which Frankfurt airport needs to be prepared for. An increase in ticket pricing seems inevitable which is expected to cause a lack in competition of the aviation market against other transport modes.

In addition to the external challenges, there are also internal issues the company is facing:

- Age gap: A large number of experienced employees will retire within the next years and there are far too few new and young employees who can absorb the lack of knowledge, competence and workforce.

- Single knowledge carriers: there is a high degree of specialist knowledge, which lies within single employees. However, the knowledge is not efficiently passed on throughout departments and into the organisation.

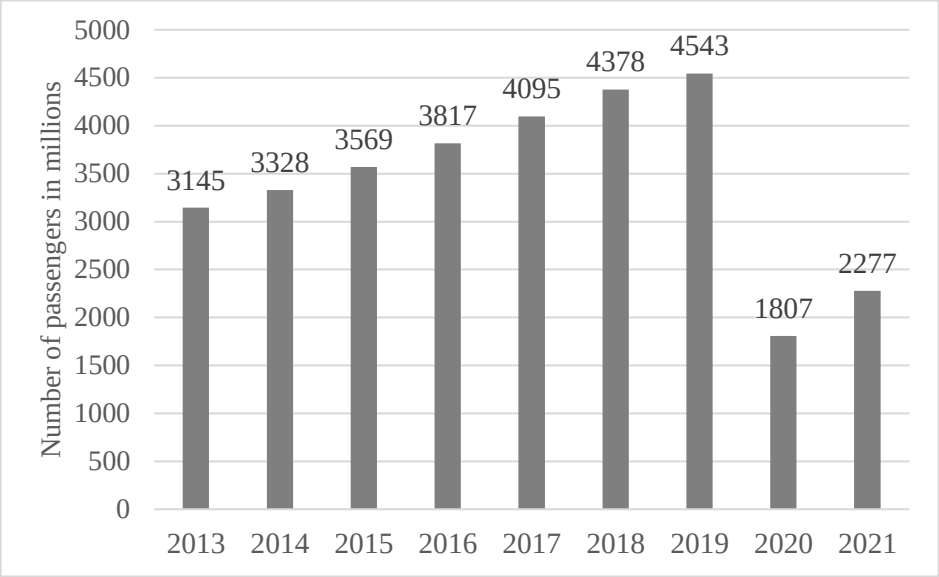
Frankfurt airport is currently seeking ways to tackle these challenges. Simply cutting costs is recognised as no suitable solution for addressing these issues, instead measures need to be identified which bring growth, realise revenues, and save costs. Therefore, the aim for Frankfurt airport is to make processes more efficient and achieve improved decision-making throughout the organisation. This research addresses the issues highlighted above, and contributes to Frankfurt airport´s aims by delivering on the study´s research questions and objectives (see Chapter 1.3) in the following ways: by identifying the ways to create learning and extract knowledge from the PMS, and by examining how to efficiently pass on the knowledge throughout the organisation in order to generate OL. This enables optimal PMS usage and learning processes so that the organisation can prepare better and faster for forthcoming challenges noted above.

1.2.4 COVID-19

The data collection phase of this project was conducted at the beginning of the COVID-19 pandemic. The selection of Frankfurt airport as a case company due to issues the airport was facing and the value of the present research to the airport prior to the pandemic, is described in sections 1.2.1 and 1.2.2 above. With regard to the COVID-19 pandemic, the importance of the research has significantly increased in its importance, due to the severe economic pressure placed on airports.

The Coronavirus (COVID-19) has been devastating for the global aviation and tourism industry: "*Besides the travel bans set up by countries globally, people's reluctance to travel during a global pandemic has had a consequent damaging impact on the aviation and tourism sectors*" (Liu, Kim and O´Connell 2021 p.2). The COVID-19 pandemics devastating effects on the aviation industry has been widely recognised within literature (e.g. Liu, Kim and O´Connell 2021; Gallego and Font 2021; Graham, Kremarik, and Kruse 2020; Suau-Sanchez, Voltes-Dorta, and Cuguero-Escofet 2020). Regarding the global airline industry, the following figure (Figure 4) highlights the far-reaching effects of the pandemic on the industry (Mazareanu 2021):

Figure 4: Number of scheduled passengers boarded by the global airline industry



(Source: Mazareanu 2021)

As depicted in Figure 4, the loss in passengers has had enormous effects not only for the airline industry but also for the airports as well. In alignment with the figure above, the impacts of COVID-19 were first experienced by Frankfurt airport within the first two months of 2020 and increased rapidly during that year (Fraport AG 2020a). In 2020, the coronavirus pandemic caused a massive collapse of the aviation traffic not only for Frankfurt airport but worldwide leading to a decrease of passengers at the airport by -73.40% for 2020 in comparison to 2019 (Fraport AG 2020a).

At the end of March 2020, Frankfurt airport started part-time work for all employees and closed the north-west runway, which then was used as a parking lot for the aircrafts. Areas of the terminals were closed before Terminal two and parts of Terminal one were shut down completely in the second quarter of 2020. Consequently, retail stores within the affected terminal were closed as well. At this time, the aviation industry and thus traffic at Frankfurt airport nearly came to a standstill. Expenses across the airport were minimised, especially the non-operational material expenses were eliminated, and capital expenditures postponed. Overall, 25% of the operating expenses before special items were reduced in 2020.

As Germany's biggest hub airport, Frankfurt airport was able to play a significant role in securing basic supplies for the country, especially with regard to distributing medical and pharmaceutical protective equipment, as well as supporting the worldwide movement of goods. In the third quarter

2020, the traffic figures slightly recovered until in the 4th quarter the number of infections with the virus caused another lockdown of the country, and traffic figures dropped sharply once more. Fortunately, the airport secured Europe´s leading hub position for pharmaceuticals in order to distribute the vaccine (Fraport AG 2020a).

Generally, the COVID-19 pandemic caused a significant decline in sales and a massive decline in results figures. Until the end of 2020, the airport had to cut costs and as a result, 4,000 jobs were lost. Employees were offered severance packages. This enabled the airport to save personnel expenses of €250 million annually. Nevertheless, the construction of the new terminal 3 was not stopped or postponed. The company justified this by arguing that the new terminal would enhance the competitive position of the airport after the coronavirus pandemic by providing more capacity. The inauguration of the new terminal will be 2026. In 2021, the situation at the airport recovered slowly, especially due to the drop in intercontinental air traffic. However, the Omicron-variant of the virus still caused a decline of -44.2% in passenger numbers in December 2021 in comparison to 2019 (Fraport AG 2021).

The COVID-19 pandemic further aids in the justification for this research. Securing the knowledge of the employees who have left and/or are about to leave the organisation, as well as effectively using PMS to improve and learn from it are essential determinants for the future of the organisation.

1.3 Research justification, aim, questions and objectives

The research problems identified throughout this first chapter, as well as the research needs identified from literature (see Chapter 1.1 and Chapter Two), the research issues identified within the airport industry and specifically within the case company of Frankfurt airport (see Chapter 1.2), all collectively make the need for this research. As noted above, the effects of the COVID-19 pandemic (see Chapter 1.2.4) also act to underline the importance of this research. The aim of this research, its questions and objectives are derived from the practical and theoretical needs identified in this first chapter. A summary of the research needs identified for this research is provided below:

<u>Theoretical research needs</u>

Within the literature a number of authors identify the need to research the holistic relationships between PMS and OL, as research relating to the theoretical and practical relationships between OL and PMS is still lacking (Zhang and Yu 2020; Robles 2019; Shurafa and Mohamed 2016). Even

though it is widely acknowledged that the relationships between OL and PMS are crucial for organisations, there is scant research regarding the relationships between these two constructs (Zhang and Yu 2020; Robles 2019; Shurafa and Mohamed 2016; Rowland and Hall 2014; Visser 2014). Indeed, research in both areas is highly fragmented, or scant (Zhang and Yu 2020; Rowland and Hall 2014; Visser 2014). Visser (2014) stresses the need to research the relationships between OL and PMS but also explains the lack of research due to the high complexity and effort in conducting holistic research, as OL and PMS belong to different subject disciplines. While PMS is prevalent in the accounting literature, OL is grouped into organisational studies (see Chapter two). Additionally, as presented in the literature review, the PMS literature and the OL literature are both highly extensive, while within each research field there are ongoing debates regarding an unified approach and understanding (see Chapter Two). These ambiguities in the research fields present a complex challenge not only in developing an understanding of OL and PMS themselves, but also to develop a comprehensive perspective of both the breadth and depth of the relationships of the research fields of OL and PMS, theoretically and practically within the context of Frankfurt airport.

Research needs in practice

The airport environment is highly competitive, placing today´s airports under enormous pressure to adapt to the rapidly changing needs (Bezerra and Gomes 2016; Green 2014; Skouloudis et al. 2012; Zakrzewski 2008; Fry et al. 2005). The measurement of airport performance is crucial, and particularly the need to make use of performance information through learning is decisive for airports (Gamo-Sanchez and Cegarra-Navarro 2015; Ribeiro De Almeida 2012). However, the process of transferring performance measurement data into learning is a highly critical endeavour, and is still under-researched as studies researching the actual process of how PMS can be used to enhance OL are lacking (Bezerra and Gomes 2018; Enoma and Allen 2007). The need for airports to enhance their PMS usage to deliver OL is undoubtedly clear, however the existing literature notes a scarcity of theoretical and practical research regarding the relationships of these two research fields (Zhang and Yu 2020; Robles 2019; Shurafa and Mohamed 2016). Frankfurt airport has been facing numerous recent challenges. Before the COVID-19 pandemic, the organisation was already struggling due to external and internal challenges (SCHULTE, S., personal communication by email. 29 September 2019) (see Chapter 1.2.3). The external challenges encompass the minimal growth rate in passengers and cargo rates due to trade disputes between USA, Europe, and China. Additionally, there is rapidly increasing competition between the hub airports and airlines, which in turn affects Frankfurt airport. Expensive investments and climate protection challenges contribute to the pressure of the airport. Additionally, internal issues, such as the large age gap are causing a lack of knowledge and competence, as well as the vast amount of single knowledge carriers provoke

significant pressure on the airport (SCHULTE, S., personal communication by email. 29 September 2019). Therefore, the airport needs to better understand how PMS can be used to create learning in order to tackle these challenges.

With regards to the Coronavirus (COVID-19) pandemic, the justification for this research is further enhanced (see Chapter 1.2.4). The COVID-19 pandemic has caused sheer devastation for the aviation industry (Liu, Kim and O´Connell 2021; Gallego and Font 2021; Graham, Kremarik, and Kruse 2020; Suau-Sanchez, Voltes-Dorta, and Cuguero-Escofet 2020). The loss in passengers has had a tremendous impact on airport, leading to a massive collapse in aviation traffic (Fraport AG 2020a). This has resulted in 4,000 redundancies at Frankfurt airport, causing massive losses in company-specific knowledge and expertise. Therefore, the COVID-19 pandemic has increased the significance of the research even more to find a solution to how PMS can be used to create learning.

All these identified research needs are depicted in the research aim to develop a comprehensive perspective of both, the breadth and depth of the relationships of the research fields, theoretically and practically within the context of Frankfurt airport. Through this research, the airport may learn how to use its PMS in order to create learning and thus prevent a loss in knowledge due to the threats and challenges the company is facing, such as the large age gap, as well as the vast amount of single knowledge carriers (SCHULTE, S., personal communication by email. 29 September 2019).

Thus, the research aim, its questions addressed in this study, the objectives and the according methodological approaches are as follows:

Table 4: Research aim, questions, objectives, and methodological approach

Aim: To develop a comprehensive perspective of both, the breadth and depth of the relationships of the research fields, theoretically and practically within the context of Frankfurt airport.		
Research Question	**Objective**	**Methodological Approach**
Research Question 1: What are the relationships between organisational learning and performance measurement systems within academic literature?	**Objective 1:** To holistically understand the disciplines of OL and PMS, their intersections, and interdependencies.	Literature review
Research Question 2: How is the sequential order of PM activities and OL forms at Frankfurt airport?	**Objective 2:** To identify the sequential structure of PMS events and OL forms.	Data Analysis: Application of the narrative schema on semi-structured narrative interview data.
Research Question 3: What is the process of performance measurement at Frankfurt airport and how are the performance measurement systems used in the case organisation?	**Objective 3:** To identify the process of performance measurement and how performance measurement systems are used at Frankfurt airport.	Data Analysis: Content analysis of semi-structured interview data and on semi-structured narrative interviews.
Research Question 4: How does individual, group and organisational learning emerge at the case company and how do the the learning forms interrelate?	**Objective 4:** To investigate the individual, group and organisational learning forms generated at the case company and to determine the relation of the learning forms.	Data Analysis: Content analysis of semi-structured interview data and on semi-structured narrative interviews.

Research Question 5: How is learning undertaken, transferred and thus organisational learning created while measuring performance at Frankfurt airport?	**Objective 5:** To develop an integrated OL/PM model, which can be applied in practice at Frankfurt airport, and which depicts empirical organisational learning processes while using performance measurement systems.	Data Analysis: Content analysis of semi-structured interview data and content analysis and narrative schema on semi-structured narrative interview data. Additionally, member-checking with the interviewees is applied to validate the result of the framework.

(Source: Author 2022)

1.4 Structure of the thesis

This chapter has introduced the research topic of this study. A rationale has been provided by examining the background of the study, the research problem, questions, and objectives.

The second chapter of this thesis presents a review of the PMS and OL literature. The aim of this chapter is to identify relevant contributions made in the research fields. This chapter strives to develop a comprehensive view on the topics and their interrelations as well as identify significant work in the research fields. Thus, the second chapter address the first research question by identifying the relationships between OL and PMS within the academic literature.

The third chapter describes and justifies the methodological approaches applied within the study. It examines the philosophical perspectives underpinning the methodological approaches and reviews and justifies the data collection and analytical methods. The methods applied were aligned with the research questions and objectives raised in the previous Chapter 1.3.

The fourth chapter presents and discusses the findings from the data analysis with regards to pertained literature. By reflecting the findings back to the relevant literature in the research fields, key findings are identified and the research questions two, three, four and five are answered.

Lastly, Chapter six concludes the thesis by identifying contributions made within this research but also by reflecting on limitations and identifying future research areas.

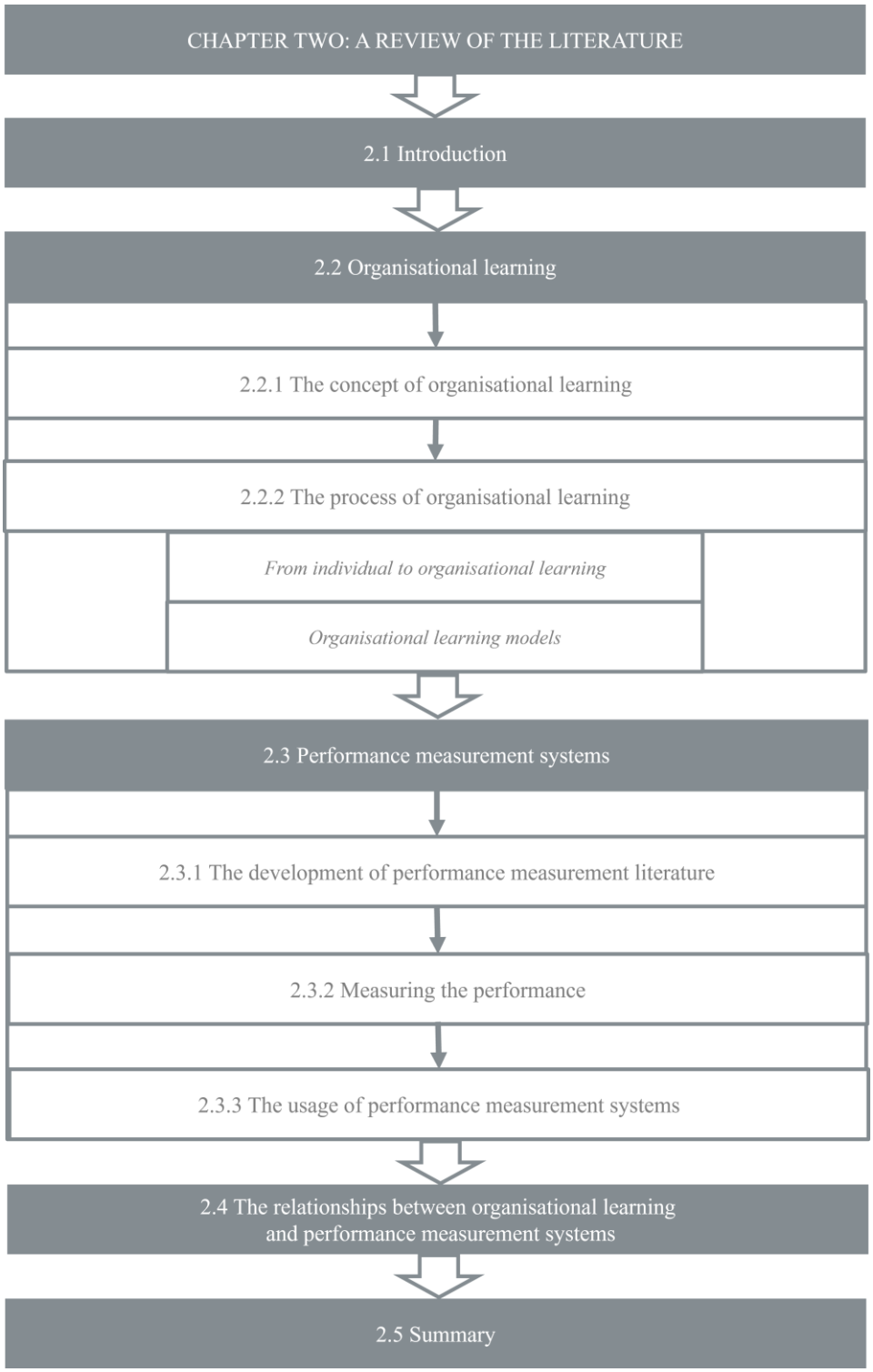
CHAPTER TWO: REVIEW OF THE LITERATURE

2.1 Introduction

This chapter provides an overview of the relevant literature within the disciplines, informing and contextualising the present research. This chapter critically reviews the constructs of organisational learning (OL) and performance measurement systems (PMS). Subsequently, the relationships of both concepts are evaluated. The aim of this chapter is to examine theories and accomplished work in these academic research areas to address research question one: What are the relationships between organisational learning and performance measurement systems within academic literature? (see Chapter 1.3). By scrutinizing the OL and PMS literature, this chapter strives to answer the objective to further understanding of the disciplines of OL and PMS, their intersections, and interdependencies.

The outline of the chapter is presented in the following figure:

Figure 5: Outline Chapter two



(Source: Author 2022)

Firstly, the OL literature is examined by investigating the construct of OL (see Chapter 2.2.1) followed by a review of the process of learning (see Chapter 2.2.2). To understand this process, the creation of leaning via the stages of individual, group and organisational learning is evaluated (see Chapter 2.2.2). Subsequently, prominent OL models (see Chapter 2.2.2) are reviewed. The next section scrutinises the PMS literature (see Chapter 2.3) by investigating the development of PMS (see Chapter 2.3.1), the measurement of performance (see Chapter 2.3.2) as well as discussing the usage and application types (see Chapter 2.3.3). Lastly, both research areas are linked while the relationships and interdependencies of OL and PMS are discussed (see Chapter 2.4) before the key insights of the literature review are briefly presented (see Chapter 2.5).

2.2 Organisational Learning

Organisational learning (OL) is considered to be critical in gaining competitive advantage and is recognised as decisive for the success and performance of organisations (Patky 2020; Kim and Park 2019; Odor 2018; Park and Kim 2018; Mitic et al. 2017; Guinot, Chiva and Mallén 2016; Nafei 2015). Organisations need to adapt quickly to ever changing economic conditions (Patky 2020; Basten and Haamann 2018; Kim and Park 2019; Park and Kim 2018; Mitic et al. 2017; Guinot, Chiva and Mallén 2016; Garvin et al. 2008). Therefore, as a key organisational core ability in addressing complexities and determining organisational growth and success, OL has become more important than ever.

The research field of OL has gained in reputation within the academic literature in the last few years and its popularity is still growing (Castaneda, Manrique and Cuellar 2018; Nafei 2015). Nevertheless, research in this area has recently progressed slowly, which might be attributed to high levels of fragmentation within literature (Lyman, Hammond, and Cox 2019). The research field is characterised by its variety of multiple heterogeneous models and theories. Thus, the characteristics of OL can be described as highly theoretically engaged, with a range of highly-developed definitions and core concepts. Furthermore, the discipline also has a well-developed practice-based dimension, with an abundance of guidelines for practical application (Lyman, Hammond, and Cox 2019; Basten and Haamann 2018; Wu and Chen 2014; Taylor, Templeton, and Baker 2010; Garvin et al. 2008). This breadth of perspective may be viewed as a lack of consensus in the nature and focus of OL, due in turn to the various voices calling for a comprehensive perspective on OL. As a result, there is a need to achieve not only an understanding of both, the breadth, and the depth of the research field, theoretically and practically (Chuah and Law 2020; Do and Mai 2020; Basten and

Haamann 2018; Wu and Chen 2014) but also focus on the interfaces with other important research areas, such as performance measurement (Zhang and Yu 2020; Robles 2019; Shurafa and Mohamed 2016). This major research gap, acknowledged by a number of other researchers (e.g. Chuah and Law 2020; Do and Mai 2020; Lyman, Hammond and Cox 2019; Basten and Haamann 2018; Wu and Chen 2014) forms the need for the first objective: to understand the discipline of OL and its intersections and interdependencies to PMS (see Chapter 1.3).

2.2.1 The concept of organisational learning

This section investigates the development of the discipline of OL, its principles, and approaches, which have evolved over time. Thus, this section reviews the main concepts and ideas relevant in the OL literature. The term and concept of OL was firstly developed by Cyert and March in 1963 with regards to decision-making (Castaneda, Manrique and Cuellar 2018; Odor 2018; Argote and Hora 2017; Saadat and Saadat 2016; Shipton 2006). However, Nafei (2015) argues that the roots of OL go back to the 1920s when Vygotsky investigated the education of children. However, the introduction of the term ‘organisational learning’ was not before 1965 when Cangelosi and Dill (1965) issued a scientific article initially heading the concept of OL and building on the research of Cyert and March (1963), Chapman et al. (1959) and Simon (1953) among others. The field of OL, however, became popular when Argyris and Schön (1978) published their theory of single-loop learning (SLL) and double-loop learning (DLL). This concept is still highly relevant in today`s research and is cited by a wide range of authors within the field, valuing the widely accepted concept (e.g. Chuah and Law 2020; Do and Mai 2020; Basten and Haamann 2018; Lau, Lee and Chung 2019). Since then, more perspectives have emerged significantly contributing to the insights of OL. The key OL theories, namely the authors and their concepts, which were mainly shaping the OL theories, are listed in the following table:

Table 5: Key OL theories

Author	**Published in**	**Concept**
Argyris and Schön (1978)	Organizational learning: A Theory of Action Perspective	Single- and double-loop learning
Hedberg (1981)	Handbook of Organisational Design	Knowledge Acquisition
Shrivastava (1983)	Management Studies	Learning systems
Fiol and Lyles (1985)	Academy of Management Review	Levels of learning
de Geus (1988)	Harvard Business Review	Knowledge, learning and competitiveness
Dutton and Thomas (1984)	Academy of Management Review	Learning curves
Senge (1990)	The Fifth Discipline	The learning organisation
Weick (1991)	Organization Science	OL forms and frequency
March (1991)	Organization Science	Knowledge exploration and exploitation
Huber (1991)	Organization Science	OL model: knowledge acquisition, information distribution, information interpretation and organisational memory
Brown and Duguid (1991)	Organisation Science	Sociocultural aspects of OL
Cyert and March (1992)	A Behavioral Theory of the Firm	OL as sum of knowledge creation, knowledge retention and knowledge transfer
Inkpen and Crossan (1995)	Management Studies	Multilevel view on OL
Nonaka and Takeuchi (1995)	The Knowledge-Creating Company	An organisations capability of knowledge creation manifests within products, services and systems and thus equals learning

Author	Published in	Concept
Crossan et al. (1999)	The Academy of Management Review	OL cycle
Lipshitz, Popper and Friedman (2002)	Applied Behavioral Science	Organisational learning mechanisms as facilitators for OL

(Source: Author 2022)

The concept of OL has been studied from a variety of different perspectives (Chuah and Law 2020; Chiva and Alegre 2005) which can be seen in the breadth of key OL concepts presented in Table 5. The wide variety of approaches to the study of OL has led to the development of a diverse but fragmented research field with a range of different emphases, such as focusing on individual or collective learning, OL from a process perspective, or as a cycle (Chuah and Law 2020; Law and Chuah 2015). The variation and difference in perspectives and definitions has created a high degree of disorientation and the potential for a confusion. Multiple views and the absence of insights from practice are dominant in the literature (Lyman, Hammond, and Cox 2019; Basten and Haamann 2018; Hariharan and Vivekanand 2018; Correia-Lima et al. 2019; Wu and Chen 2014; Crossan et al. 2011; Argote and Miron-Spektor 2011; Taylor, Templeton and Baker 2010). These versatile perceptions can be grouped into different ontological views. Within the last decades, six ontological perspectives have dominated the field of OL: management science, production management, socialism, cultural anthropology, and strategy (Crossan et al. 2000; Easterby-Smith 1997).

Management science specifically studies learning and knowledge processes within the organisation (Crossan et al. 2000; Easterby-Smith 1997). The production management perspective focusses on enhancing productivity through learning. Cultural anthropology examines organisational culture, mainly shaped by management and group cultures, which is perceived to determine learning in the organisation (Crossan et al. 2000; Easterby-Smith 1997). The social view examines the social situation within the organisation, such as the hierarchical structure and also includes the company culture and how these embedded routines, norms and behaviours affect learning (Crossan et al. 2000; Easterby-Smith 1997). Therefore, the social view and the cultural anthropological perspective are found to overlap. Strategy deals with the benefits of learning for the company, so how the organisation might use the generated learning for their competitive advantage and performance growth (Crossan et al. 2000; Easterby-Smith 1997).

Another attempt to conceptualise OL, which is noted within literature, is to categorise OL according to topics. Reflecting on existing literature, three main themes have been identified. Firstly, the literature strives to focus on barriers, routines, and behaviours which hinder learning taking place (Akgün, Lynn and Byrne 2003; Argyris and Schön 1978). A large body of research focuses on the experiences of individual employees within an organisation, and how these intrinsic experiences and values shape learning (Argote and Miron-Spektor 2011). Lastly, a large body of literature has focussed on how an organisation`s norms and procedures affect the behaviour of organisational members and thus shape the direction the organisation (Argote and Miron-Spektor 2011).

From individual learning research, Merriam, and Caffarella (1999) and Easterby-Smith, Crossan and Nicolini (2000) identify five orientations of learning. These learning orientations are recognised within literature as applicable to OL as appropriate means to structure the various perspectives on OL and to explain the core of OL (Marquardt and Waddill 2004). The orientations are: behaviourist, cognitivist, humanist, constructivist and social. The behaviourist view emerged firstly in the 1960s (Patky 2020; Skinner 1953), and was replaced by humanist orientation. In the 1970s and 1980s, cognitivism became leading (Patky 2020; Bandura 1986; Bandura and Walters 1977). Cognitive constructivism emerged subsequently in the 1980s and 1990s, and from the 1990s social orientation prevailed in the literature (Patky 2020; Corden 2001; Nystrand 1997; Palincsar 1998; Reznitskaya et al. 2007). While Chiva and Alegre (2005), as well as Hariharan, and Vivekanand (2018) consider the cognitive and social perspective as dominant within current research, Odor (2018) views the behavioural and the cognitive perspectives as prevalent approaches in literature.

The behaviourist view of OL states that learning implies a change in behaviour, which results from environmental changes (Argyris and Schön 1978). Senge (1990) for example represents the behaviourist learning orientation by defining organisational learning as a permanent change in behaviour. Even though the focus is placed on the individual, OL is regarded as group driven. Dodgson (1993) as a further advocate in the behaviourist learning field, stresses that OL occurs as a result of performance adaption. The organisation and improved usage of knowledge play a fundamental role for the efficiencies of an organisation. Therefore, this definition stresses the enhancement of efficiencies through improved routines of individuals. However, numerous researchers (e.g. Hall 2011; Pawlowski 2001; Buckmaster 1999; Huber 1991; Fiol and Lyles 1985) criticise the behaviourist approach as it merely considers learning as adaption to environmental changes without acknowledging mental learning processes happening through information insight and interpretation.

The cognitive view on organisational learning describes learning as the accumulation of knowledge within an organisation. An example for a cognitive definition of OL is provided by Fiol and Lyles (1985). They view OL as the improvement of organisations' effectiveness by gathering more knowledge and understanding. Additionally, they assume mental development as a prerequisite for learning and thus contrast and criticise the pure behaviourist learning approach. The main processes of the cognitive approach may be seen to evolve from information, which is given meaning to and implies knowledge acquisition, distribution, and storage (Akgün, Lynn and Byrne 2003; Huber 1991). However, Hariharan and Vivekanand (2018) criticise this approach by remarking on the lack of empirical studies and the strong focus on theoretical constructs.

Marquardt and Reynolds (1994) express a humanist view and see learning as a deliberate process of knowledge acquisition in order to improve or adapt individuals' own behaviours. The main characteristics of the humanist approach are self-directed and self-motivated learning. Problem recognition and motivations for learning are prevalent in this approach. However, some researchers (e.g. Huber 1991; Crossan et al. 1999) argue that learning does not always imply behavioural changes but cognitive changes as well, thus supporting the cognitive approach of OL.

The social learning view is recognised in the definition of Marriam and Caffarella (1999). They define OL as the result of knowledge-sharing and joint interpretation of members within an organisation. In general, the social learning orientation can be understood as more of a blend of cognitivism and behaviourism (Merriam and Caffarella 1999) and recognises that social interaction, dialogue, and communication are key for OL to take place (Chiva and Alegre 2005; Oswick et al. 2000). Moreover, it takes cultural factors, like the political situation within an organisation, into account. Elkjaer (2003) states that social learning contributes to how individual learning can be transferred into the group and into the organisation even though social leaning orientation does not comprise the entire OL process.

As an advocate of the constructivist learning perspective Dixon (1997) defines OL as the construction of collective knowledge and understanding gained through dialogue and communication of opinions, beliefs, and experiences. The main concepts of this view are that new knowledge is attained and integrated into existing mental models through communication and dialogue and thus connect individuals with organisational learning (Merriam and Caffarella 1999).

Table 6: OL Orientations

Organisational Learning Orientation	**Characteristic**	**Example of Researcher**	**Focus on**
Behaviourist	Learning as a change in behaviour, resulting from environmental changes	Senge (1990)	Individual
Cognitivist	Learning as the accumulation of knowledge within an organisation	Fiol and Lyles (1985)	Individual
Humanist	Self-directed learning, problem recognition and motivation for learning	Marquardt and Reynolds (1994)	Individual
Socialist	Social interaction, dialogue, and communication as key drivers	Marriam and Caffarella (1999)	Individual and group
Constructivist	New knowledge is attained and integrated into existing mental models through communication and dialogue	Dixon (1997)	Individual, group and the organisation

(Source: Author 2022)

An overview of the organisational learning orientations, their characteristics, examples of researcher and the focus of this orientation is provided in Table 6. The variations and blends of the different perspectives represent the multi-levelled nature of OL. Many theories and constructs do not only strictly represent one perspective but overlap with components of other views. In order to embrace the multi-facetted essence of OL some researchers (such as Hariharan and Vivekanand 2018; Odor 2018; Akgün, Lynn and Byrne 2003; Easterby–Smith, Crossan, and Nicolini 2000) present variations of the main perspectives in order to capture the breadth of OL as a research field.

Thus, the following cross-disciplinary perspectives on OL are identified: cognitive-behaviourism, social-constructionism, and social-cognitivism. The cognitive-behavioural approach focuses on

changes of cognitive perception, which results in adaption of individual´s behaviour, which in turn is regarded as the organisation`s conduct. An example of this perspective can be found in Argryis and Schön`s (1978) theory of action, which implies that a member of an organisation has implicit knowledge in terms of intrinsic theory and acts according to it, therefore, the cognitive map of an individual shapes the action of that individual.

The social-constructional orientation focuses on individual and group learning by transforming intrinsic knowledge of individuals to extrinsic knowledge through dialogue and communication with other members of the organisation. It entails the components of both the social and physical environments and further places strong emphasis on the social interactions with single or groups of people (Brown and Dugid 1991).

The social-cognitive view transfers individual knowledge and learning to the group level and the organisation itself. Akgün, Lynn and Byrne (2003 p. 840) state that this approach combines the learning views behaviourism, cognitivism, and social constructivism by "*recognizing individuals as both the source and the target of influence in the organization*.". This orientation is regarded as the most holistic approach and an example can be found in Crossan et al.'s (1999) OL cycle. Hariharan and Vivekanand (2018) note that current research in OL mainly represents the socio-cognitive approach of OL by pursuing the development of an encompassing view on OL.

Examples of researchers, as well as their definition in the light of the cross-sectional learning orientation is summarised in Table 7:

Table 7: Cross-sectional learning orientation

Organisational Learning Orientation	**Example of Researcher**	**Definition of OL**	**Focus on**
Cognitive behaviourism	Lipshitz, Popper, and Friedman (2002)	"a conscious and systematic process which yields information and intends to produce results and new perceptions, goals and/or behavioural strategies" (Lipshitz, Popper, and Friedman 2002 p.82)	Individual
Social constructivism	Cook and Yanow (1993)	The following activities generate OL: "(…) when organizations are seen to learn through activities involving cultural artifacts, and that learning, in turn, is understood to entail organizations` acquiring, changing, or preserving their abilities to do what they know how to do." (Cook and Yanow 1993 p. 368)	Individual and group
Social cognitivism	Akgün, Lynn and Byrne (2003)	"Organizational learning is an outcome of reciprocal interactions of social and cognitive processes embedded in organizational structures, cultures, and interactions" (Akgün, Lynn and Byrne 2003 p. 862)	Individual, group and organisation

(Source: Author 2022)

The richness and diversity of OL is depicted in the various definitions of key researchers in the research field (Do and Mai 2020; Lyman, Hammond, and Cox 2019) (see Table 7). In order to capture the breadth of the field, further examples of definitions of OL are provided in Table 8 below:

Table 8: Definitions of OL

Advocates	**Definition of OL**	**Perspective**
Argyris and Schön (1978)	OL emerges from error detecting and correcting actions.	Behaviourism
Fiol and Lyles (1985)	OL as change process based on experience, generated through knowledge.	Cognitive behaviourism
Levitt and March (1988)	OL is based on experiences from the past, which shape the individual´s actions and routines.	Cognitive behaviourism
Senge (1990)	OL by sharing knowledge, views and beliefs in order to pursue a common aim.	Behaviourism
Huber (1991)	OL as individual change by acquiring knowledge	Cognitivism
March (1991)	OL as adapted routines which lead to new behaviours, and which are based on past experiences.	Cognitive behaviourism
Nonaka & Takeuchi (1995)	An organisation is able to produce and distribute new knowledge within the entire organisation.	Social cognitivism
Crossan et al. (1999)	OL as process, which changes individual, group and organisational internal mental models, routines, norms, and behaviours.	Social cognitivism
Lipshitz, Popper and Friedman (2002)	OL as deliberate change process, which transforms information into new aims, strategies, norms, and behaviours.	Cognitive behaviourism

Advocates	Definition of OL	Perspective
Alvani (2008)	OL as error detection and correction process.	Cognitive behaviourism
Hoe and McShane (2010)	OL as knowledge acquisition, distribution, and application to respond to changed external circumstances.	Social cognitivism
Nicolini et al. (2011)	OL enhances the skills and competences of an organisation through employees' daily work routines.	Social constructivism
Argote (2013)	OL as process, which is created through experience and results in newly generated or adapted organisational knowledge.	Social cognitivism
Chiva, Ghauri and Alegre (2014)	OL as change process in the organisations cognitive mind in order to enhance organisational performance.	Social cognitivism

(Source: Author 2022)

Current definitions of OL place a strong focus on breadth, attempting to incorporate all perspectives and are thus found to be associated with the social-cognitivist perspective on OL (see Table 8). Within these recent definitions, especially integrating elements of knowledge management (KM), such as the concepts of knowledge acquisition, distribution and transfer can be found prominantly within literature (Basten and Haamann 2018; Thingvad et al. 2018; Castaneda, Manrique and Cuellar 2018; Yuliansyah and Khan 2015).

Argote and Hora (2017) for example argue that the above-mentioned KM concepts and thus KM as a whole is strongly intertwined with OL. Lyman, Hammond, and Cox (2019) connect to Argote`s (2011) definition and understand OL as process changing the organisations norms and routines caused by individual´s knowledge, acquired through past situations. Argote, Lee and Park`s (2020 p.4) definition is similar: "*Organizational learning is a process through which experience*

performing a task is converted into knowledge, which, in turn, changes the organization and affects its future performance."

Patky (2020) builds upon Tsang`s (1997) definition and views OL as a process, generated through experiences, which shape future actions and therefore build the organisational knowledge. Lara and Salas-Vallina (2017) and Vidal and Guerro (2017) relate to Dibella, Nevis, and Gould`s (1996) research by viewing OL as a change process shaped by management, and forming the mind-set of an organisation aimed at internal improvement. Basten and Haamann (2018) and Lara and Salas-Vallina`s (2017) agree with Chivas, Ghauris, and Alegres (2014) that understanding the outcome of OL is retention or enhancement of organisational performance. There is a consensus within current OL literature to view OL as a process which creates knowledge and adapts organisations´ norms, routines, and behaviours (Basten and Haamann 2018; Castaneda, Manrique and Cuellar 2018) and that OL has a beneficial influence on organisational performance (Do and Mai 2020). This present research acknowledges this view and contributes the research area.

To conclude this section, in order to achieve a holistic understanding of OL, this research adopts a social-cognitive orientation by viewing knowledge as result of OL, which is newly created, adapted or retained (Patky 2020; Thingvad et al. 2018; Argote and Hora 2017; Yuliansyh and Khan 2015) and manifested in the organisation`s norms, structures, routines and processes (Lyman, Hammond and Cox 2019; Argote and Miron-Spektor 2011) with the aim of maintaining or increasing organisational performance by adapting to environmental changes, which might be internal or external (Hoe and McShane 2010).

2.2.2 The process of organisational learning

This section of the literature review considers the process by which organisational learning is created. Due to the high degree of fragmentation in the research field noted above in Chapter 2.2.1, there are several different concepts and models each placing different foci on how learning is created. This chapter aims to unify the views, concepts, and models of OL to present a holistic perspective on the process of OL.

Generally, OL can be seen as process, which may be applied to different orgnaisational levels. These levels comprise individual learning, group learning and organisational learning and within all these levels learning occurs (Tafvelin, von Thiele Schwarz and Hasson, 2017; Oliver 2009; Crossan et al. 1999; Feurer and Chaharbaghi 1995a). In addition to the levels of learning, there are different

dimensions on how learning may take place. In order to obtain a comprehensive overview of OL, the established view on OL as a cyclic approach is adopted and the most significant models are reviewed.

From individual to organisational learning

OL implies different learning stages involving individuals, groups and the entire organisation (Tafvelin, von Thiele Schwarz and Hasson 2017; Feurer and Chaharbaghi 1995a; Crossan et al. 1999; Oliver 2009). The academic literature notes that OL covers three stages: the individual, the group and lastly the organisation (Chuah and Law 2020; Fang, Li and Lu 2016; Hasson et al. 2016; Crossan et al. 1995, 1999).

Individual learning is part of OL but significantly, the learning sub-process is performed by individuals who are motivated and possess the required competences (Chuah and Law, 2020). According to Odor (2018), individual learning is the change of an individual´s mental model by processing and interpreting information. The literature highlights the importance of experience and the usage of external resources such as other individuals or organisational data for causing new insights and creating learning at the individual level (Patky 2020; Basten and Haamann 2018; Kolb 2015; Argyris and Schön 1996). The importance of individual learning for OL and the urgency to understand individual learning as a prerequisite to develop OL is acknowledged within literature (Basten and Haamann 2018; Wang and Ahmed 2003). OL, however, develops this the construct further, so that the learning sub-processes are expanded to different entities of an organisation, individuals, groups but also strategy, systems, and organisational culture due to the complexity of organisational activities (Chuah and Law 2020; Bandura 1997). In addition to the dominant characteristics of individual learning such as changes in individual´s mental models (Bandura 1977) and adapted individual routines and behaviours (Honey and Mumford 1986).

OL comprises various elements expanding the individual (Lau, Lee, and Chung 2019). Therefore, for OL, it is important to examine the construct of group learning, as well as investigating the infrastructure and networks needed for sharing learning experiences throughout an organisation (Kloot 1997, Marquardt and Reynolds 1994). For group learning (sometimes referred to as team learning), communication, exchange, and dialogue are essential (Odor 2018; Becerra-Fernandez and Sabherwal 2008; Wenger 2009). This form of learning emerges when single members of an organisation exchange their knowledge, experiences, thoughts, and convictions; interpret them

jointly until a common understanding has been reached, and which adopt the existent inherent beliefs and perspectives of the individuals (Odor 2018).

Some writers in the field position knowledge acquisition of an organisation as similar, if not identical to OL (e.g. Huber 1991; Hedberg 1981), however, most researchers agree that OL is more than employees' individual learning and the accumulation of individual knowledge (e.g. Chuah and Law 2020; Basten and Haamann 2018; Wang and Ahmed 2003; Crossan et al. 1999; Cook and Yanow 1993; Kim 1993; Fiol and Lyles 1985; Agyris and Schön 1978). Within the academic literature there is agreement that OL is constituted when experiences and mental beliefs of individual organisational members are distributed among a group, re-interpreted by the group until a common understanding has been reached, and lastly implemented into the organisation as new knowledge which can be attained by all members of the organisation (Patky 2020; Odor 2018; Lewin, Massini and Peeters 2011; Fiol and Lyles 1985). This thesis regards organisational learning as emergent from individual knowledge, which is distributed and refined within a group and manifested within the organisation. Generally, shared meanings of individuals, the group and the organisation create organisational learning and are enabled through learning mechanisms. These so-called organisational learning mechanisms (OLMs) convey the transfer of individual learning into organisational learning (Mitki, Shani and Stjernberg 2008; Armstrong and Foley 2003; Shani and Docherty 2003).

Popper and Lipshitz (1998) defined the concept of OLMs as methods, structures, or processes, which enable the acquisition, interpretation, distribution and retention of information relevant for the organisation (Popper and Lipshitz 2000; 1998). This definition has been widely accepted by other researchers in this field (e.g. Cirella et al. 2016; Swart and Harcup 2012; Oliver 2009; Armstrong and Foley 2003). Oliver (2009) describes OLMs as enabling and transformative tools for individuals to share their views and beliefs and generate intellectual capital as output. Swart and Harcup (2012) further add that OLMs transfer knowledge and learning into organisational structures and procedures by expressing mental models of individual employees of an organisation in a way that new mental models and behaviours are generated.

Troshani (2020) defines OLMs by describing OLMs as organisational systems, roles or procedures implemented to enhance social exchange of individuals by aiming at performance improvement. Sententiously, OLMs can be described as "*the conditions which enable organisations to build capacity to learn and have, as a result, the potential to change.*" (Troshani 2020 p. 285). Therefore, OLMs appear to consist of structures, processes, and cultural dimensions, which support learning

processes by collecting, analysing, distributing, and storing information and data within the organisation by aiming at generating OL for increasing the organisational performance. OLMs therefore are structural processes but also enablers for social interactions such as training events or meetings, and thus support knowledge exchange of organisational individuals and groups. This results in implicit behavioural changes as tacit knowledge, but also appears in more explicit ways, such as documents or reports (Cirella et al. 2016; Swart and Harcup 2012).

Within the organisational behaviour literature, there is a debate surrounding the tacit/explicit transfer of knowledge (Vasconcelos 2007). This issue focusses on whether tacit knowledge may be made explicit by the interaction of an individual with a group, or if tacit and explicit knowledge remain as such.

Nonaka and Takeuchi's (1995) model of knowledge creation views the creation of knowledge through a conversion spiral of knowledge from tacit to explicit, explicit to explicit, explicit to tacit and tacit to tacit. This is achieved via stages of individual to group interactions and from group to individual. Cook and Brown (1999), however, regard knowledge creation differently. They view the process as social interaction rather than transferring knowledge via different stages. For them, it is not possible for knowledge to transform from tacit to explicit or from explicit to tacit. However, they note that "*one can be a useful tool in the generation of the other through productive inquiry*." (Cook and Brown 1999 p.397). Cook and Brown (1999) hold the view that explicit and tacit knowledge are both created and spread separately. Nevertheless, the creation of explicit knowledge can, in certain circumstances, be necessary for spreading tacit knowledge (Cook and Brown 1999). Cook and Brown differentiate this according to the needs of the situation: "*If explicit knowledge is needed, then it is explicit knowledge that needs to be generated and made sharable; if tacit knowledge is needed, then it must be generated and made sharable (…). Or both*" (Cook and Brown 1999 p. 397). Both Nonaka and Takeuchi's (1995) model of knowledge creation, as well as Cook and Brown´s (1999) theory are acknowledged in this research. However, as this project aligns with Vasconcelos' (2007) view of this issue, this work does not reflect on the transfer of tacit knowledge into explicit knowledge and vice versa, but refers to OL and PMS theories of creating and distributing knowledge via feedback, communication, and dialogue. Those theories are discussed within the following Chapter 2.2 and Chapter 2.3.

According to literature, OLMs can be grouped into three types: cognitive, structural, and procedural OLMs. (Cirella et al. 2016; Mitki, Shani and Stjernberg 2008; Shani and Docherty 2003; 2008). Cognitive OLMs are described as dialogue-intensive, and include group specific communication

and language for the joint exchange of mental models until a common understanding has been reached, in line with the organisation´s aims and strategies (Cirella et al. 2016; Oliver and Jacobs 2007). Structural mechanisms on the other hand are described as more feasible in providing explicit knowledge and enable communication and discussions among members of the organisation (Chaharbaghi and Cripps 2007) via forms of IT systems or training programs but also extending the organisation´s environment to, for example, stakeholders or customers (Cirella et al. 2016). Procedural OLMs can be understood to be learning possibilities such as briefings or regular team meetings conducted by reflecting and sharing experiences (Cirella et al. 2016; Mitki, Shani and Stjernberg 2008; Bjerlov and Docherty 2006; Gustavsen 2001; Pavlovsky et al. 2001). However, Troshani (2020) remarks that the existence of OLMs within organisations does not mean that organisational learning is necessarily created.

In line with this study, Henri (2006b) identifies performance measurement as a powerful form of OLM, particularly when managers' views and opinions about the organisation and the environment are depicted with their choice of PMS measures. These measures reflect the managers` mental models such that their views about the company and the company's strategies are distributed into the organisations via employees. Therefore, performance measurement systems and its measures depict both the priority order and hierarchy of objectives (Marginson 2002).

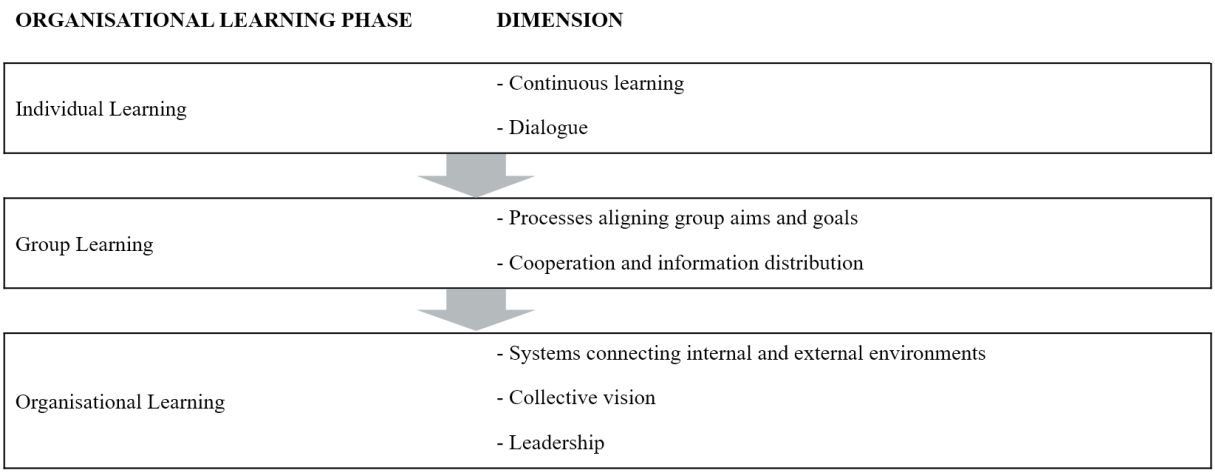
Another prominent OLM is dialogue and feedback. By raising awareness of the social character of learning, dialogue may close the gap between individual and organisational learning (Do and Mai 2020; Lloria and Moreno-Luzon 2014; Chiva and Alegre 2005). Group learning can be viewed as a middle stage, connecting individual and organisational learning, and is promoted as employees discuss and reflect their own views, experience, and opinions (Senge 1990). Dialogue encourages the widening of employees's beliefs by examining different perspectives, and thus generating learning. Discussion and communication are essential for learning by developing a shared understanding (Mazutis and Slawinski 2008). Leadership has the challenge of promoting OL by enabling and facilitating dialogue and communication (Mazutis and Slawinski 2008). A part of dialogue and another highly important enabler to share learning through the different stages, is feedback and feedforward (Do and Mai 2020; Lloria and Moreno-Luzon 2014). Crossan et al. (1999) explain that feedback and feedforward enable the flow of knowledge from the individual into the organisation and vice versa. Senge (1990) on the other hand argues that there is just one approach, which is cyclic in nature, and which is a two-way process: feedback. In this study, Senges´s (1990) concept of feedback is applied by regarding feedback not as a one way direction of

communication, but as a two-way approach in which feedback can be provided in all directions, up and down the hierarchical ladder, as it is the case with dialogue.

The academic literature views leadership even as one of the most important factors which can enable or hinder individual and group learning (Hasson et al. 2016; García-Morales et al. 2012; Yukl 2009; Aragón-Correa, García-Morales and Cordón-Pozo 2007; Beattie 2006; Berson et al. 2006; Vera and Crossan 2004; Gómez and Ranft 2003). This is because leadership has the ability to create the conditions required for dialogue and learning (Hasson et al. 2016; Yukl 2009; Yukl and Lepsinger 2004). Therefore, leadership plays a critical role in fostering or impeding a continuous learning culture (Do and Mai 2020). The last OLM presented in the literature is organisational culture. The literature argues that an environment which supports learning is essential, and is a prerequisite for fruitful OL processes (Oliver 2009). For OL to thrive, organisational culture is a critical factor (Kitapçi and Çelik 2013; 2014). Numerous researchers recommend an open organisational culture to promote learning and the exchange of knowledge (Lau, Lee and Chung 2019; Heorhiadi, La Venture and Conbere 2014). Notably, flat hierarchical levels are closely associated with OL (Pemberton and Stonehouse 2000) while formal rigid structures are found to impede OL (Curado 2006).

Extant research in the area suggests different organisational learning 'dimensions' which influence each other, and enable the stages of learning transfer (Tafvelin, von Thiele Schwarz and Hasson 2017; Hasson et al. 2016; Marsick and Watkins 2003; Yang 2003; Yang et al. 2004). These dimensions are depicted in Figure 6:

Figure 6: OL phases and dimensions



(Source: adapted from Hasson et al. 2016 p.121)

The individual level comprises two dimensions: constant learning and dialogue (see Figure 6). The latter relates to organisational effectiveness in fostering feedback and debate, whereas continuous learning embodies an organisation's efforts in creating learning opportunities. Group learning is generated through business processes, which depict the groups´ aims and goals, and via effective group cooperation, which foster dialogue and information distribution. OL can also be achieved by implementing systems which employees can use for knowledge and information-sharing, and which connect internal and external environments. Another dimension can be seen in developing a shared vision within the organisation and using employee feedback to make adjustments to that vision. Lastly, another dimension provides leadership (see Figure 6) through encouraging change and learning. Only by fulfilling these dimensions at all levels, can OL grow and be established (Tafvelin, von Thiele Schwarz and Hasson 2017; Hasson et al. 2016; Marsick and Watkins 2003; Yang 2003; Yang et al. 2004).

As discussed in Chapter 3.2.1, the concept of organisational learning integrates various elements of KM. In line with this recognition, knowledge-sharing barriers can be seen as congruent to the learning barriers identified in this chapter. These knowledge-sharing barriers can be "*individual barriers such as poor social interaction and lack of social network (Argote et al., 1990; Epple et al., 1996; Argote and Ingram, 2000; Cabrera and Cabrera, 2002); poor organisational culture and structure (McDermott, 1999; McDermott and O'Dell, 2001; Sharratt and Usoro, 2003); and technological issues such as reluctance to use new systems (Lettieri et al., 2004).*" (Bloice and Burnett 2016 p.128).

In line with the KM literature more generally, Schauer, Vasconcelos and Sen (2015) developed the ShaRInK framework which presents key categories of influencers, which affect individual knowledge sharing. The framework depicts four key categories (Schauer, Vasconcelos and Sen 2015):

- Sharers: the characteristics of the sharers
- Relations: relations between the sharers
- Institutions: which are understood as a joint entity on cognitions of the sharers
- Knowledge

In order to achieve knowledge sharing and the transition from individual to organisational learning, the framework acts as a guideline for creating a knowledge-sharing strategy within organisations (Schauer, Vasconcelos and Sen 2015).

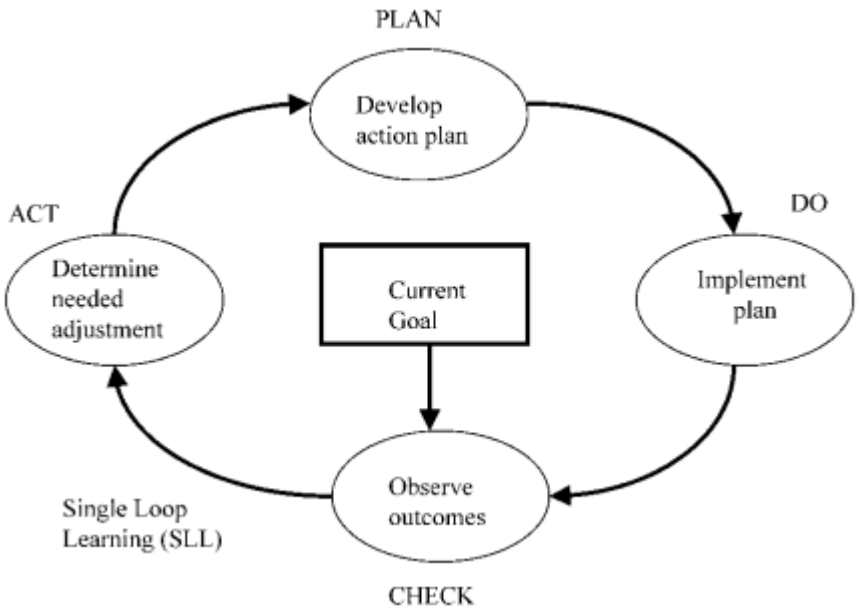
Organisational learning models

Within the academic literature, there is an extensive field of studies proposing different models for conceptualising OL. Despite this breadth of existing models, this study strives for a holistic view of OL, and thus places focus on the three most cited and commonly accepted models of OL. This holistic view of OL is essential to achieve the objective of holistically understanding the disciplines of OL and PMS, their intersections, and interdependencies (see Chapter 1.3). There are several models and theories of OL which have been proposed in the last few decades. Therefore, the following selection process was utilised: 1) the models should incorporate the different dimensions of OL 2) They should provide an encompassing view on OL and 3) The models are required to be widely accepted within academia by providing the highest citation rate. Finally, the models fulfilling the three criteria have been identified to be: Argyris and Schön´s (1978) single- and double-loop learning, Crossan et al.´s (1999) 4i model and Huber´s (1991) OL framework.

One of the most cited and widely accepted and referenced theories of OL is the single-loop learning (SLL) and double-loop learning (DLL) model of Argyris and Schön (1978) (e.g. Chuah and Law 2020; Do and Mai 2020; Basten and Haamann 2018; Lau, Lee and Chung 2019). These two concepts of learning can be also found in the literature as part of adaptive and generative learning (Senge 1990), operational and conceptual learning (Kim 1993) or lower and higher-level learning (Fiol and Lyles 1985). Parallels to the concepts of mental model building and confirming (Vandenbosch and Higgins 1995), operational and conceptual learning (Kim 1993); and primary and value learning cycles (Feurer and Chaharbaghi 1995) can also be found. Even though there are slight variations in their definitions, the principles which underping these models can be seen to be very similar. Argyris and Schön (1996) define SLL as "*instrumental learning that changes strategies of action or assumptions underlying strategies in ways that leave the values of a theory of action unchanged*" (Argyris and Schön 1996 p.20). Basten and Haamann (2018) explain that SLL aligns problem solving with the norms, structures, and guidelines prevalent in the organisation. Individuals react to issues with correcting actions in accordance with organisational policies (Fried 2010). Here, correcting actions taken are aligned with the strategy of the organisation ,and no questioning of the prevalent policies, norms, aims, structures, and guidelines takes place (Burt and Nair 2020; Azadegan et al. 2019; Jeffs et al. 2012; Fiol and Lyles 1985). Thus, SLL solves

problems instead of searching and correcting the cause of the problem (Azadegan, et al. 2019). Dervetsiotis (2004) depicts SLL as Plan Do Check Act cycle as depicted in Figure 7 below.

Figure 7: Single-loop learning



(Source: Dervitsiotis 2004 p.463)

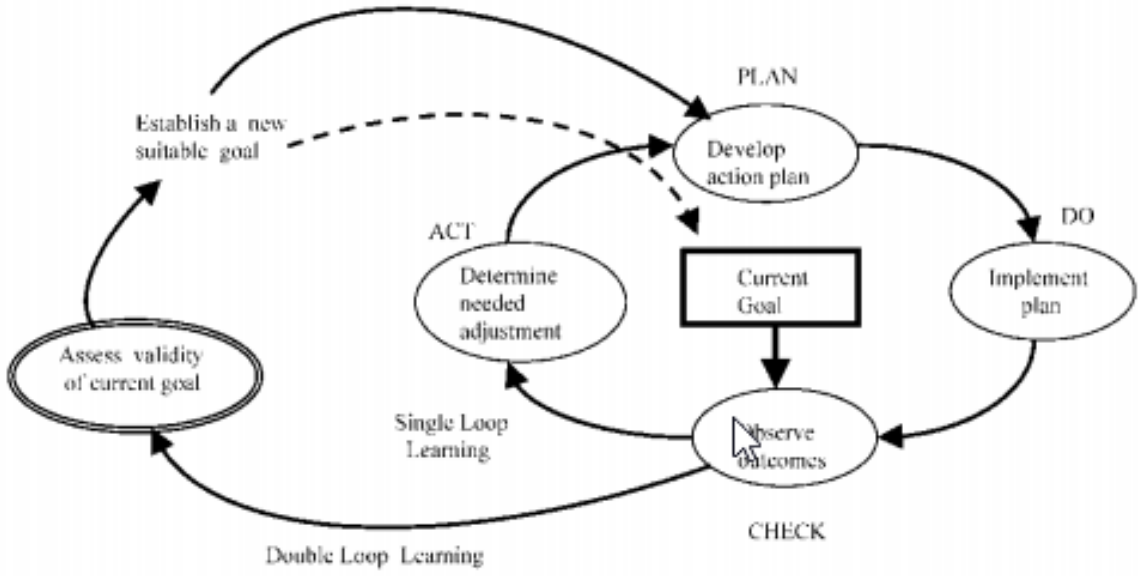
The cycle (see Figure 7) starts with the current goal of the organisation. Actions taken by organisational members are in line with the prevailing norms and behaviours of the organisational culture and are subsequently checked after actions have been pursued. Monitoring is commonly conducted via performance measurement systems which provide feedback regarding previous correcting actions. Deviations are corrected by developing and implementing an action plan, which is subsequently reviewed if the actions showed effect.

Kaplan and Norton (1996) note that SLL is vital for organisations, especially for performing daily tasks which need to stay aligned with organisational goals and strategy. SLL is the most widespread form of learning within organisations (Burt and Nair 2020), and fosters efficiency and productivity (Hall 2011).

