The Impact of Business Process Management Values on Enterprise Content Management Workflow Systems Performance

by

Hisham AbouGrad (MBA, MSc)

ORCID ID: orcid.org/0000-0003-0445-1928

Thesis

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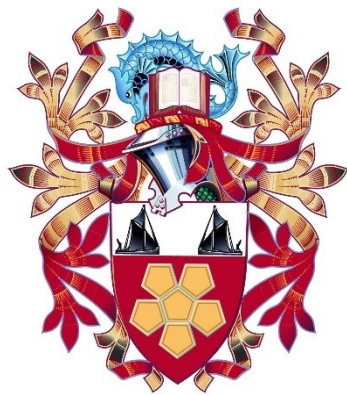## Doctorate of Business Administration (DBA)

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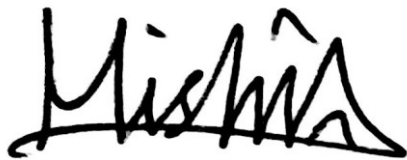
LSBU

Declaration

I, Hisham AbouGrad, would like to declare that the research study contents of this thesis entitled "Workflow Information Systems CERT Values: The Impact on Enterprise Content Management Performance" is original and represents my own and individual research study work, under the supervision of Professor Amare Desta and Professor Jon Warwick. In addition, I would like to confirm that the necessary citations and references have been made in order to address the research of other researchers and academic or non-academic studies. Hence, I would acknowledge each noted contribution in this thesis from the research work of other people. Also, I would like to confirm that not any part of this thesis has been submitted before to meet the requirements for an award at London South Bank University or another higher education institution.

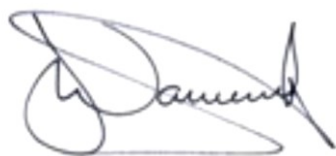|	
Hisham AbouGrad	**Monday, 22nd of June 2020**
DBA Researcher	Date
Amare Desta	**Monday, 22nd of June 2020**
1st Supervisor	Date
Jon Warwick	**Monday, 22nd of June 2020**
2nd Supervisor	Date

Abstract

Improving an enterprise's operations, services, policies and rules using information systems and business process management is a continuance decision-makers role. This research explores how business process management values impact on enterprise content management (ECM) workflow system performance and how business process management values can be incorporated as part of a measurement model for improving ECM workflow system performance to achieve business objectives and organisational goals.

The research focuses on establishing a set of variables for the measurement of CERT business process management values and further explores the impact of these CERT values on ECM workflow system performance. The CERT values are customer orientation (C), excellence (E), responsibility (R) and teamwork (T). These values can be applied using the three round structure of the Delphi method to validate key performance indicators, which are used to implement a performance measurement and management framework in order to measure workflow information system performance. Through this process, the current ECM workflow system performance (i.e. "Now" situation) and the desired future system performance (i.e. "Preferred" situation) can be described using a performance profile development model based on the concepts and variables of CERT values.

This thesis contributes to business practice studies, information systems literature and the informatics body of knowledge in several ways: First, it explains how CERT values can support decision-making by finding their impact on ECM workflow systems performance. Second, it formulates a performance profile development model, which is a decision-making process to measure ECM workflow systems performance. Third, it shows how to implement the research strategic procedures using Delphi's rounds. Fourth, it demonstrates the quality of mixed methods as the research choice for this type of information systems enquiry.

The research promotes the use of the Delphi method for the implementation of such decision-making processes, the application of the performance profile development model for scientific decision studies and the analysis of the relationships between variables to recognise other key performance indicators within business process management and the performance measurement and management research contexts.

Keywords

Dedication

This Thesis is Dedicated to

My Parents

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The research to complete this thesis has been supported by many wonderful, knowledgeable and inspiring people. I am pleased, proud and fortunate to have the opportunity to thank them for their motivation, support, guidance, helpful recommendations and friendship during my research journey and the thesis writing up. My special thanks go to the following people:

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Research Development

Through the research development in general and during the data collection phase in particular, I have experienced a lot of both positives and negatives. I am grateful to know and communicate with so many people from OpenText Corporation and other companies who are specialists in ECM systems and workflow solutions. They have shown professionalism and kindness, and I learned from them the importance of the research area of study. This has been supported by the staff of a UK Higher Education Establishment who collaborated with me in the research data collection. Therefore, a very big thank you further goes to those staff who participated in the research data collection phase.

However, it is my desire to extend my special gratitude to those LSBU staff who displayed interest to help me in order to complete the research. Also, it was my pleasure to collaborate with LSBU research administration and management staff who work tirelessly to support the postgraduate research students throughout all the research phases. I would like to mention explicitly John Harper and Louise Thompson, thank you for the help and support, you have done a very good job to keep postgraduate research students' positively progressing in their studies.

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Research Activities and Outputs

Publications

AbouGrad, H., Warwick, J. and Desta, A. (2019) Developing the Business Process Management Performance of an Information System Using the Delphi Study Technique, in: Reyes-Munoz, A., Zheng, P., Crawford, D., and Callaghan, V. (eds.) EAI International Conference on Technology, Innovation, Entrepreneurship and Education, Lecture Notes in Electrical Engineering (LNEE) book series, Volume 532. Cham: Springer International Publishing, pp. 195–210. DOI: 10.1007/978-3-030-02242-6_15.

Workshops and Presentations

Decision Making Framework: Improving Business Process Management Performance, PhD Workshops, 3rd May 2019, Greenwich School of Management, University of Plymouth.

Developing Workflow Information Systems Performance Using Delphi Method, Christmas Lecture Day, 12th December 2018, Greenwich School of Management, University of Plymouth.

Applying the Delphi Study Technique to Improve Workflow Information Systems Performance, GKEN Symposium, 8th December 2018, LSBU.

Developing Workflow Information System Using the Delphi Study Technique, LSBU Staff Conference 2018, 13th May 2018, LSBU.

Hisham AbouGrad, Jon Warwick and Amare Desta, Developing the Business Process Management Performance of an Information System Using the Delphi Study Technique, Proceedings of the TIE 17 Conference, 11th – 12th September 2017, Canterbury Christ Church University.

Posters

Performance Measurement and Management Using Business Process Management Values, LSBU Postgraduate Research Summer School 2018, 16th – 19th July 2018, LSBU.

Applying the Delphi Study Technique to Weigh Enterprise Content Management Systems, LSBU Postgraduate Research Summer School 2017, 3rd – 7th July 2017, LSBU.

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List of Abbreviations and Acronyms

A

ARPANet	Advanced Research Projects Agency Network
AHP	Analytic Hierarchy Process
Apps	Applications
AIIM	Association for Information and Image Management

B

BCS	British Computer Society
BOS	Bristol Online Survey
BPM	Business Process Management
BPMC	Business Process Management Construct
BPMM	Business Process Maturity Model

C

CQV	Coefficient of Quartile Variation
CVF	Competing Values Framework
CMS	Content Management Systems
CC	Continuance Commitment
CFC	Consideration of future consequences
CI	Consistency Index
CFP	Corporate Financial Performance
CSF	Critical Success Factors
C	Customer orientation
CERT	Customer orientation, Excellence, Responsibilities and Teamwork
CRQ	Customer orientation Research Questions
CRM	Customer Relationship Management

D

DBMS	Database Management Systems
DMS	Document Management Systems

E

EDMS	Electronic Document Management Systems
EI	Emotional Intelligence
EAS	Enterprise Approval System
ECM	Enterprise Content Management
ECMS	Enterprise Content Management Systems
ERP	Enterprise Resource Planning
E	Excellence
ER	Excellence and Responsibility
ET	Excellence and Teamwork
EC	Excellence and Customer orientation

EDA	Exploratory Data Analysis
EFA	Exploratory Factor Analysis
F		
FIL	Future Improvement Level
G		
GT	Grounded Theory
H		
HD	High Definition
HEI	Higher Education Institution
H	Hypothesis
I		
IM	Information Management
IS	Information Systems
IT	Information Technology
IQR	Inter-Quartile Range
IDF	Inverse Document Frequency
IRS	Interview Responses Score
K		
KMO	Kaiser Meyer-Olkin
KPIs	Key Performance Indicators
L		
LAN	Local Area Network
LSBU	London South Bank University
M		
MIS	Management Information Systems
MIT	Massachusetts Institute of Technology
MCDM	Multi-Criteria Decision Making
N		
NC	Normative commitment
O		
OS	Operating System
OCAI	Organisational Culture Assessment Instrument
P		
POS	Perceived Organisational Support
PM	Performance Measurement
PMM	Performance Measurement and Management
PPDM	Performance Profile Development Model
PC	Personal Computer
Q		
QWL	Quality of work life
QRS	Questionnaire Responses Score

R

RM	Records Management
RAS	Research Approval System
RO	Research Objective
R	Responsibility
RC	Responsibility and Customer orientation
RT	Responsibility and Teamwork
RRQ	Responsibility Research Questions

S

SMART	Salton's Magic Automatic Retriever of Text
SABRE	Semi-Automatic Business Research Environment
SAGE	Semi-Automatic Ground Environment
SLA	Service Levels Agreement
SaaS	Software-as-a-Service
SPSS	Statistical Package for the Social Sciences
SRI	Stanford Research Institute

T

T	Teamwork
TC	Teamwork and Customer orientation
TRQ	Teamwork research questions
TF	Term Frequency
TOPSIS	The Order Preference by Similarity to Ideal Solution
TTC	Time-To-Completion
TQM	Total Quality Management
TLI	Transformational Leadership-behaviour Inventory

U

URL	Uniform Resource Locator
UI	User Interface

V

VIF	Variance Inflation Factor

W

WS	Weighing Score
WCM	Web Content Management
WAN	Wide Area Network
WBS	Work Breakdown Structure
WfMC	Workflow Management Coalition
WMS	Workflow Management System
WIS	Workflow Information Systems
WWW	World Wide Web

Chapter 1: Introduction

Overview

The research areas of study and the research structure are introduced in this chapter. This sets the scene for this research-based project in regard to workflow information systems and explains why this research studies the impact of business process management values on enterprise content management workflow systems performance. The research key elements are also explained to further provide complete illustrations of the main research components. The overarching research purpose, including the primary issues, is presented to clarify what the research seeks to achieve. Also, the research question and hypotheses are explored to formulate the areas of study from which the research findings and contributions emerge. This is supported by the research aim, objectives and approaches. Henceforth, the importance of the research has been described to give weight to the research findings and contributions. Finally, the thesis structure and chapters are described to provide a complete understanding of the research.

1.1 Introduction

Enterprises are managing huge amount of digital content, including their projects content, marketing catalogues and sales activities. This is achieved using information systems (IS) based on business process management (BPM) frameworks and information technology (IT) infrastructure (vom Brocke and Simons, 2014). This has led to dramatic growth in IS, BPM and IT implementations as enterprises use these technologies to realise business benefits and achieve organisational goals.

Enterprise content management (ECM) is a systemic integration approach to information management for processing huge digital content in order to achieve business technological and organisational objectives (vom Brocke *et al.*, 2011b; vom Brocke and Simons, 2014). Hence, ECM has been given a lot of attention in business practice and research studies due to the year on year growth in ECM usage. Also, ECM systems are information systems to process and manage digital content using enterprise and BPM strategies. Therefore, ECM systems are used to focus on handling the enterprise's structural and systemic technical situations. ECM has many aspects, which are required to achieve business objectives. According to vom Brocke and Simons (2014), ECM systems need optimal business process management to make sufficient use of an enterprise's organisational and technological resources by identifying ways to realise the business culture and technical implementation. The vom Brocke *et al.* (2011a) study confirmed that ECM can be applied to develop an organisation's internal and external collaboration, customer services and products, improve reliability and quality of content, add significant information, improve business memory, achieve cost savings, and get better compliance with external regulations and standards. Conversely, business process management is a business management strategic approach that focuses on business processes, as described by Schmiedel *et al.* (2013). BPM practice and research studies have identified the importance of recognising organisational culture to construct BPM values for an organisation.

Practically, enterprises depend on trusted business process frameworks, policies, and BPM approaches to develop their automated workflow information systems (WIS) where organisational and technological issues go hand in hand in the achievement of business objectives (Schmiedel *et al.*, 2015). According to Schmiedel *et al.* (2013), BPM has a vital role to play in helping to drive innovation in business processes and workflows to improve business performance. Also, BPM was introduced when investment in enterprise

information systems began to transfer the majority of non-IT processes to automated IT systems (Müller *et al.*, 2016). Thus, enterprises began to enhance the automated processes by focusing on both organisational and technological aspects using BPM's comprehensive decision-making and systematic concepts.

Indeed, BPM concepts consist of the organisational values, which are used to determine whether the ECM workflow system is the appropriate tool to achieve the organisation's activities (Müller *et al.*, 2016; Schmiedel *et al.*, 2014). Thus, BPM values (a BPM construct) such as the CERT construct (i.e. Customer orientation, Excellence, Responsibility, Teamwork) can be used to measure the ECM workflow system's performance in achieving business objectives. The Schmiedel *et al.* (2014, 2015) studies described BPM values as the organisational BPM culture that supports achieving BPM objectives to ensure business continuance. This study has used BPM values to understand how business workflows are efficient and effective. BPM values are usually formulated as a set of values based on the organisation's goals, workflows and management information systems (MIS).

The Schmiedel *et al.* (2013) study on managing the organisational culture to recognise the characteristics that support BPM objectives to achieve efficient and effective workflow processes has empirically found four important BPM values. These values are Customer orientation, Excellence, Responsibility and Teamwork (collectively known as CERT). Therefore, these four fundamental BPM values form the foundation for developing a model (a BPM construct) to measure the workflow systems performance. Subsequent improvements in workflow systems are important in achieving business objectives. CERT values are BPM constructed values that themselves contain variables to manage workflow system performance. CERT values have been described by Schmiedel *et al.* (2013, p. 294) as "what a group considers as desirable, i.e. ideals that influence behavioural and organizational patterns of a group". Thus, CERT values have an impact on ECM workflow system performance. Also, CERT values can be used to identify key variables that improve workflow systems performance (Schmiedel *et al.*, 2013; vom Brocke and Simons, 2014). Hence, this research seeks to validate CERT values through a set of identified variables for each value to measure ECM workflow system performance.

CERT values have the capability to evaluate the workflow systems of BPM in order to improve business process performance and achieve business objectives. Workflow systems can be used to understand content actions, which are fundamental conditions for the

effective customisation of ECM workflow solutions (vom Brocke *et al.*, 2011a). CERT values can act as a BPM structure to support finding the workflow impact on ECM workflow system performance. The Schmiedel *et al.* (2014) study described CERT values as a concept to measure the organisation's BPM to improve workflow system performance. Conversely, workflow information systems, as IS processes, can solve problems for BPM frameworks. WIS automates business processes by combining employee activities and IS applications (Guerrero-García *et al.*, 2008). WIS can implement business processes systematically by designing the IS process framework to automate these processes (Guerrero-García, 2014).

Practically, employees who are using ECM workflow systems to achieve their tasks have an impact on ECM workflow system performance. Similarly, ECM workflow systems also have an impact on employees' performance as a result of the relationships between ECM as a workflow information system and employees as the system users. Thus, this research is the first study that focuses on such interaction (research gap) and examines how workflow information systems impact on ECM workflow system performance using CERT business process management values (Guerrero-García, 2014; Guerrero-García *et al.*, 2008; Schmiedel *et al.*, 2013, 2014, 2015). The research aims, objectives, context, methodology and framework provide many contributions to business practice and knowledge in general. The research seeks to realise the workflow behavioural aspects, which shed light on its technical aspects and highlight the right path to improve ECM workflow system performance.

Consequently, the research seeks to achieve the following key objectives: First, examining the CERT values impact on ECM workflow system performance; Second, finding the relationships between ECM systems and employees using CERT values; Third, exploring how CERT values, as a BPM construct (BPM model), impact on ECM workflow system performance; Fourth, identifying the significant variables of each CERT value that impact on ECM workflow system performance; Fifth, validating the identified variables of each CERT value to be used as key performance indicators to improve workflow systems performance.

The research has an empirical framework to examine the impact of CERT values on ECM workflow system performance by focusing on ECM workflow systems' activities and the employees (users) who are using these systems (Saunders *et al.*, 2009, 2015; Schmiedel *et al.*, 2013, 2015). The research data collection, analysis, findings, discussions and conclusions have produced the research contributions, which enhance our understanding of CERT values and their impact on ECM workflow systems performance.

In conclusion, the research is identifying a practical and balanced approach that ensures CERT values can be applied for the institutionalisation of workflow systems' actions and structures, training and development programs, a guide in project team selection or hiring decisions, performance evaluations and reviews, or a management approach for managers to know how to recognise and reward employees for their performance.

1.2 Motivation Toward Business Objectives

Information Systems and business process management play an essential role to assist an organisation in meeting its business objectives. Organisations need to undertake business activities effectively, and process customer demands smoothly in the quickest possible way. Therefore, a research study is required to formulate a business practice model (i.e. CERT construct) that organisations can apply to evaluate their business processes and ECM workflow systems performance.

BPM values are one of the most important business components for evaluating workflow systems performance to achieve business objectives (Brocke *et al.*, 2016). Over many years, it has been reported that organisations are using BPM to identify key performance indicators (KPIs) in order to control business processes performance measurement and ensure business continuance. This highlights the important role played by BPM values. Indeed, this research has been motivated by the Researcher's professional experience and business practice in ECM workflow solutions, workflow systems and business processes management. Thus, the following outlines are five key motivating factors for this research:

1. The Researcher's work experience at a Xerox company for XGS as an Engineer and Business Systems Analyst from February 2010 to May 2011. During that time, the Researcher found the company clients were striving to find an approach to measure their workflow systems performance, especially ECM workflow systems performance. This work experience demonstrated various ECM workflow systems performance issues. These issues have driven the Researcher to recognise that organisations are looking for a BPM model to identify and measure their ECM workflow systems performance.

2. The Researcher has participated in and attended many ECM and information management events, as well as academic conferences (e.g. Association for Information and Image Management (AIIM), British Computer Society (BCS), Oracle Modern Business Experience – Oracle Technology Network (OTN), International Conference on Technology,

Innovation, Entrepreneurship and Education (TIE 2017), 7th Fujitsu Information Capture Conference (ICC), Big Data London Conference, OpenText Innovation Tour London). From these events, it has become clear that the optimisation of an organisation's BPM (workflows) and ECM workflow systems performance require further research studies.

3. The Researcher's study of the DBA programme's taught level 8 modules, which are 'Quantitative research approaches, techniques and methods in business', 'Qualitative research approaches, techniques and methods in business', 'Business Research: Strategy, Methods and Theory', and 'Contemporary Business Management and Strategy'. These postgraduate study components have built sufficient knowledge to formulate the research context. Thus, the research area of study has been recognised with the support of an initial literature review and research background study.

4. Pilot research study, literature review and doctorate components during the DBA programme have played an essential role in defining the research and its potential contributions to business practice and knowledge.

5. Research, professional and academic sources have proven the need for more business practice and research studies to improve business process management, workflow systems and ECM workflow solutions performance.

In recent years, improving the effectiveness of business process management and ECM workflow systems performance has become more important than ever before, as managers are seeking acceptable organisational performance and user satisfaction (Romero *et al.*, 2015; Trisnawati *et al.*, 2017). Hence, organisational performance is dominated by core business process factors, which are represented by different workflow activities. These activities are a set of business processes for the workflow system to meet business objectives and organisational goals. Also, organisational performance properties are affected by ECM workflow systems and the relations between BPM and information systems. Indeed, business process activities are a set of actions, which are used to implement decisions to achieve business objectives. Thus, researchers have used decision-making approaches, such as the Delphi method (commonly known as Delphi study technique), to identify BPM values to achieve business objectives (Schmiedel *et al.*, 2014; vom Brocke *et al.*, 2010). Consequently, the Delphi study technique has been implemented in this thesis to define and examine the organisational BPM values, which lead to optimal business process performance in order to achieve business objectives.

In summary, CERT values aim to measure business processes and workflow information systems performance in order to achieve BPM objectives (Schmiedel *et al.*, 2013, 2015). CERT values can be used to examine the organisation's business processes in order to determine how workflow information systems (e.g. ECM workflow solutions) can impact on organisational performance, which is necessary to achieve organisational goals.

1.3 The Research Purpose

The impact of business process management values on enterprise content management performance is a business practice challenge, especially for decision-makers (Schmiedel *et al.*, 2014, 2015). Hence, an essential concept has been proposed in the research context, which is the notion of CERT values. CERT values have several impacts on ECM workflow systems performance, as these BPM values are used to achieve business objectives. Based on the CERT values concept, this thesis seeks to measure the extent to which an organisation adopts an ECM workflow solution for its business processes and workflows to improve organisational performance to meet business objectives.

Further, the research seeks to examine the relationships between ECM workflow systems and employees (users) using CERT values (Schmiedel *et al.*, 2015; vom Brocke *et al.*, 2011b). Enterprise content management contains a number of sub-components including knowledge management, information resource management and management information systems. Together, these ECM systems form the organisation's strategies, operations, processes, tools and skillsets to manage all the organisation's information assets. Hence, ECM workflow systems can drive the organisation's internal and external collaboration, add BPM values, make new services and products, optimise enterprise content quality and reliability (vom Brocke *et al.*, 2011b). Most importantly, ECM workflow systems make business processes better in terms of efficiency, effectiveness and flexibility, as ECM has well-known workflow solutions for all current business information management matters.

The Schmiedel *et al.* (2015) study has revealed empirical results from both practitioners and academics who support achieving BPM objectives by examining critical factors. CERT values are BPM critical factors, which reflect actions and structures within the business process. These cultural values manifested in actions are observable objects (e.g. behaviours, service-performs) and in structures are patterns (e.g. physical environment, technology). Conversely, workflow information systems are used to solve BPM issues and automate business processes by combining employee activities and information systems

(Guerrero-García *et al*., 2008). Workflow information systems systematically implement business requirements and procedures by designing the information systems process based on workflow frameworks (Guerrero-García, 2014).

In conclusion, the purpose of the research is to utilise the BPM framework and CERT values to support decision-making for improving ECM workflow system performance, which can impact positively on workflow information systems to meet the organisation's business objectives. This has not been looked at within the research literature before.

1.4 The Research Questions

The research purpose has led to the formulation of the research questions, having undertaken a literature review, and through discussions with many academics and professionals (Creswell, 2013, Chapter 7; Saunders *et al*., 2009, Chapter 2). Consequently, the main research question was first introduced based on the concept of CERT business process management values (Schmiedel *et al*., 2013; vom Brocke *et al*., 2011b, 2014a; vom Brocke and Sonnenberg, 2015). Indeed, CERT values have many variables that considerably affect employees who are using ECM workflow systems (Schmiedel *et al*., 2014, 2015). Also, CERT values have an impact on ECM business performance at different organisational levels. Equally, ECM systems as workflow information systems have CERT values that impact on employees' performance. These findings from the research literature review have suggested the following research main question:

How do CERT values impact on ECM workflow systems performance?

The research main question made CERT values the core of the research structure. Also, the main question leads to five other sub- questions (research problems), which are used to formulate the research objectives (Creswell, 2013, Chapter 7; Saunders *et al*., 2009, Chapter 2). Indeed, the five sub-questions are derived from the main question that focuses on each CERT value to provide complete answers and research findings. Thus, the following five research sub-questions are addressed:

1. What is the current knowledge about the impact of CERT values on ECM workflow system performance to achieve business objectives?
2. How does each CERT value impact on ECM workflow system performance?
3. How do the relationships between ECM workflow systems and employees make an impact on ECM workflow system performance?

4. What are the significant variables for the measurement of each CERT value?

5. How can CERT values be applied to improve ECM workflow system performance?

1.5 The Research Aims and Objectives

The research aims to measure the impact of CERT values on ECM workflow systems performance and identify key performance indicators using variables of each CERT value, ECM workflow systems, and employees' responses to questions relating to ECM workflow systems performance. The research seeks to explore the interaction between ECM workflow systems and employees who are interacting with and managing the ECM workflow systems using CERT values to assess their performance in order to achieve business objectives. The research also seeks to formulate a WIS framework using CERT values to improve ECM workflow system performance and increase workflow efficiency and effectiveness. Hence, the research aims can be achieved using the following research objectives (ROs), which are formulated based on the five sub-questions (Section 1.4):

RO 1. Develop a literature review with a background in business process management, workflow information systems, CERT values and enterprise content management. Full details are available in Chapter 2: Literature Review and Practical Background.

RO 2. Identify the core variables of each CERT value, which have an impact on ECM workflow system performance. Full details are available in Chapter 2: Literature Review and Practical Background and Chapter 3: Research Methodology, Design and Methods.

RO 3. Methodologically find the relationships between ECM workflow systems and employees using CERT values to measure ECM workflow systems performance. Full details are available in Chapter 3: Research Methodology, Design and Methods and Chapter 4: Data Collection, Framework and Implementation.

RO 4. Analytically evaluate the impact of CERT values on ECM workflow systems to improve workflow systems performance in order to meet business objectives and organisational goals. Full details are available in Chapter 4: Data Collection, Framework and Implementation and Chapter 5: Data Analysis and Evidence Collection.

RO 5. Validate the key performance indicators using variables of each CERT value, which can be used to improve ECM workflow system performance. These variables can be used to ensure the required reliability and validity to meet business objectives. Full details are available in Chapter 5: Data Analysis and Evidence Collection and Chapter 6: Research Findings, Interpretations and Discussions.

The research study aims and objectives have been achieved by making research project phases where each phase has tasks, as Figure 1.1 illustrates.

Phase I: Literature Review and Background

- Business Process Management.
- Workflow Information Systems.
- Enterprise Content Management.
- CERT values.

Phase II: Identify key variables of CERT values

- Creativity, commitment, communication, and customer needs.
- Efficiency effectiveness, empowerment, and employee orientation.
- Responsiveness, result orientation, right quality, and right skills.
- Transparency, transformational leadership, transactional leadership, and team collaboration.

Phase III: Methodologically find the relationships between ECM and employees

- Grounded Theory.
- Qualitative and Quantitative research study.
- Delphi Method (Delphi study technique).

Phase IV: Analytically evaluate CERT values impact on ECM performance

- Quantitative Analysis.
- Testing and Validation.

Phase V: Validate CERT values key performance indicators (KPIs)

- CERT values reliability.
- CERT values validity.

Figure 1.1 The research objectives, project phases and tasks.

1.6 The Research Hypotheses

The research has a set of hypotheses, which are developed based on the research aims, objectives and literature review (Creswell, 2013, Chapter 7). These hypotheses confirm what the research is seeking to achieve at the research findings phase, including the research contributions to business practice, professionals and knowledge. The research context, principles and questions have provided the following hypotheses:

H1. CERT values are business process management values, which influence the organisation's structure, behaviour and patterns (Schmiedel *et al.*, 2013, 2014). Customer orientation is the proactive and responsive attitude toward the needs of process output recipients. Excellence is the continuation of business improvement and innovation to achieve the expected performance. Responsibility is the commitment to BPM objectives and accountability for decision-making. Teamwork is a positive attitude toward cross-functional collaboration. Thus, hypothesis one (H1) is:

CERT values have a significant impact on ECM workflow system performance

H2. Scientists argue that the analysis of an organisation's business process management provides a suitable basis to identify content and its users using different ECM systems in which content resides as the implementation of these systems affect workflow information systems structure (vom Brocke *et al.*, 2010; Zardini *et al.*, 2010). Also, employees are required to use new ECM techniques, applications and tools to achieve organisational goals. As a result, organisations should apply CERT values as a BPM instrument at the starting and implementation of an ECM workflow system. Thus, hypothesis two (H2) is:

Together BPM values and employees impact on ECM workflow system performance

H3. Organisational performance has a strong commitment to excellence, which is enabled by ECM workflow systems. Indeed, given the ever-expanding information assets, which are increasingly challenging industry; it is clear that an ECM workflow system has an effective and efficient role to play in order to support employees, as Gartner had estimated global enterprise content management revenues to increase at a rate to reach $5.7 billion by 2014 and they are continually growing (Olusola and Sunday, 2013; vom Brocke *et al.*, 2011a). Thus, hypothesis three (H3) is:

CERT values have a consequential impact on organisational performance

H4. Organisations strive to ensure that business activities are performed in the best way and focus on combinations of excellence related factors, such as time, quality, cost and scope (Chen *et al.*, 2011; Sundqvist *et al.*, 2014). This supports the evaluation of business processes from "lack of" to "high" efficiency. Efficiency is achieved when a process is: free from defects, has a low unit cost, short cycle time, no waste and low cost of poor quality. Indeed, cost and time are commonly used variables when implicitly measuring the effectiveness of a business process (Sundqvist *et al.*, 2014). However, employees' responsibility motivates them to collaborate with IT professionals, which in turn promotes communication, as well as motivating them to acquire technology. This makes the workforce accountable for specific elements of business success. Thus, hypothesis four (H4) is:

CERT values can increase efficiency by improving ECM workflow system performance

H5. The Schmiedel *et al.* (2013) codification of CERT values indicated many important categories that impact on workflows. Thus, the research framework (process) has followed categories of each CERT value and identified the impact variables from these categories (Figure 2.1). These variables are key performance indicators, which can measure the impact on ECM workflow system performance. The results from these variables can reveal the significant positive (advantage) factors and negative (disadvantage) factors that impact on ECM workflow system performance. Therefore, each category and its variables can be used to improve the performance of ECM workflow system. Thus, hypothesis five (H5) is:

Variables of each CERT value can be used to improve ECM workflow system performance

Additionally, the recognised hypotheses are used to achieve the research objectives, which have been formulated using the research sub-questions. Indeed, the hypotheses are connected to the research objectives and sub-questions, which are mapped to make sense of the research framework and approaches, as shown in Table 1.1. Therefore, these research fundamental components have been used to develop the research approach, design and methods. Also, the research has followed a mixed methods approach as a research strategy to measure ECM workflow systems performance (Section 3.4). As a result, the use of a mixed methods approach includes applying both, deductive and inductive approaches to achieve the research objectives. Thus, the research aims, objectives and hypotheses have been linked to the research methods (approaches) for mapping these fundamentals in order to provide responses to the research sub-questions (Table 3.2).

Research Objectives	Hypotheses	Research Sub-questions
RO1	H1, H5	**Q1.** What is the current knowledge about the impact of CERT values on ECM workflow system performance to achieve business objectives?
RO2	H2, H3	**Q2.** How does each CERT value impact on ECM workflow system performance
RO3	H2, H3	**Q3.** How do the relationships between ECM workflow systems and employees make an impact on ECM workflow system performance
RO4	H4, H5	**Q4.** What are the significant variables of each CERT value
RO5	H1, H5	**Q5.** How can CERT values be applied to improve ECM workflow system performance

Table 1.1 Mapping of the research objectives, hypotheses and sub-questions.

Moreover, the research literature review (chapter 2) has provided responses to the first sub-question through RO1, H1 and H5 (Table 1.1). This literature review and the research methodology, design and methods (chapter 3) have provided responses to the second sub-question through RO2, H2 and H3. Also, chapter 3 and the research data collection, framework and implementation (chapter 4) have provided responses to the third sub-question through RO3, H2 and H3. The thesis chapter 4 and the research data analysis and evidence collection in chapter 5 have provided responses to the fourth sub-question through RO4, H4, H5. Therein, chapter 5 and the research findings, interpretations and discussions in chapter 6 have provided responses to the fifth sub-question through RO5, H1 and H5. Finally, the hypotheses are investigated and tested to validate the impact of CERT values on ECM workflow systems performance to achieve business objectives (Section 6.4.2).

1.7 The Research Approach and Design

The research follows the mixed methods approach to achieve the research aims and objectives (Creswell, 2013; Saunders *et al.*, 2009). The research has collected both quantitative and qualitative data as a result of applying the mixed methods approach. Thus, the research has chosen multiple methods as a research design choice (Saunders *et al.*, 2009, Chapter 5). Also, a sequential research framework has been used in this research, as the data collection phases have been implemented to gather quantitative and qualitative data. Then the analysis procedures are implemented to produce the research findings in order to provide the research contributions.

The research methodology has implemented the Delphi method (also known as Delphi study technique) as a decision-making strategy for the research framework, and the coding process of Grounded Theory (GT) for the research strategy to reveal quantitative facts and develop the KPIs (Pangsri, 2015; Quyên, 2014; Saunders *et al.*, 2009, Chapter 13). These methodologies are applied to measure the impact of CERT values on ECM workflow system performance by focusing on the system BPM procedures and employees who are using ECM workflow systems. Through this, and with the support of performance measurement and management (PMM) framework, it is possible to develop a performance profile.

Further, the mixed methods approach has been used to gather empirical and business practice evidence from experienced participants at an organisation in order to find sufficient responses to the research questions and achieve the research objectives. Professionals and specialists have participated in the research questionnaires and semi-structured face-to-face interviews for the research data collection and implementation phase.

Furthermore, a literature review, business documents, and many academic and industrial resources have supported the collection of evidence to conduct the research. These are processed and analysed through the research framework. Thus, the analysis of the research evidence was an iterative process with an inductive approach used. The research findings have been presented, and insights have been provided to validate the impact of CERT values on ECM workflow systems performance. Lastly, CERT values and the implementation of the Delphi method under the concept of business process management make up the themes that formulate the theoretical contribution of the research in this thesis.

1.8 Importance of the Research

The research focuses on the use of CERT values to improve ECM workflow systems performance to achieve the required business activities in order to meet business objectives. Also, based on the Schmiedel *et al.* (2013, 2014, 2015) and vom Brocke and Sonnenberg (2015) studies, BPM values are perceived factors, which are most frequently operational in perspective for measuring the KPIs of business processes in the areas of time, quality and cost. Thus, CERT values can be applied to improve ECM workflow systems performance for achieving time, quality and cost targets for the workflows. Indeed, the variables of each CERT value are the aspects of a BPM construct, which when applied as KPIs can enhance the workflows to achieve organisational goals. Hence, it is important to study the impact of CERT business process management values on ECM workflow systems performance.

Indeed, the research has a set of contributions to business practice, which provided benefits to information systems professionals and the wider community (Section 7.3). This includes the research methodology and methods, which are implemented to measure and manage ECM workflow system performance, and the research findings which contribute to many characteristics of business practice, applied research studies and the body of knowledge, in particular relating to ECM workflow solutions performance.

Consequently, the research studied several characteristics of BPM, which includes two main facets of ECM workflow solutions, which are business managerial issues and technological issues (vom Brocke *et al.*, 2011b). In this research, these BPM characteristics have been represented by variables of each CERT value. Also, the Delphi method has been implemented for developing the research findings, as well as demonstrating that the Delphi rounds can develop concepts by addressing BPM issues for the experts to respond to (Quyên, 2014; Schmiedel *et al.*, 2015). Thus, the research fills the gaps in previous research by exploring further the impact of CERT values using and the Delphi method to measure ECM workflow systems performance. This supports decision-makers to develop workflows and choose the appropriate ECM workflow solutions to achieve business objectives.

Overall, the research provides several important findings, which have implications for organisational performance, professional BPM practice and business practice research (Section 7.4). Also, the research has insights that benefit the academic community. These have been fully explained in chapter 7, but the most important research outcomes are:

First, CERT values can be applied to measure workflow systems for improving ECM workflow solutions performance to achieve business objectives and organisational goals.

Second, the Delphi method can be implemented to formulate decision-making frameworks for measuring ECM workflow systems using CERT values.

Third, the PMM framework can be used as a strategic framework to recognise the "Now" and "Preferred" situations of the ECM workflow system performance.

Fourth, the performance profile development model (PPDM) is a framework to produce an organisational performance profile to improve ECM workflow systems performance.

Additionally, while the research was progressing, the research area of study and contributions have been presented to researchers and academics through research conferences, events and publications. These are listed in the "Research Activities and Outputs" section.

1.9 Structure of the Thesis

The thesis has been structured and written to describe this research, present the research findings and document the research contributions. This has been achieved as a result of structuring the thesis in seven chapters (Figure 1.2). Indeed, the principle of the thesis structure to map the research has been adapted from the research progress reports and the suggested structure by Saunders *et al.* (2015, Chapter 14), which is: Abstract; Introduction; Literature review; Method; Findings; Discussion; Conclusions; References; Appendices.

The research has many methodological phases (Section 3.4) and uses two MS SharePoint ECM workflow systems (Section 4.3). Thus, the research structure recommended by Yin (2018) is also used to support formulating the structure of the thesis, where the narrative for each phase and ECM workflow system are presented in separate sections. In brief, after this introductory chapter, an overview of the remaining thesis chapters is as follows:

Chapter Two: This is the "Literature Review and Practical Background" that explains the research themes, which are: enterprise content management, business process management, workflow information systems, decision-making techniques and studies, Delphi method, key performance indicators and CERT values. Chapter two reviews the related studies in the research areas of study and defines the research keywords (see keywords list, page III).

Chapter Three: This is the "Research Methodology, Design and Methods", which is used to present the formulation of the research framework and processes to achieve the research objectives. Also, chapter three establishes the research study model, including theory, research practice and methods. The research framework introduces the key steps to measure the impact of CERT values on ECM workflow system performance. Also, related research studies have been reviewed to justify the selection of the research framework, including the chosen theories and methods.

Chapter Four: This is the "Data Collection, Framework and Implementation" that explains and discusses the processes used to collect the research data. Thus, ethical procedures to conduct data collection are explained. Also, the data collection process is presented along with the applications and tools to gather the required data for the research findings. Therein, the research questionnaire and semi-structured interviews implementation are explained and critically evaluated to demonstrate how the research data have been gathered to support the research analysis procedures, findings, discussions and contributions.

The Research Programme and Investigation

Chapter 1: Introduction

Introduction ⟹ Motivation Toward Business Objectives ⟹ The Research Purpose ⟹ The Research Questions

The Research Aims and Objectives ⟹ The Research Hypotheses ⟹ The Research Approach and Design

Importance of the Research ⟹ Structure of the Thesis

Chapter 2: Literature Review and Practical Background

Research Context ⟹ Background on Business Process Management ⟹ Evaluating Business Process Management

Background on Enterprise Content Management ⟹ Workflow Information Systems ⟹ Key Performance Indicators

Performance Measurement and Management ⟹ Synopsis

The Research Model Development and Implementation

Chapter 3: Research Methodology, Design and Methods

Introduction ⟹ The Research Philosophy ⟹ The Research Approach ⟹ The Research Strategy and Design

Data Collection Methodology and Methods ⟹ Data Analysis Methodology and Methods ⟹ Synopsis

Chapter 4: Data Collection, Framework and Implementation

Introduction ⟹ Collected Data Types ⟹ Selected Data San ⟹ The Research Ethics and Ethical Considerations

Access to the Research Data ⟹ Data Collection Applications and Tools

Preparing the Collected Data for Analysis ⟹ Synopsis

The Research Model Validation and Findings

Chapter 5: Data Analysis and Evidence Collection

Introduction ⟹ Descriptive Statistical Analysis ⟹ Exploratory Factor Analysis ⟹ Qualitative Data Analysis

Weighing the Findings ⟹ Performance Measurement and Management ⟹ Synopsis

Chapter 6: Research Findings, Interpretations and Discussions

Introduction ⟹ Interpretation of Explanatory Factor Analysis ⟹ Workflow System Performance Evaluation

Testing of Assumptions and Hypotheses ⟹ Synopsis

The Research Reflections and Closure

Chapter 7: Research Contributions, Reflection Commentary and Conclusions

Introduction ⟹ Research Objectives Success ⟹ Contributions ⟹ The Implications of the Research Results

Limitations ⟹ Conclusions

Figure 1.2 The Structure Map of the Thesis.

Chapter Five: This is the "Data Analysis and Evidence Collection" that explains the research data analysis and evaluation. Chapter five shows how the research data has been analytically processed to formulate the research findings and numerical insights. Hence, the empirical research evidence is recorded to build discussions on key numerical findings. Finally, the analysed data and collected numerical insights are explained, supporting the final discussion to produce the research findings and ideas.

Chapter Six: This is "Research Findings, Interpretations and Discussions", which is used to highlight the research findings by indicating the study analytical insights, and then support these with discussions, where the research findings are evaluated and critically reviewed within the context of relevant published literature. Therein, the research findings are used to indicate new theoretical and practical contributions, along with setting the strategies to improve ECM workflow system performance in order to achieve business objectives and organisational goals.

Chapter Seven: This is the "Research Contributions, Reflection Commentary and Conclusions", which reflect on the research and contributions to business practice, professionals and the body of knowledge. Chapter seven is also used to summarise the research, including the research limitations, recommendations and further research studies, which are explained with the support of concluding observations.

Chapter 2: Literature Review and Practical Background

Overview

The research literature review, practical background, research context and key areas of study are explored in this chapter. CERT business process management values are discussed to identify the gaps in knowledge and develop a survey from the relevant literature and the researcher's own professional experience. This is used to conduct the research data collection from May 2016 until February 2017. Additionally, this chapter establishes the research model, which will be applied to support the next research phases in order to find the impact of CERT values on ECM workflow system performance. Finally, the core variables of each CERT value are identified in this chapter based on the literature. These variables are the key performance indicators, which are used to evaluate ECM workflow system performance.

2.1 Research Context

Enterprises are continually seeking to improve their enterprise content management workflow systems performance to ensure business continuance by meeting their business objectives on time with the required quality. As described by (Olusola and Sunday, 2013), ECM systems control the creation, storage and distribution of business processes, information and business functionalities. ECM systems are the central strategic information management platform for managing an enterprise's digital content and handling unstructured information (e.g. reports, emails, application forms).

ECM systems are considered as an integrated BPM approach to information systems that cover and align established concepts, such as web content management and records management (RM) workflow systems, in an enterprise (vom Brocke *et al.*, 2011b). Also, an ECM workflow system as a workflow information system is used to improve an enterprise's services and employee productivity, streamline processes, monitor information, deliver support to meet regulations, remove unnecessary digital and non-digital information, and support business process continuity (Hullavarad *et al.*, 2015). Usually, organisations implement ECM systems to identify the required types of organisational culture, data and other enterprise resource planning (ERP) systems which ECM integrate with to ensure effective WIS performance.

Information systems are the core element of business process management and improvement, and are dedicated to increasing business revenue across all levels of the organisation (Becker et al., 2015). Information systems consist of three main dimensions, and these are people (staff), tasks (responsibilities) and technology (systems), which make up a BPM framework (Thomas and vom Brocke, 2010). In this research study, "ECM workflow system" is used as terminology to represent an IS model, which consists of employees in an organisation, a BPM workflow system that manages employees' tasks and an ECM workflow solution to implement the BPM workflow system.

An enterprise BPM workflow system functions using an IS model (ECM workflow solution) that includes a BPM framework to ensure business operations and activities are running to achieve business objectives as planned. Thus, a BPM framework should be validated using a decision-making method to ensure business processes and workflow systems are running according to the required business performance levels (Thomas and vom Brocke, 2010; Van Looy *et al.*, 2012). Also, decision-making support systems and techniques are essential to

improve and/or enhance information systems performance. In conclusion, the research context consists of the requirements to develop the research performance measurement and management strategic model, which includes the business process management, decision-making method, enterprise content management, workflow information systems and key performance indicators using CERT business process management values. BPM values are business management principles that determine regular organisational behaviour and structure in workflow activities (Schmiedel *et al.*, 2014).

Additionally, the research objective one (RO1) requires that a complete literature review be undertaken at the research phase one (Section 1.5), and this was accomplished as follows:

1. An initial search for research papers and reports was undertaken by applying key search terms and keywords (i.e. Enterprise Content Management, Business Process Management Values, Workflow Systems Performance, Workflow Information Systems, Decision-Making Techniques, Key Performance Indicators). This was achieved through popular research study databases (e.g. LSBU Online Library, Emerald Publishing, ScienceDirect, ProQuest Ebook Central). Therefore, an initial list of approximately 250 relevant papers and reports were identified to support developing an appropriate literature review for the research study.

2. The abstract for each of these was read to determine the relevance of the publication to this research and the most relevant papers (articles) were set aside to be read thoroughly.

3. Based on these publications, further articles were identified, and then these publications used to support the research study and develop the research literature review.

4. This sifting process resulted in a set of core publications that were central to this research and these were the publications by Guerrero-García et al.; Müller et al.; Nworie, J.; Quyên, Đ. T. N.; Schmiedel et al.; vom Brocke et al.; Recker, J.; and Van Looy et al.

5. During the progress of this research, more recent publications were searched for, the most recent search being in March 2019.

The most relevant publications, as identified by the above process, are featured in the following literature review sections.

2.2 Background on Business Process Management

Business process management is a systematic business approach to structure or restructure the organisation's processes (Chang, 2006). It is required to manage business processes based on process analysis and control of the organisation components. BPM first developed when investment in enterprise information systems flourished during the late 1960s, aiming to transfer non-information technology business processes to systemic information technology business processes (AbouGrad *et al.*, 2019; Müller *et al.*, 2016). Also, BPM helped improve the organisation's services, quality and productivity by merging information systems and technologies with process management theories. As defined by Chang (2006), BPM is a business method for performing a 'Quality' program for an organisation (e.g. total quality management (TQM)) to ensure the quality of its products and services. Indeed, BPM improves organisational efficiency and effectiveness using improvement and innovation concepts to meet the organisation's required performance.

According to Schmiedel *et al.* (2014), BPM has incorporated several management approaches, starting from the implementation of the TQM approach during the 1980s to the business process reengineering (BPR) approach from the 1990s, and approaches vary depending on their business process focus (e.g. quality, process change). The Recker (2008, p.19) research study uses a more practical definition of BPM from the Australian Community of Practice, which defined business process management as "a structured, coherent and consistent way of understanding, documenting, modelling, analysing, simulating, executing and continuously changing end-to-end business processes and all involved resources in light of their contribution to business success". This more practical definition captures the elements of the research context used in this research.

A study by Müller *et al.* (2016) has recognised that BPM approaches aim to make an organisation's operations effective and efficient using BPM systemic core workflows rather than an organisation's functional components. Also, an organisation's BPM workflow system must be developed to suitably sustain its management of WIS to meet the business processes' activities, such as business automation, policies, standards and quality assurance and controls (vom Brocke *et al.*, 2014b). Workflow is a set of activities that involve the coordinated implementation of multi-tasks performed by multi-resources to achieve business processes and perform business objectives (Chang, 2006; Rahimi *et al.*, 2016). Hence, BPM is implemented using workflow systems, where business frameworks and

procedures are completed using workflows with the support of information systems, applications and technologies.

In summary, BPM is performed by a structured workflow, which is automated by information systems to enable the performance of the required workforce activities and business decision-making procedures and mechanisms to accomplish business tasks (Rahimi *et al.*, 2016; Trisnawati *et al.*, 2017). BPM is a required strategic plan to achieve business objectives to meet organisational goals. Also, BPM workflow and information systems are combined to ensure the required performance. Information systems use BPM workflows to implement IS models, which affect the perception of benefits and services.

2.3 Evaluating Business Process Management

Business process management is a business management approach that focuses on the organisation's processes without looking at its functions (Schmiedel et al., 2013). Also, BPM enables high-quality business decision-making practices, which are significant components of an organisation's BPM workflow systems success. Therefore, appropriate decision-making business practice techniques are required to ensure that BPM workflow systems perform to the required level of quality and standards.

Indeed, there are many decision-making business practice techniques, which can be applied and have already been used in published research work (AbouGrad *et al.*, 2019). These include the Delphi method, the analytic hierarchy process (AHP) and the technique for order of preference by similarity to ideal solution (TOPSIS). The decision-making methods have also been used in combination as a multi-criteria within the Delphi method (Figure 2.1). Section 2.3.6 provides further description of both the AHP and TOPSIS. Also, this research thesis uses the Delphi method, and so this chapter will focus on the publications that have applied this method and will explore its variations that have been utilised in BPM research.

The Delphi study technique is well-known for exploring organisational issues and supporting the development of decision-making processes (Dalkey and Helmer, 1963; Quyên, 2014). The Delphi study technique was first developed as a communication control technique for forecasting based on a panel of experts. Nowadays, the Delphi study technique is also used as a method (Table 2.1) for resolving important BPM issues, making predictions and developing decision-making indicators for decision-makers who seek to improve their BPM workflow systems policy, procedures and/or quality assurance (Nworie, 2011).

As explained, workflow information systems play a key role in enabling business development and innovation in order to improve business productivity and revenues, and WIS operates using an IS model that contains the BPM framework (Becker et al., 2015). The Delphi study technique can be used to enhance the validity of a BPM framework as it produces results with high validity and consistency when compared to other data collection procedures and decision-making methods (Van Looy *et al.*, 2012). Also, Van Looy et al. argue that the Delphi method can develop WIS performance by ensuring the validity of BPM framework operations and activities.

According to Schmiedel *et al.* (2013), the Delphi method can be applied to conceptualise and analyse the elements of an organisation's BPM workflow system. The Delphi rounds can be implemented to develop a decision-making BPM construct, which acts as a model to improve a BPM framework and ECM workflow systems performance (Table 2.1). The Delphi method has been implemented to produce empirical evidence to support decision-making in many BPM situations (AbouGrad *et al.*, 2019; Müller *et al.*, 2016). Examples include: studying BPM job descriptions, categories, technical skills, and systems experience and the ability to find the ideal profiles and types of BPM professionals; and developing BPM project aims, objectives, phases, terms and conditions and contractors' portfolio by BPM experts based on specific industries and locations.

According to Schmiedel *et al.* (2014), BPM is growing as a process-oriented management field in the information systems area of research. Also, BPM has been accepted as an interdisciplinary approach to organisational processes analysis, design, implementation and improvement, and to support the sustainability of information systems. Thus, evaluating BPM mechanisms for an organisation's information system effectiveness and efficiency can be achieved with Delphi's framework. The Delphi method can formulate KPIs to evaluate the organisation's BPM through factor analysis criteria such as variance inflation factor (VIF) and critical success factors (CSF) where an organisation can ensure sustainable implementation of the organisational BPM workflow system (Pangsri, 2015).

The following sections illustrate Delphi and BPM studies, which support the use of the Delphi method to develop business decisions by evaluating BPM workflow systems performance. Also, business process management and the Delphi method are discussed in relation to WIS performance. The application of the Delphi method is explained using several published Delphi studies that demonstrate its capabilities in evaluating BPM workflow systems.

2.3.1 Evaluating the Reliability of the Delphi Method

The Delphi method creates a comprehensive set of KPIs since it can take account of many important and different workflow information system aspects. The Delphi method reveals business issues and indicators by weighing decision-making criteria using Delphi rounds as a multiple criteria decision-making process. This decision-making framework is used to identify and select business experts for participation in order to capture their knowledge and business practise experience. Knowledge in a professional field, business subject or expertise on BPM issues can be used to explore ideas and structure group communication on developing a BPM framework to be used as rating criteria for measuring workflow system performance (Nworie, 2011; Quyên, 2014; Van Looy *et al.*, 2012).

In contrast, a key objective of the Delphi method is achieving consensus and stability by allowing participants to reach consensus on the significant aspects of the business workflow information system. For example, a consensus is achieved when an agreed percentage of the participants come to a view on a BPM issue. Stability is reached when no further unstable responses are obtained within the Delphi rounds process, so stability reflects the consistency of responses between successive Delphi rounds (Nworie, 2011). Hence, the Delphi results will promote consensus and stability around the key indicators that improve BPM and workflow systems performance.

The quality of Delphi study results is high compared to other BPM study methods for evaluating and developing business process decisions and workflows (Nworie, 2011; Schmiedel *et al.*, 2013). The Delphi method's main advantage is in the reliability of the study results and the validation of the Delphi study findings, as the expert panel underpins these procedures. Indeed, several business studies have used Delphi's framework to identify the critical success factors (CSFs) necessary for achieving business objectives at the appropriate level of performance (Pangsri, 2015; Quyên, 2014).

The improvement of BPM workflow system performance requires an effective business study method to convert system results to objectives in order to achieve business tasks at the right time with the appropriate level of performance (Draghici *et al.*, 2014). The results from the use of Delphi's framework show its value in achieving business objectives and enabling improvement in BPM workflow systems for many organisations. Also, the Delphi method CSFs capability makes high levels of quality achievable, so BPM performance can be developed to ensure the quality of business products and services through its workflow

systems. The Delphi method's ability to identify and validate key indicators as a multi-dimensional construct for examining BPM can be used to explore empirically the relationship between BPM, workflow systems and organisational performance (Kohlbacher *et al.*, 2013; Schmiedel *et al.*, 2014). Hence, the Delphi method and BPM values can play an important role in developing BPM and workflow systems performance to achieve business objectives.

2.3.2 Delphi Method Validates Workflow Activities

The Delphi method has been applied to construct, identify and validate key factors in many business studies (Quyên, 2014). In business practice, the Delphi method can examine WIS validity in the weighing final round by doing a quantitative assessment of the reliability and validity of the workflow model. A quantitative measurement instrument can define specific workflow activities using the CERT values multi-dimensional structure giving empirical insights on the operational aspects of a workflow model (Schmiedel *et al.*, 2014, 2015).

A global Delphi study by Schmiedel *et al.* (2013) has evaluated the codification of Delphi's results by expert participants to verify the validity of the BPM study findings (Table 2.2). Also, the Delphi method gives consistent results from realistic quantitative evidence. Hence, the Delphi method can play a key methodological role to ensure the validity of the study results as experts can be asked to validate their results in the light of responses of other experts in order to appropriately measure the ECM workflow system performance.

2.3.3 Findings from Delphi Studies

The Delphi method can be applied to develop KPIs by following its three rounds process (Table 2.1). The Delphi study rounds aim to measure BPM workflow system performance in a structured and systemic procedure (Quyên, 2014; Van Looy *et al.*, 2012). For example, the first round is to find and recognise the initial indicators; the second round is to validate those accepted initial indicators, and then rank them based on their business practicality and objectives achievement; finally, a third round verifies the results to use these as key indicators to build the BPM constructs and evaluate workflow system performance.

Delphi round number	Delphi round	BPMM study round
Round I	Brainstorming	First
Round II	Narrowing down	Second – Third
Round III	Weighing	Fourth

Table 2.1 Delphi study toward a business process maturity model (Van Looy et al., 2012).

Generally, the Delphi method uses three rounds as a ranking approach. For example, 1. Initial ranking (e.g., entity X greater than entity Y); 2. Rate the recognised entities (e.g., entity X = 9/10 while entity Y = 4/10); 3. Compare X and Y entities based on their scale from 1 to 10 (e.g. entity X has five more identified elements than entity Y, which verify the scale of X to Y). The third round calculates and measures the scale to confirm the rank of each entity (Quyên, 2014; Van Looy *et al.*, 2012). The completion of the Delphi study results in a set of decision-making criteria that has consensus among experts. The Delphi method rounds could be distributed within more than three stages of the study framework. For example, Van Looy *et al.* (2012) have used the Delphi method within a set of four rounds (Table 2.1) in a study relating to a business process maturity model (BPMM) designed to assess and improve business process maturity.

In addition, the Van Looy *et al.* (2012) Delphi study included a total of five rounds to develop a proof-of-concept BPMM decision tool (model): First, evaluating scores of collected BPMMs based on calculations and according to the achieved weightings; Second, based on BPMMs practicality and achievement a questionnaire was developed and tested by a pilot study; Third, a BPMM decision table was developed and the questionnaire results used in conjunction with the decision table to identify the most appropriate BPMM; Fourth, BPMMs proof-of-concept was automated by merging the questionnaire and decision table; Fifth, BPMMs proof-of-concept was tested using case studies.

The Schmiedel *et al.* (2013) Delphi study has highlighted CERT values as supportive of BPM success. Also, the Schmiedel *et al.* (2015) Delphi study on how business cultural values determine BPM success has confirmed that Delphi rounds can support organisations to find unrecognised BPM issues, which can be examined through feedback from experts and professionals. Indeed, there are many studies published, which have discussed the empirical results obtained using the Delphi method (AbouGrad *et al.*, 2019; Nworie, 2011). These studies focus on finding consensus and determining the effectiveness of the criteria for measuring business activities and rules. The Delphi studies by Schmiedel *et al.* (2013, 2014) have recognised BPM values as the core values of the key indicators to measure BPM workflow systems. The recognised key indicators are the workflow information system driving factors; these factors are an instrument to quantitatively measure the workflow systems achievement of BPM objectives to improve workflow performance. The Schmiedel *et al.* (2013) global Delphi study has revealed four key BPM core values (Table 2.2), which are Customer orientation (C), Excellence (E), Responsibility (R) and Teamwork (T).

BPM Core Values	Key indicators (variables)	Description
Customer orientation	Customer orientation	The business driver and target of the workflow system.
Excellence	Continuous improvement	The process to satisfy business and customer needs.
	Innovation	The business processes creativity and upgrade.
	Leanness	The business processes efficiency.
	Quality	The ideal and right business processes performance.
Responsibility	Responsibility	The workflow commitment, engagement, and mission.
Teamwork	Cross-functional orientation	The workflow system non-functional elements.

Table 2.2 Global Delphi Study Results (Schmiedel *et al.*, 2013).

The BPM core CERT values have sub-indicators, which are used as key performance indicators to measure the workflow system performance. For example, the BPM value 'Excellence' has the following KPIs: Continuous improvement, Innovation, Leanness, and Quality; these indicators as described in Table 2.2 can be evaluated to produce the workflow system excellence rating. If the excellence rate is low, then the organisation can use the Excellence value to improve the workflow performance by focusing on the business excellence KPIs (variables). Therefore, workflow system characteristics can be examined to evaluate BPM and improve business processes performance. Also, the Delphi method and BPM values can apply a systematic BPM construct as a concept in the first stage of the decision-making process until the completion of the concept testing stage, and then the concept can be implemented as a BPM workflow system.

2.3.4 Delphi Results

Research studies reported significant insights and findings using the Delphi method (Nworie, 2011). The Delphi method has been applied to define and examine the characteristics of business processes, which enable a better understanding and evaluation of workflow system effectiveness and efficiency. In fact, previous Delphi studies have recognised CERT values (Table 2.3) as distinct key BPM values to measure an enterprise's workflows (Schmiedel *et al.*, 2014, 2015). As a result, CERT business process management values and the Delphi method can be combined to measure ECM workflow systems performance in order to achieve organisational goals.

Value / CERT Constructs	Definition
Customer orientation	The rules, policies, and attitude to obtain the required customer relationship results.
Excellence	Enterprise's business process performance continuity of improvement, creativity and innovation.
Responsibility	The courage and accountability to accomplish the enterprise's business objectives.
Teamwork	The staff ability to resolve business and workflow issues using positive attitude.

Table 2.3 CERT business process management values (Schmiedel *et al.*, 2014).

The Schmiedel *et al.* (2013) study has reported Delphi study findings, which include identifying CERT values as an important BPM construct based on the BPM study participants' feedback (Table 2.3). Additionally, the application of the Delphi method has resulted in the publication of important and valuable research studies, which led to successful business decisions, in which the Delphi study final stage "weighing round" confirms its value as a systematic, criterion and structured instrument to develop BPM workflow system performance (Nworie, 2011; Quyên, 2014).

An example is the Quyên (2014) Delphi study which developed key indicators to evaluate an organisation's governance practices. Five potential key indicators were defined as dimensions of the organisation's practices. These five dimensions were 1. Management and Direction; 2. Participation; 3. Accountability; 4. Autonomy and Transparency; 5. Management and Direction. The five dimensions identify resources at different levels within the organisation, which are used by management to realise the organisation's business tasks. Thus, the Delphi method was very useful in identifying and measuring the five dimensions and in producing the initial key indicators of the weighting system.

In a further example from the construction industry, a multi-criteria decision making (MCDM) study has been developed by Pangsri (2015) using the Delphi method to make an MCDM tool for supporting experienced decision-makers in making complex evaluations for construction projects. The study applied the Delphi method to evaluate alternatives and applied the TOPSIS weight technique to find the final decision-making criteria. This resulted in the ranking of the projects (Table 2.7). Thus, the use of the Delphi method with other methods within the Delphi rounds can result in powerful decision-making tools to be used in complex business situations. These published Delphi studies are further discussed in the following sections.

2.3.5 The Reliability of Delphi Results

Empirical studies require reliable measurement techniques to be applied in order to deliver reliable results (Schmiedel *et al.*, 2014). The Delphi study technique together with BPM values (e.g. CERT values) can ensure reliability through its multi-stage process (Table 2.4). It is clear that CERT values can ensure workflow information system reliability.

Index	Round 1	Round 2	Round 3	Round 4
Kappa	0.29	0.42	0.26	0.67
Placement-Ratio	0.59	0.72	0.62	0.82

Table 2.4 Schmiedel et al. (2014) reliability levels in the testing index.

To measure ECM workflow system performance, CERT values can be used to measure workflow performance reliability in every Delphi round. For example, the Schmiedel *et al.* (2014) Delphi study has measured the reliability using four sorting rounds based on the Delphi method, which has delivered an average for Kappa and Placement-Ratio measurement indexes (key indicators) in each round. This Delphi study has provided a testing index on reliability, which in round four has shown that a Kappa value > 0.6 and a placement-ratio > 0.8 have been reached (Table 2.4). Accordingly, the appropriate agreement levels have been achieved based on Kappa and Placement-Ratio key indicators to allow the measurement mechanism to be applied in the application phase.

The Delphi method has generated much empirical evidence in an application to workflows and information systems, and such evidence has shown that the Delphi method in combination with BPM values can be implemented to confirm the requirements for improving workflow system performance.

The Schmiedel et al. (2014) Delphi study evaluated a measurement instrument designed to identify and measure four BPM key dimensional values, which can be used to ensure BPM objectives success (Table 2.5). This Delphi study used six stages to ensure the implementation of the BPM construct (BPMC) of CERT values, and how these values support decision-making by measuring BPM. This Delphi study has two core strategic entities, which are a development core and a validation core. The development core includes: a first stage for the items construction to identify the key performance indicators (dimensions) using a literature review, questionnaires and interviews; a second stage for the substrata identification to identify the important items in order to construct categories; a

third stage for the key items selection and ranking based on experts' responses; a fourth stage for indexing (key items revision) by conducting an index-card-sorting test that asks experts to identify key indicators from stage three of this core and calculate the ratio of each indicator based on their feedback.

In the validation core, the identified key indicators from the development core four stages are used to implement the validation core entity which includes: the fifth stage for the BPMC (instrument) preparation, which refines the identified indicators by developing pre-test and a pilot test studies, and then a valid and reliable translation of the measurement BPMC, (the pre-test study evaluates and expands the understanding of the BPMC in an iterative process while the pilot test study evaluates and approves the BPMC validity and reliability using an exploratory factor analysis); the sixth stage examines the application of the validated and reliable BPMC using confirmatory factor analysis techniques based on a field survey (questionnaire) to ensure CERT values instrument practicality.

Stage	BPMC Development Core	Stage	BPMC Validation Core
1	Items creation Literature review Questionnaires Interviews	5	BPMC (Instrument) preparation • pre-test • pilot test • BPMC validity and reliability (Instrument translation)
2	Substrata identification • Construct categories		
3	Key items selection • Ranking the indicators	6	BPMC (Instrument) Application • Factor analysis techniques (field survey)
4	Indexing (key items revision) • Index-card-sorting test		

Table 2.5 Schmiedel et al. (2014) Delphi study process.

The Quyên (2014) Delphi study has collected results from four levels. The first level described an indicator set and constructs where ninety-one indicators were recognised. The second level ranked the importance of each indicator. The study found that all indicators should be included as 92.3% were rated very high (very important, or extremely important) and 7.7% rated relatively important. The third level examined consensus levels where three groups (A, B, C) were set to have the coefficient of quartile variation (CQV), along with interquartile range (IQR), and median levels to evaluate the convergence level within the experts' opinions, as well as the indicators importance level. CQV was used to evaluate the consensus level within the ratings, and the CQV formula is CQV = (Q3-Q1)/(Q3+Q1).

The fourth level is the weighting system, which resulted from the indicators of importance scores. The indicators mean scores are used to calculate the final indicator of importance levels (indicator weights). An indicator weight is the ratio of an indicator importance score to the sum of all indicators importance scores within a factor. A factor weight is the ratio of the sum of all indicators importance scores within a factor to the sum of all indicators importance scores within a dimension that includes a set of factors.

Overall, the Quyên (2014) study has recorded a high level of agreement in experts' opinions, which shows indicators importance of 70%, implying high reliability of the set. Also, the weighting results have shown significant differences in the indicator weights within 23% of the factor groups and the dimensions' factor weights of 80%. This indicates that the weighting is significant and approves the reliability of the Delphi results.

2.3.6 The Delphi Method Validity

The Delphi method has been chosen to support the development of BPM studies as a result of its iterative procedures, which enhances the validity of the study findings (Van Looy *et al.*, 2012). The Delphi method focus on experts feedback is an appropriate framework to construct, recognise, find and validate WIS key indicators and valuable factors, as shown in several BPM studies described by Quyên (2014). The main advantage of the Delphi method is to ensure the validity of the BPM study findings by asking the experts to confirm the responses. In Delphi, examining the validity of the study findings is usually undertaken in the third round. The purpose of Delphi rounds (Table 2.1) is constructing validated indicators or factors to achieve BPM objectives (Schmiedel *et al.*, 2013, 2014; Van Looy *et al.*, 2012). For example, the workflow information system has BPM values, which can be used to examine the validity of the study measurement and develop confirmatory factors through factor analysis. Also, comparing Delphi study findings to other current studies within the same area allows an analysis of the validated Delphi results.

The Schmiedel *et al.* (2014) study has validated the BPM construct of CERT values by measuring the contributions of each CERT value as a set of indicators in a distinct construct (i.e. C.E.R.T) to the total BPM construct of CERT values using three criteria (Table 2.6): First, the *weight* has shown CERT indicator weights are highly significant, which confirms the results of previous studies by the same authors; Second, the relationship between BPM constructs have been evaluated using the adequacy *coefficient* R_a^2, showing that the set of

indicators match with the aggregate BPM construct; Third, the study has measured the BPM construct for conceptual redundancy based on separating CERT influence from the BPM construct using multicollinearity examination on the basis of the variance inflation factor (VIF), which show distinct indicators have less than the restrictive limit of 3.30, leading to no multicollinearity. However, the BPM construct of CERT values has VIF ranges between 3.66 and 5.27, which means an increased probability 'p' of multicollinearity.

Indicator	Weight	Significance	VIF	Adequacy coefficient R^2_a
C	0.55	$p < 0.001$	1.74	0.83
E	0.54	$p < 0.001$	2.10	0.86
R	0.55	$p < 0.001$	1.89	0.84
T	0.54	$p < 0.001$	2.15	0.86
BPM construct of				
C	0.26	$p < 0.001$	3.66	
E	0.27	$p < 0.001$	4.53	**0.87**
R	0.27	$p < 0.001$	4.55	
T	0.27	$p < 0.001$	5.27	

Table 2.6 Schmiedel et al. (2014) validation of BPM construct of CERT values.

The Schmiedel *et al.* (2014) study has applied the Petter *et al.* (2007) four options to assess 'p' and developed independent samples t-tests between distinct indicators and BPM construct values, comparing key demographics (e.g. industry sector, C.E.R.T report). The t-tests produced insignificant 'p' values that range between 0.45 to 0.71. Hence, multicollinearity has an insignificant effect to support the case for CERT values usage.

The Pangsri (2015) study has used three decision-making methods as an MCDM methodology for project management to successfully achieve specific objectives (Figure 2.1). The MCDM methodology consists of the Delphi method, the analytic hierarchy process and TOPSIS technique.

Stage 1. The Delphi method
• Develop a questionnaire to collect experts' response.
• Determine a criteria and project candidates.

Stage 2. The AHP method
• Make the decision structure.
• Assign weight of criteria.

Stage 3. The TOPSIS method
• Evaluate alternatives and determine final ranking to prioritized projects.
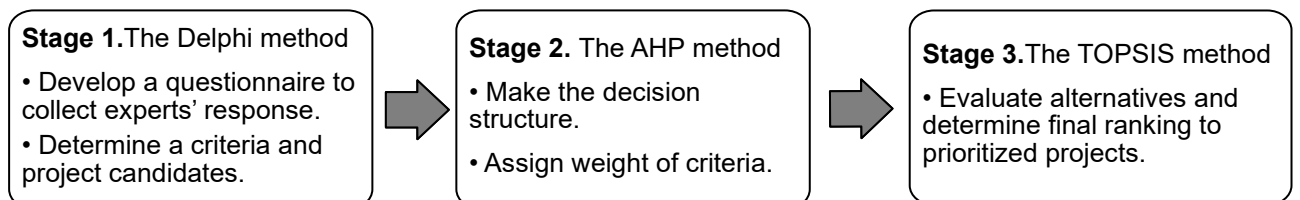
Figure 2.1 MCDM research study methodology (AbouGrad *et al.*, 2019; Pangsri, 2015).

The analytic hierarchy process is a process for determining the weights of criteria to be used in complex decision situations (AbouGrad *et al.*, 2019; Pangsri, 2015). The AHP process

consists of the following five steps: First, define the problem and develop the goal of the decision process; Second, identify the decision structure based on the goal and develop the objectives; Third, develop a set of comparison matrices (e.g. consider *n* elements to be compared C_1 to C_n then denote the relative *significance weight of C_i* relating to C_j by a_{ij} and then form a square matrix *A= (a_{ij})* of order *n* as a_{ij} = *1/a_{ji}* where *i ≠ j* , and a_{ii} = *1* , all *i*); Fourth, the significance weight elements can weigh the priorities for every element, then reweight the elements by adding its weighted values to give the overall global significance; Fifth, calculate the consistency index (CI) using formula λ_{max} − *n / (n − 1)*. The MCDM process applied the AHP process in the assignment of weight to the criteria (Figure 2.1).

The TOPSIS technique is a multi-criteria process for identifying solutions based on a set of predetermined elements (AbouGrad *et al.*, 2019; Pangsri, 2015). TOPSIS identifies a positive solution as criteria to maximises the benefits and/or minimises the cost. In contrast, a negative solution minimises the benefits and/or maximises the cost. The TOPSIS process has five steps which are:

Step 1, inputs the xij for the matrix of priorities as $i = 1 \dots m$ alternatives and $j = 1 \dots n$ criteria by $r_{ij} = \dfrac{xij}{\sqrt{\Sigma_{i=1}^{m} \Sigma_{j=1}^{n} x_{ij}^2}}$

Step 2, Use the weight normalised matrix

$$v_{ij} = w_i r_{ij} \, , where \; i = 1 \dots m \; and \; j = 1 \dots n$$

Step 3, Process the normalised decision matrix where the positive ideal solution A+ is identified by choosing the largest normalised and weighted score for each criterion, and the negative ideal solution A− is identified by choosing the least normalised and weighted score of each criterion by the calculate of these formulas

$$A^+ = \{v_1^+, .., v_n^+\}, where \; v_j^+ = \{\max(v_{ij}) \in J \min(v_{ij}) \; if \; j \in J' \}$$
$$A^- = \{v_1^-, .., v_n^-\}, where \; v_j^* = \{\min(v_{ij}) \in J \max(v_{ij}) \; if \; j \in J' \}$$

Step 4, Measure the positive and negative measures for each alternative using these formulas

$$S_i^+ = \sqrt{\Sigma_{j=1}^{n}\left(v_j^+ - v_{ij}\right)^2},$$

$$S_i^- = \sqrt{\sum_{j=1}^{n}\left(v_j^- - v_{ij}\right)^2} \, , i \; = \; 1 \; \dots \; m$$

Step 5, Obtain the relative closeness to the ideal solution (final weighting) by

$$C_i^+ = \frac{S_i^-}{(S_i^- + S_i^+)}, 0 < C_i^+ < 1, i = 1 \dots m$$

Rank No.	Project ID	The Project weight
1	Project 5	0.747
2	Project 7	0.746
3	Project 3	0.614
4	Project 2	0.441
5	Project 4	0.386
6	Project 1	0.358
7	Project 6	0.264

Table 2.7 The rank of the projects using MCDM with TOPSIS (Pangsri, 2015).

The implementation of the Pangsri (2015) MCDM methodology has ranked the studied projects using TOPSIS at the final weighting to order the projects based on their importance and indexed values (Table 2.7).

2.4 Background on Enterprise Content Management

An enterprise content management system is a core component of an information management system, which manages corporate digital materials, contents and controls unstructured stored information (e.g. digital reports, marketing brochures, images, videos, emails, application forms). ECM systems are used to administer and control the creation, arrangement and deployment of business information and functionalities (Olusola and Sunday, 2013). ECM workflow systems provide an enterprise with its BPM values and indicate to whom such values are applied to achieve tasks for meeting business objectives.

The Association for Information and Image Management (AIIM), (2018) has defined ECM as "the systematic collection and organisation of information that is to be used by a designated audience – business executives, customers, etc. Neither a single technology nor a methodology nor a process, it is a dynamic combination of strategies, methods, and tools used to capture, manage, store, preserve, and deliver information supporting key organisational processes through its entire lifecycle". Also, ECM is considered to be an integrated approach to information systems that cover and aligns established concepts including document management systems (DMS), (web) content management systems (CMS) and records management (RM) systems (vom Brocke *et al.*, 2011b).

In the following sections, ECM historical and practical views are discussed along with ECM performance to outline ECM systems development. Also, ECM features, facilities, platforms and usability are explained to provide a holistic view on the use of ECM for managing the enterprise's content.

The validity of the Delphi method and also the use of other decision-making methods (i.e. AHP and TOPSIS) has been discussed in the previous sections. Also, the BPM studies by Müller et al.; Schmiedel et al.; and vom Brocke et al. are central to this research since they have been successful in using the Delphi method to validate CERT values for use in BPM. However, their researches have not considered ECM nor the question of whether the same ideas can be applied to the improvement of ECM workflow systems performance. This is a significant gap in the literature that this thesis seeks to address. Hence, the following sections consider ECM and its business usage in more detail.

2.4.1 Historical View on Enterprise Content Management

Electronic document management systems (EDMS) are used to manage the collection of digital documents (Schulz, 2008). These systems became known as enterprise content management, because they capture, store, index and retrieve business digital contents. ECM has developed to a stage, where it can deal with all digital files, which are saved on the personal computer, network server systems or any other digital storage system. Enterprise content management systems (ECMS) have grown to include security, cooperation tools, workflow solutions, reviewing capabilities and digital contents (e.g. document, videos, audio).

In practice, the invention of paper has supported businesses to start recording and managing their content, but it was unpopular as it was expensive, heavy and hard to transport in high quantity (Burns, 2001). Subsequently, 'Paper' has evolved through the use of many materials until the current digital form. In the following paragraphs, ECM development, use and future directions are discussed to illustrate how ECM has been implemented to meet the organisational objectives.

2.4.1.1 Paperless and Digital Technology

ECM systems support a paperless business environment (workplace) by reducing paper usage to a minimum (Walker, 2009). Usually, this is achieved by converting content into ECM workflow solutions. The paperless concept provided the business with better-

economy, saved-space, improved performance, made information sharing easier, improved security, supported a green-environment and improved communications. Paper use can be eliminated using ECM workflow systems, as these can replace index-cards by database management systems (DBMS), faxes by email and reference books by IT Networks.

Computing in the business environment and the paperless office date back to the 1960s when the business use of computers began, as it was clear that enterprise contents can be manipulated using EDMS instead of paper (The Economist, 2008). The paperless office was an aspiration for the future office facilitated by the popularisation of computer workstations, such as the 1964 IBM2260 (Giuliano and Pake, 1975). The idea was to automate offices to make paper redundant for routine tasks (e.g. recording, retrieving, bookkeeping). According to Schulz (2008), improvements in printers and copiers made it easier to reproduce papers in bulk, causing global use of such technology to more than double between 1980 and 2000. This made it easy to physically produce documents, and the growing use of electro-communication often resulted in employees (users) receiving documents that were often printed. From the year 2000, paper usage has dramatically reduced, as employees are believed to use less paper by reading documents on electronic devices (The Economist, 2008). Indeed, modern screens make workflow interaction less exhausting using ECM software applications, which can be accessed instantly. This includes touch-screen laptops, tablets, smartphones and other business facilities (e.g. mobile apps). Thus, it is still argued that paperless is the future, as paper can be replaced by a suitable user interface (UI).

2.4.1.2 The Usage of ECM Systems

ECM enables information management (IM) and the incorporation of data processing. This is achieved by ECM systems, which consist of software applications, platforms and computer and mobile devices. Also, ECM platforms are a business digital contents umbrella that covers the business management of documents, web content management (WCM), scanners, search, collaboration, record and workflow systems (Hullavarad *et al.*, 2015; Schulz, 2008). This aims to manage the information lifecycle from initial publication to archiving or final disposal. ECM systems are categorised into three platform methods: First, business applications, which are installed on the organisation's on-premise systems; Second, Software-as-a-Service (SaaS) that is a WCM communication system based on an ECM service supplier system; Third, the mixed business solution, which consists of organisational and SaaS platforms.

ECM makes IM better using tools such as storage-disks, security applications, and process control and routing platforms. These provide benefits by improving efficiency, enhancing control and making valuable cost savings (e.g. a banking system that changed to load electronic copies of money transfer receipt into an ECM instead of storing paper receipt in storehouses). Nowadays, ECM platforms are available depending on the nature of the business and its requirements. ECM facilities and platforms are computer networks and servers (cloud computing), personal computing (workstation), EDMS, search engines, smart-devices, portable applications, and document transfer and scanners.

2.4.1.2.1 Computer Networks and Servers (Cloud Computing)

The initiation of mainframes in the 1960s had changed business workflows when the network(s) client/server structures launched to make organisations able to store and use their contents electronically (Banks, 2012; Schulz, 2008). Also, early computer networks involved military radar (which is called a semi-automatic ground environment (SAGE) system). This was developed during the 1950s, but later in 1960, the business airline booking system, called semi-automatic business research environment (SABRE) operated a business network using communication between two mainframes (Banks, 2012; Moschovitis, 1999). In the same year, researchers at Dartmouth did establish the "Dartmouth Time Sharing System" to distribute users across a large computer system at Massachusetts Institute of Technology (MIT). Also, a research team at General Electric and Bell Labs used computers to route and manage telephone communications, and independently during the 1960s Leonard Kleinrock, Paul Baran and Donald Davies theorised and then developed network systems, which used the concept of packets of data. This was used to link computers, and then in 1965, T. Merrill and L. Roberts made the first wide area network (WAN). In 1969, the University of California, Stanford Research Institute (SRI International) and University of Utah were connected by the advanced research projects agency network (ARPANet) using 50 Kbit/s circuits (Sutton, 2008).

Information technology network servers are the core of our communication systems. The communication range has improved significantly since the 2000s by advanced IT networks (Sutton, 2008). The requirement for communication between organisations continues to drive computer hardware and software systems development (Sutton, 2008). ECM systems are used to support clients using their IT network servers. Now, IT network servers are cheaper to buy and run locally for hosting business contents. Many IT organisations offer cloud-computing (outsourcing) to their customers (clients) in order to use their IT

infrastructure. ECM platforms provide on-demand access by web-browsers. Nowadays, enterprises, businessmen and individuals have the freedom to manipulate contents from websites, and SaaS enables them to pay only for their needs to enjoy the benefits of ECM.

2.4.1.2.2 Personal Computer (Workstation)

The personal computer (PC) for business is used by a single user at a time and is usually connected to a local area network (LAN) (Zannos, 2002). Historically, the first recognisable workstation was the IBM1620 that was housed in a desk-sized table with disk-drives, printers, paper-tape, punched-card and typewriter (Figure 2.2). This scientific computer was introduced on 21st October 1959.

Figure 2.2 The IBM 1620 Computer Workstation Model (Zannos, 2002).

Afterwards, IBM introduced the IBM1130 in 1965, which was a successor to the IBM1620. These devices could run programs written in FORTRAN and other programming languages. In the 1970s, Lisp computers were developed to ensure high-performance, networked and single-user systems for professionals (Teitelman, 1975). By the early 1980s, Lisp PCs were commercialised by enterprises, such as Symbolics, Texas Instruments (the TI Explorer), Lisp Machines and Xerox "the Interlisp-D workstations".

The first PC designed for single-users with high-resolution graphics facilities was the Xerox Alto developed at Xerox PARC in 1973 (Hiltzik, 2000). Other first workstation PCs include Three Rivers PERQ in 1979 and Xerox Star in 1981 (Smith *et al.*, 1989). Workstations first became popular during 1979-1983, as in 1979 a VAX11/780 was bought to be shared by two laboratories (i.e. Space Sciences and Applied Mechanics). This was the first VAX system at Lockheed Missiles and Space Co. (Felippa, 1984). Since November 1983, growth in large scale engineering computing and data processing with large computers have been linked to LANs. This decentralised LAN entails the acquisition of user dedicated equipment.

In contrast, the larger mainframes were managed by centralised divisions whose policies had an indirect influence on users. So, when PCs connected to LANs, enterprises were able to create and store contents, and so there was a pressing need for ECM (Mancini, 2009).

2.4.1.2.3 Electronic Document Management Systems (EDMS)

During the 1980s, EDMS started gaining popularity (Hullavarad *et al.*, 2015; Schulz, 2008). EDMS was a sophisticated software tool that only runs using a word processing centre operative. As ECM software tools improved, the responsibility moved to administrators who were managing the enterprise contents. This continued during the 1990s with user-friendly software applications allowing employees to use the ECM platforms themselves. Now, ECM systems are commonly used by all staff to foster complete co-operation within the enterprise.

2.4.1.2.4 The Search Engine

With the digital content of an organisation distributed across many locations; there is a need to be able to locate resources when they are needed (Mancini, 2009, 2010). This provided the impetus for innovations in content management. ECM provides an integrated script searching tool to find contents. In July 1945, the idea of hypertext and memory-extension was revealed by Vannevar Bush (Bush, 1945). He advised scientists in building a body of knowledge, as he believed in storing data and if a data-source is useful, it should be available visually. He then presented the idea of a fast, limitless, reliable, associative memory storing and retrieving device system called "Memex". Since then, search engine models are still using Bush's concept to develop content retrieval systems.

From the 1960s to the 1990s Gerard Salton built his research groups at Harvard and Cornell, which made Salton's magic automatic retriever of text (SMART) system (Salton, 1987). SMART consists of significant concepts, such as the inverse document frequency (IDF), term frequency (TF), relevancy feedback mechanisms, term discrimination values and vector space model. Indeed, Salton's 'Theory of Indexing' provides the basis of current search engines (Salton, 1987).

Conversely, the ARPANet network led to the internet technology that the first websites were based on and in 1990 the first search engine, Archie, was created by Alan Emtage, a student at McGill University (Slawski, 2006; Sutton, 2008). Archie solves the data scattering problem by joining a script-based data gatherer with a regular expression matcher to manipulate digital files. Nowadays, Archie's database of web filenames is implemented by most search engine frameworks.

2.4.1.2.5 Document Transfer and Scanners

The popularity of computers and information technology developments did not, however, prevent paper documents existing, but the situation changed in 1985 when the first digital scanner was introduced (Mancini, 2009). This enables the conversion of a room full of paper to digital document files. As a result, many administrators migrated to work on ECM workflow systems. This allows organisations to move into the paperless mode and achieve superior management and control of contents. Also, scanning technology has been enhanced considerably, and today an employee can get a 50 page document, attach a barcode to it, and then scan it straight into their PC ready for digital usage.

2.4.1.2.6 Smart-devices and Portable Applications

Software-as-a-Service (SaaS) companies provide a variety of ECM workflow solutions, which are used to allow everywhere and at any-time access to contents (Mancini, 2009). Also, smartphones made a further step by showing information on a hand-held device. Employees can access their databases from anywhere, search for information and share contents easily from their mobile device. As innovation in computer devices continues so will innovation in ECM applications and workflow SaaS solutions.

2.4.1.3 The Future of ECM

ECM faces many future challenges, because of its complexity of services and capabilities (Hullavarad *et al.*, 2015; Mancini, 2010). Indeed, five key trends were identified as driving ECM growth and will, no doubt, continue to have effects on ECM in the future (Jenkins *et al.*, 2005). These five trends are increased legislation, security, higher bandwidth, online mobility and marketplaces. Also, ECM technology is continually evolving and its key future changes might include: First, that present UI functions of the ECM solutions will be superseded by super smooth and compelling UI, seducing users and invoking a change in user's performance to manage contents; Second, visualisation software applications will bring "big data" that help patterns and relationships within the information to be discovered; Third, ECM online market applications (mobile apps) such as Google apps; Fourth, social media apps continue to go viral in the consumer space, and social networking will facilitate much more rapid collaboration and knowledge sharing across enterprises; Fifth, information management is aligning more with ECM reforms to aid workflow effectiveness; Sixth, open-source systems will continue to provide on-the-go access against mainstream ECM vendors, as it is inexpensive and it has business models with an easier subscription licence.

Further, organisations have four main business practice strategy cases for using ECM solutions (Jenkins *et al.*, 2005). These are based on: how the ECM solution is distributed; whether it is a step move; is it additional kit; is it a full new configuration; or is it embedded in a device or hosted system? The four business practice strategies include:

1. Cooperate and Distribute: Most organisations seek an out of the box business solution to enable employees to collaborate on deliverables.

2. Controlled Content: These contents include sensitive information, such as contracts and procedures, which are regulated through systematic control, approval and reviews.

3. Internet and Network Applications: These include applications, which are specially targeted to provide products, services, sales and marketing products.

4. Records Management: ECM systems can maintain the organisation's records from creation until disposal.

ECM Tool/Capability	Systems of Record	Systems of Engagement
Content Primary Record Type	Authored Documents (Text, Graphics)	Communal Recordings (Image, Audio, Video)
Search-ability	Easy	Hard
Usability	User gets trained on system, follow-on support	User "knows" system from consumer experience
Accessibility	Regulated & Contained	Ad hoc & Open
Retention	Permanent	Transient
Policy Focus	Security (Protect Assets)	Privacy (Protect Users)
Professional Business Practice	*Enterprise Content Management "across the chasm"*	*Social Business Systems "pre chasm"*

Table 2.8 The future of ECM solutions (Mancini, 2010).

According to Mancini (2010), in business practice, ECM has developed from being a record system to an engagement system, but the recording functionality and features are still available, as engagement systems maintain recording tools and capabilities (Table 2.8). The ECM is required to produce enterprise content in digital format, which is increasing in most organisations' workflows (Hullavarad *et al.*, 2015; Mancini, 2009, 2010). ECM platforms are creative forms of collaboration (e.g. communication and information management) and have become common business solutions to achieve workflow effectiveness. ECM architecture is completed by integrating UI and basic services, such as records management.

Era	Mainframe	Mini	Systems of Engagement		
			PC	Internet	Social
	Systems of Record				
Years	1960-1975	1975-1992	1992-2001	2001-2009	2010-2015
Typical thing managed	A batch transaction	A departmental process	A document	A web page	An interaction
Best known company	IBM	Digital Equipment	Microsoft	Google	Facebook
Content management focus	Microfilm	Image Management	Document Management	Content Management	Social Business Systems

Figure 2.3 The ECM solutions development from 1960 to 2015 (Mancini, 2011).

Since 1960, ECM systems and platforms have been through five major development phases (Figure 2.3). From 1960 until 2015, it is clear that ECM faced many changes arising from developing technology and usability. This has been a positive influence, as ECM applications, tools and strategies are now considered essential for any organisation of any size to manage digital content. Indeed, ECM's future is progressive, as changes in business activities are sustained by organisational changes driven mainly by the requirements of cost reduction and increases in efficiency and effectiveness. Additionally, the future of ECM needs interaction between all the components of ECM technology. The value will lay in the combination of ECM architecture components by integrating the functionality required to create, share and distribute enterprise content. This supports staff to achieve higher performance to meet organisational goals.

2.4.2 Practical View on Enterprise Content Management

Enterprise content management has four key components (Figure 2.4), which make up a complete ECM architecture to accomplish business objectives (Hullavarad *et al.*, 2015):

1. **User Interface:** A user platform to process digital and non-digital information to be carried into the ECM information governance components. This could be completed using hardware (e.g. Scanners) or software (e.g. Adobe, Google Apps, Microsoft Office 365).

2. **Information Governance Components:** A key ECM records component used to distinguish ECM system digital contents from other archive systems. ECM systems can give

area location to a record using function and retention rules. Also, ECM systems can routinely update records after assigning retention duration, ensuring regulatory compliance.

3. **Attributes:** ECM has many features to achieve business goals including archiving systems, workflow solutions, integration solutions, data processing systems and information disposal systems.

4. **Repository:** ECM systems are used to securely store an enterprise's information and provide different access privileges with a variety of protocols to store data and information. ECM systems have two main repositories, which are onsite storage or cloud storage.
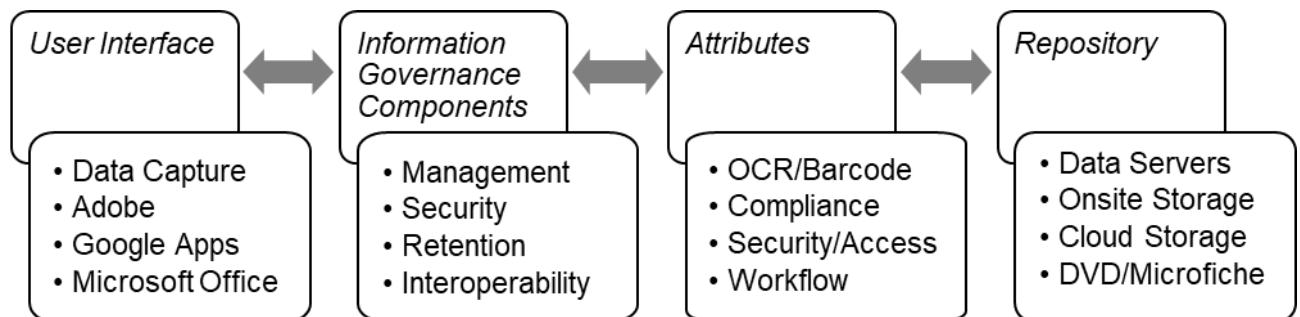
Figure 2.4 Enterprise content management architecture (Hullavarad *et al.*, 2015).

In this research, the ECM area of study is workflow information systems and business process management values. Therefore, the key focus includes ECM records management for information governance and workflow as a solution attribute (Figure 2.5). There are numerous ECM workflow solutions for information governance (e.g. IBM FileNet Content Manager, IBM Watson Explorer (Cognitive), OpenText Content Server, Xerox DocuShare, Microsoft SharePoint), which are dedicated to make an orchestration and sequentialization of business process activities in order to operate an organisation (IBM, 2018; Microsoft, 2018; OpenText, 2018; Xerox, 2018). These ECM workflow solutions are used to improve an enterprise's internal and external business content quality and collaboration along with keeping business processes consistent and standardised. Also, ECM workflow systems enable an agile information governance strategy, which is designed to reduce the risk and cost of any increase in content size within the enterprise. This supports the executive and senior management level to use the enterprise's content and information to make effective and efficient decisions in order to grow the business and increase creativity and innovation.

On the other hand, this research focuses on ECM as a workflow information system that can be assessed using the Delphi method in conjunction with CERT values, which indicate sets of workflow measurement activities to optimise ECM workflow systems performance.