DLL on the other hand questions an organisations` aims, strategies, concepts, norms and structures and therefore builds on the concept of SLL (Burt and Nair 2020; Chuah and Law 2020; Bootz, Durance and Monti 2019; Basten and Haamann 2018). SLL, as well as DLL, focusses on the

individual within an organisation, however, Chuah and Law (2020) remark that neither of these two learning forms incorporate organisational culture. While SLL focuses on changing and adapting actions for reaching organisational goals, DLL questions and develops these goals (Burt and Nair 2020; Do and Mai 2020; Bootz, Durance, and Monti 2019; Basten and Haamann 2018) and changes mental models, norms and behaviours to address the cause of the issue (Azadegan et al. 2019). Greenwood (1998 p.1052) defines DLL as "*the result of reflection on the norms, values and social relationships which underpin human action.*". DLL is essential in today's fast changing environment for organisations to stay ahead of competitors, and to rapidly adapt to the economic needs (Do and Mai 2020). Therefore, DLL can be characterised as a process of reflection with the aim of examining, challenging and validating underlying organisational goals, norms, guidelines, and principles in the light of the changing environmental needs. While SLL is mainly formed by repetition and experience provided by basic performance measurement feedback indicating behaviouristic approaches, DLL is described as more cognitive in its nature (Fiol and Lyles 1985). DLL as a learning form is predominantly associated with OL and has mainly been researched in the social sciences and via systems theories (Chuah and Law 2020; Argyris and Schon 1978). The process of refinement organisational aims and strategies in line with fast-changing external needs requires different, more complex feedback from performance measurement systems (Kaplan and Norton 1996). This feedback process is depicted as an additional cycle within Dervitsiotis (2004) cycle to illustrate the further step of the validation of prevalent underlying norms, structures and guidelines of an organisation. Dervitsiotis (2004) cycle of DLL is depicted in Figure 8:

Figure 8: Double-loop learning

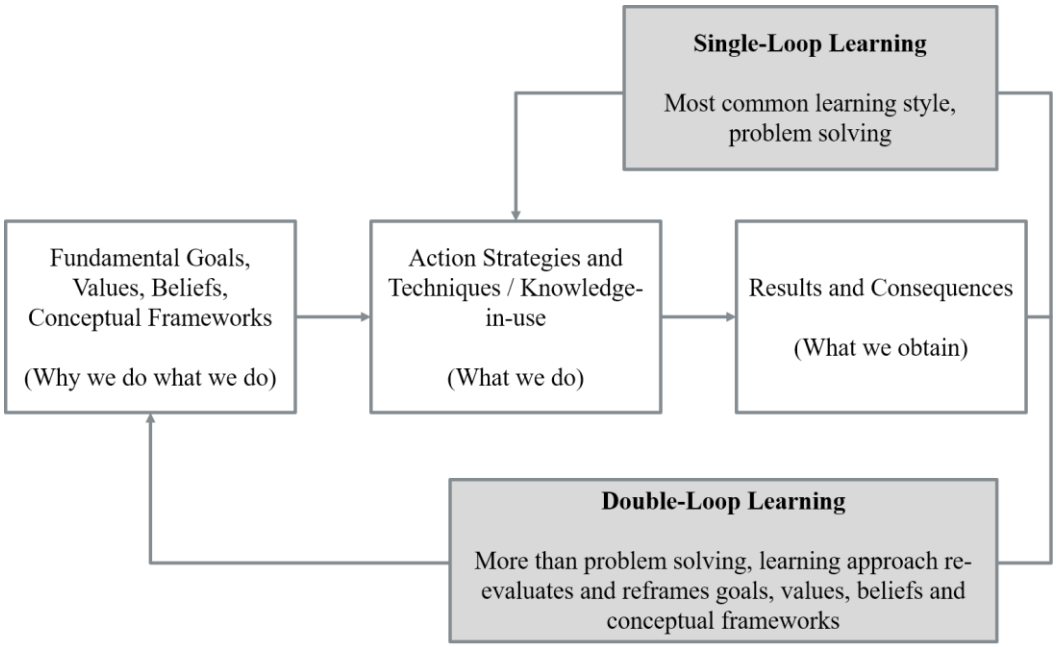


(Source: Dervitsiotis 2004 p.464)

The model presented in Figure 8 depicts the extension of the SLL cycle by highlighting the requirement of an additional second loop (DLL) to periodically question the organisations' goals and strategies in the light of current environmental needs. Depending on the result of the validation, either the organisational goals are refined and adopted, or new goals created. Basten and Haamann (2018) remark that the adjustment of organisational goals and the implementation of adopted performance standards resulting from the second feedback loop might cause conflicts among individual employees of the organisation. The harmonisation and integration of DLL into an organisation`s performance measurement routines and structures are recommended for the creation of a learning culture which validates organisational aims and strategies (Dervitsiotis 2004). With regard to the terms 'exploitation' and 'exploration', Vasconcelos (2008 p.439) highlights the dynamic tension which is crucial for the management to achieve, however, this is also "*the dilemma faced by all organisations of whether to pursue of strategies geared towards the exploitation of knowledge versus those that are driven by the exploration of knowledge* ". Contrary to SLL, which is regarded as not requiring dialogue, communication is essential for DLL (Mazutis and Slawinski 2008).

Even though DLL is mainly associated with OL (Chuah and Law 2020), writers suggest that the concepts of SLL and DLL should not be viewed independently (Weishäupl, Yasasin and Schryen 2018). An organisation needs both forms of learning, and both forms cannot exist without each other. Burt and Nair (2020) highlight the interconnectedness of the two learning forms in the following diagram:

Figure 9: Relationship between single- and double-loop learning



(Source: adapted from Burt and Nair 2020 p.4)

Figure 9 presents the DLL which questions and restructures the fundamental beliefs, values and goals of an organisation by considering the underlying issue: "Why do we do what we do?". As noted previously, SLL on the other hand is more common and solely questions the strategy, actions, used techniques and applied knowledge by asking "What do we do?" (Burt and Nair 2020).

PMS provides feedback regarding the necessary adjustments needed for daily routines and structures. DLL on the other hand is essential for questionning the root cause of an issue, and not just addressing the symptoms. Burt and Nair (2020) identify strategic foresight as one of a main characteristics of DLL. However, strategic foresight is prevented by learning traps, which are associated with SLL. Within the literature, three types of learning traps are presented (Burt and Nair 2020; Levitt and March 1988; Levinthal and March 1993). The competency trap is found to prevent individual employees of an organisation from acquiring new competencies by sticking to and refining existing skills (March and Coutu 2006).

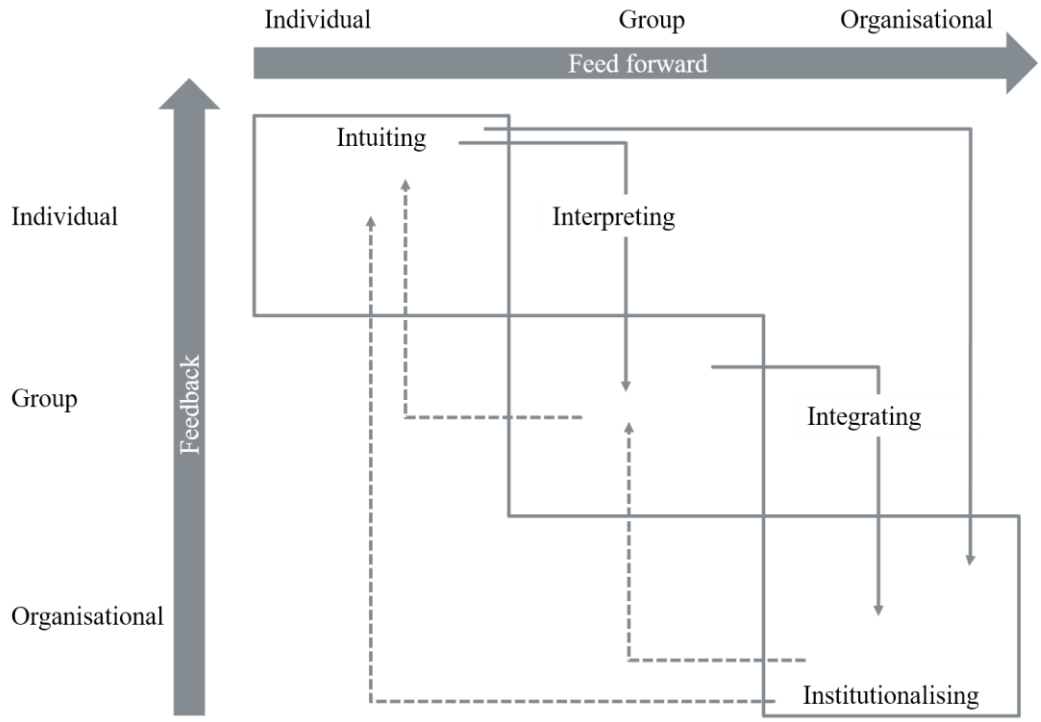
Superstitious learning is based on subjectivism, which influences the clear view on the connection between an individual´s actions and the outcome of those actions (Argote, Lee and Park 2020; Levitt and March 1988). The last form of learning trap is myopia, which is described as short-sightedness and the lack of viewing the overall picture (Levinthal and March 1993). DLL is regarded as providing a way of overcoming these challenges, and according to Burt and Nair (2020)

the potentially poorly recognised concept of ‘unlearning’ constitutes an important factor for facilitating the move from SLL to DLL. This mechanism is associated with bridging the gap from SLL to DLL and thus smoothening the fluent transition between these two interrelated concepts. Many researchers in this area fail to consider the relationship between SLL and DLL and regard them as separate entities, whereas DLL is largely regarded as a superior learning form (e.g. Li, Yang and Shih 2021; Thomson, Michovski, and Orr 2014). However, those researchers who take both forms into account view communication and dialogue as the most natural and best suited tool for transforming SLL into DLL (Henri 2006a, Crossan et al. 1999).

Another prominent and widely accepted approach to consider the multi-facetted and dynamic nature of OL is to view OL as a cycle (Choi and Chandler 2020; Watad 2018). Within the academic literature, two recent OL models have been prominent: Huber´s organisational learning framework and Crossan`s organisational learning cycle (Lau, Lee, and Chung 2019). Crossan et al.`s (1999) dynamic 4i-process model of OL has been cited more than 6.506 times while Huber`s (1991) OL cycle has been cited 12.735 times according to Google Scholar (April 2021) and are therefore most prominent within the academic field of OL. Both models attempt to depict the entire OL process showing the various parallels between each, and also their areas of complementarity. These widely accepted models are significant in theory and practice and are regarded as vital for developing a sound and encompassing understanding of the different stages of OL.

Crossan et al. (1999) incorporates the three learning stages of individual, group, and organisational learning in order to capture the different levels and layers of OL. Therefore, learning is created, applied, and transferred using feedback and feedforward at these different stages. The highly dynamic nature of Crossan et al.`s (1999) 4i-process of intuiting, interpreting, integrating, and institutionalizing (Jenkin 2013; Lawrence et al. 2005) is depicted in Figure 10 below:

Figure 10: Crossan et al.`s 4I model of OL



(Source: adapted from Crossan et al. 1999 p.532)

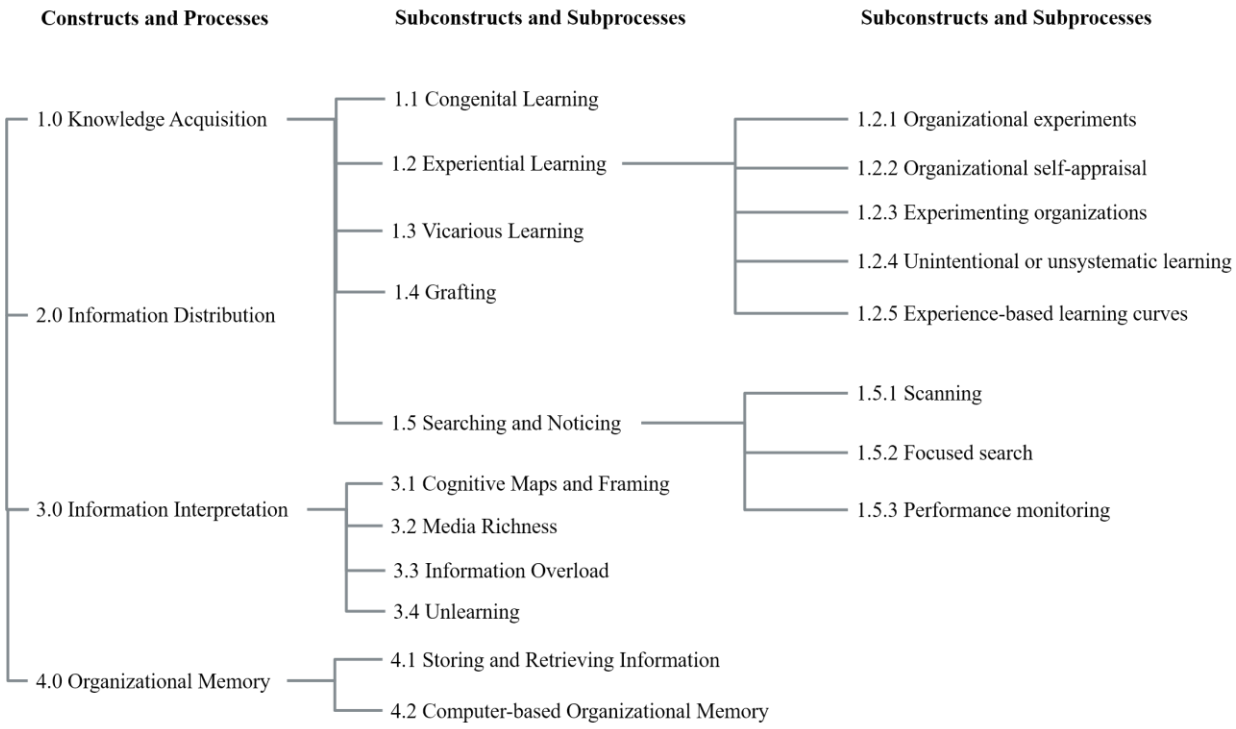
The process (see Figure 10) starts with intuiting at an individual level, in which a member of an organisation develops insights, views, and understandings. Crossan et al. (1999 p.525) define intuiting as "*the preconscious recognition of the pattern and/or possibilities inherent in a personal stream of experience*". Further, this process is stated to be complex due to the tacit and unconscious nature of the process, and triggers feed-forward (Jenkin 2013; Crossan et al. 1999). In the subsequent stage of interpreting, the mental models of the individual are spread within a group. Concepts and suggestions are formulated and shared, group knowledge is formed via discussions and dialogue. The process of integrating comprises the execution and implementation of the concepts and ideas formed in the previous process step. Crossan et al. (1999 p.525) defines it as "*the process of developing shared understanding among individuals and of taking coordinated action through mutual adjustment*". Bloice and Burnett (2016) explain the integration of knowledge as the combination of knowledge from multiple different sources in order to facilitate decision-making.

Lastly in the stage of institutionalising, learning is distributed and stored within the organisation by emedding learning into adapted routines, behaviours, and strategies. The different process stages are attained via feedback and feed-forward, whereas feed-forward is viewed as the process of giving

knowledge and learning to the next process, whereas feedback can be understood to be knowledge and learning flowing from one process-step back to the previous process step. According to Crossan et al.´s (1999) understanding, feedback can be related to SLL as the organisation's strategy, rules and guidelines lead employees to adapt their behaviours and routines in line with organisational standards and norms. Feedforward on the other hand is associated with DLL as employees derive adaptions from their intuitions in the organisation´s culture, strategy, norms, and behaviours. In the cycle, the last process step of institutionalizing triggers the first one of intuiting and the process repeats again (see Figure 10).

Huber`s (1991) organisational learning cycle has features common to Crossan et al.`s (1999) model and views OL as a process consisting of the following steps, which follow and build on each other: knowledge acquisition, information distribution, information interpretation and organisational memory. Huber´s (1991) OL model is illustrated below in Figure 11.

Figure 11: Huber´s OL model



(Source: Huber 1991 p.90)

Knowledge Acquisition is the first step in which information and knowledge is obtained (see Figure 11). In this stage, Huber (1991) identified different ways of how information is acquired. The first form is congenital learning, which is perceived as a mixture of inherited knowledge and knowledge

attained by the founders of the company. The founders on the other hand gathered their knowledge via vicarious learning, grafting, or searching (Huber 1991). Vicarious learning can be understood as gaining experience from other organisations by imitating them. Grafting is the acquisition of knowledge through new employees which bring new insights and knowledge to the organisation (Huber 1991). The last process of searching and noticing entail the sub-processes scanning, which refers to a wider external environment, focused search, which means searching in a narrow surrounding and performance monitoring (Huber 1991).Another form of acquiring knowledge is experiential learning in which learning from experience is critical and can be attained consciously or unconsciously. Huber (1991) sub-divides experiential learning into learning gained through experiments within an organisation. Here, feedback plays a major role and Huber (1991) highlights the importance of conducting experiments within an organisation to enable learning.

The next sub-form is organisational self-appraisal, which focuses on social interaction and exchange between members of the organisation. This concept also falls under Argyris and Schön´s (1974; 1978) and Argyris (1982) theory of SLL and DLL, which has been described earlier in this chapter under "organisational learning models". Experimenting within organisations is another form of knowledge acquisition and can be viewed as maintaining flexibility and adaptability (Huber 1991). While the first two sub-forms of knowledge acquisition deal with improving the adaptability of an organisation, this form strives for maintenance through a constant process of change within the organisation (Huber 1991). Unintentional or unsystematic learning is regarded as another form of knowledge acquisition, as well as experience-based learning curves, in which organisations' can mathematically depict their experience in forms of curves for predictions (Huber 1991).

The acquisition of knowledge can be conscious or unconscious and by being aware of the organisation´s external environment. Huber (1991) regards the monitoring of organisational performance as a tool to acquire knowledge. Information distribution as the second stage determines the spread of knowledge and learning throughout the organisation, which in turn generates new insights for other members. The sharing of knowledge is a key process within OL (Deverell and Burnett 2012). The subsequent process step of information interpretation involves the analysis of shared information jointly within a group, which results in a joint understanding of the information. This process is further divided by Huber (1991) into four sub-processes. Cognitive maps and framing depict an individual´s thinking and mind-set, which builds the basis and shapes the interpretation of knowledge interpretation. Media richness as another sub-process is understood as referring to different forms of communication tools used to spread the interpretations to different recipients, as well as communicating the feedback of the recipients on the interpretation.

Information overload suggests that too much information hinders individuals to adequately interpret that information. Lastly, unlearning is regarded as disposal of inaccurate knowledge (Hedberg 1981). Huber (1991) stresses that unlearning is rather a minimisation or maximisation of behaviours than adopting a new process. Lastly, the interpretation which is transformed into knowledge is stored within the organisation`s memory. Huber (1991) highlights the major role of software for storing and retrieving organisational knowledge in addition to stored organisational memory within processes, routines, and documents. Storing and retrieving information is an aspect of organisational memory in which explicit, subsistent knowledge is stored. Huber (1991) proposes that explicit knowledge should be available for organisational members in form of process descriptions or work instructions. Computer-based organisational memory is also a part of the organisational memory in form of software and email.

Within the literature, the different stages of organisational learning, individual, group and organisational learning, are regarded as critical in developing an encompassing view of OL. Huber (1991) views the OL processes as being more mechanistic and straightforward in their nature while Crossan et al. (1999) emphasise the exchange between the stages and highlight the natural flow of the processes, which overlap and create exchange up to a certain point. Crossan et al. (1999) address the importance of the learning stages in greater detail than Huber (1991). They discuss the role of feedback and feed-forward for attaining the different levels and explain that some process steps of their model comply with one single level while others develop from one level to another until finally the final stage of organisational learning is fulfilled. As previously stated, the study adopts the perspective of Senge`s (1990) concept of feedback by regarding feedback as two-way communication in which feedback is able to be provided in all directions.

One striking difference between Huber`s (1991) and Crossan et al.`s (1999) models is the interpretation stage. Whereas Huber (1991) places the interpretation of information after the knowledge distribution phase, Crossan et al. (1999) hold the view that firstly the information is interpreted and afterwards disseminated. Aponte and Zapata (2013) clarify that from their point of view the interpretation phase happens individually but, in the group as well. Moreover, the perception of the term knowledge also varies between the two models. While Huber (1991) sees knowledge more in the form of defined and prepared information which can directly be accessed, Crossan et al. (1999) mention the subconscious nature of knowledge, which gradually evolves over time. Additionally, Huber`s (1991) approach is more practical and provides guidelines on transferring knowledge for generating OL. Crossan et al. (1999) on the other hand do not provide any practical examples on how individual knowledge evolves into organisational learning.

Numerous sources draw on the OL models of Huber (1991) and Crossan et al. (1999) and indicate either confirmation or various parallels (e.g. Argote, Lee and Park 2020; Do and Mai 2020; Lau, Lee and Chung 2019; Odor 2018). The current literature also highlights Huber´s (1991) view on the importance of integrating the usage of information technology systems for storing and retrieving knowledge (e.g. Argote, Lee and Park 2020; Myreteg 2015; Lewis and Herndon 2011).

2.3 Performance measurement systems

Within the literature, performance measurement (PM) is widely acknowledged as being crucial for an organisation´s performance and for competitive advantage (Eshtaiwi, et al. 2018; Shurafa and Mohamed 2016; Taticchi, Tonelli and Cagnazzo 2010; Spitzer 2007; Sharma et al. 2005). In fact, the literature highlights PM as a pre-requisite for the improvement of organisational performance (Goshu and Kitwa 2017; Shurafa and Mohamed 2016; Newcomer, Baradei, and Garcia 2013; Lynch-Cerullo and Cooney 2011; Herranz 2010; Arie 2005) and is a necessity in today´s complex environment characterised by competition and fast-changing economic needs (Polese et al. 2017; Manning and White 2014). PM enhances efficiency and effectiveness concerning resources and organisational strategy and therefore improves organisational outcomes (Nudurupati, Garengo and Bititci 2021; Polese et al. 2017; Li 2015; Manning and White 2014).

Performance can be understood as the ability of an organisation to achieve its goals and objectives (Lebas 1995; Neely, Gregory and Platts 1995), and is determined and assessed via performance measurement systems (PMS). Besides the term PMS, other synonyms for PMS are also present in the literature, such as “Performance Information Systems” (PIS). Additionally, another popular term within literature is “Management Control Systems” (MCS). Reviewing the existing literature, both terms PMS and MCS are found to be commonly used, despite their embodiment of the same principle and concept (Siska 2015; Bitici et al. 2012; Merchant and Van der Stede 2007; Simons 2000; 1995a). Ferreira and Otley (2009) even view PMS as superior to MCS, as PMS encompass the complete concept of measuring, managing and monitoring an organisation´s performance and therefore provides the most holistic approach, while MCS is often found to be limited to accounting practices (e.g. Robles 2019; Drury 2012; March 1991). Therefore, following the approach of Ferreira and Otley (2009) the term PMS is used in this thesis, representing an umbrella term for all other synonyms such as PIS or MCS. PMS measure organisational performance, compare the results with the past but also contrast it to defined goals or external benchmarks (Feurer and

Chaharbaghi, 1995b). PMS need to be designed in alignment with the company´s strategy, goals and objectives and translate them for assessing whether the organisation is improving and moving in the right direction (Guenther and Heinicke 2019; DeVilbiss 2006). The most widely cited definition of PMS stems from Neely, Gregory and Platts (1995) who regard PMS as a set of metrics enabling an organisation to quantify the efficiency and effectiveness of actions. Effectiveness in this context is defined as the degree of achieving an aim or objective, whereas efficiency is understood to be the speed of performing tasks, which is quantifiable and verifiable (Nudurupati, Garengo and Bititci 2021; Striteska and Spickova 2012).

Feedback is an essential part of PMS to ensure that goals are reached, new goals set, or existing goals refined. Some researchers (e.g. Nudurupati, Garengo and Bititci 2021; Bititci 2015; Magretta and Stone 2002; Fowler 1999) use Crossan et al.`s (1999) feedback and feedforward concept to highlight the interactive two-way communication stream of PMS to formulate and shape the organisation´s strategy. As it has been stressed in Chapter 2.3.1, the research uses Senge´s (1990) definition of feedback and views feed-forward as an inseparable part of feedback.

PMS provide the measures but also the infrastructure and process of knowledge supply and are therefore essential for organisations to pursue their goals, strategy and objectives and improve on their performance (Franco-Santos et al. 2012; Franco-Santos et al. 2007). The overall goal of PMS is to rank business activities for enhanced organisational performance (Amos et al. 2021). This research defines PMS as a tool for operationalising an organisation’s efficiency and effectiveness through financial and nonfinancial measures, with the aim of monitoring the pursuit of strategy, objectives, and goals (Guenther and Heinicke 2019; Franco-Santos et al. 2012; Henri 2006b; Neely, Gregory and Platts 1995).

While the usage of PMS is crucial, it is also the most time-consuming part of the PM process (Landström et al. 2018). Within the literature, there is a lack of research regarding the usage of PMS and its process (Nudurupati, Garengo and Bititci 2021; Bititci et al. 2018). Additionally, there is an ongoing debate within the literature whether PMS enable or hinder OL. While some researchers claim that PMS are able to generate OL (e.g. Guenther and Heinicke 2019; Shurafa and Mohamed 2016; Simons 2014; 1995a; Tuomela 2005; Bisbe and Otley 2004) other researchers found hindering effects of PMS on OL (e.g. Myreteg 2015; Argyris and Schön 1978; Henri 2006a). The under-researched field within the PMS literature, as well as the debate of the relationships between PMS and OL formed the objective to further understand the discipline of PMS and its intersection and interdependencies to OL (see Chapter 1.3).

2.3.1 The development of performance measurement literature

This section investigates the development of the performance measurement literature, which has evolved over time. The importance of measuring an organisation´s performance has been understood for some time. Choong (2014) finds that there are early documents tracing PM roots back to China in the early third century AD. Johnson (1981) determines the beginning of PM in the 13th century with the double-entry bookkeeping but stated that PM started to thrive with the industrial revolution. Neely, Gregory and Platts (1995) add to this view by identifying the evolution of PM in the 1860s and 1870s by monitoring clearly defined goals and objectives of processes. It was Johnson and Kaplan (1987) who popularised PM and since then, PM has been studied from numerous different views such as theories of goal setting, contingency, equity, or agency. Regardless of the theoretical research lenses, the foundations of PM are found in control systems and in organisational and management control theory (Nudurupati, Garengo and Bititci 2021; Bititci 2015).

PM reached its peak in the 1960s in the discipline of accounting, to measure financial data such as budget, profit and costs (Amos et al. 2021). With the start of the information age, criticism of pure financial performance measures arose and since then has increased steadily. Traditional PMS are characterised by their focus on financial measures, leaving no room for other performance criteria such as quality and time, and neglect the focus on customers and the strategy of the organisation (Amos et al. 2021). The main focus of traditional PMS lies in maximising the profit of the organisation, however this view has shifted. In the following 20 years, in addition to the financial measures, other performance measures were regarded as highly relevant such as quality, quantity, duration and time, flexibility, and customer satisfaction. This progression of PM has been depicted in several different ways by many researchers. Bitici et al. (2012) divides the evolution of PM into sequences.

The beginning of PM, known as “productivity management”, ranges from the early 19th century to 1940, and focuses on controlling the physical work of employees (Bitici et al. 2012). From 1940 to 1980, the “budgetary control” period regarded work as an asset, focusing on costs, strategy, and competitive advantage, as well as performing management by objectives. Subsequently, from 1980 to 2000 “integrated PM” started by focusing on adapting to the fast-changing environmental needs, valuing customers and regarding work as knowledge.

Van Ree (2002) and Tangen (2004) on the other hand suggest focussing on performance criteria themselves. They remark that until the 1950s performance criteria of organisations had only focussed on effectiveness. In the 1960s efficiency was added to effectiveness. In the 1970s organisations were required to add productivity as well. The 1980s incorporated flexibility in addition to efficiency, effectiveness, and productivity. The 1990s included creativity to existing performance criteria, while in the 2000s sustainability was added and forms a significant element of performance criteria. Authors have titled this this form of PMS in different ways, such as contemporary (Franco-Santos et al. 2012), strategic (Chenhall 2005), comprehensive (Hall 2010) or multidimensional (Tung et al. 2011) PMS. However, an overarching concept has not yet been defined (Pinheiro de Lima et al. 2012). Regardless of its name, the concept is the same for all extend traditional PMS, which represent purely financial measures by other non-financial measures.

In relation to the airport environment as research context, PMS are crucial. Due to the critical economic and strategic importance of airports for countries, competition is exorbitant (Iyer and Jain 2019). Permanent assessment and measurement of the airport performance is a necessity, and the measures are complex and highly versatile to cover the performance requirements of airports as complex service providers (Iyer and Jain 2019; Bezerra and Gomes 2016; Gillen 2011; Graham 2009). Bezerra and Gomes (2016) depict the evolution of PM in the airport environment in three phases. The first phase ranges from 1970 to the 1980s in which scant research existed. The existing sparse literature centred efficiency, level of service in passenger terminals, as well as operational and financial performance dimensions (Bezerra and Gomes 2016; Omer and Khan 1988; Doganis and Graham 1987; Tosic and Babic 1984; Doganis and Nuutinen 1983; Doganis, Pearson and Thompson 1978; Bennets et al. 1975; Doganis and Thompson 1974; Whitbread 1971; Keeler 1970).

Compared to the general PM evolution, the airport industry seemed to prioritise slightly longer pure financial measures. Many authors explain the delayed development, as well as the scarcity in research with the low competitive pressure inside the industry as most airports were state-owned at that time (Bezerra and Gomes 2016; Assaf 2011; Gillen 2011; Yasin and Gomes 2010; Graham 2005; Francis, Humphreys, and Fry 2002). The second period ranges from the 1990s to the early 2000s. In this time, airports were regarded as companies, which should generate profit (Graham 2005). Bezerra and Gomes (2016) identified a substantial increase in research within the 1990s with a focus on benchmarks and the question on how to increase the efficiency and the productivity (Graham 2005; Lai Potter and Beynon 2012; Vogel and Graham 2013). Competition played a major role and the service quality but also some social and environmental aspects were researched

(Bezerra and Gomes 2016). Other popular PM topics during that period addressed services such as customer experience relating to check-in or security processes.

The last period started in the early 2000s, and research continued to focus on benchmarking of airport performances and studies about service quality. Bezerra and Gomes (2018, 2016) identified the most common subject of PM at airports was benchmarking with a focus on efficiency and productivity, followed by service quality and customer satisfaction. PM relating to safety was ranked next, followed by security. Financial PMs, which determine the effects of revenues, finances and sustainability were followed by environmental aspects of airports (Bezerra and Gomes, 2018). Many other authors such as Pacagnella Junior (2021), Iyer and Jain (2019), Baltazar, Rosa and Silva (2018), Barros et al. (2017) and Lai et al. (2015) confirm this view by stating that efficiency within airports is of greatest interest and had dominated in recent years within the academic literature. Also, PM information is valuable for stakeholders of the airport such as other airports, governments, passengers, airlines or authorities (Pacagnella Junior 2021; Lai et al. 2015). Additionally, benchmarking is considered as most suitable method for gaining insight into ways to increase performance (Pacagnella Junior 2021; Baltazar, Rosa and Silva 2018).

2.3.2 Measuring the performance

This section of the literature review addresses the measurement of organisational performance. As described earlier in Chapter two section 2.3, the goal of PMS is the rating of daily business activities in alignment with strategic organisational goals and objectives. Parmenter (2015) defines four performance measurement types, which are presented in Table 9 below:

Table 9: Performance measurement types

Abbreviation	Term	Description
KRI	Key result indicator	How is the organisation performing?
RI	Result indicator	What is the performance result of teams?
PI	Performance indicator	What is the nonfinancial performance of teams?
KPI	Key performance indicator	What is the organisational performance?

(Source: adapted from Parmenter 2015 p. 4-8)

The key result indicators (KRI) are described as the result of business activities performed by a large number of teams, and addresses the issue of how well the organisation is performing (see Table 9). Parmenter (2015) claims that this measure is often mistaken for key performance indicators (KPI). KRI indicate if the organisation is moving in the right direction at the right pace by providing the answer to what the organisational performance is (see Table 9). Parmenter (2015 p.4) describes them as "*Key result indicators are thus of little use to management as they are reported too late to change direction, nor do they tell you what you need to do to improve these results*." The cyclic reporting of KRIs may be monthly or quarterly, with some examples including net profit before tax, customer satisfaction or employee satisfaction.

The result indicators (RIs) provide an overview of the performance results of teams within the organisation (see Table 9). In contrast to the KRI, RI is described to be more important by encompassing multiple team activities. Parmenter (2015) suggests that financial performance measures belong in this category. Generally, RIs indicate long-term results and are measured on a daily, weekly, monthly, and quarterly basis. Examples of RI are daily sales figures or numbers of employee training.

Performance indicators (PIs) are the nonfinancial equivalent of RIs. The PIs are team-based and regarded as not critical for organisation's business. The PIs answer the question regarding the nonfinancial performance of the team (see Table 9). Examples may include belated deliveries, the number of projects delivered by teams, or the number of upcoming sales calls.

Key performance indicators (KPIs) are a set of measures depicting the performance of the organisation, which are crucial for the success of the company. Parmenter (2015 p.12) identifies seven characteristics of KPIs which are presented in Table 10:

Table 10: Characteristics of KPIs

KPI characteristic	**Description**
Nonfinancial	Nonfinancial measures (e.g., not expressed in dollars, Yen, Pounds, Euros, etc.)
Timely	Measured frequently (e.g., 24/7, daily, or weekly)
CEO focus	Acted upon by the CEO and senior management team
Simple	All staff understand the measure and what corrective action is required
Team based	Responsibility can be tied down to a team or a cluster of teams who work closely together
Significant impact	Major impact on the organisation (e.g., it impacts on more than one of top CSFs and more than one balanced scorecard perspective)
Limited dark side	They encourage appropriate action (e.g., have been tested to ensure that they have a positive impact on performance, whereas poorly thought through measures can lead to dysfunctional behaviour)

(Source: Adapted from Parmeter 2015 p. 12)

Parmeter (2015) describes KPIs as nonfinancial measures, which are measured frequently and acted upon on by the CEO or senior management (see Table 10). Additionally, KPIs are described to be simple, team-based indicators which have a major impact on the company, and have been tested to guarantee positive performance outcomes (see Table 10).

However, while Parmeter (2015) classifies KPIs as nonfinancial measures, within the airport industry KPIs are categorised as both qualitative and quantitative, financial, and non-financial (Granberg and Munoz 2013). Nevertheless, while Parmeter (2015) provides a nuanced

categorisation of performance measurement types, the airport industry appears to take a different approach. Airport performance literature uses KPIs as an umbrella term to include their most important performance measures. Within the airport environment, KPIs are characterised as individual, forming the basis for analyses and may also be applied to planning processes at airports (Kosanke and Schultz, 2015). Indeed, airport KPIs can be defined as measures which are qualitative or quantitative in their nature and which vary in their characteristics and structure (Granberg and Munoz 2013). It is often the case that airport KPIs are inconclusive unless they are compared to data from the past, target values or agreed values . Benchmarking is a popular approach within the airport industry to compare airport performance data with equivalent data from competitors (Pacagnella Junior 2021; Bezerra and Gomes 2018; 2016; Granberg and Munoz 2013). In alignment with Frankfurt Airport's performance measures (see Chapter one), and the literature relating to airport performance measurement (see Chapter 2.3), this research regards performance measures at Frankfurt airport as KPIs, and does not refer to key result indicators, result indicators or performance indicators described in Table 9. Furthermore, PMS is defined as a tool for operationalising organisational efficiency and effectiveness through financial and non-financial KPIs, with the aim of monitoring the pursuit of strategy, objectives, and goals (Guenther and Heinicke 2019; Franco-Santos et al. 2012; Henri 2006b; Neely Gregory and Platts 1995).

Granberg and Munoz (2013) claim that initial performance measures and KPIs solely serve economic intentions by proving accountability to authorities, which build airports for prestigious reasons (Humphreys and Francis 2002). However, the commercialisation of airports has called for an increase in the number and variety of KPIs, performance measures and systems employed by airports. Extant research highlights that the complexity of airport performance and related performance goals call for a robust process of performance measurement (Bezerra and Gomes 2018; 2016; Adler, Liebert and Yazhemsky 2013; Graham 2014; Skouloudis et al. 2012). Generally, airport KPIs can be clustered into different areas of activities. Different authors suggest structuring the KPIs into key performance areas (e.g. Bezerra and Gomes 2018; Wangdra, Hasachoo and Sirisawat 2018; Granberg and Munoz 2013). Table 11 provides an overview of performance areas appropriate to structuring airport KPIs:

Table 11: Key performance areas of airports

Key Performance Area	**Definition**	**KPI example**	**Reference**
Airport Operations (AO)	Referring to all the aircraft and logistical movements and flows at the airport.	- Turnaround time in the gates - taxiing time from runway to gate - baggage delivery time	Eshtaiwi et al. (2018)
Airport Financial Perspective (AFP)	Associated to the financial outcomes resulting from the interaction among an organisation's attributes, actions, and its environment, including the concepts of financial and economic performance	- Income per passenger - Traffic income per passenger - Staff cost per passenger	Bezerra and Gomes (2016)
Environmental Issues Airport (AEI)	Linked to the environmental issues created by aeronautical and airport operations that effect on the ecological sustainability involving noise, air quality, water quality, energy management and environmentalism.	- Breaches against ban on night flights - waste recycling - Energy consumption	Granberg and Munoz (2013)
Airport Safety and Security (ASS)	The state in which risks associated with aviation activities, related to, or in direct support of the operation of aircraft, are reduced and controlled to an acceptable level to which people and properties within the airport's boundaries are	- Number of incidents at security checkpoints - Number of aircraft safety incidents	ICAO (2013)

Key Performance Area	Definition	KPI example	Reference
	protected from potential injury/loss caused by deliberate illicit actions performed by people.	- Time it takes to business operations to begin in case of evacuation	
Airport Customer Service (ACS)	Customer service is the cooperative interaction between an airport's ability to meet customers' needs and expectations consistently and matches its customers' perception that their needs and expectations are well met.	- Check-in waiting and processing times - Security control waiting and processing times - Amount and duration of delays - Baggage waiting time	Paternoster (2008)

(Source: adapted from Wangdra, Hasachoo and Sirisawat 2018 p.813-814 and Granberg and Munoz 2013 p.2-3)

While, different authors propose different names for these key performance areas, the composition and the entailing KPIs are nearly all identical. The KPIs and different proposed key performance areas are depicted in Table 12 below:

Table 12: Comparison of KPIs to suggested key performance areas

KPI example	**Key performance area**	**Equivalent key performance area I**	**Equivalent key performance area II**
- Total costs per aircraft movement - Total costs per passenger - Revenue from Domestic Carriers - Cargo Revenue vs. Total Airport Revenue - Revenue from International Carriers - Landing Fees - Fuel fees (passenger aircraft) - Income per passenger	Airport Financial Perspective (AFP) (Bezerra and Gomes 2016)	Cost-effectiveness (ICAO 2014)	Financial Implications (ACI 2020)
- Turnaround time in the gates - Taxiing time from runway to gate - Baggage delivery time - Aircraft movements per employee - Aircraft movements per gate - Passengers per employee	Airport Operations (AO) (Eshtaiwi et al. 2018)	Productivity (ICAO 2014)	Efficiency / Productivity (Bezerra and Gomes 2016)
- Runway accidents per thousand operations - Accidents per thousand hours worked - Runway incursions per thousand operations - Bird strikes per thousand operations	Airport Safety and Security (ASS) (ICAO 2013)	Safety (Bezerra and Gomes 2016)	Security & Safety (ACI 2020)

KPI example	Key performance area	Equivalent key performance area I	Equivalent key performance area II
- Number of incidents of theft. - Number of incidents at security checkpoints - Number of aircraft safety incidents - Time it takes to business operations to begin in case of evacuation			
- Airport average daily capacity (aircraft movements per day) - Number of delays by cause - Average delay per flight - Time at security queues - Percentage of time out-bound and in-bound baggage system available during hours of operation - Cleanliness of washrooms - Overall passenger satisfaction	Airport Customer Service (ACS) (Paternoster 2008)	Quality of service (ICAO 2014)	Service quality (Bezerra and Gomes 2016)

(Source: adapted from ACI 2020; Eshtaiwi et al. 2018; Bezerra and Gomes 2016; ICAO 2014; 2013 and Paternoster 2008)

Table 12 shows that while different names for key performance areas are proposed by various authors, the underpinning concepts and related KPIs are closely aligned.

As remarked previously in Chapter 3.2.1 the most popular method for airports to assess their performance and gain insights into how to increase their performance is benchmarking (Pacagnella Junior 2021; Baltazar, Rosa and Silva 2018). Benchmarks enable the airport to compare their performance measures with other competitors, and in today´s competitive economic environment benchmarking is regarded as crucial for airports to gain insights into the performance of competitors.

The ACI (2020 p.146) defines airport performance benchmarking as follows: "*Performance benchmarking is the process of identifying best practices, understanding their meaning in relation to business, and adapting these practices to help organizations improve their performance. The comparison to a defined data set provides organizations with comparative opportunities to establish performance goals with standards and measures that would be considered a performance benchmark*.". By conducting airport benchmarking over a period of time, the airport is able to improve its efficiency and performance (ACI 2020). However, the key for conducting successful benchmarks are the core processes which need to be measured by identifying exactly what needs to be measured. The essential question of measuring performance is: how did the airport`s core processes perform in order to generate the measured performance outcome (ACI 2020)? A significant challenge for airport benchmarking is that the measures are relatable to all airports regardless of their size, and thus must have common characteristics for accurate measuring. The ACI (2020) outline an airport benchmarking process, which is depicted as follows in Table 13.

Table 13: Benchmark process for airports

Process step	**Approach**
1. Goals and implementation	Identification of management needs, customer needs and core process which address the needs
2. Selection of peer airports	Determination of airports to benchmark
3. Data Collection	Collection of data and methods, identification of metrics
4. Analysis	Analysing performance gaps between the airport and its competitors
5. Adaptation	Adaptation of the best practices defined and continuous improvement practices

(Source: adapted from ACI 2020 p.147-148)

The benchmarking process for airports start with defining the goals of the benchmark (see Table 13). Therefore, the needs of the management and of the customers need to be identified. Subsequently, the core processes, which meet and address those needs need to be defined (ACI 2020). It is crucial that sufficient understanding of these core processes is obtained to identify the most suitable measurement approach. It is important to ensure a deep understanding of critical processes as the airport needs to choose which measures are required. The ACI (2020 p.147) remarks that "*The prioritizing of benchmarking metrics should be based on each airport's individual strategic goals and objectives*.". Within this step, key processes are identified leading to the production of aims and objectives, as well as the related measures for the airport's performance improvement. The ACI (2020) recommends the application of visual tools such as flowcharts in order to enable this process step.

The second step is the selection of competitive peer airports (see Table 13) (ACI 2020). It is essential to select suitable peer airports which are comparable. It proves challenging to find airports of equal rank which provide similar comparative indicators. This task may be highly challenging and complex, and airports should be aware that poor selection creates the risk of misrepresenting performance (ACI 2020). Complex indicators such as ownership structure, capacity and utilisation rate, mixes of traffic such as pure cargo airport, passenger airport or mixed airport determine are just some criteria for airports to be aware of. The ACI (2020) emphasises the different charging structures of peer airports. Some airports may for example have different charges and revenues due

to government funding. Thus, it is crucial to examine the environment of the competitors to effectively interpret the analysis and result resulting from the benchmark (ACI 2020).

In the data collection stage, data is collected from peer airports using appropriate metrics (see Table 13). In this phase, representative airports are selected, and data is collated in a variety of ways such as surveys, conducting interviews, or analysing secondary data.

When analysing the data, it is important to focus on gaps within the airport's processes in contrast to those of competitors (see Table 13) (ACI 2020). In addition to the processes, KPIs are also a valuable source of benchmarking data (Bezerra and Gomes 2016; 2018). However, it is essential that the performance gap is understood sufficiently to understand the context of the performance gap, and to highlight the issue causing the performance drop.

The final phase is adaption, which is the application of best practices gathered via benchmarking (see Table 13) (ACI 2020). As a result, processes may need to be adapted, as well as goals and a strategy for improving performance and tackling performance gaps within the airport's processes. ACI (2020) suggests a continuous plan for improvement. It should be noted that the benchmarking process needs to be conducted several times on an ongoing basis to achieve improvement.

The key performance areas identified previously in this chapter are suitable to structure the benchmarks and to conduct benchmarks in these key performance areas (ACI 2020). The ACI (2020) provided a list of how airports can conduct benchmarks in the key performance area for cargo airports. An example of a benchmark list is provided below in Table 14. The examples are based on the key performance areas identified earlier in this chapter and reviewed in Table 12 and Table 11:

Table 14: Benchmark example

Airport Financial Perspective (AFP)				
Activity/KPI	Benchmark	Target	Result	Vs. Benchmark
Total costs per aircraft movement				
Total costs per passenger				
Staff cost per passenger				

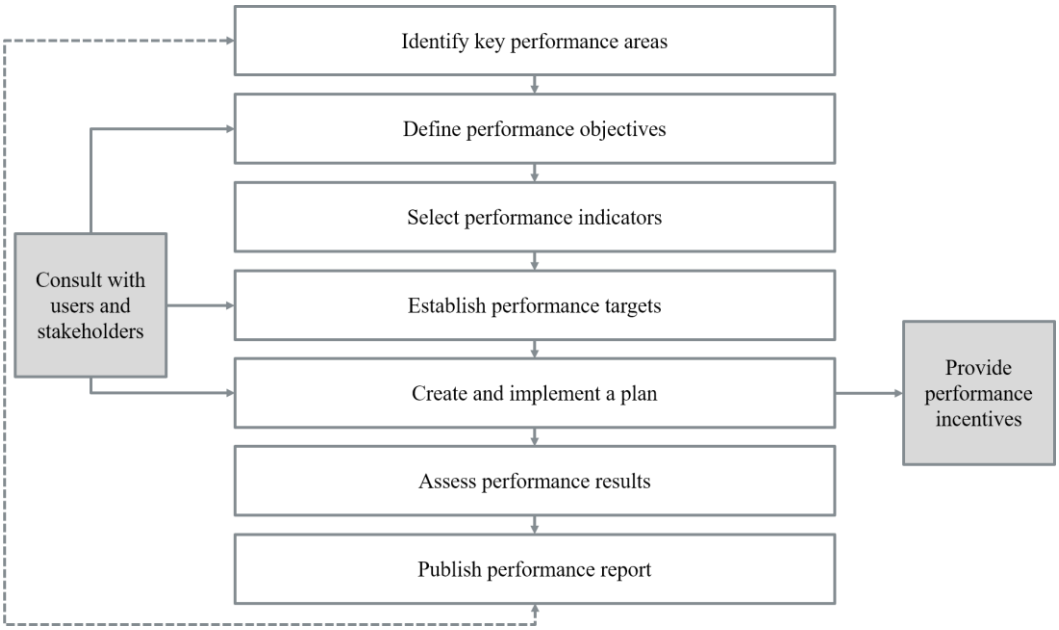
(Source: Adapted from ACI 2020; Bezerra and Gomes 2016; ICAO 2014)

As depicted in Table 14, the target of each KPI needs to be achievable so it can be met or even exceeded, and should entail specific details such as time and the level of analysis, such as being measured on an individual, team or airport level (ICAO 2014). Airport performance benchmarks can be internal or external, whereas internal benchmarking means that the airport compares its performance against itself over a certain period of time. This is also called self-benchmarking (ICAO 2014). External benchmarking compares airport performance against other peer airports.

The example of a benchmark list depicted in Table 14 is provided as a recommendation of the ACI (2020) for conducting successful benchmarks at airports. However, the ICAO (2014 App 1-7) remark: "*It is very important to note that great care must be taken when going through this exercise as comparisons of performance between airports are difficult and can often be misleading, particularly true if partial productivity indicators are being used*." The ICAO (2014) justifies this by stating that many airport measures may not be comparable to other airports due to differences in their operating models and environments. However, the relatively standardised KPIs and public benchmarks which are regularly conducted by A-CDM (see Chapter one), suggest that competition between airports is extremely high, and that external benchmarks form a significant part of airport business.

Managing performance measurement at airports thus entails elements of key performance areas, key performance indicators, and performance measurement systems. The ICAO (2014 App 1-1) provides the following process presented in Figure 12 for managing performance at airports:

Figure 12:Performance management process



(Source: adapted from ICAO 2014 App 1-1)

Firstly, key performance areas need to be defined for the airport (see Figure 12). The literature provides a useful guide by providing suggestions for establishing these key performance areas (e.g. ACI 2020; Eshtaiwi et al., 2018; Wangdra, Hasachoo and Sirisawat, 2018; Bezerra and Gomes, 2016; ICAO, 2014; 2013; Paternoster 2008). The ICAO (2014) suggests that in addition to choosing the main key performance areas of safety, service quality, productivity / efficiency and financial performance, that airports are free to select additional key performance areas based on their aims and objectives. The next step is to define the performance objectives (see Figure 12). The ICAO (2014) further recommends defining at least one objective per key performance area, however safety and security objectives need to be prioritised. Additionally, stakeholders and users should be consulted during the process of selecting suitable objectives. Subsequently KPIs need to be selected and the related targets defined. Stakeholders as well as users (e.g. employees, airlines) should also be incorporated in this process step, as well as in the implementation and creation of an action plan (ICAO 2014). Additionally, the integration of performance incentives is suggested to motivate users in achieving the performance targets (see Figure 12). These incentives can be employee bonuses for achieving performance aims or service level agreements with airlines (ICAO 2014). Lastly, the performance results are analysed and assessed, and the performance report is published (see Figure 12).

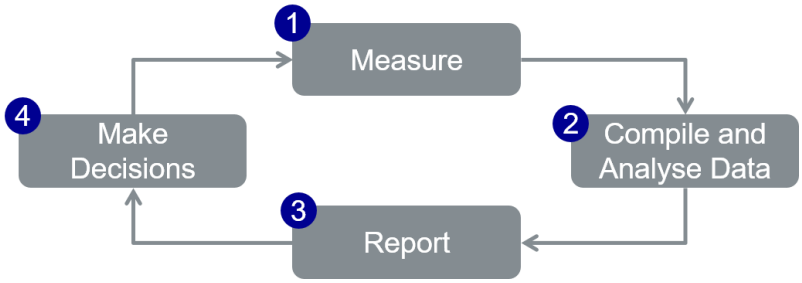
Although measurement and usage of PMS is ignored within this diagram, it is this part of performance measurement which employees and management spend most time on, and which determines the performance success of the airport. Indeed, Bezerra and Gomes (2018) remark that it is this part of performance measurement, namely from measurement up to the actual usage of performance information, which is crucial for airports. But this process is also highly complex and provides practical challenges for many airports.

2.3.3 The usage of performance measurement systems

This section of the literature review describes how performance measurement systems are used. Naslund and Norrman (2019 p.1649) argue that PMS is "*not an established academic discipline*" and that theory in this research field is weak. While there are a large number of articles assessing PM methods and the design of PMS (Nudurupati, Garengo and Bititci 2021; Hatane et al. 2020; Iyer and Jain 2019; Bititci et al. 2018), there is a recognised lack of research on the actual process of PMS, and the usage and social interactions of PMS (Nudurupati, Garengo and Bititci 2021; Bititci et al. 2018). An understanding of these elements is an essential part of understanding the relationships between OL and PMS. Further, airports are under constant pressure to handle contradicting KPIs and performance measures (see Chapter 2.3.2). While this issue is widely acknowledged in the literature, many authors also call for the need for a robust PMS process (Bezerra and Gomes 2018, 2016; Adler, Liebert and Yazhemsky 2013; Graham 2014; Skouloudis et al. 2012). Therefore, the process of measuring performance via PMS is examined further in this section.

Bourne and Bourne (2011) developed a lifecycle of PMS which outlines the stages of design, implementation, usage, and review. Building upon Bourne and Bourne`s (2011) lifecycle, Landström et al. (2018) reviewed the lifecycle and established their own cyclic approach for investigating the usage of PMS. As PMS usage is crucial, it is also the most time consuming aspect for companies (Landström et al. 2018). Landström et al.´s (2018) PMS usage cycle is depicted in Figure 13.

Figure 13: Performance measurement cycle



(Source: Landström et al. 2018)

The lifecycle starts with measuring performance (see Figure 13). Here, the measures may be collated manually or automatically, however, reliability of the data is essential (Landström et al. 2018). When implementing a PMS, the KPIs are derived from the organisation's strategy and objectives and need to be adapted as soon as the strategy, goals, and objectives of the organisation change (Kaplan and Norton, 2008; Dangayach and Deshmukh 2001). The next stage of compiling and analysing the measurement data refers to making the data visible (see Figure 13). This can also occur manually or automatically (Landstöm et al. 2018). In the reporting step, information is communicated to recipients such as stakeholders, employees, or managers (see Figure 13). Reports may vary with regards to the KPIs and time intervals. For instance, stakeholders might receive a report on a quarterly basis, while employees might need the data analysed several times per day to address performance issues. Additionally, different communication tools may be used. In the last step of decision making, the data is analysed again to determine if additional actions are required. Landström et al. (2018) suggest discussing the advantages and disadvantages of the decision before taking actions. Deville, Ferrier and Leleu (2014) state that the lower-level managers usually make decisions regarding operational performance, while strategic performance decisions are taken by high-level managers. Purcell and Kiani (2016) support Deville, Ferrier and Leleu´s (2014) view by differentiating between high-level strategic decision-making and low-level operational decision-making. Further, they attribute this differentiation to strict hierarchical decision-making processes.

In addition to the lifecycle depicted in Figure 13, usage type plays an important role and a significant number of studies highlight the need for further research into different forms of PMS usage (e.g., Müller-Stewens 2020; Guenther and Heinicke 2019; Braam and Nijssen 2004; Henri 2006a; Malmi 2001; Widener 2007). Many authors researching PMS find divergent results. For instance, there is research regarding PMS as an enabler for OL, while other articles argue the converse or have discovered that only one learning type is fostered. However, in contrast, further

research suggests that in order for OL to be generated through PMS, PMS usage is critical (Kloot 1997). Supporting this view, research in other fields confirms this by stating that the usage style of PMS is crucial (Müller-Stewens 2020; Guenther and Heinicke 2019). Within the research field, there are different names given to the two usage forms,: interactive and diagnostic, flexible and inflexible, enabling and constraining and formal and informal PMS (Hall 2011; Fried 2010). Within the academic literature, Simon´s (1990) usage types of interactive and diagnostic PMS are most popular and dominant (Guenther and Heinicke 2019; Peters, Wieder and Sutton 2018; 2016; Grafton et al. 2010) and therefore will be applied in this thesis. It is important to note that a PMS can be used in both interactive and diagnostic ways. Hence, the same PMS can be used in both forms for different purposes (Müller-Stewens et al. 2020; Guenther and Heinicke 2019; Shurafa and Mohamed 2016; Henri 2006b).

Generally, diagnostic PMS usage is related to traditional PMS, while interactive use of PMS is associated with more contemporary PMS (Henri 2006a; Bisbe and Otley 2004). Diagnostic PMS can be referred to as traditional performance feedback by helping employees to understand the organisations strategy and objectives (Zhang and Yu 2020). Interactive PMS usage on the other hand is characterised by learning, communication, and dialogue and for leading the development of new strategies and objectives for the organisation (Zhang and Yu 2020).

Diagnostic PMS are regarded as formal information systems for measuring pre-defined goals, calculating, and detecting deviations in performance and providing this information as feedback to enable correcting actions to achieve goals and strategies (Müller-Stewens et al. 2020; Guenther and Heinicke 2019; Simons 2014; Henri 2006a). Diagnostic PMS usage is regarded as essential for monitoring the performance of an organisation, and introducing and manifesting an organisation´s strategy, goals, and objectives (Guenther and Heinicke 2019; Simons 1991; 1995a; 2014; Henri 2006a; Bisbe and Otley 2004). It therefore provides structure and guidance to employees (Henri, 2006a; Simons 1995a) by setting up clear communication channels (Müller-Stewens et al. 2020) and regular cyclic intervals for strictly monitoring the performance (Simons 2014; 1995a).

While diagnostic PMS communicate the goals to reach, employees have the freedom to determine how to attain these goals (Müller-Stewens et al. 2020). Generally, diagnostic PMS usage provides clearly defined structures and directions while setting boundaries for employees by communicating measures, goals, and objectives. With regards to learning, the literature is somewhat ambivalent. Many authors associate diagnostic PMS with SLL (e.g. Guenther and Heinicke 2019; Shurafa and

Mohamed 2016; Myreteg 2015; Tuomela 2005; Argyris and Schön 1978), while other studies suggest a hindering effect of diagnostic PMS on learning (Henri 2006a).

Interactive PMS usage focuses on stretching an organisation´s boundaries by questioning the current prevalent guidelines, structures, strategy, and goals. It affects existing routines and behaviours as it creates communication and dialogue between management and employees to address strategic uncertainties and process doubts (Müller-Stewens et al. 2020; Guenther and Heinicke 2019). Communication regarding opportunities and threats occurs vertically throughout the hierarchies of the organisation leading to a two-sided dialogue exchanging knowledge and information (Müller-Stewens et al. 2020; Guenther and Heinicke 2019; Simons 2000; Macinnis and Jaworski 1989). Simons (2014; 1995a) remarks that the data generated through interactive PMS should be analysed and discussed in direct face-to-face conversations with members of different hierarchical levels of the organisation. Notably, management uses the interactive PMSs for identifying new opportunities and for involving more junior members of staff in decision making (Simon 2014; 1995a). The focus is placed on dialogue throughout the organisation´s hierarchy by aiming to develop new or revising existent strategies (Guenther and Heinicke, 2019). The interactive usage of PMS enables a free exchange of ideas and thoughts. As a result, it is proposed to create double loop learning (DLL) and is seen as an enabler for organisational learning (Guenther and Heinicke 2019; Shurafa and Mohamed 2016; Simons 2014; 1995a; Henri 2006a; Tuomela 2005; Bisbe and Otley 2004).

Within the literature both usage types – diagnostic and interactive – are regarded as essential for organisations, and many authors hold the view that both usage types complement each other (Müller-Stewens et al. 2020; Guenther and Heinicke 2019; Shurafa and Mohamed 2016; Ylinen and Gullkvist 2014; Grabner and Moers 2013 Tessier and Otley 2012; Ferreira and Otley 2009; Widener 2007; Henri 2006a). Müller-Stewens et al. (2020 p.6) argue that "*In sum, we contend that the benefits from the diagnostic (interactive) control use are enhanced in the presence of an interactive (diagnostic) control use because each use complements the other*". Even though larger companies usually use their PMS diagnostically (Guenther and Heinicke 2019; Baird, Harrison and Reeve 2004) researchers advise managers to use PMS in both ways, diagnostically and interactively, to improve results and drive innovation (e.g. Müller-Stewens et al. 2020; Guenther and Heinicke 2019; Ferreira and Otley 2009; Oliver 2009; Henri 2006b; Kloot 1997; Simons 1995a).

2.4 The relationships between organisational learning and performance measurement systems

As indicated in the previous section 2.3, there are several linkages connecting PMS and OL. However, these relationships are complex and occur in different ways. Existing literature notes a scarcity of theoretical and practical research regarding the relationships between OL and PMS (Zhang and Yu 2020; Robles 2019; Shurafa and Mohamed 2016), which further substantiates the need for this research. Even though the importance of both research fields is evident, the topics are only researched together in fragmented parts or not at all (Rowland and Hall 2014; Visser 2014). Visser (2014) attempts to explain this due to the different scientific fields both belong to. While PMS is mostly found in the accounting literature, OL forms part of organisational studies. In addition the terminology of both concepts differs. As stated in this chapter, the PMS and OL literatures are broad and conceptually rich, while a unified approach for a holistic understanding of each is scarce. As Visser (2014 p.3) notes: "*Clearly, this diverse and divided state of affairs is not very helpful in developing theory and conducting empirical research on management control and organizational learning and their interrelationships.*". Coming from a practical point of view, Shurafa and Mohamed (2016) highlight the importance of investigating PMS effects on OL for organisations to achieve competitive advantages and to improve on their performance.

The literature acknowledges that PMSs facilitate learning and the improvement of organisational processes and thus are regarded as triggers for learning and change (Hatane et al. 2020; Zhang and Yu 2020; Cestari et al. 2018; Bourne 2005). Even though the literature researching PMS and learning agree on the significance of their interrelations, the types of relationships are only researched in fragmented parts or barely evaluated further. Therefore, these numerous gaps within literature formed the objective of this chapter to further understand the disciplines of OL and PMS, their intersections, and interdependencies.

Reviewing the existing literature clearly shows a fierce debate around whether PMS enable or hinder OL. There are numerous studies claiming that PMS hinder OL due to strict control measures aligned with the organisation's norms, standards and routines and thus focus on preserving prevalent guidelines without enabling flexibility, innovation, and change (Robles, 2019; Chenhall and Morris 1995). Thus, employees tend to focus on correcting their own behaviour and decision-making is aligned with the prevalent organisational rules, guidelines, and structures. Researchers believe that in such cases, employees are too focused on achieving the organisations aims and playing by the rules of the control mechanisms embodied by and implemented through PMS, that

there is no room left for learning (Hedberg and Jönsson 1978). Indeed, employees are described as tending to ignore learning opportunities, and reluctant to question organisational measures and guidelines (Ouchi 1977). Argyris (1977) for example states that employees are likely to align their behaviour with the PMS rules and measures instead of questioning the structures and measures behind the PMS, and suggest changes to management. Thus, Argyris (1977) regards PMS as hindering change as it prevents employees from suggesting changes and thinking outside the box.

The rigid structure of PMS and the bureaucracy behind these systems are regarded as preventing employees from being open to change and innovation (Hedberg and Jönsson 1978). Hedberg and Jönsson (1978) argue that employees may even reject innovation and change as they are used to sticking to routines and formal rigid structures implemented and monitored by PMS. Thus, when an organisation faces a changing environment, writers note that organisational members may tend to be blind to changing environmental needs, and prefer to stick to their routines. Other researchers find that PMS enables individual learning by providing feedback and self-monitoring (Wiersma 2009; Forza and Salvador 2000). What is striking is that early studies on PMS and OL found rather negative effects of PMS on learning (Björkman 1989; Van de Ven 1986; Argyris 1977; Hedberg and Jönsson 1978).

Negative results were identified for PMS on DLL while other studies found PMS to support SLL (Van de Ven 1986; Argyris 1977). Researchers acknowledge the control purpose of PMS of guiding employees about prevailing routines, guidelines, and rules of the organisation, while suppressing creativity and innovation (Amabile 1998; Ouchi 1977). Therefore, SLL is found to be generated through PMS while suppressing OL. Simons (1995a) explains this by stating that the way in which MCS or PMS are used, meaning the degree of control which is exercised, is decisive for OL. Thus, Simons (1995) conceptualizes two ways of PMS usage, two levels of control exercised via PMS, which is decisive for OL: diagnostic and interactive. The diagnostic usage or level of control describes the close supervision of organisational activities by comparing the outcome with the goals set by the management (Robles 2019). Interactive usage on the other hand intends to question the guidelines, structures, strategy, aims and objectives of the organisation. Gil (2019 p.2) describes the key words for interactive PMS usage as follows: "*problem-solving, search for opportunities, rethinking organisational goals and strategy*". Therefore, diagnostic PMS are found to generate SLL, while interactive PMS create DLL. Many earlier studies which found hindering effects of PMS on OL therefore can be explained by focusing on diagnostic PMS usage and equate only DLL with OL (Bisbe and Otley 2004).

While some researchers claim that PMS always creates learning as an outcome due to its ability for self-reflection and gaining experiences (Franco-Santos et al. 2012; Chenhall 2005), other researchers stress that preconditions must be met before learning results from PMS usage (Fried 2010).

Interactive PMSs are described as enabling communication, dialogue, innovation, and learning. However, they are also dependent upon the involvement of management to foster interactive PMS (Zhang and Yu 2020; Schäffer et al. 2014). Management is thus crucial for using PMS interactively and therefore for creating OL and implementing new strategies (Zhang and Yu 2020; Simons 1995b).