ECM workflow solutions are WIS, which are used to improve an enterprise's customer services, streamline processes, employees productivity, track information, provide assistance to comply with regulations, eliminate unwanted digital and non-digital information and help implement business continuity measures (Hullavarad *et al.*, 2015). Importantly, an organisation uses ECM workflow solutions to identify the required type of organisational culture, data type and other ERP systems that ECM systems would be integrated with in order to ensure effective business processes performance.

2.4.3 Enterprise Content Management Performance

Enterprise content management has the capability to promote efficient, effective and flexible workflow systems performance (vom Brocke *et al.*, 2011b). Practically, ECM is a solution for most contemporary information management problems and business process management issues. ECM workflow systems are the business tools, approaches, processes and skills an organisation needs to manage its information assets over their business lifecycle. On the other hand, BPM workflow systems are the key engine driving ECM workflow solutions, because an understanding of business process activities is a crucial precondition for setting up and customising successful ECM workflow solutions to achieve business objectives.

ECM workflow system performance is the information system capability to run a business process management workflow system (Schmiedel *et al.*, 2013). The ECM workflow system ensures a profitable impact on several aspects of a BPM workflow system. This raises several questions such as, what information should an enterprise know? How does an enterprise establish a workflow structure that enables an understanding of its ECM workflow system? Indeed, enterprises should look at their BPM values as one of the major factors when implementing ECM workflow solutions, because of the impact of these on the business process's ability to meet organisational strategic goals (vom Brocke *et al.*, 2011b).

Research and practical business studies on ECM workflow systems have established key links to business strategy development, process and deployment using BPM workflow systems, as discussed by vom Brocke *et al.* (2011a), while others have argued that BPM analysis has provided a suitable basis for identifying content and its users along with the different systems in which content resides, as ECM workflow systems implementation affects business process activities. As a result, they argue, organisations should take CERT values as both the starting point and target for implementing ECM workflow solutions and BPM software applications.

2.5 Workflow Information Systems

Organisations are continually identifying new business directions and destinations to maintain their competitive advantage in order to allow organisational evolution (Sharp and Mcdermoot, 2009). Thus, a strategic plan that has several business actions is required to achieve these organisational changes. This guides the organisation's business objectives and responses to different common business questions, such as what should we do? who are we doing it for? Therefore, a complete mission framework can be used to implement and monitor the strategic plan (Figure 2.5). Workflow is the complete mission framework for implementing BPM systems in terms of "what we do and whom we do it for" (Sharp and Mcdermoot, 2009, p.72). Workflow acts as any framework (i.e. a structure to find, organise, systemise and perform, to generate an idea or present information). Indeed, the workflow begins when an initial request to make a process for a business purpose (e.g. Unit, Department, Project) is confirmed with the required operations and duties, after determining the business objectives and benefits (Epstein and Maltzman, 2013).
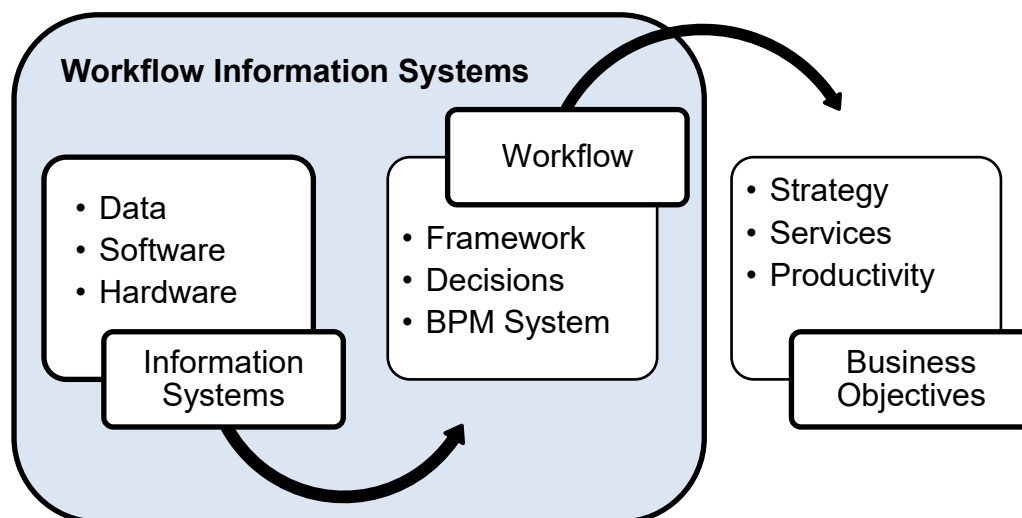
Figure 2.5 Workflow information systems context (Sharp and Mcdermoot, 2009).

The Workflow Management Coalition (WfMC) was established in 1993 to develop interoperability standards and common terminology for use by industry workflow vendors; WfMC has defined workflow as "The automation of a business process, in whole or part, during which documents, information or tasks are passed from one participant to another for action, according to a set of procedural rules" (Chang, 2006, p.132). In fact, a workflow management system (WMS) forms the BPM workflow lifecycle to support employees' activities during BPM workflow execution and result analysis (Holl *et al.*, 2014). WMS

controls BPM workflow systems to enable a framework for the business processes. Thus, a workflow is the set of work activities that emerge from business tasks and responsibilities.

Information systems and workflow are key BPM workflow system enablers (Figure 2.5). BPM tasks are broken down into a work breakdown structure (WBS) that describes the required actions and assigns resources to each business process to achieve a specific task or activity (Epstein and Maltzman, 2013; Sharp and Mcdermoot, 2009). Information systems consist of software applications, data and information, digital devices and other IT infrastructure components. In business process management, information systems are very important as they are used to manage processes such as IM platforms, software applications and DBMS. The role of IT is to support BPM approaches and their workflow technologies, which are used by business scholars and practitioners. Actually, information systems are used to improve business performance and individuals by formulating organisational values to be used as a management solution.

BPM workflow systems are BPM technology to meet business requirements using a WBS step-by-step strategic plan. Indeed, workflow and information systems are combined to form workflow information systems, which is the implementation of the WBS to allow the development of an enterprise with a competitive advantage (Guerrero-García *et al.*, 2008; Sharp and Mcdermoot, 2009). A WIS supports the improvement of enterprise performance, automates BPM, reduces cost and manages time (Figure 2.6). Thus, a WIS is the combination of BPM workflow system and IS applications to solve business problems and improve its performance. A key characteristic of a WIS is the BPM automation by connecting employees and business activities to information systems using ECM workflow solutions.

Workflow information systems manage workflow technologies for information management. WIS needs BPM as a tool to understand the business process. Thus, this study focuses on the impact of BPM values on ECM workflow system performance, as ECM software applications are used to implement BPM workflows (Guerrero-García, 2010, p.1; Schmiedel *et al.*, 2013, 2014). WIS strategic techniques can be used to evaluate the impact of CERT business process management values on ECM workflow system performance, as CERT values influence the organisational structure and behaviour. Indeed, CERT values represent four key BPM organisational values that help to ensure the achievement of business objectives (Schmiedel *et al.,* 2013). Customer orientation is the proactive and responsive attitude toward the needs of business process output recipients. Excellence relates to

continual improvement and innovation to achieve high performance leading to business success. Responsibility is the commitment to BPM objectives and accountability for decision-making. Teamwork is a positive attitude toward cross-functional collaboration.

2.6 Key Performance Indicators

The performance of business process management and workflow information systems can be monitored, measured and implemented through key performance indicators to achieve the organisational goals and objectives (vom Brocke *et al.*, 2016). Also, KPIs can be applied to control the management of an organisation (De Waal, 2010). Hence, employees have to be involved in recognising the organisation's KPIs based on their area of responsibility.

Practically, KPIs are used in performance measurement and management and help to facilitate an organisation's strategy to achieve business administration efficiency and effectiveness (Melnyk *et al.*, 2014). Therefore, the BPM construct of CERT values and the Delphi method are important for measuring workflow information systems performance in order to improve business processes and their associated workflow information system performance. In the following sections, the use of the Delphi method and KPIs to measure business processes performance, and the use of CERT business process management values to develop KPIs are discussed to formulate a PPM framework.

2.6.1 The Delphi method and Key Performance Indicators

The Delphi method has several advantages over other BPM frameworks and workflow systems measurement methods for developing decision-making criteria (Section 2.3). The major advantage of the Delphi method compared to other methods is in the validation of the Delphi results as experts are asked to validate their feedback classification to possibly reform the ultimate decision-making criteria (Schmiedel *et al.*, 2013, 2014). The Delphi method has BPM workflow system analytical rounds, which facilitate strategic decisions in terms of which BPM dimensions, an enterprise must improve. For example, the dimensions of CERT values that have KPIs below the average compared to others should be considered as KPIs for business performance development in a new BPM strategic plan.

Research studies found that the Delphi method has been successfully used to obtain the opinions of experts, structure a group communication process and build consensus to achieve study objectives. Hence, the Delphi method is a valuable research development

framework for eliciting participants' experiences and ultimate their agreement (Sitlington and Coetzer, 2015). Nowadays, it is necessary for enterprises to study their BPM workflow systems' future requirements in order to achieve their business objectives and required ECM workflow systems performance (Stitt-Gohdes and Crews, 2004). Hence, the Delphi method has the capacity to capture the collective knowledge of an enterprise BPM workflow system to find KPIs, which can be considered to improve ECM workflow system performance.

2.6.2 The Development of Key Performance Indicators

The Delphi method and CERT values can be applied to evaluate how an enterprise's various WIS are performing (Schmiedel *et al.*, 2013, 2014). Decision-makers can implement Delphi's rounds along with CERT values to examine ECM workflow system performance in order to improve their business performance. This may, for example, be used to develop organisational management information reports and a spider model diagram to explain ECM performance in relation to CERT values (Figure 2.6). Conversely, the Delphi method as a business study technique can be used to develop decision-making criteria and KPIs, which are used to improve WIS performance.
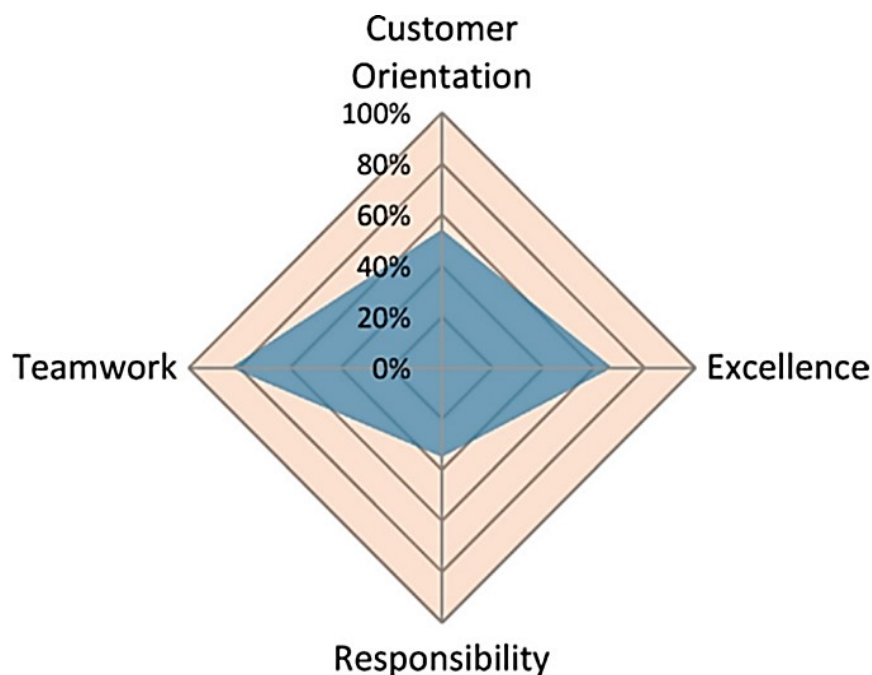
Figure 2.6 CERT insights spider model diagram by Schmiedel et al. (2014).

Practically, the Schmiedel et al. (2014) study recommended the application of the Delphi method for many business study areas to formulate decision-making criteria or key BPM performance indicators to improve BPM performance.

However, further research can be achieved by Delphi using other organisational or business values. For example, the Delphi method can be used to measure other business dimensions such as financial performance in terms of efficacy and robustness (Schmiedel *et al.*, 2013, 2014). Also, further studies are possible on dimensions such as business relations and social responsibility in the measurement and improvement of business practice.

The previous sections of this chapter have shown that the Delphi method has proven to be appropriate to construct, identify, select and validate KPIs for business process management purposes. Also, CERT values allow an enterprise to make an evaluation of its BPM workflow systems by ranking CERT classifications. Hence, the Delphi method and CERT values can be used to evaluate enterprise content management workflow solutions in order to improve business performance (Hullavarad *et al.*, 2015; Quyên, 2014; Schmiedel *et al.*, 2013). The Delphi method has some unique characteristics due to the weighing of results, which have shown significant contributions to business studies. Methodologically, the Delphi method is a successful framework to formulate KPIs to build a BPM construct (CERT values). The Delphi rounds construct the initial BPM key indicators, and then systematically structure them to be used as measurement business process values to evaluate workflow information systems performance.

In summary, the Delphi method is suitable for research studies and professional practice in a range of areas including a way to define roles of stockholders, identify business issues, find key performance indicators, explore critical issues, select a project team, forecast enterprise future and new strategies, answer research questions, deliver sufficient information for decision-making, develop service level agreements (SLA) and standards or policy construction (Nworie, 2011; Sitlington and Coetzer, 2015; Van Looy *et al.*, 2012). The following sections consider each CERT value and, through literature review, identify variables that can be used to assess the impact on ECM workflow system performance.

2.6.2.1 Customer Orientation

Customer orientation (C) is an aspect of business practice, which represents the way of doing business (Leo and Russell-Bennett, 2014). It is a behavioural concept related to meeting customer needs. Customer orientation involves employees 'listening to' and 'engaging in' dialogue with customers. However, service businesses may perceive employees' behaviour that goes against the organisation rules to be not only over-servicing but also dysfunctional sometimes with unfortunate consequences for the employees.

Customer orientation is the direct antecedent to information quality and the indirect antecedent to business performance (Chuang and Lin, 2013). Customer orientation at the organisational level is the belief in placing customer interests first, while not excluding the interests of all other stakeholders to develop a long-term profit, and at the individual level is the willingness of the individual service providers to customise their service delivery according to customer interests (Pimpakorn and Patterson, 2010). In service organisations, Customer orientation is directly related to perceptions of quality and employees' performance, which increase customer satisfaction and business performance (Tajeddini *et al.*, 2013). Customer orientation regards customers as both the driver of business improvement and a goal of business processes (Schmiedel *et al.*, 2013, 2014). Thus, Customer orientation itself contains key elements, which are creativity, commitment, communication and customer needs. These support formulating C variables (Table 2.9) by examining of the literature to find responses to the research C question (Section 1.4.1).

No.	Category	Variable	Reference
1	Creativity	Autonomy	(Martins and Martins, 2002; Sun *et al.*, 2012)
2		Influence	(Merlo *et al.*, 2006; Sousa and Coelho, 2011)
3	Commitment	Occupational Distress	(Aghdasi *et al.*, 2011; Malhotra *et al.*, 2013; Sousa and Coelho, 2011)
4		Job Satisfaction	(Aghdasi *et al.*, 2011; Donavan and Hocutt, 2001; Malhotra *et al.*, 2013)
5	Communication	Engagement	(Leo and Russell-Bennett, 2014)
6		Achievement	(Škrinjar and Trkman, 2013)
7	Customer needs	Expectations	(Chuang and Lin, 2013; Perry and Shao, 2005)
8		Work Quality	(Korunka *et al.*, 2007; Perry and Shao, 2005)

Table 2.9 References for Customer orientation categories and variables.

Also, statements used in part I of the research questionnaire were formulated from the references listed in Table 2.9, and the following sections provide details of these C elements. This supports the development of the research strategy model and PMM framework.

2.6.2.1.1 Creativity

Creativity is the role of personal values that affect Customer orientation. Personal values consist of goals that guide people's attitudes and behaviours across business situations.

Merlo *et al.* (2006, p.1215) described creativity as "the creation of a valuable, useful new product, service, idea, or process by individuals working together in a complex social system". Indeed, empirical research has defined creativity as the production of innovative and useful ideas concerning products, services and procedures (Sousa and Coelho, 2011; Sun *et al.*, 2012). These can be generated by a single employee or a team who could provide unique ideas, which are considered innovative.

Creativity reflects an ability to change according to customer needs and match those needs more effectively over-time. Also, creative decisions among service employees improve customer service quality that, in turn, improves customer satisfaction and loyalty, which are key to business success (Merlo *et al.*, 2006). Creativity is achieved when employees have high levels of autonomy in their tasks, a sense of ownership and control over their work and ideas. The experience of autonomy motivates employees to experiment with new ways of doing their jobs. Employees do creative work when they perceive themselves to have a choice in how to do their work (Sun *et al.*, 2012). The actualisation of personal aims in pursuing organisational goals involves creativity. The integration of organisational and personal business goals create value for creativity (Martins and Martins, 2002). This supports giving freedom to employees to be creative by understanding the business vision and mission. Creative work environments have a positive effect on employee job satisfaction and reduce stress. Also, it has been confirmed that employees with positive attitudes and motivation have a positive influence on their customers' satisfaction.

A creative work environment could stimulate employees' behaviour to produce positive customer experiences and improve customer satisfaction and relationships (Merlo *et al.*, 2006). In general, creativity is maintained by open communication between employees, management and different departments and is a determinant of an organisation's culture. Indeed, supporting managers in adapting rules is key to supporting organisational change, which influences creativity (Martins and Martins, 2002).

In a creative environment, attachment to an organisation is essential, because a committed employee is strongly able to believe in the organisation's mission and values. Hence, creative employees are keen to give enough time to address specific business issues and raise any issues during the course of providing business services (Sousa and Coelho, 2011). Overall, the literature around creativity identifies "Autonomy" and "Influence" as key variables that combine to impact on creativity with the Customer Orientation value context.

2.6.2.1.2 Commitment

Commitment is an important predictor of business success (Aghdasi *et al.*, 2011). It can have either a positive or negative impact. Also, employees with high affective commitment (AC) perform better than those with lower levels of AC. Commitment is positively related to an employees' motivation, job performance and job satisfaction; in contrast, commitment is negatively related to absenteeism, turnover and stress. Donavan and Hocutt (2001) confirmed that a positive perception of an employees' Customer orientation can lead to two positive outcomes: 1. an increase in customer satisfaction; 2. Improvement in commitment levels. Commitment is also about employees' organisational involvement. Commitment as a broad motivational variable may constitute a powerful force that focuses on employees' attention to job tasks, which are a pre-requisite for creativity to happen. Commitment is also positively related to employees' creativity, as it is likely to create openness to change.

According to Sousa and Coelho (2011), commitment produces positive organisational behaviour, as employees adopt behaviours that enhance the organisation's business processes. Thus, commitment means employees are willing to make every effort in order to ensure the successful accomplishment of tasks. Indeed, commitment is a form of business service quality relation. The three-dimensional approach to commitment comprises affective, normative and continuance commitments (Malhotra *et al.*, 2013). Affective commitment is the extent of employee emotional attachment to the organisation. Normative commitment (NC) denotes employee feelings of obligation to stay at the organisation. Continuance commitment (CC) is the commitment based on cost, which an employee associates with leaving the organisation. From the literature, AC has a stronger relation to business service quality than NC and CC because not all forms of commitment are strongly linked to job performance.

The Aghdasi *et al.* (2011) study approved that there is a strong relationship between components of emotional intelligence (EI) and commitment, as emotions have strong links with commitment despite the seemingly weak links between the control of emotions and the understanding of emotions with commitment. This shows a positive correlation between EI and commitment. Also, researchers have stated that EI is a key factor in increasing commitment and confirmed that AC has a positive relationship with EI. Indeed, employees with high EI have higher levels of AC and attachment to the organisation (Aghdasi *et al.*, 2011; Malhotra *et al.*, 2013). Also, organisations seek to encourage and promote AC among

their employees, as AC promotes high service quality performance. Hence, business strategies should include sharing the following duties: decision-making, role clarity, autonomy, training, feedback and job satisfaction. Overall, the literature around commitment identifies "Occupational Distress" and "Job Satisfaction" as key variables that combine to impact on commitment with the Customer Orientation value context.

2.6.2.1.3 Communication

Excellent business communication skills are necessary to improve customer orientation. Communication plays a key role in developing strategic responsive activities for customers (Leo and Russell-Bennett, 2014). Based on communication needs, employees need transparent and honest verbal communication with customers regarding expected products and services. Employees establish service communication behaviours, and studies on customer behaviours found that employees act in customers' interest in using their communication skills. Customer orientation is about employees 'listening to' and 'engaging in' dialogue with customers, and customer advocacy is a strategy of employees to represent customer interests (Leo and Russell-Bennett, 2014). Through improved communication, employees can engage in understanding the entire organisation's workflow systems, as they must know how their job impacts on others within the business environment.

Further, employees must understand how individual business processes contribute to organisational goals (Škrinjar and Trkman, 2013). Thus, an organisation's strategy and policy should be communicated, as effective communication is a key workflow success factor. Critical success factors are key areas for business growth. The literature suggests a range of well-known CSF to improve business processes by means of a workflow system.

For example, the requirement for top management support, effective project management, excellent communication and employee training. Indeed, top management people need to ensure that the organisational strategy can fit with the contingencies of the business environment (Škrinjar and Trkman, 2013). This should be communicated across the organisation, and employees must understand the contingencies to be able to achieve the organisation strategy. Accordingly, business processes can be improved using communication, values, leadership and change management, rather more than just using a business strategy. Overall, the literature around communication identifies "Engagement" and "Achievement" as key variables that combine to impact on communication with the Customer orientation value context.

2.6.2.1.4 Customer Needs

Realising customer needs is a key Customer orientation objective. This means business should provide the right service at the right time to meet customer expectations. Actually, a business environment that allows staff to deliver customer-oriented service can increase customer satisfaction by improving Customer orientation (Korunka *et al.*, 2007). Customer orientation is influenced by data collection on customer needs, employee training, teamwork and performance reward systems. Indeed, it is difficult to ignore the need to change, when information from two different parts of the business environment support change (Korunka *et al.*, 2007; Perry and Shao, 2005). Usually, new customers' requirements are different from those of current customers, and so requires careful consideration. Also, an organisation with weak Customer orientation would lack sufficient means to collect and distribute customer information leading to decisions being made misaligned with customer needs.

Further, organisations with the right Customer orientation must generate a deeper understanding of customers to develop, implement and sell services (Perry and Shao, 2005). Information from customers is used to define customer needs, which in turn help produce complete business solutions to customer problems or issues (Chuang and Lin, 2013). Research studies confirmed that Customer orientation could positively affect the quality of information gained from customers by facilitating information processing. For example, information sharing can be leveraged to enhance understanding of customer needs and how to respond to such needs quickly. This reveals the following findings: First, organisations must be in harmony with resource-strategy variables to extract high-quality information, especially information from customers; Second, modifications in business resources and strategies play a pivotal role in enhancing the quality of information (Chuang and Lin, 2013). Overall, the literature around customer needs identifies "Expectations" and "Work Quality" as key variables that combine to impact on customer needs with the Customer orientation value context.

2.6.2.2 Excellence

Excellence (E) relates to the evaluation of how well service is managed and the value clients place on the organisation's services to identify the priorities of business development (Moullin, 2007). Organisational excellence relates to outstanding practice in managing an organisation and bringing value to clients and other stakeholders. Excellence points to the organisation's business strengths and weaknesses, contains a provision for business

performance evaluation, provides a basis for business continuance improvement and contains a provision for employee's professional recognition. Excellence focusses on achieving results to delight stakeholders, fulfilling customer needs, (which can be derived from quantitative analyses) and consistently managing the business by stimulating entrepreneurship to optimise business performance. Managing the efficiency and effectiveness of key business processes through fact-based management results in business process excellence, subsequently reflected in key financial indicators.

No.	Category	Variable	Reference
1	Efficiency	Efficiency Rate	(Antony and Bhattacharyya, 2010; Sundqvist *et al.*, 2014)
2		Efficiency Performance	(Aktaş *et al.*, 2011)
3	Effectiveness	Effectiveness Rate	(Antony and Bhattacharyya, 2010; Sundqvist *et al.*, 2014)
4		Effectiveness Performance	(Draghici *et al.*, 2014; Sundqvist *et al.*, 2014)
5	Empowerment	Service Quality	(Ro and Chen, 2011; Sun *et al.*, 2012)
6		Controls	(Ro and Chen, 2011; Sim and Carey, 2003)
7	Employee orientation	Corporate Financial Performance (CFP)	(De Bussy and Suprawan, 2012)
8		Employee orientation	(Groen *et al.*, 2012)

Table 2.10 References for Excellence categories and variables.

Organisations strive to optimise people's capabilities and strengthen their organisational relations to increase motivation and lend support to their business goals (Marrewijk *et al.*, 2004). Indeed, improving organisational excellence is central to any business that wants to reach business objectives successfully (Marrewijk *et al.*, 2004; Schmiedel *et al.*, 2014). Therefore, the Excellence value key organisational categories are efficiency, effectiveness, empowerment and employee orientation. These support formulating E variables (Table 2.10) to find responses to the research E question (Section 1.4.2), which enable comparative evaluation of ECM workflow system performance. Also, statements used in part II of the research questionnaire were formulated from the references listed in Table 2.10, and the following sections provide details on the organisational E categories, which support the development of the research strategy model and PPM framework.

2.6.2.2.1 Efficiency

An organisation's business processes efficiency is the degree to which it uses a business resource for a purpose. A business process is efficient when it is making good use of time or energy. Indeed, efficiency is a question of input and transformation process and can be measured by the ratio of the resource expected to be consumed to the actual consumed resource (Antony and Bhattacharyya, 2010). On the other hand, organisational efficiency is the measurement of operations with productivity, communication, quality, stability-control, growth, cohesion, planning, adaptability and personnel development (Aktaş *et al.*, 2011). A focus on time, cost and scope relates to the concept of efficiency, as organisations look to ensure that what is carried out is performed as well as it can be. Efficiency is an evaluation process to rate the condition of a process 'from harmful to zero-harm' in a spectrum from 'lack of' to 'high' efficiency (Sundqvist *et al.*, 2014). Hence, high efficiency is reached when a process is free of defects, has a lower cost, less time, no-waste and low cost of poor quality. Overall, the literature around efficiency identifies "Efficiency Rate" and "Efficiency Performance" as key variables that combined to impact on the efficiency with the Excellence value context.

2.6.2.2.2 Effectiveness

Effectiveness is the degree to which an organisation achieves workflow objectives and solve business problems. Effectiveness has a key characteristic, which is the convergence of results to objectives; it is about doing the right things at the right time with the right quality (Draghici *et al.*, 2014). Organisational effectiveness is a ratio of actual output to expected output (Antony and Bhattacharyya, 2010).

Certainly, the concept of effectiveness is used to evaluate an organisation's workflow solution based on internal improvements in terms of time, cost and quality, and external improvements in terms of customer satisfaction (Sundqvist *et al.*, 2014). Effectiveness is listed as one of the measures of maturity for quality management, as it refers to improvement in managing business tasks with the goal of delivery on time and within budget. When effectiveness is applied to customer satisfaction it implies that workflow output exceeds full customer requirements. Usually, cost and time are the most commonly used variables when implicitly measuring effectiveness, as being effective is getting the most out of allocated resources. Overall, the literature around effectiveness identifies "Effectiveness Rate" and "Effectiveness Performance" as key variables that combine to impact on effectiveness with the Excellence value context.

2.6.2.2.3 Empowerment

Empowerment means giving the decision-making authority to an organisational level or to people who are able to make a quick, right and effective choice (Sim and Carey, 2003). Many organisations have achieved improvements in business workflow performance by empowering their employees; such organisations include NUMMI, Xerox, Hewlett-Packard and U.S. Steel. Empowerment has a positive impact on workflow systems performance, as such management action supports employees' motivation (Ro and Chen, 2011).

By understanding 'control' as an empowerment tool, organisations can increase their revenues. Control as a management system is used to influence employees' behaviour to meet the organisation goals. A question which should be addressed under empowerment is, what assumptions do we have to make in respect to human nature prior to identifying the right controls in workflow systems? Certainly, empowered daily business operations are placed under work-teams (group-based) control, as workflow systems performance can be improved only when rewards are based on group performance (Sim and Carey, 2003). Empowerment is not doing what you want when you want; instead, it is making positives outweigh negatives and supporting staff by rewards. This works when employees take ownership of what empowerment produces.

Empowering employees makes them able to speed up the workflow as a result of quick decision-making to solve problems (Ro and Chen, 2011). Empowerment is promoted when employees adopt behaviours due to the demands of each service encounter. Individual and organisational factors should be considered to increase employees' perception of empowerment. In service excellence, empowerment is the power that gives more freedom of choice in decisions and power to frontline employees, which allow more opportunity, responsibility and authority in the workplace. Organisations look to build an empowered workforce to make more information available to people, as information flow enforce employees feeling of autonomy, responsibility and involvement to improve service quality.

Indeed, empowerment relies on managers being able to focus on developing their skills to better communicate the vision and mission, stimulate enthusiasm, set high expectations, support employees to build confidence in performing business tasks, provide a flow of challenging new business process ideas and encouraging the solution of business problems (Sun *et al.,* 2012). In general, managers should develop an empowerment specialist climate and reengineer their organisational structure to enhance autonomy at all levels.

Overall, the literature around empowerment identifies "Service Quality" and "Controls" as key variables that combine to impact on empowerment with the Excellence value context.

2.6.2.2.4 Employee Orientation

Employees are the most valuable stakeholder group, as evidence supports the fact that an employee orientation adds more to corporate financial performance (CFP) than orientation towards any other primary stakeholder group (De Bussy and Suprawan, 2012). In contrast, performance measurement (PM) may stimulate employee initiatives to improve business performance, as employees share in workplace development of performance measurement (Groen *et al.*, 2012). Employees' who share in PM influence many factors, including the conceptualisation of performance evaluation, defining the measures, identifying required data, adapting information systems, designing graphs and tables for measures presentations, and producing a periodic performance report. However, an employee's orientation (e.g. self-starting, active, persistent) is an important part of a modern job performance aim of continuing the improvement of workflow systems. Overall, the literature around employee orientation identifies "CFP" and "Employee Orientation" as key variables that combine to impact on employee orientation with the Excellence value context.

2.6.2.3 Responsibility

Responsibility (R) is the empowerment of workflow tasks to keep the business continually working (Schmiedel *et al.*, 2013). Responsibility refers to the inner feeling of obligation to achieve workflow actions to meet business objectives. Responsibility is the ability to process decisions to make a controlled structure for workflow stability. An employee's responsibility enhances their motivation to collaborate, which in turn promotes communication and strengthens the learning process to acquire business technologies, as well as workflow tools and solutions (Chen *et al.*, 2011). Hence, responsibility makes the workforce accountable for specific elements of business success.

Responsibility and organisational goals are two factors that lead to experiencing trust, which enables individuals to deal with uncertainty and reduce doubt (Chen *et al.*, 2011; Schmiedel *et al.*, 2013). Therefore, responsibility key categories are responsiveness, result orientation, right quality and right skills. These support formulating R variables (Table 2.11) to find responses to the research R question (Section 1.4.3), which enable comparative evaluation of ECM workflow system performance. Also, statements used in part III of the research questionnaire were formulated from the references listed in Table 2.11, and the following

sections provide details on the organisational responsibility categories, which support the research strategic model and PPM framework.

No.	Category	Variable	Reference
1	Responsiveness	Response Reliability	(Danese *et al.*, 2013)
2		Response Time	(Danese *et al.*, 2013; Schmiedel *et al.*, 2013)
3	Result orientation	Results Time	(Gu *et al.*, 2014)
4		Manageability	(De Waal, 2010)
5	Right quality	Sustainability	(Staiculescu, 2014)
6		Quality Management	(Jinhui Wu *et al.*, 2011)
7	Right skills	Time to Completion (TTC)	(e Silva and Costa, 2013)
8		Skills Allocation	(e Silva and Costa, 2013)
9		Employee Skills	(Wang *et al.*, 2011)

Table 2.11 References for Responsibility categories and variables.

2.6.2.3.1 Responsiveness

Responsiveness is the reaction performance of the organisation to internal and external business inquiries (Schmiedel *et al.*, 2013). Responsiveness is the achievement of flexibility and delivery performance. Thus, responsive organisations are those excelling both in delivery (e.g. on-time) and flexibility (e.g. change of volumes). Responsiveness is the effort within workflow systems that involves participants in physical resource and information flows across supply networks (Danese *et al.*, 2013). This results in benefits from improved business communication, an attitude of problem sharing to reduce uncertainty and risk of delivery on schedule, processing on time and meeting scheduled due dates. Overall, the literature around responsiveness identifies "Response Reliability" and "Response Time" as key variables that combine to impact on responsiveness with the Responsibility context.

2.6.2.3.2 Result Orientation

Result orientation is used to support managers when making decisions, which are related to workflow design and execution (Gu *et al.*, 2014). Thus, managers should use a result orientated culture to enhance workflow system performance. Result orientation can be used for improving results and PM. Also, studies have suggested a combination of performance-driven behaviour and regular use of a management control system as tools to improve results. The effectiveness of PM is formed by the degree to which employees feel

responsible for their performance results and willingness to use PM to get performance information, which helps them to improve workflow system performance results. The responsibility for results requires a workforce to have certain flexibility to influence their results favourably and take action (De Waal, 2010). Therefore, employees should be authorised to take independent action on business problems and severe issues.

Indeed, a manager with an effective style can explicitly steer on results, while simultaneously supporting employees to achieve the desired results (De Waal, 2010). Hence, result-oriented steering entails the workforce making clear agreements, monitoring and investigating business issues and independent responsibility. Also, a coaching management style aims to improve an employee's insight into their possibilities to influence their results and responsibilities. The combination of both result-oriented steering and coaching management style is "result oriented coaching". Overall, the literature around Result Orientation identifies "Results Time" and "Manageability" as key variables that combine to impact on Result Orientation with the Responsibility value context.

2.6.2.3.3 Right Quality

Quality is a concept related to the desire to get financial benefits in an ethical manner (Staiculescu, 2014). Organisations promote equally responsibility and quality as two essential business components, because quality must be the responsibility of everyone, to ensure sustainability. It is clear that improving quality cost is a real advantage that successful organisations achieve. Quality of business processes is not achieved only by scientific performance, but also by responsibility in managing costs. However, quality exploitation practices are highly related to business performance outcomes when quality values are not key to the organisation's culture. In contrast, quality exploration practices are significantly associated with business performance evaluation when quality values play a key role in the organisation culture (Jinhui Wu *et al.*, 2011). The tension between exploitation and exploration exists in quality management, as organisations need to control stable and familiar workflow tasks to improve business efficiency.

Furthermore, quality exploitation aims to control the identified workflow systems (Jinhui Wu *et al.*, 2011). Also, organisations need new insights for innovation and exploration of the unidentified workflows to improve business quality. Indeed, quality needs the supportive values of doing the right thing at the right time, striving for continuous improvement, and fulfilling customer needs (Jinhui Wu *et al.*, 2011). Actually, the right quality in TQM

implementation influences how the organisation practices quality to achieve high business processes and workflow systems performance results. Overall, the literature around the right quality identifies "Sustainability" and "Quality Management" as key variables that combine to impact on right quality with the Responsibility value context.

2.6.2.3.4 Right Skills

According to recent studies, signing-off a reliable software product on-time is problematic for information systems and software technology organisations (e Silva and Costa, 2013). They claim that the cause of delay is the time taken for professionals to acquire the necessary skills to undertake tasks and yet not meeting timetable deadlines, which results in financial loss. Also, there is a problem in judging how to allocate employees when new services, responsibilities or tasks emerge. Thus, organisations should ensure that staff have the right skills and sufficient time to complete an assignment, which means deciding carefully how many and which professionals should be allocated to each assignment. This is essential when preparing to set up a business process (framework) and allocate suitable employees.

Professionals should have the right skills to ensure tasks are achieved in the allocated time to completion (TTC), (e Silva and Costa, 2013). The right skills are often acquired through staff development that includes formal training, informal development and opportunities to develop team (or group) relationships (Wang *et al.*, 2011). Hence, acquiring the right skills is fundamental to support the organisation to achieve its business objectives. Overall, the literature around the right skills identifies "TTC", "Skills Allocation" and "Employee Skills" as key variables that combine to impact on right skills with the Responsibility context.

2.6.2.4 Teamwork

Teamwork (T) is about how employees can be utilised effectively to reach high levels of business effectiveness (Tohidi, 2011). Improving teamwork involves looking to new ways for employees to be faster, more efficient and better prepared for future tasks. This might involve, for example, team reward systems, which are a fast-growing strategy for team-based environments. Team-based working can have dramatic benefits including increase profit, organisation efficiency and an improved alignment of teamwork to business needs. Also, Teamwork is the attitude of cross-functional collaboration, as it focuses on workflow instead of functional departments. Teamwork is the degree of collaborative behaviour toward workflow implementation.

No.	Category	Variable	Reference
1	Transparency	Authentic Leadership	(Norman *et al.*, 2010)
2		Trust	(Norman *et al.*, 2010)
3	Transformational leadership	Transformational Leadership Behaviour Inventory (TLI)	(Tse and Chiu, 2014; Zhang *et al.*, 2014)
4		Consideration of Future Consequences (CFC)	(Zhang *et al.*, 2014)
5	Transactional leadership	Consideration of Future Consequences (CFC)	(Epitropaki and Martin, 2013)
6		Quality of Work Life (QWL)	(Kara *et al.*, 2013)
7	Team collaboration	Team Productivity	(Tohidi, 2011)
8		Team Learning	(Akgün *et al.*, 2014; Tohidi, 2011)

Table 2.12 References for Teamwork categories and variables.

Further, Teamwork involves individuals, as together they constitute a "team" and coordinate jointly to manage their tasks in order to achieve business responsibilities (Akgün *et al.*, 2014; Schmiedel *et al.*, 2013, 2014). Team members add their professional skills, experience and knowledge of areas, which they are familiar with to stimulate systematic services and perform effectively for joint business benefits. Also, Teamwork improves conflict resolution by motivating employees to learn from each other's perspectives through communication and collaboration. Therefore, Teamwork has key organisational categorise, which include transparency, transformational leadership, transactional leadership and team collaboration. This supports formulating T variables (Table 2.12) to find responses to the research T question (Section 1.4.4), which enable comparative evaluation of ECM workflow system performance. Also, statements used in part IV of the research questionnaire were formulated from the references listed in Table 2.12, and the following sections provide details on the organisational T categories, which support the development of the research strategy model and PPM framework.

2.6.2.4.1 Transparency

Transparency is a willingness to exhibit a pattern of openness and clarity in personal behaviour toward others by sharing the required information to make decisions, accepting others' inputs and disclosing personal values, motivations and ideas in a manner that enable

followers to more accurately assess the competence and morality of leader's actions (Norman *et al.*, 2010). Transparent leadership represents transparency in tasks such as decision-making. Transparency is being obvious, understandable, clear, truthful and articulate to ensure business continuance.

Transparency characteristics are sharing relevant information, being open to feedback, being forthcoming regarding motivations and the reasoning behind decisions, and displaying alignment between words and actions (Norman *et al.*, 2010). Transparency is a key ingredient for effective business communication, engenders high levels of confidence, hope, optimism and resiliency, which are known as leader positivity and effectiveness. Overall, the literature around transparency identifies "Authentic Leadership" and "Trust" as key variables that combine to impact on transparency with the Teamwork value context.

2.6.2.4.2 Transformational Leadership

Transformational leadership has an influence on creative behaviour (Tse and Chiu, 2014). Individual and group features are proposed as social identity mechanisms, which reflect the characteristics of personal and collective identity orientations that underpin different effects of transformational leadership behaviours on workflow systems performance. Transformational leadership is an approach to understanding an individual, a group and their effectiveness. Indeed, the transformational leadership behaviour inventory (TLI), which is used to measure an individuals' perceptions of leader behaviours, examines the effects of individual and group focused transformational leadership behaviours on respective mediators and performance outcomes (Tse and Chiu, 2014; Zhang *et al.*, 2014).

Transformational leaders have a set of behaviours that include raising followers to a higher level of achievement and using their strengths for collective welfare, focusing on their growth and developing their problem-solving skills (Tse and Chiu, 2014). Transformational leadership can positively transform the focus of employees from self-interest to a collective vision and motivate them, as effective leaders promote effective activities. Also, transformational leadership encourages self-control, endurance, emphasise coordination, self-sacrifice and care to comply with an organisation business environment and consideration of future consequences (CFC) to achieve its organisational values (Zhang *et al.*, 2014). Overall, the literature around transformational leadership identifies "TLI" and "CFC" as key variables that combine to impact on transformational leadership with the Teamwork value context.

2.6.2.4.3 Transactional Leadership

Transactional leadership is used to clarify employees' tasks to meet their responsibilities, so they are rewarded for achieving certain performance levels (Epitropaki and Martin, 2013). Transactional leadership is related to individuals, CFC and workflow business outcomes (e.g. effectiveness, satisfaction, commitment, wellbeing). Transactional leadership has a positive effect on soft and hard influence tactics. Hence, employees are likely to use the whole spectrum of upward influence tactics to influence a transactional leader. Certainly, transactional managers make performance expectations clear, reward people accordingly and take corrective action, if necessary.

Additionally, transactional leaders engage in behaviours related to the constructive management style (contingent reward) and the corrective management style (management-by-exception), as they articulate role expectations and promote personal performance and quality of work life (QWL) to meet business objectives (Kara *et al.*, 2013). Overall, the literature around transactional leadership identifies "CFC" and "QWL" as key variables that combine to impact on transactional leadership with the Teamwork value context.

2.6.2.4.4 Team Collaboration

Team collaboration is the ability of teams to work together and across tasks. It is used to formulate the shared understanding of mission, process and the respective roles of the team members (Tohidi, 2011). Team members can diagnose problems, generate solutions and implement these solutions to solve problems. Team members find a solution to problems by sharing their professional knowledge and experience, so they avoid hiring consultants from outside to handle unexpected problems in order to reduce cost at the operational level.

Indeed, team collaboration supports solving unexpected problems that require insights or perspectives, rather than coping with such problems individually, as team members experience lowers the risk of implementation failure (Akgün *et al.*, 2014). Exchanging experience expands team knowledge, improves problem analysis and allows better assessment of potential solutions. In summary, team collaboration is an engagement process for learning behaviours that is more likely to allow learning from mistakes, integration of new information and benefit derived from team members experience. Overall, the literature around team collaboration identifies "Team Productivity" and "Team Learning" as key variables that combine to impact on team collaboration with the Teamwork value context.

2.7 Performance Measurement and Management

The evaluation of organisational workflow system performance needs a performance measurement and management framework (Melnyk *et al.*, 2014). CERT values can be applied to formulate dimensions for performance measurement in order to recognise the efficiency and effectiveness of the workflow system to meet business objectives (Schmiedel *et al.*, 2013, 2015). Hence, CERT values and their categories and variables are strategic PMM dimensions to evaluate ECM workflow system performance (Figure 2.7).
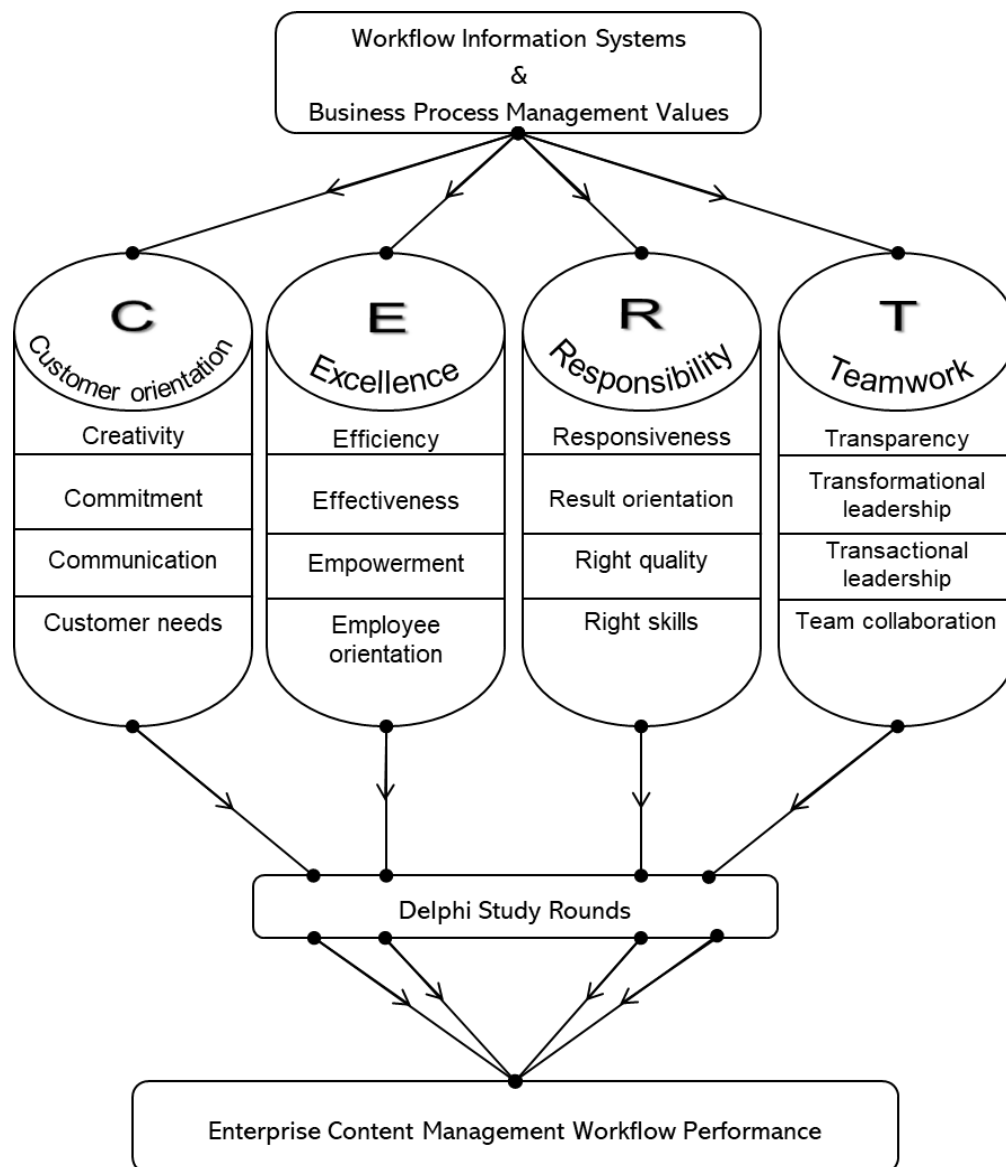
Figure 2.7 Performance measurement and management strategic model.