Some recent studies, however, are in favour of interactive PMS generating learning while other studies do not regard OL as an outcome of interactive PMS (Zhang and Yu 2020). The actual holistic interconnectedness of PMS and OL has neither been evaluated within literature nor in practice (Zhang and Yu 2020). In their study, Zhang and Yu (2020) conclude that there is a correlation between interactive PMS and OL and remark that communication and dialogue throughout the hierarchical levels of the organisation is essential while improving the performance of the organisation. However, a weakness in their study is that they do not further differentiate OL into SLL, DLL, as well as individual and group learning. This limitation is acknowledged by the researchers, who further stress the need for a holistic concept of the relationships between PMS and OL.

Simons (1995a) posits that by only using PMS interactively, OL would not be created and warns that both PMS usage styles (diagnostic and interactive) are required to generate OL. Further, this tension between diagnostic and interactive PMS is suggested as creating learning and also enabling the organisation to retrieve from the intrinsic knowledge of employees (Simons 1995a). Henri (2006b) further supports this by stating that the dynamic tension constituted by interactive and dynamic PMS usage is essential for OL by stimulating the interactive PMS usage and thus to achieve dialogue, and creativity within the organisation. Henri (2006b p.546) argues: "*The results suggest that diagnostic and interactive uses of [control] contribute both specifically and collectively to [learning] capabilities. In some circumstances, a balanced use creates dynamic tension which ensures that positive effects of interactive use on [learning] capabilities will be achieved and that such tension expands these positive effects of interactive use by fostering organizational dialogue, stimulating creativity, and focusing organizational attention*.". However, some researchers (e.g. Ferreira and Otley 2009; Oliver 2009; Kloot 1997) acknowledge the necessity of the relationship of

diagnostic and interactive PMS control levels to achieve OL. Therefore, the relationship and interaction of diagnostic and interactive PMS is complex and essential for generating OL. The literature agrees on the criticality of both learning forms, as they jointly achieve all positive learning effects (SLL and DLL), and therefore were found to create OL. The literature further states that a single PMS can be used in all ways, diagnostically and interactively, resulting in being able to create both two learning forms, SLL and DLL.

Numerous researchers acknowledge learning as the most important outcome of PMS (Pinheiro de Lima et al. 2012; Johnston et al. 2002; Vandenbosch 1999; Kaplan and Norton 1996b). Franco-Santos et al. (2012; 2007) even state that PMS usage always implies learning as outcome. Henri (2006b) regards Crossan et al.´s (1999) 4i framework as most suitable for depicting the dynamic tension between diagnostic and interactive PMS and learning creation as it balances exploration and exploitation with regards to a two-way stream of feedback and communication across the organisational hierarchy. Kane and Alavi (2007) also regard PMS as crucial for creating a dynamic feedback culture, which is characterised by a balance of feedback, entailing feedforward and feedback communication streams: "*[Control] mechanisms by which individuals learn, also significantly influence the exploration [feedforward] and exploitation [feedback] balance in firms and should not be overlooked in future examinations of OL*" (Kane and Alavi 2007 p.809). Henri´s (2006b) and Kane and Alavi´s (2007) view is acknowledged by Gil (2019) who comments that the literature, especially the current studies, ignores the relationships between PMS and OL as well as the significance of diagnostic and interactive PMS in creating OL. The need to provide feedback in all directions, not only one way, is characterised as being highly important for creating OL. Otley (1994) suggests that diagnostic PMS and feedback from PMS is essential to create learning for employees and interactive PMS is also crucial for learning from the employees as well. Thus, a dynamic tension is highly important for creating OL.

Kloot (1997) further indicates that learning occurs at different individual levels of the organisations within individuals, the group, and the organisation. Kloot (1997) further refers to Huber´s (1991) model to transfer learning across the different stages and suggests that OL incorporates features of PMS: "*OL utilises processes which are known to accountants as part of a system of management control*" (Kloot 1997 p.69).

However, PMS does not only create OL - OL also affects PMS. Learning within an organisation further enhances existent PMS, develop and re-shape their measures as well as their implementation for better serving organisational strategies, aims and objectives (Hamilton and Chervany 1981). To

conclude, PMS can be a result of OL but also a pre-condition for OL (Batac and Carassus 2009; Fried 2010). However, a holistic relationship evaluating the width and depth of the complex interrelations of PMS and OL does not exist so far. While the literature is clear about the need for all levels of learning, only very few studies evaluate the creation cycle of OL. The literature on all levels of learning and their relationship is scarce regarding the achievement of OL via individual and group learning. Generally, PMS are acknowledged as powerful OLMs by transforming individual learning into group learning and lastly into OL (see Chapter 2.2.2) (Thingvad et al. 2018; Henri 2006a; Moynihan 2005; Marginson 2002). The majority of studies focus solely on one level of learning; however, this may be an oversimplification of the concept and understanding of OL as well as its complex relationships with PMS. While many studies focus on individual learning (Kang et al. 2021; Alhabeeb and Rowley 2017; Hall 2011; Neely and Al Najjar 2006), learning must be shared with a group in order to create organisational learning (Odor, 2018; Batac and Carassus 2009; Cohendet and Steinmüller 2000; Probst and Büchel 2000). Those studies however, which focus on both levels of learning (e.g. Gil 2019; Kim and Park 2019; Lau, Lee and Chung 2019; Odor, 2018; Park and Kim 2018; Oliver 2009; Chenhall 2005; Cayla 2004; Kloot 1997) frequently draw upon Huber`s (1991) and Crossan et al.`s (1999) frameworks. Indeed, the OL models were observed to incorporate elements of PMS processes (Kloot 1997). The relationship between PMS and the cycle stages of Huber´s (1991) and Crossan et al.`s (1999) frameworks, which are reviewed in Chapter 2.2.2, are evaluated further here.

In the first stage of the cycle, intuiting and knowledge acquisition, recognitions, views, and insights are formed. In this stage PMS enables employees to reflect and thus act as a means for generating experiences by providing information (Gil 2019; Robles 2019; Crossan, 1999; Simons 1995a). PMS help employees to adjust their performance within a given set of organisational rules and guidelines which are implemented and communicated via PMS (Robles 2019). PMS define the context in which new knowledge is acquired and understood by providing employees with the necessary information (Robles 2019). When it comes to the information interpretation (Huber 1991) and interpreting stage (Crossan et al. 1999), as well as knowledge distribution (Crossan et al. 1999) and integrating (Huber 1991), PMS provides the means for communication and therefore can be regarded as a "*communication mechanism*" (Robles 2019 p.5). However, achieving a joint understanding within a group is not sufficient for learning (Johanson, Martensson and Skoog 2001). Therefore, in these stages, leadership plays an important role as various researchers found hindering effects of PMS on innovation as group members mostly found solutions for performance issues based on the prevailing processes, structures and norms of the organisation (Beer et al. 2005; Jones, Mcpherson and Thorpe 2010; Zhang, Mcpherson and Jones 2006). Generally, the literature suggests

that management needs to initiate and enable learning for employees to achieve competitive advantage (Zhang and Yu 2020; Mu and Di Benedetto 2011). Additionally, the organisation is in charge of enabling knowledge transfer between the individual employees and groups of an organisation (Burnett and Williams 2014). An open-minded environment for generating new insights and ideas enabled by leadership is essential for stressing prevailing boundaries and generating learning (Lee et al. 2014). It should also be noted that individual interpretation is highly subjective and bears the risk of bias to organisational knowledge among the dominant groups within the organisation (Feurer and Chaharbaghi 1995b). Therefore extensive discussions among groups of employees should be encouraged to create a sound and robust base for learning.

Evaluating the process of organisational memory (Crossan et al. 1999) and institutionalising (Huber 1991), Kloot (1997) stresses that PMS capture the learning of the organisation in the form of certain sets of rules and guidelines (control mechanisms) which help the individuals to attain the knowledge and adjust their actions according to these guidelines. Further, PMS can encourage employees to validate prevailing control mechanisms of the PMS and assess if they still contribute to achieving the organisations strategies and objectives (Robles, 2019). Various researchers (e.g. Hyvönen et al. 2009; Chenhall 2005; Granlund and Malmi 2002; Kloot 1997) acknowledge PMS as storing learning by enabling individuals or groups of an organisation to retain organisational knowledge. PMS thus preserve organisational knowledge within their set of metrics and control mechanisms, which guide the members of an organisation. Management is important to enable the generation of learning via PMS and its measures need to be aligned with the culture and strategy of the organisation (Pinheiro de Lima et al. 2012).

It can be seen that PMS is crucial for OL as it provides a powerful tool to create OL, it is an organisational learning mechanism and transfers individual learning into group learning and lastly organisational learning by providing feedback and communication (Oliver 2009; Chenhall 2005).

As already described earlier in this chapter, the literature assigns the creation of SLL to diagnostic PMS while DLL is seen to be generated through interactive PMS usage. However, the majority of studies neglect the two levels of OL and instead present OL as a blurred and poorly defined construct (e.g. Hatane et al. 2020; Zhang and Yu 2020; Nielsen 2014b). This explains the difference in views of whether PMS generates or hinders OL. In order to fully understand the learning impacts of PMS, SLL and DLL need to be examined separately with regards to their relation to diagnostic and interactive PMS. Research into the learning forms of OL found that PMS actually produces different learning forms depending on the usage type of PMS. Research shows that PMS is able to

create both forms of learning SLL and DLL. SLL enables management and employee monitoring, learning by gathering experiences through PMS usage, and strategy implementation. DLL on the other hand seeks to adjust the organisational strategy in case of PMS divergences (Bourne et al. 2000).

As discussed in Chapter 2.2.2, SLL and DLL are both essential for OL and both are closely linked with each other as SLL is understood to nourish DLL with information (Feurer and Chaharbaghi 1995a). The traditional diagnostic PMS adapt the behaviours of individuals within organisational strategy while contemporary interactive PMS change the organisation's strategy in alignment with the changing environment by questioning the prevalent norms, routines and guidelines. Within the literature, SLL can be regarded as behavioural learning due to the adaption of an individual's actions and routines while DLL can be characterised as cognitive learning due to the change of an individual's inherent cognitive thinking (Feurer and Chaharbaghi 1995a; 1995b). Thus, a PMS should incorporate and create both forms. SLL is created via diagnostic PMS, which correct an individual's actions and DLL is created via interactive PMS by challenging the cognitive abilities of individuals to think outside the box and question organisational rules and strategies. While Franco-Santos et al. (2012) claims that PMS always produces learning, it can be argued that SLL is always an outcome of diagnostic PMS as PMS are designed for control purposes in the first instance and act as monitoring devices to correct and adjust individuals' actions in relation to the strategy and goals of the organisation. The fact that the initial goal of PMS is to exercise control supports the view that SLL is regarded as the most frequent and prevalent learning form within organisations (Argyris 1982). Mazutis and Slawinski (2008) add to this that it is natural human behaviour, which tends to SLL as individuals are prone to adjusting their own behaviours in alignment with prevalent rules and hide mistakes and errors made. Hall (2011) researched managerial learning by using comprehensive PMS, found that the PMS confirmed the managers mental models and created SLL . This shows that within a rigid hierarchical structure, management is likely to dominate the inherent beliefs of employees by projecting their own mental models into the organisation and thus prevent open learning. Hall (2011) suggests that DLL can be achieved as well, however only if certain conditions are met. Thus, this supports the occurrence of SLL as dominant and most frequent learning form within organisations even though PMS provide the potential to be used interactively and create DLL.

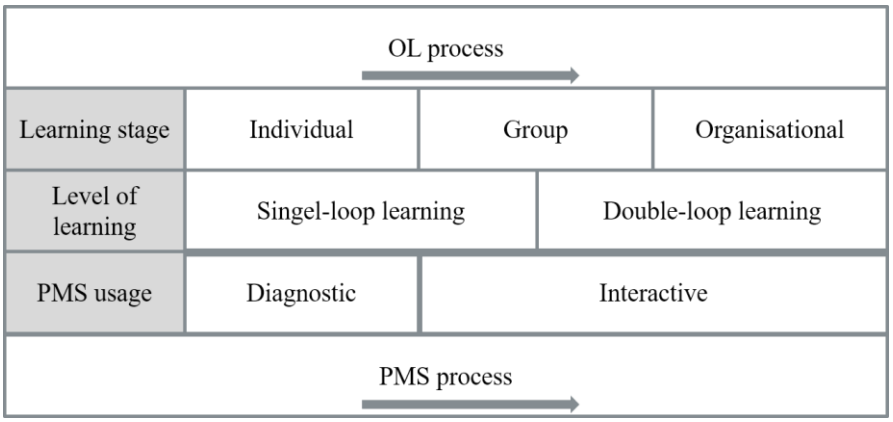
Organisational structure is also a determinant of the PMS learning outcome. Hall (2011) concludes that smaller organisations tend to produce more DLL than bigger and more bureaucratic

organisations, due to the high level of informal communication and different competitive environment.

As there are few studies which examine the interconnectedness of PMS and OL, most studies do not define OL further or only analyse one PMS usage type with regards to a lucid construct of OL (e.g. Hatane et al. 2020; Zhang and Yu 2020). The lack of differentiation between SLL and DLL leads to different results as to whether PMS has the ability to create OL or hinders OL. The SLL is an important construct, which is needed for creating OL as it functions as a pre-requisite for DLL. Thus, the relationships between diagnostic and interactive PMS to SLL, DLL, individual, group and OL need to be researched holistically to grasp the complexity of the relationships between PMS and OL.

By reviewing the literature, various intersections of PMS and OL have been identified. The literature is characterised by the ongoing debate around the relationships between PMS and OL; however, these studies do not take the holistic aspects of the relationships between PMS and OL into account, and instead largely focus on specific elements only. This chapter has brought together the various different views from the literature, and has found intersections of the two seemingly separate constructs. There are fundamental concepts in each of the research areas, which have been largely ignored in the literature researching their relationships. The crucial areas of intersections of PMS and OL have been identified and are summarised in the following Figure 14:

Figure 14: Intersections PMS and OL



(Source: Author 2022)

As depicted in Figure 14, the process intersections of PMS usage and OL creation can be grouped into three parts:

- The learning stages of individual, group and organisational learning and their interconnectedness to PMS
- The levels of learning, SLL and DLL, and their relationships to PMS
- The PMS usage types of diagnostic and interactive and their effect on OL, the learning stages, and the level of learning

The processes of PMS usage and OL creation have mutual impacts on each other. It has been found that OL can be a result of PMS if certain conditions have been met. But PMS can also be a result of OL. The learning stages play a critical part in OL creation: individual learning must be transferred into group learning and lastly into organisation to create OL. Huber´s (1991) and Crossan et al.´s (1999) models of OL depict the transformation of the learning stages. The comparison with the PMS usage cycle reveals that new knowledge and experiences are acquired via PMS. Further, PMS act as knowledge distribution tools to share knowledge within the group and to transfer individual learning into group learning. Lastly, the learning outcome is implemented within the control mechanisms of PMS and shos the learning attained by adapted performance measures. With regards to PMS usage types and the level of learning, it has been found that diagnostic PMSs are able to create SLL while interactive PMS usage has the power to generate DLL. Generally, PMSs are powerful tools with the ability to create OL. Both management and organisational culture are crucial in determining learning outcomes. The literature clearly shows that the relationships between PMS and OL occur in a variety of different ways and contexts, highlighting the high degree of complexity between both.

2.5 Summary

This chapter has provided a review of the relevant literature for this research with the aim of developing an understanding of the disciplines of OL and PMS, their interrelations, and intersections. Via this chapter, the first research question: “What are the relationships between organisational learning and performance measurement systems within academic literature?” has been addressed.

The first section examined the research area of OL and discussed its emergence and defining traits (see Chapter 2.2.1). The research field of OL is found to be characterised by a high degree of

fragmentation due to multiple different perspectives, concepts, and views, as well as the absence of practical insights. Therefore, one major difficulty in the research field of OL is the lack of a uniform definition. The first section presented the various perspectives, which can be grouped into different concepts, orientations, and ontological views and which represent the multi-levelled nature of the research field. Current definitions of OL imply elements of KM and place a strong focus on a broad definition, attempting to incorporate all perspectives and are found to represent the social-cognitive perspective on OL. As this research strives for a holistic understanding of OL, the social-cognitive orientation is pursued by regarding knowledge as result of OL, which is newly created, adapted or retained and manifested in an organisation`s norms, structures, routines, and processes. Adopting this view contributes to the objective of this research to holistically understand the discipline of OL. The aim of OL is seen to be maintaining or increasing the organisational performance by adapting to environmental changes, which might stem from the internal or external environment.

The first section of this chapter examined the process of OL and the learning stages, as well as reviewing and examining significant theoretical models from the literature (see Chapter 2.2.2). The literature shows that OL evolves via the learning stages of individual, group, and organisational learning. Individual knowledge is distributed and refined within a group and subsequently, the outcome of group learning is communicated and manifested within the organisation. The sharing of knowledge and learning is found to be enabled via OLMs. Prominent OLMs were found to be PMS, dialogue, and feedback, as well as leadership and organisational culture. For a holistic view of OL, three prominent models were evaluated: Argyris and Schön`s (1978) SLL and DLL, Huber´s (1991) OL model and Crossan et al.`s (1999) 4i model of OL. These models enable an encompassing perspective on OL and stress the importance of communication, dialogue, and feedback. This research draws upon Senge´s (1990) understanding of feedback by defining feedback as a two-way communication stream in which feed-forward is assumed to be an inseparable part of feedback. Thus, the first section within this chapter contributed to the first objective to holistically understand the academic field of OL.

The second section presented PMS as an extant research field (see Chapter 2.3), initially discussing the emergence as well as the characteristics of PMS (see Chapter 2.3.1). The aim of PMS, sometimes referred to as MCS or PIS, is the ranking of business activities for improved organisational performance. This work draws upon Neely, Gregory and Platt's (1995), Henri´s (2006b), Franco-Santos et al.´s (2012) and Guenther and Heinicke´s (209) definitions by regarding PMS as a tool for operationalising organisational efficiency and effectiveness through financial and nonfinancial measures with the aim to monitor the pursuit of strategy, objectives and goals. While

there is a significant body of literature discussing the measures and benchmarks of PM at airports (focusing on efficiency, service quality, customer satisfaction, security, finances or environmental aspects), the theory regarding the process of PMS as well as more general theoretical considerations of PMS is found to be weak. In alignment with this chapter´s objective to further understand the disciplines of OL and PMS, their intersections and interdependencies, the actual usage and process of PMS has been examined (see Chapter 2.3.3). Building on the PMS cycle approach of Bourne and Bourne (2011), Landström et al.´s (2018) PMS usage cycle was presented. Many authors find contradictory results when researching PMS. The reason for this has been found to be rooted in the usage types of PMS. Within the literature Simon´s (1990) terms of diagnostic and interactive PMS are commonly used and are applied in this work. A single PMS can be used in both ways, diagnostically and interactively. The diagnostic PMS usage is related to traditional PMS and claimed to create SLL while interactive PMS are associated with contemporary PMS, create DLL and enable OL. Both usage types were found to complement each other. Thus, the second section of this chapter contributed to the first objective to holistically understand the discipline of PMS.

In the last section, the relationships between PMS and OL were presented (see Chapter 2.4). The Literature agrees on the importance of researching the interrelations of PMS and OL, however both areas are only investigated together in fragmented parts or not at all. It has been found that diagnostic PMS create SLL while interactive PMS generate DLL. Both learning forms are regarded as necessary for generating OL and also both of the two PMS usage types are regarded as essential. However, the literature clearly shows that despite growing understanding of the relationships between diagnostic and interactive PMS, the concepts remains complex, and still requires further research. Additionally, it has been found that PMS and OL have mutual impacts on each other: PMS can be a result of OL but also a pre-condition for it. Certainly, a further understanding of the breadth and depth of their interrelations has not been researched thus far. Another factor which needs to be considered is the learning stages. Organisational learning can only be created if individual learning is spread and refined within a group. Existing studies which consider all learning stages build significantly on Huber´s (1991) and Crossan et al.´s (1999) approaches. Evaluating the interrelations of PMS and the OL cycle, the following connections were found. First, PMSs help employees to acquire new knowledge, insights, and experiences. Second, they act as communication tools to share these insights and attained knowledge. Third, organisational learning is embodied within the control mechanisms and measures of the PMS. What should be noted is that leadership and organisational culture are essential. They determine if newly created knowledge is shared within a group and the organisation, and if existent organisational boundaries, norms, and behaviours manifested in working routines and processes of the organisation are challenged and

questioned. The last section of this chapter contributed to holistically understand the disciplines of OL and PMS, their intersections, and interdependencies.

In the next chapter, Chapter three, the methodological approach used in this study is presented, and is is aligned with the aim and objectives of this research identified in Chapter one.

CHAPTER THREE: METHODOLOGY

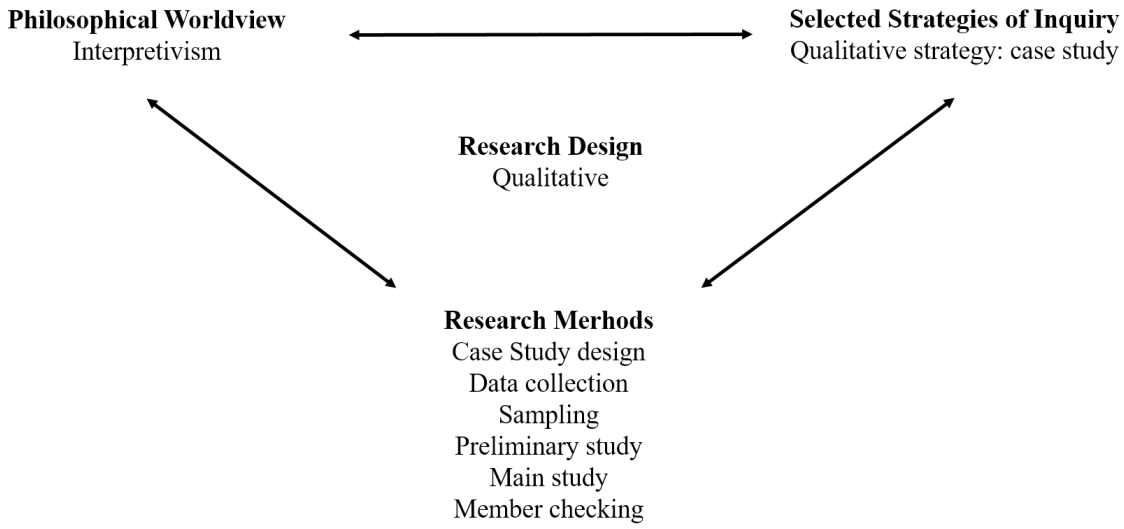
3.1 Introduction

As stated in Chapter one, the aim of this study is to develop a comprehensive perspective of both the breadth and depth of the relationships of the research fields, theoretically and practically. In order to achieve this aim and the concomitant objectives identified in Chapter one, an appropriate methodological approach was adopted, which is presented in this chapter. This chapter presents the research methods used within each stage of the study; justifies the methodological choices made during the project; provides an overview of the research process; and elucidates the application of the methods.

Chapter two presented a review of the literature, which addressed the objective: 'to further understand the disciplines of OL and PMS, their intersections and interdependencies'. The literature presents a number of highly complex relationships between these two research fields. While Robles (2019) and Shurafa and Mohamed (2016) conclude that there is a lack of theoretical and practical research regarding the relationships between OL and PMS, other researchers further note that both research areas are viewed as highly fragmented or are not considered at all (Zhang and Yu 2020; Rowland and Hall 2014; Visser 2014). Additionally, within each research field there are a wide range of concepts lacking a holistic understanding. However, not only is a holistic perspective of the relationships between OL and PMS needed, but also research from practice is scarce and is essential for organisations to achieve performance increase and thus competitive advantage (Shurafa and Mohamed 2016).

This chapter presents the methodological approach adopted and provides justifications as to the research methods applied in the following ways:

Figure 15: Methodology framework



(Source: adopted from Creswell 2009 p.24).

This chapter presents the process of reviewing and determining the appropriate research philosophy and related research strategy for the study. These were used to structure the research and to determine the suitability of the methods adopted (see Figure 15). The methodology of this study shows the natural and harmonic fit of the relationships between the research philosophy, the research design, the selected research strategy of inquiry and the applied research methods and illustrate how they shaped the present research.

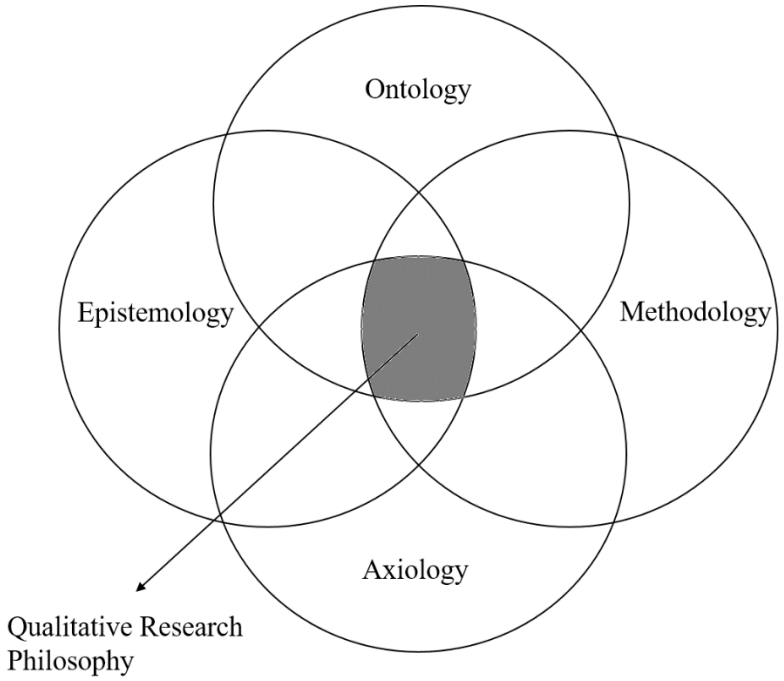
3.2 Research Philosophy and Approach

This study adopts a qualitative approach due to its strong focus on researching the "why", "what" and "how" of the subject, as presented in the study´s research questions (Saunders, Lewis and Thornhill 2016; Saunders 2007) (see Chapter 1.3). The aim of the research (to develop a comprehensive perspective of both, the breadth and depth of the relationships of the research fields, theoretically and practically within the context of Frankfurt airport) requires a qualitative in-depth investigation in order to examine the relationships holistically. Qualitative research is distinctive in its interpretive engagement with its subject (Denzin and Lincoln 1998). Qualitative strategies such as interviews, observations, personal experience, case studies or introspective are used for researching qualitative routines or issues (Denzin and Lincoln 1998). Thus, the characteristics of qualitative research are well suited to the requirements and needs of this research and clearly show

that qualitative strategies would be appropriate to addressing the research questions raised for this research.

The underpinning research philosophy of any research project must be determined by considering the acquisition and nature of knowledge itself. Saunders, Lewis and Thornhill (2016) define a research philosophy as "*a system of beliefs and assumptions about the development of knowledge*" (Saunders, Lewis and Thornhill 2016 p.124). The research philosophy contains assumptions which underpin the strategy and methods adopted for the study. The research philosophy functions as umbrella, containing the most important determinants for a research project. Generally, there are three research assumptions, two of them differ in their approach of thinking: ontology and epistemology (Saunders 2007). Ontology is referred to as the perceived reality of the research (Creswell 2013) while epistemology epitomises the generation and justification of knowledge of the perceived reality (Mauthner 2020). Matthews and Ross (2010) describe it as "*the theory of knowledge and how we know things*" (Matthews and Ross 2010 p.23). The methodology as the third assumption describes the methods used to investigate the perceived reality (Carson et al. 2001). Each research paradigm is evaluated according to these three assumptions, which reveal the issues within a discipline and therefore provide a framework to the researcher for solving the key research issues (Easterby-Smith et al. 2002). The relationships between these three assumptions are as follows: the ontology, the perceived reality of the researcher influences the epistemology, (knowledge about the perceived reality). This knowledge is generated through the methodology, the methods used to examine the perceived reality (Aldawod and Day 2017). Quinlan et al. (2015:397) describe the methodology as "*the overall approach to the research project; the way in which the research is carried out; a means of supporting the philosophical assumptions that underpin the research project*". While these three represent the main assumptions, there is another research assumption, which is often neglected: axiology (Saunders, Lewis and Thornhill 2016). Axiology can be described as a branch of research philosophy which deals with the topics of values and ethics within the process of research. Aldawod and Day (2017) and Lincoln et al. (2011) consider axiology as highly significant as the values and ethics within the research process affect the entire research process, starting from the research questions, the research paradigm, the data collection and analysis methods, up to and including the presentation of the findings. Particularly in qualitative research, axiology should be highly acknowledge as research biases may influence the research and its results (see Chapter 3.10). A robust research framework for qualitative research should incorporate all these philosophical elements: ontology, epistemology, methodology and axiology. Figure 16 shows that qualitative research philosophies should consider all the philosophical elements:

Figure 16: The relationship between ontology, epistemology, methodology and axiology



(Source: adapted from Aldawod, Alvin and Day 2017 p.19)

Therefore, as depicted in Figure 16 above, this project emphasises the need to incorporate all philosophical elements and thus adopts and applies a qualitative research philosophy entailing the ontology, the methodology, the axiology, and the epistemology.

Within the literature, there are numerous different philosophical positions, all deriving from the two main paradigms: positivism and interpretivism. Both paradigms use different terminologies epitomising the underpinning principles behind each concept. Positivism can be also referred to as a quantitative, scientific or objectivist paradigm while interpretivism may be also referred to as a qualitative, phenomenology, social constructivism or humanistic paradign. The terms positivism and interpretivism are used throughout this thesis, entailing the synonyms which embody those paradigms. The origins of positivism can be traced back to the 20th century to the work of the Vienna Circle and in particular, the philosophers Bacon and Comte (Saunders, Lewis, and Thornhill 2009). This research paradigm relates to science, which work in an observable reality by generalising the outcomes. Interpretivism emerged as a critique of positivism in the early- and mid-20th century in Europe (Saunders, Lewis, and Thornhill 2009). It represents the view that social science research needs to use a different approach and that social phenomena needs to be researched differently from scientific phenomena.

The main characteristics of each paradigm are presented in Table 15 below:

Table 15: Research paradigms

Positivistism	**Interpretivism**
Quantitative	Qualitative
Large samples	Small samples
Hypothesis testing	Generates theories
Highly specific and precise data	Rich and subjective data
Artificial location	Natural location
High reliability	Low reliability
Low validity	High validity
Generalises from sample to population	Generalises from one setting to another

(Source: adopted from Hussey and Hussey 1997 p.54)

The two main research paradigms are compared in Table 15. Positivism is characterised by quantitative studies using large sample sizes, testing hypothesis, implicating a high reliability versus a low validity and generalises from samples to the population. Interpretivism on the other hand is used in qualitative studies employing small samples to create theories, but has a rather low reliability versus a high validity, and is poor at generalising from one setting to another setting.

Subsequent paradigms have also evolved from these two main philosophies. Saunders, Lewis, and Thornhill (2009) identify five research philosophies in business and management research: positivism, critical realism, interpretivism, postmodernism and pragmatism. In the following table, the differences between these paradigms are examined in relation to the research assumptions:

Table 16: Comparison of five research philosophies

Ontology (Nature of reality or being)	**Epistemology** (What constitutes acceptable knowledge)	**Axiology** (Role of values)	**Typical methods**
Positivism			
Real, external, independent One true reality (universalism) Granular (things) Ordered	Scientific method Observable and measurable facts Law-like generalisations Numbers Causal explanation and prediction as contribution	Value-free research Researcher is detached, neutral and independent of what is researched Researcher maintains objective stance	Typically deductive, highly structured, large samples, measurement, typically quantitative methods of analysis, but a range of data can be analysed
Critical realism			
Stratified/layered (the empirical, the actual and the real) External, independent Intransient Objective structures Causal mechanisms	Epistemological Relativism Knowledge historically situated and transient Facts are social Constructions Historical causal explanation as contribution	Value-laden research Researcher acknowledges bias by world views, cultural experience, and upbringing Researcher tries to minimise bias and errors Researcher is as objective as possible	Retroductive, in-depth historically situated analysis of pre-existing structures and emerging agency. Range of methods and data types to fit subject matter

Ontology (Nature of reality or being)	**Epistemology** (What constitutes acceptable knowledge)	**Axiology** (Role of values)	**Typical methods**
Interpretivism			
Complex, rich Socially constructed through culture and language Multiple meanings, interpretations, realities Flux of processes, experiences, practices	Theories and concepts too simplistic Focus on narratives, stories, perceptions and interpretations New understandings and worldviews as contribution	Value-bound research Researchers are part of what is researched, subjective Researcher interpretations key to contribution Researcher reflexive	Typically inductive. Small samples, in-depth investigations, qualitative methods of analysis, but a range of data can be interpreted
Postmodernism			
Nominal Complex, rich Socially constructed through power relations Some meanings, interpretations, realities are dominated and silenced by others Flux of processes, experiences, practices	What counts as 'truth' and 'knowledge' is decided by dominant ideologies Focus on absences, silences and oppressed/ repressed meanings, interpretations and voices Exposure of power relations and challenge of dominant views as contribution	Value-constituted Research Researcher and research embedded in power relations Some research narratives are repressed and silenced at the expense of others Researcher radically reflexive	Typically deconstructive – reading texts and realities against themselves In-depth investigations of anomalies, silences and absences Range of data types, typically qualitative methods of analysis

Ontology (Nature of reality or being)	**Epistemology** (What constitutes acceptable knowledge)	**Axiology** (Role of values)	**Typical methods**
Pragmatism			
Complex, rich, external 'Reality' is the practical consequences of ideas Flux of processes, experiences and practices	Practical meaning of knowledge in specific contexts 'True' theories and knowledge are those that enable successful action Focus on problems, practices and relevance Problem solving and informed future practice as contribution	Value-driven research Research initiated and sustained by researcher's doubts and beliefs Researcher reflexive	Following research problem and research question Range of methods: mixed, multiple, qualitative, quantitative, action research Emphasis on practical solutions and outcomes

(Source: Saunders 2007 p.119)

Table 16 above clearly shows the distinct characteristics of the various research philosophies and has been used to determine the most suitable research philosophy for this study. A comparison of the different research philosophies makes it apparent that the present study is highly interpretivist in nature. As previously described and evaluated in Table 15, interpretivism is qualitative, uses small samples, and focuses on generating theory by using rich data. All the attributes of interpretivism listing in Table 15 apply to this research. The ontology of this research, as well as the ontology of interpretivism is constructed by the interpretation and worldview of social actors within the case organisation. Employeees provide insights into their reality, knowledge, and value systems (Walsham 1995) via semi-structured and semi-structured narrative interviews. These methodologies were found appropriate for interpretivism as a research philosophy and have been applied to ensure the suitability of data required to achieve the objectives of the study. The aim of this research is to develop a comprehensive perspective of both the breadth and depth of the relationships of the research fields PMS and OL, theoretically and practically within the context of Frankfurt airport (see Chapter 1.3). Different social components of interpretivism were considered in this study including the organisational culture of the case company, personal experiences, and the knowledge and beliefs of employees. Stakeholders of the organisation (experts, line managers, senior managers and top managers) were interviewed in order to understand their perceptions, knowledge and experiences (see Chapter 3.7.1). As a result, interpretivism as a research philosophy was determined to be most appropriate and suited to the research project, and has been applied within the research process. Throughout this chapter, the selection and application of the methodologies will be discussed further, and the paradigms providing a framework for the research will be assessed.

Within the literature, two research approaches are apparent: inductive and deductive . Collis (2003 p.15) defines the two approaches as follows: "*Deductive research is a study in which conceptual and theoretical structure is developed … Inductive research is a study in which theory is developed from observation of empirical reality*". The major characteristics, as well as differences of the research approaches are listed in Table 17 below:

Table 17:Deductive and inductive research approaches

Deduction emphasises	**Induction emphasises**
scientific principles	gaining an understanding of the meanings humans attach to events
moving from theory to data	a close understanding of the research context
the need to explain causal relationships between variables	The collection of qualitative data
the collection of quantitative data	a more flexible structure to permit changes of research emphasis as the research progresses
the application of controls to ensure validity of data	a realisation that the researcher is part of the research process
the operationalisation of concepts to ensure clarity of definition	less concern with the need to generalise
a highly structured approach	
researcher independence of what is being researched	
the necessity to select samples of sufficient size in order to generalize conclusions	

(Source: Saunders, Lewis and Thornhill 2009 p. 127)

As described in Table 17, deduction moves from theory to data by explaining causal relationships between variables using quantitative data (Saunders, Lewis and Thornhill 2009). Conclusions are developed using scientific generalisation, while quantitative data is collected in a highly structured approach, and the researcher is independent of the subject of research (see Table 17). In contrast, induction focuses on gaining a close understanding of the context of the research while the researcher is actually a part of the research process (see Table 17) (Saunders, Lewis and Thornhill 2009). In addition, the research process is more flexible to allow changes in the research emphasis as the research progresses. Lastly, rather than using scientific generalisation, induction uses analytical generalisation by aiming to build rather than to test theory (see Table 17).

For the purposes of this research, an inductive approach was adopted for the following reasons: the research requires an in-depth understanding developed by interviewing the employees involved in performance measurement and organisational learning process, understanding their views, and

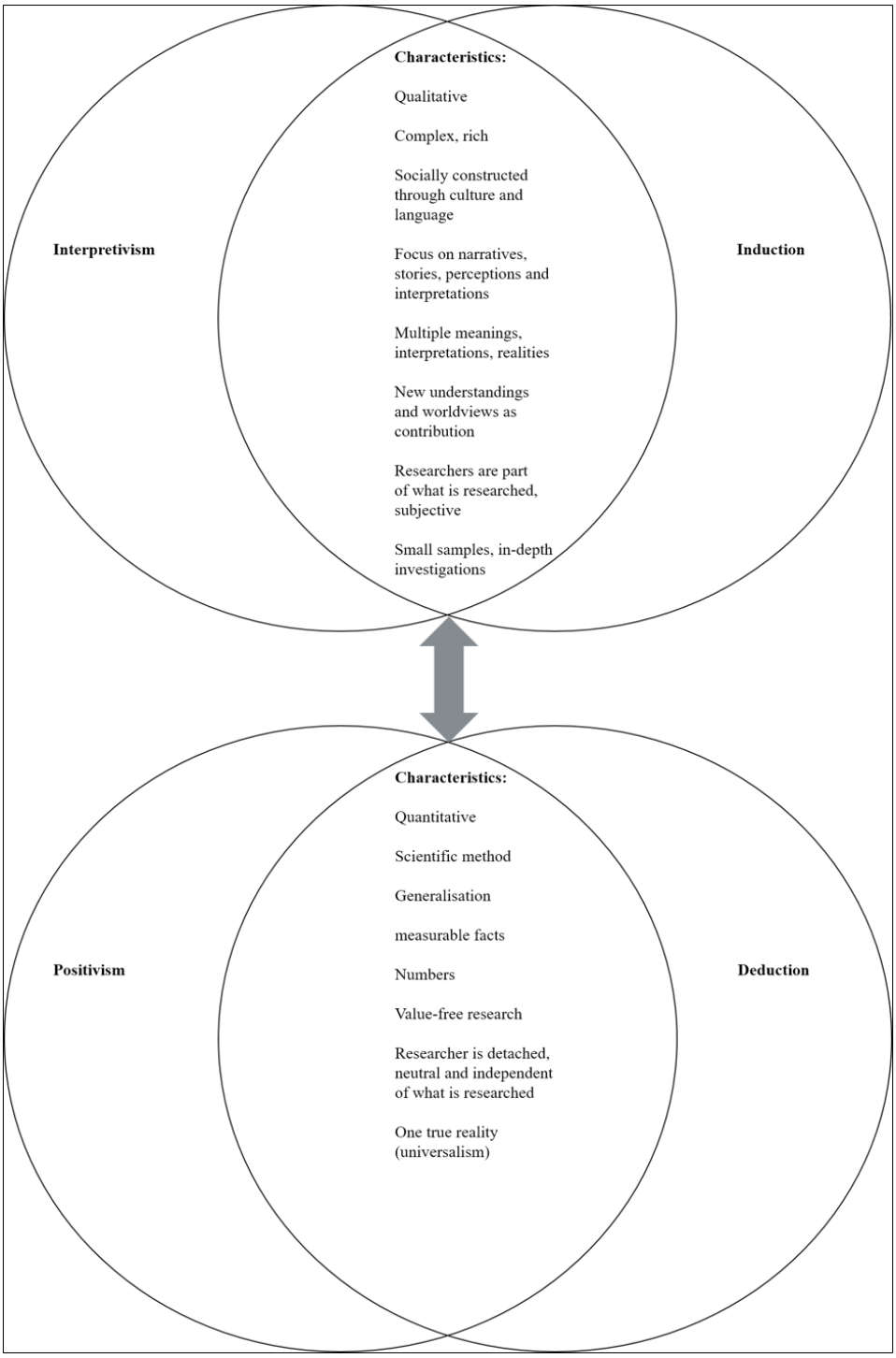
categorising them. The focus is placed on achieving a holistic understanding rather than aiming for generalisation. This is achieved by using a qualitative data collection method.

Deduction tests theory and is closely associated with scientific research. In the deductive approach a hypothesis is derived from theory which is operationalised and subsequently tested (Saunders, Lewis and Thornhill 2009; Robson 2002). Deduction is highly likely to use quantitative data and uses controls for testing the hypothesis. Subsequently, the methodology applied is highly structured to ensure reliability (Gill and Johnson 2002). Operationalisation is essential within this research approach to ensure quantitative measurement. Another characteristic of the deductive approach is generalisation. Sample numbers need to meet a sufficient numerical size (Saunders, Lewis and Thornhill 2009).

Induction on the other hand seeks to build theory. Critics of the deductive approach remark that induction allows a more flexible approach to finding alternative explanations, and thus allows changes of research emphasis. Social science researchers opine that it is important to develop an understanding of the individuals' worldview first before generating and testing a hypothesis. Normally within induction, the researcher is part of the research process itself, and therefore it is vital to consider the context of research. Thus, the inductive approach utilises small sample sizes rather than large samples, and is less concerned with the need for generalisation. Additionally, researchers using the inductive approach collect qualitative data through a variety of data collection methods as this enables a variety of viewpoints on the research issue (Saunders, Lewis and Thornhill 2009).

The differences between the research approaches already suggests which approach the researcher should apply having chosen the research philosophy. This is due to the close relationship between the research philosophy and the research approaches, which is presented in the following diagram:

Figure 17: Positivism-deduction and interpretivism-induction characteristics



(Source: adapted from Saunders, Lewis and Thornhill 2009 p. 127 and Saunders 2007 p.119)

The choice of research approach depicted in Figure 17 results from the different research philosophies due to the various characteristics of interpretivism and induction, as well as positivism and deduction. The table shows that the characteristics of positivism are the same as those of deduction and similarly with the attributes of interpretivism and induction (see Figure 17). Therefore, the actual relationships between the research philosophies and the approaches are summarised in the following:

Table 18: Relationships between research philosophies and approaches

Philosophy:	**Positivism**	**Interpretivism**
Data:	Quantitative	Qualitative
Reasoning:	**Deduction**	**Induction**
Process:	Theory testing	Theory building
Key distinction:	Describes the general and ignores the particular	Produces a wealth of detailed data on a small number of individuals

(Source: adapted from Hyde 2000 p.82-89)

The table above clearly shows the relationships between the philosophies and the research approaches, and shows that this research is suited to the interpretivist philosophy by collecting and focusing on qualitative data. While positivism implies deduction as reasoning, the focus is placed upon quantitative data and theory testing to describe the general, rather than the specific (see Table 18). Interpretivism on the other hand implies induction as reasoning and aims at theory building by using qualitative data and insights in relation to a small number of individuals (see Table 18). The reasoning for this research is clearly induction due to the need for an in-depth understanding, gaining insights into employees' experiences and by using interviews as a qualitative data collection method.

Hyde (2000) argues that there are two approaches of reasoning, deduction and induction, for acquiring new knowledge. Deductive reasoning implies the process of theory testing while inductive reasoning encompasses the process of theory building (see Table 18). A key distinction between both forms of reasoning, as well as between the two research philosophies, is the focus on researching the general versus the particular. Positivism and deductive reasoning construct generalisations while ignoring single cases. This is quite the opposite when it comes to

interpretivism and inductive reasoning. Here, the data is characterised as rich and in-depth using a small sample size.

Regarding the choices of research philosophy and approaches, Saunders et al. (2009) argue that there is no one "better" choice over others, but that it really depends on the research questions the researcher seeks to answer. Therefore, the research approach applied in this project is inductive due to the following reasons. Firstly, the researcher is not independent but part of the research process and organisation. Secondly, to address the research questions, the data collection and analysis techniques are qualitative and focus on the worldview, experiences and understanding of employees (expert, line managers, senior managers, and top managers) and PM processes. Thirdly, due to the nature of in-depth investigation, the sample is small and focuses on theory building rather than testing. As such, the study seeks to develop a deep understanding of the relationships of OL and PMS and therefore includes the objective of examining the relevant literature.

3.3 Research Strategy

In order to conduct the research, a plan of how to execute the research is required. This plan is known as a research strategy (Johannesson and Perjons 2014). According to Krishnaswamy (2004) the research strategy is highly important as it acts as kind of a roadmap to guide the researcher through the planning stages and conducting the research (Johannesson and Perjons 2014).

Punch (2006) adds that the strategy provides a perspective which helps to define the research questions and purpose of the research. As indicated in the previous section 3.2, this research´s nature is qualitative, following an interpretivist research philosophy and applying an inductive research approach. For the purpose of the study, the case study as research strategy best suits the needs of the research and is applied accordingly. The case study addresses the study´s need for an in-depth investigation within a single unit of analysis and aids in developing a holistic understanding of the research area. However, for the purposes of this study, it is important to review qualitative research strategies to determine the suitability of a case based approach. Reviewing the research strategy literature, the following strategies were identified (Creswell 2016; Petty, Thomson, and Stew 2012; Saunders 2007):

- Case study
- Grounded theory
- Ethnography
- Phenomenology
- Narrative research
- Evaluation research
- Action research and participatory action research
- Hermeneutics
- Feminism
- archival research
- practitioner-research

In the following sections, research strategies which are suitable for qualitative research (and are underpinned by an interpretivist epistemology and are applicable to practice) are evaluated. Grounded theory, evaluation research, hermeneutics and feminism will not be analysed as they do not meet the criteria for this research as stated above.

Case study

Case studies as research strategies "*can paint a (…) detailed picture of its subject*" (Johannesson and Perjons 2014 p.44). The case study strategy aims at achieving a deep understanding by gaining in-depth insights of situations, businesses, and processes (Blake 2012). The focus is placed on the holistic context within a single unit of analysis, such as a company or a group of employees (Collis and Hussey 2003). A key characteristic of case study research is the rich and multi-faceted knowledge about the unit of analysis (Blake 2012). Commonly used data collection techniques include interviews, observation, and document analysis (Petty, Thomson, and Stew 2012). The case study strategy can also comprise multiple cases if the rationale is to generalise the finding from a previous single case study (Saunders, Lewis, and Thornhill 2009). A major criticism of the case study as research strategy is its lack of generalisability. Further criticisms address the large volume of data generated by this approach and the time frames for these studues (Mohajan 2018). Advantages of case studies include their high levels of validity, and their strength in establishing new hypotheses to examinine new knowledge and address complexity (Mohajan 2018; George and Bennett 2005). Furthermore, a case based approach is appropriate for gaining a holistic view on situations and can provide a rich and detailed picture. Moreover, it closely examines the processes,

forms, and behaviours within an organisation (Noor 2008). Its strengths and weaknesses are summarised in the following table:

Table 19: Strengths and weaknesses of a case study

Strategy	Strengths	Weaknesses
Case Study	- Provides a holistic view - Addresses complexity - Single unit of analysis - Addresses "How", "What" and "Why" Questions	- Generalisation - Time consuming - Large set of data

(Source: Author 2022)

Ethnography

Ethnography can be defined as follows: "*Ethnography is about describing people or cultures.*" (Johannesson and Perjons 2014 p.46). Ethnography is a phenomenological approach originating from anthropology, and studies cultural groups within the society. The aim of ethnography is to understand the culture, norms, and beliefs of groups of people by investigating multiple aspects such as work, social and political contexts (Johannesson and Perjons 2014; Collis and Hussey 2003). In ethnography, the researcher actively participates in the activities of the group to understand their worldview (Johannesson and Perjons 2014). The research strategy is not designed for business research and comprises distinct participant observation (Saunders et al. 2009). A key criticism of ethnography relates to reflexivity. It is argued that the researcher's relationship to the group under investigation and the research process itself cannot be objective. In order to tackle this issue, researchers are advised to reflect on their own background, beliefs and worldviews (Johannesson and Perjons 2014). The strengths and weaknesses of ethnography are summarised as follows:

Table 20: Strengths and weaknesses of ethnography

Strategy	Strengths	Weaknesses
Ethnography	- Examines shared views, patterns, and beliefs - Interpretation based on others' views and perspectives	- Reflexivity: lack of objectivity - Ethical challenge of privacy and consent

(Source: Author 2022)

Action research

Action research "*seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities.*" (Reason and Bradbury 2001 p.1). Action research can be traced back to Lewin, who first introduced this research strategy in 1946. The aim of this research strategy is to answer organisational questions and solve business-related challenges. Coghlan and Brannick (2005) state that action research is rather "in action" and less "about the action" due to the dynamic relationship of the researcher and the research environment. As the major focus is placed on businesses, there is concern that this research strategy is seen solely as a form of consultancy intended to develop a conceptional theory with little focus on practice (Eden and Ackermann 2018). Its strengths and weaknesses are summarised in the following table:

Table 21: Strengths and weaknesses of action research

Strategy	Strengths	Weaknesses
Action Research	- "How" questions focus on change - Involvement of employees (practitioners) throughout the process	- Concern for the development of theory - Time consuming due to the cyclic nature of the research process

(Source: developed by present researcher)

Archival Research

Archival research "*makes use of administrative records and documents as the principal source of data.*" (Saunders, Lewis, and Thornhill 2009 p.150). This strategy uses recent or historical data, documents and records of organisations or institutions. These data represent daily activities and are thus not collected specifically for the research (Hakim, 2000). Due to the passive nature of the research strategy and the missing link to participants, the research strategy is not suitable for this study and will therefore not be used.

Table 22: Strengths and weaknesses of archival records

Strategy	Strengths	Weaknesses
Archival Research	- Data of processes and daily activities	- Missing link to participants

(Source: Author 2022)

Practitioner-researcher

This research strategy views '…*the practitioner as researcher; professional contexts are the sites of study; there are blurred boundaries between inquiry and practice; community and collaboration are important constructs; and they act to make new knowledge public and have this new knowledge lead to improved practice.*" (Letts 2013 p.478). This research strategy can be referred to as workplace research intended for conducting research on the organisation in which the researcher is employed. On the whole, it is instigated by the employer who seeks to understand a particular problem or issue within the organisation. Its strengths and weaknesses are summarised as follows:

Table 23: Strengths and weaknesses of practitioner-researcher

Strategy	Strengths	Weaknesses
Practitioner-researcher	- Focus on the organisation - Focus on the status of the researcher	- Rather a status than a strategy

(Source: Author 2022)

Phenomenology

The research strategy of phenomenology "*emphasises inductive logic, seeks the opinions and subjective accounts and interpretations of participants, relies on qualitative data analysis and is not so much concerned with generalisations to larger populations but with contextual description and analysis*." (Gray 2009 p.28). This method is suitable for examining the structure of different characteristics of experience like memory, imagination, and emotion, amongst others. Petty, Thomson and Stew (2012) describe this research strategy as seeking to understand the views and beliefs of people or groups by investigating their experience with the purpose of extracting meaning to explore the core of a phenomenon. However, even though the focus is placed on individuals, there is no link to business patterns. Therefore, phenomenology is not regarded as suitable strategy for this research. Its strengths and weaknesses are highlighted as follows:

Table 24: Strengths and weaknesses of phenomenology

Strategy	Strengths	Weaknesses
Phenomenology	- Exploring the core of a phenomenon - Focus on individuals	- Missing link to business

(Source: Author 2022)

Narrative

"*Narrative research may be biographical following the life of individuals, while an oral history explores the personal reflection of events from one or more individuals*." (Petty, Thomson, and Stew 2012 p.380). As this quote suggests, narrative research focuses on detailed stories and experiences from the life of individuals (Creswell 2007). It might be a single event, multiple events, or a sequence within the life of a group or an individual. The focus is placed on the individual and can be linked with other research strategies (Petty, Thomson, and Stew 2012). However, as a research strategy, it also misses the required links to business. Its strengths and weaknesses are depicted below:

Table 25: Strengths and weaknesses of Narrative Source

Strategy	Strengths	Weaknesses
Narrative	- Following individual´s life	- Missing link to business

(Source: Author 2022)

Justification of the research strategy

The following table summarised the strengths and weaknesses of the research strategies and evaluates the suitable strategy for this research. The evidence-based research can be distinguished in full agreement (X), partial agreement ((X)) and not applicable (-).

Table 26: Strengths and weaknesses of the research strategies

Strategy	**Strengths**	**Evidence-based research**	**Weaknesses**	**Evidence-based research**	**Research Justification**	**Ranking**
Case study	Provides a holistic view	X	Generalisation	X	Dominant on the strengths Risk in weaknesses	1
	Addresses complexity	X	Time consuming	X		
	Single unit of analysis	X	Large set of data	X		
	Addresses "How", "What" and "Why" Questions	X				
Ethnography	Examines shared views, patterns and beliefs	(X)	Reflexivity: lack of objectivity	X	Not applicable because of missing link to business	-
	Interpretation based on others' views and perspectives	(X)	Ethical challenge of privacy and consent	X		
Action Research	"How" questions	X	Concern for the development of theory	X	Dominant in strengths and weaknesses	2

Strategy	Strengths	Evidence-based research	Weaknesses	Evidence-based research	Research Justification	Ranking
	focus on change involvement of employees (practitioners) throughout the process	(X) X	Time consuming due to the cyclic nature of the research process	X		
Archival Research	Data of daily activities	-	Missing Link to participants	X	Not applicable due to the missing link to participants	-
Practitioner-researcher	Focus on the organisation Focus on the status of the researcher	(X) (X)	Rather a status than a strategy	X	Partially applicable: lack of depth in strategy	3
Phenomenology	Exploring the core of a phenomenon Focus on individuals	X (X)	Missing link to business patterns	X	Not applicable because of missing link to business	-
Narrative	Following individual´s life	(X)	Missing link to business	X	Not applicable due to missing link to business	-

(Source: Author 2022)

An examination of Table 26 above shows that a case study approach best suits the needs of the research and will thus be applied as a research strategy. Case study as a research strategy for data collection is consistent with interpretivism as a research philosophy and the inductive approach outlined earlier in Chapter 3.2.

Hyde (2000), as well as Genoe McLaren (2010) argue that case studies are naturally linked with inductive research, as a way of implicating each other. The single-case study approach adopts the inductive approach by having the assumption that behaviour and experiences of individuals cannot only be explained by formal logic but also through critical thinking.

The rationale for applying a single-case study approach lies in the in-depth analysis which is required to address the study´s research questions and objectives. The single case study enables the researcher to investigate a phenomenon in fine-grained detail, which cannot be achieved through multiple case studies or other methods (Ozcan, Han and Graebner 2017).

Merriam (1998) suggests that the uniqueness of a case study lies in its uniqueness, and its ability to generate knowledge, which is revealed through the case itself. The case study employed in this project does indeed reveal novelty and knowledge about the relationships of OL and PMS, both theoretically and practically by analysing the case of Frankfurt airport. The purpose of this study is to explore a phenomenon based on a single case study (see Chapter 1.3). The study focuses on developing an understanding of the relationships between OL and PMS, and selects a single case, Frankfurt airport (see Chapter 3.4.2), to develop an understanding of this issue (Stake 1995). This project seeks to develop an in-depth understanding of the relationships between OL and PMS by exploring and analysing the phenomenon within the selected case company (Mukhija 2010). While the approach of multiple case studies aims to develop a broad understanding and seeks generalisability, this research aims to develop an in-depth understanding of the relationships between OL and PMS.

The single case study approach is applied in various research fields where in-depth research is necessary such as management, politics, education, or law (Gulsecen and Kuba, 2006). The use of single case studies is widespread in the field of management as it enables the investigation of complex organisational processes to produce novel insights and rich knowledge (Ozcan, Han and Graebner 2017; Yin 2014; de Padua Carrieri 2014). Genoe McLaren (2010 p.1) adds that "*The rich empirical data that lie at the heart of case study enhance the development of a theory that is*

accurate, interesting, and testable.". Gaya and Smith (2016 p.532) also state that "*In Sweden, case studies research design constitutes the most important empirical base for PhD theses*".

Langley et al. (2013) suggest that the nature of single case studies is significant for investigating organisational processes and interactions among organisational actors and tools, by investigating the "how" and "why" of organisational issues. Further, "*Single cases can enable researchers to develop a particularly detailed and nuanced view of organizations and phenomena, which can both influence existing theories and lead to the development of new theories*." (Ozcan, Han and Graebner 2017).

Ozcan, Han and Graebner (2017) further conclude that single case studies in management are highly significant and valuable methods. Other researchers confirm this by stating that case studies are key within management research (Gaya and Smith, 2016; Hyett, Kenny and Dickson-Swift, 2014). The case company selected for this research is Frankfurt airport (see Chapter 3.4.2). In their study, Ozcan, Han and Graebner (2017) recommend the use of single case studies for researching complex processes within organisations in detail to create high quality research, which is rich in theory. Additionally, Ozcan, Han and Graebner (2017) state that embedded cases enable researchers to analyse the subject of research in detail and suggest using embedded case design to collect data at different levels throughout the organisation.

The case study focusses on Frankfurt airport (see Chapter 3.4.2) and provides the opportunity to research the OL-PMS relationships in a business context and to produce insights into the organisational processes and experiences of employees, which may not be possible by applying any other research methods (Ozcan, Han and Graebner 2017; Searle 1999). Therefore, the case study has been adopted as a research methodology to obtain detailed insights into the practical experiences of employees from Frankfurt airport, to explore a real-life phenomenon via in-depth data collection (Creswell 2013). Applying a qualitative single-case study approach enables the generation of knowledge by developing an understanding of how learning is created at Frankfurt airport through the usage of PMS for OL practices (see Chapter 1.3).

There are further clear reasons why this research applies a single-case study design. The single-case study design is perfectly suited for management or professional research (Barzelay, 1993), which in this research context constitutes the relationships between OL and PMS within Frankfurt airport. The reason why Frankfurt airport is suited as a case company is presented in Chapter 3.4.2. Another reason is that multiple case studies generate results to compare the cases and produce

generalisations. Rather than seeking empirical generalisation, this project focuses on achieving analytical generalisation (see Chapter 5.5) by generating a deep understanding of the issue under investigation, and creating in-depth knowledge of the complexities of the research context. By applying single-case studies, researchers take the position that "*we do not study a case primarily to understand other cases. Our first obligation is to understand this one case*" (Stake 1995 p.4). Yin (2003) further explains that the more cases which are employed in a project, less depth is achieved, and he therefore recommends the usage of single-case study design for generating a detailed and in-depth view of organisations and organisational phenomena.

Single-case study design enables the researcher to study the phenomenon holistically (Cronin, 2014). Thus, single-case studies are used to generate a holistic view of the phenomenon under analysis as the researcher investigates the entire context, and the relationships involved (Gummesson 2000). Case studies are applied to produce an understanding of a case and are often described as a "sense-making" approach (Woodside and Wilson, 2003) by incorporating the perspectives of participants to achieve a holistic view.

Miller and Salkind (2002) explain the approach used to conduct case studies in six steps:

1. Conduct an in-depth study: The researcher selects the case being studied and assesses if the case or issue is important to be investigated. For this study, the research problem is presented in Chapter 1.2. Prior to the main study (see Chapter 3.7), a preliminary study was conducted (see Chapter 3.5) to contribute to the researcher's overall understanding of Frankfurt airport's organisational structure and performance, and to aid the identification and selection of the sample for the main study.
2. Ask research questions to address the issue: Chapter 1.3 describes the research questions addressed in the main study (see Chapter 3.7) to achieve the study's research aim of developing a comprehensive perspective of both, the breadth and depth of the relationships of the research fields, theoretically and practically within the context of Frankfurt airport.
3. Develop an in-depth understanding through data collection: data was collected throughout the organisational hierarchy of the case company (see Chapter 3.7.1) to address the concomitant research questions. Therefore, semi-structured and semi-structured narrative interviews were conducted with executives, senior management, line management and employees.

4. Description of the case and analysing patterns and themes: the semi-structured interviews were analysed using content analysis whereas the semi-structured narrative interviews were analysed using the narrative schema of Labov and Waletzki (1967) (see Chapter 3.7.2).
5. Describing and developing patterns and themes: By transcribing and analysing the interviews (see Chapter 3.7), the interviewer was able to identify patterns in the data (see Chapter 3.7 and Chapter four)
6. Interpretation of the case: Lastly, the case itself was interpreted (see Chapter four) and action steps recommended to the case company based on the findings (see Chapter 5.5).

The single-case study design is highly appropriate to this research as it enables an in-depth understanding of how learning is undertaken, transferred and thus organisational learning created while measuring performance at Frankfurt airport. Therefore, the single-case study as a research method enables the exploration of the OL and PMS research fields in a way which explain the complexities within the real-life setting of Frankfurt airport to a degree which may not be achievable via other research methods.

3.4 Research methods

3.4.1 Case study design

The research objective of depicting the empirical OL processes while using PMS is one of the main goals of this study (see Chapter 1.3). Therefore, applying a case study approach to identify the learning process while using PMS is appropriate for studies which require a high level of in-depth understanding (see Chapter 3.3). Yin (1994) highlights the importance and increasing trend in research investigating complex organisational phenomena. Yin (1994) further concludes that for complex organisational phenomena, case studies are most suited as a research method. Case studies allows researchers to gain insights into complex organisational situations by extracting rich and in-depth knowledge (Mukhija 2010; Yin 2003; 1994). The study´s research questions consider both "how" and "what" questions (see Chapter 1.3) and thus are aligned with the case study approach presented in Chapter 3.3 by investigating the "how", "what" and "why" of organisational processes and interactions among actors and tools (Langley et al. 2013). Additionally, the case study investigates details such as organisational processes to extract rich, in-depth knowledge and explores the actions of employees which influence organisational situations (Smith 1991).

A case study can be described as an empirical investigation of a contemporary phenomenon within its real-life context using different sources of evidence (Creswell 2016; Yin 2009, Saunders et al. 2007). Yin (2003) explains that case studies are appropriate in different situations as they contribute to the knowledge of an organisation, organisations, individuals or groups. Mukhija (2010) proposes that case studies explore single phenomenon in an in-depth and multifaceted way, and are closely related to qualitative inductive research approaches (see Chapter 3.3). The case study as a research strategy can be regarded as a challenging approach, as there is no universal structure or routine for cases (Halizahari 2019; Yin 2003). However, as described in Chapter 3.3, in order to structure the application of the case study, the study applied Miller and Salkind´s (2002) approach of conducting case studies in six steps (see Chapter 3.3).

Yin (2009) differentiates between case studies which build theories and case studies which test theories. While case studies which test theories are division observed within quantitative research (Gummesson 1991), a theory-building case study is used as a research strategy for the needs of this research. The theory-building case study explores real-life issues by conducting in-depth studies in which the research design is based on the data collection, analysis, and reporting stages. Further main characteristics and the appropriateness of the research strategy for this study have been presented and discussed in the Chapter 3.3. Specifically, the in-depth investigation of a contemporary phenomenon is ideally suited to the research problem for this study. However, there are some weaknesses in the selected research method, which need to be considered and examined first. Weick (1979) suggests that theory helps to maintain intellectual control over the case study (see Chapter 3.7.4). Thus, incorporating theory acts to reduce the potentially flawed explanatory characteristic of case studies. By incorporating theory from the academic literature, the case study thus provides a powerful tool for research.

As noted above, a key criticism regarding case studies is empirical generalisation. Instead of using empirical generalisations, case studies use analytical generalisation by expanding and developing theories. Other researchers further note the limitations of rigour due to a perceived lack of systematic procedures. As result, some researchers (e.g. Halizahari 2019; Dul and Hak 2008; Pervan and Maimbo 2005; Voss et al. 2002; Merriam 1998; Tellis 1997; Eisenhardt 1989; Yin 1984; 1995) suggest steps for undertaking a successful and valid case study. Other critics address the time-consuming nature of a case study, as well as the risk of data sets which are too large. Hartley (1994) contradicts these critics by stating that all criticisms of case studies are obsolete as the method is highly reliable, apart from instances where it is used incorrectly. Other researchers (e.g. Yin 2009; 2003; 1981; Eisenhardt 1989 and Pettigre 1979) address shortcomings through a

technique which seeks to guarantee validity and reliability for case studies. The tests for ensuring the quality of case studies is proposed by Yin (2009). The tests components are as follows: Construct Validity, Internal Validity, External Validity, and Reliability. The validity and reliability tests, their purpose, suggested method and their areas of application in this project are depicted in Table 27 below:

Table 27: Application of case study quality tests

Test	Purpose	Method	Application
Construct validity	To establish operational measures	- Multiple sources of Evidence - Establish chain of evidence - Interview and documentary evidence - Review by informants	✓ Data collection: primary (Interviews) and secondary data (documents)
Internal validity	To establish causal relationships or explanations	- Pattern matching - Explanation building - Rival explanations - Logic models	✓ Data analysis: new methodological contribution in valid and tested analysing techniques to case study design (see Chapter 3.10)
External validity	To generalise findings	- Use theory in single-case studies	✓ Research design and discussion of data in the light of literature reviewed
Reliability	To demonstrate the possibility of replication	- Case study protocol - Case study database	✓ Data collection

(Source: Yin 2009 p.41)

Table 27 shows how the study applied the case study quality tests to ensure the validity and reliability of this research. Reviewing existent case study frameworks on building theory and constructing validity, this project uses Eisenhardt`s (1989) framework, which builds upon the grounded theory work of Glaser and Strauss (1967) and Strauss (1987), as well as incorporating elements of research from Van Maanen (1988) on ethnography, Jick (1979) on triangulation of data types, and Mintzberg (1979) on direct research. Eisenhardt`s (1989) framework is widely acknowledged among other researchers in this field (such as Halizahari 2019; Pervan and Maimbo 2005; Easterby-Smith et al. 2002; Yin 2003b) and therefore provides a solid basis for the case study used in this project. The process steps and their application were applied as follows to ensure validity within the case study:

Table 28: Steps to addressing validity

Process	Activities	Rationale	Application
Getting Started	Definition of research question Possibility of *a priori* constructs Neither theory nor hypotheses	Focuses efforts Provides better grounding of construct measures Retains theoretical flexibility	Identification of research problem (Chapter 1.2) Review of literature (Chapter two) Identification of research questions and objectives (Chapter 1.3)
Selecting Cases	Specified population Theoretical, not random, sampling	Constrains extraneous variation and sharpens external validity Focuses efforts on theoretically useful cases—i.e., those that replicate or extend theory by filling conceptual categories	Case selection based on research problem (Chapter 1.2.4)
Crafting Instruments and Protocols	Multiple data collection methods Qualitative and quantitative data combined Multiple investigators	Strengthens grounding of theory by triangulation of evidence Synergistic view of evidence Fosters divergent perspectives and strengthens grounding	Data collection: Interviews and Documentation (Chapter 3.6)
Entering the Field	Overlap data collection and analysis, including field notes	Speeds analyses and reveals helpful adjustments to data collection Allows investigators to take advantage of emergent	Data collection and analysis: Pilot study and preliminary study (Chapter 3.5); pilot

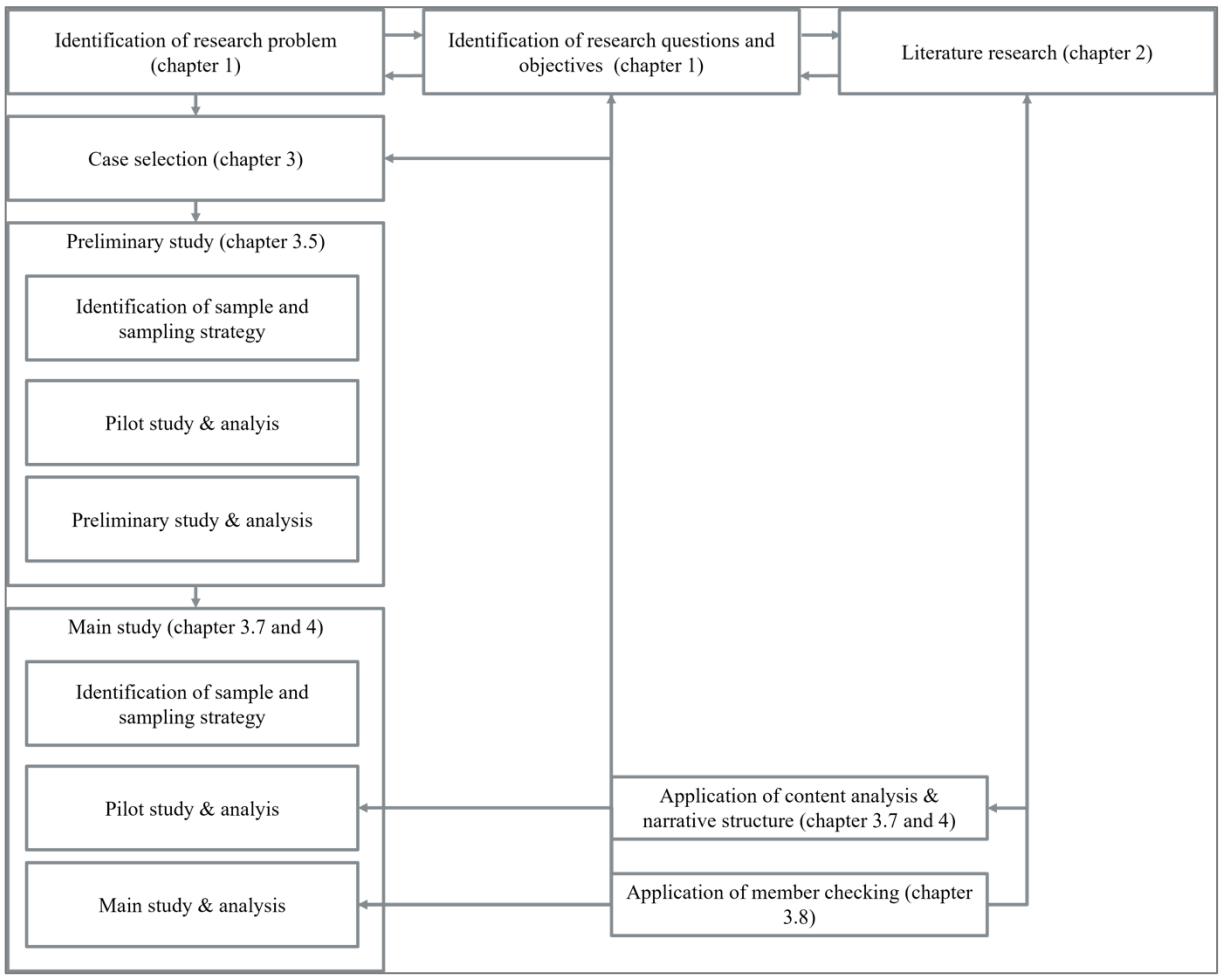
Process	Activities	Rationale	Application
	Flexible and opportunistic data collection methods	themes and unique case features	study and main study (Chapter 3.6)
Analysing Data	Within-case analysis Cross-case pattern search using divergent techniques	Gains familiarity with data and preliminary theory generation Forces investigators to look beyond initial impressions and see evidence through multiple lenses	Data collection and analysis: Pilot study and preliminary study (Chapter 3.5); pilot study and main study (Chapter 3.6)
Shaping Hypotheses	Iterative tabulation of evidence for each construct Replication, not sampling, logic across cases Search evidence for "why" behind relationships	Sharpens construct definition, validity, and measurability Confirms, extends, and sharpens theory Builds internal validity	Data analysis: Content analysis and narrative schema - building themes, concepts and relationships (Chapter 3.6)
Enfolding Literature	Comparison with conflicting literature Comparison with similar literature	Builds internal validity, raises theoretical level, and sharpens construct definitions Sharpens generalisability, improves construct definition, and raises theoretical level	Findings and discussion: review of findings in the light of literature (Chapter four)
Reaching Closure	Theoretical saturation when possible	Ends process when marginal improvement becomes small	Findings and discussion, conclusion: Answer of research questions (Chapter four and Chapter five)

(Source: Adapted from Eisenhardt 1989 p.533)

Table 28 shows the steps applied in this study based on Eisenhardt`s (1989) framework to ensure the validity of this research. The framework´s steps for ensuring the validity have been addressed throughout this thesis as follows: initial steps and the selecting of the case are addressed throughout Chapter one by identifying the research problem and objectives (see Table 28). The steps of crafting, entering the field, analysing the data and sharpening the hypothesis are presented throughout Chapter three. The step of including the literature by reviewing the findings in the light of the literature is highlighted in Chapter four. Lastly, reaching closure is reached by answering the research questions and reflecting the answers based on the literature in Chapters four and five.

Due to the nature of the research issue and its aims and objectives, a preliminary study was carried out before the main study. Therefore, the following diagram depicts the steps undertaken within the research process and also provides insights into the logical order of the research steps:

Figure 18: Research process



(Source: Author 2022)

Figure 18 depicts the process of the research. Within the first stage of the research, the research problem and questions were defined. Even though the research questions were refined during the course of the literature review and the preliminary study, it provided a clear form and structure for the study (see Figure 18). Eisenhardt (1989) argues that providing a clear focus from the beginning by defining the research question prevents the researcher from getting overwhelmed by the extensive volume of data. Thus, the type of organisation and the type of data required to answer the research question becomes clear and evident. Eisenhardt (1989) stresses that a priori specification of constructs might help to refine the research design. In accordance, the review of the literature sharpened and developed the research questions (see Figure 18). Regarding the a priori constructs, Eisenhardt (1989) claims that potential theoretical constructs from the literature can be used to triangulate and thus ground emergent theory (see Chapter 3.7.4). Within the study several potentially relevant constructs were identified within the literature which shaped the questions used within the semi-structured interviews (see Figure 18). Additionally, these constructs formed the content categories of the applied data analysis. The research problem and the emergence of the research questions are described in Chapter one. The explanation and application of the data analysis is explained throughout the chapter. The relevant literature is reviewed in Chapter two.

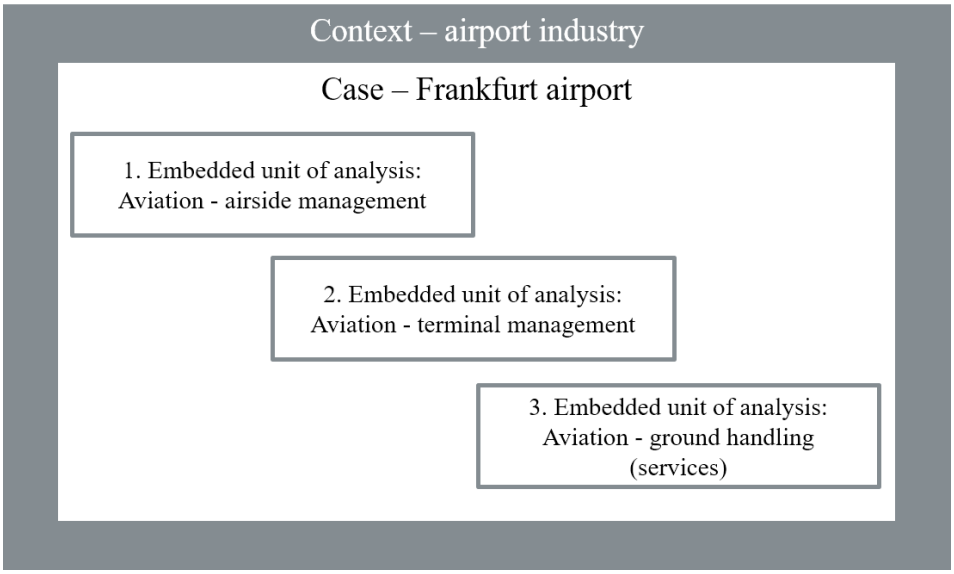
In relation to theoretical sampling, it is important to such cases which can be replicable and which are suitable for extending emerging theory (Eisenhardt 1989). Case studies may be classified into single and multiple case studies. These can be differentiated further (Yin 2009):

- Single-case holistic
- Single-case embedded
- Multiple-case holistic
- Multiple-case embedded

The rationale for multiple case study design is to investigate if findings from one case occur in another (Saunders 2007), and thus act to support the claim of generalisability. A single-case study however is best suited when the research intends to represent a critical case, an extreme or unique case, a typical or representative case, a relevant, revelatory or longitudinal case (Yin 2009). This was achieved by in this project by conducting an in-depth case study, yielding a deeper understanding of the situation within Frankfurt airport. Prior to selecting this approach, a multiple-case study approach using three airports in Germany was considered. However, this idea was rejected as the research questions and objectives of the study firstly require an in-depth case investigation with the aim of understanding the relationships between OL and PMS (see Chapter

1.3). The present study selected a single-case with three embedded units of analysis as it is a typical case within the airport industry. The three embedded units of analysis were selected as part of the preliminary study (see Chapter 3.5.4) to validate and identify the most approporiate departments of the airport. The most suitable departments were identified within the airport, as those which are of high importance to the airport´s performance. The structure of the single-case study with embedded units on analysis is depicted in the following figure:

Figure 19: Single case study with embedded units of analysis



(Source: adapted from Yin 2009 p.46)

The units of analysis are depicted in Figure 19 and are the core processes and departments within Frankfurt airport. These are critical to the operation of an airport, and are the fundamental units each airport must have to function effectively.

Overall, there are five core processes within Frankfurt airport: aviation, which is divided into airside management and terminal management, ground handling services, retail and real estate and international activities and services. Another important process is safety and security. However, this process is beyond the scope of the study as the process is operated by the federal police force and supported by a subsidiary of Frankfurt airport. The main processes are briefly explained in the following:

1. Aviation - airside management deals with the infrastructure of the airside and its operations.
2. Aviation - terminal management handles the landside operations and capacity management.
3. Ground handling services manage the central infrastructure, which encompasses the baggage conveyor belts, the passenger bridges, provide sanitary services, the passenger ramps and de-icing facilities. The ramp and passenger service deals with the loading and unloading of aircrafts, provides walk-out assistance, manages check-in and boarding, lost and found and weight and balances. Additionally, it also manages cargo services.
4. The retail and real estate process includes shopping, services and advertising, real estates such as rents in the terminals, services and administrative buildings and car parking.
5. International activities and services relate to global investments and service units such as asset deals and concessions.

However, the preliminary study clearly showed that the core processes no airport can survive without are aviation – airside management, aviation – terminal management and ground handling services (see Figure 19). The rationale for this selection is further explained in Chapter 3.5.4, while Chapter 3.5 describes the preliminary study in more detail.

3.4.2 Justification of Frankfurt airport as case study

In order to investigate airport performance and its effect on organisational learning, a suitable case organisation was required. Therefore, a case organisation with a robust performance was best suited to the research needs, research questions and objectives. Studies conclude that there are four criteria which determine and assess an airport`s performance and efficiency (Fasone and Zapata-Aguirre, 2016). Striving for high and optimal performance and efficiency is the optimal usage of an organisation’s resources by having the lowest rate of waste. The criteria associated with efficiency and high airport performance are, according to Fasone and Zapata-Aguirre (2016), as follows:

- Hub status: many studies conclude that airports which have a hub status are highly productive with regard to aircraft movements, passenger numbers and freight movements.
- Location: airports which are located in well-developed regions and are supported by government are viewed as more efficient than airports in less developed regions.
- Ownership: research into the impact of ownership on airport performance is limited.
- Size: Larger airports have a better overall performance than smaller airports.

Further, in their study, Fasone and Zapata-Aguirre (2016) indicate that qualitative, in-depth studies are needed as there are a significant number of quantitative studies present within literature. Therefore, it is appropriate to select an airport which fulfils the criteria noted above to investigate the relationships between OL and PMS, and how PMS can be used to enable and promote OL to gain advantage in the highly competitive airport industry. According to the national aviation authority, Frankfurt airport ranks fourth in the biggest airports in Europe in 2019, and according to the Skytrax world airport awards, also ranks number four in the best airports in Europe in 2019. The airport is also Germany´s biggest hub airport. Frankfurt airport has been discussed in Chapter 1.2.1 and in Chapter 1.2.3. Therefore, Frankfurt airport meets the requirements of the study and and as such is well suited as a case company. Given the current challenges of the airport, and especially under the effects of COVID-19 (see Chapter 1.2.4 and Chapter 5.4), there is a need to enhance efficiency and market performance. Aligning OL and PMS may aid Frankfurt airport in preparing and adapting for these current challenges in an efficient manner. Given the needs of the case company as noted throughout Chapter one, as well as the research needs identified within literature in Chapter two, Frankfurt airport is an appropriate setting for an investigation of performance measurement practices and its impact on organisational learning. This is not only because of the aims of the airport and their current challenges but also because the departments provide “face-to-face” interactions allowing the exchange of information to be inserted into the social contexts of employees throughout the organisations’ hierarchies.

3.4.3 Data collection

Theory-building research constructs validity through multiple sources of evidence. Additionally, research is dependent upon primary and secondary data and thus shape the collection and interpretation techniques adopted for the study. Sound research questions and objectives help to determine suitable sources of evidence for the case study (Saunders 2007). Yin (2009) identifies six sources of data collection methods for case studies:

- documentation
- archival records
- interviews
- direct observation
- participant observation
- physical artefacts

As the choice of data collection method depends on the research questions, no one source has an advantage over another (Yin 2009). This study uses interviews as sources of primary data and documentation as sources of secondary data. Additionally, the research utilised member checking to ensure internal validation (see Chapter 3.7).

The documents used in the present study as sources of secondary consisted of year-end closure reports, quarterly closure reports, traffic figures, process diagrams, aviation statistics and benchmarks. The documents also entailed a process map of the organisation, the risk control matrix, profit centre reports, cost centre reports, organigrams of the units of analysis and organisation charts. These documents were reviewed and applied throughout the study as background content during the preliminary and main studies.

Interviews as data collection methods are highly popular within studies adopting both positivism and interpretivism (Collis and Hussey 2003) as they are perfectly suited for gaining an in-depth understanding of experiences within peoples´ life (Fontana and Frey 2005). As Yin (2009 p.106) stated: "*One of the most important sources of case study information is the interview*". There are different typologies of interviews, which are varying in their degree of control exercised by the interviewer. The different types are depicted in the following table:

Table 29: Interview classification according to standardisation

Type	**Question (content and sequence)**	**Answer (possibilities)**
Standardised / Structured	Predetermined	Predetermined
Semi-standardised / Semi-structured	Predetermined	Predetermined, open
Non-standardised / Non-structured	Open (predetermined in topic/area)	Open

(Source: adapted from Gläser and Laudel 2010 p.41)

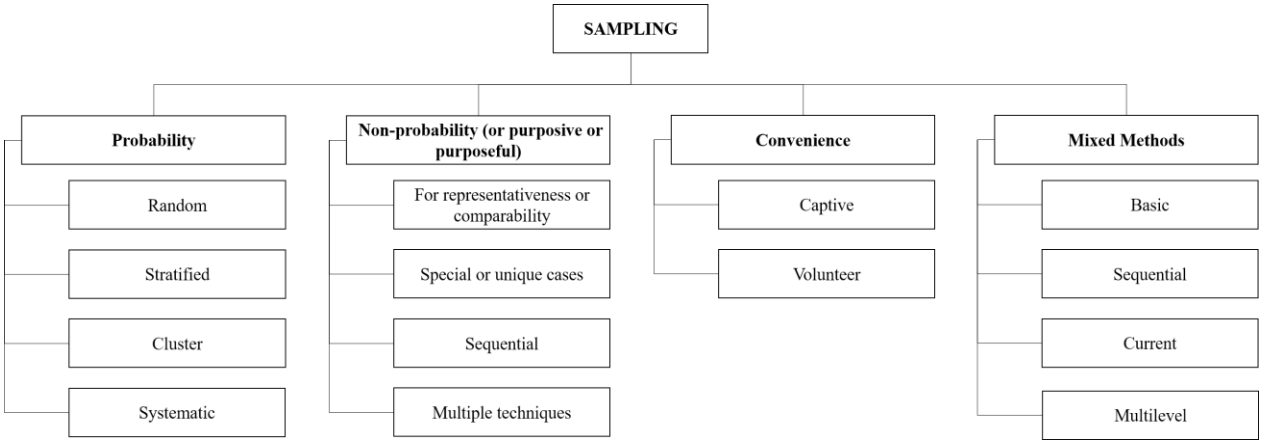
Standardised interviews maintain a high level of control over the participant and steer the interviewees to clear outcomes (see Table 29). In contrast, non-standardised interviews rely heavily on participants guiding themselves throughout the interview process. These aim to obtain data which may not be collated using highly structured interviews (see Table 29).

Both the preliminary study as well as the main study were conducted using semi-standardised interviews as a data collection method. The appropriateness of using semi-structured interviews within this study is best explained by Sauders at al. (1997 p.212): "*Semi-structured and in-depth, or non-standardised, interviews are used in qualitative research in order to conduct exploratory discussions to reveal and understand not only the 'what' and the 'how', but also to place more emphasis on exploring the 'why'*." The needs of the research are best addressed through a more flexible structure than standardised interviews, and are thus suited for exploring the relationships between OL and PMS within the case company. Semi-structured interviews provide a structure but still leave enough freedom to the participants to reveal valuable information, which might get lost in structured interviews. It thus provides an appropriate structure for exploring topics which are less familiar to the interviewer, as participants may be more willing to share information while maintaining a suitable structure for subject coverage. Thus, the structure allows the interviewer to incorporate additional questions in an impromptu way (Saunders, Lewis and Thornhill 2016).

3.4.4 Sampling

Within the research methods literature, several different sampling methods are proposed. An overview of the variety of sampling methods is given in Figure 20, which has been derived from Teddlie and Yu (2007), Cooksey and McDonald (2019) and Saunders (2007).

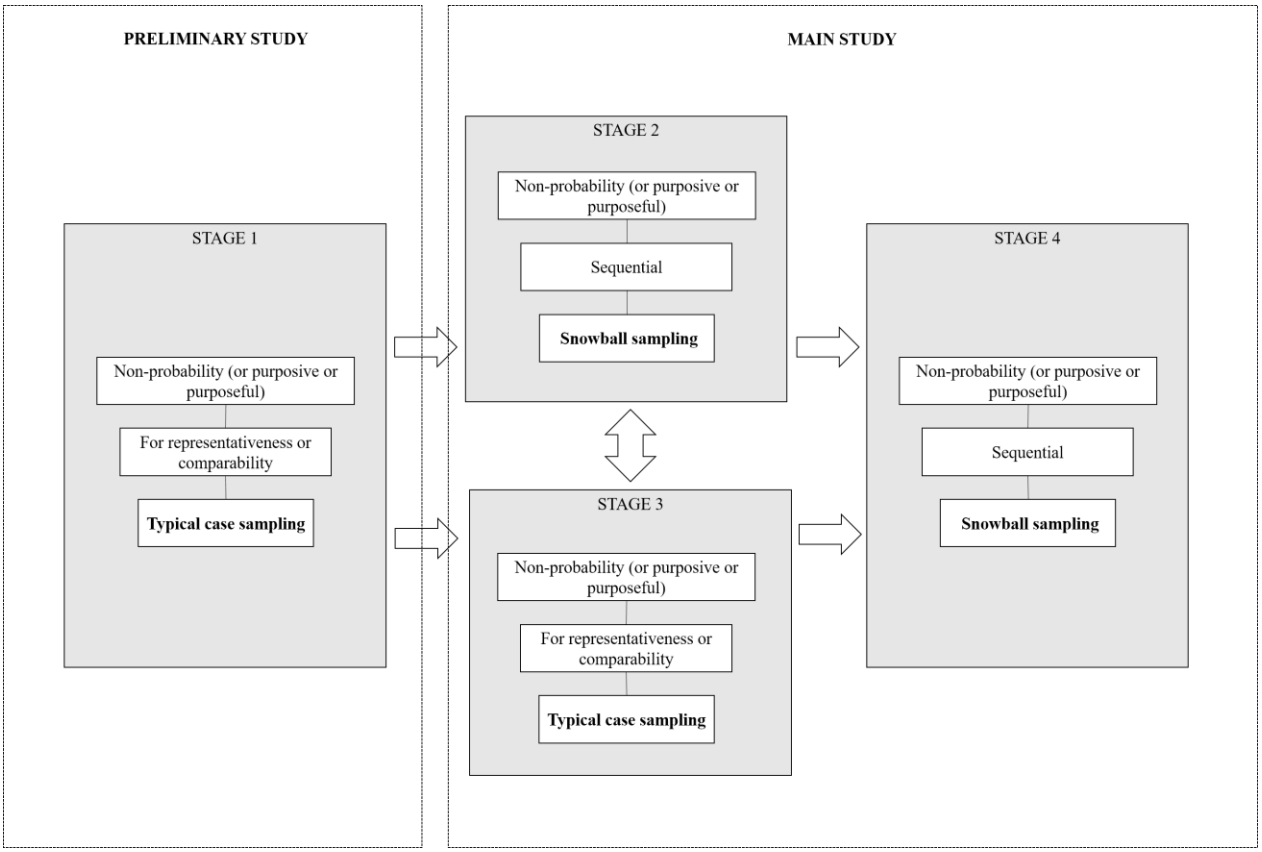
Figure 20: Sampling methods



(Source: adapted from Saunders 2007 p.207)

The research strategy applied in this study is composed of several stages and comprises a preliminary study (stage one) and the subsequent main study (stages two to four). Figure 21 below shows the individual data collection steps:

Figure 21: Sampling strategy



(Source: Author 2022)

The stages depicted in Figure 21 are examined in more detail throughout this chapter. Non-probability sampling (also known as purposive, purposeful, or qualitative sampling) is, as the name suggests, particularly suited for qualitative research. Moreover, this sampling method is appropriate for the selection of information-rich cases by investigating critical knowledge carriers, which might be individuals or groups (Palinkas et al. 2015; Cresswell and Plano Clark 2011, Teddlie and Yu 2007; Patton 2002), and is therefore well suited for case study research (Palinkas et al. 2015; Saunders 2007). Saunders (2007) stresses that even when conducting larger case studies, the sample would not be sufficient for random selection, which leaves the pursuit of non-probability sampling as the most appropriate sampling strategy for this study. Cooksey and McDonald (2019) add to the qualitative nature of non-probability sampling method by indicating that the strategy is particularly useful when the emphasis of the data is on the sampling criteria itself rather than on the sample foci. This is the case when the importance of the perspectives and knowledge derived from the sample is included, and sole focus on the representativeness of the sample is extended by this additional

dimension. A further benefit of non-probability sampling lies in its ability to combine multiple qualitative techniques if the research has several goals and stages (Berndt et al. 2020).

One limitation of non-probability samples is again generalisability. It is often noted by researchers that those samples lack representativeness due to their limited sample size (Berndt et al. 2020; Verma 2019). Moreover, another potential weakness pertains to researcher bias, especially when the sampling decisions are insufficiently described (Berndt et al. 2020). Verma (2019) remarks that validity in non-probability sampling can be strengthened by evading bias and making use of random selection.

With respect to the study´s research questions, its underlying objectives and in line with the case study design, an in-depth investigation was used to explore the relationships of PMS and OL (see Chapter 3.4 and Chapter 3.3). Having identified the research problem through the literature search and review (see Chapter two), non-probability sampling was identified as an appropriate technique to employ in order to produce the data required to address the aims and objectives of the research project.

Numerous researchers identify and list different non-probability sampling methods (e.g. Berndt et al. 2020; Cooksey and McDonald 2019; Bryman and Bell 2015; Saunders et al. 2007). This sampling strategy is characterised by its dependence on the researcher's assessment for selecting the most suitable sample (Brendt et al. 2020). Therefore, in order to identify a suitable sampling technique, it is important that the researcher is guided by the goal and objective of his or her study. Hence, Teddlie and Yu (2007) classify non-probability sampling techniques according to the different goals a case study may have:

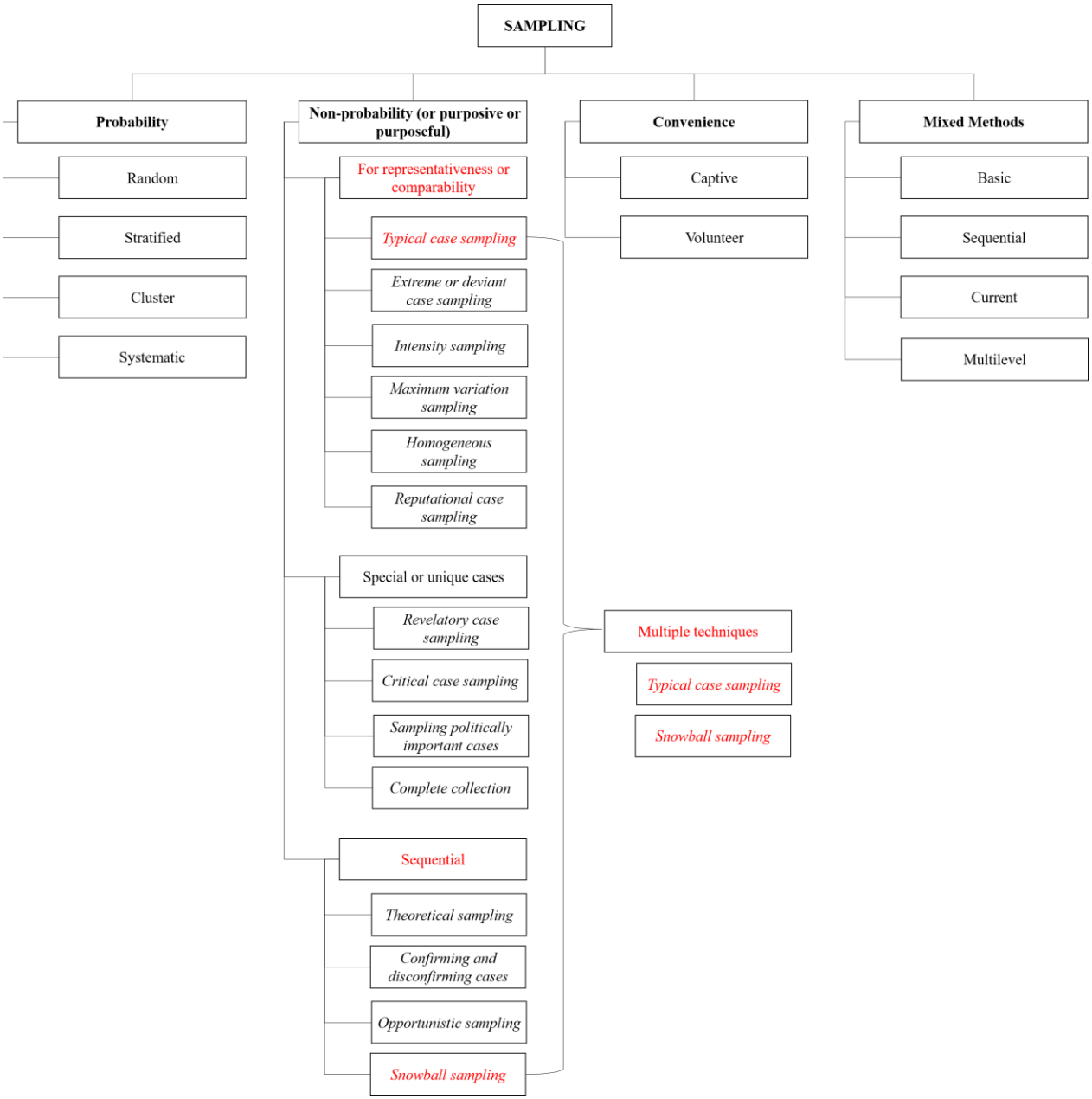
1) The aim is to achieve representativeness or comparability
2) Targeting special or unique cases (the focus lies on the sample and not so much on the research)
3) Aiming at sequential sampling (to develop theory or if the participants emerge out of the collected data - the focus is on selecting appropriate samples and not so much on the representativeness)
4) Multiple techniques combined to achieve different aims (combination of the above-mentioned techniques)

The purpose of this approach is two-fold: firstly, to attain representativeness by finding typical examples of the interplay between PMS and OL at Frankfurt airport. Secondly, the purpose of the approach is to further develop theory by extending the existing literature of OL and PMS to show the holistic relationship of the two concepts, as the current literature focusses on examining fragmented parts and an encompassing approach and understanding is lacking (see Chapter two). Therefore, selecting appropriate samples which can provide the data necessary for this project, was achieved by applying snowball sampling and typical case sampling. Both purposes were achieved through interviewing a stratified group of experts, spread throughout the hierarchy (top managers, senior managers, line manager and experts) of the core departments of the airport identified in the preliminary study in Chapter 3.5. Two non-probability sampling methods, typical case sampling and snowball sampling, were applied in order to achieve the aims established for the research (see Figure 21).

Typical case sampling aims at collecting the prevalent and dominant viewpoints by trying to represent what is typical and normal. Therefore, in the case of this research the purpose of the sampling aimed to grasp the dimension of PMS and OL at Frankfurt airport throughout the organisation's hierarchical structure. Focus was placed on the depth of learning (Cooksey and McDonals 2019) and the samples were selected according to their relevance and knowledge of the research subject (Cooksey and McDonals 2019).

In order to engage with employees with detailed knowledge (experts), it was not only necessary to select participants from across the organisation's hierarchy, but also to select those with greatest knowledge regarding the key departments' performance measures and learning processes. Snowball sampling (also called network sampling) was used in this research for this purpose. It is commonly used in interpretivism, and is highly suited for use in settings which are unfamiliar to the researcher (Berndt 2020; Cooksey and McDonals 2019). Therefore, applying both sampling methods was determined to be the most appropriate approach to answer the study´s research questions and objectives (see Figure 21). An overview of the sampling techniques applied is presented in Figure 22 below:

Figure 22: Sampling types



(Source: adapted from Saunders 2007 p.207)

The research applied the sampling strategies of typical case sampling and snowball sampling, as illustrated in Figure 22.

The research strategy employed several stages which are illustrated in diagram 21. Firstly, a preliminary study was conducted using typical case sampling to find potential interview participants who could identify the key departments and core processes of the airport (see Figure 21: stage 1. For further details please refer to Chapter 3.5). Results of the preliminary study indicated that employees with valuable knowledge relating to organisational learning processes and process measures work within the core departments of the company. Those knowledge-carriers were selected as suitable interview participants for stage two of the sampling process (see Figure 21: stage 2). Subsequently, stage three followed by identifying top, senior and line managers of the core departments via typical case sampling to develop an understanding of the organisational learning process and performance measurement process throughout the business and its hierarchical structure (see Figure 21: stage 3). The last sampling stage used data from the interviews from stages two and three, in which interviewees were asked to identify additional valuable knowledge carriers (experts) (see Figure 21: stage 4).

To determine a suitable sample size, the saturation concept of Glaser and Strauss (1967) was employed. Saturation is a widely applied principle for defining sample sizes and is based on informational redundancy (Vasileiou et al. 2018). In their study, they suggest that the optimum sample size for qualitative research is reached when no new information can be derived from the participants' viewpoints, meaning that the point of saturation has been reached. Data saturation was reached after interviewing three top managers, four senior managers, five line managers and six employees. Therefore, the sampling process was stopped once saturation was reached in terms of no new evidence being derived from the interviews and the interviewees repeating descriptions, views, and experiences. Saturation size is explained by Jette, Grover and Keck (2003) who state that the expertise on the selected research topic reduces the amount of necessary participants in a study. The overall number of 18 participants matches the research study of Mason (2010), who suggests that 68% of studies using interviews as qualitative data collection method utilise the sample sizes suggested by Creswell (1989) of between 5 to 25 for qualitative studies.

3.5 Preliminary Study

3.5.1 Function and Purpose of the Preliminary Study

Prior to the primary data collection stage of the main study, a preliminary study was conducted. Smith (2015) suggests that preliminary studies have a significant role in defining samples. The sample size of a preliminary study can vary significantly and may take several forms ranging from small qualitative studies up to larger quantitative studies. Key characteristics of preliminary studies include their brevity and low cost (Smith 2015). In addition, Smith advises that preliminary studies are conducted within the same culture or community, but with different individuals than in the main study.

The purpose of this stage was to contribute to the researcher's overall understanding of Frankfurt airport's organisational structure and performance, and to aid in the identification and selection of the sample for the main study (see Chapter 3.7.1). Specifically, the objectives for the preliminary study and their achievement are depicted in Table 30 as follows:

Table 30: Preliminary study objectives and evidence

Objective	**Evidence**	
To select an appropriate sample group for the main study	✓	see Chapter 3.5.2
To identify the key departments within the airport which are of high importance to the airport´s performance	✓	see Chapter 3.5.4
To identify initial contact persons responsible for measuring the performance within the key departments	✓	see Chapters 3.5.3 and 3.5.4
To understand the relationship between the core departments' performance and the overall performance of the airport	✓	see Chapter 3.5.4
To achieve an understanding of the core departments' performance measures	✓	see Chapter 3.5.4
To establish a common language prior to the main study and develop an understanding of key terminology used by personnel within Fraport AG	✓	see Chapter 3.5.4

(Source: Author 2022)

In addition to the objectives of the preliminary study presented in Table 30 above, the preliminary study was also used to refine and shape the research aim, its questions, and objectives (see Chapter 1.3).

3.5.2 Preliminary Study Sampling

The guiding principle for the selection of the sample group was to identify a group within the company with extensive and encompassing knowledge about Frankfurt airport´s processes with the aim of identifying the key departments within the company. Within this stage of the research, non-probability, typical case sampling was used, as this sampling strategy is highly suited for qualitative research and case studies (Palinkas et al. 2015; Saunders et al. 2007). Further, it can be combined with multiple qualitative techniques as the research pursues distinct research stages and aims (Berndt et al. 2020).

The sample group selected encompassed Frankfurt Airport's Department of Process and Quality Management, which consists of five employees and a manager. This department was selected as it combines understanding of all airport processes and general performance measures of the company. In addition, four of the members of the department as well as the manager were identified as able to assess and answer the objectives set for the preliminary study. One employee was deselected due to a short period of employment at the company, and a resulting lack of knowledge with regards to the company structure and processes. Prior to the interviews, a confidentiality declaration was issued to and signed by the participants regarding the recording of the interviews and to assure that their anonymity would be maintained. The interviews were transcribed in full, and analysed using content analysis.

3.5.3 Preliminary Study Data collection

The preliminary study interviews required a flexible structure to enable the investigation of unfamiliar topics, but still provide a solid structure and guideline regarding the interview topic. Semi-structured interviews are suitable for achieving the above-mentioned criteria (Kallio et al. 2016) as they are characterised by their open-ended questions, and their flexibility in changing and deepening the directions as information emerges and deepens. The interviewer is able to adjust the sequence of questions, and interviewees also have the chance to deepen their responses as they wish due to the formulated questions, structure and guidelines provided by the interviewer (Magaldi and Berle 2018; McIntosh and Morse 2015; Knox and Burkard 2014). Furthermore, semi-structured

interviews seek to establish a sphere of creativity and security in which the interviewees´ can reflect and fully dive into the research topic (Magaldi and Berle 2018; Polit and Beck 2010a; Fylan 2005). The ability of semi-structured interviews to create versatile substantial and complex data make them unique (Magaldi and Berle 2018), and they were chosen as the most suited method of data collection for this research.

Prior to the preliminary semi-structured interviews, a preliminary pilot study was also conducted. The purpose of the preliminary pilot study was to test the appropriateness and clarity of the questions used within the preliminary interviews. As a result of the preliminary pilot study, the interview questions were adapted and extended to ensure clarity and common understanding among participants.

Semi-structured interviews were selected as the method of data collection for this stage of the research as they use a more flexible structure than structured interviews, and as such are useful for exploring topics which may not be completely familiar to the interviewer, while at the same time providing a general structure in terms of the subject coverage of the interview.

Due to the COVID-19 pandemic, semi-structured interviews with four team members and the manager of the department were conducted one-to-one via video chat at a time specified by the interviewees. Microsoft Teams was selected as an appropriate instrument due to the availability and familiarity of the software to all department members. The preliminary interviews lasted approximately thirty minutes, with the longest lasting about forty minutes and the shortest twenty minutes.

The topics covered in the interviews were the following:

- The interviewees' understanding of the term "core department" and "core processes"
- Identification of the company´s core processes
- Identification of the company´s core departments
- The relationship between the key departments
- The relationship between the performance of the key departments
- Performance measures of the organisation and the key departments
- Contact persons from the relevant departments with extensive knowledge about their performance measures

All interviewees agreed to help the interviewer by identifying relevant contacts from the core departments. Further, one interviewee offered to contact them personally to tell them that they would be invited to participate in the main study, and another interviewee agreed to be named when making contact with relevant personnel from the key departments. All objectives were achieved except for attaining an understanding of the core departments' performance measures, as the detailed knowledge lies within the key departments and is therefore non-transparent for members outside these departments (except for the board of directors).

3.5.4 Preliminary Study Data Analysis

The interviews were transcribed and analysed using content analysis. This data analysis method was appropriate given the needs of the research as it directly draws upon the actual data of interviewees´ knowledge (Picciotto and Fox 2017; Hsieh and Shannon 2005). As existing research into the core processes of Frankfurt airport is limited, the application of predetermined categories was not possible (Kondracki and Wellman 2002). Therefore, the rich data derived from the interviews form and shape the categories applied in the data analysis. This method is also known as inductive category development (Mayring 2000). The major benefit of using the conventional approach to content analysis is seen in deriving rich knowledge directly from the interviewees without enforcing preconceived theoretical insights (Hsieh and Shannon 2005).

Hsieh and Shannon (2005) identify a potential weakness with regards to validity in conventional content analysis. Therefore, Picciotto and Fox (2017) and Creswell (2013) recommend the inclusion of forms of verification. Therefore, triangulation through the use of company data (such as organigrams, process descriptions, process maps, internal reports, etc.) and rich descriptions was used in this study.

Objectives for the preliminary study (see Chapter 4.5.1) are identified as follows. The interviewees' understanding of the term "core department" and "core processes" refers to a department of strategic importance to the company. Within Frankfurt airport, there are strategic business processes and departments, as well as supporting business processes and departments.

As an outcome of the preliminary study data analysis , one core process (which incorporate three core-sub-processes and two core departments) was identified as the most important, central, and essential process which represents the airport: the aviation process.

Table 31:Results preliminary study

Core Process	Sub-process	Department	Notes	Ranking
Aviation	Airside Management	AVN	Strategic Business Unit, without Corporate Safety and Security as this is done by the federal police force and supported by a subsidiary.	#1
	Terminal Management	AVN	Strategic Business Unit, without Corporate Safety and Security as this is done by the federal police force and supported by a subsidiary.	#2
	Ground Handling / Ground Services	GH	Strategic Business Unit, partly done by the subsidiary FRAGround	#3

(Source: Author 2022)

Table 31 presents the data from the preliminary study. It shows that the core process of Aviation is delivered by two core departments, AVN (the internal company abbreviation for aviation) and GH (the internal company abbreviation for ground handling services). Together, these departments employ approximately 65% of Fraport AG´s total employees. While Aviation, Infrastructure Management and International Activities are all core to Fraport AG's operations, each of these processes differ significantly. The preliminary interviews were used to aid in the identification and selection of one key process on which to focus the research. The following interview quotes emphasis the value of aviation as a central core process:

> I3: "*The airport consists of two core processes, the aviation process which is divided into airside and terminal management and the other core process is ground handling. Those two core processes encompass the complete airport operation."*

The interviewees were unanimous about the core processes within Frankfurt airport, which also represent the classic airport processes used in all airports:

> I4: "*The classic core process of the airport is aviation management, divided into airside and terminal management done by AVN and the ground handling process done by GH. Those are the classic airport processes*."

The participants rated the core process of the airport and ranked the core processes according to their priority:

> I1: "*What really represents the airport is the aviation process: airside management, terminal management and lastly the ground handling processes.*"

The interviewees ranked the strategic business units of the airport, and selected and ordered them according to their ability to generate value:

> I5: "*It is clearly AVN [airside management and terminal management] which generates most value."*

The interviewees' justification for the core business processes and departments is neatly summarised in the following quote:

> I2: "*The current situation clearly shows us that without the Aviation process, all of the other processes are non-existent. Without this core process everything collapses like a house of cards. This is exactly the situation we are facing now. Therefore, it is clear that airside management is by far the most important core process at Frankfurt airport. As second most important core process, terminal management follows. And as third core process, ground handling."*

The respondents highlight not only the core processes within Fraport AG, but also the reliance of the business on the aviation process, and its value to the organisation. In addition, the interviewees

identified initial contacts from the core departments who were noted as having extensive knowledge regarding the performance measurement and learning practices within the airport.

3.5.5 Preliminary Study Triangulation

In order to triangulate the primary data from the preliminary interviews, secondary financial reporting data relating to revenue and personnel was utilised. However, the reporting structure is based on the organisational structure of the company and not in core processes. For example, Aviation contains financial data from the Airside and Terminal Management department, Corporate Safety and Security - AVN (the company abbreviation for aviation) as a strategic service unit and from the Corporate Infrastructure Management department – ZIM (the internal company abbreviation for central infrastructure management) as a Service Unit. Ground handling consists of the Ground Services strategic business unit – GH (internal company abbreviation for ground handling services) and the following Central Units: Human Resources, Internal Auditing and Cargo Infrastructure and Development. Therefore, the following additional company data was used for data triangulation and validation:

- Process map of Fraport AG
- Risk control matrix
- Profit Center Reports
- Cost Center Reports
- Organisation charts

This data also provided the foundation for the main study by aiding in the development of an understanding of the processes and department structures of the organisation. Additionally, the material provided by EUROCONTROL (2017) further helped to triangulate the preliminary interviews, as it provided an overview of the entire airport operations management process and the entities involved (see Chapter 1.2.2). This made evident that it is indeed aviation management and ground handling services which are central to the airport operation.

3.6 Pilot Study

Yin (2009 p.106) claims: "*One of the most important sources of case study information is the interview*". There are different types of interviews which can be identified (Gläser 2010). For the purposes of this research, the semi-standardised type was selected as most appropriate. According to the research design, the form of one-to-one (face-to-face) interviews (Saunders 2007) with top managers, senior managers, line managers and employees of the key departments at Frankfurt airport is necessary to achieving the aims and objectives identified for the project. As described in Chapter 3.1, the interview technique varied dependent on the hierarchical group of the organisation. Top, senior and line managers were interviewed using the semi-structured approach and asked the same questions to determine the measurement and learning flow throughout organisational hierarchies. For employees, semi-structured narrative interviews were used to determine the sequential order of events. Like the preliminary study (see Chapter 3.5), due to the COVID-19 pandemic, interviews were conducted in the form of one-to-one video chats. The video chat tool Microsoft Teams was selected as an appropriate instrument because of the availability and familiarity of the software to the interviewees. Prior to the main interviews, four interviews were conducted with one manager and three employees. The purpose was to test the structure of the interview, the time needed for the different sections, the clarity of the questions and unknown hurdles and barriers within the different sections, as well as the data analysis methods.

The interview with the manager revealed rich content and thus due to the high quality of the data, the interview questions were not adapted, only the explanations were slightly modified in terms of their structure.

The employees on the other hand were interviewed using the semi-structured narrative approach. The pilot study with the employees aided in the identification of some issues and was adjusted accordingly twice. Therefore, the interview was conducted with three different employees until the questions and explanations revealed solid, rich-content data. The issue with the pilot interviews regarding the employees was that they did not open up and tell a complete and honest story. This might have been due to the language barrier as the interviews were conducted in English, however the native language of the employees is German. Accordingly, they needed time to think about a suitable story to tell. This is why the interview questions were sent to the last pilot interviewee in advance, so that the interviewee could prepare. This actually provided a key contribution as the interviewee told a good story which revealed rich and solid content. Moreover, the pilot study tested the effectiveness of the chosen methodological approach in terms of delivering suitable results for

addressing the research questions and meeting the research objectives (see Chapter 1.3). No changes regarding the sampling, data collection or analytical approaches had to be made as the chosen methodological approach depicted a rich and good structured content for answering the research questions and meeting the objectives of the study.

3.7 Main Study

Having identified the appropriate sample through the preliminary study (see Chapter 3.5), the main study utilised snowball sampling (also called network sampling) and non-probability, typical case sampling. The rationale for this choice was to achieve the following two-part aim: to achieve representativeness by finding the typical and normal case of interplay between PMS and OL at the case organisation. Additionally, the purpose of the approach was to expand the theory of OL and PMS by understanding the holistic relationship of OL and PMS, as the current literature examines only fragmented parts of the concepts, and an encompassing view is lacking (see Chapter two). The sampling methods were found to be highly suited for interpretivism (see Chapter 3.4.3) and applying both was found to be the most effective method to answer the study´s research questions and objectives (see Chapter 1.3).

The sampling methods related to the results from the preliminary sampling (see Chapter 3.5.4) in the following ways:

1. Snowball sampling: recommended experts (from interviewees of the preliminary study) who work in the core departments.
2. Non-probability, typical case sampling: based on the identified core departments (from the preliminary study) and the hierarchical structure.

The objective of the sampling was to identify experts with significant knowledge about prevalent performance measurement and learning processes of all hierarchical levels throughout the core departments at Frankfurt airport. Based on the first set of interviews which stemmed from snowball and typical case sampling, a second set of snowball sampling was pursued to address the most knowledgeable experts, and to cover a suitable number of experts and managers (see Chapter 3.7.1 and Table 32).

3.7.1 Data collection

Kohlbacher (2006) argues that qualitative content analysis as an inductive approach perfectly suits case studies as an analytical method. The inductive approach of building theory is distinctive in case study research (Yin, 2003; Eisenhardt, 1989) (see Chapter 3.4.1) and in content analysis (Kohlbacher 2006; Gläser and Laudel 1999). Case studies provide a multidimensional perspective and thus create a holistic view of situations or processes (Patton and Appelbaum 2003; Remenyi 2002). Moreover, multiple sources of evidence are appropriate to case studies, with one of the most important sources being the interview (Yin 2003). Additionally, case studies investigate complex social phenomena (see Chapter 3.4.1). Qualitative content analysis supports this by generating a holistic understanding of complex situations (Hartley 1994) and by using interviews as a key resource (Mayring 2003).

Another characteristic of qualitative content analysis is that it is a flexible method allowing for combination with other qualitative methods for data analysis (Mayring 2000). Furthermore, case studies also commonly use narrative analysis as a data analysis method (Moen 2006; Creswell 1998).

The aim of the analytical approach of this research was two-fold: Firstly, the approach sought to extract rich content depicting the relationship between performance measurement systems and organisational learning. Secondly, the sequential structure of the interplay of the two elements was analysed. Therefore, the research firstly requires content analysis to extract the rich content of the interviews. The application of content analysis firstly demands the definition of the content categories. For the purpose of this study, content categories are divided into organisational learning and performance measurement categories. Both categories were applied separately to the interview data and were based on the literature reviewed in Chapter two. Table 32 depicts the OL and PMS content categories:

Table 32: Content Categories

Organisational Learning Categories		**Performance Measurement Categories**
Individual (Crossan et al, 1999)	Knowledge Acquisition (Huber 1991)	Measure (Landström et al. 2018)
Individual to group (Crossan et al. 1999)	Interpretation (Crossan et al. 1999 and Huber 1991)	Compile and analyse (Landström et al. 2018)
Group to organisation (Crossan et al. 1999)	Knowledge distribution (Huber 1991)	Report (Landström et al. 2018)
Organisation to individual (Crossan et al. 1999)	Memory (Huber 1991)	Make decisions (Landström et al. 2018)

(Source: Author 2022)

Table 32 shows the content categories applied in the main study. The OL categories are based on Crossan et al.´s (1999) levels of learning and Huber´s (1991) OL model (see Chapter 2.2.2). The PM categories are in line with Landström et al.´s (2018) PMS cycle (see Chapter 2.3.3). Further, applying content categories based on literature aids the triangulation of the study (see Chapter 3.7.5).

These content categories depicted in Table 32 were applied to all interviews (top managers, senior managers, line managers and employees). Strauss (1987 p.27) highlights the importance of coding for qualitative research by noting that "*Coding...is an essential procedure. Any researcher who wishes to become proficient at doing qualitative analysis must learn to code well and easily. The excellence of the research rests in large part on the excellence of the coding.*" The analysis software NVivo 12 was applied to structure and sort the interviews into the categorical content categories.

In a second stage, the holistic structure is identified by conducting narrative interviews and analysing these with a holistic form of narrative analysis (see Chapter 2.7.4). One of the most influential models for analysing narratives is provided by Labov and Waletzky (1967). The schema extracts the actual sequence of events as they occurred (Lambrou 2019) and thus is well suited for analysing the structural interplay of performance measurement and organisational learning. Therefore, the Labovian model provides the analytical method used in this research for extracting narrative form and structure.

Narrative structure contains the following elements for extracting the story schema: abstract, orientation, complication, evaluation, resolution, and coda. However, only four elements orientation, complication, evaluation, and resolution are essential for the analysis as they define the core of a narrative (Romano et al. 2013). Lambrou (2019) even argues that only one single element is needed: the complication.

Romano et al. (2013) define the elements as follows:

> "1. Abstract: What is the story about?
> 2. Orientation: Who, when, what, and where?
> 3. Complication: And then, what happened?
> 4. Evaluation: And so what?
> 5. Resolution: Then, what happened in the end?
> 6. Coda: Signals the end of the story"
> (Romano et al. 2013 p.75)

NVivo 12 was also used here to sort the transcribed interviews into the elements of the narrative schema.

Therefore, in order to generate a holistic framework of the interconnectedness of performance measurement and organisational learning, the following analysing methods, depicted in Table 33, were applied:

Table 33: Overview Data Analysis

Sample Group	Sample Size	Data Collection Method	Content Analysis	Narrative Schema
Top Managers	3	Semi-structured interviews	x	
Senior Managers	4		x	
Line Managers	5		x	
Employees	6	Semi-structured narrative interviews	x	x

(Source: Author 2022)

The employees provide the structure of events, as they were involved in all organisational learning stages, and also play a central role in performance measurement. Therefore, semi-structured narrative interviews were conducted with the employees (see Table 33). Together with the managers who were interviewed using the semi-structured approach (see Table 33), rich content was developed to depict the interplay of organisational learning and performance measurement within all levels throughout the case organisation. The semi-structured narrative interviews with the employees were conducted using a deliberately open approach (see Table 33). Thus, interviewees were asked to tell a story of how performance was measured and how learning emerged out of it.

The semi-structured interviews with the managers were more comprehensive and specific.
In line with the research questions and objectives presented in Chapter 1.3, the semi-structured interviews were divided into two parts. The first part aimed to identify how performance measurement systems were used within daily business, while the second part investigated the managers' own personal experience with organisational learning, and how it related to performance measurement systems. The interview guide for the semi-structured interviews, as well as the interview guide for the semi-structured narrative interviews are provided in APPENDIX I and APPENDIX II.

3.7.2 Analysis and Interpretation

Content Analysis:

Having defined the content categories based on the relevant literature (see Chapter 3.7.1), the transcribed interviews were sorted into categories. "*At this stage, separate sentences or utterances are assigned to relevant categories*" (Lieblich et al. 1998 p.113). In this section, some extracts from the data analysis of the pilot study were used to visualise the data analysing process. The length of the extracts taken from the different interviews varied according to the interview type, semi-structured narrative or semi-structured, and according to the interviewee's answers. In some cases, larger interview sections were more relevant to a single category than a single sentence, or vice versa.

The following table shows an extract of the allocation of the pilot interview sequences according to the content categories. Due to the richness and length of the pilot interviews, only some quotes were used to show a glimpse of the complex relationship between the performance measurement processes and the organisational learning processes. These are presented in Tables 34 and 35 below.

Table 34: Content Analysis Organisational Learning

Organisational Learning Categories		**Extracts Pilot Study**
Organisational learning phase	**Organisational learning process**	
Individual (Crossan et al. 1999)	Knowledge Acquisition (Huber 1991)	"First, I have a look at a topic individually. I research about it and gather some information and knowledge." (Employee 3) "Knowledge acquisition happens at the individual level and is then passed on and refined in the group. Lastly the organisation gets knowledge from the group." (Manger 1)
Individual to group (Crossan et al. 1999)	Interpretation (Crossan et al. 1999 and Huber 1991)	"(…) I do not agree to this lifecycle because I think interpretation is a part of individual aspects, not only knowledge acquisition. Because without interpretation you can´t communicate your individual to group." Manger 1 "First, I have a look at a topic individually. I research about it and gather some information and knowledge. Afterwards, we as a department evaluate which was valuable and which we should implement." (Employee 3)

Organisational Learning Categories		Extracts Pilot Study
Organisational learning phase	**Organisational learning process**	
Group to organisation (Crossan et al. 1999)	Knowledge distribution (Huber 1991)	"The organisation needs different knowledge and interpreted information from individuals and from different groups of the organisation. There is a process for analysing and decision making on each level of the organisation: employees, managers until it is implemented into the organisation" (Manager 1) "Knowledge distribution can happen within groups and from groups into the organisation" (Manager 1)
Organisation to individual (Crossan et al. 1999)	Memory (Huber 1991)	"After they decided on if they want to implement our idea, the decision flows into the organisation and the whole organisation must stick to these new settings and rules now. Usually, these new settings and rules are then implemented systemically and within company guidelines or the company policy." (Employee 3) "You mentioned memory, I think that memory is one of the main aspects of organisational learning and how organisations learn. There is a memory on how to act, employees get information about problems or instruction about certain things via the organisation´s memory. I think an organisation will learn just only by triggers. A trigger could be positive or negative. The organisation could learn from the knowledge coming from the individual via the group and the management. This generated knowledge will modify the memory because it might correct views, policies and/or processes. It is also a feedback cycle to the individual, especially if things went wrong within an organisation." (Manager 1)

(Source: Author 2022)

Table 35: Content Categories Performance Measurement

Performance Measurement Categories (Landström et al. 2018)	**Extracts Pilot Study**
Measure	"Either I, my boss or the senior manager have the idea of changing something, so adjusting the performance of the company´s risk management." (Employee 3) "And to the question how often: I think normally once per month or in some cases just before we have the steering committee. Because we have to report it to the steering committee and therefore, we have to get a clear view on this three measurements [time, quality and budget]. Perhaps all six weeks or eight weeks, two months. It depends." (Manager 1)
Compile and analyse	"Afterwards we as a group researched on the threshold levels as well, in order to build our own opinion about it independently from PwC. After each of us team members researched on our own, we sat together, discussed about our opinion and then we agreed on a concept. Afterwards we presented our concept to our supervisor" (Employee 3) "Compile and analyse data it is an activity with the team or individually. I have to get a clear view concerning the measurement and so I check it and analyse it with my team, because just only a personal view is not enough to analyse certain KPI´s. If I report to the steering committee I have to ensure that I have the right analysis of the measures and KPIs" (Manager 1)

Performance Measurement Categories (Landström et al. 2018)	**Extracts Pilot Study**
Report	"Then either I discuss it with my team members, so that we discuss about the topic and agree on a concept we present our boss or I directly discuss the idea with my boss or within the risk management committee where our boss and his boss are part of." (Employee 3) "Reporting normally is my part. I report to the steering committee or just to my boss (Manager 1)
Make decisions	"Afterwards my boss and his boss make a decision about it. After they decided on if they want to implement our idea, the decision flows into the organisation and the whole organisation must stick to these new settings and rules. Usually, these new settings and rules are then implemented systemically and within company guidelines or the company policy." (Employee 3) "But it is a question of reporting, because as a manager it is a normal management function to measure and correct and to make decisions. But sometimes I have also to report at the steering committee and then the steering committee makes a decision. So we have different levels of measurement and there are different persons and institutions to the decisions." (Manager 1)

(Source: Author 2022)

Analysis of the narrative schema:

As discussed in Chapter 4.1, the semi-structured narrative interviews were further analysed using the narrative schema of Labov and Waletzky (1967). This approach was used to identify the actual sequence of events. The application of the narrative schema is depicted below in Table 36 by analysing the third semi-structured narrative pilot interview:

Table 36: Narrative Schema Analysis

Abstract	"One time PwC measured the performance of our department and reviewed our risk management. They made some points where they suggested to change some things and to do some things differently." (Employee 3)
Orientation	"We learn a lot from other experts. They tell us about their experience and about things we can learn from them and things we can implement within our department and within the company. Afterwards, we as a department evaluate which was valuable and which we should implement." (Employee 3)
Complicating action	"Talking about the review of PwC, there were many things which we as a team agreed on that didn´t make sense to us. So, we decided we wouldn´t implement all points they made, only some. Other things were very useful, and we agreed to implement their advice. One example they advised us to do and which we implemented was increasing the threshold levels. The senior manager told us that our department´s aim is to reduce risks. Within the review, PwC suggested some threshold levels. Afterwards we as a group researched on the threshold levels as well, in order to build our own opinion about it independently from PwC. After each of us team members researched on our own, we sat together, discussed about our opinion and then we agreed on a concept. Afterwards we presented our concept to our supervisor." (Employee 3)
Evaluation	"So the process is usually as follows: Either I, my boss or the senior manager have the idea of changing something, so adjusting the performance of the company´s risk management. At first, I have a look at a topic individually. I research about it and gather some information and knowledge. Then either I discuss it with my team members, so that we discuss about the topic and agree on a concept we present our boss or I directly discuss the idea with my boss or within the risk management committee where our boss and his boss are part of. Afterwards my boss and his boss make a decision about it. After they decided on if they want to implement our idea, the decision flows into the organisation and the whole organisation must stick to these new settings and rules now. Usually, these new settings and rules are then implemented systemically and within company guidelines or the company policy." (Employee 3)
Resolution	"All employees learn out of it because everyone, no matter from which department they are have to adhere to these new rules or settings. Usually, we also inform them and sometimes we also train them if for example if we change something in the system. I myself learn from it of course as well. At first I learn out of my own research I do to gather knowledge and then I learn again when we discuss it within the group and then again, I learn when we implement it." (Employee 3)
Coda	"So yeah, that´s basically an example of how performance is measurement within the risk management and how others and we learn from it." (Employee 3)

(Source: Author 2022)

3.7.3 Drawing conclusions from the results

Lastly, conclusions are drawn from the results. Lieblich et al. (1998 p.113) describes the approach as follows: "*the contents collected in each category can be used descriptively to formulate a picture of the content universe in certain groups of people or cultures*".