The codification of CERT values by Schmiedel *et al.* (2013, 2014, 2015) studies have recognised a set of WIS categorise, which can impact on BPM workflow systems and achieving business objectives. So, the research strategy follows a set of categories to find

key variables from the CERT construct (Section 2.6.2). These key variables of each CERT value can be applied as KPIs to measure ECM workflow system performance. Overall, Customer orientation categories are Creativity, Commitment, Communication and Customer needs (Figure 2.7). Excellence categories are Efficiency, Effectiveness, Empowerment and Employee orientation. Responsibility categories are Responsiveness, Result orientation, Right quality and Right skills. Teamwork categories are Transparency, Transformational leadership, Transactional leadership and Team collaboration.
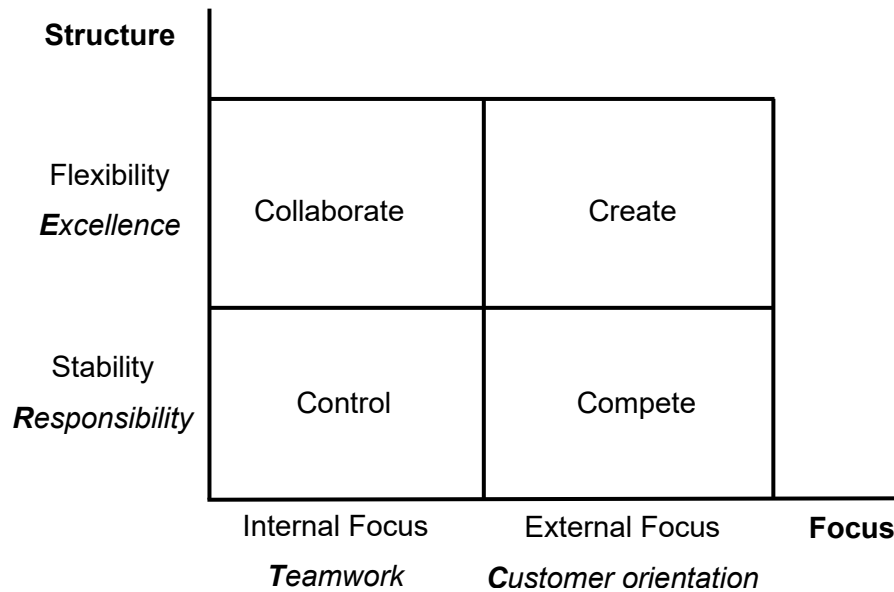
Figure 2.8 The research PMM framework using CERT values (Schmiedel et al. 2013).

The competing values framework (CVF) is an organisational culture assessment instrument (OCAI) with multidimensional characteristics that predicts the current (now) and preferred (future) situations of the organisational culture (Cameron and Quinn, 2011). According to Schmiedel *et al.* (2013, 2015), the CVF in combination with CERT values can provide a set of dimensions, which can be used as a PMM framework (Figure 2.8). The CERT values PMM framework has two dimensions: First, a focus on internal versus external; Second, structure flexibility versus stability (Melnyk *et al.*, 2014; Schmiedel *et al.*, 2013). These dimensions can identify four types of organisational culture (aspects), which are: collaborate, control, compete and create. Figure 2.8 summarises these characteristics as follows: 1. focusing on internal aspects, as 'Collaborate' is characterised by a strong sense of belonging to a community, while 'Control' is driven by rules and processes, which are used to account for security, efficiency and uniformity; 2. focusing on external aspects, as 'Compete' is concerned with productivity, performance and goal achievement, while 'Create' emphasises growth, risk-taking, innovation and adaptability to change in the business environment.

2.8 Synopsis

A key finding of this review is that BPM values are able to measure ECM workflow system performance by finding the impact of these values (Schmiedel *et al.*, 2013, 2014). Until now, BPM and ECM research studies did not examine the impact of CERT values on ECM workflow system performance. According to Schmiedel *et al. (*2013, 2015) and vom Brocke *et al.* (2011a, 2011b) research studies, the BPM approaches can be used to achieve business objectives, but more research studies are required to examine how CERT values are related to efficient and effective business processes. Hence, this research seeks to address this specific research gap and apply the CERT values to measure ECM workflow system performance in order to achieve business objectives and organisational goals.

Therefore, a further research gap has been identified, which is to examine the measurement of CERT values and their categories through the identification of variables in order to assess each CERT value using ECM workflow systems. The justification for this is that the ECM workflow system can be improved by measuring the impact of CERT values on the system's performance. CERT values can be used as KPIs to recognise business process issues using the Delphi method (Sections 2.6). This can be used as a weighing system for decision-makers to produce decisions and undertake forecasting that recognises the core elements of improvement to ECM workflow system performance. The Researcher's own practical experience in MIS has highlighted the need for the development of a methodological process through which ECM workflow systems can be assessed and improved (Section 1.2). This further gap is explored using CERT values as KPIs within a Delphi process and then with the CVF to develop a performance profile and identify areas for improvement (Figure 2.7).

In summary, this literature review has identified the possibility of applying both the methodology and the results of BPM research to evaluate ECM workflow systems performance. Thus, the key tasks to be performed are: First, establish whether the identified variables from the literature can form a consistent set of measures for each CERT value (Section 2.6.2); Second, apply the CERT values in conjunction with the Delphi method to assess an ECM workflow system in practice; Third, use these results in conjunction with the CVF to suggest ECM workflow system improvements that would impact work practice through all dimensions of CERT (Figure 2.8). Fourth, critically review the outcome of the first three stages to establish answers to examine the hypotheses and questions highlighted in Chapter 1. These research themes are discussed further in the following chapters.

Chapter 3: Research Methodology, Design and Methods

Overview

The research philosophy, approach, design, methodology and methods along with data collection and analysis techniques are discussed in this chapter. The purpose of this chapter is to present the methodological justification for measuring enterprise content management workflow system performance. Indeed, chapter two (i.e. literature review and practical background) has been used to support this chapter to demonstrate the role of both theory and practice in order to develop the research methodology and methods. Also, this chapter explains the methodology and methods, which are used to implement the research PMM strategic model (Figure 2.7). Further, the research framework, which is used to develop and implement the research methodology is explained to show how workflow information systems and BPM values can be applied to measure ECM workflow system performance. Furthermore, the research questions, which are explained in chapter one (Section 1.4) are used to formulate questionnaires in the first phase of the research and face-to-face interviews in the second phase.

3.1 Introduction

The research theoretical approaches are discussed in this chapter based on the term "*methodology*" (Saunders *et al.*, 2015, Chapter 1). This includes the use of theory, and consideration of several philosophical worldviews (Creswell, 2013, Chapter 1). The philosophical worldviews are used to formulate the fundamental beliefs, behaviours and attitudes that underpin the research framework and the practical actions needed to find answers to the research questions. These philosophical worldviews include consideration of key terms, which are *ontology*, *epistemology* and *axiology*, and describe the research practicality. Additionally, the research techniques, procedures and phases are presented, described and discussed based on the term "*methods*" (Saunders *et al.*, 2015, Chapter 1). The methods are used to enable the research data collection and analysis, such as questionnaires, interviews, quantitative data analysis (e.g. descriptive analysis techniques, statistical relationships analysis, forecasting) and qualitative data analysis (e.g. Grounded Theory, classification into categories, transcript analysis, template analysis etc.).
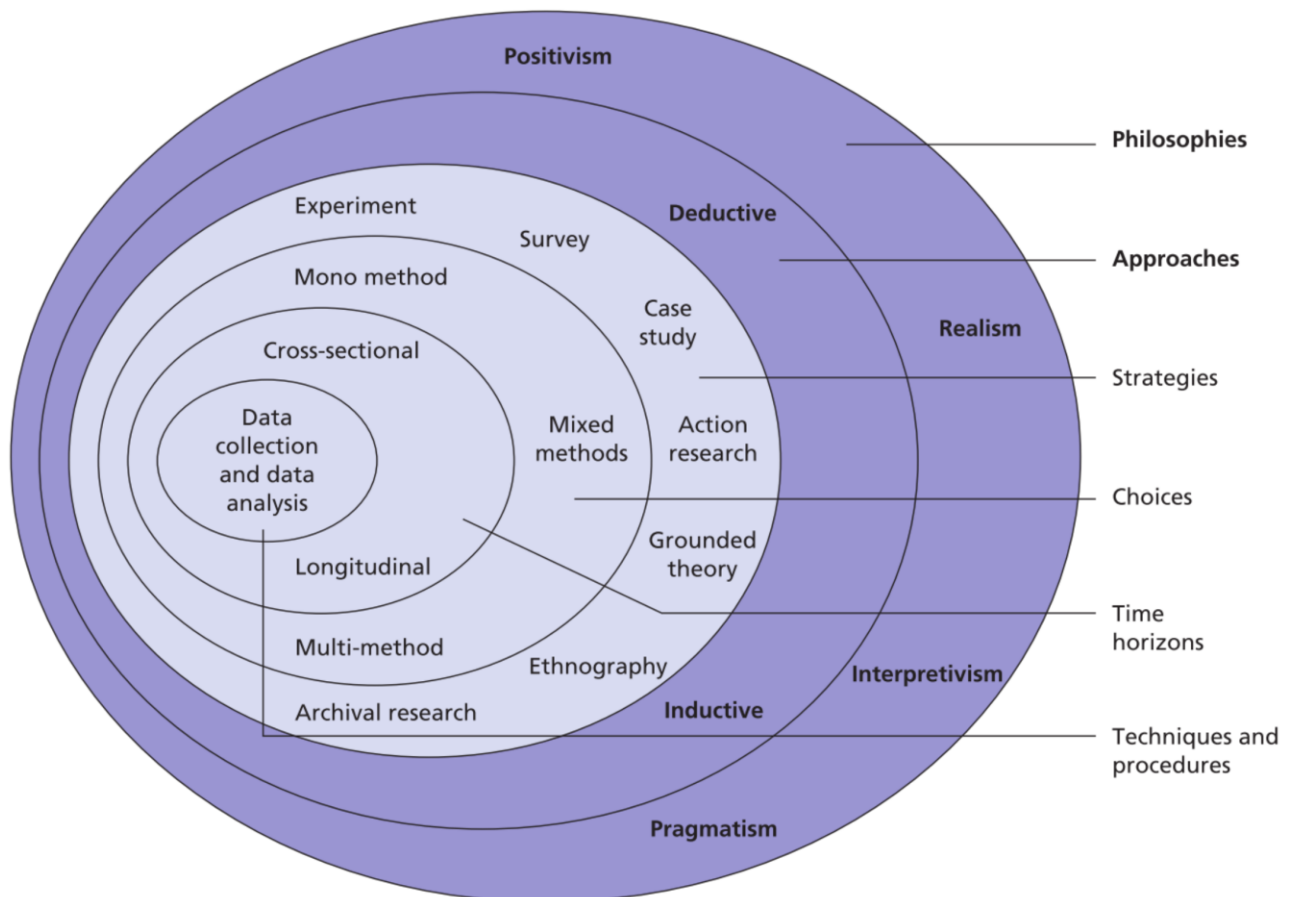
Figure 3.1 The research 'Onion' (Source: Saunders *et al.*, 2009, p.108).

The adopted research philosophy assumptions (Section 3.2) and the importance of these philosophies, as well as information systems research philosophical positions, are explained (Becker *et al.*, 2015; Creswell, 2013; Saunders *et al.*, 2009, 2015). The 'research onion' has been implemented as a framework to organise the selection of research philosophies, approaches, strategies, choices and techniques and procedures (Figure 3.1). Also, the research approach has been identified for conducting the research based on the chosen theoretical worldview. The research approach involves the use of theory based on the adopted research philosophy (Section 3.3).

The research strategy and framework implement mixed methods as the research choice to answer the research questions and obtain the findings (Figure 3.1). The mixed methods as an approach supports the collection of data in different phases using both quantitative and qualitative approaches from which follows testing of the research hypotheses and the generation of the research findings and contributions (Sections 3.4 and 3.5).

Lastly, a conclusion to the research design and methodology summarises the final research framework and methods (Section 3.6). The key data collection phases (Delphi rounds) are explained with support of the literature. Also, further research steps are discussed to shed light on the research contributions to business practice and further research studies.

3.2 The Research Philosophy

This research is a business practice study within the information systems field. Therefore, an appropriate research philosophy that reflects this research area of study is important (Creswell, 2013; Saunders *et al.*, 2009, Chapter 4). The research focuses on how CERT business process management values can impact on ECM workflow system performance (Section 1.4). The research studies several actions, situations and consequences, which represent a *pragmatic* research philosophical worldview. A pragmatic research philosophy means the research uses a *pragmatism* paradigm to understand the research study phenomena. Pragmatism uses the research questions to determine the epistemology, ontology and axiology in order to use the most appropriate branch of philosophy (Table 3.1).

In this research, pragmatism paradigm has been adopted, as there is no dedication to a particular research philosophy and multiple views have been recognised (Creswell, 2013, Chapter 1). Therein, by thinking about the research questions, seeking "*what*" and "*how*" in the research data collection and analysis can lead to valid responses and findings. Indeed,

the research philosophy reflects more than one research position, which requires the use of mixed (multiple) approaches for collecting and analysing the data. Also, the research seeks to apply the Delphi rounds as a multistage framework to generate the research findings and contributions (Sections 3.4.1 and 3.5). This confirms that pragmatism paradigm is the most suitable philosophical worldview for this research study.

	Positivism	Realism	Interpretivism	Pragmatism
Ontology: *the researcher's view of the nature of reality or being*	External, objective and independent of social actors	Is objective. Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist)	Socially constructed, subjective, may change, multiple	External, multiple, view chosen to best enable answering of research question
Epistemology: *the researcher's view regarding what constitutes acceptable knowledge*	Only observable phenomena can provide credible data, facts. Focus on causality and law like generalisations, reducing phenomena to simplest elements	Observable phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). Alternatively, phenomena create sensations which are open to misinterpretation (critical realism). Focus on explaining within a context or contexts	Subjective meanings and social phenomena. Focus upon the details of situation, a reality behind these details, subjective meanings motivating actions	Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research question. Focus on practical applied research, integrating different perspectives to help interpret the data
Axiology: *the researcher's view of the role of values in research*	Research is undertaken in a value-free way, the researcher is independent of the data and maintains an objective stance	Research is value laden; the researcher is biased by world views, cultural experiences and upbringing. These will impact on the research	Research is value bound, the researcher is part of what is being researched, cannot be separated and so will be subjective	Values play a large role in interpreting results, the researcher adopting both objective and subjective points of view
Data collection techniques most often used	Highly structured, large samples, measurement, quantitative, but can use qualitative	Methods chosen must fit the subject matter, quantitative or qualitative	Small samples, in-depth investigations, qualitative	Mixed or multiple method designs, quantitative and qualitative

Table 3.1 The four main branches of research philosophy in management (Source: Saunders *et al.*, 2009, p.119).

The research questions have been established based on exploring the impact of CERT values on ECM workflow systems performance (Section 1.4). These BPM values can be

measured by weighing a set of variables for each CERT value. This requires the ontological and epistemological views of pragmatism as a multistage approach that uses a mixed methods approach to enable answering the research questions (Table 3.1). Conversely, the research objectives consist of several rules and procedures (i.e. RO3, RO4, RO5), which are used to formulate the research design, analysis and validation elements (Section 1.5). These objectives focus on the development of a model for measuring ECM workflow system performance (Figure 7.1). The axiology of pragmatism has been adopted, as both objective and subjective points of view have been valued. This leads to the application of mixed methods of data collection (i.e. multiple method designs, quantitative and qualitative) to achieve the research objectives (Table 3.1). To conclude, pragmatism is the research philosophy best encompassing the mixed methods approach, as a worldview, to realise the research paradigm. The following sections provide further details with explanations that support the research philosophy.

3.3 The Research Approach

Conducting the research study requires a clear identification of an approach for collecting data and its analysis to achieve the research objectives and obtain the research findings. Indeed, the pragmatism philosophical worldview has indicated that the use of multiple (mixed) views leads to a combination of research approaches (Creswell, 2013; Saunders *et al.*, 2009, 2015). Hence, the research approach is a combination of deductive and inductive research, as shown in the research 'Onion' process and framework (Figure 3.1). The research use of deductive and inductive inquiry is a *mixed methods* approach and utilises both quantitative and qualitative data. This means the study data collection integrates separate structures of data with distinct types of design. The use of *mixed methods* collects valuable complementary data about the research issues, and the deductive and inductive approaches offer different perspectives on the research issues and strategic procedures.

The mixed methods approach adopts a position on the objectivist-subjectivist continuum research paradigm (Saunders *et al.*, 2009, 2015, Chapter 4). This pragmatism philosophical position excludes engaging in pointless debate about the truth and reality of such concepts and instead focuses on studying what is of interest, and value to the researcher by offering different perspectives on the research problems. Also, mixed methods support building an in-depth and rich dataset that bring positive consequences to aid the research inquiry.

Further, the mixed methods approach is the research choice that best implements the research PMM strategic model (Figure 2.7). This involves using both deductive and inductive reasoning during Delphi's rounds. Deductively, the research implements quantitative data collection (i.e. questionnaires) and analytical evaluation (i.e. Exploratory Factor Analysis) to examine the relationships between ECM workflow systems and employees using the identified set of variables for each CERT value to meet the research objectives 3 and 4. Inductively, the research implements qualitative data collection (i.e. face-to-face interviews) and analytical evaluation to validate key variables of each CERT value to be used as KPIs to improve ECM workflow system performance using Grounded Theory with the use of the PMM framework to meet the research objectives 3, 4 and 5. Thus, the research implements further quantitative data analysis using the competing values framework to complete the PMM to reveal the final scores in order to meet the research objective 5.

Furthermore, the mixed methods approach is used in this research to start from a survey for initial results and afterwards move to a second phase, which conducts interviews to gain more detailed views in order to support recognising the research problems, and then a third phase to validate the research findings using PMM framework. This supports the testing of the research hypotheses and the development of theory.

3.4 The Research Strategy and Design

This research studies the impact of CERT business process management values on ECM workflow system performance, as described in chapter 1. The research seeks to establish the significance of the relationships between suggested variables of each CERT value (Figure 2.7) and how these can be applied to improve ECM workflow system performance (Schmiedel *et al.*, 2013, 2014, 2015). The research emphasis is on carrying out an *explanatory* study of ECM workflow systems to explain the relationships between variables of each CERT value in order to achieve the research objectives (i.e. RO2, RO3, RO4, RO5) and answer the research questions (Section 1.4). This is supported by an exploratory study to explore how CERT values can impact on ECM workflow system performance.

The research strategy applies a combination of a deductive approach in the first phase of the study and an inductive approach in the second phase (Figure 3.2). The deductive approach implements a survey strategy for quantitative data collection (Section 3.5.1.2), (Creswell, 2013; Saunders *et al.*, 2009). The inductive approach implements semi-structured interviews for qualitative data collection (Section 3.5.1.3).
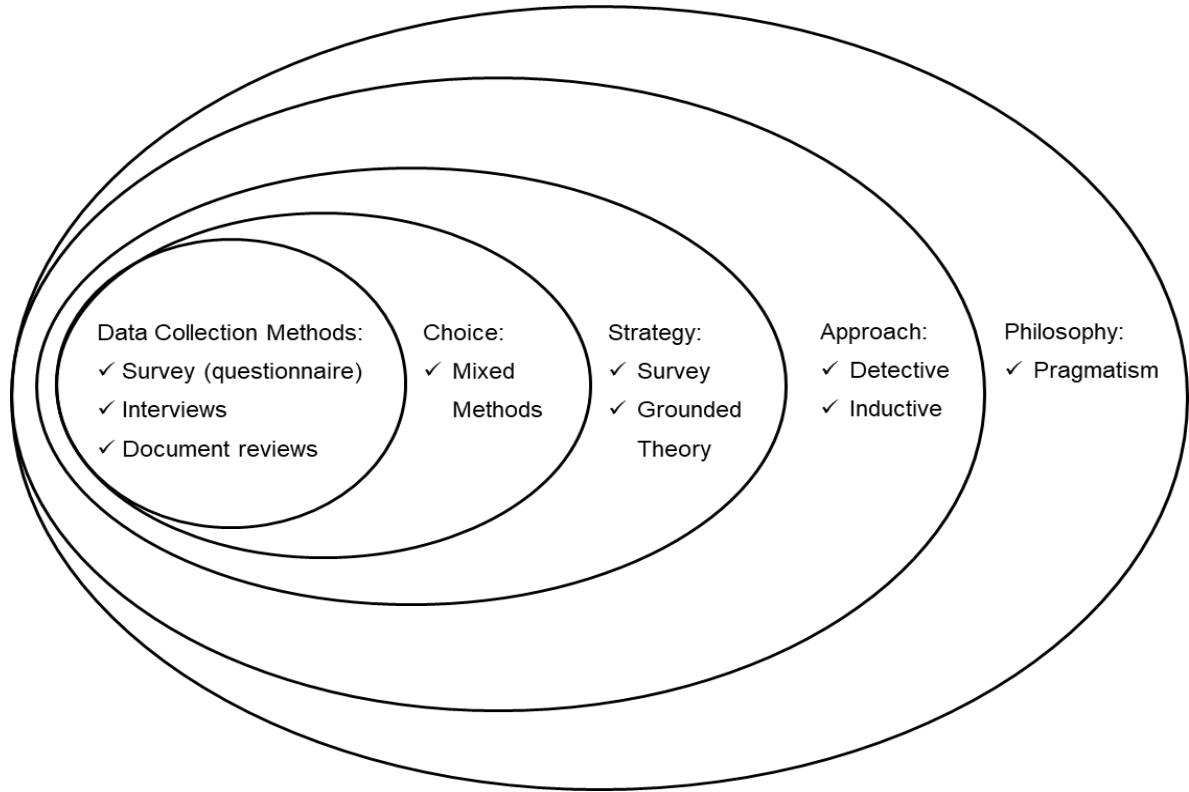
Figure 3.2 The research strategy on the research 'Onion' process (Saunders *et al.*, 2009).

Applying mixed methods as a choice for this study requires both an approach for predicting and explaining behaviours and a multiple-phase method that supports decision-making, reliability and validity to evaluate ECM workflow systems (Section 2.3). Thus, it has been decided to employ the Delphi method using Survey, Interviews, Grounded Theory and PMM as the research framework to implement the mixed methods approach (Saunders *et al.*, 2019, Chapter 5; Schmiedel *et al.*, 2013). The use of the Delphi method as an MCDM methodology and to formulate KPIs have been justified and discussed in section 2.3 and section 2.6 citing many BPM and decision-making published studies. As previously discussed, Delphi method can be applied to structure group communication when dealing with a complex research study that requires input from respondents diverse in both professions and expertise. Hence, the research approach applied is a sequential explanatory research design using Delphi's three rounds. In detail, the first round conducts a quantitative study, the second round conducts an explanatory qualitative study, then the third round conducts a weighing exercise to implement the PMM framework using CVF.

Implementing the mixed methods approach is supported by the research key characteristics, which are derived from the research aims, objectives (ROs) and hypotheses (Hs) using the pragmatism paradigm as a philosophical worldview (Saunders *et al.*, 2019, Chapter 5).

Thus, a mapping of the research methods, alongside the research aims, ROs and Hs, is presented to evaluate the reliability and validity of the research (Table 3.2).

Component	Method	Description
The research aims	The mixed methods	Implementing the Delphi method rounds triangulates the research strategy (Figure 3.2) and enables a mixed methods approach to achieve the research aims. This supports the literature review and the use of Survey, Interviews, EFA, GT, CVF and PMM to develop a model (PPDM) to measure and improve ECM workflow system performance in order to meet business objectives (Figure 7.1).
RO1	Literature review development	Prepared a literature review using the research keywords and themes including business process management, enterprise content management, workflow information systems, CERT values, Key performance indicators and Delphi method.
RO2	The literature review, EFA and GT	The literature review, EFA and GT developed to identify the key variables for each CERT value. These variables can be used as KPIs to evaluate ECM workflow system performance.
RO3	The mixed methods	The Delphi method rounds supported by applying the PMM strategic model (Figure 2.7) enabled finding the identified relationships to measure and improve ECM workflow system performance.
RO4	EFA & PMM	Applying exploratory factor analysis (Figure 3.7) gives facts and insights from the collected empirical evidence. These findings are used to implement the PMM using KPIs to evaluate ECM workflow system in order to ensure meeting business objectives (Figure 5.8).
RO5	EFA, Mann-Whitney Test & PMM	The EFA (Figure 3.7), Mann-Whitney non-parametric significance test (Section 5.2) and PMM (Figure 5.8) validated the use of CERT values as KPIs to measure and improve ECM workflow system performance.
H1	EFA, GT and PPM	Testing the significance of CERT values impact is approved by implementing the EFA, GT and PPM.
H2	The Delphi method	Delphi's three rounds are applied to identify KPIs using CERT values in order to run PPM to provide an OCAI scoring profile (Figure 6.3).
H3	PMM	The PMM with the use of CERT values is able to measure ECM workflow system current and preferred situations, which provide a profile for the system impact on the organisational performance.
H4	The mixed methods & PMM	Applying the mixed methods approach and PMM support approving that CERT values can increase the organisation's efficiency. PMM is a framework to measure ECM workflow system performance in order to meet the organisational performance and business objectives.
H5	EFA & PMM	Variables of each CERT value have been validated using EAF in order to use them as KPIs for the PMM to evaluate the workflow system in order to improve ECM performance and to meet business objectives.

Table 3.2 The research methods link to the research aims, objectives and hypotheses.

Triangulating the research approach using the mixed methods support implementing a combination of methods (i.e. EFA, Mann-Whitney Test, GT, PMM) to achieve the research aims, objectives and examine the hypotheses (Table 3.2). These methods make the pragmatism philosophical worldview possible by building a theory, which can include a collection of different procedures in a sequential framework based on the Delphi method. This results in a model to measure ECM workflow system performance that supports improving organisational performance to achieve business objectives. The following sections provide explanations about the research framework and strategy, which include the Delphi method, survey and the Grounded Theory.

3.4.1 The Delphi Method

As described in the previous section, it was decided to apply the Delphi method as a structured decision-making framework (AbouGrad *et al.*, 2019; Quyên, 2014; Van Looy *et al.*, 2012). The Delphi method collects experts' opinions and attempts to find a consensus of opinion by a series of controlled inquiries, which are known as "rounds" (Table 3.3).

Round	Input of the codification panel	Output of the expert panel
I	**Brainstorming** • Propose an initial list of criteria • Request missing criteria	• Per initial criterion: — rate its importance — give open comments • For all criteria: — rate overall importance — give open comments • Propose missing criteria
II	**Narrowing Down** • Consolidate criteria	• Per criterion: — rate its importance — give open comments • For all criteria: — rate overall importance — give open comments
III	**Weighing** • Determine final criteria • Request weightings	• For all criteria: — rate overall importance — give open comments • Weigh criteria and options

Table 3.3 The Delphi method rounds (Van Looy *et al.*, 2012).

The Delphi method is particularly useful for prediction or for improving an understanding of a business dilemma, opportunity and solution (AbouGrad *et al.*, 2019; Kezar and Maxey, 2016). Also, the Delphi method has been employed as a framework for participatory research and for studying an issue or a phenomenon when a lack of knowledge is noticeable, the research area of study is undecided, or there is an insufficient level of consent from experts.

A number of Delphi studies were described in Chapter 2 which applied the Delphi method in a variety of ways and with differing numbers of rounds as a criterion for decision-making. However, the Delphi method conventionally has three rounds with different aims (Van Looy *et al.,* 2012). Round I is "Brainstorming" to identify or select key indicators or factors and set up an initial list of criteria. Round II is "Narrowing Down" to validate that list of criteria or key indicators and rate (rank) these key indicators in importance or feasibility. Round III is "Weighing" to reach consensus or verify the decision and validate the research study results. Table 3.3 summarises the conventional Delphi method rounds and its inputs and outputs, and an explanation of the Delphi method rounds has been provided in the following sections.

3.4.1.1 Brainstorming

Brainstorming is the first round of the Delphi study (Round I). This is used to collect the first sample of the study data to propose the initial list of criteria and indicate their importance (e.g. workflow system importance levels). Based on the Brainstorming round (Table 3.2), the initial decision criteria will be the subject of the Narrowing Down round (Quyên, 2014; Van Looy *et al.*, 2012). In practice, brainstorming is used to identify key measurement indicators for business processes and workflow systems (AbouGrad *et al.*, 2019). CERT values have the potential to structure the Brainstorming round in order to identify initial BPM workflow system key indicators (Schmiedel *et al.,* 2013, 2014). Based on the Brainstorming round, the identified key indicators from the variables of each CERT value can be used in the next Delphi study Narrowing Down round.

3.4.2.2 Narrowing Down

Narrowing Down is the second round of the Delphi study (Round II). This validates the results from the Brainstorming round (Table 3.2). Narrowing Down is used for seeking a complete rating or ranking of the recognised key indicators by measuring their importance or feasibility in order to obtain a degree of consensus (Quyên, 2014; Van Looy *et al.*, 2012). This gives a list of key indicator values to be used in the Weighing round.

The Narrowing Down round confirms the key measurement indicators of the workflow system in order to obtain a consensus for improving ECM workflow system performance and to validate the use of key performance indicators (AbouGrad *et al.*, 2019; Schmiedel *et al.*, 2013, 2014). This is used to recognise the key variables of each CERT value and rate each key variable.

Based on Narrowing Down, both the recognised WIS key variables of CERT values and the level of consensus on each key variable can be used in the Delphi study weighing round. This study has applied the Narrowing Down round through a set of face-to-face interviews with a range of experts who use, or manage the use of, the WIS.

3.4.1.3 Weighing

Weighing is the final stage of the Delphi study (Round III). It is used to conduct a final evaluation to reach and then reveal the Delphi study results (Nworie, 2011; Quyên, 2014). Thus, the research process determines the final modelling criteria (e.g. weighting system, workflow model diagram, profile development model).

The weighing round uses the most reliable key performance indicator variables of CERT values to obtain the best ECM workflow system performance measurement, which can be regarded as the system KPIs (AbouGrad *et al.*, 2019; Schmiedel *et al.*, 2013, 2014). These KPIs are the WIS running principles, which can be used to determine the most appropriate information system behaviour and structure for meeting the organisation's strategic goals.

3.4.2 Survey Research Strategy

The survey strategy is usually implemented when a research question can be answered by a quantitative description of opinions, responses and comments (Creswell, 2013; Kezar and Maxey, 2016; Saunders *et al.*, 2009, 2015). This is achieved by a sample of a population who participate in the research data collection phases. The survey strategy in this thesis consists of a cross-sectional study using a questionnaire for the data collection. Also, the survey strategy is effective and efficient, as it reduces cost. It is flexible, as the participants usually have enough time in which to complete the questionnaire. Overall, the survey supports the development of the PMM framework based on the identified significant relationships between variables of each CERT value in order to construct a model to measure ECM workflow system performance in order to meet business objectives.

3.4.3 The Grounded Theory

Grounded Theory (GT) has been applied as an interpretive process (explanatory framework) for the second phase of the research data collection (Round II), and contributes toward building interrelationships and enhancements to the research data using an inductive approach (Creswell, 2013; Saunders *et al.*, 2009, Chapter 5). Grounded Theory takes its name from the process of theory development through immersion in data. Ground Theory supports the research by considering the collected data at a conceptual level so as to construct research findings and theoretical insights (Kuckartz, 2014, Chapter 2).

The coding process in GT has been implemented using face-to-face interviews, as the research strategy, to provide experts' answers to the research questions to gain qualitative clarifications (Creswell, 2013; Kezar and Maxey, 2016; Saunders *et al.*, 2009, 2015). The qualitative opinions, reactions and statements can be used to structure ideas, identified by a coding process, which the researcher can use to provide clear research findings and beliefs. More detail about GT can be found in section 3.6.2, which includes the coding process and how the research data can be analysed using the coding process in GT.

3.5 Data Collection Methodology and Methods

The research data collection techniques and analysis procedures are illustrated to provide details as to how the research data and information can be processed in order to reach the study results and contributions. This is achieved by the research strategy and design components (Figure 3.3), which represent the data collection methodology to make use of the Delphi method, Grounded Theory and other analytical methods (e.g. EFA, Mann-Whitney Test, CVF). These methods are used to implement the mixed methods approach.

Round I.	Quantitative	• Data Collection by Questionnaires • Data Analysis
Round II.	Qualitative	• Data Collection by Interviews • Data Analysis
Round III.	Quantitative & Qualitative	• Further Data Analysis • Research Delphi Results • Research Findings

Figure 3.3 The research study rounds and strategic procedures.

The research strategy is used to obtain the most reliable consensus using Delphi's controlled feedback rounds to develop a framework based on CERT values (i.e. BPM construct) in order to improve ECM workflow system performance (Figure 3.3). Indeed, applying the Delphi rounds can establish a group communication process to deal with complex business processes and workflow system issues (AbouGrad *et al.*, 2019; Schmiedel *et al.*, 2013). Thus, data collection and analysis has three rounds, which are used as strategic procedures (phases) to achieve the research aims and objectives:

- Round I: Quantitative data collection and analysis using questionnaires;
- Round II: Qualitative data collection and analysis using interviews;
- Round III: Quantitative and qualitative in-depth data analysis and research findings.

A complete explanation is provided to illustrate the research data sources, data collection procedures, and data analysis techniques in the following sections. These sections discuss the implementation of the research rounds in Figure 3.3.

3.5.1 Data Collection Methods

The research strategy requires a mixture of data collection methods (Figure 3.3). The research data collection has been developed to apply triangulating data sources using both quantitative and qualitative methods (Creswell, 2013). Triangulation can be improved by implementing a mixed methods design to collect quantitative and/or qualitative datasets in order to assure data accuracy, consistency, validity and reliability. The triangulation of data collection looks at several data sources to verify the research results and confirm that the collected datasets are giving true research findings (Saunders *et al.*, 2009; Schmiedel *et al.*, 2013). Thus, CERT values and their categories are used to ensure that the research datasets are demonstrating what the respondents are saying (Figure 2.7). For example, data collected using semi-structured interviews (Round II) is a valuable way of triangulating data collected by questionnaires (Round I).

The research data types are mainly primary data supported by secondary data from other research studies. Primary datasets are collected from employees (members of staff) who are using ECM workflow solutions. The research primary data collection is processed over two phases (Figure 3.3). A self-administered questionnaire is employed to collect the primary data for the Delphi Round I (Saunders *et al.*, 2009, Chapter 11). The self-administered structured questionnaire uses web-based self-completion that is electronically

managed using an internet website page (Brace, 2013, Chapter 2). This is known as an internet-mediated questionnaire, and it is posted to the research participants usually by email services, although the questionnaire website internet address could also be handed to the research participants. Thereafter, semi-structured face-to-face interviews are arranged to collect the primary data for the Delphi Round II (Figure 3.3). The face-to-face interviews are an interviewer-administered data collection method that is used to complete the research primary data collection (Brace, 2013). This has been discussed in Section 3.4. However, there are three types of interview data collection (Table 3.4); these are termed exploratory, descriptive and explanatory (Brace, 2013; Creswell, 2013, Chapter 9; Saunders *et al.*, 2009, Chapter 10).

Category	Exploratory	Descriptive	Explanatory
Structured		✓✓	✓
Semi-structured	✓		✓✓
Unstructured	✓✓		
✓✓ = more frequent	✓ = less frequent	U = Selected	

Table 3.4: Interviews data collection key categories (Saunders *et al.*, 2009, p. 323).

In detail, the first type of interview is the structured interview, which is based on questionnaire standards, prearranged questions and/or a specific set of questions (Brace, 2013; Saunders *et al.*, 2009, Chapter 10). Structured interviews are more frequently used for a descriptive research strategy and used less frequently for explanatory research. The second interview type is a semi-structured interview, which is used to cover a list of questions or topics (Creswell, 2013, Chapter 9; Saunders *et al.*, 2009, Chapter 10). This type of interview is not so rigidly defined. In this research, semi-structured interviews are arranged with the ECM workflow system managers and administrators to collect qualitative datasets for the research Round II. This is used to support and clarify the quantitative datasets from the research Round I (questionnaires). The third type of interview is the unstructured in-depth interview, often carried out with directors/executives, which is more of a free-flowing and open conversation to get the full picture of important organisational issues. This type of interview uses open-ended questions or free-response questions.

In this research, semi-structured face-to-face interviews are used to review and explore the data resulting from the questionnaire from the research Round I. System managers and users are the research interview participants who are going to provide mainly explanatory insights and some exploratory understanding of how CERT values impact on ECM workflow

solutions performance. Also, secondary data are collected from other workflow systems, business process management and enterprise content management studies to support the research literature in order to achieve complete research findings and contributions in this area of study and body of knowledge.

3.5.1.1 Selecting the Population and Sampling Methods

The research data sampling strategy and procedures are now explained to identify the research population (Creswell, 2013, Chapter 8; Saunders *et al.*, 2009, Chapter 7). This identifies the people who should participate in the research, and the participants should provide the required empirical evidence to generate insights leading to the research findings and final results. Therefore, the research data sample characteristics and size are important because this is the source of the research data. Using a data sample allows the collection of the required data and reduces data collection time, as it is impossible to reach the total population of all people who are using ECM workflow systems.

The research area of study focuses on organisations and employees who are using ECM workflow systems (Sections 1.5 and 2.4.2). Therefore, the research data should be collected from employees at an organisation that uses ECM workflow systems. The total size of such a population is unknowable, as it is impossible to specify the number of organisations and employees who are using ECM workflow systems (Creswell, 2013; Saunders *et al.*, 2009, Chapter 7). Hence, *non-probability* (judgemental) sampling has been adapted to generate the research data. Non-probability sampling does not provide statistical information about the research population, but does allow the collection of data that will provide an appropriate set of answers to the research questions (Section 1.4). This can be applied to any ECM workflow system in order to measure its performance. Therefore, selected cases can be used to examine ECM workflow systems performance using the Delphi method and CERT values. The selected cases can provide the necessary insights to achieve the research aims and objectives, as it is possible to undertake a research study that concentrates on small selected cases to provide the required information in order to generate the research findings.

The research strategy (Section 3.4) uses Grounded Theory with sample sizes of between twenty and thirty participants for the questionnaire and between three and ten participants for the face-to-face interviews, which are acceptable to provide satisfactory research findings and insights (Creswell, 2013, Chapter 8; Saunders *et al.*, 2009). This is considered as a sufficient sample size to reach "saturation". Thus, the research selected ECM workflow

systems can be used to measure the saturation point, as when the required number of participants obtained for each system ensures reaching sufficient sample size.

This research has implemented the "*purposive sampling*" (judgemental sampling) technique to select the cases for the research data sample (Creswell, 2013; Saunders *et al.*, 2009, Chapter 7). Usually, purposive sampling is applied to study a small sample that is selected, because it is particularly informative. Purposive sampling is known as selective because those with rich experience are selected, and subjective because the selection is based on profile. Purposive sampling is used to squeeze lots of information out of the collected data to explain the key impact factors on a population. Consequently, researchers who are using Grounded Theory in their research study often employ purposive sampling.

The research purposive sampling strategy needs to focus on those working with similar ECM workflow systems. Consequently, the *"homogeneous"* sampling strategy has been chosen for implementing the research strategy and collect data from respondents who have similarities of experience and profession. According to (Creswell, 2013, Chapter 8), the homogeneous sampling strategy supports the researcher to exclude any possibly confusing variables and provide accurate research findings.

Further, the research data sample is a non-probability sample, because it does not have a sampling frame, and the total population is unknown (Saunders *et al.*, 2009, Chapter 7). It is ineffective in terms of cost and time, as well as resources consumption to construct a sampling frame for this research. Also, the research seeks to maintain control over the research data sample. Therefore, a small homogeneous sample is sufficiently suitable for this research study.

Furthermore, while a small sample can provide the required insights for this research study (discussed in Section 4.3), a small sample is unable to represent the total population and this results in an inability to estimate error, as there is no way to make estimations over certainty and margin levels. The chosen data sample is used for testing the research questions to ensure sufficient reliability and validity. Also, the data sample may have high levels of bias, and so it would be difficult to generalise the research findings. Therefore, organisations can adopt the research findings to improve their ECM workflow solutions, but they need to develop an initial study to validate how useful these research results are for both their ECM workflow systems performance and their business objectives and organisational goals.

3.5.1.2 Questionnaire Design and Development

The research data collection strategic procedures used a questionnaire to complete Round I (Figure 3.3). The questionnaire allows the collection of primary data, which supports the achievement of the research objectives (Section 1.5), and then testing it through data analysis to produce the research findings (Brace, 2013, Chapter 2; Vogt *et al.*, 2014, Chapter 4). A questionnaire should collect the required datasets in a way that provides data accuracy. This means collecting accurate responses, as the key objective in developing the questionnaire is supporting the participants to provide accurate responses and truthful feedback in order to validate the identified variables of each CERT value.

Accordingly, the internet web-based self-completion method can be used to carry out the questionnaire using an online application form to implement the data collection. In theory, web-based self-completion questionnaires have the same strength as paper self-completion questionnaires, as participants can complete the questionnaire in their own time, leaving it, if they are interrupted, and return later (Brace, 2013, Chapter 2).

In light of practice, there is evidence that some participants leave a questionnaire while they think about their responses and return later to complete it. This delivers valuable feedback. Additionally, web-based self-completion internet platform questionnaires use two key mechanisms, which are closed-web and E-mail uniform resource locator (URL) embedded. The closed-web process is carried out by directly contacting and allowing the participants to visit a website to complete the questionnaire. While the E-mail URL embedded process is carried out by email invitation to the participants that contains the questionnaire website link or web address on which participants click to access the questionnaire platform. This research study has adopted the E-mail URL embedded approach to communicate with the questionnaire participants and undertake the data collection using the internet web-based self-completion. Such data collection process supports faster communication and better time management, as well as getting the highest number of the required participants to implement the research framework.

A questionnaire plan has been designed to demonstrate the questionnaire data collection process using a structured flowchart (Brace, 2013). In this research, the questionnaire data collection process begins by making a list of participants who are using an ECM workflow system, after receiving access permission from the organisation (Figure 3.4).

Access to the research participants (List of professionals/experts)

Does the listed participant match the selection criteria? — No → Remove from the participants list

Yes

Send an invitation email to the participant

Does the listed participant accept to respond? — No → Remove from the participants list

Yes

Connect to the research questionnaire website

Questionnaire introduction page

Part I: **C**ustomer orientation questions

Part II: **E**xcellence questions

Part III: **R**esponsibility questions

Part IV: **T**eamwork questions

Part V: General details questions

The questionnaire is completed and data are submitted and then stored on the research database platform.

Research data protection, ethics procedures, and code of conduct

Figure 3.4 A flowchart of the research questionnaire data collection process.

Afterwards, the collected list of participants is checked with the advice of the manager who has provided the list of participants to ensure each participant matches the selection criteria, and if the participant does not match the criteria, then the participant contact details are removed (destroyed). Then, an invitation by email is sent to the identified participant (Appendix A.2). If the participant does not consent to participate, then all the participant contact details are removed. If the participant has agreed to participate by clicking on the URL embedded in the E-mail, then the participant is connected to the questionnaire website (web-based self-completion questionnaire uploaded). Then, the questionnaire introduction page will be uploaded to provide information about the questionnaire (Appendix A.4).

Afterwards, the questionnaire part one questions about Customer orientation begin (Section 3.5.1.2.4 – Part I). Then, the questionnaire part two questions about Excellence begin (Section 3.5.1.2.4 – Part II). Following this, the questionnaire part three questions about Responsibility begin (Section 3.5.1.2.4 – Part III). Then, the questionnaire part four questions about Teamwork begin (Section 3.5.1.2.4 - Part IV). Finally, the questionnaire part five, which is used to collect general details from the participant (Section 3.5.1.2.4 – Part V).

3.5.1.2.1 Types of questions for the Questionnaire

The questions on the questionnaire are based on CERT values (Figure 2.7). Each question is designed to have a number of predetermined answers to measure ECM workflow system performance and identify the significant variables based on participants' responses (Brace, 2013, Chapter 4). Hence, the questionnaire has a pre-coded closed type of question (multiple-choice or multi-chotomous questions), which include a range of possible answers. Such questions have a fixed number of responses, which require participants to select an answer from a given range of possible answers based on the participant's judgment.

3.5.1.2.2 Questionnaire Data Types

The collected data is interval scale data, which provide a rating scale for each item (i.e. question). The rating scale consists of numerically equal-distant values, with an arbitrary zero point (Brace, 2013, Chapter 5; Saunders *et al.*, 2009, Chapter 11). This has been used to determine the relative strength of relationships between the identified CERT categories and variables in order to measure ECM workflow system performance (Figure 2.7). Further detail about the questionnaire data types is explained in the following sections and the research data collection phase (Section 4.2).