The analysis of the examples from the pilot study shows that the content categories (see Chapter 3.7.1 and Table 32) could be successfully applied to the primary data. The example analysis (see Chapter 3.7.2) also highlights the importance of the differentiation between the hierarchical levels present, by highlighting the relationships between these different levels. The analysis further reveals first insights into the relationships between the PM processes and the learning processes at the case company and provided the opportunity to reflect back on the literature reviewed in Chapter two.

3.7.4 Main Study Triangulation

The aim of triangulation is to enhance the validity and reliability of research (Mishra and Rasundram 2017). Especially when conducting single-case studies, triangulation helps to support the validity of the research process. Yin´s (2009) judgement as a continuous test for maintaining the quality of case studies and Eisenhardt`s (1989) framework were applied to construct validity for this research, (see Chapter 3.4.1). Theory triangulation was used in the main study (see Chapter 3.11 and Chapter 5.3) specially to construct both external and internal validity, however this section also highlights three other triangulation methods which were used in conjunction with theory triangulation to further enhance the reliability and validity of the findings of the study.

By applying theory triangulation, theories from literature are used when analysing the data collected (Denzin 1970) (see Chapter 3.7.1). A major advantage of theory triangulation is the generation of an in-depth analysis of the findings (Farquhar, Michels and Robson 2020). By using theories from the literature while interpreting the findings, theory-building and the extension of existent theories is achieved (Farquhar, Michels and Robson 2020). The study applied content categories identified from themes within the OL and PM literatures to triangulate the analysed data with theory (see Chapter 3.7.1). Additionally, besides applying theory triangulation in the form of content categories, the study further uses theory (presented in Chapter two) to triangulate the data analysed and presented within Chapter four. Therefore, to apply theory triangulation to the main study, this thesis brings together the analysis of the primary and secondary data with the discussion in one chapter: Chapter four "FINDINGS AND DISCUSSION". As such, this chapter dualistically reflects on the relevance and validity of theories from both the OL and PM literatures, while concurrently interpreting the findings generated from the primary and secondary data. This approach achieves the

triangulation of the data with the literature and directly discusses the findings in relation to relevant theoretical perspectives.

Another triangulation approach used within this study was the usage of different data analysis methods (Farquhar, Michels and Robson 2020). This triangulation approach was applied within the study using two data analysis methods: the narrative schema of Labov and Waletzky (1967) and content analysis (see Chapter 3.7.1). Additionally, some researchers (e.g. Schmidt and Zartler 2019; Jick 1979) suggest a triangulation of perspectives. Jick (1979 p. 603-604) explains this approach as follows: "*triangulation [of perspectives] may be used not only to examine the same phenomenon from multiple perspectives but also to enrich our understanding by allowing for new or deeper dimensions to emerge*". By interviewing participants across the different hierarchical levels of the company, triangulation of perspectives among the interview participants was also achieved.

Besides theory, method and perspective triangulation, another form of triangulation which was used to support the credibility of the findings was achieved through member checking (Nicholls 2017). This technique was applied and is further described in Chapter 3.8. Member-checking is a suitable triangulation method for single-case studies as the findings are checked and confirmed by organisational members (Mishra and Rasundram 2017).

Applying these four triangulation methods strengthens the case study tremendously and mitigates the criticism of case studies for lack of rigour. Applying the different forms of triangulation in addition to Eisenhardt`s (1989) framework and Yin´s (2009) judgement as continuous test (see Chapter 3.4.1) helps to support the validity and reliability of this research.

3.8 Member checking

In order to validate the results, the technique of member checking, also referred to as participant or respondent validation, is applied in the research to confirm the results of the study and aid in triangulation as highlighted in the previous section (see Chapter 3.7.4). The potential of researcher bias, as well as the ethical issues associated with this technique are presented and discussed in Chapter 3.8 and Chapter 3.9.

Member checking is used to validate the trustworthiness of the results from qualitative data analysis (Doyle 2007) and can be defined as follows: "*The method of returning an interview or analyzed data to a participant is known as member checking*" (Birt et al. 2016 p.1802). The method is used to

re-engage the interviewees in order to validate the result of the analysis, in accordance with their own views (Busetto, Wick and Gumbinger 2020). This research used the final result of the data analysis (see Chapter 4.5), the model answering the final research question, to ask participants to check the accuracy. The researcher thus sent the final model together with the summary of the results explaining the model to the participants, with the request to check the model and the findings. They were also asked to contact the interviewer and provide feedback on the findings, both positive as well as negative. The participants confirmed the accuracy and validity of the model presented in Chapter 4.5 and the results described throughout Chapter four. One participant remarked on the complexity of the model and suggested using different colours for the processes. As a result, the researcher adapted the model and applied colour to provide a clearer structure. One participant who is also familiar with the PMS and OL theory, noted the accuracy of the model not only from practice but also from a theoretical standpoint. Additionally, participants were highly enthusiastic about the model and suggested its appropriateness to other airports worldwide. Moreover, two participants offered the researcher an opportunity to directly optimise their PMS and OL processes within their departments and to directly implement the findings of this research within their departments.

3.9 Ethics

The purpose of this section is to highlight the ethical issues impacting on the project, to state their significance in relation to the gathering and analysis of the data (and the generation of related findings), and to detail how these ethical issues were addressed. Research ethics must be followed precisely by insider, outsider and inbetweener researchers to avoid bias (Saidin and Yaacob 2016). Fleming (2018) identifies the following ethical challenges for researchers conducting research within the own company: privacy and confidentiality, protected identity, and the ethical principle of informed consent.

Ethical considerations relating to the conduct of the research were addressed in accordance with Robert Gordon University guidelines on Research Governance and Ethics. The research fully adhered to the University's ethical policy (https://www.rgu.ac.uk/research/university-research-policies/research-governance-ethics) and ethical approval was gained from Robert Gordon University as part of the research process. In addition, ethical approval was obtained from the case company's human resource department and audit committee. In order to obtain the ethical approval, the researcher provided a detailed overview of the project and discussed the data collection and

analysis approach. For ethical considerations, the researcher also worked closely with the legal and data protection departments of Frankfurt airport.

Researcher-participant relationships bear risks in terms of the existence of formal or informal power imbalances (Fleming 2018). The researcher does not have any power relations to the interviewees as the participants are unknown to her. This risk is further mitigated by applying the ethical principles of autonomy, privacy, and confidentiality, which are evaluated below in this chapter.

Ethics is of major importance to this study. Specifically, ethical challenges are addressed in line with the ethical principles of autonomy, privacy and confidentiality, informed consent, beneficence, and justice (Fleming 2018; Minnesota 2003; Orb, Eisenhauer and Wynaden 2001).

Autonomy

Autonomy includes the right of participants to decide whether they would like to participate or withdraw from the study without fearing penalty (Capron 1989). The principle of autonomy has been applied in the following ways. The researcher ensured that all interviewees voluntarily participated in the interviews. Two managers offered to address their subordinates directly to guarantee participation in the interviews. However, the interviewer refused these offers and instead addressed employees directly. Using this approach, the interviewer wanted to guarantee autonomy to the participants as they might have felt forced to participate in the interviews if their line manager sought their participation Lastly, all participants voluntarily agreed to take part in the interviews, and only one participant withdrew from the interview. This interviewee did not feel comfortable enough to provide information about the organisation`s OL and PMS culture, despite the researcher's assurance that their identity would not be disclosed.

Privacy and confidentiality

Research participants have the right to privacy and confidentiality, and researchers need to ensure that this right is not violated (Fleming 2018; Minnesota 2003; Orb, Eisenhauer and Wynaden 2001). As described in the previous section "Autonomy", two managers offered to direct their subordinates to participate in the interviews, which the researcher declined in order to protect their right of autonomy. Although these two managers were content to reveal their identities (both by making public their participation in the research interview, and by wanting to promote this study) the interviewer did not disclose their identities. Throughout the research process, it has been of great importance to the interviewer to guarantee every participant the right of privacy and confidentiality by not disclosing anyone's identity, even when they agreed to be named. The researcher regards the

principle of autonomy and the principles of privacy and confidentiality as influencing each other. If the researcher accepted the offer to disclose the identities of the two managers, this may have influenced other participants as some might have felt under pressure to participate, which in turn affects the principle of autonomy. Additionally, interviewees were guaranteed that the audio recordings of the interviews, as well as the transcribed materials, would be secured and available only for the research purpose to the researcher and destroyed after the finalisation of the research in line with Robert Gordon University regulations.

Securing and maintaining privacy and confidentiality is a major ethical issue within qualitative research (Fleming 2018; Minnesota 2003; Orb, Eisenhauer and Wynaden 2001). Together with the legal and data protection department of Frankfurt airport, the researcher developed a data protection form (see APPENDIX III) for the interviewees to guarantee the confidentiality, anonymity, and data protection of interviewees and to inform about the legal requirements of data protection as well as the researcher´s duty of confidentiality.

The final model generated from the analysis was sent to the participants with the request to review the model, and provide direct feedback to interviewer in case of errors or omissions. In addition, participants could also arrange to talk to the interviewer or make further comments (see Chapter 3.8). This approach of validating the final model sought to minimise the ethical issues usually involved in the validation technique of member checking (Nicholls 2017). It should also be noted that all participants were strictly kept anonymous when engaging with the final model developed from the data analysis.

Informed consent

The researcher's duty is to guarantee informed consent by being transparent about the research and about the role of the participants within it (Fleming 2018; Minnesota 2003; Orb, Eisenhauer and Wynaden 2001). Participants consented to take part in the interviews based on the principle of autonomy, prior to their participation. Therefore, potential interview candidates were informed about the research project and the university. The interviewer was fully transparent regarding the purpose, aim, final outcome of the study, as well as the research process and procedures involved. The participants were asked to validate the final results of the research (see Chapter 3.8), and also signed a data protection form in which confidentiality, anonymity, and data protection were guaranteed to them, and in which the researcher declared her duty of confidentiality (see APPENDIX III). The interviewees were asked to sign the data protection form before the interview was scheduled. Further, interviewees were informed that the audio recordings of the interviews, as

well as the transcribed materials, would be stored securely and available only for research purposes to the researcher, and would be destroyed following the completion of the research, as noted above. At the start of the interviews, the participants were again informed about the research topic, purpose and procedure and reminded about their data protection form. The participants were then asked again if they are willing to start the interview.

Beneficence principle

In line with the beneficence principle, the interviewer offered to present participants with practical findings beneficial for their department's improvement (Fleming 2018; Minnesota 2003; Orb, Eisenhauer and Wynaden 2001). Some managers approached the interviewer and asked to come directly to their department to apply the findings. Significantly, the board of directors of Frankfurt Airport requested that the researcher apply the results of the study and the framework to the case company. As described in Chapter 5.6, the researcher already provided the abstract of this thesis to the board of directors. The board members have also requested a meeting with the researcher to discuss the concrete actions of the recommendations as soon as they have received a copy of the thesis. The benefits and recommendations derived from the findings of this research for the case company are discussed in Chapter 5.5. The board of directors have already announced a company-wide project to implement the recommendations of this.

Justice

The principle of justice is to protect participants from being exploited by recognising vulnerability (Fleming 2018; Minnesota 2003; Orb, Eisenhauer and Wynaden 2001). While the sample group of participants may at first not to be seen to be categorised as vulnerable, the interviewer was aware that all participants from all hierarchical layers of the organisation need to be heard and acknowledged to ensure the validity of the results. By protecting their rights of autonomy, privacy and confidentiality, informed consent, and beneficence, the participants' right of justice was also guaranteed.

3.10 Potential research bias

An interviewer´s background and experiences can lead to the potential for bias (Clough and Nutbrown 2002; Denscombe 1998). The researcher, functioning as a data collector and analyst, may be prone to researcher bias (Birt et al. 2016; Miles and Huberman 1994). However, Kvale (1996)

argues that personal interactions between the interviewer and interviewee should not be avoided but instead, the interviewer should be regarded as a methodological tool. Further, Kvale (1996) argues that the researcher's familiarity with the research environment is crucial. Certainly, the researcher´s professional background, including working at the case company, experiencing OL and PM process issues, and awareness of the competitiveness and struggles within the aviation environment, led to and influenced the inception of the research.

As the researcher works at Frankfurt airport, it was a critical ethical issue to recognise the advantages and disadvantages of studying her own organisation. As Jaswinder and Nest (2019 p.446) describe, "*Insider research is now a well-established feature of qualitative methodologies*". They propose that the duality of the insider-outsider concept is too simplistic with regard to ethical considerations. Other researchers such as Milligram (2016), Obasi (2014) or Perryman (2011) suggest a more nuanced view of the concept of insider-outsider research, and propose the "inbetweener" researcher. The concept of the "insider-outsider-inbetweener" continuum is regarded as more accurately reflecting the multiple levels of the insider-outsider relationship, and its associated ethical considerations for researchers conducting qualitative research in their own work environments (Jaswinder and Nest 2019). The insider-outsider-inbetweener continuum provides researchers with more flexibility in their positioning within their research project, as "*people are insiders in some respects but outsiders in others*" (Jaswinder and Nest 2019 p.447). This inherent flexibility is supported by Arthur (2010) who argues that depending on the situation, a researcher may be an insider or an outsider. Therefore, reflecting on the ethical and methodological considerations within the present study, the researcher may indeed be regarded as an "inbetweener" within the "insider-outsider-inbetweener" spectrum, as the researcher is familiar with the company structure (insider), but is completely new to the fields of operational aviation and ground handling services (outsider). The researcher investigates parts of the organisation which are unknown to her (outsider) and collects data from unknown employees (outsider), even though they are members of the same organisation (insider). Additionally, the researcher does not have any personal ties, relations, or professional working experiences with the interviewees (outsider). It was critical to the researcher to clearly demarcate the research, her role as researcher and her role as employee and being part of the work environment.

Conducting research at the researcher's own organisation brings several advantages, such as "*(a) having a greater understanding of the culture being studied; (b) not altering the flow of social interaction unnaturally; and (c) having an established intimacy which promotes both the telling and the judging of truth.*" (Unluer 2012 p.1). Additionally, insiders and inbetweeners have knowledge

which usually takes a long time for outsiders to attain, as they know how the organisation functions. Despite the advantages, researchers need to be aware of the potential risks and biases arising when researching their own organisations.

It is important that the researcher remains objective towards the research and that if someone else were to undertake the interviews, the results would be the same (Kyle 1996). One advantage is that even though the researcher has experience in the research field, the PM and learning processes of the operational departments differ greatly to the researcher´s own experiences.

The researcher´s own background and experience were also felt to have led to richer interviews. The mutual respect and understanding of the same terminology used within the airport and the aviation industry made the interviewees more comfortable so that they were willing to open up and openly, bluntly and honestly told their stories and experiences. Therefore, the interviewer can indeed be regarded as a methodological tool as prior knowledge enabled a more effective collection of the interview data (Kvale 1996).

Nevertheless, as the researcher conducted the research within her own organisation, it was critical to follow ethical guidelines to avoid bias. In addition to the ethical principles presented in the previous Chapter 3.9, the researcher also deployed the tactic of Chavez (2008), which aimed to mitigate research bias in conducting research at the researcher's own company. At the beginning of the interview, the interviewees were informed that the researcher worked at the airport, but was completely new to the operational airport field.

Therefore, it can be observed that significant efforts were made to identify, acknowledge and mitigate any potential for personal bias within this project Both the data collection and analysis processes provided potential for researcher bias. A researcher may impose personal interests and perspective on the results, thus leading to the dominance of a personal viewpoint over interviewees' perspectives (Birt et al. 2016; Mason 2002). In order to avoid this, the researcher conducted member checking and asked the interviewee participants to validate the final model drawn from the interviews (see Chapter 3.8). As noted above, member checking can act to mitigate the potential for researcher bias, as participants validate the findings as congruent with their worldview.

3.11 A novel approach to internal validity

Internal validity describes the causal relation between variables and results in which the researcher provides plausible and logical arguments to defend the findings of the research (Gibbert, Ruigrok and Wicki 2008). Internal validity includes data analysis (Yin 1994) and can be measured in three ways. Their application in the present study is presented in Table 37 below:

Table 37: Internal validity

Internal validity measure	**Application**
Clear research Framework	✓ Applying Eisenhardt`s (1989) framework (see Chapter 3.4.1)
Data analysing method: - Pattern matching - Explanation building - Rival explanations - Logic models	- Application of content analysis - Application of narrative analysis
Triangulation	✓ Drawing back the results to literature (see Chapter four) ✓ Apply literature as content categories (see chapter 3.7.1) ✓ Member checking to validate the findings (see Chapters 3.8 and 3.7.4) ✓ Method and theory triangulation (see Chapter 3.7.4)

(Source: adopted from Gibbert, Ruigrok and Wicki 2008 p. 1468)

In order to guarantee internal validity, the measures of Gibbert, Ruigrok and Wicki (2008) were adopted in this research (see Table 37). A clear research framework was developed and applied by using Eisenhardt`s (1989) framework (see Chapter 3.4.1), as well as the different triangulation methods described in Chapter 3.7.4. However, the methods of content analysis and the narrative schema used in this study (see Chapter 3.7.1) were not in line with Yin`s (1994; 2003; 2009) methods of analysing techniques for creating internal validity.

Yin (2009) limits the proof of internal validity of case studies to the analytical methods of pattern matching, explanation building, rival explanations and logic models. However, after evaluating the different analytical methods, content analysis and narrative analysis were best suited to address the aims of the research. The research proves that content analysis and narrative analysis are suitable analysis methods for creating internal validity within case studies and thus should be regarded as such. The distinctive characteristics of the case study, content analysis and narrative analysis are presented in Table 38 below:

Table 38: Relationship between case study, content analysis and narrative analysis

Distinct characteristics	**Case study**	**Content analysis**	**Narrative analysis**
Inductive approach of theory building	✓	✓	✓
In-depth analysis of complex social phenomenon	✓	✓	✓
Interviews as most important source of evidence	✓	✓	✓
Flexible in their combination with different analysing methods	-	✓	✓

(Source: Author 2022)

While Yin (2003) and Eiesenhardt (1989) argue that the inductive approach of building theory is characteristic in case studies, it is also typical for content analysis (Kohlbacher 2006; Gläser and Laudel 1999) (see Table 38). Qualitative content analysis supports case studies by investigating complex phenomenon and generating a holistic understanding of social situations (Hartley 1994). Additionally, both content analysis and narrative analysis are characterised as flexible enough to be used with different methods of analysis, which provides a more robust data analysis (see Table 38). The case study, as well as the content analysis and the narrative analysis used interviews as the most important source of evidence (see Table 38). While the application of content analysis in case studies is rare, narrative analysis is applied commonly withing case studies (Moen 2006; Creswell 1998).

Member checking was applied to validate the results of the data analysis (see Chapter 3.8). The application of member checking validated the results of the data analysis techniques and thus proved that the data methods applied were suited for creating internal validity. It is proposes that

Yin´s (2009; 2014) list of valid data analysis methods could be extended to include the methods applied in this research.

3.12 Summary

This chapter has described the methodological approaches applied within the this research project, as well as detailing the philosophical perspectives, which underpin the methodological approaches adopted. The methods applied were derived from the research objectives (see Chapter 1.3) and a detailed examination of the methods adopted has been presented (see Chapter 3.2, Chapter 3.3, Chapter 3.4, Chapter 3.5 and Chapter 3.7). In order to answer the research questions and to address the objectives raised in Chapter one of the study, the methods applied were structured accordingly. Along with the research gaps, which were identified in Chapter two, the study identified the need for a qualitative hybrid methodological approach using semi-structured and semi-structured narrative interviews (see Chapter 3.7.1). Content and narrative analysis can be used to present a holistic framework encapsulating both the breadth and depth of the relationships between OL and PMS, both theoretically and practically. The ethical issues associated with this research project and the potential for research bias are discussed and addressed in Chapter 3.9 and Chapter 3.10. A methodological contribution is also proposed by justifying the data analysing methods of content analysis and narrative analysis as suitable for creating internal validity in case studies (see Chapter 3.11).

The following Chapter four presents the findings and discussion of the data collection and analysis.

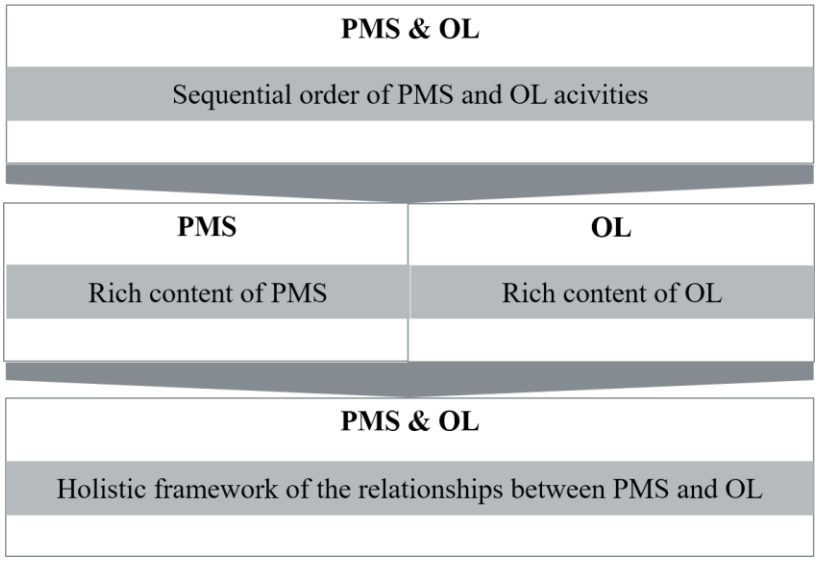
CHAPTER FOUR: FINDINGS AND DISCUSSION

4.1 Introduction

This chapter presents the findings derived from the data, which was collected and analysed according to the methods discussed in the previous Chapter three. This chapter contributes to the research aim of developing a comprehensive perspective of both the breadth and depth of the relationships of the research fields, theoretically and practically (see Chapter 1.3). In order to achieve this aim, the structure of this chapter is as follows: firstly, the sequential order of PMS and OL events is identified by analysing the narrative interviews (see Chapter 4.2). The resulting findings are crucial in determining the structure of the framework by providing insights into the sequential order of PMS and OL events. After the conditions for the framework have been identified, the PMS findings from the content analysis of the semi-structured and semi-structured narrative interviews are presented, and discussed in the light of the literature reviewed in Chapter two (see Chapter 4.3). Thirdly, the OL results of the semi-structured and semi-structured narrative interviews are offered and evaluated in relation to the literature reviewed in Chapter two (see Chapter 4.4). The PMS and OL results are critical for providing details to the framework of the relationships between PMS and OL. All findings are used to develop and present the holistic framework of the relationships between PMS and OL at Frankfurt airport (see Chapter 4.5).

Figure 23 depicts the structure of the findings and discussion chapter by aiming to develop a holistic framework, which presents the relationships between PMS and OL:

Figure 23: Structure findings and discussion



(Source: Author 2022)

Figure 23 depicts the structure of this chapter and the logic of combining the results to answer research questions two, three, four and five and their according objectives presented in Chapter 1.3. All findings are discussed in light of research question one: "What are the relationships between organisational learning and performance measurement systems within academic literature?".

4.2 Sequential order of performance measurement and organisational learning

Identifying the sequential order of PMS and OL is crucial to develop a framework which depicts the relationships between PMS and OL. While the literature on the relationships between PMS and OL is scarce, several intersections are identified within Chapter 2.4. Overall, the literature shows that the diagnostic and interactive usage of PMS are used to create OL (Ferreira and Otley 2009; Oliver 2009; Henri 2006; Kloot 1997; Simons 1995a) by transforming individual learning into group learning and OL (Thingvad et al. 2018; Henri 2006; Moynihan 2005; Marginson 2002) (see Chapter 2.4). This transformation by using PMS is due to the fact that PMS can be regarded as a communication tool (Robles 2019). By applying the narrative schema of Labov and Waletzky (1967), the sequential order of PMS and OL is clarified (see Chapter 3.7.1) and thus provides insights into the framework conditions of the relationships between these two constructs. Identifying the structure of the OL and PMS events is the first step in achieving the research aim of developinga comprehensive perspective of both, the breadth and depth of the relationships of the

research fields, theoretically and practically within the context of Frankfurt airport (see Figure 23 and Chapter 1.3). After the framework conditions are identified, the content analysis provides insights into the details of the relationships of PMS (see Chapter 4.3).and OL (see Chapter 4.4).

In order to identify the sequential order of the relationships between PM and OL, experts were asked to tell a story about PM where organisational learning emerged. Therefore, the sequential structure of the experts` stories was identified with the aim of obtaining a holistic view of the interconnectedness of PMS and OL,. To understand these complex relationships, the narrative interviews were, in addition to the content analysis, analysed in their narrative form to determine the exact sequence of actions. Therefore, the narrative schema of Labov and Waletzky (1967) found was used to determine the order of events (see Chapter 3.7.1 and Chapter 3.7.2). As described in the Methodology Chapter, the sequential elements of the schema which were used are: abstract, orientation, complication, evaluation, resolution and coda. Romano, Porto and Molina (2013) argue that from these parts, only four elements (orientation, complication, evaluation, and resolution) are essential while Lambrou (2019) even sees only one element is important in determining the narrative structure: the complication (see Chapter 3.7.1). Thus, the structure of this section is guided by the elements of narrative schema, which are depicted in Table 39 below.

Table 39: Narrative schema of Labov and Waletzky (1967)

Narrative schema of Labov and Waletzky (1967)	
Abstract	What is the story about?
Orientation	Who, when, what, and where?
Complication	And then, what happened?
Evaluation	And so what?
Resolution	Then, what happened in the end?
Coda	Signals the end of the story

(Source: Lambrou 2014 p.37)

In the following, the interplay between PMS and OL is determined by understanding the sequential and chronological structure of how both occur and interact by applying the narrative schema of

Labov and Waletzky (1967) presented in Table 39. The sections are divided into abstract, orientation, complication, evaluation, resolution, and coda (see Table 39). Section 4.2.6 reflects on the sequential order of PMS and OL and in doing so, addresses research question two: How is the sequential order of PM activities and OL forms at Frankfurt airport?

4.2.1 Abstract

Within the abstract, the content of the narrative is briefly summarised to indicate the plot of the story (see Table 39). All of the experts told a story about the occurrence of performance issues and how these had been handled at the case company:

> "*There had been a strike of the control navigators and then the senior management and the board of directors decided that to prevent further strikes our Ground Handling should do the task of marshalling.*" *(*I14_Expert_Aviation)

The majority of the experts summarised that as soon as a performance issue arouse, a meeting with management took place to solve the issue:

> "*Last year we had issues regarding the waiting times at the security checks and therefore we had several meetings with representatives of the authorities and the airlines*." (I2_Expert_Aviation)

Some of the stories involved external parties, where management had to come to an agreement with authorities and airlines.

4.2.2 Orientation

In the orientation section, the basic conditions are explained by the narrator of the story, providing an overview of the people involved, the time and place of the story (see Table 39). Additionally, the action and current situation are described further. While the timings of the stories differ, ranging from several years ago to current stories the people involved can be clustered into three categories: experts, management, and external parties. All narratives contain experts and management, while external parties are only covered in some interviews:

> "So, *in the meeting were managers from the Ground Handling Services, from Aviation, managers from Condor and I had to do the analysis*." *(*I12_Expert_Ground_Handling)

The initial situation is identified as common to all the narratives collated for this research: the trigger for further actions in all stories were anomalies detected in the performance data:

> "*Last year we had issues regarding the waiting times at the security checks [...] we measure that daily several times, we monitor it constantly*." (I2_Expert_Aviation)

Up to this point, there is a clear structure in all the stories regarding the people involved (experts, managers, and sometimes external parties) and the initial situation (performance measurement and the detection of a loss in performance).

4.2.3 Complication

The complication focuses on what really happened in the story (see Table 39). In this section, the detailed events and actions are evaluated. At this stage, a divergence in the stories was detected, in which the roles of the actors varies. The majority of narrators, 66.67%, related a story in which management had been in charge, while the other interviewees told a narrative where they detected a performance issue and explained how they initiated procedures to solve it. In most instances, the participants noted that the performance error led to meetings of senior management:

> "*All these meetings and dialogues were held on the level of the senior management and board of directors.*" (I2_Expert_Aviation)

This finding aligns the PMS usage cycle proposed by Landström et al. (2018) who notes that reporting occurs after performance has been measured, compiled and analysed. The narrators explained that experts were consulted to do an in-depth analysis for management regarding the area where the performance issue occurred. Further, the narratives revealed that this ad-hoc analysis (used to gain deeper insights) had been delegated to a project team, which consisted of experts who possess detailed knowledge about the business area affected:

> "*So, we sat together with the newly founded subsidiary, the FRA Vorfeld GmbH, which claimed that no one can do the marshalling except for them and there was the Ground Handling Services, which said "oh we don´t want to do that but we have to do it, so tell me*

how" and Aviation which also wanted to stay everything as it is. And then we tried to get the groups of people to work together to develop a new process." (I14_Expert_Aviation)

The narratives indicate that on some occasions, single experts were also consulted by management to conduct a detailed analysis. The stories explained that for this detailed analysis, PMS systems data was taken and analysed to a more extensive degree than the standard analysis reports, which are automatically generated by the system. Commonly, more data from different departments was said to be involved to create an overall picture of the affected process, experiencing the performance issue:

"*[...] and I had to do the analysis. However, I couldn´t generate the report because the processes are very restricted and at Fraport it is more a single department thinking and not a process thinking. [...] So they send me their KPI reports, and I generated an own report and analysed according to the form of error and which error occurred most often. Then I presented my report in the meeting [...] it is very hierarchical with strict separation of duties and not according to the process flow. But we are used to it."*
(I12_Expert_Ground_Handling)

Even though this additional step of conducting an in-depth analysis seems logical from a practical point of view, there is no evidence within the PMS literature which proposes conducting further in-depth analyses (see Chapter 2.3). One expert from the project team then presented the results of the analysis at a management meeting. After the presentation, the experts explained in their stories that they had to leave the meeting, so that the management team could discuss the issue privately and thus make their decisions:

"*What was really cool of him, I was very happy about that was that he asked me one time to join a meeting with the other managers to present the changes we made in the system. I was allowed to present it in front of all the other managers, which was very cool of him. But I wasn´t allowed to stay during the meeting, I just presented there and left after it. That was before we set the changes productive so that the other managers still could add thoughts and ideas to it."* (I13_Expert_Ground_Handling)

This PMS step clearly fits within the PMS usage cycle proposed by Landström et al. (2018) who also suggest that the decision-making step is essential within PMS usage (see Chapter 2.3.3). Bloice and Burnett (2016) remark that combining knowledge from different sources facilitates decision-

making. This also finds application in practice, as managers consult experts to analyse the PMS data before making a decision. After the management team made their decision, the people involved were told to implement the decision within the organisation. The management team further communicated the changes within the organisation and to external parties:

> *"Afterwards, the manager told me we can set it productive, and the manager communicated it in the organisation but also to the authorities like the DFS, EUROCONTROL and the European aviation authority."* (I13_Expert_Ground_Handling)

Respondents noted that management decisions were communicated via various channels to reach all organisational members. Examples were given by the narrators about the communication channels, which comprised direct feedback from the management team, internal news, or adapted working and process instructions:

> "*I got the feedback that the implemented process works via our Skynet News, because there an article had been published to inform everyone in the company about the new process.*" (I14_Expert_Aviation)

This finding relates to the issue of organisational memory within the OL process in which knowledge is stored and made available to employees in forms of process descriptions, internal news or work instructions (Huber 1991). However, a third of experts narrated another story about their perception of performance measurement and organisational learning. In their stories, they said that that instead of being approached by management regarding performance issues, they detected the error on their own. After the error detection, they approached their manager to get permission to initiate talks with staff involved in the affected area:

> "*So the handlings-agent started to blame the airport quite often even though it was not true and so we met for a coffee and discussed about it, because such discussions are always better face-to-face. So, we met in a nice environment because we are co-dependent and a good collaboration is vital, so I tried to express in a nice ways that he should stop with this shit. We met two times, and it all went very well and the outcome was that that the major delay reasons were wrong but there were also some which were correct but for which we didn´t had the internal information for the mistake*." (I15_Expert_Aviation)

The experts further noted that after these talks, they reported the result to their line managers and together they decided how to proceed. Experts stated that the management team decided that additional actions for solving the performance issue were postponed until the performance data (measured via PMS) indicated the effects noted by the experts. This finding clearly matches the steps of the PMS usage cycle proposed by Landström et al. (2018), who suggest that that the performance is firstly measured, subsequently compiled, and analysed, then reported and afterwards a decision is made (see Chapter 2.3.3). What is interesting to note is the involvement of the different organisational hierarchies within this process. While the detection of performance drops varies between management and employees, management always appear to be involved or in charge of the decision-making process. Within the literature, this finding is stated to be typical for a strict hierarchical organisation in which the management is usually involved into the decision-making process (Purcell and Kiani 2016) (see Chapter 2.3.3).

4.2.3 Evaluation

Evaluation can be seen to differ from the other elements of the schema. While the previous parts focus on the structure and information of events, evaluation addresses the actual emotions of the narrator (see Table 39). Romano, Porto and Molina (2013) view this part as highly important as it reveals the purpose of recounting he story by using underlying emotions to express the feelings of the narrator.

The narrative analysis indicated that the feelings and attitudes of the participants towards their stories were mixed. Half of the interviewees expressed dissatisfaction at some point in their stories while the other half of the participants were satisfied with the learning outcome and viewed this as a personal benefit for them.

Some of the participants who indicated negative feelings in their narrative stated that according to their views, senior management decisions were indisputable, and employees had to follow them without question:

> "*We get guidelines by the management, and we need to act according to them. [...] The management informs the Business Information Manager and he or she informs us. Those are instructions and there is nothing to discuss about or questioning it.*"
> (I2_Expert_Aviation)

This finding assigns the strict decision-making process to the hierarchical structure of the organisation, and is confirmed by the research of Purcell and Kiani (2016) (see Chapter 2.3.3). The narrators indicated their wish to be more involved in the feedback process. Furthermore, there were feelings of dissatisfaction expressed towards the hierarchical structure of the company, and the strict separation of duties, processes and KPIs:

> "*I just distribute the KPI´s and that´s it, I don´t get any feedback of what's happening with the KPI´s. [...] So you can see we are no process-oriented organisation, we are a classical hierarchical organisation but not process oriented. [...] you see this is not smooth, it is very hierarchical with strict separation of duties and not according to the process flow. But we are used to it. [...] But anyway, as I already said, we have a clear hierarchical structure and I just pass on my reports to the management so that they are informed for their meetings with other high managers from Lufthansa or so, I am excluded due to my low hierarchical status. [...] I don´t get feedback of the results or what they decide even though I distribute the data up to all management levels.*" (I12_Expert_Ground_Handling)

The other half of the interviewees demonstrated a more positive attitude in their narratives. All of them concluded with learning outcomes, which they viewed as beneficial for them. Participants were particularly positive when they had the opportunity to master a difficult situation on their own. Notably dialogue, communication and talks with colleagues or external parties were welcomed and seen as key learning opportunities:

> "*The dialogue with the airlines is very important because both sides can learn from it [...]. Unfortunately, we are also having the issue that some airlines don´t want to go into dialogue with us. But if they do it is great because we can learn from [...]*" (I17_Expert_Aviaiton)

The analysis of the narrative interviews indicates that the experts appreciated learning opportunities, but viewed the strict hierarchical structure of the company and potentially limited feedback from management more critically. The finding demonstrates the high influence of management responsible for promoting dialogue and exchange (Mazutis and Slawinski 2008). In fact, the literature regards leadership as the most important factor to enable or hinder individual and group learning (Hasson et al. 2016; García-Morales et al. 2012; Yukl 2009; Aragón-Correa, García-Morales and Cordón-Pozo 2007; Beattie 2006; Berson et al. 2006; Vera and Crossan 2004; Gómez and Ranft 2003) as they determine the conditions for communication and learning (Hasson et al.

2016; Yukl 2009; Yukl and Lepsinger 2004) (see Chapter 2.2.2).

4.2.4 Resolution

The resolution describes the consequence of the story (see Table 39). Nearly all the stories finished with the implementation of amended working routines or processes:

> "*[...] the Ground Handling Service is now doing the marshalling for the whole airport. The instructions were then adapted separately at each department and also the training was done separately at the different departments [...].*" (I14_Expert_Aviation)

Participants further concluded that the changes were communicated to the staff affected and, depending on the relevance and size of the project, were also communicated to external members and to the whole organisation:

> "*Afterwards, the manager told me we can set it productive, and the manager communicated it in the organisation but also to the authorities like the DFS, EUROCONTROL and the European aviation authority*." (I13_Expert_Ground_Handling)

Additionally, most interviewees mentioned the generation of new learning as a key outcome in their stories:

> "*So, we learned from it how we can do it better.*" (I17_Expert_Aviation)

Participants related the creation of learning not only to single individuals or themselves but also to groups of people, the management, and multiple departments. This finding shows that the theoretical findings of PMS as OLM, which transforms individual learning into group learning and lastly into organisational learning (Robles 2019; Oliver 2009; Henri 2006; Chenhall 2005) (see Chapter 2.4) exists in practice and that the learning outcomes do result from performance information generated through PMS.

4.2.5 Coda

The Coda indicates the end of the story (see Table 39), but according to Porto and Belmonte (2014) can also be used for interviewees to express their views and beliefs in the form of general observations, such as advice or learning points. However, as the interview questions were strongly business related, few generalisations were expressed by participants. To some extent, the narrators discussed the general situation at the airport. Issues mentioned included the strict hierarchical culture, the lack of feedback given to the employees from management and limited process thinking, which impacts process improvement due to the focus on departmental process areas rather than the processes itself:

> "*[...] at Fraport it is more a single department thinking and not a process thinking [...] So you can see we are no process-oriented organisation, we are a classical hierarchical organisation but not process oriented. [...] is very hierarchical with strict separation of duties and not according to the process flow. But we are used to it*."
> (I12_Expert_Ground_Handling)

Additionally, it was noted that performance is continuously measured within the airport, and exchange, dialogue and communication are seen to be important for creating learning:

> "*The dialogue with the airlines is very important because both sides can learn from it [...]. Unfortunately, we are also having the issue that some airlines don´t want to go into dialogue with us. But if they do it is great because we can learn from [...]*"
> (I17_Expert_Aviaiton)

This finding is supported by the literature, which regards communication and dialogue as essential for creating learning (Odor 2018; Becerra-Fernandez and Sabherwal 2008; Wenger 2009; Chiva and Alegre 2005; Oswick et al. 2000), by transferring individual learning into group learning and lastly into organisational learning (Merriam and Caffarella 1999) (see Chapter 2.2.2).

Some interviewees noted the impact of the COVID-19 pandemic on performance and on proposed projects as well:

> "*But unfortunately, due to COVID-19 the project is postponed.*" (I17_Expert_ Aviation)

Narratives show that the pandemic caused a halt to a vast number of change projects, which potentially might have led to organisational learning at the airport. The devastation caused by the covid-19 pandemic to airports not only impacts the general function of the airport, (Liu, Kim and O´Connell 2021; Gallego and Font 2021; Graham, Kremarik, and Kruse 2020; Suau-Sanchez, Voltes-Dorta, and Cuguero-Escofet 2020) (see Chapter 1.2.4) but also strongly impacts OL within the airport.

4.2.6 Reflection of the sequential order of PMS and OL

In the following section, the findings from the narrative schema (see Table 39). are discussed in light of the review of the literature by aiming to address the research question two: How is the sequential order of PM activities and OL forms at Frankfurt airport? (see Chapter 1.3) The analysis of the narrative interviews reveals the structural sequencing of PM and OL in how these two processes interact with each other. The identification of the sequential order of PMS and OL is critical for developing a holistic framework, which depicts the entire relationships between PMS and OL. The literature reviewed in Chapter two identified that OL is generated by using PMS both diagnostically and interactively (Ferreira and Otley 2009; Oliver 2009; Henri 2006; Kloot 1997; Simons 1995a) and that PMS is a powerful tool for transforming individual learning into group learning and lastly into OL (Thingvad et al. 2018; Henri 2006; Moynihan 2005; Marginson 2002) by providing the means for communication (Robles 2019). However, further insights from the literature into the relationships between PMS and OL is scarce. This emphasises the importance of the sequential order of PMS and OL events in identifying the structure of the framework, providing an encompassing view of the relationships between PMS and OL. The application of the narrative schema of Labov and Waletzky (1967), helped to identify the following sequential order of PMS and OL events and therefore provides the basis and conditions of the overall framework.

The following table presents the sequential order of PMS and OL events :

Table 40: The sequential order of PM and OL

Sequence	**Event**	**PMS**	**OL**
1	Error Detection	Diagnostic Usage: Monitoring of KPIs	Individual Learning
2	Communication		
3	In-depth analysis	Interactive PMS Usage	

4	Discussions, Exchange, and Re-interpretation		Group Learning
5	Decision-Making		
6	Communication		
7	Implementation		
8	Communication		Organisational Learning

(Source: Author 2022)

The narrative schema of Labov and Waletzky (1967) highlights the sequential order of events by showing the OL and PMS steps, and when they occurred. The sequential order of events clearly shows that PMS act as OL mechanisms and thus confirm Robles`s (2019), Oliver`s (2009), Henri´s (2006) and Chenhall`s (2005) view of PMS as powerful OLM by facilitating communication and dialogue (see Table 40 and Chapter 2.3.3). PMSs trigger actions within the organisation, which thus generate learning.

The findings derived from the narrative schema of Labov and Waletzky (1967) clearly show the flow of events and how PMS are used to generate learning. In line with the literature review in Chapter two, at the beginning errors are detected by using PMS diagnostically. KPIs are monitored and in case of discrepancies, performance issues may be communicated further. In either case, individual learning is generated from the diagnostic PMS usage. The literature however associates diagnostic PMS with SLL (Guenther and Heinicke 2019; Shurafa and Mohamed 2016; Myreteg 2015; Tuomela 2005; Argyris and Schön 1978) (see Chapter 2.4). As SLL is centred upon the learning of an individual, it suggests a form of individual learning. Thus, it can be assumed that SLL is learning on the individual level and therefore it can be shown that the literature supports the finding that diagnostic PMS usage creates individual learning.

As a second step, reporting occurs if the issue is pursued further, and an in-depth analysis is created. With this step, the PMS is used interactively, and individual learning is triggered again. Subsequently, the issue is discussed and reinterpreted by using the results of the PMS interactively, and group learning is stimulated. Group learning is generated throughout making decisions about the issue, communicating instructions, and implementation. The finding support the literature, which highlights the necessity of communication, exchange, and dialog in order to create group learning (Odor 2018; Becerra-Fernandez and Sabherwal 2008; Wenger 2006) (see Chapter 2.2.2).

Individuals exchange their knowledge and experience, jointly discuss and interpret their thoughts and beliefs until a common understanding has been reached which reshapes their inherent beliefs into new knowledge (Odor 2018).

Lastly, organisational learning is created when the issue is reported and implemented along with its proposed solution. This finding supports the extant literature, which defines the creation of OL as distributing the mental models and experiences of individual employees, which have been discussed and re-interpreted within a group and are lastly embedded into the common understanding of the organisation (Patky 2020; Odor 2018; Levin et al. 2011; Fiol and Lyles 1985) (see Chapter 2.2.2).

The finding of the sequential order adds to the literature by clarifying understanding of OLMs. While the literature suggests communication and dialogue as well as PMSs as OLM (Do and Mai 2020; Lloria and Moreno-Luzon 2014; Henri 2006; Chiva and Alegre 2005), the analysis shows that PMS are firstly used as OLM to trigger and initiate communication and learning which in return function as second OLM to generate OL. This finding is confirmed by Robles (2019) who regards PMS as a communication mechanism, suggesting PMS is used to trigger dialogue and feedback (see Chapter 2.4). This key finding clearly shows that both OLMs, communication and dialogue and PMS, are required to generate OL and that PMS functions as a pre-requisite to trigger the OLM of communication and dialogue.

It was discovered that management and the strict hierarchical structure of the company strongly influence the sequential order of PMS and OL by enabling or hindering interactive PMS usage, communication, and dialogue. Existent literature confirms this finding in stating that leadership is the most important factor in enabling or hindering learning (Hasson et al. 2016; García-Morales et al. 2012; Yukl 2009; Aragón-Correa, García-Morales and Cordón-Pozo 2007; Beattie 2006; Berson et al. 2006; Vera and Crossan 2004; Gómez and Ranft 2003) due to its influence on communication and learning within the organisation (Hasson et al. 2016; Yukl 2009; Yukl and Lepsinger 2004) (see Chapter 2.2.2).

It should be noted that the COVID-19 pandemic not only impacted the airport industry in general (Liu, Kim and O´Connell 2021; Gallego and Font 2021; Graham, Kremarik, and Kruse 2020; Suau-Sanchez, Voltes-Dorta, and Cuguero-Escofet 2020) (see Chapter 1.2.4) but also severely affected the sequential process of PMS and OL such that that OL opportunities within the airport were hampered.

4.3 Performance Measurement Systems

The findings of the performance measurement categories from the content analysis of semi-structured interview data and of semi-structured narrative interviews are presented in this section, which addresses the third research question: How are performance measurement systems used in the case organisation and who are the actors involved? The findings are further discussed in the light of the literature reviewed in Chapter two. The structure of this section is based on the performance measurement content categories described in Chapter 3.7.1 and is depicted in the following table:

Table 41: Performance measurement categories

Performance Measurement Categories
Measure (Landstrom et al. 2018)
Compile and analyse (Landstrom et al. 2018)
Report (Landstrom et al. 2018)
Make decisions (Landstrom et al. 2018)

(Source: Author 2022)

The content categories are based on the PMS steps of measure, compile and analyse, report and make decision as proposed by Lanström et al. (2018) (see Table 41). In the section 4.3.6 "Reflection on the Performance Measurement Discussion and Findings", the findings and discussion of the content categories are merged to identify how performance measurement systems are used at Frankfurt airport and to classify actors involved in the process.

4.3.1 Measurement

The findings show that the various departments at Frankfurt airport use several different PMS. These PMS measure a wide range of different KPIs. The breadth and depth of the KPIs vary between departments- and are aligned hierarchically to produce the main KPIs of the company, which are further described in section 1.2.3. The operational KPIs can be accessed via the main operational system (Business Intelligence Architecture Framework), which is further explained in section 1.2.3. BIAF is is a central information platform with an overview of the main business

objects within the airport. Within this system, all measures from other systems are bundled into intervals of fifteen minutes. This guarantees that the performance data is current and can be accessed via different reports.

> *"And then we also have the actual live quality measurement, which is measured daily, and which flows every 15 minutes in our system where I can monitor it." (*I16_Line_M_ Ground_Handling)

This finding correlates with the literature as continuous assessment and measurement of performance is mandatory due to the complexity of the airport environment (Iyer and Jain 2019; Bezerra and Gomes 2016; Gillen 2011; Graham and Nafukho 2008) (see Chapter 2.3.1). These findings indicate the high standard of measurement at Frankfurt airport, which is in line with other airports' performance measures. This finding also suggests the importance of benchmarking for Frankfurt airport. This is supported by the literature which states that benchmarking is the most important method for airports to assess their performance and to investigate ways to increase their performance (Pacagnella Junior 2021; Baltazar, Rosa and Silva 2018) (see Chapter 2.3.2). Additionally, the findings show that Frankfurt airport also exchanges PM results with multiple stakeholders including national and regional authorities, airlines, and other airports with the aim of monitoring every part of a flight. This covers data ranging from the departure of the aircraft from a foreign airport up to approaching the final parking position at Frankfurt airport. This data exchange is vital for Frankfurt airport´s performance and daily tactical decision-making, as it enables the airport to adapt its daily processes, preparations and working routines in case of issues such as unexpected delays:

> *"Within the flight operations management we are using different PMS. Since 2010, Frankfurt airport is an A-CDM airport, A-CDM means Airport Collaborative Decision-Making, which further means that for every single flight event starting from the activation of the flight plan until the aircraft reached its final landing position, we are constantly receiving flight status. We are able to trace when the flight started from the airport of departure or the edging-to-fix, which means the final approach of the airport happened. We can track how long the aircraft had been on the runway, if the turn-around process complied with the usual turn-around process or if there were deviations."* (I4_Top_M_Aviaton)

This quote provides a valuable insight into the importance of being an A-CDM airport, as this collaborative decision-making of the European airports enables Frankfurt airport to enhance its

efficiency and planning. By exchanging flight data, the airports are able to optimise their resources and improve their planning through greater predictability of air traffic. This finding is supported by the literature which stresses the importance of exchanging data with entities involved in airport operations (EUROCONTROL 2017). The close collaboration between the organisations involved in the operation of Frankfurt airport is presented in Chapter 1.2.3. The findings reveal that measurement is very important for the airport as the PMS provide insights into performance and enables the airport to determine opportunities for improvement. In line with the analysis of Frankfurt airport and its benchmarking against European airports presented in Chapter 1.2.3, the airport is under continuous pressure to perform better than its competitors. Especially with regards to punctuality, the airport needs to perform well to compete with other European hub airports.

At Frankfurt airport, findings are in line with secondary company data which shows that performance data is measured automatically. However, some values need to be manually inserted by employees. This also aligns with the literature, which states that measurement can be automatic or manual (Landström et al. 2018) (see Chapter 2.3.3). A good example of this is provided by an employee from the aviation department:

> *"A camera with a laser record when the position got free, when the aeroplane was pushed-back and for all such events we are having time stamps either measured automatically via the system or noted manually into the system."* (I17_Expert_Aviation)

As there are a wide variety of performance data, there is a clear distinction between the recipients of the KPIs. The KPIs vary between departments and the hierarchical status of the recipients. This finding is in line with the literature, which also claims that the KPI reports differ according to the type of recipients (e.g. customer, supplier) and their role (e.g. management, employees, board of directors) (Landstöm et al. 2018) (see Chapter 2.3.3). The findings confirm the view of the literature and indicates that senior and top-level managers receive summarised KPIs with the most important KPIs being produced on a monthly or quarterly basis. These KPIs are more process oriented and therefore provide the basis for strategic decision-making.

Line managers and employees on the other hand receive detailed KPIs on a daily or weekly basis. These detailed KPIs are relevant for their daily work and their tactical, every-day decision-making. Understandably within the airport, a significant number of processes depend on the performance of customers, external service providers or authorities. Therefore, it is necessary to discuss and jointly

agree KPIs and threshold values if the process and the performance affect both parties (see Chapter 1.2.3).

Usually, important KPIs and threshold values are identified in service level agreements between Frankfurt airport and external parties. One such agreement is highlighted in the following quote:

> *"[…] everything is controlled and managed via KPIs. We agreed with our service providers on KPIs which we try to measure daily and which we try to meet. For example, the security checks and border controls are done by the federal police force and they and Fraport AG agreed on KPIs like how long the maximal waiting time for a passenger must be. And we further discussed those KPIs with our biggest customer Lufthansa if they also agree with those KPIs."* (I18_Line_M_ Aviation)

This quote suggests a high degree of sensitivity within the performance measurement relationship between the airport and its service providers and customers. However, such a complex and sensitive relationship within PM figures and KPIs is lacking from the literature,. While there are numerous articles acknowledging the importance of PM results and KPIs for airport stakeholders including passengers, authorities, governments, airlines and other airports (e.g. Pacagnella Junior 2021; Iyer and Jain 2019; Baltazar, Rosa and Silva 2018; Bezerra and Gomes 2018; 2016; Barros et al. 2017; Lai et al. 2015; Gillen 2011; Graham 2009), there is little insight into the negotiations regarding target performance values and the exchange of the KPIs between stakeholders and the airports. Only the ICAO (2014) recommends integrating users into the selection of KPIs, their target definitions and related action plans, as well as suggesting the implementation of performance incentives such as service level agreements with airlines (see Chapter 2.3.2). However, the findings show the importance of agreeing KPIs with stakeholders, and reviewing these KPIs regularly in joint meetings. The findings also show that sanctions are agreed upon between the airport and stakeholders if target KPIs cannot be reached:

> "*The thing is that the responsible company for the delay of the flight has to pay money to the airline or the airport according to the service-level agreements. Therefore, the handlings agents often try to use codes which don´t hurt them. In the past it was extreme because the airport didn´t monitor the reasons for delays and so we had to pay a lot of money to the airlines. Since we do that regularly it is way better. So, the handlings-agent started to blame the airport quite often even though it was not true (…) we are co-dependent and a good collaboration is vital, so I tried to express in a nice ways that he should stop with this shit. We met two times, and it all*

went very well, and the outcome was that that the major delay reasons were wrong but there were also some which were correct but for which we didn´t had the internal information for the mistake. So, it was a combination between we need to adapt, and the handlings-agent needs to talk to some colleagues that they cannot blame the airport all the time if it is their own fault for the delays. So, it is often a combination of both." (I15_Expert_Aviation)

This quote neatly summarises the complex and sensitive relationship between the airport and the airlines. Reflecting ack on the airport benchmarks discussed in Chapter 1.2.3, delays at Frankfurt airport (and indeed other airports) are mainly caused by airlines. This suggests a vulnerable relationship between the airport and its airline customers, which is highlighted within the findings. Both parties are dependent upon each other but still want to achieve the best conditions for themselves. The findings confirm this sensitive, dependent relationship:

"*Airlines have to provide reasons if they are delayed regarding why they are late, so for example if there had been technical issues with the plane of if the boarding of the passengers was late. Anyway, for each delay reason we are having a code. The airlines have to report the code and a time to us, and we further report it to EUROCONTROL. But to prevent that the airlines blame the airport all the time we are monitoring the delay codes and times so if the reported values are reasonable."* (I17_Expert_Aviation)

This quote highlights the importance of punctuality. EUROCONTROL is an organisation dedicated to Europe's air traffic and monitoring of Europe's sky traffic performance. The findings show that punctuality in particular is a critical issue which needs to be discussed by the airlines and the airport (see Chapter 1.2.3). However, there are often accusations of wrongdoing between the stakeholders, and the cause of delays is often deliberately hidden. Therefore the findings suggest that the motivation provided by incentives (defined in the service level agreements) leads to mutual recriminations and cover-ups, rather than helping to achieve the performance targets, as suggested by the ICAO (2014)

In order to undertake the daily management, threshold values are implemented into the systems. The thresholds are defined by the management team and are based on middle- and top-level management decisions, or on service level agreements with customers, service providers or authorities. Line managers receive alerts if KPIs fall below these threshold values, so they know when to intervene in the processes, as well as when to undertake corrective actions to improve performance:

"We also have threshold values, and we get an alert in form of emails if the values are above or below these threshold values. We have also a lot of daily and monthly performance reports." (I9_Line_M_Aviation)

As there is a variety of different KPIs and PMS, the main KPI for both line management and employees (at both ground handling services and aviation) is punctuality:

"Punctuality is our main KPI." (I12_Expert_ Ground_Handling)

Within the airport, one of the most important quality indicators is punctuality. It is essential to keep customers (airlines and passengers) satisfied, as a delay in services and flights does not only decrease customer satisfaction but also increases costs for the airport. Based on the benchmark of European airports presented in Chapter 1.2.3, the punctuality rate is very important not only for Frankfurt airport but for other airports as well. While the overall punctuality rate increased during the COVID-19 pandemic due to a significant decrease in customers, an analysis of causes of delays suggests room for improvement for Frankfurt airport. While the major cause for delays in Frankfurt airport is mainly due to the delay of the airlines, the second leading cause is due to the airport performance itself (DFS 2019).

With regard to Europe's biggest airports, Frankfurt ranks second last with regards to delays caused by the airport itself (see Chapter 1.2.2) (DFS 2019). Nevertheless, the main cause for delays are still due to the airlines themselves. The following excerpt summarises how Frankfurt airport tries to reduce the number of delays caused by airlines:

"*So, my daily work is doing analysis and evaluations regarding punctuality. For example, we have regular meetings with Lufthansa where I provide the KPI´s but I don´t attend these meetings. There are these regular meetings between Fraport and Lufthansa regarding punctuality where they discuss on how to enhance punctuality from sides of Lufthansa and how we can support them. And for such topics or events I am providing the data for us, Fraport AG but also for Lufthansa, because there are often mutual recriminations*." (I12_Expert_ Ground_Handling)

The interview extract highlights the KPI of punctuality for the airport and the attempts made to minimise delays. Therefore, regular meetings are conducted with the airlines to discuss the KPI of

punctuality. Due to the highly sensitive relationship between customers and service providers, it is often challenging for Frankfurt airport to emphasise to the airlines that they should improve their delays, as they often blame the airport for the delays instead of taking responsibility themselves.

Therefore, while the KPI for the employees and line management is broken down to one KPI (punctuality), which is also a part of the quality KPI, the senior and top-level managers have more aggregated KPIs. They stated in the interviews that their focus is on the KPIs of quality and efficiency. As there are a number of different systems which use time stamps to track when process steps occur, middle- and senior managers use those and compare them to the threshold values from the service level agreements in order to assess quality. The findings show that KPI efficiency is evaluated on a more aggregated level. This differs between business divisions and the process, including all resource inputs in relation to revenues. In order to determine the general process, different traffic performance values are taken which vary from department to department and can comprise factors including the number of passengers, the number of flight events, etc.. Middle and top-management suggest that for them, the aim is to strive for a balance between both quality and efficiency. This is a demanding and challenging task as the two KPIs are potentially contradictory:

> *"[…] when it comes to performance, we strive to reach an equilibrium of both efficiency and effectiveness […] The thing is that the airlines are only interested in the quality and not how efficient we are. For us it is hard because maybe the competitors can offer a cheaper price for the service because they are more efficient, need fewer staff for achieving the same quality, so this is a real challenge for us. It is very difficult to decide on the exact way that the customer is satisfied with the quality but we are also satisfied with our efficiency."* (I6_Top_M_ Ground_Handling)

The struggle for airports to align the contradicting KPIs and performance goals is widely accepted within the literature, and a possible solution for it is proposed through developing a solid PMS process for PMS usage (Bezerra and Gomes 2018; 2016; Adler, Liebert and Yazhemsky 2013; Graham 2014; Skouloudis et al. 2012). The previous quote highlights the challenge of management, which is the tension between customer satisfaction and saving costs. The managers explained that the customers' only interest is the quality of their work while providing good terms and conditions. However on the other hand, management need to act in the economic interests of the company and to reduce costs as much as possible to be profitable. The management team thus needs to establish a performance level which is better than those of its competitors, which the customer is satisfied with the quality of the service, and is at a price which is affordable to the customer and also profitable for

the airport. So, the interviews show that it is hard for them to find the balance between providing a good quality service and being economically efficient.

The highly varied performance requirements reflect the quantity of measures which represent manager's objectives and priorities (Marginson 2002). The KPI of efficiency within airports is of the most significanct, and has dominated the academic literature in recent years (Pacagnella Junior 2021; Iyer and Jain 2019; Baltazar et al. 2018; Bezerra and Gomes 2018; Barros et al. 2017; Lai et al. 2015) (see Chapter 2.3.1). Additionally, benchmarking is considered as most suitable method for gaining insight into ways to increase performance (Pacagnella Junior 2021; Baltazar et al. 2018). This is reflected in Fraport AG´s efforts to align their performance targets and KPIs with the expectations of their customers, but also as part of the A-CDM (Airport Collaborative Decision Making) airports. A-CDM aims to improve cooperation between the airport partners and the network manager for a more transparent and smooth relationship, to facilitate the exchange time-based air traffic information.

Continuous benchmarks enable Frankfurt airport to constantly consider its performance in relation to its competitors, and manage customer expectations. In line with literature, reports vary with regard to KPIs and time intervals (Landström et al. 2018; Parmenter 2015) (see Chapter 2.3.3). The variety of KPIs and the intervals at which they are applied, are aligned with the objective that PMSs need to reflect the strategy, goals, and objectives of the organisation. Therefore, this needs to be reflected in the KPIs, and when they are applied. This is reflected in the hierarchy of the organisations as managers receive different KPIs at different intervals from lower management or employees.