3.5.1.2.3 The Use of Pre-coded Multiple-choice Answers in the Questionnaire

The pre-coded multiple-choice questions approach can be applied to measure an attitude by an itemised rating scale to produce quantitative data (Brace, 2013, Chapter 6). Such a scale can determine the relative strength of relationships for the suggested variables of each CERT value. The rating scale collects the participants level of agreement with statements, which measures the extent of their satisfaction toward ECM workflow system performance. In fact, an agree or disagree rating scale is known as a Likert scale, which was first published by psychologist Rensis Likert in 1932 (Brace, 2013, Chapter 6). The Likert questionnaire technique gives a series of attitude dimensions to be chosen by the participants. For example, how strongly participants agree or disagree using the five-point scale (Figure 3.5). The Likert technique is easy to administer using a web-based self-completion questionnaire.

Below are a number of statements regarding attitudes to shopping. Please read each one and indicate whether you agree or disagree with it by ticking one box for each statement.					
	Disagree strongly	**Disagree**	**Neither agree nor disagree**	**Agree**	**Agree strongly**
Being a smart shopper is worth the extra time it takes.	☐	☐	☐	☐	☐
Which brands I buy makes little difference to me.	☐	☐	☐	☐	☐
I take advantage of special offers.	☐	☐	☐	☐	☐
I like to try new brands.	☐	☐	☐	☐	☐
I like to shop around and look at displays.	☐	☐	☐	☐	☐

Figure 3.5 The use of Likert scale in a research questionnaire (Brace, 2013, p. 63).

The Likert rating scale (also known as Likert-style) is used in the questionnaire to give attitudinal responses per questionnaire statement that is scaled from 1 to 5 (Brace, 2013, Chapter 6; Saunders *et al.*, 2009, Chapter 11). This produces a set of scores based on the following order: 1. Strongly Agree; 2. Agree; 3. Neither; 4. Disagree; 5. Strongly Disagree. These scores result in interval data from which some descriptive statistics can be calculated

although care must be taken. For example, the measure of average recommended for summarising the 'typical' response to an item would be the mode rather than the arithmetic mean. Also, the collected interval data for each statement provides codes, which can be analysed by quantitative procedures and comparisons, including non-parametric statistical analysis (Brace, 2013; Saunders *et al.*, 2009, 2015).

Further, the research questionnaire uses a Likert scale grid (or matrix) format to save space and avoid repeating the information multi-times (Brace, 2013, Chapter 6; Saunders *et al.*, 2009, Chapter 11). Grid and matrix formats make viewing easy and clear, but they can be difficult question formats for participants to answer. These formats need participants to match the information in rows with others in columns, which is quite complex as this needs the respondent to work both vertically and horizontally for each statement. In order to reduce this complexity and make it easier for the participants to answer the questions, it has been decided to place the Likert scale answer after each statement, as Table 3.5 shows (Dillman *et al.*, 2014, Chapter 6). This allows the participant to read each statement individually and provide a Likert scale response.

Furthermore, while grid and matrix formats do provide an easy clear view, they can cause high rates of statement non-response; for example, participants may give the same response to each statement in the grid (Dillman *et al.*, 2014, Chapter 6). Hence, the amount of information contained in the questionnaire has been reduced to make clear statements and minimise questionnaire clutter. Also, the Likert-style scale is used to provide a comfortable and organised questionnaire structure, which reduces response time, missing data and visual complexity.

3.5.1.2.4 The Questionnaire – Round I

The research questionnaire has been developed based on the research objectives using a series of procedures (Brace, 2013, Chapter 1; Saunders *et al.*, 2009). One of the research strategic procedures is to turn the research objectives into a set of information requirements in order to build the questionnaire to find the required information. Then, the questionnaire is used to accomplish the research data collection for the first round procedure (Figure 3.3).

Accordingly, the first page is the research questionnaire's introduction, which is used to provide information to the questionnaire participants about the research and the purpose of the questionnaire (Dillman *et al.*, 2014, Chapter 2). Afterwards, the core parts of the questionnaire start to appear. These are mainly based on CERT values (Figure 2.7), which

are used to measure ECM workflow system performance (Schmiedel *et al.*, 2013, 2014). Therefore, the questionnaire has four core parts, which relate to Customer orientation, Excellence, Responsibility and Teamwork.

Each questionnaire part is used to assess a set of proposed variables by asking the respondent to give a response to each variable's statement using the Likert rating scale technique. Then, a fifth part is added to collect some general details about the participant in order to support the research findings and statistical results with more ECM workflow system performance views. Finally, a questionnaire completion approval page is shown to confirm that the participant has submitted a completed questionnaire.

Questionnaire Introduction

An introduction page (Appendix A.1) provides information to help the participants estimate the questionnaire completion time, appreciate the reason for doing the research, the value of the research, the research area of study and the expected use of the research results (Dillman *et al.*, 2014, Chapter 2). This establishes a trust that motivates the invited participants to respond honestly and to the best of their knowledge. The questionnaire introduction has been written after reading about questionnaire design and development to ensure that the best practices are followed (Brace, 2013; Dillman *et al.*, 2014, Chapter 2).

Part I: Customer orientation

Customer orientation focuses on the respondent's proactive and responsive attitude toward the needs of process output recipients, and of meeting customer needs. Customer orientation is the ECM workflow system organisational category that consists of Creativity, Commitment, Communication and Customer needs (Table 3.5). This section seeks to measure the performance of ECM workflow system in relation to Customer orientation. This section (part I) has eight different statements.

Each Customer orientation variable (aspect) has two statements used to evaluate the Customer orientation variables and provide feedback to the value overall. As previously described, these variables are derived from the literature review (Section 2.6.2.1) and referenced articles (Table 2.2).

No.	Category	Questions	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
1	Creativity	My ECM workflow system daily tasks completed under my own ownership, control, and ideas	○	○	○	○	○
2		I used ECM to solve particular/special problems and individual customer needs	○	○	○	○	○
3	Commitment	ECM has a role of anxiety that effect on my commitment to work	○	○	○	○	○
4		ECM has a role of job satisfaction that effect on my commitment to work	○	○	○	○	○
5	Communication	I do raise ECM errors, issues, or solve problems, when it's necessary to do so	○	○	○	○	○
6		ECM matches with my daily job duties and responsibilities to complete business tasks	○	○	○	○	○
7	Customer needs	ECM gives information for better service quality and performance to meet customer expectations	○	○	○	○	○
8		I am satisfied with my work activities on ECM	○	○	○	○	○

Table 3.5 Questionnaire Part I: Customer orientation list of statements.

Part II: Excellence

Excellence is the BPM orientation toward the continuous improvement of, and innovation in, an organisation's workflow to achieve higher business processes performance (Schmiedel *et al*., 2013, 2014). Organisations need excellence to ensure that efficiency and effectiveness are achieved in order to meet the organisational objectives and goals (Section 2.6.2.2). Excellence is the ECM workflow system organisational category that consists of Efficiency, Effectiveness, Empowerment and Employee orientation (Table 3.6).

No.	Category	Questions	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
1	Efficiency	ECM has high efficiency rate for business process resources (Cost, Time, Quality)	○	○	○	○	○
2		My ECM efficiency performance has been highly developed since last year, as ECM improved my work productivity, communication, cohesion, growth, planning, adaptability, and service control	○	○	○	○	○
3	Effectiveness	ECM has high effectiveness rate for business objectives and outputs (Cost, Time, Quality)	○	○	○	○	○
4		My ECM effectiveness performance has been highly developed since last year, as ECM improved my work service quality, problem-solving, delivery, and customer satisfaction	○	○	○	○	○
5	Empowerment	ECM empowers my work activities to make-decisions and confidently communicating for internal service quality	○	○	○	○	○
6		ECM control my tasks decision-making toward empowering team performance	○	○	○	○	○
7	Employee orientation	ECM is used to strength my work relationships and team performance	○	○	○	○	○
8		ECM is used to effect on my own performance level to be more positive, capable, and initiative	○	○	○	○	○

Table 3.6 Questionnaire Part II: Excellence list of statements.

This section (part II) has eight statements, and each Excellence variable has two statements. These statements are used to measure each variable and provide responses to the overall value (Table 3.6). Every statement in part II relates to a variable, which is derived from the literature review (Section 2.6.2.2) and referenced articles (Table 2.3).

Part III: Responsibility

Responsibility is the employees' commitment to business process management, ECM workflow system objectives and the accountability of workflow decision-making procedures (Schmiedel *et al.*, 2013, 2014). Responsibility is the ECM workflow system organisational category that consists of Responsiveness, Result orientation, Right quality and Right skills (Section 2.6.2.3 and Table 3.7).

No.	Category	Questions	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
1	Responsiveness	ECM has high response level for my internal and external inquiries	○	○	○	○	○
2	Responsiveness	ECM performs high for On-time delivery	○	○	○	○	○
3	Result orientation	ECM gives me the right results to meet my time-plan (schedule)	○	○	○	○	○
4	Result orientation	ECM supports me to reach my expected results and complete my tasks as planned	○	○	○	○	○
5	Right quality	ECM is the core of business process and implementation: Work commitments, Responsibility and Quality	○	○	○	○	○
6	Right quality	ECM improves my work quality in terms of customer service, teamwork, management, training and personal development	○	○	○	○	○
7	Right skills	ECM cuts information management (IM) tasks time and enable me to be more productive	○	○	○	○	○
8	Right skills	Do you think employees training on ECM cuts IM tasks time and make them more productive	○	○	○	○	○
9	Right skills	I believe that the company workforce skills are enough to carry out content management tasks using various ECM functions and tools	○	○	○	○	○

Table 3.7 Questionnaire Part III: Responsibility list of statements.

This Section (part III) has nine statements based on four Responsibility categories. Three of these categories have two statements, and the fourth category has three statements. These statements evaluate the Responsibility variables and provide feedback on the overall value (Table 3.7). Each Responsibility statements relates to a variable, which is derived from the literature review (Section 2.6.2.3) and referenced articles (Table 2.4).

Part IV: Teamwork

Teamwork is the employees' positive attitude toward cross-functional business collaboration (Schmiedel *et al.*, 2013, 2014). Teamwork is the ECM workflow system organisational category that consists of Transparency, Transformational leadership, Transactional leadership and Team collaboration (Section 2.6.2.4 and Table 3.8).

No.	Category	Questions	Strongly Agree	Agree	Neither	Disagree	Strongly Disagree
1	Transparency	ECM is positively supporting work duties, as it provides hope, resiliency, optimism, and efficacy	○	○	○	○	○
2		ECM is trusted to manage business content, as it provides the ability to manage information with competency and performance to complete on-time	○	○	○	○	○
3	Transformational leadership	ECM improves the level of achievement, which enables workforce's commitment by: - The motivation to solve-problems in new ways - The ability to change the way of business process and automation - Self-reported (Self-worth) attitude and empower person's behaviour toward other team members	○	○	○	○	○
4		ECM supports better future performance as it improvises business continuance by giving better vision, time management, and cost reduce	○	○	○	○	○
5	Transactional leadership	ECM helps employees to adapt the attitude and behaviour to maximise achievements and accessibility by its ability toward information exchange, business commitment, and improve service performance	○	○	○	○	○
6		ECM rewarded me good performance and support my accomplishments to better quality of work life	○	○	○	○	○
7	Team collaboration	ECM supports team performance and productivity to reach the right service level and team goals	○	○	○	○	○
8		ECM provides team learning capabilities by giving: - Experience to improve services and productivity - Trust among team members - Better team commitment and communication	○	○	○	○	○

Table 3.8 Questionnaire Part IV: Teamwork list of statements.

This section has eight statements about teamwork variables. These teamwork variables have statements to evaluate each variable and provide overall feedback on the Teamwork value (Table 3.8). This section has statements that cover variables which are derived from the literature review (Section 2.6.2.4) and referenced articles (Table 2.5).

Part V: General Details

The participant's general details are demographic datasets and general control variables (Table 3.9). These variables can be used to compare responses for data analysis purposes (Saunders *et al.*, 2009, Chapter 12). Comparing response groupings enable sense to be made of the collected data and create statistical figures such as cross-tabulation.

No.	Questions	Response
1	Ref No.	Generated unique no.
2	Full name	
3	Job title	
4	Email (preferred work email)	
5	Current Industry	
6	Current Department / Section / Unit	
7	Age range	❍ -18 ❍ 18-24 ❍ 25-30 ❍ 31-35 ❍ 36-40 ❍ 41-45 ❍ 46-50 ❍ 51-55 ❍ 56-60 ❍ +60
8	Gender	❍ Male ❍ Female
9	Years of work experience	❍ -1 ❍ 1-3 ❍ 4-6 ❍ 7-10 ❍ 11-15 ❍ 16-20 ❍ 21-25 ❍ 26-30 ❍ +30
10	Which of the following best represent your most recent education background?	❍ 1 - 4 Levels / CSEs / GCSEs, Entry, Foundation Diploma, NVQ Level 1, Foundation GNVQ, Basic Skills. ❍ 5+ O Levels – passes / CSEs – Grade 1 / GCSEs – Grades A* - C, School Certificate, NVQ Level 2, Intermediate GNVQ, City and Guilds Craft, BTEC First/General Diploma Apprenticeship. ❍ 2+ A Levels/VCEs, 4+ AS Levels, Higher School Certificate, Progression/Advanced, NVQ Level 3, Advanced GNVQ, City and Guilds Advanced Craft, ONC, OND, BTEC Nation. ❍ Professional and other work-related qualifications. ❍ Undergraduate degree, e.g. BSc, BA. ❍ Master degree, e.g. MSc, MBA. ❍ Doctorate degree, e.g. PhD, DBA.
11	Comments / Notes (Please provide your feedback on the questionnaire)	
12	Thank you for participating The case study results will be sent by email upon completion	

Table 3.9 Questionnaire Part IV: General Details.

The demographic data in table 3.9 have been collected to provide a background about the research participants. For example, the years of work experience variable shows the participants level of experience. Also, each employee's most recent level of education is recognised through this section. More details about the use of the collected demographic data will be explained in chapter 4 and chapter 5.

3.5.1.3 Interviews Design and Development

The research data collection strategic procedures (Figure 3.3) require semi-structured interviews to complete the research Round II (Creswell, 2013, Chapter 9; Saunders *et al.*, 2009, Chapter 10). Interviews are used to collect primary qualitative data, which enables a review of the research Round I and the Narrowing Down phase of the Delphi method to achieve the research objective three (Section 1.5, RO 3). The interview phase of the data collection implements face-to-face interviewing, which has been a common qualitative research study method for many years, especially in the UK (Brace, 2013, Chapter 2; Dillman *et al.*, 2014, Chapter 7). The reason is that face-to-face interviews allow various forms and characteristics of communication, which are much more than just spoken words. Face-to-face interviews recognise facial expressions, eye contact and body language, which are a considerable source of information on top of the spoken words during an interview, and such information is not available in other types of data collection methods.

The face-to-face interviewing (interviewer-administered) method has been used subsequent to the web-based self-completion questionnaire data collection so that narrowed answers can be obtained, and the results from the questionnaire can be used for clarifying certain issues related to interviewee judgement (Creswell, 2013; Saunders *et al.*, 2009). During the face-to-face interview, the interviewees are asked about four areas based on the CERT values. Also, the statements from the questionnaire are re-used during the interview to fine-tune and validate the responses from Round I. The purpose of this face-to-face interview is to collect descriptive answers from members of staff who are Managers, Directors or Administrators to understand their views on ECM workflow system performance using CERT business process management values and the research Round I results.

Figure 3.6 shows the research interview plan, which has been designed to demonstrate the face-to-face interview data collection process (Brace, 2013). This process begins with making a list of participants who are using an ECM workflow system, after receiving access permission from the organisation that uses the targeted ECM workflow system.
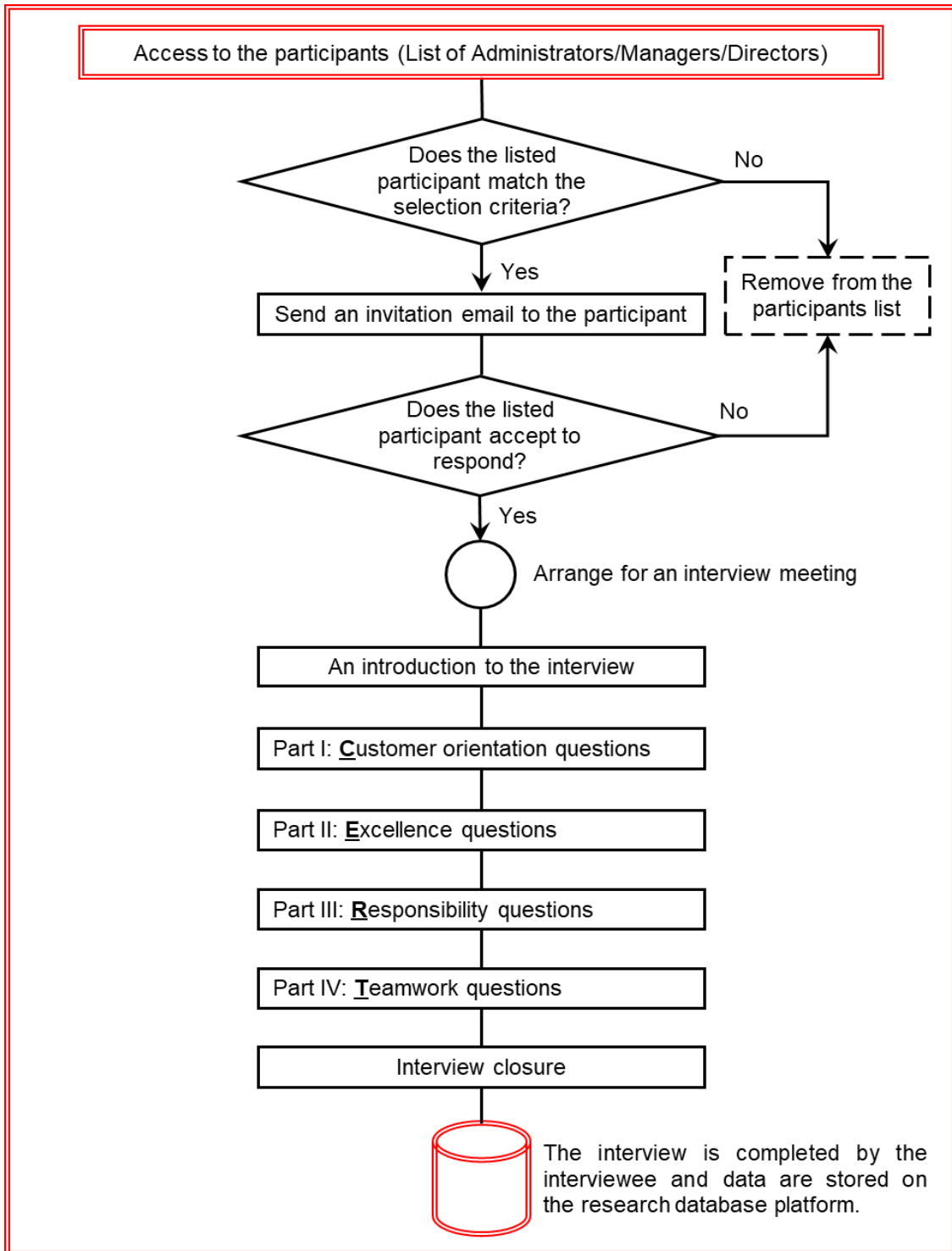
Figure 3.6 A flowchart of the research face-to-face interview data collection process.

Afterwards, the collected list of participants (interviewees) is checked with the advice of the manager who provided the list to ensure each participant matches the interviewee selection criteria, and if the participant does not match the criteria, then all the participant contact details are removed (destroyed). Then, an invitation by email (Appendix B.1) is sent to the

identified interviewees, along with an attached interview participant information sheet (Appendix B.2). A reply from the participant is anticipated within two weeks or so, and if the participant does not consent to participate, then all the participant contact details are removed. Then, the participants who accepted are invited for a face-to-face interview and interview room location and time details are agreed as convenient for both the interviewee and interviewer (Researcher). Then, an introduction to the interview procedure is provided to give the interviewee an overview of the interview and an indication of how the interview will be conducted (Section 3.5.1.3.4 – Interview Introduction).

Afterwards, the interview part one questions about Customer orientation begin (Section 3.5.1.3.4 – Part I). Then, the interview part two questions about Excellence begin (Section 3.5.1.3.4 – Part II). Then, the interview part three questions about Responsibility begin (Section 3.5.1.3.4 – Part III), and then, the interview part four questions about Teamwork begin (Section 3.5.1.3.4 – Part IV). Finally, the interview formally closed. This is the last section of the face-to-face interview, which seeks to provide the final statements in order to end the interview (Section 3.5.1.3.4 – Interview Closure).

3.5.1.3.1 Types of Questions for Face-to-face Interviews

The face-to-face interviews use a pre-coded open-ended question type, as interviewees can answer the pre-coded multiple-choice list of possible selections (Likert scale), and provide open responses to each question, explaining why the interviewee has selected that answer (Brace, 2013, Chapter 4). The face-to-face interviewing with pre-coded multiple-choice questions includes a list of pre-codes, which is provided with open questions for the interviewer's use. It is important to provide a space for the interviewees to give responses that are not covered by the pre-codes because the interviewees are the experts in that particular ECM workflow system.

The face-to-face interview is a semi-structured type of research interview, as the purpose of the interview questions is getting responses about CERT values based on four key probing questions (Brace, 2013, Chapter 4; Saunders *et al.*, 2009, Chapter 10). This validates the findings from the research Round I and provides more data in order to increase the depth of the data analysis (Figure 3.3). The specific questions of the questionnaire are used to prompt detailed answers to measure ECM workflow system performance. Also, the interviewees are provided with an opportunity to give an open response to the questions, but it is not necessary to have an open response to every question.

3.5.1.3.2 The Face-to-face Interviews Data Types

The research interview data are collected during each face-to-face interview by audio-recording and making notes (Saunders *et al.*, 2009, Chapter 10). This collected data is then transferred to a text document, and then analysed using the coding process in Grounded Theory (Figure 3.8). The interview transcript contains the open discussions, the Likert scale responses and contextual data.

The open discussions are the complete conversations during the interview, which can be transcribed prior to qualitative data analysis procedures. This is supported by responses from the research questionnaires (Round I), which can be used to find the strength of relationships between the identified variables of each CERT value (Figure 2.7). Indeed, the research rounds provide the required data to measure ECM workflow system performance, as well as validate the research results (Brace, 2013; Saunders *et al.*, 2009). Conversely, the interview contextual data has a number of general details, such as interview location, time, organisation and interviewee (e.g. job title, gender, background). As a result, the interview can provide open statements with specific scaled responses based on the Likert scale of Round I and includes contextual data to compare variables.

3.5.1.3.3 The Use of Probing and Pre-coded Multiple-choice Interview Questions

An interview probing questions are open-ended questions, which can be used to explore CERT values by the responses from the interviewees (Brace, 2013, Chapter 4; Saunders *et al.*, 2009, Chapter 10). This is used to follow CERT values as a BPM construct using an open-ended question and a list of questions from the research questionnaire (Round I). The responses to these questions can be used to reflect and make a probe on CERT values. The probing questions style bring an intention that encourages the interviewee exploration of each interview question without giving an interpretation from the interviewer side (Saunders *et al.*, 2009, Chapter 10). It is important to make the interview process as comfortable as possible by asking clear questions so that the research can include the most appropriate, accurate and proper responses.

3.5.1.3.4 The Face-to-face Interviews – Round II

The face-to-face interviews are Round II of the research strategic procedures and Delphi study rounds (Figure 3.3). Each interview has six stages to complete where two stages are an introduction and closure of the interview, and four stages are the core interview stages, which are based on CERT values. The interview stages are implemented to provide a

complete qualitative dataset, regarding the interviewee's ECM workflow system experience. In detail, the interview six stages start with an introduction, which provides an overview about the purpose of the interview, the interview participant consent form to officially receive the participant's consent (Appendix B.3), and then explains the CERT values (Saunders *et al.*, 2009, Chapter 10). This is an opportunity for the interviewee to gain an understanding of their ECM workflow system based on CERT values and discuss issues, which they may not have thought about before this research.

Afterwards, the four core interview sections start. These sections have the interview questions, which are arranged using the CERT construct (Figure 2.7). Then, the interview ends with the closure section, which is an opportunity to gather more comments, feedback and/or questions from the interviewee which can be used to support the research findings. Finally, the interviewer provides a closure statement by acknowledging the interviewee for participating in this research with a final 'thank you' message to end the interview.

Interview Introduction

The face-to-face interview starts with a welcome message from the interviewer and brief conversation with the interviewee to begin the interview, as well as to get the interviewee signature on the interview participant consent form (Saunders *et al.*, 2009, Chapter 10). Then, the interviewer explains what the interview is about and the BPM construct of CERT values. Also, the interviewee should understand from the invitation email and the interview introduction section the following key interview principles:

1. The interview participants are Manager/Directors from within the set of questionnaire (Round I) participants (members of staff) and/or an ECM workflow system administrator, professional or expert.

2. The interviewee provides a full picture of the important organisational issues and clarifies some key questionnaire results from the research Round I.

3. The interview has four main sections to investigate relating to the CERT values of Customer orientation, Excellence, Responsibility and Teamwork.

4. The impact of CERT values on ECM workflow system performance as an underlying factor will be explored in the interviews.

After the completion of the introduction, the interview core sections, begin in which each of the CERT values, are discussed as outlined in the following parts.

Part I: Customer orientation

The degree to which Customer orientation impacts on ECM workflow system performance is investigated. This uses statements from the questionnaire Customer orientation section (Table 3.5). Also, the interview investigates the impact of creativity, commitment, customer needs and communication on ECM workflow system performance (Schmiedel *et al.*, 2013, 2014). This addresses the following dimension of the core research question:

How does 'Customer orientation' impact on ECM workflow system performance?

Part II: Excellence

Excellence is used to evaluate how well an organisation's content management services are managed to meet business objectives and organisational strategic goals (Schmiedel *et al.*, 2013, 2014). This is investigated using the questionnaire Excellence section that consists of statements about the Excellence value (Table 3.6). The Excellence core categories are efficiency, effectiveness, empowerment and employee orientation and these core categories are used to find the Excellence value impact on ECM workflow system performance. Thus, the variables of the Excellence value are used to addresses the following dimension of the core research question:

How does 'Excellence' impact on ECM workflow system performance?

Part III: Responsibility

Responsibility relates to employee attitude and business activities that aim to empower workflow decisions in order to achieve business objectives successfully (Schmiedel *et al.*, 2013, 2014). This supports the investigation of performance measurement and management to control business structure and stability, which is investigated using the questionnaire Responsibility section and has four core categories (Table 3.8). These categories are responsiveness, result orientation, right quality and right skills, which are used to explore responsibility BPM value in order to address the following dimension of the core research question:

How does 'Responsibility' impact on ECM workflow system performance?

Part IV: Teamwork

Teamwork is the staff and workflow information system's capability to be faster, efficient and better prepared to improve ECM workflow system performance in order to meet business objectives (Schmiedel *et al.*, 2013, 2014). The Teamwork value can be used to recognise how ECM workflow system can be developed to comply with potentially more advanced

tasks. This is investigated using the questionnaire teamwork section that consists of statements based on Teamwork categories, which are transparency, transformational leadership, transactional leadership and team collaboration (Table 3.10). These categories are used to explore the Teamwork value in order to address the following dimension of the core research question:

How does 'Teamwork' impact on ECM workflow system performance?

Interview Closure

Naturally, interviews are managed to use the available time appropriately (Saunders *et al.*, 2009, Chapter 10). Thus, the interview is concluded by confirming that the interview questions are completed. At the end of the interview, the researcher may ask the interviewee for any comments about the experience that the interviewee had in either the questionnaire or the interview, including feedback about the ECM workflow system. Finally, the researcher closes the interview by thanking the interviewee for attending the interview.

3.6 Data Analysis Methodology and Methods

The research data analysis has been implemented using quantitative and qualitative data analysis methods (Saunders *et al.*, 2009, Chapter 12). Quantitative analysis methods are the processes, frameworks and techniques, which are used to turn quantitative data into useful numeric information. Also, the quantitative analysis produces statistical figures, graphs and charts that support the researcher to observe, examine and explore significant features, characteristics and relationships based on the research data.

The quantitative data analysis provides descriptive, inferential and multivariate statistical analysis using quantitative methods to process the research data from the questionnaire (Round I) and the quantitative data from the face-to-face interviews (Round II), (Saunders *et al.*, 2009, Chapter 12; Thakurta, 2017; Williams *et al.*, 2010). These research rounds provide quantitative results, facts and insights based on quantifying the responses to variables of each CERT value and using analytical processes to test the study data in order to meet the research objectives from RO2 to RO5 (Field, 2013, Chapter 17). This is used to test whether the suggested measurement variables of each CERT value form a coherent grouping each related to measuring the CERT value concept. To do this exploratory factor analysis was used (Section 3.6.1). On the other hand, qualitative data analysis methods are applied to develop a theory based on an inductive approach using datasets from the

participants' responses in order to find relationships that have been identified inside sets of categories belong to each CERT value (Saunders *et al.*, 2009, Chapter 13). Qualitative data are non-numerical (unquantified) data that consists of responses from qualitative data collection methods, such as open-ended questions of a web-based questionnaire platform, transcripts from interviews, organisational documents, documentaries, etc.

The qualitative data analysis is an integrated analysis process to summarise, make categories (groups) and/or restructure the qualitative data in order to provide a logical structure, meaningful examination and analytical figures (Kuckartz, 2014, Chapter 2; Saunders *et al.*, 2009, Chapter 13). Qualitative data analysis can also result in impressionistic views of what the interview participants mean and statistical diagrams (e.g. the scale of specific categories within such qualitative data) based on a conceptual framework of the research study. Hence, within Grounded Theory, the coding process is applied for developing and evaluating key categories (Section 3.6.2). Coding in Grounded Theory develops an explanation based on the participants' feedback, which defines what is happening. This generates a set of indicators toward certain categories and can provide quantitative data from the qualitative responses. As a result, the qualitatively analysed data can be used to measure ECM workflow system performance, as well as generate a set of theoretical, professional and business practice findings.

The research data analysis is completed by implementing the performance measurement and management (PMM) framework (Section 3.6.3). Indeed, PMM is Delphi's round three of the study rounds and strategic procedures (Figure 3.3) that uses the EFA quantitative procedures, Grounded Theory and competing values framework (Melnyk *et al.*, 2014; Schmiedel *et al.*, 2013, 2014).

In conclusion, the data analysis methods are the processes used to make sense of the research data. These analysis processes are implemented to support the execution of the research framework and strategic procedures in order to achieve the research objectives. Full details of the research data analysis theories, models, implementations and practices are available in Chapter 5: Data Analysis, Testing and Evidence Collection.

3.6.1 Exploratory Factor Analysis

Exploratory factor analysis is a multivariate technical (procedural) method for identifying the correlations in a set of variables based on their relationship to each other as expressed in the research data, which can be presented in a linear model format (Field, 2013, Chapter

17; Thakurta, 2017). EFA uses mathematical procedures to shorten (simplify) the interrelated actions in order to discover specific consequences, patterns or behaviours within the identified set of variables (Thakurta, 2017; Yong and Pearce, 2013). Hence, EFA has been applied to discover a set of factors (F), which influences variables (X). As a result, these variables become linked together (e.g. cluster, class, group) by having them set in different groups linked to certain factors (Figure 3.7). Thakurta (2017) and Yong and Pearce (2013) described EFA as a quantitative analysis method that identifies common factors within the research data. EFA is also used to label the dependent variables as surface attributes and the underlying factors (i.e. structures, constructs) as internal attributes.
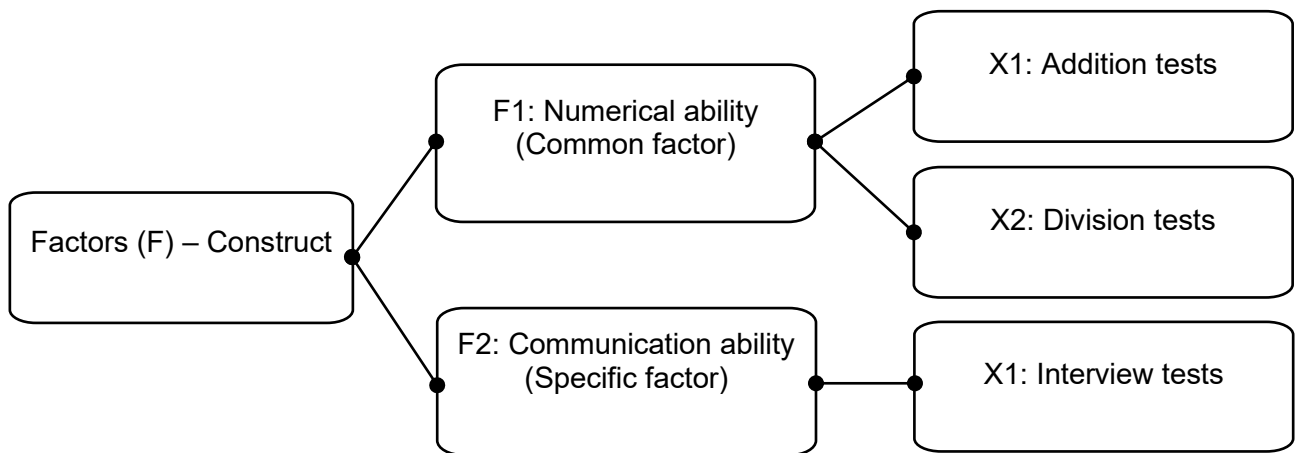
Figure 3.7 Factor analysis and types (Yong and Pearce, 2013).

Factor analysis has two types of factors (Figure 3.7), termed common factors and specific factors (Yong and Pearce, 2013). Common factors are used to affect several surface variables (two or more). Conversely, specific factors have a direct influence on only one variable. Exploratory factor analysis is applied in this research study to test the suggested variables of each CERT value in order to validate them as measuring the same construct (i.e. CERT value). This validates the use of the suggested variables for the measurement of CERT values. The research EFA implementation details and procedures are available in Chapter 5: Data Analysis, Testing and Evidence Collection.

3.6.2 Coding in Grounded Theory

According to Glaser and Strauss (1967), Grounded Theory can be applied to make a connection between categories and their associated properties (variables). Indeed, GT contains a set of groups for coding where each group has its theoretic interpretational features and hypotheses (Kuckartz, 2014, Chapter 2; Saunders *et al.*, 2009, Chapter 13). Also, it has been confirmed that defining groups (e.g. categories) and coding process in GT

are central to Grounded Theory as a qualitative analysis approach. Figure 3.8 shows the coding process in GT, which was developed by Kuckartz (2014, Chapter 2) and Saunders *et al.* (2015, Chapter 13). Indeed, within GT there is a distinction made between three types of coding, which are open coding, axial coding and selective coding. Also, the coding in GT has been described by Charmaz (2006, p. 46), as "The pivotal link between collecting data and developing an emergent theory to explain these data. Through coding, you define what is happening in the data and begin to grapple with what it means". Hence, the coding in GT can be a research analytical framework that enables qualitative data analysis.
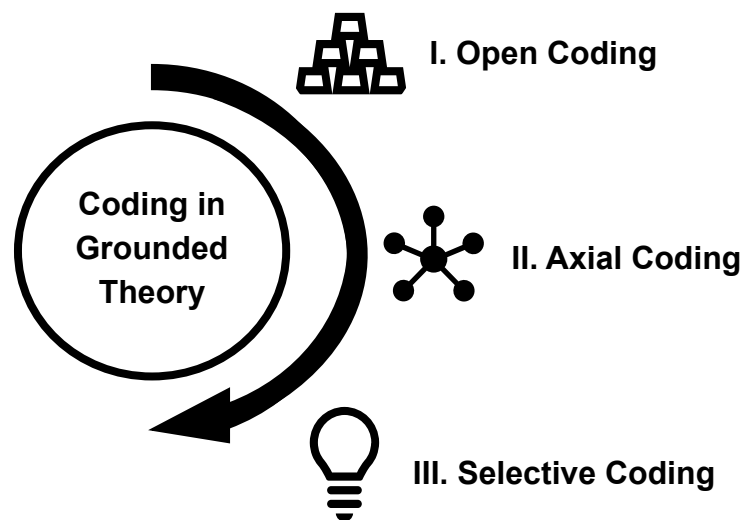
Figure 3.8 The coding process in Grounded Theory.

The coding process in Grounded Theory is a well-used procedure for developing codes (categories) from qualitative data (Jones and Alony, 2011; Kuckartz, 2014, Chapter 2; Saunders *et al.*, 2015, Chapter 13). The first step is to categorise using "I. Open Coding"; the second step uses procedures for finding the key relationships between the identified categories using "II. Axial Coding"; the third (final) step is to analytically process these categories and give them clear dimensions by finding the integration within the identified categories to build a theory using "III. Selective Coding" (Figure 3.8). More details are to be found in the following sections supported by the implementation of GT in this research study.

3.6.2.1 Open Coding

Grounded Theory open coding is the first stage of the Grounded Theory coding process (Figure 3.8). Open coding has procedures to disaggregate qualitative data into categories (e.g. items, classes, aspects) by investigating, comparing and conceptualising, then describing the key components of the qualitative data (Jones and Alony, 2011; Kuckartz, 2014, Chapter 2; Saunders *et al.*, 2009, Chapter 13). This is used to provide open concepts

in order to analyse the qualitative data. The core categories from GT open coding are based on three key terms, which are subcategories, dimensions and properties:

Subcategories: A set of units and concepts, which are connected to the core category. This provides the category with more specifications, clarification and accurate description.

Dimensions: Represent the length of the range that includes the properties of a category. Dimensions are used to add a scale to a category in order to build a theoretical view.

Properties*:* The meaningful key features that give a category a clear definition. This defines the characteristics of the category.

Open coding actions make codes based on specific words, passages or a complete set of sentences within the collected text data (Jones and Alony, 2011; Kuckartz, 2014, Chapter 2; Vogt *et al.*, 2014, Chapter 11). Actually, codes are developed based on the identified variables and the characteristics of these variables. For example, a category such as "Observation" has several dimensions that consist of subcategories, defined dimensions for each subcategory and properties for the subcategories and defined dimension (Table 3.10).

Category	Subcategories	Defined Dimension		Properties
Observation	Frequency	Often	Never	
	Duration	Long	Short	
	Intensity	High	Low	
	Extent	Many	Few	

Table 3.10 Category dimensions (Kuckartz, 2014, Chapter 2).

Open coding is an initial coding of the qualitative data to find areas that demonstrate a lack of data and support closing gaps (Charmaz, 2006, Chapter 3; Kuckartz, 2014, Chapter 2; Vogt *et al.*, 2014). This is the initial analytical process of coding in Grounded Theory. In fact, "Initial codes are provisional, comparative, and grounded in the data" (Charmaz, 2006, p. 48). Hence, open coding makes conceptual codes (also known as in vivo codes), which are terms based on the participants' testimony. These terms (codes) enable direct communication with the participants without the use of theoretical terms and aid the structure and flow of communication. Finally, open coding can be initiated by the Grounded Theory framework and literature review in order to reflect valued sources for analytical categories and comparison (Charmaz, 2006, Chapter 7).

In this research study, open coding is the initial analytical process in Round II. The open coding has been implemented in two ways: first, by disaggregating the interview data to categories and variables of each CERT value (Section 2.6.2). Hence, the research literature review and PMM strategic model have been used to transfer the interview transcripts to transitory tables for each CERT value's set of variables to be ready for the axial coding stage (Section 5.4); second, the interview transcripts were coded to identify supporting evidence for the judgements made by interviewees.

3.6.2.2 Axial coding

Grounded Theory axial coding is the second stage of the Grounded Theory coding process (Figure 3.8), which follows the open coding procedure (Kuckartz, 2014, Chapter 2). Axial coding processes the categories from open coding in a different way by recognising the connection between these categories based on their relationships (Jones and Alony, 2011; Kuckartz, 2014, Chapter 2; Saunders *et al.*, 2009, Chapter 13). This is used to connect categories (codes) together by relating them to each other.

The purpose of axial coding is to recognise the characteristics from the initial codes that link to make a conceptual framework (Kuckartz, 2014, Chapter 2; Vogt *et al.*, 2014, Chapter 11). Axial coding uses a category as an "axis" and other codes are centred around it. According to Charmaz (2006), axial coding is used to create an "axis" around each key category based on researcher analysis of relationships, connections and defined dimensions (Table 3.10). This links the research data together in a coherent way having been split by the initial (first) coding. Axial coding does relate key categories to subcategories and specifies the defined dimensions and properties for each category. The initial axial coding is used to classify, sort, recategorise, synthesise and generate coherence in big datasets in order to reconceptualise the data after completing the open coding process. In detail, axial coding is used to answer research questions including "how", "why", "when", "where", "what", and "what is the consequence". Axial coding supports data exploration and imposes an analytical framework on the data. Conversely, axial coding could limit learning about broader research concepts as restricted codes could be an outcome of axial coding.

An example of axial coding is formulating research questions or inquiry statements that can be used as hypotheses for testing relationships and accessing categories (Charmaz, 2006, Chapter 3; Saunders *et al.*, 2009, Chapter 13). Indeed, researchers require axial coding to gain a deeper understanding of the qualitative data after open coding to allow the

development of coherency within the data by establishing an "axial" construction where categories are linked based on relationships with each other in an axial way.

In this research study, the interviewees' answers are connected to the questionnaire statements for the variables of each CERT value using the axial coding. This is applied by finding answers based on scores using the Likert scale (i.e. Strongly Agree, Agree, Neither, Disagree, Strongly Disagree) and the open coding of any supplementary verbal commentary given by the interviewee. Afterwards, scores are assigned using the answer text in the findings table (Appendix D.1).

3.6.2.3 Selective Coding

The process of integrating categories to formulate a theory is the last step in Grounded Theory, which is known as selective coding (Figure 3.8). Actually, selective coding is a core category selection process using a systematic connection of categories within the research data (Jones and Alony, 2011; Kuckartz, 2014, Chapter 2). Selective coding also validates the connections between categories and makes possible the filtering of categories, which can be refined (developed) into new and different patterns within the data. This resembles multivariate statistical analysis with its focus on making an analytical story based on core categories and related categories in a logical, sequential and systematic manner. The main goal of selective coding is to only choose related and relevant codes from the data (e.g. transcripts) and then only add data that adds value to the core category. Hence, saturation based on the theoretical concept is achieved as all categories are connected with a validated relation to the core category (Charmaz, 2006). At this stage, the researcher can accept that the data core categories and dimensions are empirically matured.

In this research study, selective coding is implemented by systematically coding the assigned scores from the axial coding stage. This makes a logical process to specific numerical answers to the interview statements by transferring the axial coding stage scores from the findings' tables (Section 5.4.1) to their relevant numbers (i.e. Strongly Agree = 1, Agree = 2, Neither = 3, Disagree = 4, Strongly Disagree = 5). Later, these findings' tables are used during the weighing round (Round III) to provide overall findings' tables and scores for each CERT value and its categories (Section 5.5). In addition, supporting statements are linked to the numerical judgements as supporting justification of ECM workflow system performance. For example, Customer orientation overall research findings in Table 5.29 shows the overall score of each interview for the variables of the value.

3.6.3 Performance Measurement and Management – Round III

Workflow information systems and business process management values have an impact on workflow system performance (Melnyk *et al.*, 2014; Schmiedel *et al.*, 2013). Indeed, performance measurement and management (PMM) can be used to recognise the effective and efficient management approaches, which are applied to measure ECM workflow system performance. PPM is a framework that generates effective control and correction by reporting the current level of performance (Actual performance) and comparing it with the desired level of performance (Predicted performance); for example, in organisational management standards (Melnyk *et al.*, 2014). PMM communicates strategically as a study framework to find what has been measured in order to recognise what has not been measured and the important BPM workflow system components.

According to Schmiedel *et al.* (2013, 2014), CERT values can be used along with the CVF to measure BPM values (Figure 2.8). Hence, CERT values can be applied to measure an ECM workflow system to improve its performance. Indeed, CERT values in the CVF can be used for ECM workflow system performance measurement and management. This is performed by focussing on to reliability and validity using the Delphi method (Table 3.3). CERT values in the CVF formulates a PMM framework to measure an ECM workflow system to improve its performance in order to meet business objectives (Schmiedel *et al.*, 2015). The use of CVF with CERT values provides many dimensions through which to evaluate an ECM workflow system performance (Table 3.11).

CERT Values	C	E	R	T
Core-dimensions	External Focus	Flexibility	Stability	Internal Focus
Sub-dimensions	Proactiveness / Responsiveness	Continuous Improvement / Innovation	Commitment / Accountability	Cross-functional Collaboration

Table 3.11 Dimensions of CERT values to support BPM (Schmiedel *et al.*, 2015).

In this research study, CERT values in the CVF are applied to be KPIs for measuring the ECM workflow system (Schmiedel *et al.*, 2013, 2015). CERT values in the CVF can be used as dimensions to support BPM with the use of their four major quadrants (i.e. collaborate, create, control, compete) and sub-dimensions to create a performance profile, which can be used to improve ECM workflow system performance (Table 3.11). In detail, the weighing round (Round III) applies the PPM framework of CERT values in the CVF, which is an OCAI to predict the current and preferred situations using the major quadrants (Cameron and

Quinn, 2011). Also, the sub-dimensions' quadrants are used to give more characteristic information using CERT values. Table 3.11 shows these CERT sub-dimensions, as follows: Customer orientation is the *proactiveness* or *responsiveness* attitude concerning the required workflow outputs; Excellence is the orientation in relation to *continuous improvement* and *innovation* to achieve high levels of performance; Responsibility is the *commitment* to process BPM objectives and the *accountability* for the BPM workflow system decisions; Teamwork is the positive attitude regarding *cross-functional collaboration*.