The employees and line managers criticised the strict separation and division of departments in terms of their sub-processes. Many processes cross various different departments, and interface processes often lack in efficiency due to the strict separation of processes. This significant finding shows that within Frankfurt airport, the KPIs are not focussed on the overall process, but performance deviations are viewed from a departmental perspective. Top management initiates a review of the overall process only if major performance discrepancies occur:

> *"The aim is to have a uniform measurement for Ground Handling Services and Aviation, so to achieve a process based view, today it is very focused on single departments not on the process itself." (*I7_Line_M_Aviation)

Previous studies have generally suggested that measured KPIs are derived from organisational strategies and objectives, and need to be adapted as soon as the strategy, goals, and objectives of an organisation change (Kaplan and Norton 2008; Dangayach and Deshmukh 2001). According to the findings, the adaption of KPIs is not as simple as stated in the literature, but also needs to be aligned with the structure and processes of the organisation to be more effective.

The aviation departments use an analysis and prediction tool to prepare for each day and to monitor current airport data. The system is used at every process point at the airport to make predictions, such as how many passengers will arrive, and identifying peak times of the day. Monitoring takes place based on measurements at these process points. While the tool is currently based on experience values to enhance planning and decision-making on a daily basis, the findings show that there is an intention to plan and implement an artificial intelligence-based system:

> *"We are having a passenger-flow analysing tool which is called PFA. […] Today the data we enter into the system is highly based on experience and experienced values and we type that in manually like for example that the passenger number in summer is higher than in winter and the system processes this information so that we enhance our prediction. But AI is so interesting because it is self-learning and so we wouldn´t have to type in so many things manually into the system."* (I18_Line_M_Aviation)

Using and implementing artificial intelligence may help to improve the tool and facilitate daily work. As a line manager of the division Aviation stated, artificial intelligence could manage easy decision-making tasks, such as adjusting signs at the security checks if there is a large number of passengers waiting.

4.3.2 Compile and analyse

As measurement is mainly done automatically via sensor systems, the analysis of the data is also done automatically in the system. Every fifteen minutes, data is transferred automatically from different operative systems into major operational system, BIAF, in which employees and line managers can access current data by retrieving pre-defined analysis reports:

> *"within the systems the automated analysis show me the latest KPI´s based on the 15-minute interval. […]. We are having target aims where I can assess the measured quality data and see if*

I am on track and if I meet my target value or if I have to take correcting actions. " (I16_Line_M_Ground_Handling)

The quote shows that the employees and management can directly access the latest KPIs within the system. There, the KPIs are automatically compiled and visualised:

"*We use a traffic light system within the operative departments, so green for good performance, yellow and red for bad performance*." (I7_Line_M_Aviation)

This quote depicts an a simple method of analysing data and presenting results. This form of visualisation is also popular within literature, Landström et al. (2018 p.131) suggests that: "*The simplest way of visualising a KPI is with a red or green dot. Red means that the result is off target while the green indicates that the results is within the target limits.*"

Within Frankfurt airport, there are both manual and automatic performance analyses. If a manual analysis follows an automatic analysis, this is dependent on the occurrence of discrepancies within the KPIs. If discrepancies exist, the performance data requires further analysis. At the operational level, the KPIs are monitored on a daily basis and in case of a bad performance, the issue is reported from line management to the next senior management level. This is mainly the case when it comes to systematic anomalies, which have to be reported to senior management. In relation to this point, one respondent notes:

"[…] and then you have the data analysis which is either on automated data analysis level or management level." (I8_Top_M_ Ground_Handling)

In-depth analyses are needed to obtain further insight into the KPIs, to enable managers to make good decisions, . These ad-hoc analyses are done by a central department, which also distributes the standard performance reports:

"We are currently having sub-departments which are doing the analysis of the KPIs, and which are generating the reports and which also send the standardised reports to us managers. Sometimes on rare occasions we from the management team also ask them to do an ad-hoc analysis on a specific topic." (I5_Senior_M_Aviation)

Detailed reports are either reviewed and analysed by management, or the reports are directly sent to experts, who are, in addition to the in-depth analysis, consulted to obtain further in-depth insights on the topic and to determine the root cause of performance losses.

This practice corresponds with the literature which suggests that PM results should be communicated and analysed if actions are required (Landström et al. 2018) (see Chapter 2.3.3). However, this research extends the findings of prior studies by via the key finding that additional in-depth analyses should be conducted to gain in-depth understanding of the situation.

4.3.3 Report

Performance measure reporting occurs in two forms at Frankfurt Airport. The first is the performance data which is reported via standardised analysis reports. These standardised reports have been designed by the IT department in conjunction with the reporting departments, and automatically run each day, month, or quarter. These automated reports are then either available via the IT system which employees and managers can access, or they are distributed via email to the recipients from a central department:

> *"Here at Fraport all reports are standardised and automatically generated. We generate the reports out of the data warehouse system, and I just take the reports and send them to the different recipients."* (I12_Expert_ Ground_Handling)

The findings show that the performance information provided in the reports varies between departments. This matches the defined purpose of PMS to incorporate the organisation's strategy, goals, and objectives into measures. This is achieved by breaking down those objectives and aims into KPIs, which vary according to the recipients and departments (Kaplan and Norton, 2008; Dangayach and Deshmukh 2001). KPIs are kept strictly separated and access to performance data is limited to the department the employee works for, or the business division unit of the manager:

> *"However, I couldn´t generate the report because the processes are very restricted and at Fraport it is more a single department thinking and not a process thinking. So, I can only access certain data for my department but not for Aviation, because the system access is restricted to departments and not to processes."* (I12_Expert_ Ground_Handling)

This quote shows the strict separation of KPIs by department at Frankfurt airport. Line managers receive detailed performance data, which they can also look up in the system for daily guidance. The higher the management position of the employee, the more aggregated but encompassing the KPIs are. This matches the purpose of the performance report: to support top-level management in their strategic decision-making, and lower management and employees in their daily operative tactical decision-making. The timely interval of the reports therefore differs from daily up to monthly or quarterly reports. Diagnostic monitoring takes place after the performance reports have been received,:

> *"[…] and then we get a complete performance review sheet with all the various KPIs and then you do the diagnostic monitoring"* (I8_Top_M_ Ground_Handling)

Results show that the second form of reporting varies. In most departments, this form of reporting only occurs if the performance measures show outliners and must be discussed further. This reporting form goes hand in hand with communication and the subsequent stage of "making decisions" in the PMS cycle. There are two forms of this reporting in the airport:

1. Reporting within management: Either the outliner of the performance is reported up or down the management hierarchy, or is openly discussed in management meetings:

   "*The airport duty mangers and terminal duty managers sit in control centers at the airport that they are the ones who in case of issues are doing the coordination of our partners, however they are closely supervised by their manager, and they don´t decide about actions, they just report.*" (I7_Line_M_Aviation)

2. Reporting to or from external parties: In this case performance issues are discussed with external parties. The initial communication request can stem from either party:

   "*We have an ACDM manager who works not only for Fraport but also for the DFS, the German air traffic control. So, for example he approaches us and the DFS or the airline if he recognised specific systematic anomalies*." (I4_Top_M_Aviation)

The reporting to external actors can be a sensitive matter, as performance issues are usually quite political. Due to the interdependence of the parties' business processes and the mutual impact on

their performance it is vital for Fraport AG to remain a good partner, and avoid accusations of poor performance. Such communication must be undertaken carefully, and is mainly performed by senior management. For minor daily issues, line managers are in close contact with both customers and service partners:

> "*We then inform for example the federal police force like "hey, did you notice that the flight with 10 000 passengers which we expected to arrive at 10am is delayed for half an hour?". And this is live and proactively intervening into the KPIs, the passenger flow control or other process steps."* (I18_Line_M_Aviation)

In the operations department, employees are informed about performance and the decisions made by line managers on the last day. Based on their decisions and the course of performance of the day, shift workers are continuously briefed and informed to meet performance targets:

> "*We communicate the quality, so inbound, outbound and delays every day multiple times. We implemented a shop-floor management where we brief the shifts, so we start with the morning shift, and I tell them the KPIs […]*" (I16_Line_M_ Ground_Handling)

The operative ground handling team, which consists of operational employees and line managers, implemented an effective communication system in which each shift of employees is informed about the performance of the day. In the mornings, the performance of the previous day is communicated. The current KPIs of the actual day are reviewed in the noon shift with regards to the quality and if targets were met. This is repeated for each shift and in the next morning, the whole performance of the day is reviewed again before the current performance is monitored. There are, however, many mistakes due to human error. If such mistakes lead to a decrease in performance, the management talks with the person responsible in private about the issue. However, that the actual error occurred and that the error caused a lack in performance is also communicated to the group to avoid such mistakes in future:

> "*I discuss the errors of the employees always in a dialogue, just the two of us but that the mistake actually happened is also discussed at the check-ins and check-outs, so that all know how important it is for example to set the time stamps." (*I16_Line_M_Ground_Handling)

This approach enables employees to learn from the experience of their colleagues, and thus is regarded as a good learning opportunity for employees. The different approaches clearly highlight

the importance of leadership, which strongly influences both employee and group learning by hindering or enabling communication. This also supports the prevalent view of the literature (Do and Mai 2020; Hasson et al. 2016; Lloria and Moreno-Luzon 2014; García-Morales et al. 2012). Thus, both learning structures and organisational cultures are shaped by styles of leadership, whether they include their team and employees, and if they handle the issue on the management level.

4.3.4 Make decisions

After the "reporting" step has been accomplished, the decisions are made. Within the literature, the step of decision-making is referred to as analysing PM information, and subsequently deciding if actions for improvement are required (Landström et al. 2018). The findings of this research are congruent with this view from literature, however, the interviews revealed that the decision making stage is much more profound than presented in the literature. Within the airport, two different forms of decision-making were identified both of which have different influences on OL, and both of which depend on the usage forms of the PMS.

Firstly, the findings reveal that within the case company, the participants differentiate between two different types of decisions: there are tactical decisions and strategic decisions. Tactical decisions are more short-term in nature and can be experienced in daily work as reactive actions based on daily or weekly performance results. However, strategic decisions are proactive undertakings based on long- or medium-term performance results, such as monthly or quarterly KPI reports. The interviews revealed that tactical decisions are mainly made by line management and sometimes by employees as well. Furthermore, tactical short-term decisions are based on the diagnostic usage of PMS whereas strategic long-term or tactical medium-term decisions are made by middle and senior management through interactive use of PMS. This finding supports the literature reviewed in Chapter two by stressing that the focus of interactive PMS in placed on dialogue throughout the organisation´s hierarchy, by aiming at developing new or revising existent strategies (Guenther and Heinicke 2019). Diagnostic PMS usage is regarded as essential for ensuring that organisation's goals are attained by monitoring performance in cyclic intervals (Simons 2014; 1995). Furthermore, diagnostic PMS provides the structure and measures to employees to achieve the aims set by the organisation, even though diagnostic PMS enables employees to define their own ways on how to achieve these aims (Müller-Stewens et al. 2020). Strategic long-term or tactical medium-term decisions address improvements and learning opportunities for the company, and are based upon a longer comparisons of the KPIs. Therefore, both middle and senior management make future-

oriented decisions, whereas the tactical reactive decisions intended to improve the KPIs of the business day, are usually made by line management or employees. The following interview excerpt summarises the different decision-making methods:

> "*PMS are mainly used diagnostically for day-to-day decisions and short-term decision-making at the operative departments and the lower management, but it gets interactive as soon as general changes like "how I can improve" so strategic decisions have to be made, then the middle- and senior management is involved. So, the lower management at the operative departments use the PMS diagnostically for day-to-day decisions like for example increasing resources at short notice, main target is to rescue the quality for the day. The actual topics regarding change are usually made later after the assessment of the quality and the productivity. We don´t measure the productivity on a daily basis, it is measured monthly and those are the topics where we say okay what can we learn out of it.*" (I6_Top_M_Ground_Handling)

The quote shows that management has clear views regarding the division of decision-making: tactical day-to-day decisions are made by line management, whereas tactical medium-term and strategic decision-making is the role of senior management. The analysis of the interviews revealed that the hierarchy of the company is reflected in the employees' ability to make strategic decisions, as only senior management is authorised to make these:

> "*The strategic-operative decisions are done by the senior management.*" (I5_Senior_M_Aviation)

The quote reflects the decision-making policy of the company by clearly stating that strategic decisions are made by senior management, while tactical decisions for daily guidance are made by line management and employees. This suggests a strict hierarchical structure exists within the airport, which is confirmed by the literature which states that within hierarchical organisations, lower-level employees make operational performance decisions while high-level managers make strategic performance decisions (Deville, Ferrier and Leleu 2014). Purcell and Kiani (2016) confirm this finding by categorising decision-making into high-level strategic decision-making and low-level operational decision-making, and additionally relate it to a typical strict hierarchical decision-making process. Taking a step further and adding PMS usage into this finding, the clear statements of the participants neatly summarise the decision-making concept of the case company: the top, senior and middle management make strategic decisions and take proactive actions based on long or

medium-term performance results from PMS. Line management and experts make tactical decisions in the form of reactive decisions to diagnostic PMS results for their daily steering. This significant finding adds new insight for the organisational PMS literature, as the connections between forms of decision-making and PMS usage types have not been previously researched

Additionally, depending on the level of performance results and the seniority of the people involved, information in which actions are required and decisions needed is passed up the management hierarchy:

> "*But those are really the employees on the lowest working level who generate and distribute the reports to the management and the topics are then further addressed up the hierarchical ladder, so from one management level to the next senior management level and we from the senior management level decide […] Currently all the decision-making is done in the management.*" (I5_Senior_M_Aviation)

The quote shows that strict and clear forms of decision-making are apparent within the management structure. With regard to daily operational decisions, experts pass performance results up the management hierarchy. What is apparent from the interviews is that line managers report issues up the hierarchical ladder but are not involved in making these mid or long-term decisions:

> "*We have the PMS cycle, however the last point of making decision is not in my area of responsibility anymore as this is something the senior management level does. Sometimes I am also involved but we line managers usually report it to the senior management*." (I9_Line_M_Aviation)

This quote highlights that even line managers need to pass on critical performance information to senior management, and are usually excluded from the strategic decision-making process. Decisions may be made by the manager themself, by a group of managers in a management meeting or in dialogue with external parties. Middle and senior management delegate the analysis of performance issues to make strategic long-term or tactical medium-term decisions. To make robust decision, managers, need to make a an appropriate assessment by developing an understanding of the different dimensions causing, interfering, and influencing the affected area. Therefore, the task of analysis is passed down the organisational hierarchy to subordinates, lower management and employees who may be experts in the area under investigation. Experts are then requested to conduct an in-depth analysis on the affected area:

"*[…] we use the PMS diagnostically and if we realise that we have a general weakness in a process we use it interactively, so we analyse it in more depth with more perspectives as we usually do it in the standard performance measurement. For example, my sub-departments which I lead they get the task to go deeper into the topic and to analyse it in more depth to see if there are patterns and then I know I have to focus on this gap within this certain process*." (I6_Top_M_Ground_Handling)

The quote describes the approach of senior level managers. Firstly, the PMS are used diagnostically, and if there are systematic anomalies, senior management continues to use the PMS interactively by requesting in-depth analyses to obtain a holistic and detailed picture of the performance issue. This in-depth analysis is usually undertaken by subordinates who report the analysis to management. The experts consulted are usually employees and managers responsible for the business unit in which the performance decline has occurred, due to their knowledge of processes and routines. However, consulting experts always bears the risk that the real cause of the performance issue is concealed out of fear of being accused and defamed:

"*However, regarding learning, it is difficult because if you ask the responsible person why the quality decreased, they will always come up with an excuse but never admitting that they made a mistake. So, the whole performance measurement causes employees to take a defensive position if the quality was bad. And they don´t try to learn out of it by being honest and telling the real cause of the problem. It is very difficult to get them to the point that they can learn openly and that they don´t need to fear or apologise for their mistakes. But it is very difficult and the excuses and taking a defensive role prevents learning to take place. […]it is very difficult for us managers to find the real reason because the employees always tend to conceal the real reasons and blame others.*" (I6_Top_M_ Ground_Handling)

The statement above highlights the dilemma of management regarding mistakes and open-learning culture. It is suggested that employee's fear of accusation may prevent an open-learning environment and hinder learning within the organisation. This shows that the management culture clearly plays a significant role not only for decision-making but also for the learning culture of the organisation. As identified from the interviews, managers mainly determine if learning is achieved. This is congruent to the literature reviewed in Chapter two, which identifies leadership as a critical OLM (Robles 2019; Henri 2006). Indeed, the literature even states, that it is management who define the degree of communication and exchange, and thus build the learning culture within the

company (Do and Mai 2020; Lee et al. 2014; Mazutis and Slawinski 2008). The statements from the participants show that management is in charge of both communication and error culture. Even though managers seem aware of their power to shape communication, errors and learning culture, some managers state that they are under significant pressure, and as such are not always able to actively promote the exchange and feedback:

> *"(...), however direct feedback is not as often the case as we would wish because we just don´t have enough time and there are so many decisions I take daily, it is easier to just tell the departments what they have to do."* (I7_Line_M_Aviation)

This quote highlights the managers' awareness of their responsibility for useful feedback and communication, and also confirms view expressed in the literature that it is management who are responsible for the feedback culture within the organisation (Do and Mai 2020; Lee et al. 2014; Mazutis and Slawinski 2008). However, it appears that managers do not place enough emphasis on feedback and communication, as it is often regarded as being easier and less time-consuming just convey instructions. This may be because two-way communication across the organisational hierarchy is particularly challenging as Fraport AG utilises a hierarchical structure, with clearly defined tasks and responsibilities which leave little opportunity for independent action. The literature suggests that formal, rigid organisational structures are found to hinder learning (Curado 2006). Although decision-making is mainly based on the knowledge of experts, they are not involved into the process itself due to the hierarchical structure present in the airport. On occasion, experts are invited into management meetings to present KPIs, the analysis or the changes which have been implemented, but they are obliged to leave the meeting as soon as the presentation is finished. Even though they are not included in the decision-making process, it is considered an honour for employees to present to the senior management team.

> "*What was really cool of him [manager], I was very happy about that was that he asked me one time to join a meeting with the other managers to present the changes we made in the system. I was allowed to present it in front of all the other managers, which was very cool of him. But I wasn´t allowed to stay during the meeting, I just presented there and left after it.*" (I13_Expert_Ground_Handling)

This statement highlights the hierarchical situation at the case company. As noted above, employees consider it an honour to present analyses and findings to senior managers, even though they are not allowed to attend the full meeting and are required to leave as soon as their presentation is finished.

Further, experts are barely involved in communications regarding customers or external partners. Although they distribute their knowledge about performance issues to senior management, there is a perceived lack of feedback regarding the decisions:

> "*I just distribute the KPI´s and that´s it, I don´t get any feedback of what's happening with the KPI´s […] we have a clear hierarchical structure and I just pass on my reports to the management so that they are informed for their meetings with other high managers from Lufthansa or so, I am excluded due to my low hierarchical status. In such meetings I am not more than rarely invited as guest speaker and then I have to leave the meeting after I finished presenting to leave the high managers on their own for discussions. I don´t get feedback of the results or what they decide even though I distribute the data up to all management levels.*" (I12_Expert_Ground_Handling)

This quote shows that the approach used within the case company is largely determined by the hierarchical structure of the organisation. The experts pass on their analysis to management, to ensure that they are fully informed for their meetings with other managers or customers. Occasionally, experts are invited into the meetings to present their results, but often feedback from management is lacking, and the experts are largely uninformed about further courses of action. Indeed the findings show that the teams who address the performance issues are frequently not informed about the reasons underpinning decisions. This contradicts the basic learning process within literature, as it is commonly acknowledged by researchers that learning is generated from feedback (e.g. Do and Mai 2020; Hasson et al. 2016; Lloria and Moreno-Luzon 2014; Lee et al. 2014; Mazutis and Slawinski 2008; Chiva and Alegre 2005; Dervitsiotis 2004; Crossan et al. 1999; Huber 1991; Fiol and Lyles 1985). This leads to the realisation that learning processes at Frankfurt airport are highly influenced by feedback, and that a lack of feedback and communication (including scant reasoning for decisions), hinders proper learning within the organisation. Further, this finding provides a strong potential for the airport to enhance its learning processes by improving feedback and the communication culture. Moreover, decisions which have been made cannot be questioned or challenged by employees. Employees simply execute the instructions, regardless of whether or not they understand the reasons behind decisions:

> "*The management informs the Business Information Manager and he or she informs us. Those are instructions and there is nothing to discuss about or questioning it.*" (I2_Expert_Aviation)

This quote highlights the rigid hierarchical structure of the company, which suggests a one-way communication and feedback stream without the detailed information required to nourish a learning culture. As identified within literature, discussion and dialogue are essential for creating individual, group and organisational learning (Do and Mai 2020; Hasson et al. 2016; Lloria and Moreno-Luzon 2014). Often critical discussions with external parties (especially customers) are necessary because of the interdependent nature of business processes, which impact the KPIs of both parties. A critical co-dependence is punctuality, which is also further described in Chapter 1.2.3. This indicates that the major cause of delays for Frankfurt airport is due to the airlines (DFS, 2019) themselves. Thus, the airline and airport processes need to be carefully coordinated and aligned. However, due to the co-dependencies and overlaps in the processes, relationships are often tense and characterised by accusations of wrongdoing. Therefore, these meetings are often highly political and are undertken at the highest management level:

> "*But only on certain occasions incidents are analysed further. Such de-briefings can be highly political, especially if customers like Lufthansa are involved, therefore the meetings are all with the senior management. […] I can only say that the de-briefings with customers can be highly political, and the decisions need to be communicated and harmonised within the management, so throughout the organisation's hierarchy*." (I10_Senior_M_Aviation)

The interviewee highlights the highly sensitive nature of meetings with customers, which need to be discussed at a management level. Due to the political nature of such meetings, decisions need to be aligned across all hierarchical management levels within the organisation. There are also KPI issues which are caused by customers, but which cannot be addressed by Fraport AG as they are beyond its sphere of influence. Such issues largely comprise performance issues relating to punctuality. Due to the importance and sensitive nature of the customer relationships, changes which might improve the processes at Fraport AG are often avoided and not discussed. This is to avoid endangering customer relationships. Sometimes there are other far-reaching decisions to make which involve external parties such as the European Air Traffic Control, or other airports. Such decisions require a high degree of communication and dialogue, as Fraport AG is not authorised to act independently. As a result, issues are communicated up the management hierarchy, with senior management requesting meetings to solve these issues collaboratively:

> "*Sometimes we as airport are also not capable of making decisions for example if there aren't enough air traffic controllers, so we are also the ones who request and urge the responsible*

persons to take actions and who point out the consequences. So, such things are then discussed for example in Brussels in meetings." (I9_Line_M_Aviation)

The respondent highlights that communication and dialogue are essential to solving issues. This perspective is further supported by the literature which states that communication, feedback, and dialogue are key for learning (Do and Mai 2020; Hasson et al. 2016; Lloria and Moreno-Luzon 2014). However, it is usually senior management which is involved in discussions and meetings with external parties. Conversely, junior managers, as well as employees make short-term decisions for daily tasks. These steering decisions are correcting actions taken to address declining performance results:

"*But if there are decisions like for example regulating the arrival for a day because one flight is delayed or premature […] and the landing rate therefore needs to be changed […] Such decisions can be made on a lower level. […] the decision-making for such operative day-to-day events is located lower down the hierarchy*." (I5_Senior_M_Aviation)

In the operations department, some experts are duty managers, which means that they are allowed to make day-to-day decisions up to a defined threshold. Additionally, senior management always need to be kept informed about the resulting decisions:

"*We have clearly defined decision thresholds and a clearly defined information chain, so the degree of decision a Duty Manager can make is all defined all the way up the hierarchical management ladder*." (I10_Senior_M_Aviation)

This quote highlights the clearly defined hierarchical structure of the organisation, and the corresponding decision-making freedoms associated with the hierarchical structure of the company. Duty managers are enabled by senior management to make independent decisions for the various shifts used by the operative departments. Employees work on weekends, at nights or on public holidays while managers do not. However, the decisions which employees make take are limited. In addition, the system proposes decisions based on predictive scenarios selected by the Duty Manager:

"*[…] For decision-making we are having automated proposals for values. […] for each daily decision to make there are only limited scenarios to choose from, so the Duty manager choses one scenario like redirecting the passengers to security check B, so the system already provides*

all the possibilities, which are limited of course and out of them the Duty managers chose what to do." (I10_Senior_M_Aviation)

Managers at the lower hierarchical levels have targets to assess performance. However, these targets need to strike a between providing quality and saving costs. Therefore, management experience is vital for decision-making. While critical performance results are communicated up the hierarchical ladder of the company, the outcome of decisions is only rarely communicated back down the organisation. Notably the findings show that direct feedback to employees is lacking, with instructions being given without enough background information to understand the impacts or reasons behind the decision. This is because managers are often very busy and therefore may not have the time to inform employees directly:

"*For me personally it is very important to explain the employees why we did this and this measure because it is motivating for the employees if they are able to understand the steps, we took to solve the issue. But you cannot do it all the time because what happens is that you as a manager just doesn´t have the time to give the employees feedback all the time."*
*(I4*_Top_M_Aviation)

This quote again highlights that managers are aware of their responsibility to provide feedback, however the respondent explains that time constraints often prevent them from providing proper feedback to their subordinates. This indicates that it is often not possible to provide ongoing feedback. The findings suggest that different approaches are depending on whether feedback is required or not. Even though the literature argues that feedback and dialogue are critical for creating learning (Do and Mai 2020; Lee et al. 2014; Mazutis and Slawinski 2008), the interviews confirm a distinction between scenarios in which instructions need to be sufficient for individuals, and when feedback is required and is important for learning. Notably, decisions regarding inter-divisional changes are only communicated to the employees who are executing those decisions. Other employees who were also involved in the analysis stage are often not informed at all. In case of major changes, the information regarding changed, improved, or newly implemented business processes are communicated to the entire organisation via the corporate intranet.

4.3.5 Usage

The findings clearly show that in the first instance, PMS are always used diagnostically. Interactive usage evolves from diagnostic monitoring and depends on the identification of patterns or major

discrepancies by managers, which require strategic long-term or tactical medium-term decision-making:

> "*[…] a PMS is always used diagnostically in the first place and then depending on the factors it is used interactively in a fluent transition*." (I4_Top_M_Aviation)

This finding proposes an extension to the existing literature, which currently suggests that while interactive PMS creates OL, diagnostic PMS usage is also needed, as both types complement each other (Müller-Stewens et al. 2020; Guenther and Heinicke 2019; Shurafa and Mohamed 2016; Ylinen and Gullkvist 2014; Grabner and Moers 2013 Tessier and Otley 2012; Ferreira and Otley 2009; Widener 2007; Henri 2006a) (see Chapter 2.4).

Management is insistent that interactive PMS usage rarely occurs, as PMS are usually used for the diagnostic monitoring of KPIs. Results from the data analysis show that diagnostic monitoring comprises detecting statistical outliners and triggers tactical short-term decision-making. This is usually the case in day-to-day decision-making if performance declines and ad-hoc measures need to be undertaken to address the issue and therefore the performance of the day. However, as soon as patterns are identified within outliners, PMS usage further evolves into interactive usage by using communication tools and dialogue to detect the cause of the performance issue via conducting in-depth analysis. As a last step, interactive usage is found to involve strategic long-term and tactical medium-term decision-making. A top manager of the aviation division provides a clear explanation of this correlation:

> "*So as I said as standard we are in the diagnostic cycle but if we identify certain patterns, for example that the airline XY differs in certain parameters or that a process partner has a problem it continues in an interactive cycle, because communication and interaction with the actual or the alleged perpetrator is essential. So, we try to find correcting measures, and this is not possible in such situations by only using PMS diagnostically. Therefore, in the first place, it is diagnostic and then it is developed into interactive. It would stay diagnostically if you only have statistic outliners. If you cannot identify systematic outliners of target times and target values, you stay in the diagnostic cycle, and it will transform or trigger the interactive cycle if you believe you found systematic anomalies.*" (I4_Top_M_Aviation)

From a practical perspective, this quote neatly summarises the variety of PMS usage types. The findings further reveal that the usage form also depends on the hierarchical status of management.

At the case company, it is common that middle and top management trigger interactive usage of the PMS while the employees and the line management mainly use the PMS diagnostically for tactical every-day decision making:

> "*PMS are mainly used diagnostically for day-to-day decisions and short-term decision-making at the operative departments and the lower management, but it gets interactive as soon as general changes like "how can I improve?" so strategic decisions have to be made, then the middle and senior management is involved.*" (I6_Top_M_Ground_Handling)

Findings from the interviews reveal that interactive PMS usage uses communication and dialogue as critical tools for examining performance issues via in-depth analyses. These analyses are normally commissioned by senior management, and conducted by experts at operational working-level who possess detailed expertise in the affected area. After the results of the in-depth analysis are discussed at the management level, management communicates the decisions made. However, a sufficient explanation is not always provided regarding the reasons underpinning the decisions made:

> "*The diagnostic part is done by employees and the interactive part is done by us managers. The employees provide us with the reports and based on them we managers trigger the interactive part. After we decided on actions, we tell the employees about what they have to do and what they have to adapt. It is a learning organisation because the employee who recognised the anomalies receives feedback about the resulting actions. The employee get told that we talked about the issue, how we approached it and ideally, but this is not always the case, we also explained why we took this measures*." (I4_Top_M_Aviation)

This quote usefully highlights the importance of feedback provided by management in createing learning. This finding supports the existing literature which states that feedback and dialogue are essential for generating OL (Do and Mai, 2020; Lee et al., 2014; Mazutis and Slawinski, 2008) (see Chapter 2.2.2). The findings suggest that managers seem to be aware of their responsibility to provide feedback to the employees so the organisation can learn. As discussed earlier in this chapter, during the interviews the managers admitted that there are often time constraints which prevented them from providing detailed feedback by communicating the entire reason for their decisions and actions. The analysis of the data revealed that the interactive use of PMS enables the flow of knowledge throughout the organisational hierarchy. However, this knowledge flow is highly dependent on the managers, who may either impede or foster it:

> "*But I think the main issue which is not working is the interactive usage of the PMS and generating learning and the memory is also an issue because usually we don´t give feedback to the employees.*" (I9_Line_M_Aviation)

The quote shows the awareness of managers in enabling learning by providing feedback, and of their responsibility to ensure that learning is embedded throughout organisation. The findings reveal that the lack of feedback given to employees from management about decisions is particularly evident within the aviation division. Here, management and employees are aware that interactive usage and therefore learning needs to be improved. Increasing the frequency of knowledge exchange through interactive PMS usage (especially at the operational employee level) is seen to be highly beneficial to achieving OL, and is seen as a welcome aim:

> "*Currently the PMS are only used diagnostically on the operational employee level, but it would be the aim that the employees learn from the operative activities of the day and that they can apply what they learned on the next day so that they exchange their knowledge and not only distribute hard measured data but that they also get to know the context of the data.*" (I5_Senior_M_Aviation)

This quote shows how diagnostic PMS can be further used interactively in practice. The literature clearly states that PMS are used largely used diagnostically (Guenther and Heinicke 2019; Baird Harrison and Reeve 2004) (see Chapter 2.3.3). This view is confirmed by the findings. Within Frankfurt airport, PMS are largely used diagnostically, while interactive usage only occurs infrequently. It is especially challenging for the airport to use the PMS interactively at an operational employee level, as interactive usage is mainly undertaken by managers. Senior management shows awareness that the learning issue within the company can only be addressed by using PMS interactively on an operational employee level. This would aid in the exchange of knowledge and learning, and would embed learn from the performance review at all organisational levels.

Further, managers indicated that the solution would be to communicate not only the performance data but also the context and impact of the data to generate learning at the operational employee level. This insight is also confirmed by literature, which proposes that group and organisational learning can only be achieved through communication, feedback, and dialogue (Do and Mai 2020; Lee et al. 2014; Mazutis and Slawinski 2008) (see Chapter 2.2.2).

It is apparent from the findings that the interviewees believed that PMS provide the means to create learning at all levels: individual, group and organisational learning. This insight again confirms the extant literature, which suggests that PMS are powerful tools for enabling learning at all levels (Thingvad et al. 2018; Henri 2006; Moynihan 2005; Marginson 2002) (see Chapter 2.4). The literature argues that learning needs to be shared within a group to generate OL (Probst and Büchel 2000; Cohendet and Steinmüller 2000; Batac and Carassus 2009; Odor 2018). The interviews clearly reflect the literature by showing that PMS help employees to adjust their activities and behaviours. Not only do PMS communicate the rules and norms of the organisation (Robles 2019), but they also extend this stage of individual learning by transferring knowledge between individual employees and groups of the organisation (Burnett and Williams 2014). The findings show that diagnostic usage triggers individual learning and thus SLL. An important finding is that this learning form does not always happen consciously, but can also be acquired indirectly through repetition and experience. With consideration to the literature, PMS were found to adjust the activities and performance of single members of organisations by correcting their actions which deviated from the organisation's norms and standards, which are embedded in PMS measures (Robles 2019). This may suggest that an unconscious form of individual learning may be possible by using PMS diagnostically.

The findings further reveal that interactive usage of PMS spreads individual knowledge (gained through using initial diagnostic use of PMS) e, across the team and therefore triggers the OL cycle via dialogue and communication:

> "*The PMS cycle triggers the OL cycle. PMS provide the information, but no relationships are evaluated. I just have an operative system which shows data and knowledge is on an upper level. When it comes to PMS, it is firstly gathering the information and discussing about the information. When it comes to discussing, each participant uses his or her implicit knowledge based on experience. The implicit knowledge is based on years of experience and learning. So single-loop learning provides the basis for organisational learning, but this always depends on the individuals who have influence, for example if they are role models and by being convincing*." (I3_Senior_M_Ground_Handling)

The quote above from a senior manager summarises the relationship between PMS and OL: PMS enable OL by triggering the learning cycle. PMS generate information, which is interpreted by employees based on their individual intrinsic knowledge. This individual knowledge builds the

foundation for discussion among the groups in which experiences and knowledge are exchanged to interpret performance results. Additionally, the quote highlights the danger of single members of the organisation disregarding the opinions and knowledge of other employees due to their status. This risk is also acknowledged within the literature, which notes the subjective nature of individual interpretation is prone to bias by dominant groups within the organisation (Feurer and Chaharbaghi 1995b). Firstly, significant key finding for this research is that PMS actually triggers the OL cycle. Secondly, the interviews highlight the importance of SLL while measuring performance, and the importance of communication and discussions in generating and distributing learning to enable organisational learning. While the literature specifies that both PMS usage types complement each other (Müller-Stewens et al. 2020; Guenther and Heinicke 2019; Shurafa and Mohamed 2016; Ylinen and Gullkvist 2014; Grabner and Moers 2013 Tessier and Otley 2012; Ferreira and Otley 2009; Widener 2007; Henri 2006a), The evolution of interactive usage evolves from diagnostic PMS usage is not noted in the literature. Thus, another significant finding proposes an extension to the existing literature by showing that PMS are always used diagnostically in the first instance, and then continue to be used interactively.

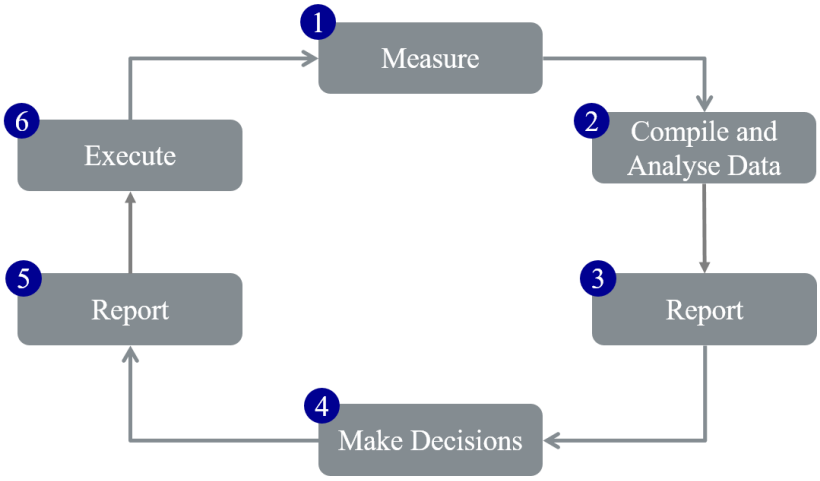
4.3.6 Refection of Performance Measurement Discussion and Findings

In the following section, the findings from the data analysis are reflected upon in light of the literature review. This section also aims to address research question three: What is the process of performance measurement at Frankfurt airport and how are the performance measurement systems used in the case organisation?

The findings derived from the semi-structured and semi-structured narrative interviews support Landström et al.`s (2018) PMS usage cycle, presented in Chapter two. The analysis reveals that the PMS cycle occurs in practice, as well as in theory. Within the literature, Landström et al. (2018) find that the cycle starts with measurement, followed by compilation and analysis of the data, reporting, and decision making. However, senior and top-level managers remarked that communication and feedback of their decisions are vital in their daily business, in relation to the PMS cycle. The importance of communicating their decisions to employees and other managers as well as customers was also noted. Moreover, the interviewees stated that the actual step of executing their decisions is also of importance to them, and given this they concluded that these two steps should be incorporated into the PMS cycle. From a practical point of view, the subsequent actions of providing feedback (namely the repetition of the reporting step and the execution of the activities) is feasible and justifiable, and as such should be incorporated into the cycle. Therefore,

the findings show that the PMS cycle can be adapted and extended by the following steps: reporting, namely providing feedback, and execution. The adapted PMS cycle can be depicted as follows:

Figure 24: Adapted PMS cycle



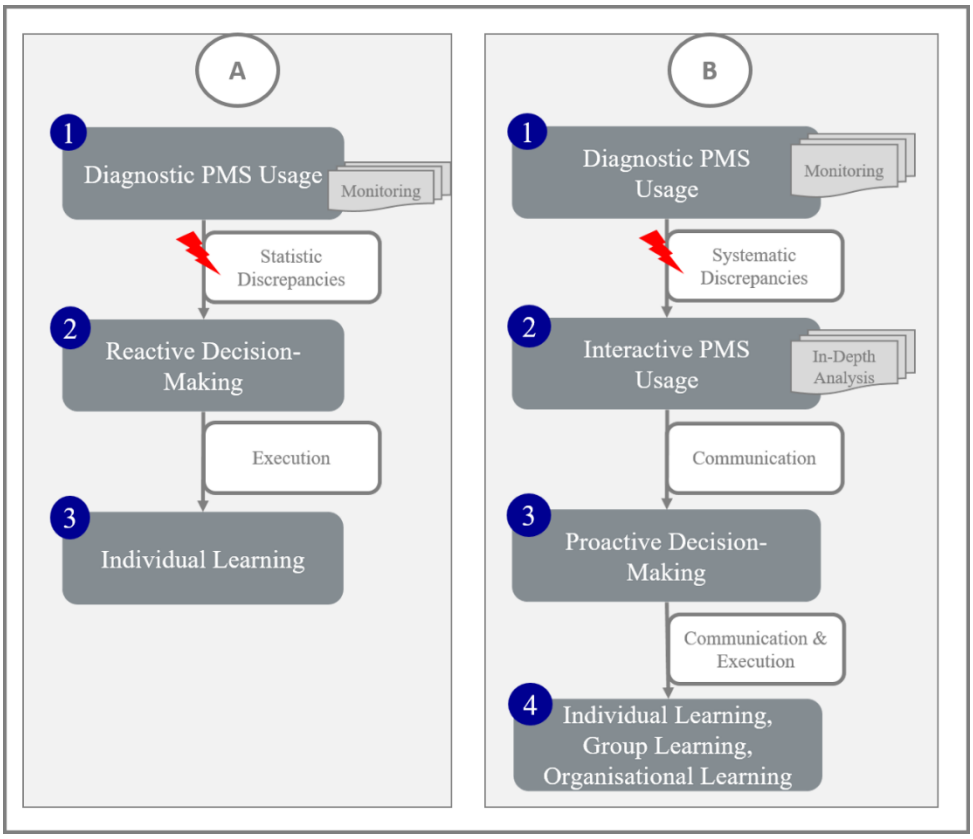
(Source: Author 2022)

As noted above, the findings derived from the primary data suggest that the PMS lifecycle designed by Landström et al. (2018) can be refine and extended via the additional steps: Reporting and execution (see Figure 24). Results from practice showed that after decisions are made, feedback is provided to the parties involved before decisions are implemented.

The analysis also shows that PMS are essential for all employees to guide and manage the company. The interviews confirm that management of the airport would not be possible without constant monitoring of the KPIs via PMS. In line with Landström et al. (2018), results of the PMS are distributed among the entire organisational hierarchy in different forms and intervals. The organisational hierarchy is clearly defined, as well as the tasks and the extent of decision-making. The findings further show, that at Frankfurt airport, PMS can be used both diagnostically and interactively. This supports the literature which states that a PMS can be used in both forms for different purposes (Müller-Stewens et al. 2020; Guenther and Heinicke 2019; Shurafa and Mohamed 2016; Henri 2006) (see Chapter 2.3.3). Indeed, the data analysis reveals that PMS are always used diagnostically first and, depending on the form of performance issue, they are either used interactively or usage stays on a diagnostic level. This finding also seeks to extend the existing literature which finds both usage forms as important and necessary to create OL (Müller-Stewens et

al. 2020; Guenther and Heinicke 2019; Shurafa and Mohamed 2016; Ylinen and Gullkvist 2014; Grabner and Moers 2013 Tessier and Otley 2012; Ferreira and Otley 2009; Widener 2007; Henri 2006a) (see Chapter 2.4), but without further stating the nature of their relationship and how they interrelate. Results from practice provide insights by showing that normally employees and line management use PMS diagnostically for daily steering as a reactive response to performance drops. Within the case company, the usage of interactive PMS is mostly triggered by senior and top-level managers for proactive responses to systematic performance anomalies, and also strategic long-term or tactical medium-term decision-making. However, the results show that the form of performance decline indicates how the PMS need to be used. Therefore, one key finding from this research is that PMS are used diagnostically to detect drops in performance at the case company. If the drop in performance is a statistical outliner, PMS continue to be used diagnostically to monitor performance. However, if patterns are clear (indicating systemic outliners), then the PMS continue to be used interactively. Participants noted that interactive usage does not happen often and should be actively encouraged. This aligns with the literature, as many authors claim there is a lack of interactive PMS usage at larger companies (e.g. Guenther and Heinicke 2019; Baird, Harrison and Reeve 2004) (see Chapter 2.3.3). The key findings identified in this chapter regarding PMS usage types are summarised in the following figure:

Figure 25: PMS Usage



(Source: Author 2022)

Within Frankfurt airport, two different usage scenarios are depicted in Figure 25. Scenario A shows the process of individual learning identified from the data analysis by using PMS diagnostically. Scenario B involves both diagnostic and interactive usages of PMS, which enables the creation of all learning forms. This insight from practice enables the production of a holistic view of PMS usage types and their learning outcomes. While, PMS are used diagnostically for monitoring in scenario A (see Figure 25), reactive decisions are made in the event of statistical discrepancies. The execution of decisions leads to an activity adaption and thus to individual learning. In scenario B (see Figure 25), PMS are used diagnostically to monitor performance. However, if systemic discrepancies are detected, te PMS are used interactively and an in-depth analysis is conducted. This analysis is communicated and discussed until a proactive decision is made. Communication and execution of decisions results in individual, group, and organisational learning.

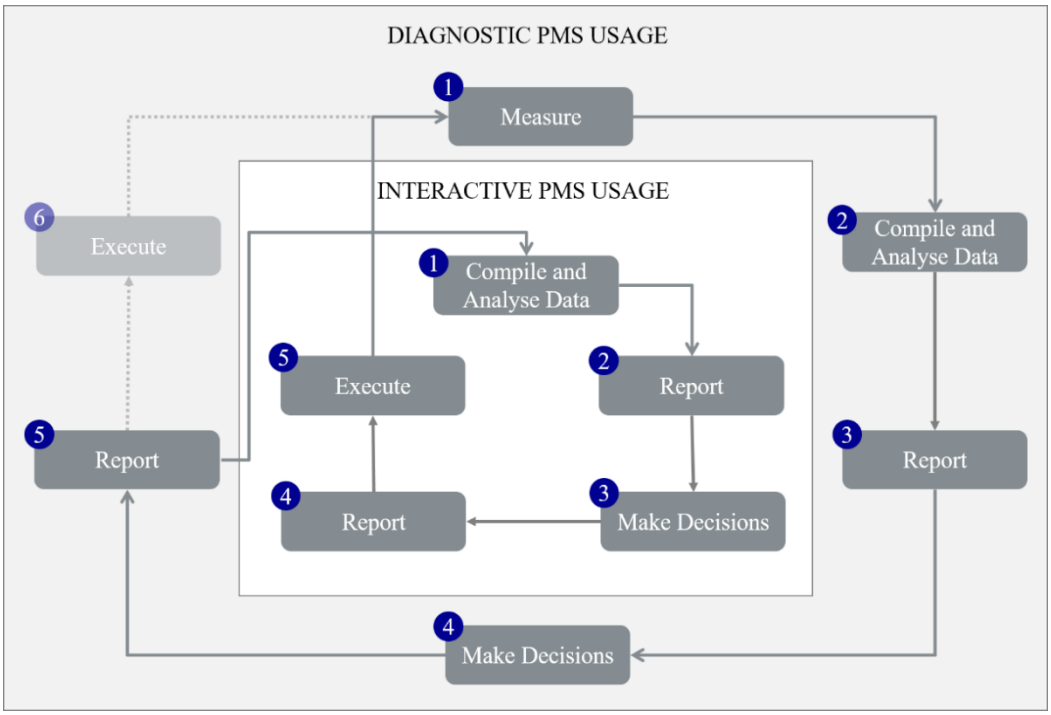
In line with the literature review presented in Chapter two, which states that PMS have the ability to create OL (Thingvad et al. 2018; Henri 2006; Moynihan 2005; Marginson 2002), the data analysis also reveals that using PMS generates individual, group and organisational learning, which

results in intrinsic individual knowledge. This is because the actions of individuals are monitored and reviewed within performance reports. Within Frankfurt airport, both positive and negative performance is reviewed. This creates an optimal environment for employees and management to learn from a variety of performance actions and adjustments, both good and bad. Therefore, PMSs are used firstly used diagnostically, which in turn creates individual learning. Other individuals and groups can learn from this if the individual decides to continue to use the PMS interactively. Therefore, interactive PMS usage has the ability to generate all forms of learning: individual, group and organisational learning. These significant findings add additional depth to the existing literature which states that interactive PMS usage has the ability to create OL (Zhang and Yu, 2020; Guenther and Heinicke, 2019; Shurafa and Mohamed, 2016; Simons, 2014, 1995; Henri, 2006a; Tuomela 2005; Bisbe and Otley, 2004), while diagnostic PMS usage is limited to individual learning. It is even proposed it may actually impede learning (Henri 2006a) (see Chapter 2.4). The interviews reveal that more interactive usage is needed, as there is currently a lack of feedback from managers to employees within Frankfurt airport. Frequently, only work instructions are communicated after a decision is made, which does not lead to learning from employees as there is no explanation of the reasons behind the decision s. In these cases, only managers experience individual and group learning. The data analysis shows that managers are aware of their responsibility to provide feedback, as well as their ability to create learning when communicating the reason behind their decisions. This findings clearly supports the extant literature by showing that group and organisational learning can only be created through feedback, communication, and dialogue (Do and Mai 2020; Lee et al. 2014; Mazutis and Slawinski 2008). The managers state that they strive to pass on their learning and provide reasons to enable that learning. However, due to high workloads and insufficient time, passing on the reasons behind their decisions is often neglected. The interviews further reveal the danger of single individual employee interpretations ignoring the opinion and knowledge of less influential members of the organisation. This risk of bias is also acknowledged by the literature which highlights the subjective nature of individual interpretation, and as a result bears the risk of individuals dominating the interpretation and knowledge of an entire organisation (Feurer and Chaharbaghi 1995b). Especially within hierarchical organisations, the literature reviewed in Chapter two shows that managers tend to project their own inherent beliefs to employees, and thus are likely to produce SLL, and prevent employees from DLL due to their dominant views (Hall 2011).

Comparing the interview data with the PMS cycle of Landström et al. (2018) reveals some notable deviations. The data analysis reveals that interactive PMS usage produced not only a single cycle but a double cycle. As noted above, one key finding generated from the research is that PMS are

always used diagnostically in the first place. Therefore, the interactive PMS cycle starts with the diagnostic PMS cycle before a double-loop is initiated via interactive usage. Therefore, the PMS measurement cycle is extended by a double loop in Figure 26, depicting the interactive PMS usage:

Figure 26: Diagnostic and interactive PMS cycle



(Source: Author 2022)

The PMS usage illustrated in Figure 26 starts with the diagnostic PMS cycle, while performance is mainly measured automatically via different operational systems. Sometimes employees' also enter additional manual values to the system. The measurement data is then compiled and analysed in the main operational system where employees can access automatically generated reports and send them to the different staff involved in monitoring performance. In case of discrepancies, the employees decide if the outline is an exception or if there are identifiable patterns . In case of statistical outliners, the person responsible performs counteractive actions to improve the KPI. Here the actions may be reported to the manager, but this is not compulsory. In this case, it remains at the diagnostic level and performance continues to be monitored. This is depicted in the grey cycle in Figure 26. If however the performance loss is systemic (as a pattern is identifiable), then the issue is reported either to the senior management or communicated within across the management level (see Figure 26, white cycle). Here, double-loop learning takes place not because the own actions and behaviours are corrected, but because the individual questions the overall process because the

systemic patterns have identified a weakness in the business structures and process. What is apparent is the recognition that double-loop learning is usually initiated by management, as they decide on the need for a deeper analysis on the issue. Experts may report the deviation, but it is management who decide on the creation of double-loop learning. This second loop is fundamentally different to the first loop as it acknowledges and includes a deeper understanding of the topic. This is achieved by conducting an in-depth analysis, and most importantly triggers a reinterpretation of the available information. Parallels to both SLL and DLL are apparent. The findings show that the interactive cycle is distinct from the diagnostic cycle, as the second loop is undertaken with the focus of achieving a deeper understanding through the analysis of in-depth data and the reinterpretation of in-depth data. This recognition is discussed further throughout this chapter. An in-depth analysis takes place to further determine the cause of an issue. The findings show that on the whole, in-depth analysis is undertaken by less senior members of staff who report the findings to management (Step 2, Figure 26). Managers then review the data and assesses the situation. This review of in-depth data clearly sets the second loop of the cycle apart from the first loop, as a deep understanding and joint review now contribute to the decision. The review is found to be a part of the decision-making step as the management discusses their views based on their experiences and knowledge. Therefore, the role of review is vital as the initial conclusion obtained from the first decision-making step is revised. After a joint review has occurred, a decision is made (Step 3, Figure 26). Afterwards, the outcome is reported to relevant staff (Step 4, Figure 26) so that the decision can be implemented (Step 5, Figure 26).

What is apparent in all the interviews, undertaken for this research project, is the power of management to foster or impede learning. This significant finding supports the literature which identifies leadership as a critical OLM, which largely determines if OL can be achieved. By enabling or hindering communication and feedback, managers strongly shape the learning culture within the organisation (Do and Mai 2020). In fact, management is a significant determinant whether PMS are used interactively or not. Therefore the interactive usage and fostering of communication and learning (Zhang and Yu 2020; Schäffer et al. 2014, Simons 1995b) requires significant involvement from management. Generally leadership helps to create OL if it promotes dialogue and communication (Mazutis and Slawinski 2008). The literature also emphasises the importance of an open-minded environment, which needs to be enabled by management to create learning (Lee et al., 2014). With reference to the literature, the interviews reveal the awareness of management of their power to foster or impede learning by communicating the reasons underpinning their decisions.

A number of researchers suggests that an open organisational culture promotes individual, group and organisational learning (Lau, Lee and Chung, 2019; Heorhiadi et al. 2014). Significantly for this research, Curoado (2006) found that formal rigid organisational structures actively hinder OL (Curado 2006) (see Chapter 2.2.2). The findings show that Frankfurt airport is a hierarchical organisation with clear hierarchical levels and lines of communication. In addition to the lack of feedback from management to employees regarding the reasons behind decisions, participants also noted the lack of an open learning culture within the organisation. management urge employees to reveal the 'real' causes of performance issues, without disguising the real reasons for errors, which may be hidden out of fear of being blamed. The data analysis reveals that within Frankfurt airport, an open learning culture does not exist as yet, but that management has clearly stated a need to strive for it.

This research was unable to establish if OL affects existing PMS by reshaping the measures of PMS, as proposed by some researchers (e.g. Fried 2010; Batac and Carassus 2009; Hamilton and Chervany 1981) (see Chapter 2.4). While this seems reasonable from a practical perspective, the participants only stated improvements and adaptions within their business processes or aims. However general measures of efficiency and punctuality were not amended. This may be because the airport's PMS measures are already up-to-date and suitably aligned with the requirements of the airport environment, the company's strategies, and aims and objectives. As the data analysis reveals, the airport's main KPIs of efficiency and punctuality are aligned with the expectations of customers, by aiming to outdo competitors. Frankfurt airports KPIs are confirmed by many authors in the PMS airport field as being one of the most important KPIs within recent years. In addition, the literature notes that competitor benchmarking is the most appropriate method for increasing the performance (e.g. Pacagnella Junior 2021; Iyer and Jain 2019; Baltazar et al. 2018; Bezerra and Gomes 2018; Barros et al. 2017; Lai et al. 2015) (see Chapter 2.3.1). The commercial pressure placed on the airport is not visible in the official benchmarks conducted by organisations such as the A-CDM or DFS, which review KPIs across airports (see Chapter 1.2.3). The alignment of the airport's KPIs with important customers (such as airports and authorities, as well as the membership of the A-CDM airports) suggests a homogenisation of KPIs across the industry (see Chapter 1.2.3). While benchmarks of most significant KPIs are publically available, these make KPIs appear stable and established, whereas the performance of the airport is under continuous pressure.

4.4 Organisational Learning

This section addresses the fourth research question by using the content analysis of the semi-structured and semi-structured narrative interviews: How does individual, group and organisational learning emerge at the case company and how do the the learning forms interrelate?

The findings are structured according to the organisational learning categories presented in section 3.7.1, and are listed in Table 42 (below).

Table 42: Organisational learning categories

Organisational Learning Categories	
Individual (Crossan et al. 1999)	Knowledge Acquisition (Huber 1991)
Individual to group (Crossan et al. 1999)	Interpretation (Crossan et al. 1999; Huber 1991)
Group to organisation (Crossan et al. 1999)	Knowledge distribution (Huber 1991)
Organisation to individual (Crossan et al. 1999)	Memory (Huber 1991)

(Source: Author 2022)

Firstly, the findings of the organisational learning categories as derived from the content analysis (presented in Table 42) are presented and discussed in relation to the literature, as reviewed in Chapter two. This section goes on to consider the findings and discussion generated from the data analysis and the literature research, and in doing so, addresses the third research question. The findings and discussion have been brought together in one chapter as a form of triangulation (as discussed in Chapter three) to facilitate the theoretical and practical examination of the individual,

group and organisational learning forms generated at the case company, and to determine the relationships between the learning forms.

4.4.1 Knowledge Acquisition

The acquisition of knowledge is a broad field comprising several different factors, which may enable or hinder the process. The data analysis shows that PMS and knowledge acquisition are closely connected, with the usage of PMS clearly having a strong influence on the acquisition of knowledge, especially for employees. This finding clearly supports the extant literature which regards PMS as tool for generating experience through information provision (Robles 2019; Gil 2018; Crossan 1999; Simons 1995a). Therefore, PMS define the context in which knowledge is acquired by supplying the information required (Robles 2019). The data analysis further indicates that individual knowledge acquisition can be grouped into two categories: unconscious knowledge acquisition and conscious knowledge acquisition. This finding is congruent with literature, which also confirms the conscious and unconscious nature of knowledge acquisition (Huber 1991). However, no further related research is present within the literature. The findings from this research contribute to addressing the dearth of research in this area. The findings thus deepen understanding of this topic by showing that unconscious knowledge acquisition stems from diagnostic usage of PMS and is based on an incremental embedding of processed information. Individual employees perform corrective actions to address poor performance in the form of ad-hoc adjustments, based on previous experiences and repetitive tasks:

> "*[...] because from my understanding the knowledge acquisition of the individual is a basic training and then the individual agent learns by experience." (*I8_Top_M_Ground_Handling)

The view that knowledge gained through experience is evident within the literature. Indeed, learning from experience is regarded as highly significant, and as stated above, may be acquired consciously or unconsciously (Huber 1991). The employees work in a fast-changing environment where quick responses to declining performance are essential. Due to the live monitoring of the KPIs, the adjustments which are implemented are visible within the diagnostic monitoring of the KPIs. Therefore, employees receive direct feedback via the PMS if adjustments are effective. Indeed, the data analysis reveals that by continuously repeating such scenarios, the actions which lead to improvements are generated in an unconscious manner within the mental models of the employees, and an indirect form of learning occurs:

> "*[...] by using PMS interactively I have the chance to explore these relationships. But this happens rarely, usually we look at the KPIs, notice outlines and react with ad-hoc measures and hope that it will show effect." (*I3_Senior_M_Ground_Handling)

The quote provides a valuable insight into how employees deal with drops in performance. In cases of poor performance, PMS are used diagnostically to detect errors and a lack of performance. The excerpt further shows that employees react by drawing on their previous experiences, apply those measures and waiting to determine if the measures are effective. If they are effective, the employees acquire knowledge of which measures are appropriate to addressing the associated decline in performance. The data analysis also reveals another key finding, that conscious knowledge acquisition appears in two forms: self-motivated knowledge acquisition and externally-motivated knowledge acquisition. Self-motivated knowledge acquisition can be the result of accessing organisational memories, or by interactively using PMS. Organisational memory appears in various forms as Fraport AG uses several different methods to generate organisational learning. Employees are provided with opportunities to directly access information to obtain new knowledge and insight on a topic. This can be in form of training opportunities, internal news or by directly asking for feedback or information on specific issues. Employees proactively request new insights from management to gain knowledge:

> "*I told my manager that I found anomalies and that I want to meet with the handlings-agent*." (I15_Expert_Aviation)

This quote provides a useful example of how an expert seeks insights into a drop in performance after diagnostically using a PMS. The employee is self-motivated to learn about the causes of the error and the issues affecting performance, instead of simply reporting the loss in performance to management. External motivation is either triggered by management providing feedback, commissioning research and the acquisition of knowledge, or through colleagues sharing their personal knowledge and experience, and communicating and discussing particular issues. This finding also aligns with Huber's (1991) finding that feedback is important within experimental learning. One basic but essential form of learning, is training and educating employees in their area of expertise:

> "*For me as manager knowledge and the employees are my most important resources and I have to constantly educate and train my employees*." (I10_Senior_M_Aviation)

This quote clearly highlights the importance of recognising employees as the most valuable organisational resource. Thus, management make an effort to motivate employee learning. This occurs in the form of training events, adapted working routines or process descriptions. Furthermore, with regard to organisational performance, management often requests detailed information on specific topics:

> "*I always need to be informed about important issues so that I am able to report to my manager. It is always a riding on the edge of a razor blade between too closely monitoring the employees and not being able to report or defend myself and my team in front of my manager."* (I11_Line_M_Aviation)

The interviewee summarises the management challenge of balancing the levels of employee supervision and monitoring . Management may choose to commission additional research in the event of a drop in performance. Experts in the area are then required to share their knowledge or to attain new knowledge regarding the affected area and then to share this with management:

> "*[...] they [employees] pass on either only the information of the KPIs or their knowledge as well to the management*" (I5_Senior_M_Aviation)

This statement shows that within Frankfurt airport, employees either only pass on performance information to management, or they also share their knowledge with management. This suggests that managers either draw on their own knowledge without acquiring additional knowledge from experts, or they turn to the experts to provide additional knowledge as well as a performance report. In the first example, managers utilise their own knowledge gained from experience. In the latter case, managers acquire knowledge from experts and their experiences:

> "*[...] it has to do with experience what experiences individuals made and how they share it with the group or with the manager of the group or team and how their share their experiences together."* I8_Top_M_Ground_Handling)

This quote shows that learning from experience is regarded as a significant form of knowledge acquisition for Frankfurt airport. This finding aligns with Huber´s (1991) forms of conscious or unconscious experiental learning. However, in addition to experiental learning, Huber (1991) also specifies other forms of knowledge acquisition. Congenital learning is a form of inherited learning

obtained from the founders of an organisation (see Chapter 2.2.2). From a practice-based perspective, this form of learning is achievable, as both organisational and subject experts share their knowledge with new employees. The data analysis suggests that the participants embed Huber´s (1991) congenital learning in their concept and understanding of learning from experience:

> "[...] *By acquiring knowledge from past experiences we further know [...]. So, the decision would be based on experience from previous similar situations*." (I5_Senior_M_Aviation)

This quote shows the interviewee's understanding of knowledge acquisition, and is based on experience. Vicarious learning is another knowledge acquisition form present in the literature, and emphasises gaining experience by imitating other organisations (Huber 1991). In Frankfurt airport, this occurs in the exchange of data and information with other A-CDM airports and external benchmarking organisation. This helps to ensure that the airport industry is highly transparent, and aims to simplify global airline processes (see Chapter one). Grafting as a knowledge acquisition form can be viewed as gaining knowledge through new employees who possess new knowledge from outside the company. Organisational experiments produce learning based on the feedback and analysis of experiments conducted at the organisation. This form of learning was not identified at Frankfurt airport as no experiments were conducted during the period of study. Nevertheless, the feedback and communication of projects and performance are both essential and visible at the case company. Huber (1991) notes that this form of knowledge acquisition if very rare. Organisational self-appraisal can be defined as a form of experiental learning, and focuses on the social interactions and dialogue among employees. The findings show that this form of knowledge acquisition is also apparent within Frankfurt airport due to its focus on social interactions and exchange between organisational members. Notably, Huber (1991) also assigns the concept of SLL and DLL by Argyris and Schön´s (1974; 1978) and Argyris (1982) to organisational self-appraisal. In conclusion, Huber´s (1991) form of congenital learning, vicarious learning, grafting and organisational self-appraisal of knowledge acquisition (see Chapter 2.2.2) are present within the case company, under the umbrella term of experience. Thus, this research proposes a revision of condensing the knowledge acquisition forms into the broader term of 'experience'. This proposed revision acknowledges the terminology used by the interviewees and also includes most of the concepts proposed by the literature.

The findings from this study contribute to the existing literature by furthering understanding of the knowledge acquisition process in several ways. While the literature assigns Argyris and Schön´s (1974; 1978) and Argyris' (1982) theory of SLL and DLL to knowledge acquisition, the analysis of

the primary data provides an additional level of insight into this issue. While unconscious knowledge acquisition mainly results from diagnostic usage of PMS, conscious knowledge acquisition (both self-motivated and external-motivated), may use different sources, including interactive PMS usage. Another key finding is that while unconscious knowledge acquisition can be attributable to single-loop learning, conscious knowledge acquisition is a part of both single-loop and double-loop learning. Nevertheless, conscious knowledge acquisition can be seen to be the knowledge acquisition form which triggers the OL cycle, and which leads to group learning and OL.

The findings show that the acquisition of knowledge within the organisation is based largely upon feedback, which can occur in different forms and is stored in the organisational memory or results of performance measurement. This is also congruent with the literature, as a number of researchers agree that PMS can be used by employees to acquire knowledge by accessing feedback and information (Robles 2019; Gil 2018; Crossan 1999; Simons 1995b). Management is responsible for promoting the exchange of knowledge and information within their teams to enable each employee to acquire new knowledge. This finding also supports the literature which states that leadership is essential for shaping learning cultures (Do and Mai 2020) (see Chapter 2.2.2). One factor which may impede or facilitate the free flow of learning and knowledge distribution, is the avoidance of an 'error culture' in the organisation, which is critical for the success of knowledge acquisition.

What is also apparent is that the distribution of knowledge and the acquisition of knowledge clearly influence and affect each other. New knowledge is attained by individuals who share and distribute their own knowledge. Moreover, the data analysis reveals that understanding of the process of acquiring knowledge and interpretation is flexible, as knowledge acquisition may also be understood to be synonymous with the acquisition of data or information. Thus, knowledge is embedded into employee's mental models as individual knowledge via this process and is refined and shaped within the next process step of interpretation (see Chapter 4.4.2).

4.4.2 Interpretation

With regard to interpretation, the findings suggest that this step is inextricably linked to the previous step of knowledge acquisition. This is due to the finding that each employee interprets information individually to give it reason and meaning,and also to transfer that information into mental models as inherently implicit knowledge. The following interview excerpt neatly summarises the process of interpretation:

> "*We know tomorrow it will be snowing all day and we are not able to maintain our capacity, so we have to do something. By acquiring knowledge from past experiences, we further know that the snowfall will cause a decrease in capacity by X percent. By doing the interpretation we assume our punctuality will decrease by Y percent. Now what we should do is to systemise such situations by sitting together in a meeting: the management, and the external partners and discuss and agree on a flight cancellation concept regarding different weather conditions."* (I5_Senior_M_Aviation)

The interviewee provides a vivid example from practice of how the interpretation process proceeds. Information is interpreted by the employee, based on their experience. The experience of an individual is regarded as their inherent knowledge. Afterwards, the information and the interpretation are discussed within a group including management and external partners. During the discussion within the group, each member has the opportunity to add their individual knowledge to the current performance information and interpretation. As a result this process, a collaborative re-interpretation takes place. It is important to note that whether knowledge individual is acquired consciously or unconsciously manner has no impact. This is because interpretation occurs whether PMS are used diagnostically or interactively. However, the literature, is divided with regard to the occurrence of information interpretation. While Huber (1991) holds the view that information is firstly interpreted after it is distributed, Crossan et al. (1999) suggests that the interpretation phase occurs before distribution. Conversely, Aponte and Zapata (2013) hold the view that information interpretation occurs twice, the first time solely by the information recipient, and the second in a group context. The findings appear to confirm Aponte and Zapata´s (2013) view, and reveal that in the case organisation, information is indeed interpreted twice: the first time individuals interpret the performance data as soon as the KPIs are available, and then after enough knowledge has been acquired by that employee. The second time occurs within the group, after an individual has shared information and their individual interpretation.

4.4.3 Knowledge Distribution

The findings from the data analysis reveal that knowledge distribution only occurs when PMS are used interactively. When PMS are only used diagnostically to monitor drops in performance caused by statistical discrepancies, reactive decisions are made by individuals. The knowledge attained as a result is not distributed further, and individual learning results from it (see Chapter 5.2.6). However, when systemic discrepancies in the performance occur, the PMS are continued to be used

interactively and the knowledge is distributed via communication and dialogue (see Table 40 and Chapter 4.2.6). Thus, one finding discussed in the previous Chapter 4.2., is that the knowledge distribution occurs when using PMS interactively. Additionally, data analysis revealed, that the process of distributing knowledge is closely connected to the acquisition of knowledge. Both process steps mutually influence and affect each other as by sharing knowledge new knowledge is generated. By distributing and sharing knowledge, the knowledge is further evaluated, re-interpreted and transformed until a joint understanding has been reached:

> "*But the employees shouldn´t just focus on the hard measured time but also describing the problems and how they addressed them so that the team can learn from it and also apply their acquired knowledge in similar situations.*" (I11_Line_M_Aviation)

The quote highlights the awareness of the management to share knowledge and experiences about performance issues with the team of employees in order to generate individual and group learning. The data analysis suggests that the distribution of knowledge is a key process for sharing learning and encourage group learning. This finding is also supported by literature, which regards the distribution of knowledge as key process for OL (Deverell and Burnett 2012). Especially the sharing via communication, dialogue and feedback is regarded as crucial mechanism for creating OL as it is connecting individual learning with group learning (Cirella et al. 2016; Chiva and Alegre 2005; Oliver and Jacobs 2007; Oswick et al. 2000; Merriam and Caffarella 1999). The finding of re-interpreting the shared knowledge is an essential insight as within literature there is a debate whether interpreting the information occurs before or after distributing the information. The finding combines Huber´s (1991) and Crossan et al.`s (1999) view that interpretation occurs individually and, in the group as well and thus supports Aponte and Zapata`s (2013) view of interpretation. Within the case company, knowledge is distributed via various channels: internal news, trainings, process- and work-descriptions, experts, or the management. Further, data analysis showed, that the distribution can be self-motivated or externally motivated:

> "*Of course, in reality the cycle is more dynamic and not so static, so we use the PMS diagnostically and if we realise that we have a general weakness in a process we use it interactively, so we analyse it in more depth with more perspectives as we usually do it in the standard performance measurement. For example, my sub-departments which I lead they get the task to go deeper into the topic and to analyse it in more depth to see if there are patterns and then I know I have to focus on this gap within this certain process.*" (I6_Top_M_Ground_Handling)

This quote summarises one example of the communication and knowledge distribution stream within the case company. In case of systemic performance issues, the PMS are used interactively by communicating the issue via various channels. The management triggers the communication stream by initiating an in-depth analysis and the sharing of knowledge with a group of experts and managers about this topic. The data analysis majorly shows the responsibility of the management to initiate the distribution of knowledge. The recognition of the management being in charge of and dominating the communication and knowledge distribution streams within the company is also recognised by the literature. Mazutis and Slawinski (2008) for example also refer to the challenging aspect for the management to enable and facilitate dialogue and the sharing of knowledge within the organisation. This is an important issue, as the management remarked their lack of time for sufficiently providing knowledge and feedback to the employees:

> *"[...], however direct feedback is not as often the case as we would wish because we just don´t have enough time and there are so many decisions I take daily, it is easier to just tell the departments what they have to do."* (I7_Line_M_Aviation)

The management is aware of their responsibility to foster and enhance the distribution of knowledge within the organisation and findings from data analysis confirm that the management is crucial for distributing knowledge and forming a feedback culture within the organisation. This finding is confirmed by literature, which state that the culture of feedback, dialogue and communication depends upon the management (Do and Mai 2020; Lee et al. 2014; Mazutis and Slawinski 2008).

> *"I am not more than rarely invited as guest speaker and then I have to leave the meeting after I finished presenting to leave the high managers on their own for discussions. I don´t get feedback of the results or what they decide even though I distribute the data up to all management levels*." (I12_Expert_Ground_Handling)

Data analysis shows that within Frankfurt airport, the distribution of knowledge is highly worthy of improvement. The experts who are consulted by the management share their knowledge with the management but on the other hand, the management rarely distribute their gained knowledge back to the experts. The quote further highlights the hierarchical structure of the company. The communication and knowledge distribution streams are discovered to be dominated by hierarchical structures and guidelines and especially the flow of knowledge from the management to the employees seems to be highly improvable. The employees executing the decisions made by the

management often show a lack in explanation and reasoning behind the decision from sides of the management. This suggests a hindering in the learning as literature widely acknowledges feedback and communication as essential learning tool (Do and Mai 2020; Hasson et al. 2016; Lloria and Moreno-Luzon 2014; Lee et al. 2014; Mazutis and Slawinski 2008; Chiva and Alegre 2005; Dervitsiotis 2004; Crossan et al. 1999; Huber 1991; Fiol and Lyles 1985). However, it is not solely the knowledge exchange with the management, which is crucial but also the exchange with colleagues and important stakeholders is needed for gaining insights into how the airport can enhance its performance. The essentiality of knowledge distribution with important stakeholders is shown in the following excerpt:

> "*The dialogue with the airlines is very important because both sides can learn from it [...] Unfortunately, we are also having the issue that some airlines don´t want to go into dialogue with us. But if they do it is great because we can learn from it [...] So we learned from it how we can do it better*." (I17_Expert_Aviation)

The quote shows that the airport is dependent upon the knowledge exchange with the airlines in order to enhance the processes and increase the punctuality rate and satisfaction of the customers.

From the understanding of the participants, knowledge distribution also includes the organisational memory, which is distributed unilateral as external manifested knowledge whereas the actual nature of knowledge distribution is bilingual. This is for example the case for internal news, process- and work-descriptions as the knowledge is explicitly available and communicated single-sided without dialogue:

> "*There are functions you need to perform as a team or as a group. The group learning, the information sharing in the group is very important but then you also have the experience sharing or good and bad example-sharing which is important in knowledge distribution and organisational memory*." (I8_Top_M_Ground_Handling)

The excerpt emphasises the importance of knowledge distribution in order to create group learning. This group learning is achieved by exchanging good and bad experiences, so that the group is able to learn from mistakes as well. Additionally, memorising the learning within the group and the organisation is stressed as being crucial. While the literature clearly sees leadership as one of the most crucial factors to foster or impede individual and group learning (Hasson et al. 2016; García-Morales et al. 2012; Yukl 2009; Aragón-Correa, García-Morales and Cordón-Pozo 2007; Beattie

2006; Berson et al. 2006; Vera and Crossan 2004; Gómez and Ranft 2003), Frankfurt airports management is aware of their power to determine the communication and feedback flow and shape the learning culture to a great extent.

An issue the interviewees raised, is the strict separation of processes per departments or division business units. Even though processes pass several different departments, each department focuses on their sub-processes. Various times more knowledge exchange has been demanded as solution to make processes more efficient:

> "*[...] currently each department just has their own KPIs with no regards to the overall process. So currently we are just having the measures, but we are not at the point yet to jointly decide what the best actions would be, so no joint interpretation, no joint decision making and no joint actions and measures as result.*" *(*I5_Senior_M_Aviation)

The quote emphasises the current situation of department thinking and not process oriented thinking at the airport. At the airport it is internally called silo thinking. This wording and norm have established as a well-known fact at the organisation, still no one is willing to tackle it. The strict separation of departments and their data divides the processes into fragmented parts and leaves the intersections of the processes with weakness and inefficiencies. This strict division of so-called management territories can be traced back to the strict hierarchical culture of the organisation. The management is aware of this weakness, however, seems reluctant to solve this issue. By reflecting upon the process in its whole, the interviewees regard all different departments to be required to exchange their knowledge about the process. This would help to make the airport more efficient. Data analysis clearly showed that the distribution of knowledge via communication and dialogue is essential for the airport to run efficiently. Communication and dialogue happen at all the different hierarchical levels, within them and beyond them to external partners and customers:

> "*The aim is to give the employees feedback of the performance the day before, which problems occurred and how they should work on this day regarding improving actions they should do this day."* (II1_Top_M_Ground_Handling)

Resulting, communication and dialogue enable learning, the flow of knowledge and lastly provide the basis for the success of the company. Data analysis makes it undoubtedly clear, that the airport would not function without it and needs to improve on it considerably.

4.4.4 Organisational Memory

Within literature, the organisational memory stores the knowledge of the organisation in explicit forms (Huber 1991). Data analysis found organisational memory to be a form of knowledge distribution but differs from knowledge distribution in two points: Firstly, the knowledge occurs in an explicit form and is mostly accessible in written or digital format. Second, the knowledge flow is unilateral, no mutual knowledge exchange with the employee who acquires the knowledge occurs. Within the case company, the organisational memory is embedded in the forms of trainings and training materials, process- and work-instructions, proposed scenario values generated by the system and internal articles and news:

> "*There are different communication types, currently we are having paper-based work instructions each employee must read for learning purposes. [...] Moreover, in every operational department we also have an info kiosk where employees can access our intranet and read current company news.*" (I1_Senior_M_Ground_Handling)

The quote suggests some sources of retaining the organisational knowledge. The findings are congruent with literature. Huber (1991) highlights software as important storing tool for organisational memory and urges knowledge to be available as process descriptions or work instructions for organisational members. The data shows that the memory of an organisation can be divided into two groups: organisational memory and group-specific memory. The organisational memory can be accessed by all members of the company whereas the group-specific memory is only available to certain organisational members belonging to this category. This comprises clusters like managers, specific experts, departments, divisions and so on. Within literature, Huber (1991) divides the organisational memory into computer-based organisational memory. The findings of this research, however, suggests a categorisation into organisational memory and group-specific memory, as in the current age the IT systems are inseparable from any organisational documentation and process and are regarded as main source to retrieve the organisational memory. In the time Huber (1991) conducted the study, the IT systems and computers were only at the beginning of the digital revolution and in today´s organisation they are inseparable from any organisational processes. Thus, this study suggests dividing the organisational memory in organisational memory all organisational members can access and into group-specific memory, which can only be attained to certain groups of the organisation due to the subject-specific criticality of the information. Nevertheless, both memory types need to be refreshed constantly:

> "*The memorising of things is an issue because you constantly need to refresh the memory.*" (I8_Top_M_Ground_Handling)

The management needs to ensure that both, the organisational memory, and the individual knowledge, is regularly refreshed to ensure learning within the organisation. This finding can be linked back to the literature, which regards the management as one of the most important factors to enhance or impede learning (Hasson et al. 2016; García-Morales et al. 2012). Additionally, the management and quality controller are responsible to ensure that the organisational learning is embedded within all working routines of the company:

> "*[The] Management makes sure it is implemented within the organisation by providing quality controller who make sure that the guidelines are followed and by letting employees sign forms that they read instructions and by providing training sessions and material. Within each operational department, we are having quality controller who are required to monitor that employees act according to the work instructions. [...] each time there are new work instructions it needs to be communicated to the employees. This is controlled as every employee needs to sign the new work instruction and the effectiveness of the new work instruction is also monitored.*" (I1_Senior_M_Ground_Handling)

The quote shows the approach of implementing new crucial knowledge in the case organisation. Especially critical changes regarding policies but also internal process modifications are supervised by quality controllers. If training is provided, employees need to sign forms that they accomplished the training. The knowledge within the organisational memory is, as it is the case in knowledge distribution, reinterpreted by the individuals who acquire the knowledge in terms of their own incremental understanding and insights so that the inner models are adapted to the new working routines, processes or instructions:

> "*[...] the knowledge had been implemented into the whole department via our internal news and we also adjusted and wrote new process descriptions, so it is within the organisation's memory and other employees can access that knowledge.*" (I6_Top_M_Ground_Handling)

This interview excerpt gives insight into how organisational learning is manifested into the organisational memory and how employees can access this knowledge. In this example, the OL is communicated within the internal news, new process descriptions have been written to ensure employees can access the knowledge. Huber (1991) however, did not only describe the

organisational memory as being explicit, but also tacit. Data analysis confirms this and suggests that another part of memory, which exist, is the individual memory. The inherent implicit knowledge of each individual person. Data analysis indicated that this is also a form of organisational memory. Interviewees warned that the organisation should strive to make this implicit knowledge available as explicit knowledge for all organisational members to prevent a loss of knowledge:

> "*[...] I notice how much knowledge is lost every day. The colleagues know it from their experience, but they don´t share it and others don´t learn from them and someday they will retire and all their knowledge is lost, so we need a learning cycle here.*"
> (I7_Line_M_Aviation)

Interviewees stated the need for the implementation of an organisational learning cycle to preserve and spread knowledge within the entire organisation. However, this is a notable challenge for the case company and facing the current economic crisis caused by the COVID-19 pandemic an omnipresent threat. Short-term work and the redundancy program make the fear of losing valuable individual intrinsic knowledge pervasive. The findings regarding the organisational memory at Frankfurt airport clearly shows that organisational memory is closely linked with knowledge acquisition. This has been also acknowledged by Huber (1991).

4.4.5 Single-Loop Learning and Double-Loop Learning

Within literature, SLL is understood as instrumental learning, which adjusts the correcting actions to the underlying norms and structures of an organisation without questioning those prevalent organisational policies (Burt and Nair 2020; Azadegan, et al. 2019; Basten and Haamann 2018; Jeffs et al. 2012; Fried 2010; Argyris and Schön 1996; Fiol and Lyles 1985) (see Chapter 2.2.2). DLL on the other hand extends SLL by questioning the norms, policies, and structures of an organisation (Burt and Nair 2020; Chuah and Law 2020; Bootz, Durance and Monti 2019; Basten and Haamann 2018). The interview participants agreed with literature, that the learning types of SLL and DLL exist in practice. Data analysis confirms Huber´s (1991) view that both learning types start within the process of knowledge acquisition. However, findings add greater detail to the current understanding of SLL and DLL with the following key finding: Single-loop learning is found to be achieved via the knowledge acquisition types of conscious and unconscious learning. DLL on the other hand is found to only occur when knowledge is acquired in a conscious manner. Data analysis showed that both learning types are highly interwoven with the usage forms of PMS. SLL is investigated to occur in making and executing tactical, reactive decisions. This learning form

is ascertained to focus on error detection and improving actions in line with the organisation`s prevalent norms, structures, and underlying guidelines. This finding is congruent with literature, which state that SLL focuses on adapting actions in order to achieve organisational goals (Burt and Nair 2020; Do and Mai 2020; Bootz, Durance and Monti 2019; Basten and Haamann 2018). Even though it is triggered by several of different factors like trainings or process- and work descriptions, a powerful way to achieve SLL is found to be by using PMS diagnostically:

> "*Every day we are facing situations where we can learn from. For the operational management the performance measurement became most essential."*
> *(*I18_Line_M_Aviation)

The quote highlights the importance of performance measurement and PMS for the organisation to create learning. From a practical point of view the two concepts of PMS and learning seem inseparable and PMS are regarded as means to create learning. This finding is supported by literature, which acknowledge learning as most important outcome of PMS (Pinheiro de Lima et al. 2012; Johnston et al. 2002; Vandenbosch 1999; Kaplan and Norton 1996b). The finding, that diagnostic PMS create DLL is supported by literature, which state that the monitoring of SLL is done with diagnostic PMS to provide feedback on the actions taken (Dervetsiotis 2004). As soon as the organisation's structures, regulations and principles are questioned DLL occurs. This finding is also congruent with literature, as DLL is described as questioning an organisation`s aims, strategies and structures and thus change the mental models of individuals (Burt and Nair 2020; Chuah and Law 2020; Bootz, Durance, and Monti 2019; Basten and Haamann 2018). Thus, findings confirm current literature, which state that the diagnostic PMS usage provokes SLL while the interactive PMS usage creates DLL (Guenther and Heinicke 2019; Shurafa and Mohamed 2016; Simons 2014, 1995; Henri 2006a; Tuomela 2005; Bisbe and Otley 2004). However, data analysis provides an extended insight into the interrelation of SLL and DLL, diagnostic and interactive PMS with the key finding that SLL is a pre-requisite for DLL and as soon as systemic deviations are found within company data, SLL is transformed into DLL. As it is the case with SLL, DLL is achieved by using PMS interactively:

> "*[...] single-loop learning triggers double-loop learning which leads to organisational learning. [...] So double-loop learning definitely enables organisational learning, but the double loop learning has to be initiated by single-loop learning*." (I5_Senior_M_Aviation)

The quote summarises the interconnection of the PMS usage types and the learning forms of SLL and DLL. The data analysis clearly shows the unambiguous alignment of the learning types with the process of PMS. The diagnostic PMS usage focuses on error detection and correcting actions as it is the case in SLL. As soon as patterns within the performance data are identified, critical scrutiny takes place, SLL develops into DLL and organisational learning can take place. This equally applies for PMS usage. PMS are converted from diagnostic monitoring tools to interactive analysing systems by trying to find the real causes of performance loss in examining and questioning the organisation´s structures and processes:

> "*By using PMS diagnostically no organisational learning takes place, because you need the discussions, exchange, and different views for organisational learning and therefore to make the OL cycle happen. Diagnostic usage is using the figures for day-to-day decisions, which is from my point of view individual learning happening at the single operational departments for single short-termed counteractive measures. Single-loop learning, or individual learning is the basis for organisational learning and for double-loop learning. So single-loop learning is a pre-condition for double-loop learning and organisational learning*." (I6_Top_M_Ground_Handling)

The quote summarises the interrelations between PMS, SLL, DLL, and OL: SLL is found to be created by using PMS diagnostically in order to decide on short-termed reactive measures for daily decisions. Data analysis revealed that resulting SLL builds the basis and is a precondition for OL and DLL. Even though literature describe PMS as OL mechanism with the potential of achieving learning when using PMS, data analysis showed that within the case company PMS are the means to create SLL and DLL. While SLL only involves individual learning, DLL is associated with individual learning, group learning and organisational learning. As it applies for transforming the usage from diagnostic into interactive usage, SLL is stated to be transformed into DLL via communication and dialogue:

> "*But I think there needs to be put communication in this cycle as well because in my opinion the single-loop transfer to double-loop learning works only with communication." (*I8_Top_M_Ground_Handling)

Data analysis make it clear that DLL and OL need communication, feedback, and dialogue.

The finding that SLL is transformed into DLL is another key finding as literature only specifies that both, SLL, and DLL, are necessary in order to achieve all learning benefits (Burt and Nair 2020; Weishäupl et al. 2018). The management thus plays an essential role, as they are the ones majorly shaping the organisation´s culture and resulting can foster or impede the transformation of SLL into DLL. Data analysis revealed that participants agreed with literature that the OL cycle only occurs when DLL takes place and communication, dialogue and the organisational culture provide the means to it (Guenther and Heinicke 2019; Shurafa and Mohamed 2016; Simons 2014, 1995; Henri 2006a; Tuomela 2005; Bisbe and Otley 2004):

> "*The organisational learning cycle is automatically double-loop learning because double-loop learning generates organisational learning and triggers the organisational learning cycle." (*I4_Top_M_Aviation)

Data analysis revealed that the learning types are inevitably connected to the PMS usage: The performance is monitored by diagnostically using PMS and statistic performance discrepancies generate SLL. However, if systemic discrepancies occur, the SLL is continued into DLL and PMS are further used interactively. Literature state that learning traps prevent DLL, which are associated with SLL (Burt and Nair 2020). These learning traps are described to be the competency trap, which prevents members of an organisation to acquire new competencies by sticking to their old and strusted skills (March and Coutu, 2006). Superstitious learning, which is highly subjective and affects the view on an action and its implemented outcome (Argote, Lee and Park 2020; Levitt and March 1988) and myopia, which describes the lack of viewing an entire situation but rather describes an individual´s short-sightedness (Levinthal and March 1993). The data analysis suggests that the systematic approach of applying PMS can overcome these learning traps in a way that in case of systematic discrepancies diagnostic PMS are used interactively and SLL is transformed into DLL. Vasconcelos (2008) points out the dilemma of organisations of whether to adapt strategies of exploration or exploitation and highlights the importance of the management to balance both. This interwoven relationship between SLL and DLL explains the statements from literature why SLL and DLL should not be viewed separately (Weishäupl, Yasasin and Schryen 2018) and that an organisation needs both forms (Burt and Nair 2020).

The last step in the OL cycle, memory, triggers the acquisition of new knowledge and therefore SLL:

> "*I think the employees are quite good informed regarding our internal news so I think that the connection between organisational memory and knowledge acquisition is given [...].*" (I7_Line_M_Aviation)

The interviewees remarked that the organisational memory is given within the case company and that the way between organisational memory and knowledge acquisition is provided. Further, data analysis revealed that within Frankfurt airport, mainly SLL takes place:

> "*Currently I would say we mainly have single-loop learning, the aim would be to focus on double-loop learning I order to generate organisational learning."* (I7_Line_M_Aviation)

This finding matches with literature that SLL is the most prevalent learning form apparent within companies (Burt and Nair, 2020). Mazutis and Slawinski (2008) explains this by stating that humans tend to SLL as individuals are more prone to adjusting their behaviours in alignment with the organisations guidelines instead of questioning the norms and structure of the organisation. The main drivers of achieving DLL are dependent on the feedback/feedforward and error culture of the organisation, which at Frankfurt airport is characterised and dominated by the management. The cultural aspect of the country also plays an important role as it influences the organisational culture as well. Participants agreed that the error culture within the organisation needs to be enhanced considerably:

> "*What I really have to say, which is playing a very important role is the culture of mistakes and errors, so how mistakes are dealt with. So, we as Germans and as a German company we have a different error culture than other counties and I think this majorly influences the transfer of knowledge, if it doesn´t hurt me I distribute the knowledge and my learning but as soon as it hurts me it is often covered up and the errors and mistakes are hidden and then no organisational learning occurs, only SLL, individual learning. But we on the management levels really want to promote an error culture where it is good to openly name an error or mistake. My personal opinion is that errors and mistakes are good, because only by doing mistakes we can learn, therefore we shouldn´t cover up or hide the mistakes we made, [...] and not to murder the employee. But actually, this is wishful thinking [...].*" (I10_Senior_M_Aviation)

The quote shows the prevalent learning culture within the airport: it is doesn´t hurt the individual, the knowledge is distributed, however if it hurts the individual, the error is tried to be covered up.

The interviewees remarked the German culture to strongly shape this error culture, which is characterised as error blaming culture and being highly hierarchical by exposing individuals for errors made. However, Mazutis and Slawinski (2008) state that generally it is natural human behaviour to hide errors and mistakes which have been made. This questions the influence of the nationality in this topic but makes it even clearer that the management is in need to proactively foster an open-learning culture in which mistakes are a source of learning. Data analysis showed that the participants acknowledge the major role of the management to promote learning. This is reflected in not only in the error culture but also within the culture of the organisation. The findings match with the literature, which regards dialogue and feedback, as well as leadership as crucial factors which can impede or foster learning (Do and Mai 2020; Hasson et al. 2016; Lloria and Moreno-Luzon 2014; García-Morales et al. 2012). Moreover, what further aggravates DLL is the rigid hierarchical structure of the case company. Even higher managers seem to be powerless to fight against the prevalent dominant hierarchical structure of the case company:

> "*In most cases we are having a single-loop learning and it stays on the level of single-loop learning and is not developed further from individual learning into organisational learning and into double-loop learning. I think that the higher the position of a manager is, the more he has to allow double-loop learning to take place as this is the only way for the organisation to develop. Otherwise, there is the danger that the organisation is not prepared for the future. I further think that the new generation of employees, young and motivated will demand double-loop learning and OL to take place and they will also be unlikely to accept this strict hierarchical structure we have and the demand for a flattened hierarch will grow." (*I4_Top_M_Aviation)

Hall (2011) supports the perception of the management that it is very hard for them to enable smoother communication due to the hierarchical structure of the company by stating that big organisations do not have such a high level of informal communication due to the clear structure and the less competitive environment in comparison to smaller organisations with flat hierarchies. Additionally, larger organisations are much more bureaucratic hindering a fee informal communication stream. It is clear, that the prevailing form within Frankfurt airport of learning is SLL at the individual learning level, even though DLL is seen as the only way for the organisation to stay competitive and to improve the company.

4.4.6 Refection of Organisational Learning Discussion and Findings

In the following, the findings from the data analysis are reflected upon in the light of the review of the literature by aiming to answer the research question four: How does individual, group and organisational learning emerge at the case company and how do the the learning forms interrelate?

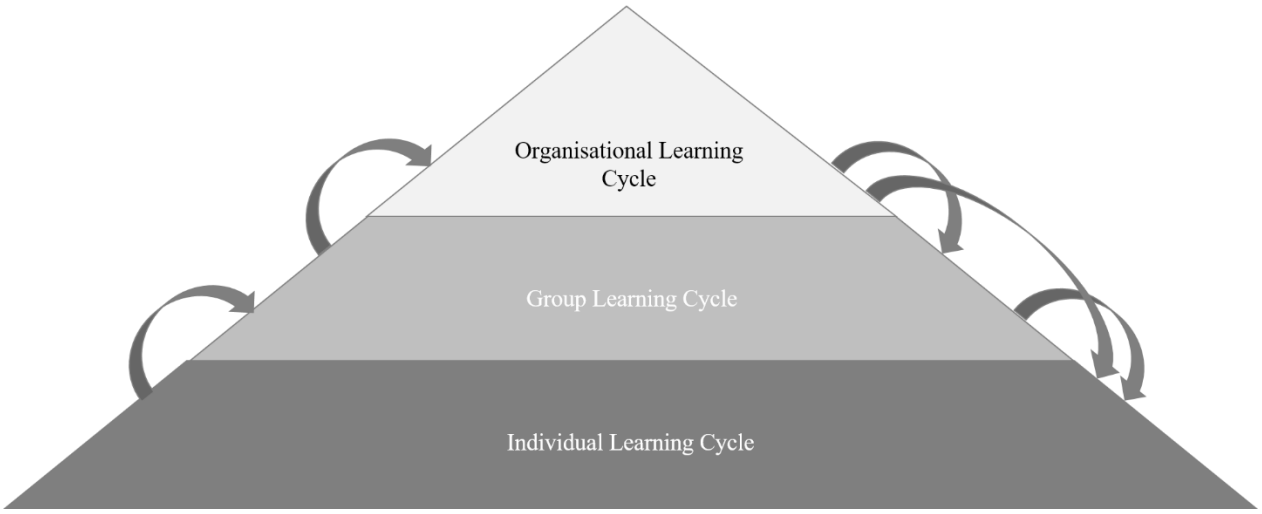
Drawing from the literature reviewed in Chapter two, the analysis identifies the occurrence of individual, group, and organisational learning forms. However, findings also reveal that within the case company, these three learning forms are actually cyclic in nature, and thus occur in three cycles: the individual learning cycle, the group learning cycle and the organisational learning cycle. The learning cycles builds on and evolve from each other, and as depicted in Figure 27, the individual learning cycle forms the basis of all the learning cycles. In the next stage, the group learning cycle emerges, including the individual learning cycle. The most advanced stage an organisation can reach is the organisational learning cycle.

The organisational learning cycle comprises the individual and group learning cycles, and without both of these, organisational learning would not be possible. All learning cycles are important and essential, due to their interdependencies; however, the findings and literature both suggest that OL generates the highest learning benefit for organisations.

The interrelation of the learning forms is also acknowledged within literature, and are regarded as necessary to present a holistic view of OL. The findings support Crossan et al.`s (1999) view that dialogue and feedback are essential for achieving the various learning levels. Indeed, the process of sharing individual knowledge to a group and the organisation is vital, and confirms Deverell and Burnett´s (2012) view that it is very important within the OL process. The findings support the view of the literature that OL implies different learning stages, and needs to evolve via individual learning and group learning before organisational learning can be achieved (Chuah and Law 2020; Fang and Lu 2016; Hasson et al. 2016; Crossan et al. 1995; 1999) (see Chapter 2.2.2). However, the data analysis can be seen to add greater depth to existing understanding of the learning stages.

The analysis of the interviews reveals that the learning stages are actually learning cycles, which cannot be viewed as completely separate entities, but whose outcome is essential for the other learning cycles to occur (see Figure 27). Thus, the learning cycle stages are depicted as a pyramid which uses the individual learning cycle as a foundation. These relationships are presented in Figure 27, below:

Figure 27: The learning pyramid



(Source: Author 2022)

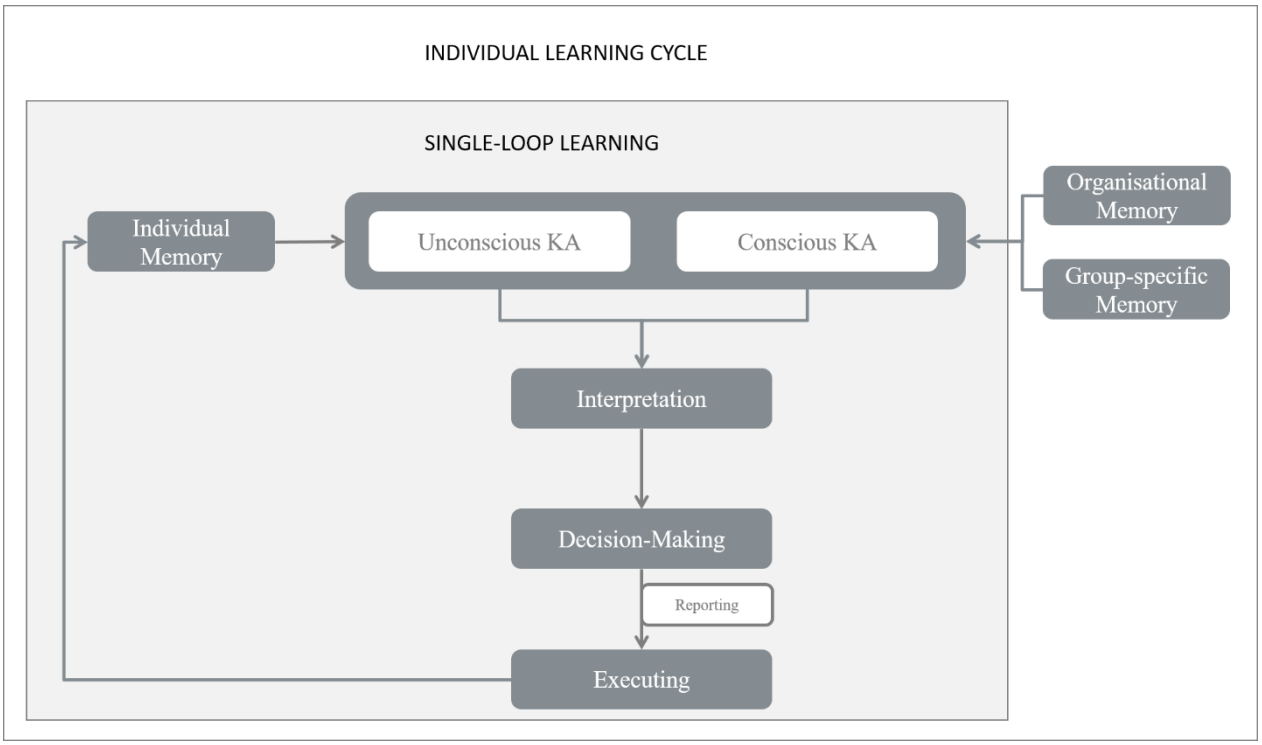
Figure 27 illustrates the relationships between the learning cycles. The second stage of the pyramid can only be reached once individual learning is present. The group learning is needed to enable and trigger the organisational learning cycle (see Figure 27). The learning cycles, as well as the outcomes of the cycles (individual learning, group learning and organisational learning), are highly interrelated with the other stages of the pyramid and therefore nourish each other and enable the generation of new knowledge and learning by using communication and dialogue as means of distribution (see Figure 27).

The learning cycles` nature Is dynamic, and the group learning and organisational learning cycles cannot exist without communication and dialogue. These two components can be seen as enablers, and are themselves generated by the culture of the organisation. This culture may impede or promote communication and dialogue, and is mainly characterised by its style of management, the presence of an error culture, and the culture of the country the organisation is located in. This finding clearly aligns with the learning barriers presented in the literature review such as a lack of communication, poor organisational culture, and structure (Bloice and Burnett 2016) (see Chapter 2.2.2). Further, it further supports the academic literature, which defines OLM as a means of reaching the learning stages, and thus transferring individual learning to group learning and lastly organisational learning (Mitki et al. 2008; Armstrong and Foley 2003; Chou and Wang 2003; Shani and Docherty 2003).

The data analysis has enabled the identification of the nature, dynamic and composition of these learning cycles, and can be described as key findings for this study, as they are not present within the literature. Prior research in this area acknowledges three learning stages and their interdependency. However this research contributes significantly to developing an understanding by revealing the actual cycles which underpin each learning stage. Just as Crossan et al. (1999) and Huber (1991) identified the OL cycle (see Chapter 2.2.2), the data analysis reveals a similar cyclic nature behind the learning stages. The approach of depicting learning as a cycle is regarded as the most holistic approach to present the transformation of the learning stages, and the dynamic tensions between diagnostic and interactive PMS (Henri 2006b). As such, it provides an invaluable approach to illustrate the learning cycles. In addition to supporting the perspectives identified within the literature, the data analysis reveals the cyclic nature of the learning stages. Therefore, these learning stages are referred to as learning cycles, which collectively further understanding of the process of generating individual, group, and organisational learning.

Findings from the data analysis confirm the current view of the literature that SLL is the most widespread form of learning within an organisation (Burt and Nair 2020). Within the case company, the most prevalent cycle form is the individual learning cycle. It provides the foundation for the pyramid from which the group learning cycle emerges. In contrast to the other learning cycles, the individual learning cycle is able to create learning without dialogue and communication. In the following figure, the individual learning cycle is derived from the findings of this research:

Figure 28: The individual learning cycle - SLL

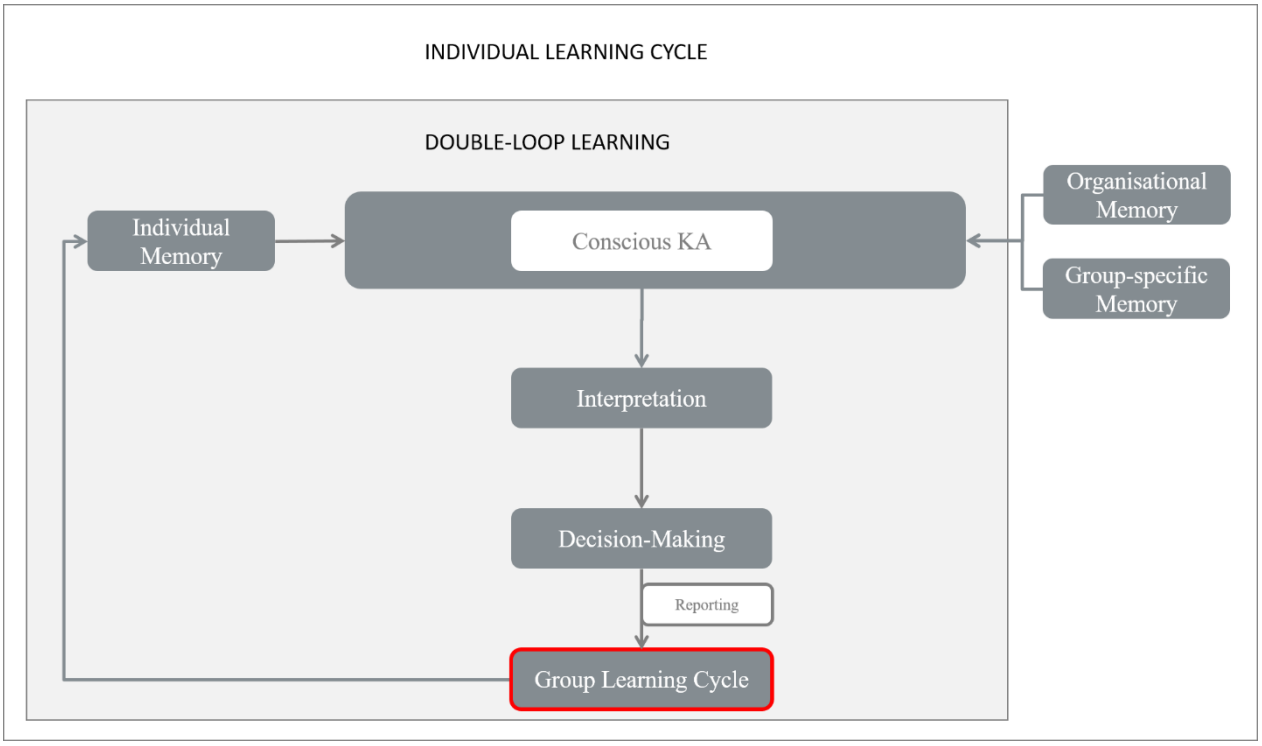


(Source: Author 2022)

This cycle (presented in Figure 28), starts with the unconscious or conscious acquisition of knowledge. This is triggered either by organisational learning or group learning generated from the group learning cycle and stored as a group-specific memory, or as an individual memory. The group-specific memory is either enhanced through organisational learning, as changes leading to adapted working routines are reflected in the group-specific memory, or via group learning (see Figure 28). The information acquired is then given meaning through interpretation, and afterwards by the individual make their decision. Depending on the situation, the outcome is either reported or directly executed. As a last step, the result is stored within an individual´s memory and individual learning is created (see Figure 28). In this learning cycle, the individual corrects their own errors, or adapts their own actions in line with the organisation's culture, norms, and guidelines. Therefore, the results show that the individual learning cycle generates SLL. The cycle starts again if new knowledge is acquired, either through the individual´s memory, group-specific memory, or the organisational memory (see Figure 28). The individual learning cycle occurs most commonly within the case company, especially among experts, and can be observed in reactive actions and in performing daily tasks. However, as soon as the individual challenges and scrutinises the given forms and structures of the organisation, DLL is created and the group-learning cycle is triggered by

a slightly different individual learning cycle, which generates DLL and develops into group-learning (see Figure 29):

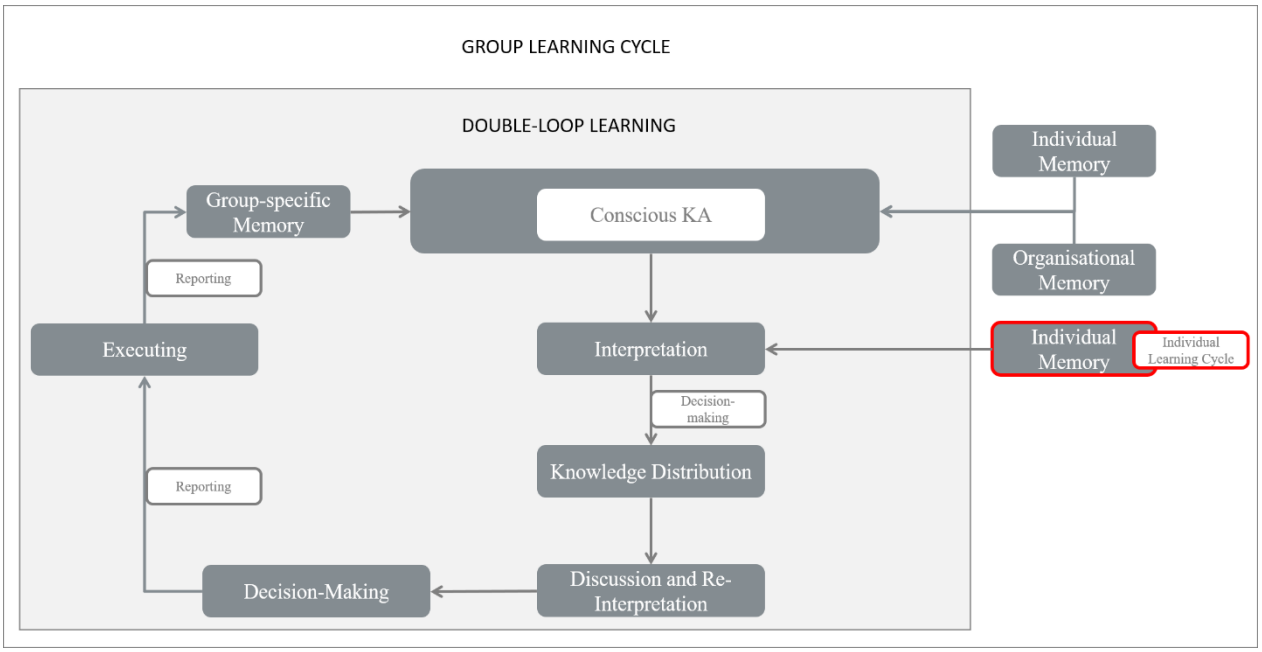
Figure 29: The individual learning cycle – DLL



(Source: Author 2022)

The group learning cycle uses individual learning as basis, and is depicted in Figure 29 (see above). The individual questions the given organisational structures and norms, and decides to report that challenge to a group. Therefore, the individual learning cycle is further transformed into group learning (see Figure 29). For group learning to take place, communication and dialogue are needed to share individual learning. The group learning cycle can be depicted as follows (see Figure 30):

Figure 30: The group learning cycle



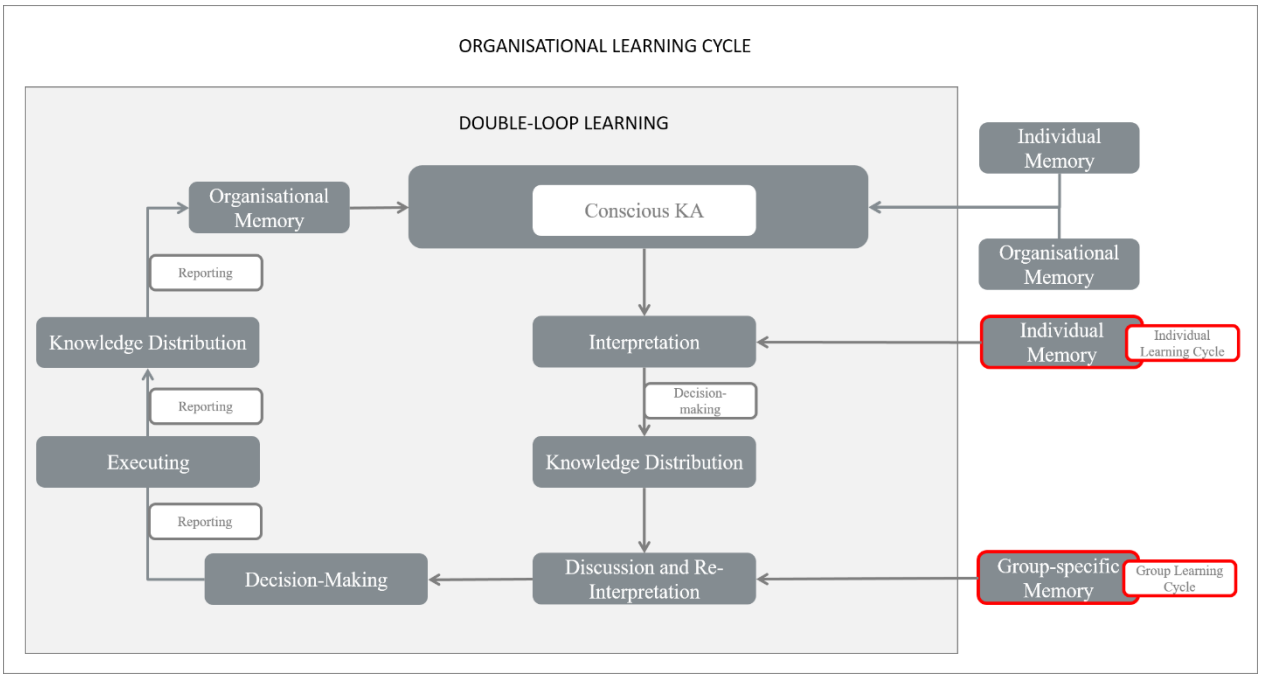
(Source: Author 2022)

The first steps of the group learning cycle presented in Figure 30 are identical to the individual learning cycle generating DLL (as illustrated in Figure 29). The learning cycle is based on the conscious knowledge acquisition of the individual, and is triggered by individual memory, organisational memory, or group-specific memory (see Figure 30). In the subsequent interpretation step , the acquired knowledge is evaluated in relation to individual knowledge. These first two steps are part of the individual learning cycle: the employee questions the current structures and norms and decides to share the nature of that challenge with a group. Therefore, the individual shares their critique of the organisational norms and structures with the group members, and consequently a joint discussion and re-interpretation is undertaken. The finding regarding the interpretation sheds light on the debate within literature, as to whether interpreting information occurs before or after distribution. While Huber (1991) suggests that the interpreting stage occurs after distributing the information to organisational members, Crossan et al. (1999) hold the view that the information is firstly interpreted before it is shared with others (see Chapter 2.2.2). The research findings confirm Aponte and Zapata`s (2013) view that interpretation occurs both individually as well as in a group context. The group makes a decision and executes it either directly or delegates the implementation to external members. After the execution takes place, the outcome is reported again, and stored in the group´s memory (see Figure 30). In this learning cycle, the individual questions the structures and processes of the organisation, and instead of generating SLL, DLL is created for the group

involved. This cycle usually comprises either a mixed group with experts and management, or a group of managers. The data analysis reveals that this learning cycle involves tactical or strategic medium-termed decisions, which affect a small group of organisational members. Research participants agreed that the group learning cycle needs to be promoted within Frankfurt airport, primarily because individual learning in the form of SLL occurs. Moreover, if external members outside the group are instructed to execute the group's decision, they are usually only provided with the instructions required to execute that decision, but are not given of the underpinning reasons as to why those actions were required. Therefore, a more detailed explanation provided to the people involved would enhance individual learning for those involved in the decision, but who are not part of the group. The findings show that this form of learning largely occurs within management. However, experts involved in executing the decision, are not provided with a detailed explanation from which they might learn.

Organisational learning is created, if the learning attained is distributed to members outside the group or is spread across the whole organisation . The organisational learning cycle is the most extensive learning cycle in which learning is distributed across the entire organisation. The cycle is presented in Figure 31 below:

Figure 31: The organisational learning cycle



(Source: Author 2022)

The trigger for organisational learning is provided by individual, group-specific or organisational memory, which triggers the conscious acquisition of knowledge (see Figure 31). This knowledge is interpreted using the individual memory of the learning cycle initiator. It is distributed to a group where discussion and re-interpretation takes place. In organisational learning, the discussion and re-interpretation usually involve consulting a group of experts, as detailed knowledge is needed to make accurate decisions. The outcome of those decisions is reported for action. After feedback on the successful implementation is received, a new working routine is made public and stored within the organisation´s memory (see Figure 31). The findings clearly show that it is senior management who initiates the OL cycle for strategic decision making. The reason for initiating the OL cycle is based on long-term performance issues, which need to be investigated and solved. Management usually commissions a group of experts to research and gather detailed information on the affecting issues. This group-specific expert knowledge provides the basis for further discussion among management. After management makes the decision, the group of experts implement the requisite changes. The findings indicate that managers then inform their subordinates affected by the changes. Training sessions are prepared, and process and work descriptions are adapted according to the new routines. In addition, the entire organisation is informed about the change via methods including publishing articles in the corporate intranet or in the company´s newspaper. This finding clearly supports the literature which highlights the importance of information technology systems in storing and retrieving organisational knowledge (Argote, Lee and Park 2020; Myreteg 2015; Lewis and Herndon 2011; Huber 1991) (see Chapter 2.2.2). However, the participants confirmed that organisational learning happens rarely in the case company and should actively be promoted. The findings also reveal that the lack of feedback to experts significantly hinders the generation of organisational learning.

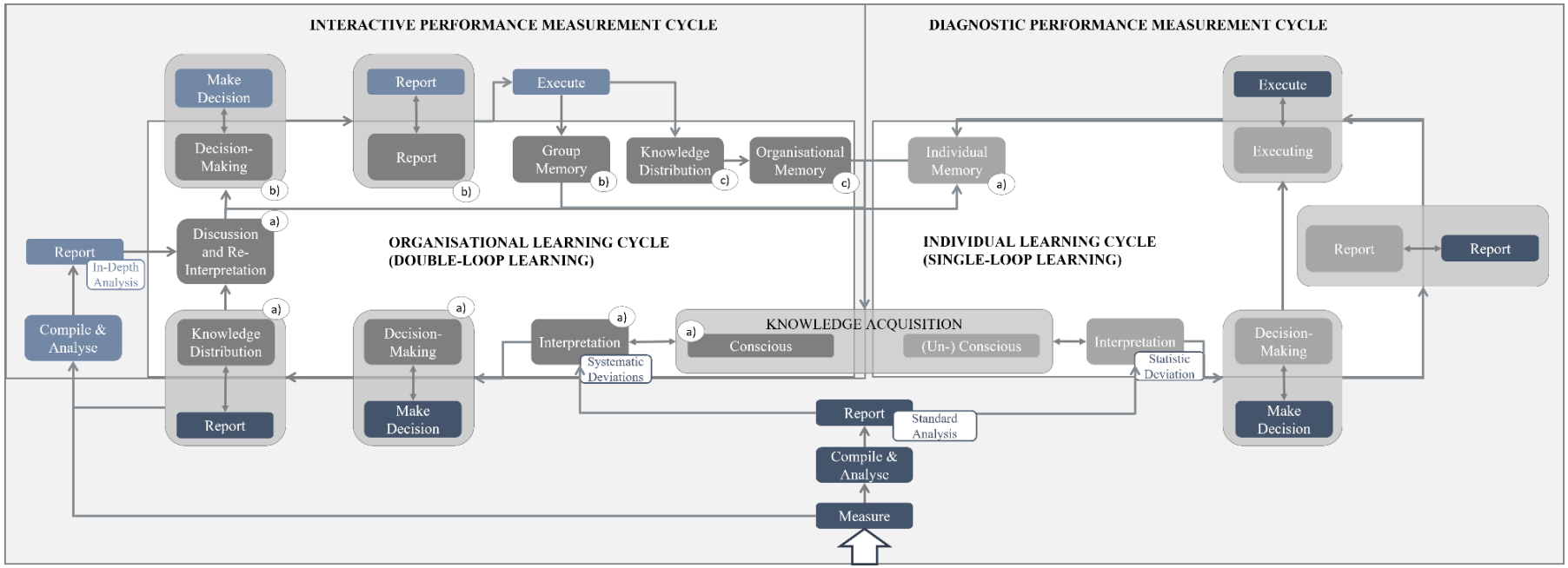
The analysis of the data highlights that within the context of the case company, group learning and organisational learning need to be recognised and improved considerably. Employees hold significant intrinsic expert knowledge, however this is not shared widely, and the threat to the organisation in losing this knowledge is considerable. Therefore, a solution is required (notably for operational experts) to enable the distribution, preservation, and storage of their knowledge to enhance learning for other operational experts. Some departments implemented effective methods to share their knowledge across the different operational shifts, and these could act as role models for all operational departments at the airport. What is also notable is the lack of group learning in operational departments which are not shift-oriented. Here, group learning is not nearly so visible. The current economic crisis caused by the COVID-19 pandemic to the airport industry calls for fast,

sustainable solutions to preserve existent intrinsic knowledge. Short-term work and redundancy programs at Frankfurt airport make the emphasise the need for effective knowledge sharing and ubiquitous learning opportunities (see Chapter 1.2.4 and Chapter 5.4).

4.5 Connecting the dots: the relationships between PMS and OL

This section strives to address the final research question: "How is learning undertaken, transferred and thus organisational learning created while measuring performance at Frankfurt airport?". The section brings together the findings from research question two, (presented in Chapter 4.2.6), three, (presented in Chapter 4.3.6) and four, (presented in Chapter 4.4.6) into a holistic framework. The framework depicts the complex relationships between organisational learning and performance measurement systems identified from the data analysis. The interrelationships of organisational learning and performance measurement are depicted in the model below (see Figure 32):

Figure 32: The interrelationships of organisational learning and performance measurement



(Source: Author 2022)

The data analysis reveals that within Frankfurt airport, two major learning cycles arise while measuring performance: the organisational learning cycle and the individual single-loop learning cycle (see Figure 32). The organisational learning cycle is marked in dark grey in Figure 32. This generates double-loop learning and includes both the individual double-loop learning cycle (see 'a)' Figure 32) and the group learning cycle (see 'b)' Figure 32). These learning forms evolve and build from on each other. PMS are generally used diagnostically in the first instance to monitor key performance indicators to detect performance issues. Within the framework presented in Figure 32, the diagnostic performance measurement process is depicted in dark blue, and the interactive performance measurement emerging from diagnostic usage is illustrated in light blue (see Figure 32). The measurement of performance provides the starting point for creating learning. The first three steps (measure, compile, and analyse and report) are largely automated within the case company, with the recipients receiving standard analysis reports. The standard analysis however, differs between users, and is either accessed individually by logging into the SAP system, or is distributed by a central department. The findings show that employees interpret these reports based on their previously acquired knowledge (which can be conscious or unconscious in form) and monitor these reports for performance deviations.

The model presented is structured around the learning cycles prevalent at Frankfurt airport:

1. The individual single-loop learning cycle, marked in light grey and involving the diagnostic performance measurement cycle (depicted in dark blue)
2. The organisational learning cycle, illustrated in dark grey, involving both the diagnostic (marked in dark blue) and the interactive performance measurement cycles (pictured in light blue). This cycle includes the following learning cycles:

   a) The individual double-loop learning cycle, outlined as 'a)' in the model
   b) The group learning cycle, illustrated as 'b)'
   c) The organisational learning cycle, depicted as 'c)'

If the performance measurement reports indicate statistical deviations, the individual single-loop learning cycle is triggered. This cycle is depicted as light grey in the model above (see Figure 32).

1. The individual single-loop learning cycle (light grey)

In the interpretation stage, individuals acquire new knowledge as they receive feedback on performance results based on previously noted actions. After interpreting performance, individuals make their decisions on appropriate actions. Depending on the situation, they either communicate their intervention, or execute it directly. This experience is stored within the individual's mind as an individual memory in an implicit incremental manner, leading to the acquisition of new knowledge. However, if the performance deviation in the standard analysis report shows systemic anomalies, the organisational learning cycle is triggered. This cycle is outlined in dark grey in Figure 32.

2. The organisational learning cycle (dark grey)

The analysis of the data reveals that the primary function of the organisational learning cycle is to generate individual double-loop learning. Secondly, as a subsequent stage, it adds to the individual double-learning cycle to achieve group learning. The most advanced learning stage was found to be organisational learning. However, this learning form is noted as only occurring rarely. The data analysis shows that individual learning and the individual learning cycle is the most common form at Frankfurt airport, as individual learning can occur without direct communication, and is therefore the most independent form of learning. The group learning cycle appears less apparent as it requires the feedback and communication of other employees. However, organisational learning was found to occur only as the least frequent learning cycle used in the case organisation, as this learning requires the most proactive form of communication and feedback, across all levels of the organisation. The group learning cycle (marked as' b)' in Figure 32) emerges from the individual double-loop learning cycle (indicated as a) in Figure 32) and the organisational learning cycle (depicted as 'c)' in Figure 32) arises from the group learning cycle (see Figure 32, 'b)').

a) The individual double-loop learning cycle (marked as a) in the model)

The individual double-loop learning cycle ('a)') starts when an individual makes a decision to report systemic anomalies by distributing the personal knowledge (see Figure 32). The performance measurement systems are not used for diagnostic monitoring at this point, but are used interactively for in-depth analyses. Measurement data is largely used to detect the root cause of a performance issue. This usage form can be seen in the light blue cycle in the model above. Following this, the in-depth analysis is discussed and interpreted within the team, the individual previously shared his or her knowledge about the systemic performance outlier. The discussion and exchange with other

individuals leads to the generation of new knowledge in terms of experience and understanding, and is stored within individual memories. The individual memory triggers new the acquisition of knowledge, and the individual double-loop learning cycle is completed (see Figure 32).

b) The group learning cycle (b))

As soon as the in-depth analysis is discussed in the group, the exchanges between the team members generate discussions and interpretation, and collectively, a joint decision is made (see Figure 32). Following this, the team reports its decision, and either executes it or delegates the task to other members in or outside the organisation (e.g. IT consultants, other departments, subordinates, etc.). At this point, the experience obtained is stored within the team`s memory implicitly as individual double-loop learning and explicitly in the form of amended work instructions and/or process routines, among others. The group learning stage thus has been reached, and the group learning cycle is completed (see Figure 32, b)).

c) The organisational learning cycle (c))

Following the execution of a decision, organisational learning is created if, the knowledge acquired by the team members is distributed further into the organisation. After this, the knowledge is stored within the organisation`s memory in the form of internal news, changed processes, work instructions, training events, etc. As soon as knowledge is distributed across all layers of the organisation, employees are able to access the information provided, acquiring new knowledge and thus, creating organisational learning (see Figure 32, c)).

The framework presented in Figure 32 clearly shows the alignment and inclusion of PMS and OL into one encompassing concept, and provides insights into how PMS can be used to generate OL. While the literature (as presented in Chapter two) has clearly shaped and supported the findings of this research, this study proposes extensions to that body of scholarly activity, and provides entirely new insights into the relationships between PMS and OL. The findings are supported by literature, but also significantly extend the literature and thus contribute to a new understanding of the relationships between the OL and PMS research fields. The dynamic relationship illustrating how the literature has informed the framework and how the framework, in turn, expands the literature and contributes to knowledgeis summarised below.

This study has identified that a single PMS can be used both diagnostically and interactively and that both usage types are required to generate OL. This finding is supported by the literature, which states that both usage forms are important, and necessary to the generation of OL (Müller-Stewens et al. 2020; Guenther and Heinicke 2019; Shurafa and Mohamed 2016; Ylinen and Gullkvist 2014; Grabner and Moers 2013 Tessier and Otley 2012; Ferreira and Otley 2009; Widener 2007; Henri 2006a) (see Chapter 2.4). Furthermore, the finding that OL is only generated by using PMS diagnostically and interactively confirms the view present in the literature (Ferreira and Otley 2009; Oliver 2009; Henri 2006a; Kloot 1997; Simons 1995a). The study also extends the literature by showing that PMS are always used diagnostically in the first instance and then, depending on the form of deviation (systemic or statistical), continue to be used diagnostically or to be used in an interactive way.

The findings show that PMS transforms individual learning into group learning and into organisational learning through communication and dialogue. This finding is acknowledged by the literature which regards PMS as a powerful tool for transferring individual learning into group learning and ultimately into OL (Odor 2018; Thingvad et al. 2018; Henri 2006a; Moynihan 2005; Marginson 2002) by acting as tool for communication (Robles 2019) (see Chapter 2.4).