3.7 Synopsis

The research methodological frameworks have been explained and discussed in this chapter. This has documented the research methodology, design and methods prior to doing the fieldwork in order to collect the research data, and then analyse that data. Also, the research philosophical and theoretical worldviews have been discussed in adopting a pragmatism approach that leads to applying mixed methods approach in order to achieve the research aims and objectives and to test the research hypotheses (Table 3.2).

Further, the research strategy and design have been structured to conduct a survey (questionnaire) and face-to-face interviews using the Delphi method in order to confirm the use of CERT values to measure ECM workflow systems performance (Figure 3.2). However, there are several ways to use the Delphi method; for example, some researchers depend on experts to find issues or key indicators while others may use a literature review to formulate a set of indicators or categories prior to the Delphi rounds (Schmiedel *et al*., 2013, 2014). The use of Delphi three fundamental rounds in this research study leads to improving ECM workflow system performance in order to meet business objectives and the organisational goals.

Furthermore, the chapter has presented the research data collection methods, as well as data analysis methods, including the use of exploratory factor analysis, coding process in Grounded Theory and performance measurement and management framework. The discussion of the research methodology in this chapter has built the narrative for the thesis Chapter 4: Data Collection, Framework and Implementation and Chapter 5: Data Analysis, Testing and Evidence Collection. Lastly, Chapter 4 and Chapter 5 provide details on the use of this chapter's methodology and methods, along with discussions on the implementation of the research data collection and analytical procedures.

Chapter 4: Data Collection, Framework and Implementation

Overview

Conducting an empirical study requires the implementation of the research framework using the research methodology and methods in order to collect data for the research analytical procedures. This chapter explains the research implementation, and how the research methodology and methods have been applied to access the required data. The research data types and selected data samples have been explained in the first sections to illustrate the characteristics of the collected data. The core sections of the chapter are dedicated to the data collection stages, as well as the ethical framework needed to conduct the research. In addition, the data collection practices, processes and tools have been illustrated in the final sections to discuss practically, how the research data has been collected. Lastly, the collected data structure, key facts and quality assurance have been explained.

4.1 Introduction

As explained in chapter 3, the research data collection process has two key stages to collect empirical evidence (Brace, 2013, Chapter 2; Saunders *et al.*, 2015, Chapter 10). These stages are first: a self-administered questionnaire to collect data from employees using an internet web-based self-completion technique (Delphi Round I, Sections 3.5.1 and 3.5.1.2) and second: semi-structured interviews to collect data from managers and administrators using face-to-face interviews technique (Delphi Round II, Sections 3.5.1 and 3.5.1.3).

Following the discussion of the research methodology, design and methods in the previous chapter, the following sections in this chapter describe the practice of implementing the data collection procedures. Therein, commentary on what went well (positives), did not go well (negatives) and the applied software applications and research tools used to collect data have been provided. Accordingly, aspects of the research data collection are illustrated starting with the collected data types, the selected data sample, access to the research data, and then ending with ethical procedures, a summary description of the quantitative data collected in the research rounds, and description of the research data collection software applications and tools.

4.2 Collected Data Types

The research data have been prepared and managed during the data collection process to assist the research data analysis steps (Brace, 2013, Chapter 5; Saunders *et al.*, 2015, Chapter 12). Hence, the research data are structured in tables based on three key data types, which are Likert scale data (attitudinal rating scales), ordinal data and contextual data.

The Likert scale data have a range of numbered items, which are represented based on a scale (Sections 3.5.1.2.2 and 3.5.1.2.3). This scale has an equivalent distance between each item, which is numbered for the research quantitative data analysis. The research ordinal data are values to be classified and then transformed to categories based on the research CERT values strategy (Figure 2.7) or a variable in the scale points (rank-order). The research contextual data are collected from transcripts or notes to provide qualitative data, which can be categorised, and then quantified to produce quantitative data to be used in Round III to support the research findings from the previous rounds (Sections 3.5.1.3.2 and 3.5.1.3.3). These data types can determine the level of the relationships within each CERT value and the variables of its subcategories. The questionnaire statements have been

developed to provide an answer for each item that represents a variable of a subcategory that is should be relevant to one of the CERT values (Section 3.5.1.2.4).

4.2.1 Likert Scale Data

Likert scale data are interval scale quantitative data, which are used to denote the difference (interval) between a range of values for a specific variable (Brace, 2013, Chapter 6; Saunders *et al.*, 2015, Chapter 12). Hence, Likert scale data are not used to present the relative difference, as collected values of a variable can only be added or subtracted to be a meaningful scale based on a set of numbers.

In the light of using Likert scale to study CERT values to measure ECM workflow system performance, it has been decided to use the attitudinal rating scale, which is common in such situations (Brace, 2013, Chapter 6; Saunders *et al.*, 2015, Chapter 12). This is to receive respondent perceptions on a set of defined attitudinal dimensions (Table 3.10) based on a defined scale from 1 to 5 (Figure 3.5). A Likert scale has been chosen to collect the research quantitative data (Section 3.5.1.2.3). The Likert scale approach is commonly used because it assigns a specific number as a response to each question or statement to show rank, value or score. This approach can be used to assess the ECM workflow system performance. The research Round I has questions in the form of statements (Section 3.5.1.2.4) where each statement generates a response in the form of specific numbers, which are 1, 2, 3, 4 and 5 (Brace, 2013, Chapter 8; Saunders *et al.*, 2015, Chapter 11). These numbers represent a Likert scale of five different values that demonstrate three broad attitudes, which are: the positive attitude that includes "Strongly agree" = 1 and "Agree" = 2; a point of indifference by choosing "Neither" = 3; the negative attitude that includes "Disagree" = 4 and "Strongly disagree" = 5.

4.2.2 Ordinal Data

The research qualitative data are organised and structured into categorical data by classifying these datasets based on their characteristics, and then transform the classified data to specific variables in order to numerically rank-order these variables (Brace, 2013, Chapter 8; Saunders *et al.*, 2015, Chapter 12). Also, the research ordinal data have been structured to multi-category scale datasets, which are used to classify the identified categories (Sections 3.5.1.2.4 and 3.5.1.3.4). This allows the rank-ordering of these categories numerically to a set of scores for measuring ECM workflow system performance. Hence, the rating scale approach has been applied to measure CERT business process

management values and their identified variables as key dimensions by adopting the Likert scale within the questionnaire. This provides quick responses to save time, reliability to access and easier way for the participants to accurately respond.

Further, most of the data collected through this research are based on the Likert scale and are an example of ordinal data. This type of data can provide evidence of the relative ranking of responses but, due to the arbitrary assignment of numbers to the measurement scale, cannot be treated as comparable in any other sense. Hence, the use of many parametric statistical procedures is not appropriate for this data. Therefore, this research has adopted the use of non-parametric statistical methods, which are designed for use with ordinal data. Also, exploratory factor analysis is a robust technique that has been assessed as suitable for use with ordinal data.

4.2.3 Nominal Contextual Data

The research contextual data consists of different nominal data types (also known as descriptive data), which are categorised by counting the relevant occurrences (amount) of each category within the research contextual data (Brace, 2013, Chapter 5; Saunders *et al.*, 2015, Chapter 12). The nominal contextual data is analysed by the identified categories to transfer that data to an ordinal data scale (multi-category), and then transfer these to Likert scale data (Sections 3.5.1.3.2 and 3.5.1.3.3).

The research contextual data consist of participants' Round II responses, and the study evidence from the data collection processes (Saunders *et al.*, 2015, Chapter 10). Contextual data also includes records of the interview location (e.g. institution, building), date, time, participant background (e.g. job title, gender) and interviewer first impression. This qualitative data can be used to highlight important issues, which are expected to be examined in the research data analysis and testing (Chapter 5). Indeed, the contextual datasets are processed by counting the responses compared to each identified code in order to categorise these datasets (Brace, 2013, Chapter 5).

4.3 Selected Data Sample

The research data has been collected based on a homogeneous sampling strategy (Section 3.5.1.1) as a representative sample (Creswell, 2013, Chapter 8; Saunders *et al.*, 2009, Chapter 7, 2015, Chapter 12). Therefore, the data sampling method is purposive sampling, which is used to recognise particular ECM workflow solutions for use in the research study.

As mentioned in the research data collection methods (Section 3.5.1), it has been decided to target organisations, which use ECM workflow systems as business workflow solutions and mainly Microsoft SharePoint and OpenText Content Server. This results from searching for the most common ECM workflow solutions using trusted professional sources such as Gartner, OpenText, IBM, Microsoft (MS) and Xerox, along with attending professional events (Appendix C.2) to identify the currently most commonly used ECM workflow solutions (Gartner, 2018; IBM, 2018; Microsoft, 2018; OpenText, 2018; Xerox, 2018). However, attempts to get companies fully engaged with this research were fruitless, and it was decided that the data collection can be implemented at a single Higher Education Institution (HEI) only. This data sample can be used to evaluate a firm technological performance as described by Camisón and Villar-López (2014). Section 4.5 provides further details on the data sample and the attempts made to broaden the sample range.

The research study sampling frame is based on two specific samples, which are from the HEI members of staff who are using two ECM workflow approval systems, designed for different purposes and organisational goals. The selected data sample participants have the required knowledge, professional and business practise experience to allow judgements to be made on ECM workflow systems performance (Hogan and Coote, 2014). Actually, the targeted participants have the experience to be able to evaluate the variables of each CERT value (Section 3.5.1.2.4). In detail, the participants include: HEI staff at the professional levels and academic levels; Professional members of staff are mainly Managers and Senior Managers; Academic members of staff are mainly Lecturers, Senior Lecturers and Professors (Table 4.1). The research data sample consists of the enterprise approval system (EAS) and research approval system (RAS) datasets. One of the strengths of this research data sample is that both systems are in implementation at the same organisation based on one ECM workflow solution (i.e. MS SharePoint), although these ECM workflow systems are used for different purposes and business objectives.

The potential number of data subjects based on the provided list of names by the HEI is 54 participants for the research questionnaire and 9 for the face-to-face interviews. The actual number of participants agreeing to take part in the research questionnaire (Round I) was 29 and the face-to-face interviews (Round II) yielded 7 different interviews with 6 participants. This includes one interview with two parts, an EAS part and a RAS part since the interviewee was working on both systems. This is an acceptable number of participants to achieve the saturation point for the selected data sample since it represents a relatively high percentage

of the total population (54% for the questionnaire). Also, the participants were self-selecting, and the responses to research general questions show an acceptable cross-section of staff in term of education, experience, age and role (Section 4.7.1.5). Although the conventional view of saturation in a qualitative study (continuing to interview until no new insights are forthcoming) has not been followed in this research, the high participation rate together with the representative cross-section of staff participating lends strength to the robustness of the results obtained for these particular ECM workflow systems (i.e. EAS, RAS). Since the scope of the research has been limited to a single organisation using two workflow solutions and the sample size is considered adequate to provide meaningful results in such case. The contextual data collected in terms of the range of experience, background and level of responsibility of those taking part support the validity and reliability of the data collected.

4.3.1 Enterprise Approval System

The enterprise approval system (EAS) is used for enterprise project management and approval processes. This is an ECM workflow information system that uses Microsoft SharePoint for the approval and management of enterprise projects within the allocated financial and administration constraints (Appendix C.3). The research study has received responses for the questionnaire and face-to-face interviews from the HEI members of staff who are part of the enterprise approval workflow system. The EAS questionnaire has 17 participants and face-to-face interviews were conducted with 4 participants.

4.3.2 Research Approval System

The research approval system (RAS) is an ECM workflow system for research project approval and management. This ECM workflow information system has been designed using MS SharePoint for the approval of the HEI's enterprise and research projects (Appendix C.4). The RAS is used to manage the budgets and administration cycle for the approved research projects. HEI members of staff who are managing and using the research approval workflow system have participated in the RAS part of the research. Hence, the RAS questionnaire (Round I) has 12 participants and face-to-face interviews (Round II) were conducted with 3 participants.

4.4 Research Ethics and Ethical Considerations

The research data are collected following the London South Bank University (LSBU) research code of practice. Thus, a research ethical approval application has been submitted

along with a report that consists of all details about the data collection framework and practical procedures. The LSBU research ethics committee approved the ethical approval application on Monday, 23rd May 2016 under reference number UREC 1579. Thereafter, the round one data collection process started from Monday, 30th May 2016 until Friday, 24th February 2017 (Section 3.5.1.2.4). Afterwards, the round two data collection process started from Monday, 28th November 2016 until Friday, 12th May 2017 (Section 3.5.1.3.4).

The research Round I data was stored online with a secure username and password at the online survey's website (Section 4.6). Indeed, the research datasets have been structured and treated based on UK higher education research ethics and data protection act 1998, as well as the general data protection regulation (GDPR), which has been implemented from 25th May 2018 (Brace, 2013, Chapter 14; Creswell, 2013, Chapter 4; GOV.UK, 2018; Saunders *et al.*, 2015, Chapter 10). These research ethical policies, acts and regulations have been used to ensure the confidentiality of the research datasets. In addition, the research Round II and Round III (Section 3.6.3) contextual datasets have been separated from the face-to-face interview transcripts and any recordings to ensure that data are genuinely in a state of complete anonymity and confidentiality (Saunders *et al.*, 2015, Chapter 6). The research datasets have been linked using key codes to identify the different sections, lines and rows. Indeed, the research data have been securely stored and accessed by the researcher and the supervisory team only to ensure meeting the university code of practice. This includes the anonymity of the research findings, insights and final reports.

4.5 Access to the Research Data

The selected population is based on a non-probability (judgemental) approach (Section 3.5.1.1), which is used to produce the data sample (Creswell, 2013; Saunders *et al.*, 2015, Chapter 7). Thus, purposive data sampling has been used to choose the data sample, which the research study uses. This has provided identification of the participants who can provide answers, criticisms and insights to measure ECM workflow systems performance.

Consequently, the researcher has attended several ECM business conferences, seminars and exhibitions (Appendix C.2). These professional events consist of the most well-known companies in the enterprise content management and business process management sectors of the information technology industry in the United Kingdom (UK). The researcher has attended these professional events before and during the research data collection to

have an up-to-date understanding of current ECM workflow systems, as well as communicating with professionals in these sectors to support the research data collection. The research has received positive feedback from many professionals who would individually participate but due to data privacy concerns, all IT companies approached, as well as their customers, were unwilling to let their employees participate.

Gaining access to contact participants who are using ECM workflow solutions proved very difficult. Based on the researcher's experience from attending professional events and contacting gatekeepers, it has been realised that ECM workflow systems contain sensitive information often of a commercial nature. Hence, gatekeepers are unwilling to provide access to both the ECM workflow systems and employees contact details due to concerns about business privacy, data protection and the flow of sensitive information.

The researcher provided the questionnaire and interview information sheets along with the interview participant consent form as proof of how the research data are protected by the LSBU code of practice for research involving human participants and the UK data protection act (Appendix C.1). Also, the researcher is a professional member of the British Computer Society (BCS) and required to follow BCS Code of Conduct (The Chartered Institute for IT Trustee Board Regulations – Schedule 3 Code of Conduct for BCS Members).

The researcher invited approximately 14 different organisations to take part in the research study, but the responses were negative, and most invitation emails received no response despite follow-up. Only one organisation (i.e. the HEI) was willing to take part in this research. This led the researcher to focus only on two HEI workflow solutions based on the Microsoft SharePoint ECM software system for the research data collection. These ECM workflow information systems are used for approving and managing the contents of enterprise projects and research projects at the HEI.

Further, permission to access the HEI members of staff who are using EAS and RAS was obtained along with LSBU research ethics committee approval (UREC 1579) to implement the research data collection and invite the target sample (Creswell, 2013; Saunders *et al.*, 2015, Chapter 7). Therefore, a list of emails has been prepared to send an invitation email to the questionnaire participants (Appendix A.2) with an attached questionnaire participants information sheet (Appendix A.3), which are used to explain the research purpose, benefits and details about the research area of study. This motivates the targeted participants (groups) to contribute to the research, as the provided information can give them details

about the area of study, ethics and the researcher contacts if a participant has any issues or further enquiries about the questionnaire or the research. Consequently, when the data collected from the questionnaire was complete, a list of emails was prepared to send an invitation email to each interview participant individually (Appendix B.1) with attached interview participant information sheet (Appendix B.2) and interview participant consent form (Appendix B.3). This describes the research study and the purpose of the face-to-face interview with supporting documents to clarify and motivate the applicants to support the questionnaire findings and contribute to the research.

Correspondingly, the given information and details about the area of research, ethics and the researcher contacts are available for the participant to arrange a suitable interview time and raise any issues or questions about the research and interview process. The research primary data collection for the questionnaire (Round I) and interviews (Round II) proceeded for approximately one year, from Monday, 30th May 2016 until Friday, 12th May 2017. Consequently, the research collected datasets from Round I and Round II have been used for the performance measurement and management (Section 3.6.3), which is the Round III, along with the coding process in GT implementation, to conduct further analysis in order to complete the research strategic procedures (Section 5.4). This ran for approximately six months, from Monday, 19th June 2017 until Friday, 22nd December 2017.

Indeed, the research collected datasets met the required data quality, as the participants' number reached the expected number of participants for the selected sample. Also, the collected datasets can be used to complete the research strategic procedures (rounds), which are used to find the required evidence to measure the impact of CERT values on ECM workflow systems performance to meet the organisational goals and business objectives.

4.6 Data Processing Applications and Tools

Several software applications and tools have been implemented through the study rounds of the Delphi method (Figure 3.3). The research Round I (quantitative primary data collection by questionnaire) was developed using an internet survey web platform (i.e. www.onlinesurveys.ac.uk). This was formerly known as Bristol online survey (BOS), which is hosted by Jisc (i.e. www.jisc.ac.uk) who provide advanced digital technology solutions to support UK education and research (Jisc, 2018; Onlinesurveys, 2018). The BOS is able to develop, deploy and provide basic analysis for questionnaires via the world wide web (WWW). Also, the BOS has flexible usability tools for the questionnaire administrator and

manager to design, distribute, import, export, share and analyse questionnaires, as well as for the questionnaire participants (users) to see the questionnaire completed percentage, navigate between the questionnaire forms (pages) and save a record of the submitted questionnaire (i.e. print, download pdf, email). As previously explained, the research has two related questionnaires (Section 3.5.1.2.4). First, a questionnaire for the EAS participants (Appendix A.4). Second, a questionnaire for the RAS participants (Appendix A.5).

The research Round II uses qualitative data collection through face-to-face interviews. This uses audio recording and written notes from a set of arranged one-to-one interviews at the HEI. During each interview, two recording devices and software applications were used to ensure high definition (HD) voice quality. The first device is a laptop computer connected to a professional microphone for capturing audio for interviews. This operates using Microsoft Windows 10 operating system (OS) with the installed Audacity software system. The Audacity cross-platform application for recording and editing sounds is used to record the interviews and manage audio files (i.e. *.wav, *.mp3, *.aup) on the computer and then save the audio file to the research cloud storage on the LSBU Microsoft OneDrive. The second device is a mobile phone that operates using Android OS with installed Recorder mobile application. The Recorder is an Android default application for voice recording. This also used to record the interviews and manage audio files (i.e. *.wav, *.aup, *.mp3) on the mobile and then save the audio file to the research cloud storage.

The research Round III uses the archived (stored) data from Round I and Round II. This data have been restructured for further analysis (coding), (Saunders *et al.*, 2015, Chapter 12 and 13). The research data are structured quantitively in the form of MS Excel files (i.e. *.xlsx) and Statistical Package for the Social Sciences (SPSS) files (i.e. *.sav), and qualitatively in the form of MS Word files (i.e. *.docx) and QSR NVivo Project files (i.e. *.nvp).

4.7 Preparing the Collected Data for Analysis

The research datasets are structured based on questionnaires and face-to-face interview responses (Jisc, 2018; Onlinesurveys, 2018). The responses from the questionnaires were formulated in numerical figures and tables to quantitively present the collected data from the research Round I. The responses from the face-to-face interviews have been transferred to English language, as written words (text), to be prepared for the qualitative analysis. The following sections provide details on the research data collection and show the preparation process in order to use this data in the research data analysis phase.

4.7.1 Responses from the Research Questionnaires

The research Round I used online questionnaires, designed and structured to contain five key response sections (Brace, 2013, Chapter 15; Saunders *et al.*, 2015, Chapter 11). These sections consist of responses to Customer orientation, Excellence, Responsibility, Teamwork and general contextual questions. The research questionnaires provide data about the ECM workflow systems using the research strategy model (Section 2.7) and the questionnaire structure (Section 3.5.1.2.4).

The following sections present the research data from the questionnaires (Round I). Thus, overall views can be examined to look at the similarities and differences within the collected data from these questionnaires.

Further, the data collected have been prepared to describe its essential characteristics, and therefore, it was necessary to give an average or "typical" response from the data for each question. This was done in three ways: by identifying a typical response for the EAS, the RAS and both ECM workflow approval systems combined.

Furthermore, when summarising Likert data type, it is conventional to use the modal response or the median response rather than the arithmetical mean (Field *et al.*, 2013; Joshi *et al.*, 2015). The mode is the most popular since it is intuitively appealing and visually clear from the bar charts. Also, calculating the median can yield a typical value, which is unrepresentative (for example in a U shaped distribution of responses). With such small research datasets, it can be the case that the data is multi-modal, and so when coming to an overall judgement on the typical response, ties in the mode have been broken by additionally calculating the median response to break the tie and prepare the datasets for analytical procedures.

4.7.1.1 Responses to Customer Orientation Research Questions

The first BPM measurement value is Customer orientation, which has variables based on four key categories, which are Creativity, Commitment, Communication and Customer needs (Leo and Russell-Bennett, 2014; Schmiedel *et al.*, 2013). Therefore, the variables of the Customer orientation research questions (CRQ) are Autonomy and Influence for Creativity; Occupational distress and Job satisfaction for Commitment; Engagement and Achievement for Communication; Expectations and Work quality for Customer needs (Table 2.9). Details on the data collection for these Customer orientation variables are provided using the CRQ in the following outlined summaries:

CRQ1. ECM Approval System completes my tasks under my own supervision.

The modal response for the EAS system is "Agree" and for the RAS system is also "Agree" (Figure 4.1). As a result, when the data is combined for both systems, then the modal response is also "Agree". Thus, the data suggest that the level of ECM approval systems autonomy for the HEI staff is appropriate for the staff who are using each approval system (i.e. EAS, RAS).
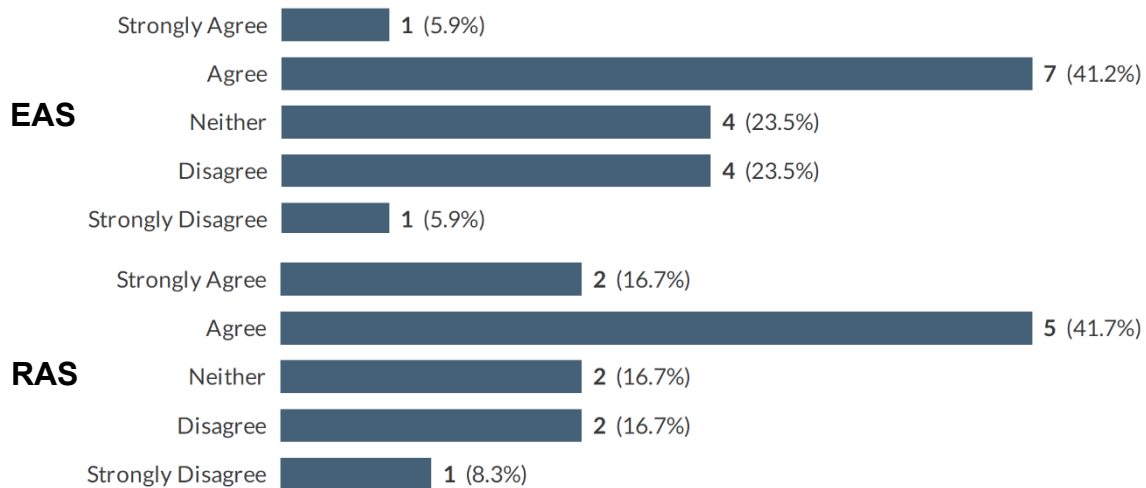
Figure 4.1 The autonomy scales for the Creativity.

CRQ2. ECM Approval System solves specialist problems and individual customer needs.

The modal response for the EAS system is "Strongly Disagree" and for the RAS system is "Neither" (Figure 4.2). However, when the data is combined for both systems, then the modal response is "Neither".

Figure 4.2 The influence scales for the Creativity.

Further, the responses from the EAS participants show they strongly disagree toward the influence of the ECM approval system, which indicates that there is no system support and influence to solve specialist problems, individual issues and specific customer needs.

CRQ3. ECM Approval System has an effect on my commitment to work.

The modal response for the EAS system is "Neither" and for the RAS system is also "Neither" (Figure 4.3). When the data is combined for both systems, then the modal response is "Neither". Thus, the occupational distress for the commitment to Customer orientation value has received uncertain responses from both ECM workflow approval systems. This indicates that the staff are unsure about how the ECM approval system affects their work commitment.
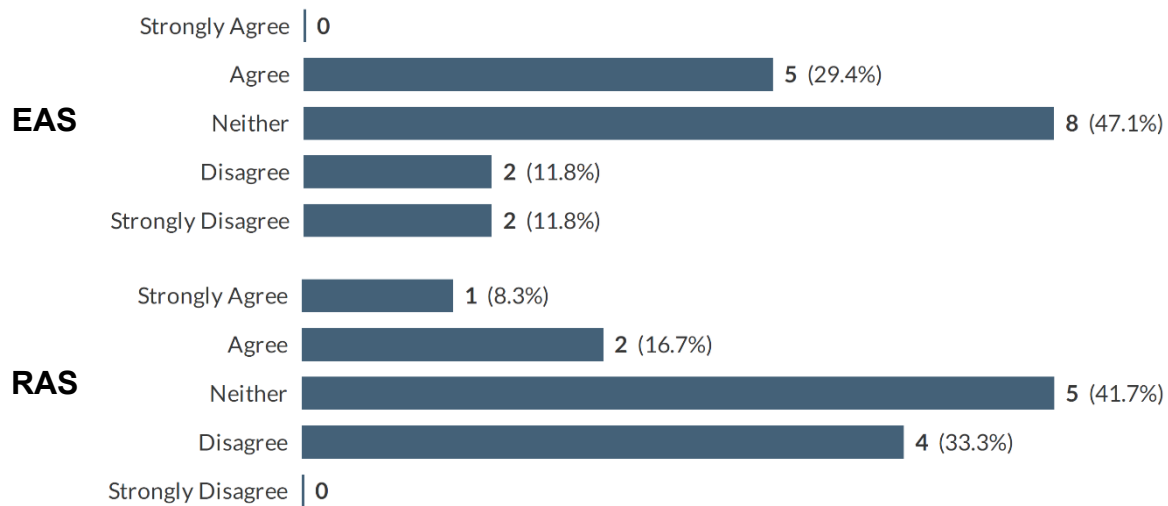
Figure 4.3 The Occupational distress scales for the Commitment.

CRQ4. ECM Approval System has an effect on my job satisfaction.

The modal response for the EAS system is "Agree" and for the RAS system is also "Agree" (Figure 4.4). As a result, when the data is combined for both ECM workflow approval systems, then the modal response is also "Agree". Thus, the staff responses to the "Job satisfaction" variable for the Commitment category is noticeably "Agree".
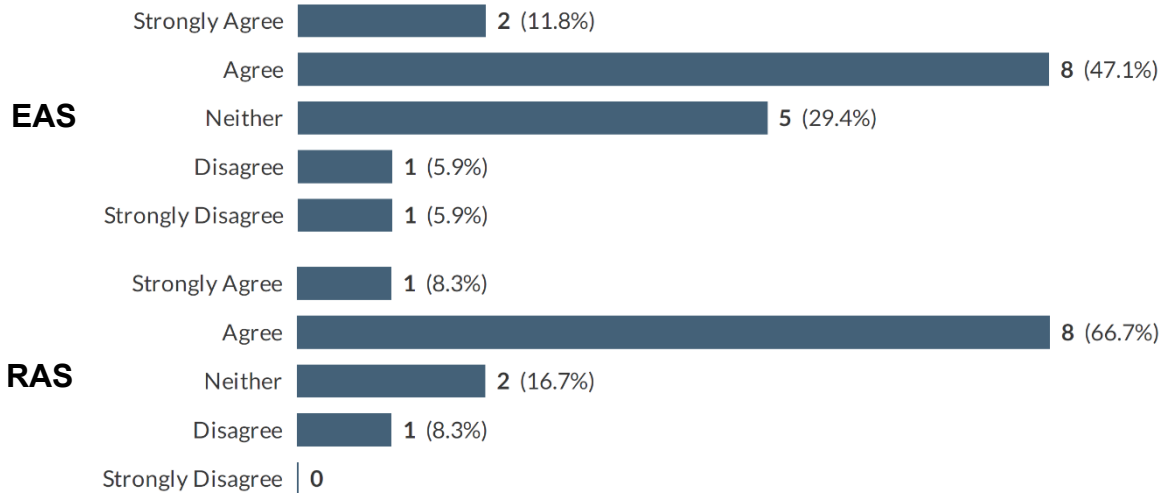
Figure 4.4 The Job satisfaction scales for the Commitment.

CRQ5. I do raise ECM Approval System errors, issues, or solve problems when it's necessary to do so.

The modal response for the EAS system is "Agree" and for the RAS system is also "Agree" (Figure 4.5). As a result, when the data is combined for both systems, then the modal response is "Agree". Thus, a high "Agree" level on the Engagement variable for the Communication of Customer orientation value has been noticed in the staff responses.
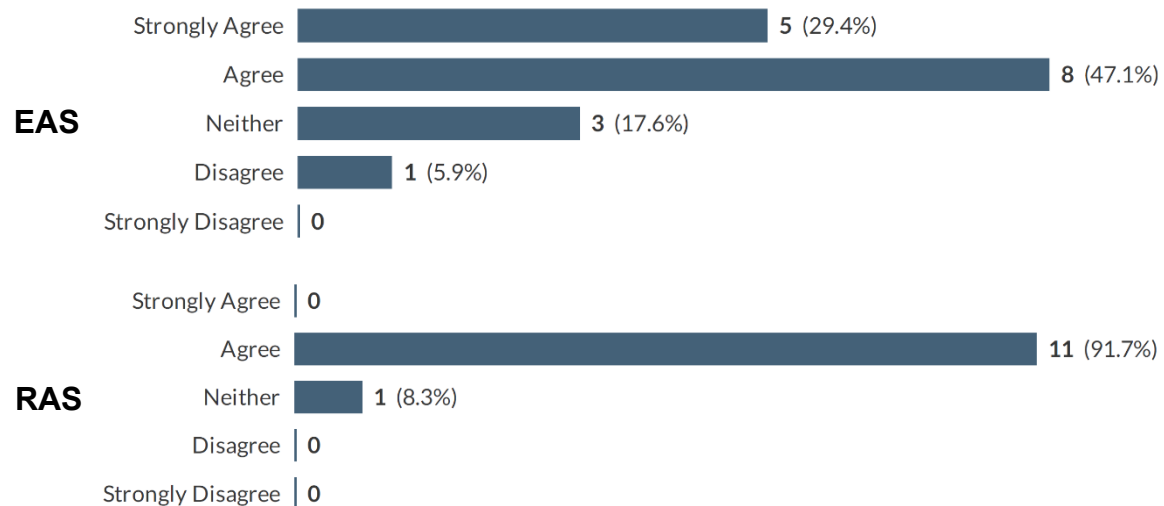
Figure 4.5 The Engagement scales for the Communication.

The participants of both ECM workflow approval systems have selected "Agree" to be the most appropriate indicator of their engagement with the ECM workflow approval system errors, issues or problem-solving. Overall, the two ECM workflow systems have similarities based on the participants' feedback and the selected scale for the Engagement variable.

CRQ6. ECM Approval System completes my job responsibilities when it is required to do so.

The modal response for the EAS system is "Agree" and for the RAS system is also "Agree" (Figure 4.6). As a result, when the data is combined for both systems, then the modal response is also "Agree". Thus, the Achievement variable for the Communication of Customer orientation value has been clearly agreed by the participants from both ECM workflow approval systems. This demonstrates that the ECM approval systems can support the staff to complete their tasks based on how the ECM approval systems are designed in order to meet the business objectives.

EAS

Strongly Agree	0
Agree	8 (47.1%)
Neither	3 (17.6%)
Disagree	4 (23.5%)
Strongly Disagree	2 (11.8%)

RAS

Strongly Agree	0
Agree	6 (50%)
Neither	3 (25%)
Disagree	3 (25%)
Strongly Disagree	0
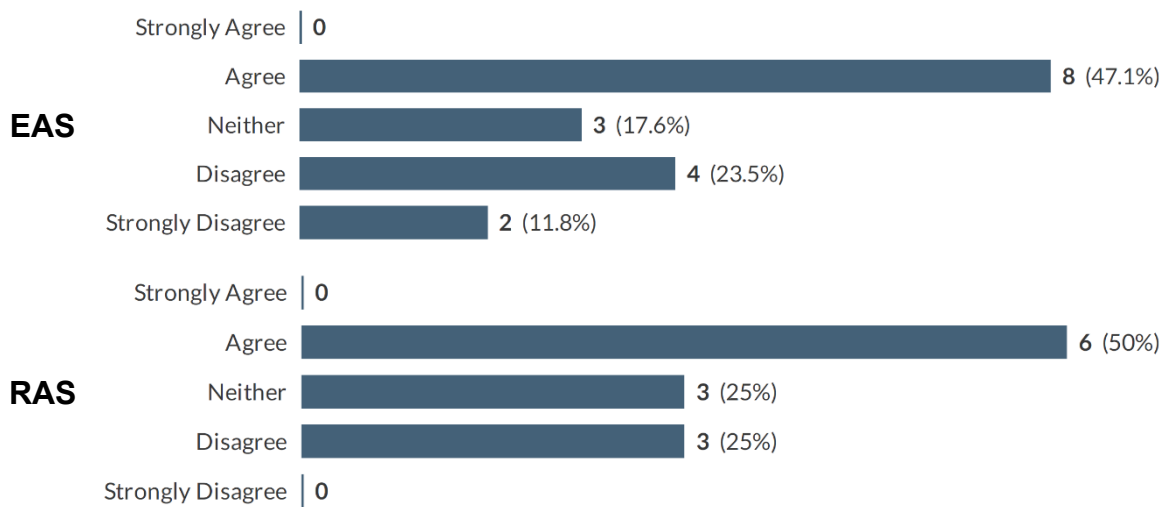
Figure 4.6 The Achievement scales for the Communication.

CRQ7. ECM Approval System gives information for better service quality and performance to meet customer expectations.

The modal response for the EAS system is "Agree" and for the RAS system is also "Agree" (Figure 4.7). As a result, when the data is combined for both systems, then the modal response is "Agree".

Consequently, the staff responses to their "Expectations" based on their usage of the ECM workflow approval systems for the Customer needs are mostly toward agreeing. The EAS participants response is 35.3% agreed. Similarly, the RAS participants response is 41.7% agreed. Overall, there is agreement by the participants from both ECM workflow approval systems toward meeting the customer expectations.
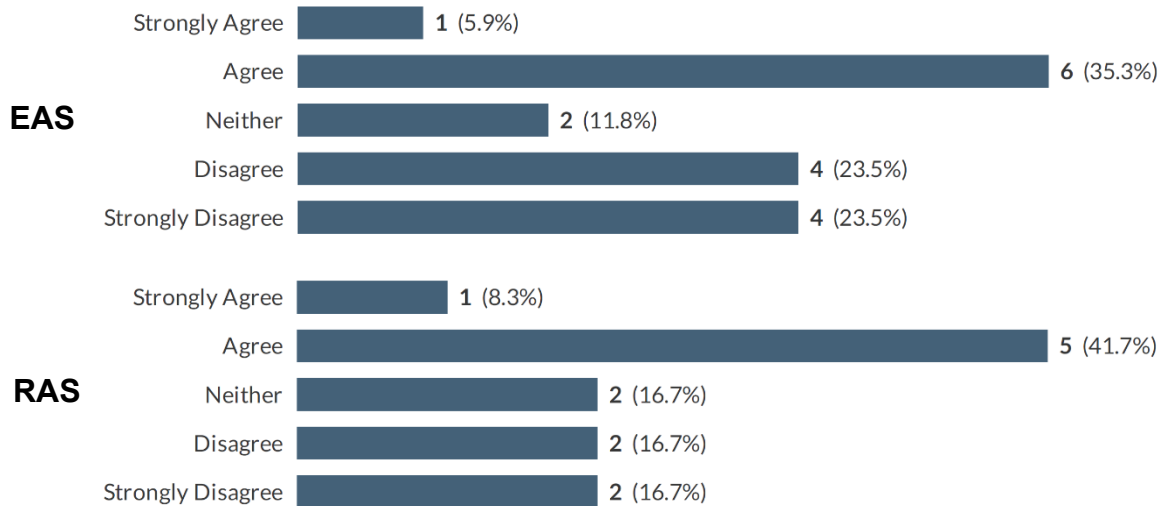
Figure 4.7 The Expectations scales for the Customer needs.

CRQ8. ECM Approval System satisfies my work activities.

The modal response for the EAS system is "Agree" and for the RAS system is also "Agree" (Figure 4.8). As a result, when the data is combined for both systems, then the modal response is "Agree".
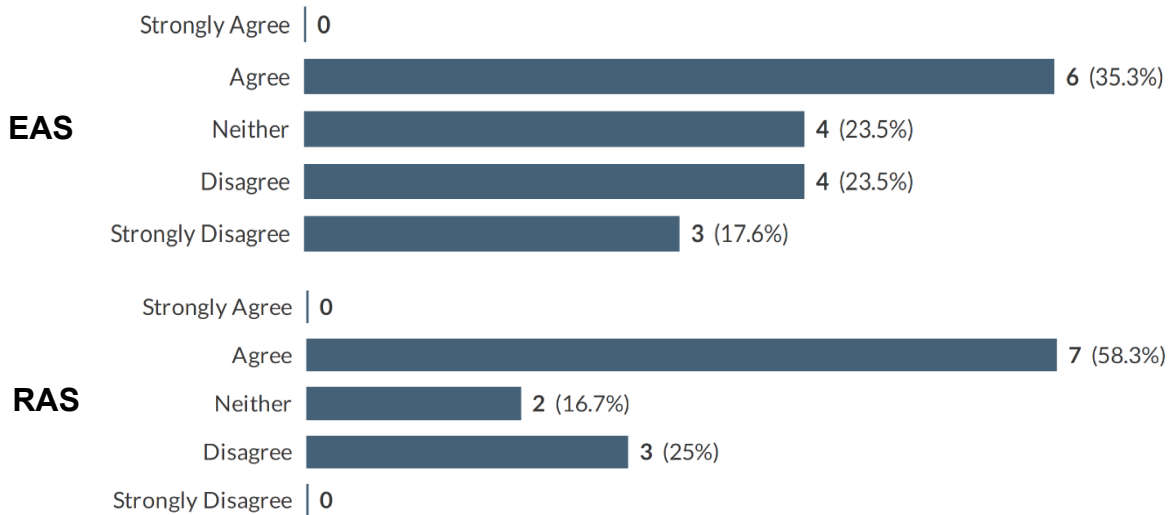
Figure 4.8 The Work quality scales for the Customer needs.

Further, the EAS participants response is 35.3% agreed, and the RAS participants response is 58.3% agreed, and an overall "Agree" is the most selected response. This supports the observation that the ECM approval systems fully achieve the staff work activities.

4.7.1.2 Responses to Excellence Research Questions

Excellence is a core BPM value to measure ECM workflow systems performance. According to Schmiedel *et al.* (2013, 2014) studies, Excellence value can be used for evaluating workflow systems performance improvement, creativity and innovation so as to reach expected BPM performance. Usually, organisations are motivating their staff to improve their capabilities and organisational relations to empower them in order to support achieving business objectives (Marrewijk *et al.*, 2004; Ro and Chen, 2011). Hence, the aspects of the excellence research questions (ERQ) are efficiency rate and efficiency performance for the efficiency category; effectiveness rate and effectiveness performance for the effectiveness category; service quality and controls for the empowerment category; corporate financial performance and employee orientation for the employee orientation category (Table 2.10). Details from the data collected for these excellence aspects are provided using the ERQ in the following data summaries:

ERQ1. ECM Approval System has a high efficiency rate for my business process resources, e.g. cost, time, and quality.

The modal response for the EAS system is "Agree" and for the RAS system is also "Agree" (Figure 4.9). As a result, when the data is combined for both systems, then the modal response is "Agree". Thus, the efficiency rate variable for the efficiency category has received an "Agree" response from the majority of the HEI staff who are using both ECM workflow approval systems.

EAS
- Strongly Agree: 2 (11.8%)
- Agree: 6 (35.3%)
- Neither: 1 (5.9%)
- Disagree: 4 (23.5%)
- Strongly Disagree: 4 (23.5%)

RAS
- Strongly Agree: 0
- Agree: 7 (58.3%)
- Neither: 1 (8.3%)
- Disagree: 4 (33.3%)
- Strongly Disagree: 0
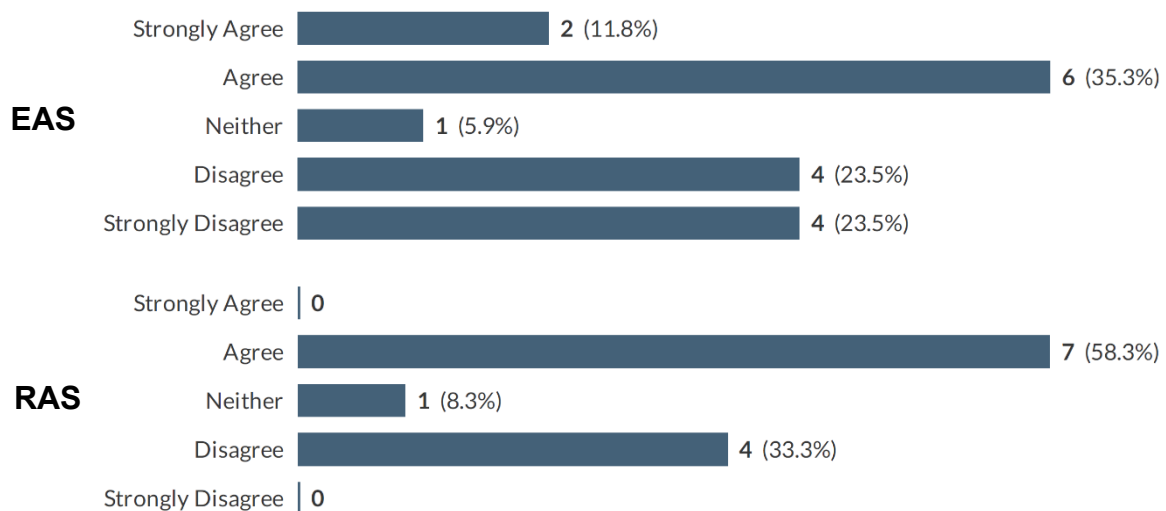
Figure 4.9 The Efficiency rate scales for the Efficiency.

ERQ2. My ECM efficiency performance has been highly developed since last year, as ECM Approval System improved my work productivity, communication, planning, and service control.

This is the first case where there are two modal responses for the EAS. Hence, the median response to break the tie has been used to get the "typical" response for the EAS, which is "Neither" (Figure 4.10). Also, the RAS modal response is "Neither" and when the data is combined for both systems, then the modal response is "Neither". This indicates that the staff are unsure about how the system affects their level of efficiency.

EAS

Strongly Agree	0
Agree	5 (29.4%)
Neither	5 (29.4%)
Disagree	3 (17.6%)
Strongly Disagree	4 (23.5%)

RAS

Strongly Agree	1 (8.3%)
Agree	3 (25%)
Neither	6 (50%)
Disagree	2 (16.7%)
Strongly Disagree	0
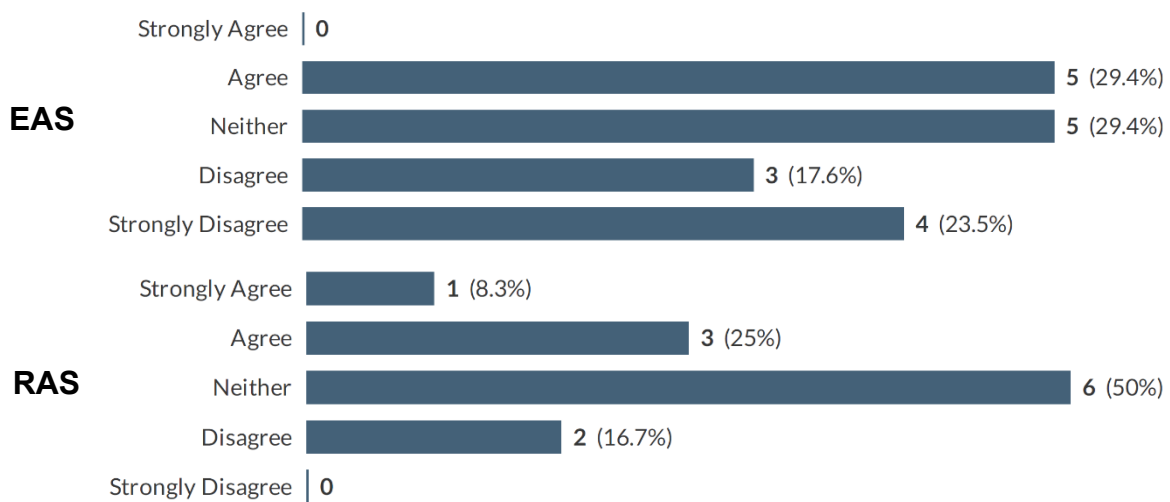
Figure 4.10 The Efficiency performance scales for the Efficiency.