The analysis of the data indicates that SLL is the most commonly identified form of learning within Frankfurt Airport. This neatly aligns with the perspectives from the literature, which view SLL as the most popular form of learning within an organisational context (Burt and Nair 2020) (see Chapter 2.2.2).

In addition, the data analysis shows that management and leadership are critical in determining if learning is enabled or hindered. This finding is also congruent to literature, which states that leadership is the most important factor in enabling or hindering learning (Hasson et al. 2016; García-Morales et al. 2023, Yukl 2009; Aragón-Correa, García-Morales and Cordón-Pozo 2007; Beattie 2006; Berson et al. 2006; Vera and Crossan 2004; Gómez and Ranft 2003) (see Chapter 2.2.2 and Chapter 2.4).

This research was unable to determine if OL affects existing PMS by reshaping the measures of PMS, as suggested by some researchers (e.g. Fried 2010; Batac and Carassus 2009; Hamilton and Chervany 1981). The reason why this might not apply to Frankfurt Airport is presented in Chapter 4.3.6.

Literature proposed a The present study builds up on the lifecycle approach of PMS (Landström et al. 2018).This approach is presented and reviewed in Chapter 2.3.3. The findings from this study have enabled it to be reshaped by expanding the cycle into a diagnostic PMS cycle and an interactive PMS cycle. This was achieved by connecting both cycles together, and by expanding the cycle via the reporting and executing steps of (see Chapter 4.3.6).

This study has presented new insights into the field of PMS and OL research by furthering understanding of the relationships between OMS and PL in the following ways: the data analysis shows that PMS are always used diagnostically first as a reactive response if performance drops are statistical outliners. This is mainly the case in day-to-day business, and is used for daily guidance. Diagnostic PMS continue to be used interactively as proactive responses to systemic performance drops. Interactive PMS usage is mainly used for tactical medium medium-term decision-making, or for strategic long-term decision-making. The findings show that senior management initiates the OL cycle and interactive PMS usage. Lastly, this study has shown that the learning stages identified within the literature are actually learning cycles. The analysis of the data enabled the identification of the nature, dynamic and composition of these learning cycles, and thus can be described as a key finding as these have not been researched in detail within the academic literature as yet.

Kloot (1997) review of Huber´s (1991) OL cycle, and Robles (2019) review of Crossan et al.´s (1999) 4i model are also apparent within the study´s framework: knowledge can be acquired via PMS, and can be distributed via PMS. However, the study´s final framework provides significant additional detail and understanding to the apparent insights identified within the literature. This study is the first of its kind to develop a comprehensive PMS-OL model in detail for practical application. The findings thus add significantly to understanding of the the relationships between PMS and OL.

4.6 Summary of key findings

This chapter has presented the findings from the content analyses of the semi-structured interview data and the semi-structured narrative interviews. The findings were discussed in relation to the OL and PMS literature, as presented and reviewed in Chapter two. This chapter has identified key findings relevant to the PMS and OL research fields, which are summarized below.

PMS

The analysis shows that the PMS cycle of Landström et al. (2018) may be extended by including the steps of reporting and executing, and only presents the diagnostic PMS cycle (see Chapter 4.3.6). However, with regard to the interactive PMS cycle, the diagnostic cycle is extended via a second loop depicting the interactive cycle. A significant key finding is that PMS are always used diagnostically in the first instance. If a loss of performance is a statistical outliner, the PMS continue to be used diagnostically. This is most common usage within the case company. Particularly in daily steering, diagnostic PMS are used as a reactive response to performance drops, and continue to be used to monitor changes in performance. However, if there are systemic performance anomalies, the PMS continue to be used interactively. This interactive usage is usually triggered by management, and used for strategic long-term or tactical medium-term decision-making. This key finding seeks to extend the literature, which at present does not specify and investigate the nature of usage types, and how they are interrelated (see Chapter 4.3.6). The literature simply describes both usage type as important and necessary for OL (Müller-Stewens et al. 2020; Guenther and Heinicke 2019; Shurafa and Mohamed 2016; Ylinen and Gullkvist 2014; Grabner and Moers 2013 Tessier and Otley 2012; Ferreira and Otley 2009; Widener 2007; Henri 2006a) (see Chapter 2.4). Furthermore, the findings identified the potential of diagnostic PMS for generating individual learning, while interactive PMS were found to create all learning forms. This finding also extends the existing literature which states that interactive PMS usage has the ability to create OL (Guenther and Heinicke 2019; Shurafa and Mohamed 2016; Simons 2014; 1995; Henri 2006a; Tuomela 2005; Bisbe and Otley 2004) and thus clarifies the debate within literature as to whether diagnostic PMS are limited to individual learning or even impede learning at all (Henri 2006a). This research highlights the need to promote interactive PMS usage and to provide feedback to employees to enable learning on both management and employee levels (see Chapter 4.3.6).

OL

The findings from this study seek to contribute to the extant literature by identifying that learning stages are actually highly interrelated learning cycles. The individual learning cycle builds the foundation for learning, and flows into the group learning cycle before the organisational learning cycle can occur. While the individual learning cycle is more robust, it is also the most common cycle within the case company and can exist without communication and dialogue (see Chapter 4.4.6). The other learning cycles, group and organisational learning, however, are dependent on the drivers of communication and dialogue to exist. Those drivers are further determined by the organisational culture, which is mainly shaped by management. These cycles are presented and explained in Chapter 4.4.6. Another key finding provided by this research is that the individual learning cycle can produce both SLL and DLL, and that the individual learning cycles vary according to the learning forms. As soon as an individual member of the organisation challenges and questions the prevalent forms and structures of the organisation, double-loop learning is created, and the group-learning cycle is triggered. While the SLL cycle can be triggered by both conscious and unconscious knowledge acquisition, the individual DLL cycle is only triggered if the knowledge acquisition is conscious. It was also found that only the individual DLL cycle is able to trigger the group learning cycle. Another key finding for this study is the clarification of the ongoing debate within the literature as to whether interpreting information occurs before or after distribution. The findings of this study show that interpretation occurs twice: individually and then again within the group. The analysis revealed the need to promote the group learning cycle within Frankfurt airport, as individual learning in the form of single-loop learning is currently most common. The analysis further reveals that the organisational learning cycle rarely occurs within the case company, as the lack of feedback from management to employees hinders the generation of organisational learning. The analysis revealed that management is crucial to impeding or fostering learning (see Chapter 4.4.6).

PMS and OL

A major key finding for this study is the identification of the sequential order of PM events, and the creation of the OL forms in Chapter 4.2.6. Currently the literature is scant with regard to the relationships between PMS and OL, and only the role of PMS as OLM is highlighted within the academic literature. The analysis explored the relationships and indicated the flow of events showing how PMS are used to generate learning (see Chapter 4.2.6). The finding indicated the sequential relationship between PMS and OL. The final research question was addressed by combining the sequential order of the PMS findings and OL findings. Another key finding is that communication and dialogue, as well as PMS, are both OLM. These are essential for OL, however PMS as OLM is a pre-requisite for the OLM of communication and dialogue (see Chapter 4.2.6).

The major key finding of this study is the development of a holistic model presented in Chapter 4.5, which depicts the complex relationships between PMS and OL, both theoretically and practically. By merging the findings generated through the data analysis and addressing research questions two (see Chapter 4.2.6), three (see Chapter 4.3.6) and four (see Chapter 4.4.6), the final research question: “How is learning undertaken, transferred and thus organisational learning created while measuring performance at Frankfurt airport?” is addressed in Chapter 4.5 by developing a holistic framework which depicts the complex relationships between PMS and OL (see Chapter 4.5). This framework addresses several major gaps identified within the literature (see Chapter two) and addresses the aim of this research (see Chapter 1.3), to develop a comprehensive perspective of both the breadth and depth of the relationships of the research fields, theoretically and practically within the context of Frankfurt airport. The model depicts the learning forms, how they are undertaken and transferred to create organisational learning while measuring performance.

CHAPTER FIVE: CONCLUSION

The aim of this research was to further understand the relationships between OL and PMS by developing a comprehensive perspective of both the breadth and depth of the relationships of the research fields, theoretically and practically in the case of Frankfurt airport (see Chapter 1.3). The research has clearly shown the complex interrelations of PM practices at Frankfurt airport and how these affect learning processes. The research has achieved its aim by developing a holistic framework depicting these relationships. Furthermore, the research also highlights the roles of the employees involved in the PM process, and the significance of their influence on the learning processes resulting from PMS usage at Frankfurt airport. This chapter highlights the original contributions to knowledge made by this research, as well as examining the limitations of the study and identifying directions for further research.

5.1 Theoretical and practical contributions

The research has made substantive contributions in understanding both the breadth and depth of the relationships between PMS and OL theoretically and practically within the airport industry. The research has built on the two research areas PMS and OL by examining both areas and their theoretical interrelations by reviewing the extant literature. The contextual contributions made by this research pertain to the research questions below:

Research Question 1: What are the relationships between organisational learning and performance measurement systems within the academic literature?

The literature review revealed that the research field of OL is characterised by a high level of fragmentation as multiple different perspectives, concepts and views exist, with an absence of practical insights (see Chapter 2.2.1). Notably, a unifying definition of OL is lacking from the discipline. The multi-levelled nature of the research field is apparent within the various views of OL. These views can be sorted into different concepts, orientations, and ontological views. This study adopts a social-cognitive perspective by regarding knowledge as a result of OL, which is newly created, adapted or retained and stored in an organisation`s norms, structures, routines, and processes (see Chapter 2.2.1). As a result, the aim of OL is seen as increasing the organisational performance by adapting to changes resulting from internal or external

environments (see Chapter 2.2.1). The review of the literature on PMS shows that there is extensive research on PM measures for airports (e.g. Iyer and Jain 2019; Bezerra and Gomes 2016; Gillen 2011; Graham and Nafukho 2008) (see Chapter 2.3.1 and Chapter 2.3.2). However, literature is found to be poorly developed in relation to the actual PM process and PMS application (see Chapter 2.3.3). Overall, the purpose of a PMS is in rating business activities to improve organisational performance .This research defines PMS as a tool for operationalising organisational efficiency and effectiveness through financial and nonfinancial measures with the aim of monitoring the pursuit of strategy, objectives and goals. The literature is unanimous in its view of the importance of research into the relationships between PMS and OL, however both areas are only examined collectively in fragmented parts, or not at all (Robles 2019; Shurafa and Mohamed 2016) (see Chapter 2.4). Reviewing the interrelations of the two constructs revealed the following findings from literature:

- Diagnostic PMS creates SLL while interactive PMS generates DLL
- Diagnostic and interactive PMS usage are both essential as SLL and DLL are required to generate OL
- PMS is found to be a result of OL, and can also be a pre-condition for it
- Employees acquire knowledge through PMS
- PMS are used as communication tools to share acquired knowledge
- The learning of the organisation is reflected in the control mechanisms and measures of the PMS

The literature reviewed in Chapter 2 showed the complexity of the relationships and emphasises that a deep understanding of the breadth and depth of their relationships has not yet been achieved (see Chapter 2.4). Existing studies which have attempted an encompassing view of OL have largely drawn upon Huber´s (1991) and Crossan et al.´s (1999) OL cycles. Additional factors which further determine the learning outcome via PMS usage were found to be leadership and organisational culture. These two factors were found to influence whether knowledge is created and shared with a group and the organisation or not. Further, these two factors determine the questioning and challenging of organisational norms, boundaries, routines and behaviours, which are prevalent in the organisational processes and working routines.

Research Question 2: What is the sequential order of PM activities and the OL form creation at Frankfurt airport?

Determining the sequential order of PM and OL events identified the sequential flow of PM events and its learning outcome. It thus provided insights into the framework conditions of the relationships between these two constructs. Identifying the structure of the OL and PMS events set the framework conditions, whereas the content analysis applied for research question three and four provided insights into the details of the relationships of PMS and OL.

The analysis of the narrative interviews revealed the structural sequences of PM and OL, and how these two occur and interact with each other(see Chapter 4.2). The identification of the sequential order of PMS and OL was critical for developing the holistic framework, which depicts the relationships between PMS and OL. The narrative schema of Labov and Waletzky (1967) uncovered the sequential order of events by showing the OL and PMS steps, and when they occurred. The finding of the narrative schema of Labov and Waletzky (1967) clearly show the flow of events and how PMS may be used to generate learning (see Table 40 and Chapter 4.2.6).

The findings show that errors are initially detected by using PMS diagnostically. Individual learning was found to be a result of diagnostic PMS usage. Subsequently the issue is reported, oand if management decides to pursue the performance issue, an in-depth analysis is conducted. As a result, PMS are used interactively, and individual learning occurs. The issue is discussed and reinterpreted, and group learning is created. Group learning is created throughout the subsequent steps of making decisions, communicating, and implementing instructions. Organisational learning occurs in the final communication step..

The finding of the sequential order clearly provides additional insight into the existing literature by contributing to the understanding of OLMs. PMS and communication and dialogue were identified as OLMs whereas PMS were found to function as pre-requisites for the OLM of communication and dialogue (see Chapter 4.2.6). In addition, the findings show that management and the strict hierarchical structure of the company significantly influence the sequential order of PMS and OL by enabling or hindering interactive PMS usage, communication, and dialogue.

Research Question 3: What is the process of performance measurement at Frankfurt airport and how are the performance measurement systems used in the case organisation?

Examining the PM process and PMS usage at Frankfurt airport, the analysis revealed that the process for diagnostic PMS usage is generally in accordance with Landström et al.`s (2018) proposed PMS cycle. However, this research proposes an extension to this cycle by adding the additional process steps of reporting and executing at the end of the cycle (see Figure 24 and Chapter 4.3.6).

With regard to the interactive PM process, the findings show that the diagnostic PM cycle is extended by a second loop (see Figure 26 and Chapter 4.3.6). A major finding was that PMS are always used diagnostically in the first instance. If the performance drop is a statistical outliner, PMS continue to be used diagnostically. This is most commonly the case in Frankfurt airport. Nevertheless, if the loss in performance is due to systemic anomalies, the diagnostic PMS continues to be used interactively. Managers were found to be decisive for the switch in usage from diagnostic to interactive usage. They usually use PMS interactively for medium-term or long-term decision making, while diagnostic PMS are used for short-term decision-making. This significant finding finally explains the various differences in academic studies, as they do not investigate the actual interrelations of the usage forms.

The data analysis also revealed that diagnostic PMS is able to create individual learning, while interactive PMS has the potential to generate all learning forms: individual, group and organisational learning. The literature suggests measured KPIs are derived from the organisation´s strategy and are adapted as soon as the organisation changes its goals and objectives (Kaplan and Norton, 2008; Dangayach and Deshmukh, 2001). However, the interviewees stated that the adaption of KPIs is not as simple as suggested in the literature, and rather it needs to be aligned with the structure and processes of the organisation to be more effective. Thus, the findings emerging from this research not only extend the existing literature, but also provide completely new insights into the field of PMS.

Research Question 4: How does individual, group and organisational learning emerge at the case company and how do the the learning forms interrelate?

The following OL stages are acknowledged within the literature,: individual, group, and organisational learning (Tafvelin, von Thiele Schwarz and Hasson, 2017; Oliver 2009; Crossan et al. 1999; Feurer and Chaharbaghi 1995a). However, the data analysis revealed that the learning stages are actually more dynamic and are cyclic in their nature. In line with the learning stages identified in the literature (see Chapter two), the individual learning cycle needs to be accomplished first and subsequently triggers the group learning cycle, which then starts the OL cycle (see Chapter 4.4.6).

Within the case company, the individual learning cycle is most common. Contrary to the other cycles which are based on communication and dialogue, the individual learning cycle does not need interaction with others. The most important drivers of communication and dialogue were found to be determined by management and organisational culture (see Chapter 4.4.6).

The individual learning cycle is found to be able to generate SLL and DLL, and its cycle varies according to these learning forms (see Chapter 4.4.6). A significant finding is that the individual SLL cycle can be triggered by both conscious and unconscious knowledge acquisition The individual DLL cycle however is dependent on the conscious acquisition of knowledge.

Only the individual DLL cycle is able to trigger the group learning cycle. Within the literature, there is a debate as to whether interpreting information occurs before or after distribution. The findings from this study revealed that interpretation does indeed occur twice: once individually and then again within the group. This finding is in line with Aponte and Zapata (2013) who also argue that interpretation happens individually but also in a group context.

Within the case company, individual SLL the most common learning cycle. Interviewees expressed the need for Frankfurt airport to promote individual DLL, and thus group and organisational learning. The reason behind this is that there is a lack of feedback from management. The analysis of the data made evident that management is the key determinant in fostering or impeding learning. These significant findings extend the literature by providing novel insights into the learning forms and the learning cycles present within the case company.

Research Question 5**:** How is learning undertaken transferred and thus organisational learning created achieved while measuring performance at Frankfurt airport?

By merging the findings of the research questions one, two, three and four, a holistic framework was developed, which provides a comprehensive perspective of both the breadth and depth of the relationships of OL and PMS, both theoretically and practically (see Figure 32 and Chapter 4.5).

Within the literature, many authors identify the need to research holistic learning transfer holistically (Rompho and Siengthai 2012; Batac and Carassus 2009; Oliver 2009; Tuomela 2005; Buckmaster 1999), but studies in this area are still lacking (Thingvad et al. 2018; Nielsen 2014a). The holistic interconnectedness of PMS and OL has neither been evaluated within the academic or practitioner literatures(Zhang and Yu 2020; Robles 2019; Shurafa and Mohamed 2016). There is the need to conduct research into the integrative interplay of PM and OL (Zhang and Yu 2020; Robles 2019; Alonso and Austin 2017; Alonso and Austin 2016; Shurafa and Mohamed 2016; Nielsen 2014a) theoretically and empirically, so that organisations can exploit the full potential of their PMS (Thingvad et al. 2018).

Thus, this research provides a significant contribution to the understanding of the relationship between OL and PMS by developing a novel theoretical model of how PMS can be used to generate OL for practical application. The findings can be seen to revolutionise the PMS and OL literature by furthering understanding of the relationships between PMS and OL, thus enabling organisations to exploit the potential of their PMS to generate learning.

These findings significantly shape current understanding of the PMS and OL relationships within the literature, by providing an encompassing perspective on OL and PMS processes and how they mutually impact each other. The findings provide major insights and encompassing assistance to organisations to enhance their PMS processes to generate learning, as well as to enhance their learning processes by using PMS. The final model shows the three main learning cycles, individual, group and organisational learning and how they occur depending on how PMS are used (see Figure 32 and Chapter 4.5).

5.2 Methodological Contributions

In addition to the theoretical and practice-based contributions noted above, this study has also made methodological contributions, specifically in relation to validity. The causal correlation between variables and results is defined as internal validity in which the researcher provides reasonable arguments to defend the research findings (Gibbert, Ruigrok and Wicki 2008). Internal validity is achieved via three measures: providing a clear research framework, theory triangulation and applying a suitable analysing method. However, Yin (1994, 2003, 2009) determines the analytical methods of pattern matching, explanation building, rival explanations, and logic models for determining internal validity. Due to the number of case study attributes, and the adopted analytical methods of content and narrative analysis, this research applied member-checking to determine the suitability of the data analysis methods for internal validation (see Chapter 3.11). The findings and methodological approach adopted for this study collectively suggest that both analytical techniques may be utilised as valid data analysis methods for case studies. Although this research did not seek to provide any substantive methodological contributions, these were achieved by showing that content analysis and narrative schema are valid analytical methods to extract rich content from case studies.

5.3 Originality

Currently, there are no practical applications of OL concepts to PM present within literature. Furthermore, there is a lack of a holistic and integrative perspective on the relationships between organisational learning and performance measurement systems. Therefore, this research makes a significant contribution to the OL and PMS research fields by researching the encompassing interrelations of OL and PMS. This research is unique, as it finally closes multiple research gaps by building on and aligning the fractured studies of OL and PMS into a holistic concept. The research is the first study of its kind to combine OL and PM into an integrated and holistic framework through examining PM practices and their effect on OL. Frankfurt airport´s management practices were analyses to develop an OL model of PM for practical application in the airport industry. This was undertaken to help Frankfurt airport to exploit the full potential of its PMS to generate individual, group and organisational learning (see Chapter 4.5). With this research, a key contribution to knowledge has been achieved by combining OL and PMS into an embryonic hybrid OL-PMS research field.

5.4 Effects of COVID-19 on the research

The COVID-19 pandemic significantly affected the data collection phase of this study in two ways. Firstly, face-to-face interviews were only possible due to video chat tools such as Microsoft Teams. Secondly: due to the tremendous economic effect of the pandemic on the aviation industry, nearly all interviewees worked reduced hours, which caused a delay in conducting the interviews. Thirdly, the pandemic made the need for the research even clearer and increased the importance of this research. Due to the economic collapse of the airport industry, a large number of employees were made redundant. Numerous valuable knowledge carriers left or are leaving the organisation soon, without sufficiently passing on their knowledge to the organisation. All interviewees unanimously stated the importance of an OL solution, and the effective use of PMS to generate learning and transfer individual knowledge to the organisation. The practical importance for this research has been made evident as two departments have already requested that the researcher deploy the framework for effectively using PMS to create OL in their departments.

5.5 Benefits and recommendations for the case company

This research provides a guide for the case company on how they can mitigate their challenges by drawing on the findings of this study (see Chapter four). In the following, the challenges of Frankfurt airport are discussed as well as the benefits of this study for the case organisation. Recommendations are drawn based on the benefits and findings for the case company in order to improve on their organisational performance, their KPIs and external benchmarks.

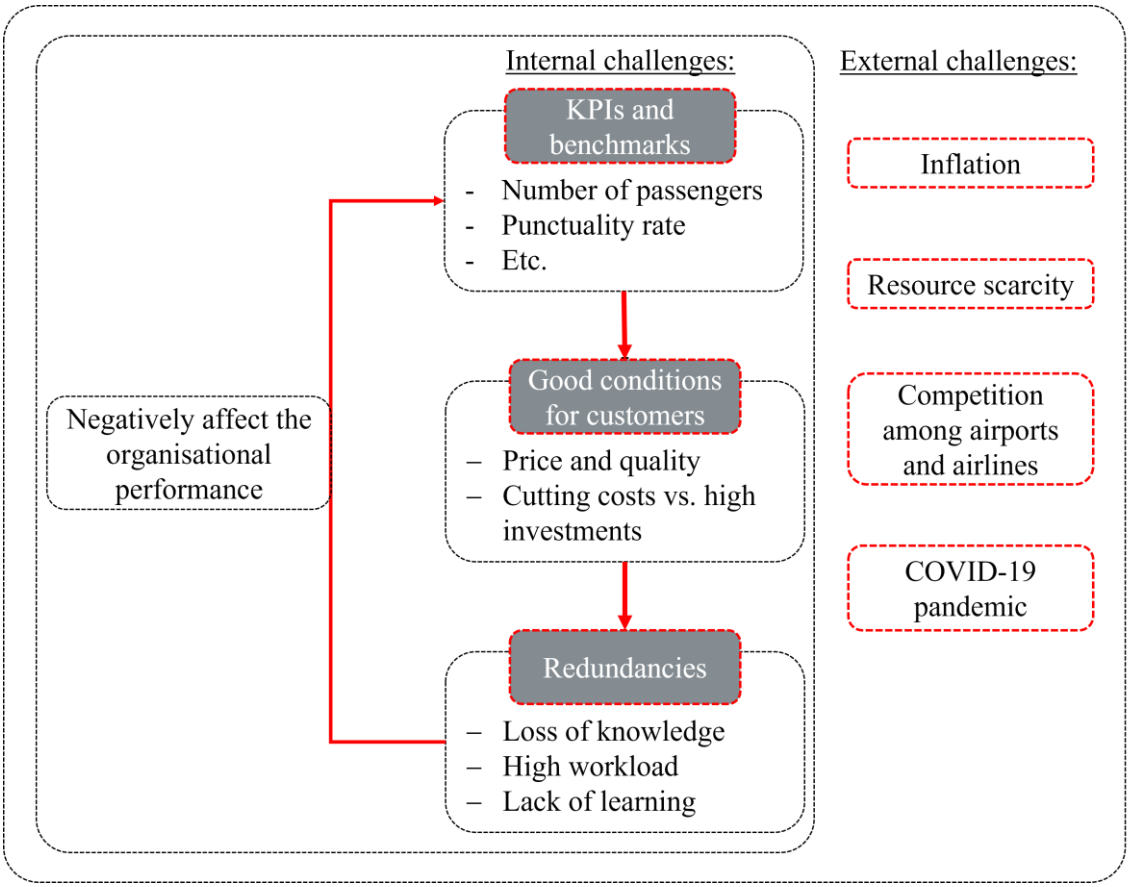
Challenges

The importance of this research to Frankfurt Airport has been explained throughout the thesis (see Chapter 1.2.3, Chapter 1.2.4, Chapter 5.4). While the Covid-19 pandemic actively increased the need for this research (see Chapter 1.2.4 and Chapter 5.4), Frankfurt airport is now facing numerous challenges (see Chapter 1.2.3). A major challenge for the airport is how to spread learning within the organisation. The airport is dependent upon a large number of single knowledge experts who do not pass on their learning and knowledge. A vast amount of these experts are about to retire, or are part of a recent redundancy programme. The large number of redundancies requires a quick solution for maintaining performance, and sharing learning across the remaining employees. While 4,000 of

21,000 employees have already been made redundant, this round of redundancies has not yet been completed. However, the workload remains the same despite the number of employees, and the company needs to find a solution for sharing knowledge and learning while maintaining an acceptable level of performance.

The figure below summarises the major challenges currently faced by Frankfurt airport, how these challenges affect each other. This research addresses the loss in knowledge, the lack of learning and therefore the organisational performance with regards to improved KPIs and benchmarks. The impact of this research and how the findings address the issues to reduce the impact of loss of knowledge and lack of learning are both evaluated throughout this chapter within the sections "Practical Benefits" and "Recommendations".

Figure 33: Challenges of Frankfurt airport



(Source: Author 2023)

As described in Chapter 1.2.3, Chapter 1.2.4 and Chapter 5.4, the KPIs are of great importance to the airport. Both financial and non-financial indicators are closely monitored via benchmarks, and are continuously compared to other hub airports around the world. There is at present only minimal growth as cargo rates are declining while the number of passengers is only growing slightly. The economic downturn of the aviation industry caused by the COVID-19 pandemic has in tun created a financial crisis across the industry. Nevertheless, competition remains vast and grows continuously. Thus, despite the financial crisis for the airport, there is still an ever-growing competition between airports as well as airlines, which in turn puts pressure back on the airports. The airports are competing against each other on passenger numbers and punctuality rates, which determine their level of attractiveness (see Figure 33). Adding to this, the airlines are highly sensitive and prone to switching their fleet to other competing airports, which in turn leaves airports with scheduling and planning issues. However, to attract more customers, provide the best conditions for airlines, and thus offer the best options for passengers (with regard to flight prices and variety of destinations), Frankfurt has had to invest in both infrastructure and capacity. As construction costs skyrocket and resources are scarce, the airport´s board of directors has decided to significantly cut costs on their greatest expenses, which are personnel costs (see Figure 33).

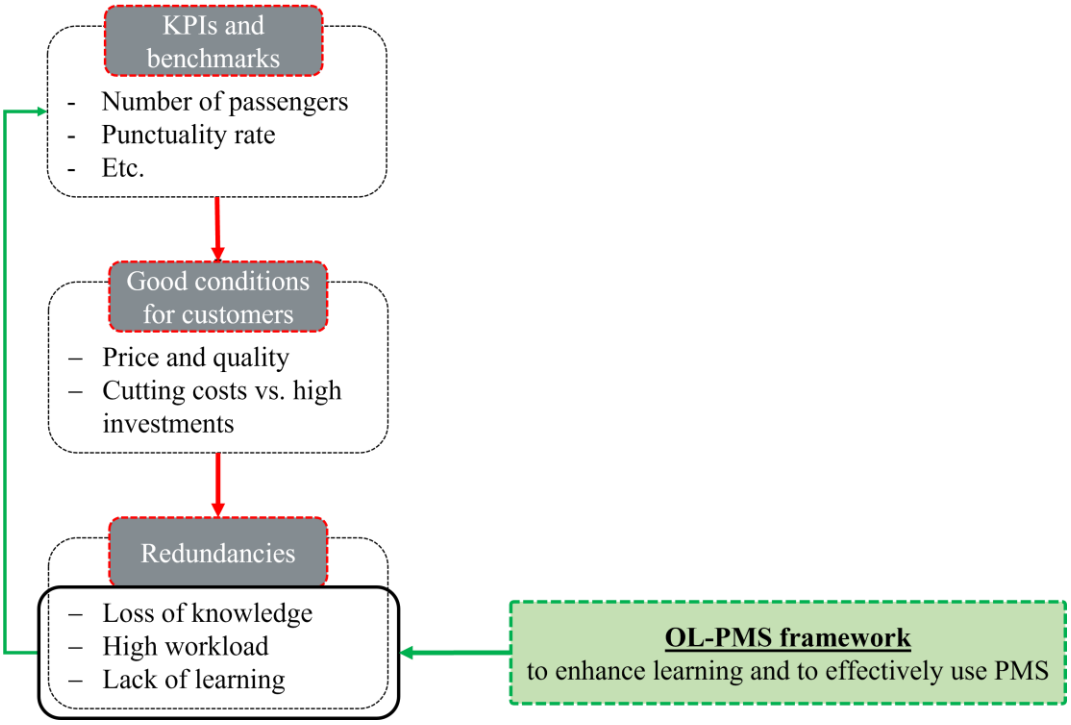
Frankfurt airport has already significantly cut costs through a redundancy programme. However, this in turn negatively and severely impacts internal processes and performance. The already visible age gap within the company between experienced specialists and younger, less senior employees, is exacerbated by the redundancy programme. Via this programme, Frankfurt airport enables experienced employees to retire early, or to leave the company with compensation. This leads to a rapid deterioration of organisational knowledge, as the company fails to effectively pass on knowledge from the experts to other employees.

This lack of knowledge, the lack of learning due to missing processes for knowledge transfer and learning generation, (as well as the high workload) negatively affect organisational performance, resulting in negative KPIs and benchmarks. Instead of aiding performance improvement, the redundancies appear to have intensified the learning and performance issues of Frankfurt airport. As a result, a downward performance trajectory is emerging, which requires a solid solution. This downward performance spiral can be addressed, at least in part, by implementing the findings of this study at Frankfurt airport.

Practical Benefits

This study has enabled a deeper understanding of the challenges Frankfurt airport is facing, their correlations and most importantly how the research benefits the case company by mitigating these challenges. In the following, based on Figure 33 (above), the potential benefits of this research to Frankfurt airport are examined in relation to their challenges.

Figure 34: Benefits addressing challenges of Frankfurt airport



(Source: Author 2023)

Applying the results of this research could clearly benefit the case company by improving its organisational performance and thus KPIs and benchmarks. This may be achieved by applying the OL-PMS framework to enhance learning through using Frankfurt airport's PMS (see Figure 34). The framework (see Chapter 4.5 and Figure 32) offers a potential solution to mitigate the loss of knowledge, high workloads, and lack of learning, which are in turn intensified by redundancies, and which directly affect the performance of the organisation.

Of particular importance following the COVID-19 pandemic (see Chapter 1.2.4 and Chapter 5.4.). A number of practical benefits result from this research for the case organisation.

The study identified the potential for PMS to generate individual, group and organisational learning (see Chapter four). Using PMS in a suitable way should lead to an increase in learning and knowledge for the company. The findings clearly show that PMS is able to create OL and therefore DLL, and thus confirm Robles`s (2019), Oliver`s (2009), Henri´s (2006) and Chenhall`s (2005) view of PMS as a powerful OLM by providing communication and dialogue, and therefore creating OL. However, the data analysis indicated that SLL is the most widespread form of learning within Frankfurt airport, as is mostly the case within all organisations (Burt and Nair 2020). In order to promote DLL, it was found that management and leadership are critical to determining which learning form is created, and if learning is indeed created at all (Hasson et al. 2016; García-Morales et al. 2023, Yukl 2009; Aragón-Correa, García-Morales and Cordón-Pozo 2007; Beattie 2006; Berson et al. 2006; Vera and Crossan 2004; Gómez and Ranft 2003). Therefore, the interactive use of PMS should be promoted across the organisation to create learning at the group and organisational levels,

The case organisation also benefits from this study, as the findings clearly show how to use PMS in order to create OL, group learning and individual learning (see Chapter 4.3.6). Additionally, the study finally reveals how PMS may be used according to the business situation: diagnostic PMS should be used in day-to-day business for daily steering, diagnostic PMS continue to be used interactively as proactive responses to systemic performance drops, and used for tactical medium-termed decision-making or strategic long-term decision-making. The case organisation clearly benefits from these insights as they now understand how to operate with tactical and strategic decision-making to enhance their process efficiencies. However, as Frankfurt airport's learning processes have deteriorated due to the redundancy programme developed as response to the COVID-19 pandemic, the company firstly needs to enable the transfer of learning and knowledge by focussing on the interactive usage of PMS before shifting to the balanced usage of diagnostic and interactive PMS. The literature shows that the COVID-19 pandemic has heavily impacted not only the airport industry in general (Liu, Kim and O´Connell 2021; Gallego and Font 2021; Graham, Kremarik, and Kruse 2020; Suau-Sanchez, Voltes-Dorta, and Cuguero-Escofet 2020) but has also severely damaged the opportunities for OL within the airport. The interviews revealed that more interactive usage is needed within Frankfurt airport as there is a lack of feedback from managers to employees (see Chapter four).

The research also provides guidance on achieving learning through interactive PMS usage (see Chapter 4.5). The results show that it is important to discuss and re-interpret mental models and

experiences of individual employees within a group, until a common understanding has been reached (Patky 2020; Odor 2018; Levin et al. 2011; Fiol and Lyles 1985) through the use of PMS. By increasing interactive usage of PMS, all members of the organisation potentially benefit from learning, and also develop a better understanding of the processes they monitor. This increase in knowledge would in turn lead to improved process performance, as employees finally develop a deep understanding of the different factors and interrelations causing a decline in performance. The improvement in performance in turn positively affects the KPIs and external benchmarks (see Chapter 1.2.3). Therefore, in addition to the performance benefit, this research clearly contributes to a potential financial benefit due to enhanced performance and KPIs for the case company, which in turn would positively affect the external benchmarks and the airport's attractiveness to customers (such as passengers, airlines, and suppliers).

The literature notes that, particularly within hierarchical organisations, management tends to project the own inherent beliefs to employees, and thus are likely to largely produce SLL and prevent employees from DLL due to their dominant views (Hall 2011). By enabling or hindering communication and feedback, management strongly shapes the learning culture within the organisation (Do and Mai 2020). In fact, management is a large determinant of the interactive use of PMS, and thus requires intense involvement to enable interactive usage and foster communication and learning (Zhang and Yu 2020; Schäffer et al. 2014, Simons 1995b). The literature also agrees on the importance of an open-minded environment, which needs to be enabled by management to create learning (Lee et al., 2014). This study clearly shows the importance of management and leadership in enabling learning by shaping the communication structure within the case company (see Chapter four). Therefore, Frankfurt airport significantly benefits from this finding, as the research provides a guide for management communicating the shape of organisational culture and enabling learning.

As noted above, the framework benefits the case company by providing a guide to using the PMS to generate individual, group and organisational learning (see Chapter 4.5 and Figure 32). A process view is produced by generating an exchange of knowledge between departments and different members of the organisation and also by incorporating intersectional processes. Indeed, within the findings, the employees made clear that a process view would make processes more efficient (see Chapter 4.3.1). Therefore, by implementing a learning exchange with other departments based on organisational processes, the company would clearly benefit from learning across the different departments, which in turn enhances the efficiency of processes and organisational performance,

particularly with regard to the intersectional processes. This enhancement would also positively impact personnel expenses, as personnel resources can be relocated and utilised differently.

Recommendations

In the following section, recommendations for practical implementation in Frankfurt airport are derived from the findings of this study:

PMS usage:

As PMS are used for daily steering within Frankfurt airport, this study shows that Frankfurt airport does require a redesign of PMS. Instead, PMS usage needs to be considered and reviewed. The findings show that currently the PMS are mainly used diagnostically (see Chapter 4.3). However, the findings also indicate that interactive PMS usage generates group and organisational learning. Thus, the management is advised to use PMS frequently in an interactive way and also to foster interactive PMS usage within their departments.

Communication and dialogue:

Communication and dialogue are critical for impeding or fostering learning, as is management. Therefore, managers need to be informed about their ability to impede or foster learning. Management needs to understand that a lack of communication due to time constraints hinders employee learning, and thus negatively affects knowledge within the company.

Furthermore, the findings show that the communication and knowledge distribution channels are dominated by hierarchical structures and guidelines. Notably, the flow of knowledge from management to employees is in need of attention and improvement. The employees executing the decisions made by the management, often highlight the lack of explanation and reasoning behind decisions taken by management. Thus, learning is primarily generated at the management level and less on the level of the employees (see Chapter 4.4). The company is advised to review its hierarchical structure in terms of a more flexible chain of communication to make learning more accessible at an employee level. Additionally, the strict separation of departments divides the airport processes into

fragmented parts, and leaves the intersections of processes with inherent flaws. This strict division of management territories hinders the exchange of knowledge, even though an exchange of process specific knowledge and inter-divisional learning would help to make the airport more efficient (see Chapter 4.4).

As evaluated in the discussion and findings chapter, employees are sometimes scared of management may choose to hide actions which may have caused performance drops. The fear of being accused of an error hinders the development of an open-learning environment and learning within the organisation (see Chapter 4.3).

In conclusion, the learning processes at Frankfurt airport are largely influenced by feedback. Thus, the lack of feedback and communication including the scant reasoning for decisions, hinders learning within the organisation. It is advised that managers also reflect on good performance instead of focusing solely on negative performance. Managers may be trained to avoid enabling a blame culture, and instead focus on the creation of an open learning environment. This finding offers potential for the airport to enhance its learning processes by improving its feedback and communication culture. Notably, a shift to viewing the company from a process perspective instead of a departmental viewpoint could make a tremendous difference to learning, knowledge, and communication-flow between the different departments. This, however, requires a substantive change in management approach, which needs to be exemplified by the board of directors, followed by top and senior management to encourage departments to work closely together and to view these processes holistically.

Usage of technology:

Inevitably, the redundancies at the airport increased the workloads of the employees. Most managers claimed that they did not have sufficient time to pass on their learning to the employees (see Chapter 4.3). The organisation must seek ways to enable management to take the time to talk with their employees and thus enable learning. Managers would also benefit from their learning, as employees pass on their learning to management. One solution would be to make more use of software already present within the company, and to assist employees and managers with software automatization. It is recommended that basic

daily work be to enable a better focus on performance monitoring, daily steering and learning.

Application of the OL-PMS framework:

It is recommended to apply the framework (see Chapter 5.4 and Figure 32) at the airport at all organisational levels to aid individual, group and organisational learning. The framework may be implemented across management, employees, and jointly across management and employees. The group structure is dependent on the areas of expertise, and is suggested that these be aligned with the organisational processes instead of the organisational departments to overcome the issue of management territories as discussed above in "Communication and dialogue". This approach would seek to include all hierarchical levels of the company into the individual, group and organisational learning cycle.

The following implementation steps would assist with the application of the OL-PMS framework:

1. Identify the learning groups using a process perspective: Management, as well as management and employees.
   Ensure learning groups are developed across all levels and divisions across the organisation. The groups should be aligned with the processes they seek to measure. It is important that these learning groups develop a deep understanding of the process they monitor, and that they develop a sense of unity in terms of responsibility towards the performance in this particular process area. An initial kick-off event could be established with each group to critically evaluate the following questions:
   - Who are we as a group?
   - What is our purpose and what are we trying to do?
   - Where do we want to go?

   Following this, the management and management-employee groups from the same process area should be brought together for a "kick-off part 2" meeting. Some management team members overlap in their groups, as managers are also part of the management-employee groups. Each group should present their answers to the questions above and then jointly discuss their views. It is preferable if the answers to

the questions of the groups differ, to allow each group to provide a different focus on same process.

It is important to make clear that the focus is on learning and not on blame, and that openness and knowledge gaps are accepted and welcomed.

Within the joint meeting, the following questions should be considered:

- Mission: What are we trying to achieve?
- Vision: What does it look like if we have achieved it?
- Strategy: What is our plan to achieve it?
- Goals: How do we measure progress?

While the mission and vision are the same for all group members, strategy and goals would differ for each group and thus would be created in individual breakout groups. Specific measurable values should be defined and named, such as decreasing time spend by x%, saving costs by x%. increase the KPI of baggage connectivity by x%, saving costs by being punctual and thus adhering to the client's contract by x%. The breakout groups should present their strategies and goals to the main group and discuss it with all members to make their approach transparent and communicate it with all employees involved in the process. This would enables the process performance to be enhanced considerably, as all aspects of the process are considered and discussed within the main group and the small breakout groups too.

2. Identify the measured performance and the monitoring interval .
   Here, the focus is placed back on organisational performance, with each management and management-employee group needing to be aware of their performance and KPIs they monitor and measure. It is important to understand the process area of performance and to be aware of the interdependencies of this process area, such as dependency on external parties (airlines, DFS, supplier, etc.). It is suggested that a meeting be set up within each group to discuss the area of process measurement, and to develop a deeper understanding of the process itself. The following questions should be considered to develop an awareness of performance issues:
   - Which performance do we measure and monitor?
   - What are the dependencies of the performance, and which factors (internal and external) can influence performance?
   - Which is the interval best suited to monitoring performance?

3. Establish regular team meetings to jointly discuss and interpret the performance measures to exchange views, expertise, and knowledge. These meetings may be a 60-minute exchange and do not require physical presence, so team members may also participate using the video chat tool, Microsoft Teams. This enables a greater degree of flexibility and convenience to team members so that they regard the meetings as opportunities to learn. It is important to compare the data measures to previous values to evaluate and trace performance. It should also be made clear that in such meetings, blaming is not tolerated, and that guidelines need to be collectively established to avoid a blame culture. These meetings would promote openness, honesty, and the acceptance of knowledge gaps. Further, the meetings would also aid as 'lessons learned' events, with all members in the group learning from the experiences of their team members, negative as well as positive. It is also very important to create an atmosphere in which the free exchange of ideas and experiences is possible without fear of blame or consequences. Actions and their effect on process performance need to be evaluated continuously by considering the following questions:
    a. How is current performance and how is it developing in comparison to yesterday, last week and last month?
    b. Why is performance developing in a certain direction? And what is the issue (positive or negative) behind the performance change?
    c. How do you address the issue (positive or negative) and what do you require to address it?
    d. What can Frankfurt airport learn from it?

Positive feedback is as important as negative, so members of the organisation can also learn about the factors and actions which lead to improved performance. Team members should be encouraged to take notes to document new learning and knowledge from failures or mistakes, as well as successes. Thus, a form could be developed in which the group could note the performance issue (positive or negative), actions taken which led to this issue and actions to address it. Additionally, the form could include a section in which each member can note their personal learning from the meeting.

Implementing a non-monetary reward system could also be considered, not for the best performance action, as this may lead to the development of a blame culture, but for the most valuable learning outcome. This system could reward the member who contributes most to learning. The non-monetary reward system could for example be a challenge

cup. Another approach would be to monitor the process performance, including targets for certain percentages to the team, and awards to the entire team if the target has been reached with, for example, a joint dinner or afternoon tea and cake.

4. In case of tactical performance issues, identify the group of employees the issue is reported to. Usually, it should be the management group of the relevant process area (see point 1). However, the group may also differ, for example if the issue needs to be addressed to the board of directors, customers, or other process groups. Nevertheless, it should be ensured that the discussions and outcomes are transparent to the initial group in which the original performance discussion took place. It should also be ensured that the rationale for a decision is made transparent across all the organisational members involved. Therefore, the outcome should either be discussed in a joint group meeting (see point 1) or within the actual group meeting (see point 3).
5. The initial phase will take time, as organisational members will learn which performance issues can be solved quickly, and which issues require reconciliation, knowledge exchange and learning. It is recommended that a one-year period for implementation, and at least another six months for stabilisation are needed until a learning culture has been established. After the implementation period, improvements with regard to knowledge and performance results should be clearly visible.
6. It needs to be ensured that performance review meetings are set up on a regular basis. It is further advised that the groups identified in point 1 meet on a yearly basis to review their mission, vision, strategy, and goals. Additionally, each group should regularly review the questions described in point 2 and reflect on them.
7. After the one-year implementation phase, the benefits of this research should show visible effects in the organisational performance, its KPIs and within the external benchmarks. After the additional six-month stabilisation period, a clear shift in the organisational and learning culture should be visible in addition to enhanced organisational performance.

5.6 Practical application

The decision to implement the recommendations provided in this thesis rests with the board of directors of Frankfurt airport. A copy of this thesis will be submitted to the board of directors of

Frankfurt airport with a board template and an executive summary of the recommendations and suggested actions. The significance of this research has already been made evident as two departments, as well as the board of directors have asked the researcher to apply the results of the study and the associated framework .

Implementing the recommendations at Frankfurt airport requires commitment from the management, as well as the willingness to change existing habits and processes. A clear announcement is needed from the board of directors to support the project, such that managers are willing to adapt and communicate changes to their teams. The researcher has already provided the abstract of this thesis to the board of directors, and the board members has requested a meeting to discuss the recommendations. The board of directors also pre-announced the establishment of a company-wide project to implement the recommendations of this research.

5.7 Limitations of the Research

As research is generally limited by its nature, it is important to reflect on those research areas which could have been enhanced. The limitations refer to the contributions identified previously in Chapter 5.1 and in Chapter 5.2.

A key criticism regarding the use of case studies in social science research is scientific generalisation. However, the need and the aim of this research was to develop a robust theory and to develop a deep understanding of the research subject (Gustafsson 2017). Therefore, as noted in the methodology chapter, this case study seeks analytical generalisation and the achievement a holistic understanding rather than aiming for scientific generalisation (see Chapter 3.2). However, achieving scientific generalisation is suggested as a course of worthy future research (see Chapter 5.6).

The sample size of the research was aligned with the knowledgeable experts and their hierarchical position within the key departments, however, it was relatively small. Nevertheless, the research was conducted until a saturation of unanimous answers and stories was reached. As Fowler (1993 p.19) stated: "*How well a sample represents a population depends on the sample frame, the sample size, and the specific design of the selection procedures.*"

The language barrier was a challenge within the sampling process. Some participants were discouraged, as the interviews were not conducted in their native language of German, but in

English. Even though the researcher tried to assure them that the language barrier would not hinder them in telling their stories or answering the questions (as they could switch to talking in German if required), some participants remained unconvinced.

A major limitation was inevitably caused by the COVID-19 pandemic, which particularly affected the researcher´s time in the following ways: Firstly, managers were very limited in their availability, as they needed to focus on the airport under the influence of the pandemic. Secondly, the interviews had to be conducted via a video chat tool, and could not have been conducted personally. Third, due to reduced hour contracts as a result of the economic collapse of the airport industry caused by the pandemic , the interview process was prolonged as most employees worked less.

5.6 Future Research and Concluding Remarks

The research presented here has achieved its aim of developing a comprehensive perspective of both the breadth and depth of the relationships between OL and PMS, theoretically and practically within the context of Frankfurt airport. Important research findings have been identified, which are significant both for OL and PMS theory, as well as for airport practice. However, with regard to the contributions made by this research, several topics have emerged which are worthy of pursuit:

- Applying and testing the framework at other large airports worldwide.
- Applying and testing the framework in small airports to determine if they achieve group and organisational learning at different intervals.
- Applying and testing the framework in airports with a flat hierarchical structure to see if communication and feedback (and thus group and organisational learning) are encouraged, and if they occur at different intervals.
- Focus on the OLMs to determine how airports might support their PMS and OL processes.

The OL and PMS research field is in need of further research, and the complex airport environment requires and provides extensive scope for conducting critical primary and secondary research. The findings of this study are likely to be of particular interest to the airport industry and professionals working within the industry. Reflecting on the research project, the findings carefully reflect the practical needs of the case airport. The majority of study participants showed great interest in adapting the final model to aid their PMS and learning processes. The vast amount of positive feedback provided to the researcher by research participants, managers and even the board of

directors of the case airport by requesting the application of the final framework at the organisation, illustrates the importance of this research for Frankfurt airport. Thus, it is anticipated that the model may well be worthy of application in other airport contexts.

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APPENDIX I: Semi-structured interview guide

Introduction

Thank you for agreeing to participate in this interview, which is being conducted as part of the primary data collection stage of my doctoral research project at Robert Gordon University in Scotland. This project is under the supervision of Professor Simon Burnett (s.burnett@rgu.ac.uk).

The aim of the research project is to investigate how performance measurement systems can promote organisational learning. The case study focusses on Frankfurt airport, with the aim to identify organisational learning processes within performance measurement systems.

The interview will take approximately 30 minutes to complete. Please note that all responses will be treated confidentially and that your identity will not be disclosed. You also have the right to withdraw from participation at any point. All primary data will be stored securely and disposed of in line with academic data management guidance.

I am looking forward to hearing your opinion and learning about your experience from practice!

In general, the interview is structured in five parts:

I. Introduction
II. Explanation Part1
III. Question Part 1
IV. Explanation Part 2
V. Question Part 2

Thank you very much for your participation!

II. Explanation Part 1

All questions asked in part 1 relate to **performance measurement systems** and **your experience** with it (please refer to the performance measurement within your department).

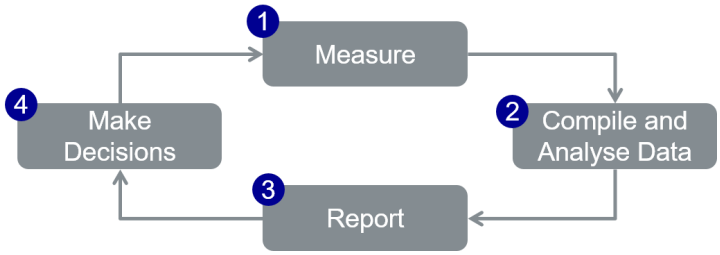
Generally, **performance measurement** can be defined as:

"*A set of metrics used to quantify both the efficiency and effectiveness of actions*."

(Neely et al. 1995)

Performance measurement systems are designed and used to ensure that an organisation is moving into the right direction (DeVilbiss, 2006) by monitoring and controlling actions relevant for an organisation's success.

The usage of performance measurement can be described as **cycle**:



Performance measurement cycle (Akmström et al., 2017)

Further, the **usage of performance measurement systems** can be divided into **interactive and diagnostic**. Interactive usage involves continuous dialogue and debate (Henri 2006) whereas diagnostic use embodies monitoring and correcting deviations (Henri 2006; Parsons 2007; Tung et al. 2011).

III. Question Part 1

In this interview part I want to identify how you use performance measurement systems within your daily business.

1. *How do you measure performance within your department?*
2. *Which performance measurement systems do you use?*
3. *Do the cycle steps in explanation part 1 match with your experience of the process of performance measurement?*

Now I would like to know about the people (actors) who are involved in performance measurement.

4. *Who is involved in performance measurement?*
5. *Which role do the involved actors have?*
6. *What is your role in performance measurement?*
7. *Can you assign the actors and their role according to the cycle steps in explanation part 1?*

Now let´s talk about the usage of performance measurement systems.

8. *Do you use performance measurement systems diagnostically and interactively?*
9. *Do you discuss performance measurement results within your department?*
10. *How is information and knowledge distributed while doing performance measurement?*

IV. Explanation Part 2

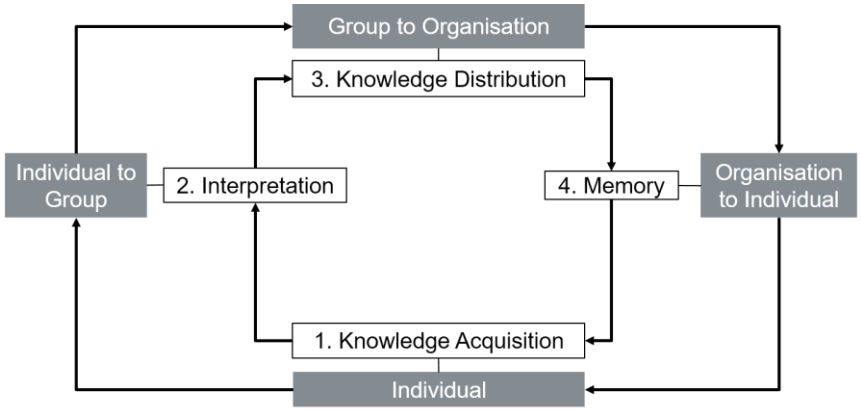
All questions asked in part 2 relate to **your personal experience with organisational learning and how it relates to the use of performance measurement systems**.

An organisation obtains knowledge through gaining experience. This continuous process can be called organisational learning. Therefore, **organisational learning** can be defined as:

"*The process of improving actions through better knowledge and understanding.*"

(Fiol and Lyles, 1985:803)

Organisational learning can be understood as **learning cycle**, starting on the individual level, flowing into the group and into the organisation:



Organizational learning cycle (Huber 1991; Crossan et al. 1999)

In addition to the individual level in the learning cycle, literature identified **two learning processes: single-loop and double-loop learning**. Single-loop learning is characterized as changing the behaviour of an individual (Kin, 1993) as the individual detects and corrects his/her own errors. Double-loop learning on the other hand questions norms and behaviours and transfers individual mental models into collective mental models.

V. Question Part 2

In this section I would like to know your opinion and perception of the practice of organisational learning and its relation to performance measurement systems.

Firstly, please have a look at the organisational learning cycle in explanation part 2 (above).

1. *From your experience, do these cycle stages occur while measuring performance?*

Now I would like you to compare the organisational learning cycle and the performance measurement cycle form explanation part 1 and 2.

1. *From your experience, is there a relationship (or relationships) between these cycle? If yes, how do they relate?*

In question part 1 you identified actors within the performance measurement cycle

2. *Which role do the identified actors have in the organisational learning cycle?*
3. *How do the identified actors contribute to organisational learning?*
4. *How do the actors distribute information and knowledge relating to?*
5. *How do the actors learn from the performance measurement process?*

Please refer to the learning processes from explanation part 2.

6. From your experience, which learning processes occur while measuring performance?

Now please have a look at the usage of performance measurement systems from explanation part 1 and at the learning processes from explanation part 2.

7. Can you relate the different usage of performance measurement systems with the learning processes?

Please consider the learning processes described in explanation part 2.

1. *Can you assign the occurring learning processes to the stages within the organisational learning cycle?*

Lastly, please consider the statements provided below, and state whether you agree or disagree. For each statement, please indicate why you agree or disagree.

2. *Do you agree or disagree with the statements provided below? Why?*

Statements
Single-loop learning does not lead to organisational learning
Organisational learning leads to single-loop learning
Double-loop learning triggers the organisational learning cycle and thus leads to organisational learning
Double-loop learning occurs only at the individual level

Thank you very much for your help!

I really appreciate your support!

Could you recommend another valuable expert I could interview?

For further suggestions or questions please do not hesitate to contact me.

Please note, in line with the ethical procedures taken in this research, all response will remain confidential and your identity will not be disclosed. If you have any questions or issues regarding this research, you can contact me (j.gisy1@rgu.ac.uk or j.gisy@fraport.de) or my academic supervisor Professor Simon Burnett (s.burnett@rgu.ac.uk).

Kind regards,

Jenny Gisy

APPENDIX II: Semi-structured narrative interview guide

INTERVIEW SCHEDULE

I. Introduction

Thank you for agreeing to participate in this interview, which is being conducted as part of the primary data collection stage of my doctoral research project at Robert Gordon University in Scotland. This project is under the supervision of Professor Simon Burnett (s.burnett@rgu.ac.uk).

The aim of the research project is to investigate on how performance measurement systems can promote organisational learning. The case study focusses on Frankfurt airport, with the aim to identify organisational learning processes within performance measurement systems.

The interview will take approximately 30 minutes to complete. Please note that all responses will be treated confidentially and that your identity will not be disclosed. You also have the right to withdraw from participation at any point. All primary data will be stored securely, and disposed of in line with academic data management guidance.

I am looking forward to hearing your opinion and learning about your experience from practice!

The interview is structured as follows:

I. Introduction
II. Explanation Part 1
III. Explanation Part 2
IV. Question Part

Thank you very much for your participation!

II. Explanation Part 1: Performance Measurement

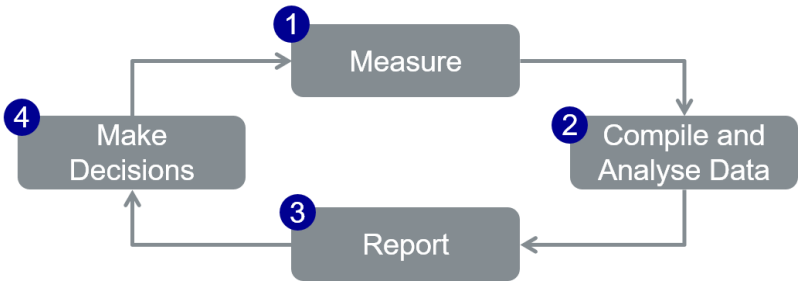
Generally, **performance measurement** can be defined as:

"*A set of metrics used to quantify both the efficiency and effectiveness of actions*."

(Neely et al. 1995)

Performance measurement systems are designed and used to ensure that an organisation is moving into the right direction (DeVilbiss, 2006) by monitoring and controlling actions relevant for an organisation's success.

The usage of performance measurement can be described as **cycle**:



Performance measurement cycle (Akmström et al., 2017)

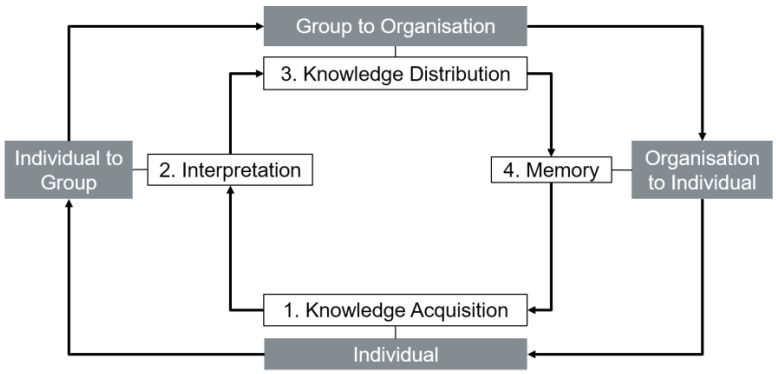
III. Explanation Part 2: Organisational Learning

An organisation obtains knowledge through gaining experience. This continuous process can be called organisational learning. Therefore, **organisational learning** can be defined as:

"*The process of improving actions through better knowledge and understanding.*"

(Fiol and Lyles, 1985:803)

Organisational learning can be understood as **learning cycle**, starting on the individual level, flowing into the group and into the organisation:



Organizational learning cycle (Huber 1991; Crossan et al. 1999)

In addition to the individual level in the learning cycle, literature identified **two learning processes: single-loop and double-loop learning**. Single-loop learning is characterized as changing the behaviour of an individual (Kin, 1993) as the individual detects and corrects his/her own errors. Double-loop learning on the other hand questions norms and behaviours and transfers individual mental models into collective mental models.

IV. Questions

Please try to recall a story or situation involving performance measurement in your department and how learning emerged out of it.

Do you have a story in mind?

Please tell the story about performance measurement and how learning emerged out of it.

Thank you very much for your help!

I really appreciate your support!

Could you recommend another valuable expert I could interview?

For further suggestions or questions please do not hesitate to contact me.

Please note, in line with the ethical procedures taken in this research, all response will remain confidential and your identity will not be disclosed. If you have any questions or issues regarding this research, you can contact me (j.gisy1@rgu.ac.uk or j.gisy@fraport.de) or my academic supervisor Professor Simon Burnett (s.burnett@rgu.ac.uk).

Kind regards,

Jenny Gisy

APPENDIX III: Data protection form

Einwilligung

Im Rahmen der Doktorarbeit „DEVELOPING AN UNDERSTANDING OF THE RELATIONSHIPS BETWEEN ORGANISATIONAL LEARNING AND PERFORMANCE MEASUREMENT SYSTEMS: THE CASE OF FRANKFURT AIRPORT" untersucht Frau Gisy anhand qualitativer Interviews innerhalb der Fraport AG, wie Performancemessungen zur Förderung von Lernen im Unternehmen beitragen können.

Zum Zwecke vorgenannten Zweck werden folgende Daten durch Frau Jenny Gisy, Goethestraße 17, 76698 Ubstadt-Weiher, verarbeitet:

- *Tonaufnahmen der geführten Interviews*

Es findet keine Verarbeitung der Daten zur automatisierten Entscheidungsfindung und/oder Profiling statt.

Der Teilnehmende hat das Recht auf Auskunft über die zu seiner Person im Rahmen des oder im Zusammenhang mit den gespeicherten Daten sowie auf Berichtigung, Löschung, Einschränkung der Verarbeitung dieser Daten. Der Teilnehmende hat ferner das Recht, Beschwerde bei der zuständigen Person einzulegen, wenn er/sie der Ansicht sind, dass die Verarbeitung der ihn/sie betreffenden personenbezogenen Daten gegen datenschutzrechtliche Regelungen verstößt.

Einwilligungserklärung:

Mir ist bewusst, dass die Bereitstellung meiner oben aufgeführten personenbezogenen Daten zum Zwecke der Interviews zur Doktorarbeit von Frau Jenny Gisy gesetzlich oder vertraglich nicht vorgeschrieben und für mich freiwillig ist. Die Nichtbereitstellung hat zwar zur Folge, dass die Dissertation nicht angefertigt werden kann. Meine Teilnahme am Interview ist weder verpflichtend noch zwingend.

Nach erteilter Einwilligung erfolgt die Verarbeitung meiner Daten auf Grundlage von Art. 6 Abs. 1 Satz 1 lit. (f) DS-GVO. Die Ergebnisse werden für die Dissertation genutzt und anschließend gelöscht.

Mir ist bekannt, dass ich meine Einwilligung jederzeit und ohne Angaben von Gründen bei Frau Jenny Gisy, Goethestraße 17, 76698 Ubstadt-Weiher, mit Wirkung für die Zukunft widerrufen kann, ohne dass die Rechtmäßigkeit der aufgrund der Einwilligung bis zum Eingang des Widerrufs erfolgten Datenverarbeitung berührt wird.

Ort, Datum, Unterschrift