ERQ3. ECM Approval System has a high effectiveness rate for my business objectives and outputs, e.g. cost, time, and quality.

The modal response for the EAS system is "Agree" and for the RAS system is also "Agree" (Figure 4.11). As a result, when the data is combined for both systems, then the modal response is "Agree". The research results in Figure 4.11 show that the EAS participants response is 29.4% agreed, where the RAS participants response is the highest as 50% agreed. Thus, the most common response of "Agree" is seen on the effectiveness rate variable for the effectiveness category.
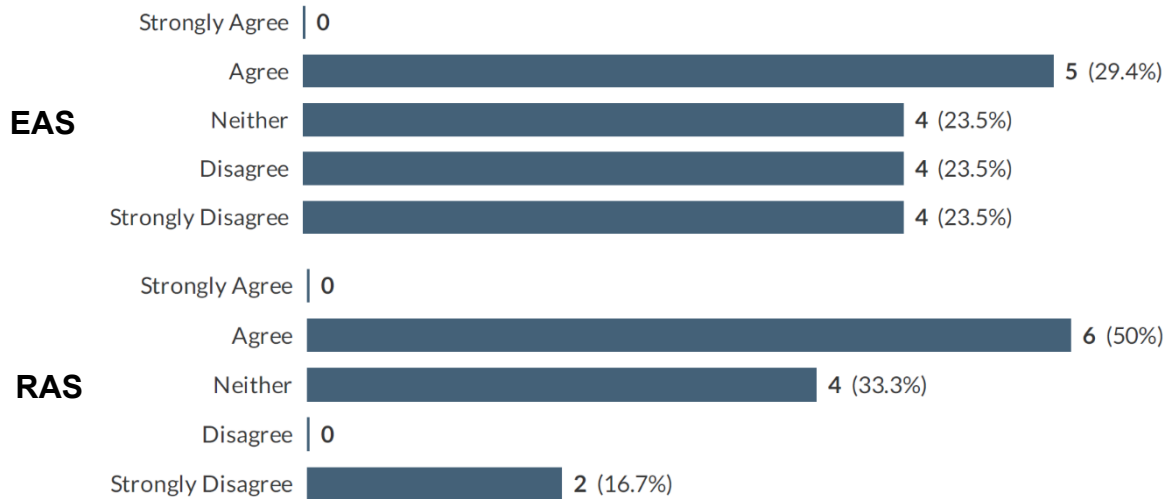
Figure 4.11 The Effectiveness rate scales for the Effectiveness.

ERQ4. My ECM effectiveness performance has been highly developed since last year, as ECM Approval System improved my work service quality, problem-solving, delivery, and customer satisfaction.

The modal response for the EAS system is "Agree" and for the RAS system is also "Agree" (Figure 4.12). As a result, when the data is combined for both systems, then the modal response is "Agree".

Figure 4.12 The Effectiveness performance scales for the Effectiveness.

The staff response to the effectiveness performance variable based on their work improvements from using the ECM workflow system is "Agree". The EAS participants highest response is 35.3% agreed, and the RAS participants highest response is 41.7% agreed. Thus, there is an overall "Agree" by the participants from both ECM workflow approval systems.

ERQ5. ECM Approval System empowers my work activities to make decisions and confidently communicating for internal service quality.

The modal response for the EAS is "Disagree" and for the RAS is "Agree" (Figure 4.13). However, when the data is combined for both systems, then the modal response is "Agree". Actually, the Service quality variable for the Empowerment category has received contradictory responses between the two ECM approval systems. This reveals that there is a difference between the two systems in terms of service quality.

The EAS participants highest response is 29.4% toward "Disagree". Conversely, the RAS participants highest response is 41.7% toward "Agree". However, the most selected response by the participants of both ECM approval systems is "Agree".
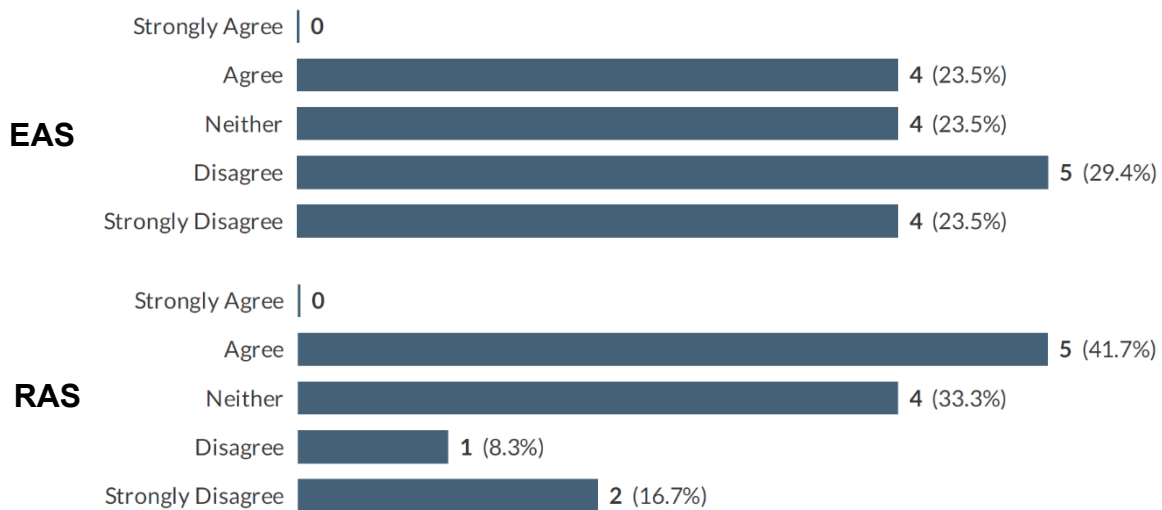
Figure 4.13 The Service quality scales for the Empowerment.

ERQ6. ECM Approval System controls my job decision-making, which empowers my team performance.

The modal response for the EAS is "Disagree" and for the RAS is "Agree" (Figure 4.14). However, when the data is combined for both systems, then there is a tie between "Neither" and "Disagree". Calculating the median response for the data breaks the tie in favour of "Neither". It is clear that the Controls variable for the Empowerment category has also received contradictory responses. This reveals that there is a difference between the two systems in term of empowerment in staff decision-making.
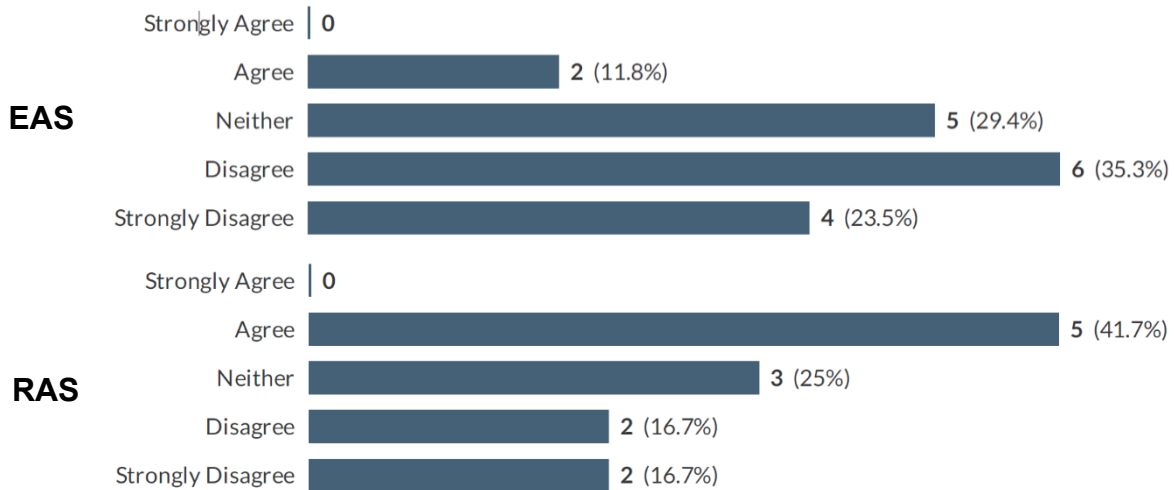
Figure 4.14 The Controls' scales for the Empowerment.

ERQ7. ECM Approval System strengthens my work relationships and team performance.

In this case, there is a tie in the modal response for both approval systems. For the EAS, the median calculation breaks the tie in favour of "Disagree". For the RAS, calculating the median fails to break the tie as the median is exactly between the two modal responses. This is the only case where the median fails to break the tie. To resolve this matter, it seems clear that there are 6 responses in agreement, 5 in neither and only 1 response in disagreement. This tips the balance in favour of "Agree". Thus, when the ECM approval systems are combined, the modal response is "Agree".
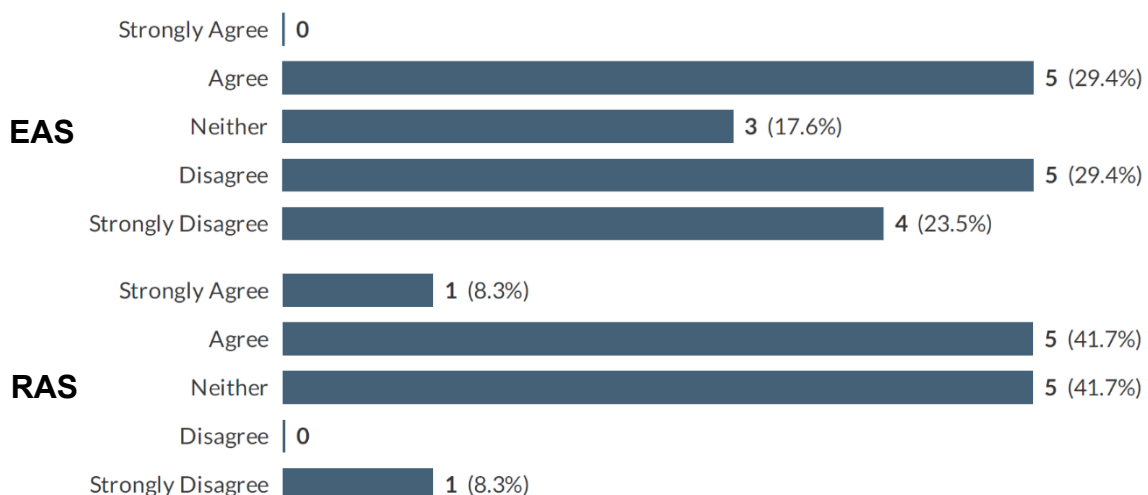
Figure 4.15 The CFP scales for the Employee orientation.

The corporate financial performance (CFP) variable for the Employee orientation category has received divergent responses. However, when both ECM approval systems are combined there is support for an overall "Agree" (10 participants agreed).

ERQ8. ECM Approval System effects my own performance level to be more positive, capable, and initiative.

The EAS data shows a 3-way tie for the modal response (Figure 4.16). Calculating the median response breaks the tie in favour of "Disagree". The modal RAS response is "Agree". Thus, when the data is combined for both ECM approval systems, then the modal response is "Neither". The collected data have shown that the Employee initiative variable for the Employee orientation category has received divergent responses.

In detail, the EAS participants response is 29.4% for each of the tied responses, and the RAS participants highest response is 41.7% toward "Agree". Overall, both ECM approval systems together give a response of "Neither" toward the Employee initiative variable.
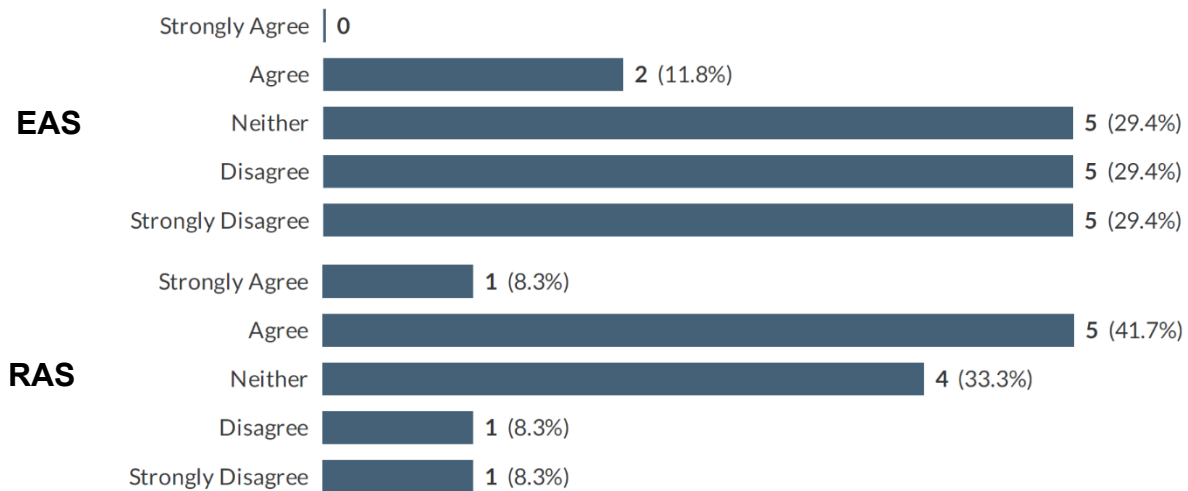
Figure 4.16 The Employee initiative scales for the Employee orientation.

4.7.1.3 Responses to Responsibility Research Questions

The Responsibility value key categories and their core variables data for the ECM approval systems have been collected to measure system performance. Research studies by Chen *et al.* (2011) and Schmiedel *et al.* (2013) have connected business objectives to responsibility as a key factor to motivate staff in order to achieve their tasks to meet the business strategy and organisational goals. Additionally, the suggested variables of the responsibility research questions (RRQ) are Response reliability and Response time for Responsiveness; Results time and Manageability for Result orientation; Sustainability and Quality management for Right quality; Time to completion (TTC), Skills allocation and Employee skills for Right skills (Table 2.11). Details from the collected data for these variables are provided using the RRQ in the following data summaries:

RRQ1. ECM Approval System has high response level on my internal and external inquiries.

The modal response for the EAS is "Neither" using the median calculation to break the 3-way tie (Figure 4.17). Also, the RAS modal response is "Neither". Thus, when the data is combined for both systems, then the modal response is also "Neither".

The collected data have shown that the Response reliability variable for the Responsiveness of the Responsibility value has received a range of responses. Actually, the EAS participants response is 29.4% neither, which is the same for agreed and disagreed while the RAS participants highest response is 58.3% toward "Neither". Overall, the participants have selected "Neither" to be the most appropriate indicator of how high the response level is for staff internal and external inquiries.
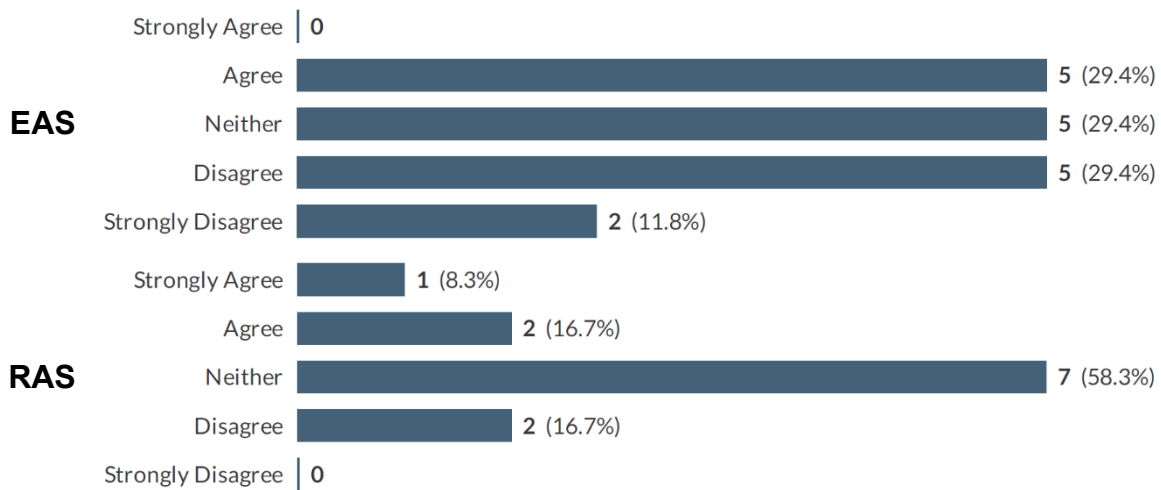
Figure 4.17 The Response scales for the Responsiveness.

RRQ2. ECM Approval System performs high for on-time delivery.

The modal response for the EAS is "Neither" and for the RAS is also "Neither" (Figure 4.18). Also, when the data is combined for both systems, then the modal response is "Neither". Thus, the Response time for the Responsiveness of the Responsibility value has received high uncertainty, with "Neither" responses from the staff. This indicates that the staff who participated are unsure about how well the system performs for on-time delivery.
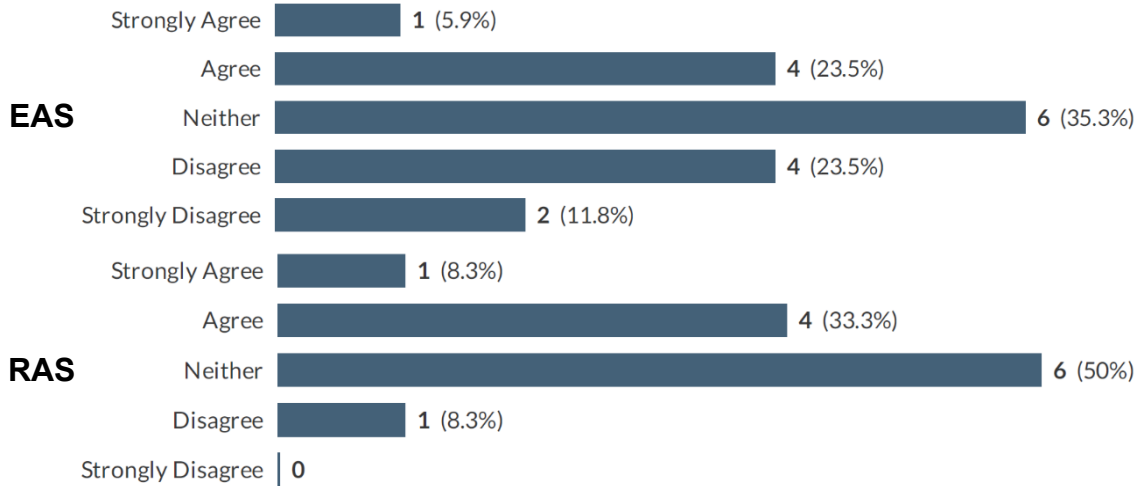
Figure 4.18 The Response time for the Responsiveness.

RRQ3. ECM Approval System gives me the right results on-time.

The modal response for the EAS is "Agree" and for the RAS is "Neither" (Figure 4.19). However, when the data is combined for both systems, then the modal response is "Neither" using the median to break the tie between "Agree" and "Neither". It is clear that the staff response to the Results time variable of the ECM approval systems based on their time to receive the results from the system indicates, overall, a lack of support one way or the other.
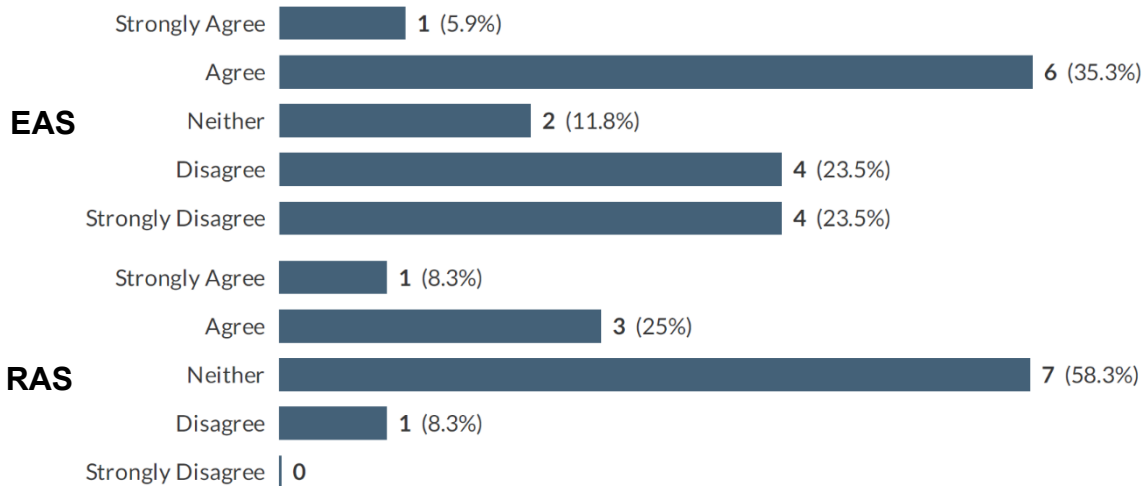
Figure 4.19 The Results time for the Result orientation.

RRQ4. ECM Approval System reaches my expected results and completes my tasks as planned.

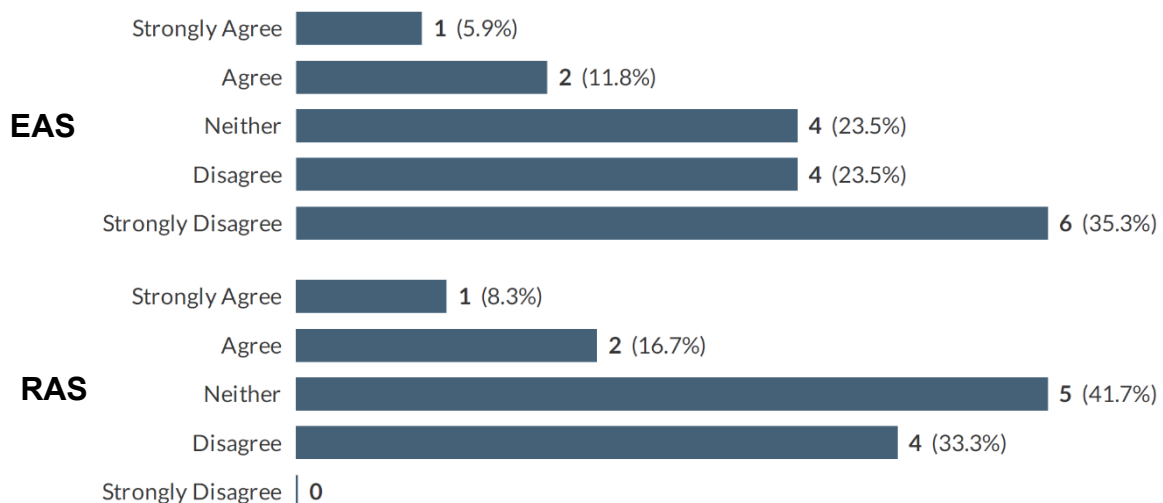The modal response for the EAS is "Agree" and for the RAS is "Neither" (Figure 4.20). However, when the data is combined for both systems, then the overall response is "Neither" using the median to break the tie between "Agree" and "Neither".
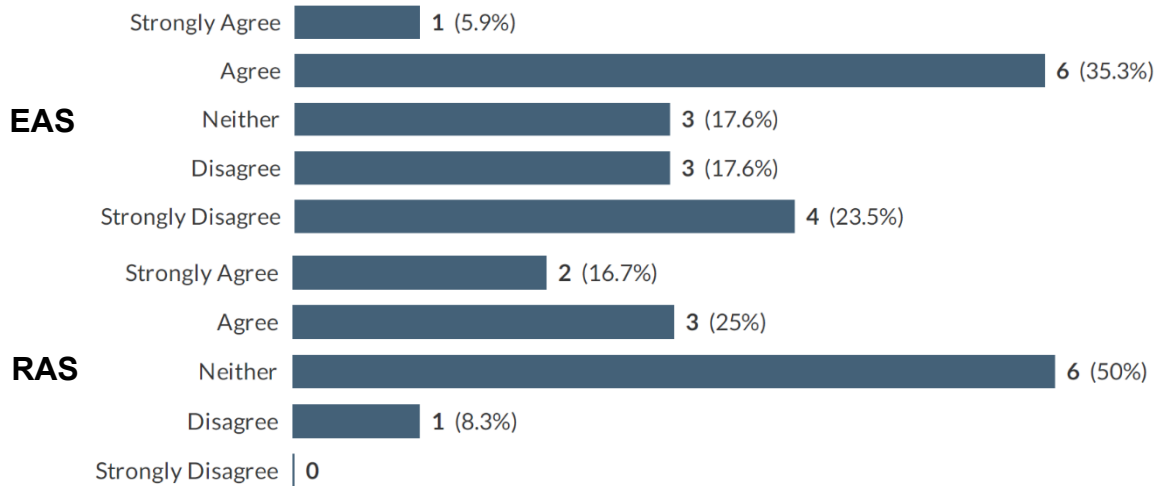
Figure 4.20 The Manageability scales for the Result orientation.

In detail, the EAS participants highest response is 35.3% toward "Agreed". Conversely, the RAS participants highest response is 50% toward "Neither". Thus, the Manageability variable for the Result orientation category has received "Neither" by majority.

RRQ5. ECM Approval System is my core business process and implementation system for my job duties, commitments, and quality.

The modal response for the EAS system is "Neither" using the median to break the three-way tie in modal response (Figure 4.21). Also, the modal response for the RAS is "Neither". Thus, when the data is combined for both systems, then the modal response is "Neither".

Consequently, the staff responses to the Sustainability variable for the Right quality of the Responsibility value has received a high "Neither" response across both ECM approval systems. This shows that the staff are unsure about how the system affects their job duties, commitments and quality.
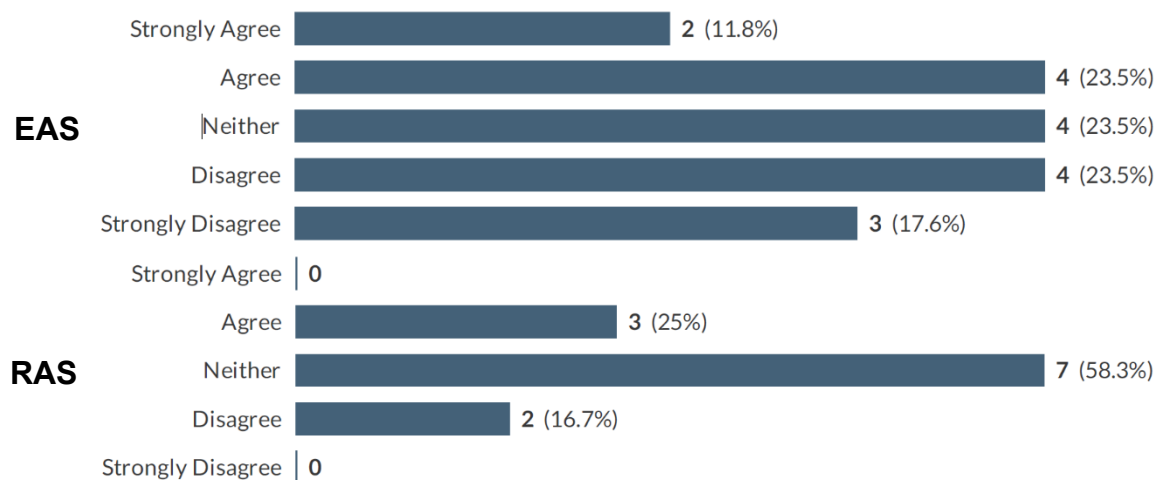
Figure 4.21 The Sustainability scales for the Right quality.

RRQ6. ECM Approval System improves my work quality in terms of customer service, teamwork, and personal development plan.

The modal response for the EAS is "Neither" and for the RAS is "Agree" (Figure 4.22). Thus, when the data is combined for both systems, then the modal response is "Neither". It is clear that the Quality management variable for the Right quality of the Responsibility value has received divergent responses between the two ECM approval systems. Clearly, the overall staff responses give a high indication toward "Neither".
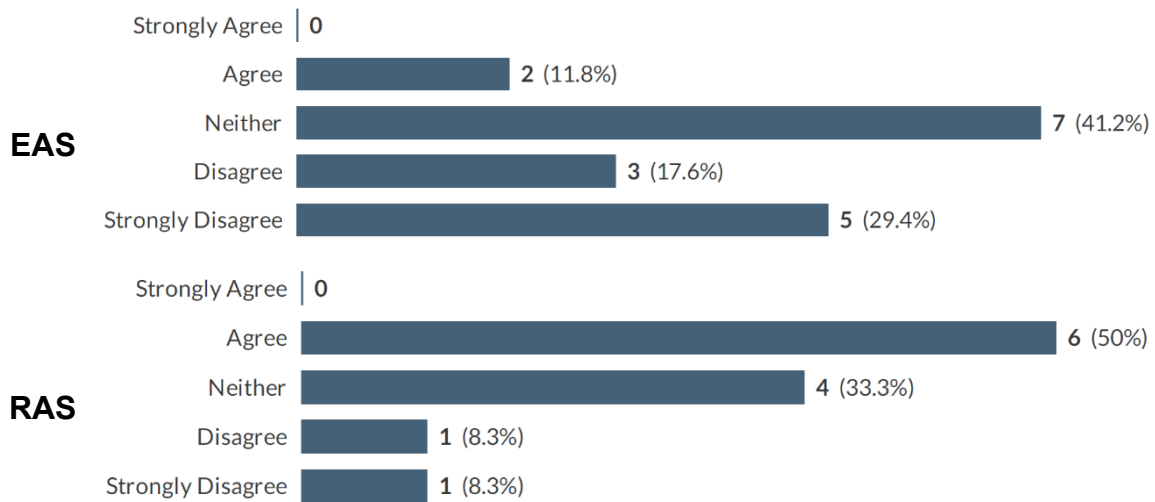
Figure 4.22 The Quality management scales for the Right quality.

RRQ7. ECM Approval System reduces information management (IM) tasks time and enables me to be more productive.

The modal response for the EAS is "Neither" using the median to break the tie between modal responses (Figure 4.23). Also, the RAS modal response is "Agree". Thus, when the data is combined for both systems, then the modal response is "Agree". The collected data have shown that the Time to completion (TTC) variable for the Right skills of the Responsibility value has received high responses in favour of "Agree".
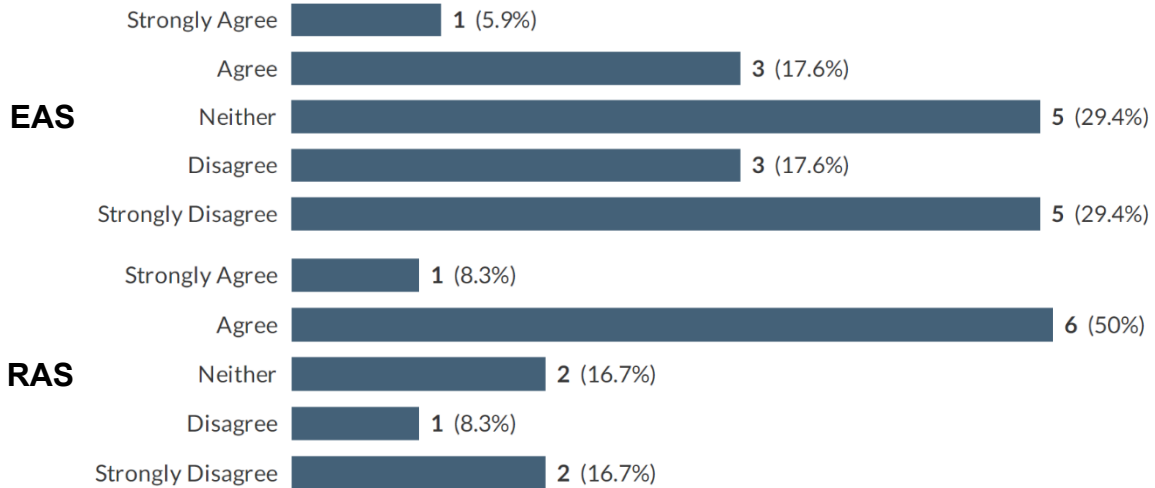
Figure 4.23 The TTC for the Right skills.

RRQ8. Employees training programmes on ECM Approval System make us more productive and enable me to reduce IM tasks time.

The modal response for the EAS is "Strongly disagree" and for the RAS is "Agree" (Figure 4.24). Thus, when the data is combined for both systems, then there are two divergent modal responses, which are "Agree" and "Strongly disagree". In order to break this tie then the median is calculated, and this gives "Neither" as the typical (or average) response. This is an example of the difficulty in breaking ties between two very different modal responses.
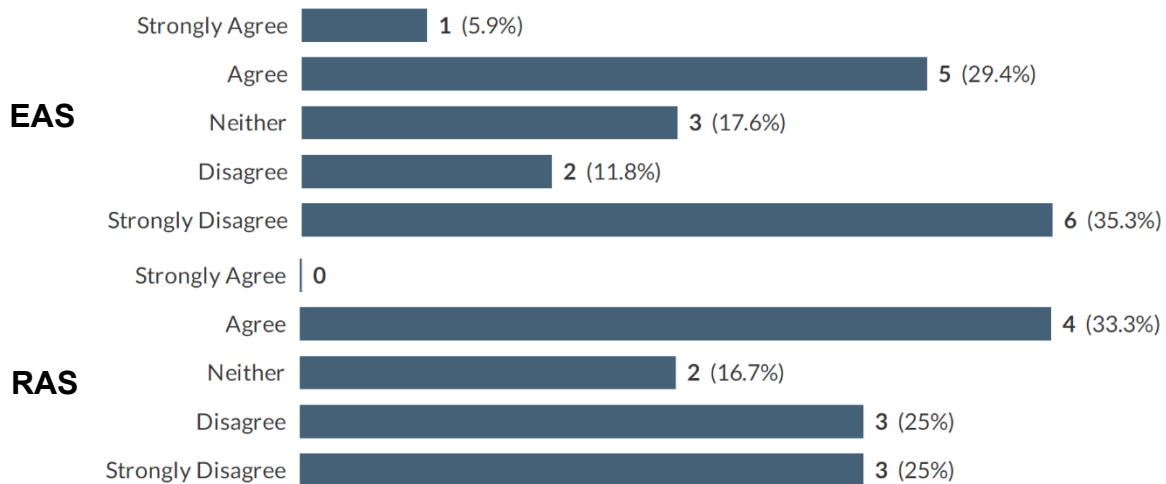
Figure 4.24 The Skills allocation scales for the Right skills.

RRQ9. Employees skills are enough to carry out content management tasks using various ECM Approval System functions and tools.

The modal response for the EAS is "Agree" and for the RAS is also "Agree" (Figure 4.25). As a result, when the data is combined for both systems, then the modal response is also

"Agree". Thus, an obvious "Agree" has been reached for the Employee skills variable of the Right skills category. Overall, the participants confirmed that Employees' skills are enough to carry out content management tasks using the ECM approval system functions and tools.
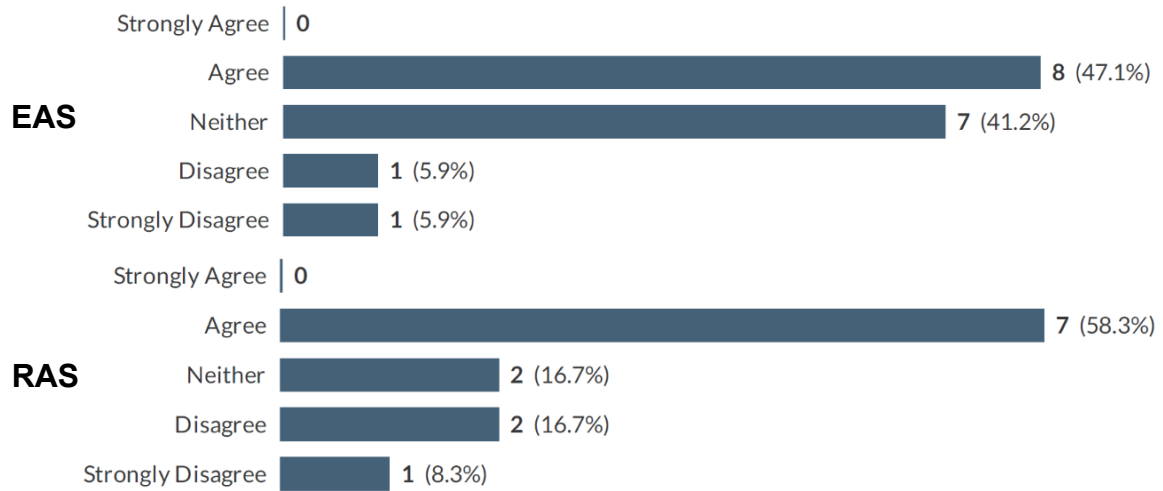
Figure 4.25 The Employee skills scales for the Right skills.

4.7.1.4 Responses to Teamwork Research Questions

The teamwork variables are important elements to BPM and ECM workflow systems, as teamwork makes the staff faster, effective and more prepared to achieve organisational goals and undertake responsibilities (Tohidi, 2011). Teamwork is able to evaluate the staff specialist, personal skills and practical knowledge to implement systemic BPM procedures, as well as work toward accomplishing business objectives (Akgün *et al.*, 2014; Schmiedel *et al.*, 2013, 2014). Hence, ECM workflow systems can be assessed using Teamwork variables to measure employee motivation in exchanging knowledge, communicating effectively and collaborating to improve the ECM workflow systems performance.

Teamwork research questions (TRQ) consist of Teamwork categories and their variables, which are: Authentic Leadership and Trust for Transparency; Transformational leadership-behaviour inventory (TLI) and Consideration of future consequences (CFC) for Transformational leadership; CFC and Quality of work life (QWL) for Transactional leadership; Team productivity and Team learning for Team collaboration (Table 2.12). Details from the data collection for these teamwork variables are provided using the TRQ in the following data summaries:

TRQ1. ECM Approval System gives me hope, resiliency, optimism and efficacy to complete my tasks as planned.

The modal response for the EAS is "Strongly disagree" and for the RAS is "Neither" (Figure 4.26). As a result, when the data is combined for both systems, then the modal response is "Neither". Thus, the staff responses to the Authentic leadership variable of the ECM approval systems based on the staff estimated hope, resiliency, optimism and efficacy to complete their tasks as planned, have indicated "Neither" thereby expressing uncertainty as to whether the systems achieve the desired result.

EAS
- Strongly Agree: 0
- Agree: 2 (11.8%)
- Neither: 5 (29.4%)
- Disagree: 3 (17.6%)
- Strongly Disagree: 7 (41.2%)

RAS
- Strongly Agree: 0
- Agree: 4 (33.3%)
- Neither: 5 (41.7%)
- Disagree: 1 (8.3%)
- Strongly Disagree: 2 (16.7%)
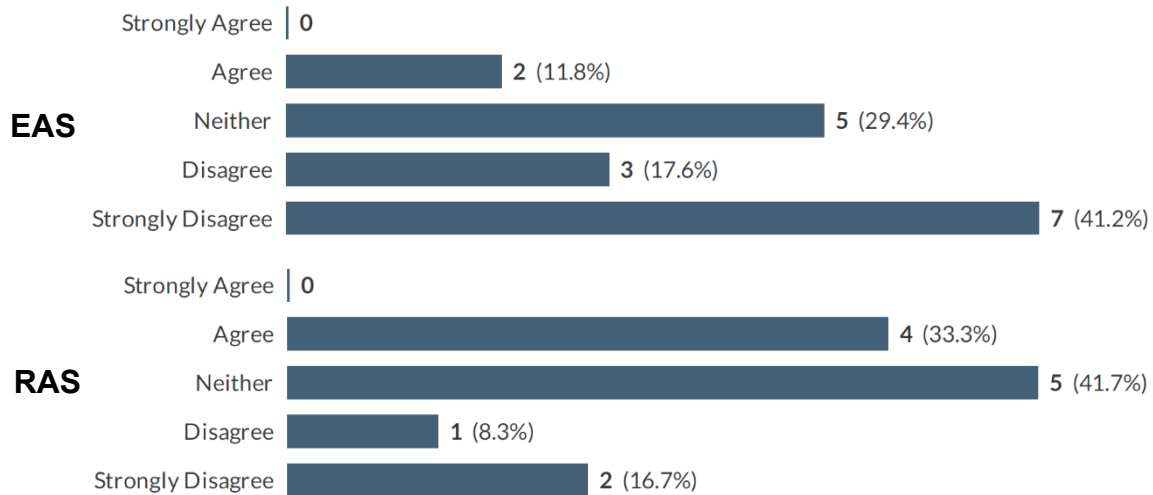
Figure 4.26 The Authentic leadership scales for the Transparency.

TRQ2. ECM Approval System is trusted to manage information on-time.

The modal response for the EAS is "Neither" (Figure 4.27). Calculating the median to break the tie between "Neither" and "Agree" for the RAS has indicated to "Neither". Thus, when the data is combined for both systems, then the modal response is also "Neither". Overall, it is clear that respondents are unable to decide whether the system can be trusted to manage information in a timely manner.

EAS
- Strongly Agree: 1 (5.9%)
- Agree: 4 (23.5%)
- Neither: 7 (41.2%)
- Disagree: 1 (5.9%)
- Strongly Disagree: 4 (23.5%)

RAS
- Strongly Agree: 1 (8.3%)
- Agree: 4 (33.3%)
- Neither: 4 (33.3%)
- Disagree: 2 (16.7%)
- Strongly Disagree: 1 (8.3%)
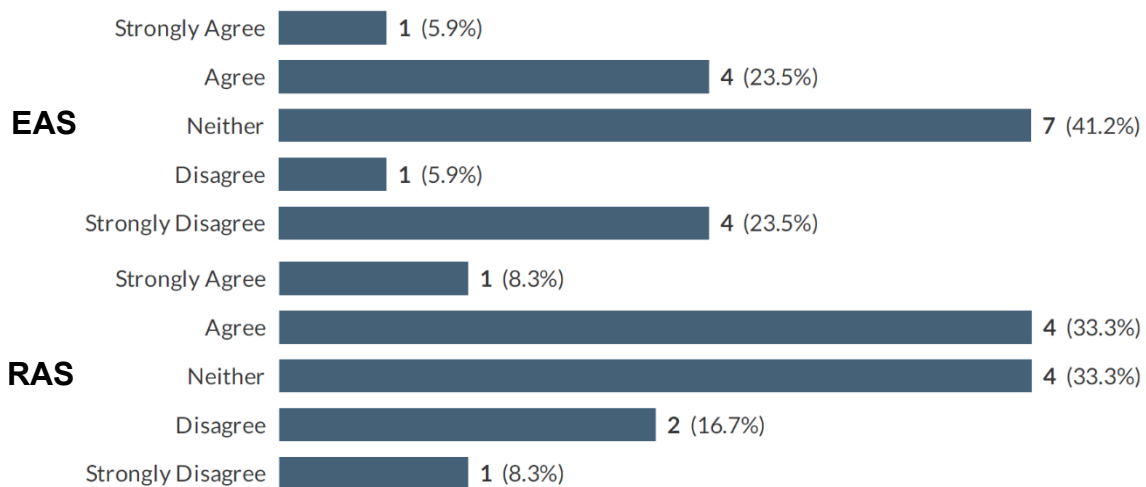
Figure 4.27 The Trust scales for the Transparency.

TRQ3. ECM Approval ECM System motivates me to solve-problems in new ways, changing the way of business processes and automation, and self-reporting (self-worth) attitude and behaviour toward others, so that my level of achievement become higher.

The modal response for the EAS is "Disagree" using the median to break the tie between "Neither" and "Strongly disagree" (Figure 4.28). Also, the modal response for the RAS is "Neither" using the median to break the tie. As a result, when the data is combined for both systems, then the modal class is "Neither". Thus, the TLI variable for the Transformational leadership category has received divergent responses, but overall the highest response indicated toward "Neither".
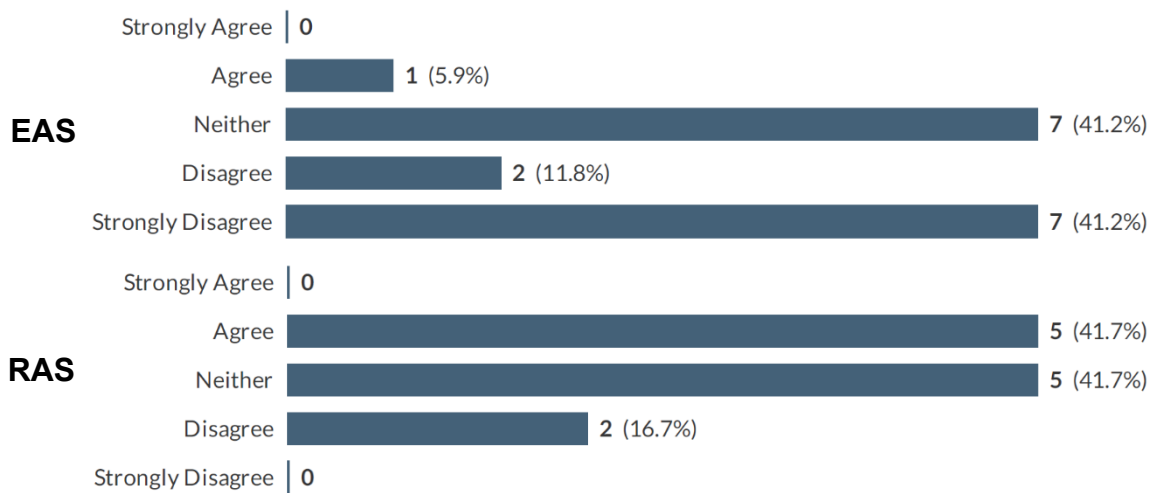
Figure 4.28 The TLI scales for the Transformational leadership.

TRQ4. ECM Approval System gives better vision, time management, and cost reduction, so that improves business continuance.

The modal response for the EAS is "Neither" and for the RAS is "Agree" (Figure 4.29). As a result, when the data is combined for both systems, then the modal response is "Neither" using the median to break the tie between "Agree" and "Neither". Thus, there is uncertainty as to whether the ECM Approval System gives better vision, time management and cost reduction in order to improve business continuance.
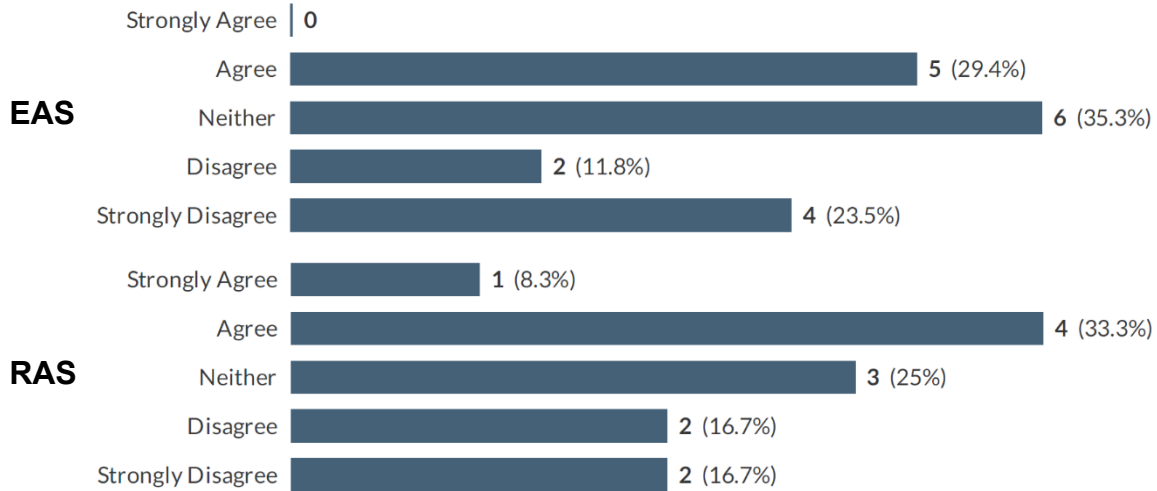
Figure 4.29 The CFC scales for the Transformational leadership.

TRQ5. ECM Approval System gives the ability toward information exchange, business commitment, and improve service performance, which helps the employees to adapt the behaviour to maximise achievements and accessibility.

The modal response for the EAS is "Neither" and for the RAS is "Agree" (Figure 4.30). Thus, when the data is combined for both systems, then the modal response is "Neither" using the median to break the tie. This indicates an overall of "Neither" toward the CFC variable.
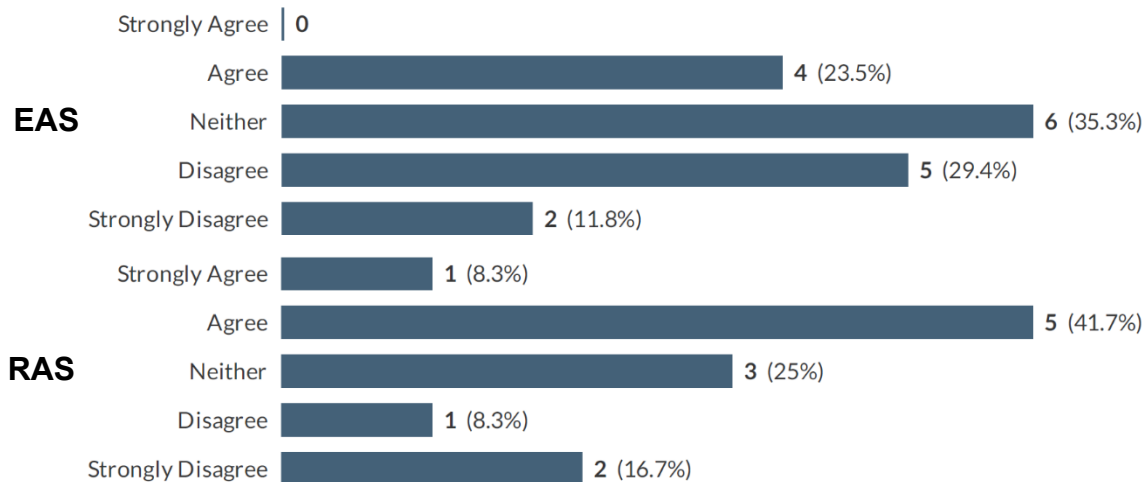
Figure 4.30 The CFC scales for the Transactional leadership.

TRQ6. ECM Approval System rewarded me good performance and support my accomplishments to a better quality of work life.

The modal response for the EAS is "Strongly disagree" (Figure 4.31). Also, the modal response for the RAS is "Neither" using the median to break the tie. Thus, when the data is combined for both systems, then the modal response is "Strongly disagree" for the Transactional leadership variable.
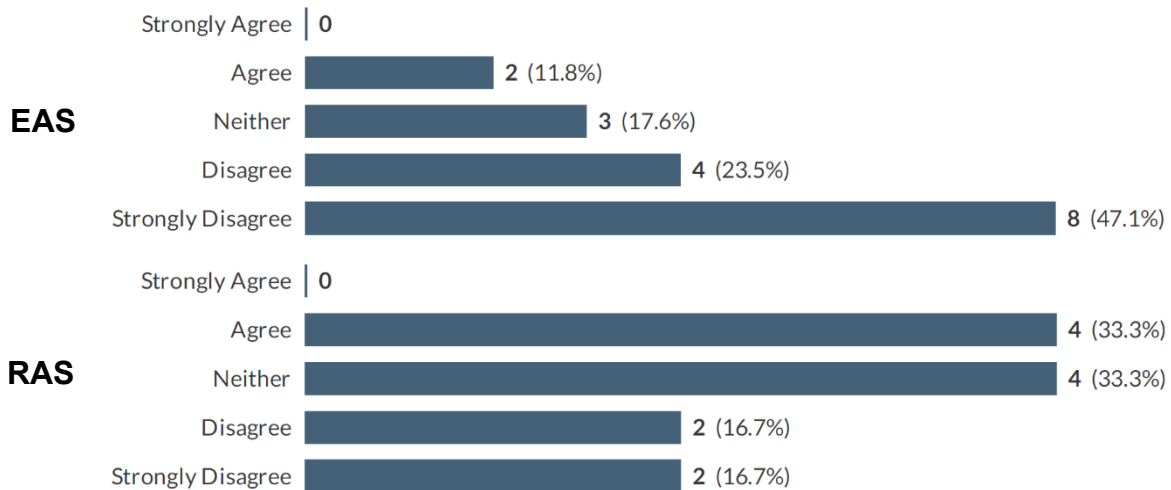
Figure 4.31 The QWL scales for the Transactional leadership.

TRQ7. ECM Approval System has the performance and productivity to reach the right service level and team goals.

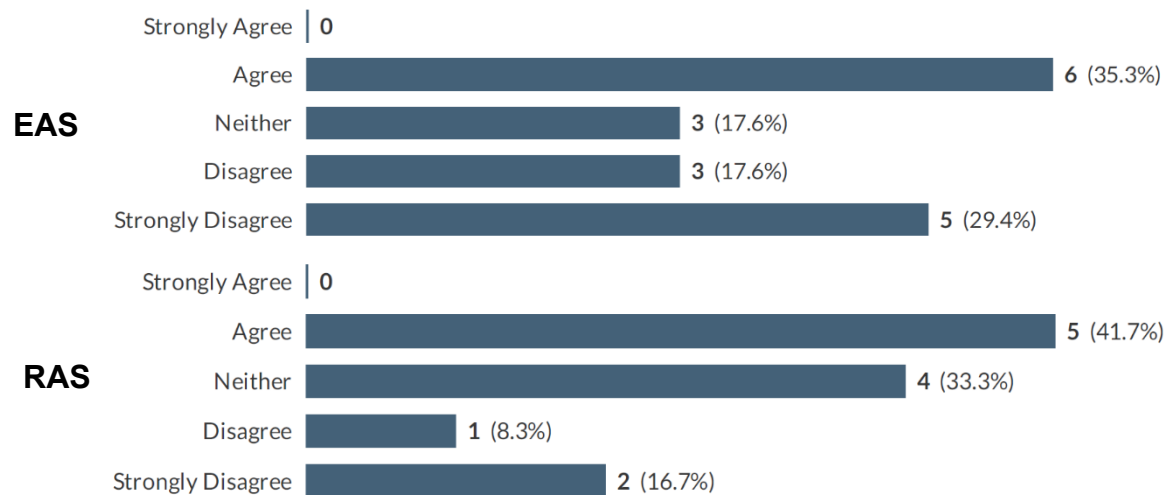The modal response for the EAS is "Neither" and for the RAS is "Agree" (Figure 4.32). As a result, when the data is combined for both systems, then the modal response is "Neither". Thus, the Team productivity variable for the Team collaboration category has received divergent responses, and most participants indicated to "Neither".
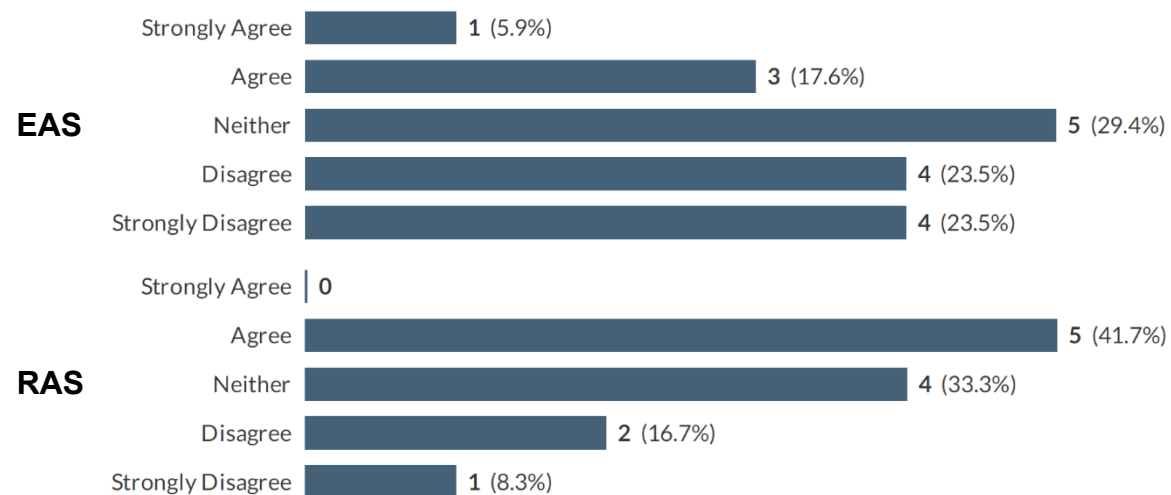
Figure 4.32 The Team productivity scales for the Team collaboration.

TRQ8. Approval ECM System gives me the experience to improve services and productivity, trust among team members, and better team commitment and communication; so, team members always have the capability to learn.

The modal response for the EAS is "Neither" using the median to break the observed tie (Figure 4.33). Also, the modal response for the RAS is "Agree". Thus, when the data is combined for both systems, then the modal response is "Agree".

Overall, the participants selected "Agree" (10 participants) as an indicator of how the ECM approval system provides the experience to improve Team learning. Thus, an overall "Agree" is approved by the participants of both systems toward the Team learning variable for the Team collaboration category.
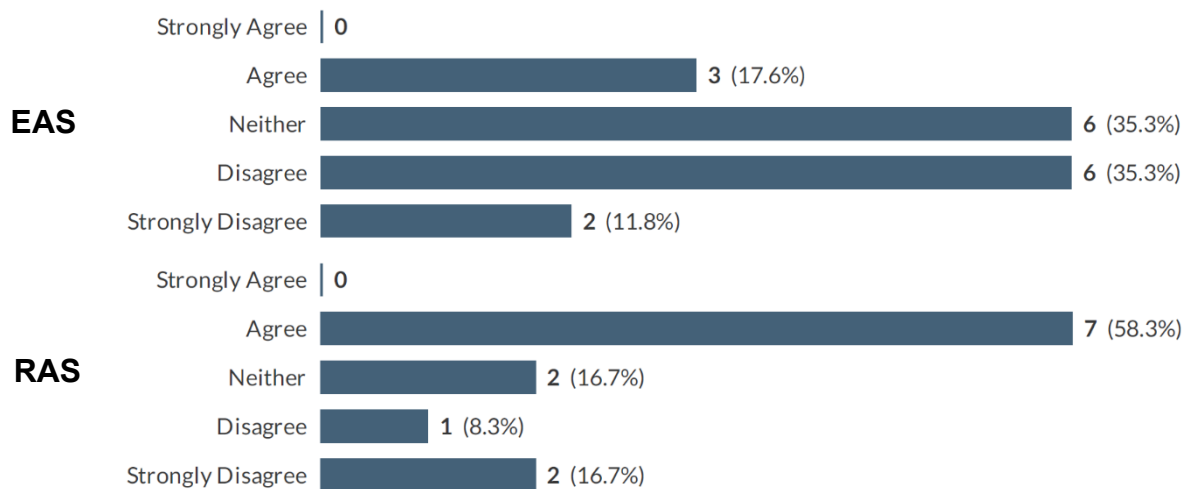
Figure 4.33 The Team learning scales for the Team collaboration.

4.7.1.5 Responses to General Research Questions

Demographical data have been collected as general control variables to compare BPM values and their variables through further statistical analysis (Saunders *et al.*, 2015, Chapter 12). Thus, general research questions (GRQ) have been used to get a sense of the collected data. The GRQ covers some of the participant's employability profile details, which are job title, industry sector, department, year of work experience, education, gender and age. Although this data was originally included as part of the questionnaire in order to provide for a richer analysis of responses through partitioning of the data, the final sample size was too small to allow such partitioning to be undertaken.

GRQ1. Job title.

The participants who provided feedback on the job title comprised 10 members of staff from each system with most of them being Professors, Senior Lecturers, Senior Managers or Managers (Table 4.1).

No.	EAS Job Title Responses	RAS Job Title Responses
1	BAM	Head of the Division of Creative Technologies
2	Head of Health and Wellbeing Institute	Professor
3	Business Manager	Senior Lecturer
4	Head of Knowledge Exchange Institute	Professor
5	Head of Compliance and Systems	Research Support Officer
6	Finance Business Support Manager	Professor
7	PVC/Dean Business School	Professor
8	Head of Enterprise Institutes	Senior Lecturer
9	Manager Creative and Digital Economy	Professor
10	Research and Enterprise Development Manager	Senior Lecturer

Table 4.1 Participants Job Titles.

GRQ2. Which of the following best describes your industry sector?

The staff responses to the industry sector descriptor have indicated Education/Higher Education, which of course represents the HEI (Table 4.2). However, some participants have provided their specific area of study at the HEI as an industry.

No.	Option	EAS Count	RAS Count
1	Document Services Provider	1	0
2	Education	12	9
3	Healthcare	1	1
4	Legal and Professional Services	1	1
5	Media, Entertainment, Publishing	0	1
6	Non-Profit, Charity	1	0
7	Other - Global Challenges	1	0

Table 4.2 Participants Industry Sector.

GRQ3. Department/Section/Unit

The most common staff responses were from the Research, Enterprise and Innovation Section at the HEI (Table 4.3).

No.	Response	EAS Count	RAS Count
1	Research, Enterprise and Innovation	4	2
2	HE – Centre for Education and School Partnerships	0	1
3	School of Business	1	1
4	School of Arts and The Creative Industries	0	1

Table 4.3 Participants Department/Section/Unit.

GRQ4. Years of work experience.

The participants' response to their years of experience has provided evidence of their level of experience (Table 4.4). In detail, the EAS participants' responses show a numerical average of 18.5 years, which is rank value 6 in Table 4.4. Conversely, the RAS participants' responses show a numerical average of 24.6 years, which is rank value 7 in Table 4.4. The overall numerical average for the years of work experience is 21 years, which indicates that on average most of the research study participants are people with a high level of experience and highly skilled as professionals.

Rank Value	Option	EAS Count	RAS Count
1	Less than one Year	0	2
2	1 to 3 Years	2	0
3	4 to 6 Years	2	1
4	7 to 10 Years	2	1
5	11 to 15 Years	3	0
6	16 to 20 Years	2	1
7	21 to 25 Years	0	1
8	26 to 30 Years	1	0
9	31 to 35 Years	3	3
10	36 to 40 Years	1	0
11	41 to 45 Years	1	1
12	46 to 50 Years	0	1
13	+50 Years	0	1

Table 4.4 Participants Years of Work Experience.

GRQ5. Which of the following best represent your most recent education background?

The staff responses have confirmed that most of the employees are highly qualified people who already hold a master and/or doctoral degree (Table 4.5). The EAS participants most common level of education is Master's (i.e. option no. 5), where most of the RAS participants are doctoral degree holders (i.e. option no. 6).

No.	Option	EAS Count	RAS Count
1	1 - 4 Levels / CSEs / GCSEs, Entry, Foundation Diploma, NVQ Level 1, Foundation GNVQ, Basic Skills	0	0
2	5+ O Levels – passes / CSEs – Grade 1 / GCSEs – Grades A*-C, School Certificate, NVQ Level 2, Intermediate GNVQ, City and Guilds Craft, BTEC First/General Diploma Apprenticeship	0	1
3	2+ A Levels/VCEs, 4+ AS Levels, Higher School Certificate, Progression/Advanced, NVQ Level 3, Advanced GNVQ, City and Guilds Advanced Craft, ONC, OND, BTEC Nation	0	0
4	Undergraduate degree, e.g. BSc, BA	4	0
5	Master degree, e.g. MSc, MBA	7	3
6	Doctorate degree, e.g. PhD, DBA	1	7
7	Professional and other work-related qualifications	5	1
8	Other	0	0

Table 4.5 Participants Highest Qualification.

GRQ6. Gender.

The participants' responses to gender show more males than females (Table 4.6). The EAS participants are 75% Male (9 males and three females). In contrast, the RAS participants are slightly more females than males (4 males and 5 females).

No.	Option	EAS Count	RAS Count
1	Male	9	4
2	Female	3	5

Table 4.6 Participants Gender.

GRQ7. Age range.

The participants' responses to the age range variable have provided evidence of their most common age (Table 4.7). In detail, the EAS participants' had an average age of 41.2 years, and the RAS participants' had an average age of 46 years. The overall average (most common) age is 43.2 years.

No.	Option	EAS Count	RAS Count
1	18-20	0	0
2	21-24	0	0
3	25-30	1	2
4	31-35	6	1
5	36-40	3	1
6	41-45	2	1
7	46-50	0	3
8	51-55	3	1
9	56-60	2	2
10	61-65	0	0
11	66-70	0	0
12	+70	0	1

Table 4.7 Participants Age Range.

4.7.2 Responses from the Research Face-to-face Interviews

The face-to-face interview meetings have been recorded as a set of audio-files (Section 4.6) along with written notes by the researcher (interviewer). The collected qualitative data have been transferred to text transcripts to be prepared for qualitative data analysis.

The research number of face-to-face interviews has 7 recorded transcripts for both ECM approval systems. The EAS interviews have 4 recorded transcripts and the RAS interviews have 3 recorded transcripts. The total number of face-to-face interviews met the targeted qualitative data sample (Section 4.3), which is enough to generate the research findings. The qualitative data analysis framework is fully explained in chapter 5: Data Analysis, Testing and Evidence Collection.

4.8 Synopsis

The research data collection, framework and implementation have been explained and discussed throughout this chapter. The following data collection key elements and fundamentals have been illustrated to clarify the sources of the research findings and the prepared data for the research data analysis:

1. The collected data types, categories and structure for the research data collection framework and implementation (Section 4.2).

2. The data sampling strategy including the targeted participants (Section 4.3). This identifies the research data sample used in the research Delphi rounds and strategic procedures (Figure 3.3).

3. Access to the research data has been explained (Section 4.5). This clarifies the connection and communication procedures required to collect the research data.

4. Implementation of the data collection has been explained with discussions about the applications, tools and the collected data structure and quality (Sections 4.6 and 4.7). This provides figures and tables, which represent the collected data for the research data analysis procedures and findings.

The research data, analysis and interpretation and the outputs from the Delphi rounds required to analytically support the research findings are provided in the next chapter (chapter 5). This consists of the research data analysis and examination, as well as insights development and management.

Chapter 5: Data Analysis and Evidence Collection

Overview

The data analysis methodology and methods are discussed in this chapter to show the collection of the research empirical evidence. This supports the achievement of the research objectives for improving ECM workflow system performance. The first sections present the key statistical figures and empirical results. The second section focuses on qualitative analysis using the coding process in Grounded Theory. Finally, the performance measurement and management framework is implemented to measure the impact of CERT values on ECM workflow system performance, which ensures business objectives are achieved as well as the organisational strategic plan and goals. Also, the research objectives and results from the previous chapters are discussed to yield research findings, which will be explained in the following chapter (Chapter 6).

5.1 Introduction

The research has a framework, methodology and data analysis methods, which are implemented to collect empirical evidence in order to provide research findings and contributions (Saunders *et al.*, 2015, Chapter 12 and 13). These research practices seek to apply the CERT values, as a BPM strategy to measure ECM workflow systems performance (Figure 2.7). This has been achieved by examining the proposed variables (aspects) of each CERT value using descriptive statistics, exploratory factor analysis (Section 3.6.1) and the coding process in Grounded Theory to transfer qualitative collected data and findings to quantitative findings allowing comparison with the questionnaire findings (Figure 3.8).

The research data analysis consists of different analytical procedures to enable validation, statistical testing and reliability measurement (Saunders *et al.*, 2015, Chapter 12). Hence, the exploratory data analysis (EDA) approach has been applied to examine the research Round I data using statistical software to produce figures, tables and EFA diagrams to find the significant relationships within the collected data (Section 4.6). Analysis of the qualitative data (Round II) is then undertaken before the Round III weighing is described. Thus, the research has implemented descriptive quantitative statistical analysis, significance tests, EFA, qualitative data analysis and the PMM framework to meet the research objectives. The details of these analytical procedures are discussed in the following sections.

5.2 Descriptive Statistical Analysis – Round I

The research data analysis requires implementing a descriptive statistical analysis to understand the collected data. Indeed, applying descriptive statistical analysis provides numerical outputs (e.g. tables, figures, diagrams), which can be used as empirical evidence to produce a full explanation, description, measurement and/or comparison, and to make sense of the collected data (Saunders *et al.*, 2015, Chapter 12). In this research, descriptive statistical analysis is first implemented to explore the CERT values and their proposed variables. This is linked to the research main question (Section 1.4).

The SPSS *Descriptives* option for descriptive statistical analysis in Table 5.1 provides the minimum, maximum, mean and standard deviation of the Likert scale data for each CERT value (Field, 2009, Chapter 7). This confirms the level of stability between these BPM values. Table 5.1 validates that the CERT values have similar ranges in all general descriptive statistics from participants who are listed (N = 29).

BPM Values	No.	Minimum	Maximum	Mean	Std. Deviation
Customer Orientation Questions Average Scale	29	1	5	2.80	0.970
Excellence Questions Average Scale	29	2	5	3.22	1.123
Responsibility Questions Average Scale	29	2	5	3.00	0.845
Teamwork Questions Average Scale	29	2	5	3.36	1.085
Valid No. (listwise)	29				

Table 5.1 General Descriptive Statistics of CERT Values.

Therefore, the data was examined as shown in Table 5.1 to find out if there are any significant differences in overall responses to each CERT value using the Mann-Whitney U test (Mann and Whitney, 1947). The Mann-Whitney U test is a non-parametric significance test. This can be applied when data cannot be assumed to follow a normal distribution, or when the sample size is small (Field, 2013, Chapter 6). Thus, the following sections provide Mann-Whitney U significance tests to each CERT value in order to explore any significant differences that may exist in responses to each ECM approval system. Indeed, for each CERT value test, the null hypothesis reveals that there is no significant difference in responses against an alternative that there is a significant difference (2-tailed).

5.2.1 Customer Orientation Significance Test

A Mann-Whitney U test has been implemented to Customer orientation variables to look for differences. Table 5.2 illustrates the results of testing whether the scores for the Customer orientation variables are significantly different between the two ECM approval systems ($p < 0.05$). In each case, the null hypothesis is accepted indicating that there is no significant difference between the responses given for the EAS and RAS.

No.	Statement	Variable	Sig.	Decision (Result)
1	ECM Approval System completes my tasks under my own supervision.	Autonomy	**.556**	Retain the null hypothesis
2	ECM Approval System solves specialist problems and individual customer needs.	Influence	**.107**	Retain the null hypothesis
3	ECM Approval System has an effect on my commitment to work.	Occupational Distress	**.066**	Retain the null hypothesis
4	ECM Approval System has an effect on my job satisfaction.	Job Satisfaction	**.586**	Retain the null hypothesis
5	I do raise ECM Approval System errors, issues, or solve problems when it's necessary to do so.	Engagement	**.616**	Retain the null hypothesis
6	ECM Approval System? complete my job responsibilities, when it's required to do so.	Achievement	**.647**	Retain the null hypothesis
7	ECM Approval System? gives information for better service quality and performance to meet customer expectations.	Expectations	**.556**	Retain the null hypothesis
8	ECM Approval System? satisfies my work activities.	Work Quality	**.211**	Retain the null hypothesis

Table 5.2 SPSS Output of Customer Orientation Value Mann-Whitney U Test.

Overall, the Mann-Whitney U test shows no significant difference in the responses obtained for both ECM approval systems in all Customer orientation variables (Table 5.2).

5.2.2 Excellence Significance Test

A Mann-Whitney U test has been conducted on the Excellence variables to look for significant differences between the two ECM approval systems (Table 5.3).

No.	Statement	Variable	Sig.	Decision (Result)
1	ECM Approval System has high efficiency rate for my business process resources, e.g. cost, time, and quality.	Efficiency Rate	.527	Retain the null hypothesis
2	My ECM efficiency performance has been highly developed since last year, as ECM Approval System improved my work productivity, communication, planning, and service control.	Efficiency Performance	.245	Retain the null hypothesis
3	ECM Approval System has high effectiveness rate for my business objectives and outputs, e.g. cost, time, and quality.	Effectiveness Rate	.211	Retain the null hypothesis
4	My ECM effective performance has been highly developed since last year, as ECM Approval System improved my service quality, problem-solving, delivery, and customer satisfaction.	Effectiveness Performance	.444	Retain the null hypothesis
5	ECM Approval System empowers my activities to make-decisions and confidently communicate for the internal service quality.	Service Quality	.227	Retain the null hypothesis
6	ECM Approval System controls my job decision-making, which empowers my team performance.	Controls	.140	Retain the null hypothesis
7	ECM Approval System strengthens my work relationships and team performance.	Corporate Financial Performance (CFP)	.066	Retain the null hypothesis
8	ECM Approval System effects my own performance level to be more positive, capable, and initiative.	Employee Initiative	.014	Reject the null hypothesis

Table 5.3 SPSS Output of Excellence Value Mann-Whitney U Test.

The Mann-Whitney U test confirms that the Employee Initiative is the only significantly different variable (Table 5.3). Also, Figure 5.1 shows the box-plot of the Employee Initiative for item 8 in Table 5.3. This confirms that the scores obtained for the RAS are significantly lower than the scores of the EAS. Thus, the RAS has a higher level of agreement for the Employee Initiative variable. Overall though, it has been demonstrated that the variables of the Excellence value are broadly comparable between the two systems. This has been further discussed in Section 6.2.1.2.
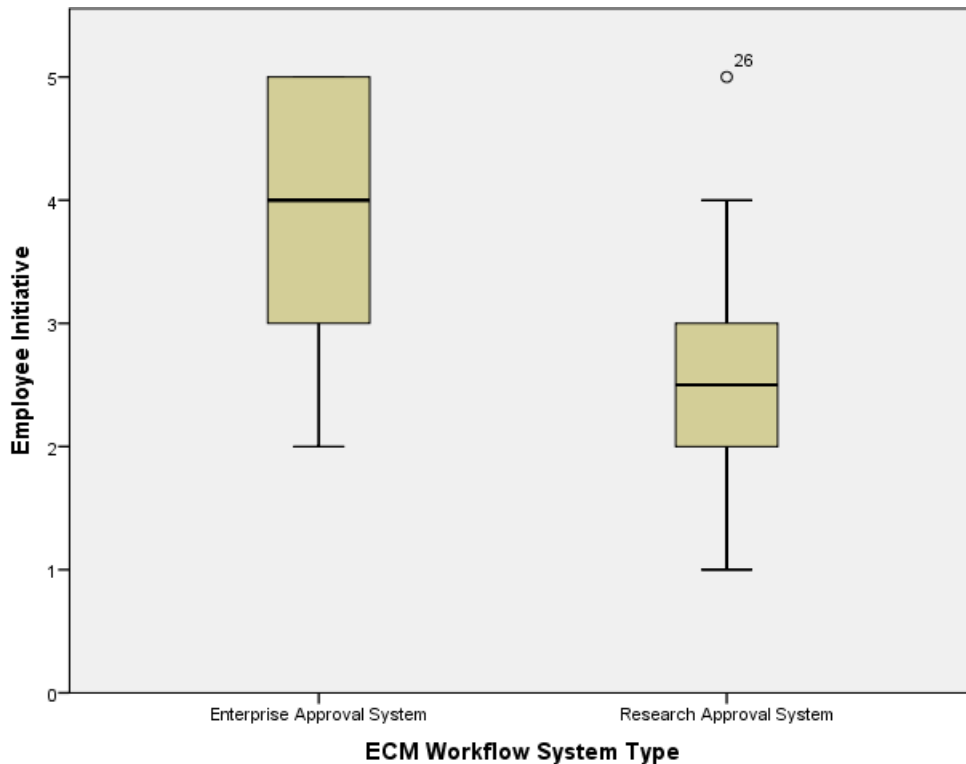
Figure 5.1 SPSS Box-plot Output of Excellence Value Mann-Whitney U Test.

5.2.3 Responsibility Significance Test

A Mann-Whitney U test has been conducted on the Responsibility variables. Table 5.4 shows the results of testing whether the scores for the Responsibility variables are significantly different between both ECM approval systems.

No.	Statement	Variable	Sig.	Decision (Result)
1	ECM Approval System has high response level on my internal and external inquiries.	Response	.394	Retain the null hypothesis
2	ECM Approval System performs high for on-time delivery.	Reliability	.211	Retain the null hypothesis
3	ECM Approval System gives me the right results on-time.	Response time	.325	Retain the null hypothesis
4	ECM Approval System reaches my expected results and completes my tasks as planned.	Results time	.245	Retain the null hypothesis
5	ECM Approval System is my core business process and implementation system for my job duties, commitments and quality.	Manageability	.679	Retain the null hypothesis
6	ECM Approval System improves my work quality in terms of customer service, teamwork, and personal development plan.	Sustainability	.030	Reject the null hypothesis
7	ECM Approval System reduces information management (IM) tasks time and enables me to be more productive.	Quality	.140	Retain the null hypothesis
8	Employees training programmes on ECM Approval System make us more productive and enable me to reduce IM tasks time.	HR Management	.983	Retain the null hypothesis
9	Employees skills are enough to carry out content management tasks using various ECM Approval System functions and tools.	Time to Completion (TTC)	.879	Retain the null hypothesis

Table 5.4 SPSS Output of Responsibility Value Mann-Whitney U Test.

The Mann-Whitney U test confirms that the Sustainability variable shows a significant difference in the responses obtained (Table 5.4).
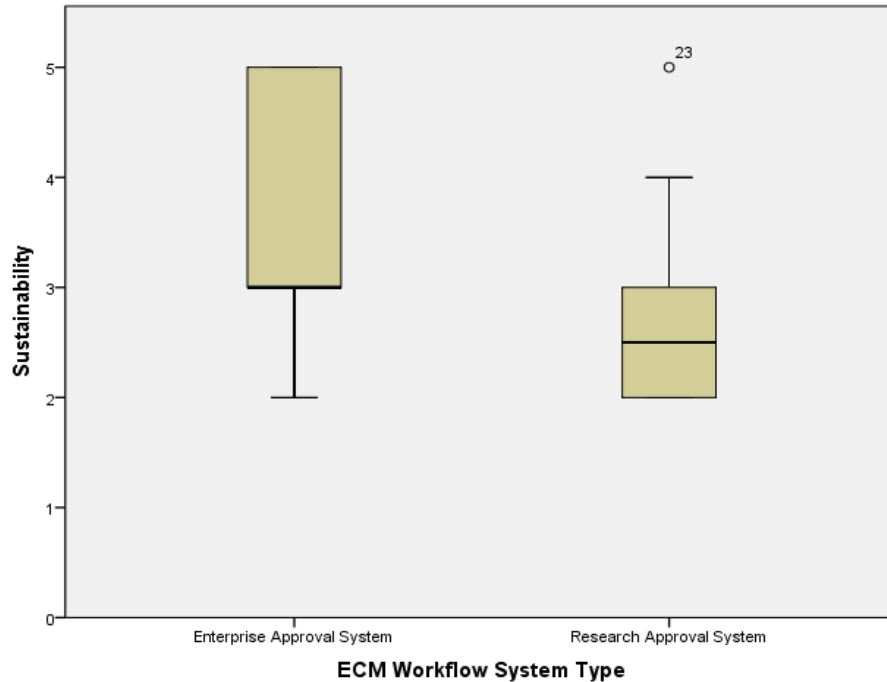
Figure 5.2 SPSS Box-plot Output of Responsibility Value Mann-Whitney U Test.

The significant difference in the Sustainability variable has been illustrated by the box-plot (Figure 5.2). It is clear from Figure 5.2, the scores obtained for the RAS are significantly lower than for the scores of EAS. This confirms that the RAS has a higher level of agreement for the Sustainability variable. Overall, it has been approved that the variables of the Responsibility value are broadly comparable between the two systems. This has been further discussed in Section 6.2.1.3.

5.2.4 Teamwork Significance Test

A Mann-Whitney U test has been conducted on the variables of the Teamwork value. Table 5.5 shows the results of testing whether the scores for the Teamwork variables are significantly different between both ECM approval systems. This confirms that only one significantly different variable has been recognised (Table 5.5). The transformational leadership behaviour inventory variable seems to show a significant difference in the responses obtained, as the box-plot in Figure 5.3 illustrates. Thus, it has been confirmed that the scores obtained for the RAS are significantly lower than the scores of the EAS. Once more, this demonstrates that the RAS has a higher level of agreement for the TLI variable. Overall, it has been approved that the variables of the Teamwork value are broadly comparable between the two systems. This has been further discussed in Section 6.2.1.4.

No.	Statement	Variable	Sig.	Decision (Result)
1	ECM Approval System gives me hope, resiliency, optimism, and efficacy to complete my tasks as planned.	Authentic Leadership	.080	Retain the null hypothesis
2	ECM Approval System is trusted to manage information on-time.	Trust	.499	Retain the null hypothesis
3	ECM Approval System motivates me to solve problems in new ways, changing the way of business processes and automation, and Self-reporting (Self-worth) attitude and behaviour toward others, so that my level of achievement become higher.	Transformational Leadership Behaviour Inventory (TLI)	.008	Reject the null hypothesis
4	ECM Approval System gives better vision, time management, and cost reduction, so that improves business continuance.	Consideration of Future Consequences (CFC)	.556	Retain the null hypothesis
5	ECM Approval System gives the ability toward information exchange, business commitment, and improve service performance, which helps employees to adapt the behaviour to maximise achievements and accessibility.	Consideration of Future Consequences (CFC)	.245	Retain the null hypothesis
6	ECM Approval System rewarded me good performance and achieve a better quality of work-life.	Quality of Work Life (QWL)	.053	Retain the null hypothesis
7	ECM Approval System has the performance and productivity to reach the right service level and team goals.	Team Productivity	.245	Retain the null hypothesis
8	ECM Approval System gives me the experience to improve services and productivity, trust among team members, and better team commitment and communication, so that team members always have the capability to learn.	Team Learning	.117	Retain the null hypothesis

Table 5.5 SPSS Output of Teamwork Value Mann-Whitney U Test.
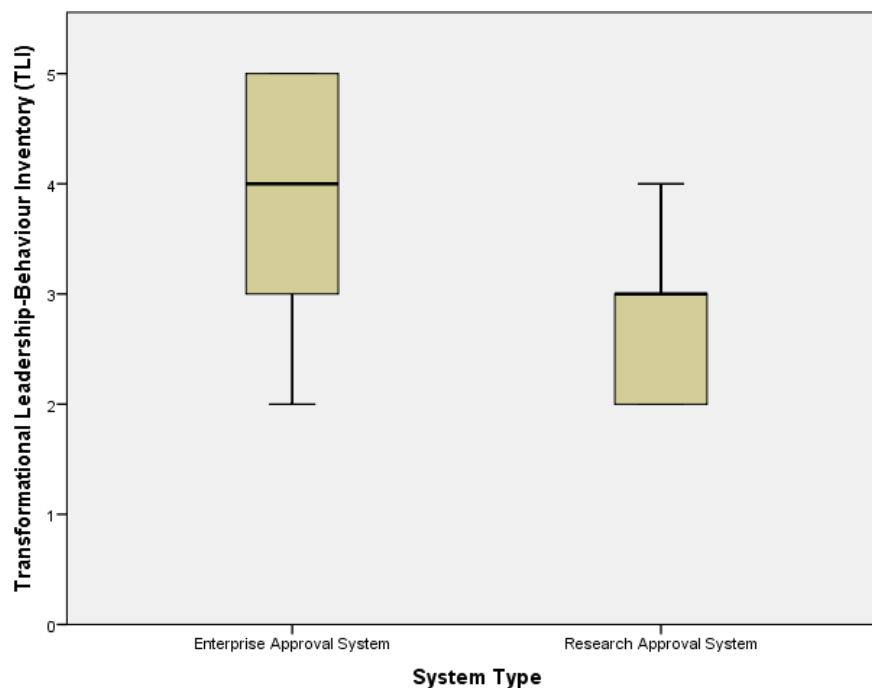
Figure 5.3 SPSS Box-plot Output of Teamwork Value Mann-Whitney U Test.

5.3 Exploratory Factor Analysis – Round I

It has been shown that both ECM approval systems (i.e. EAS and RAS) have produced very little by way of significant differences in questionnaire responses and so it was decided to merge the two datasets for the purpose of exploring the CERT values using exploratory factor analysis. Thus, EFA for each of the CERT values, in turn has been conducted on the entire dataset. According to Field (2013, Chapter 17), EFA can be used to determine the extent to which the variable of each CERT value are consistently contributing to the achievement of the CERT values (Section 3.6.1). Accordingly, the EFA for each CERT value consists of analytical procedures that produce the following outputs:

1. The initial correlation matrix (R-matrix);

2. KMO and Bartlett test results;

3. The scree plot (factor extraction);

4. The rotated component matrix (orthogonal/varimax rotation) of the factor loadings.

The correlation matrix has been applied to explain the significant relationships between variables (predictors) of each CERT value (Field, 2013, Chapter 8). The correlation matrix (also known as R-matrix) can be formulated using the SPSS *Coefficients* and *Significance* levels options (Field, 2013, Chapter 17; Yong and Pearce, 2013). The *Coefficients* option provides the R-matrix, and the *Significance* levels option is used to provide a matrix indicating the significance value of each correlation in the R-matrix. According to Field (2013, Chapter 17), the R-matrix table consists of the correlation coefficient between all the study variables in pairs. Usually, factor analysis identifies' variables that correlate but are not perfectly matched. The EFA will not group variables which are correlated with no others. Thus, the R-matrix can be used to search for the pattern of relationships within a cluster based on variables of each CERT value.

The Kaiser-Meyer-Olkin (KMO) test is used for measuring the sampling adequacy (Field, 2013, Chapter 17; Thakurta, 2017). This has been implemented to represent the ratio of the squared correlation between variables of each CERT value to the squared partial correlation between variables, which confirms whether the sample is adequate to provide factors. Statistically, KMO can vary from 0 to 1, and when a KMO value is close to 0, the partial correlation total is large compared with the correlations total. This signifies a diffusion in the pattern of correlations, which means factor analysis is likely to be inappropriate.

Conversely, a KMO value close toward 1 means the pattern of correlations is rather compact, which allows factor analysis to produce reliable and distinct factors. Kaiser (1974) recommended KMO values of greater than 0.5, as values below this level indicate the need for more data or revision to the chosen variables.

Further, Bartlett's test can be used for testing the sphericity, as it examines whether a matrix is significantly different to an identity matrix (Field, 2013, Chapter 16; Uskarcı and Demirörs, 2017). Thus, Bartlett's test provides an answer about two key elements by asking: First, are the diagonal elements of the variance-covariance matrix equal? Second, are the off-diagonal elements approximately zero implying that the dependent variables are uncorrelated? SPSS *KMO and Bartlett's* test option provides the KMO value and Bartlett's test of sphericity results. To proceed with EFA, a significant result is required for this test ($p < 0.05$) as it shows off-diagonal correlations significantly greater than 0.

Furthermore, the scree plot is a criterion for factor selection (Field, 2013, Chapter 17). This is implemented by selecting all factors with eigenvalues greater than one, as the eigenvalues are used to represent the data variation explained by a factor. An eigenvalue of one or more represents an identified factor. The scree plot chart is used for plotting every eigenvalue (Y-axis) coinciding with the factor to which it is related (X-axis). According to Field (2013, Chapter 17), as many factors as possible can be selected from the variables by examining eigenvalues. The scree plot displays the eigenvalues of each factor, starting with the high eigenvalues. This plot shows a distinctive shape where a sharp descent in the curve is followed by tailing-off. Williams *et al.* (2010) interpreted the scree plot using the following two steps: First, make a straight line (in red) through the many low eigenvalues and note where a departure from this line occurs, as this point highlights where the point of inflexion (break) occurs; Second, the point of inflexion indicates the number of factors, which can be selected by the researcher. In SPSS, *Scree plot* option is part of the factor extraction, which is utilised to provide the scree plot. Field (2013, Chapter 17) describe the implementation of SPSS factor analysis extraction including the scree plot.

The rotated component matrix (also known as rotated factor matrix) represents the final factor loadings of variables (items) and the link between each variable and each defined factor (Field, 2013, Chapter 17; Razak *et al.*, 2016). The rotated component matrix is based on an orthogonal rotation analysis model (varimax method). The orthogonal rotation analysis has been implemented using SPSS factor analysis: *Options* where the selection criteria

settings are chosen. This includes setting the factor loadings to be equal or more than 0.3 by putting .3 in the *Absolute value below* and choosing *Suppress small coefficients* and *Sorted by size* in the *Options* form. Field (2013, Chapter 17) described the full implementation of SPSS orthogonal rotation to provide the rotated component matrix.

In conclusion, an exploratory factor analysis summary supported by an explanation of the key factors will be undertaken for each CERT value. This indicates whether the chosen variables are indeed correlated with a given CERT value to validate the selection of variables made when the questionnaire (Round I) was prepared (Section 3.5.1.2.4).

5.3.1 Exploratory Factor Analysis for Customer Orientation

The correlation matrix in Table 5.6 shows the correlations between the Customer orientation variables. Observing Table 5.6, it is clear that there are significant correlations between the variables with the exception of the variable "Engagement", which shows an insignificant correlation with any other variable.

Customer Orientation Variables		Autonomy	Influence	Occupational Distress	Job Satisfaction	Engagement	Achievement	Expectations	Work Quality
Autonomy	Pearson Correlation	1	.570**	.210	.176	.106	.193	.571**	.591**
	Sig. (2-tailed)		.001	.274	.361	.585	.317	.001	.001
Influence	Pearson Correlation	.570**	1	.361	.183	.204	.455*	.660**	.707**
	Sig. (2-tailed)	.001		.054	.343	.289	.013	.000	.000
Occupational Distress	Pearson Correlation	.210	.361	1	.679**	-.044	.011	.407*	.549**
	Sig. (2-tailed)	.274	.054		.000	.822	.956	.028	.002
Job Satisfaction	Pearson Correlation	.176	.183	.679**	1	-.022	-.190	.116	.370*
	Sig. (2-tailed)	.361	.343	.000		.910	.324	.550	.048
Engagement	Pearson Correlation	.106	.204	-.044	-.022	1	.005	.274	.098
	Sig. (2-tailed)	.585	.289	.822	.910		.978	.150	.612
Achievement	Pearson Correlation	.193	.455*	.011	-.190	.005	1	.356	.231
	Sig. (2-tailed)	.317	.013	.956	.324	.978		.058	.228
Expectations	Pearson Correlation	.571**	.660**	.407*	.116	.274	.356	1	.684**
	Sig. (2-tailed)	.001	.000	.028	.550	.150	.058		.000
Work Quality	Pearson Correlation	.591**	.707**	.549**	.370*	.098	.231	.684**	1
	Sig. (2-tailed)	.001	.000	.002	.048	.612	.228	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Total number (N) for all variables is 29

Table 5.6 SPSS Output of the Correlation Matrix for Customer Orientation.

The variable factorability of Customer orientation by KMO and Bartlett's test gives a measure of sampling adequacy of 0.726 (Table 5.7). This is above the recommended minimum of 0.5. Also, Bartlett's test of sphericity is significant (p = .000). This means that there is significant correlation present between the variables shown in the correlation matrix and so factor analysis is appropriate (Table 5.6).

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.726
Bartlett's Test of Sphericity	Approx. Chi-Square	89.830
	df	28
	Sig.	.000

Table 5.7 SPSS Output of Customer Orientation Value KMO and Bartlett's Test.

Figure 5.4 and Table 5.8 show that there are three factors suggested as being of value in this analysis, and these factors help to explain 76.2% of the data variation.
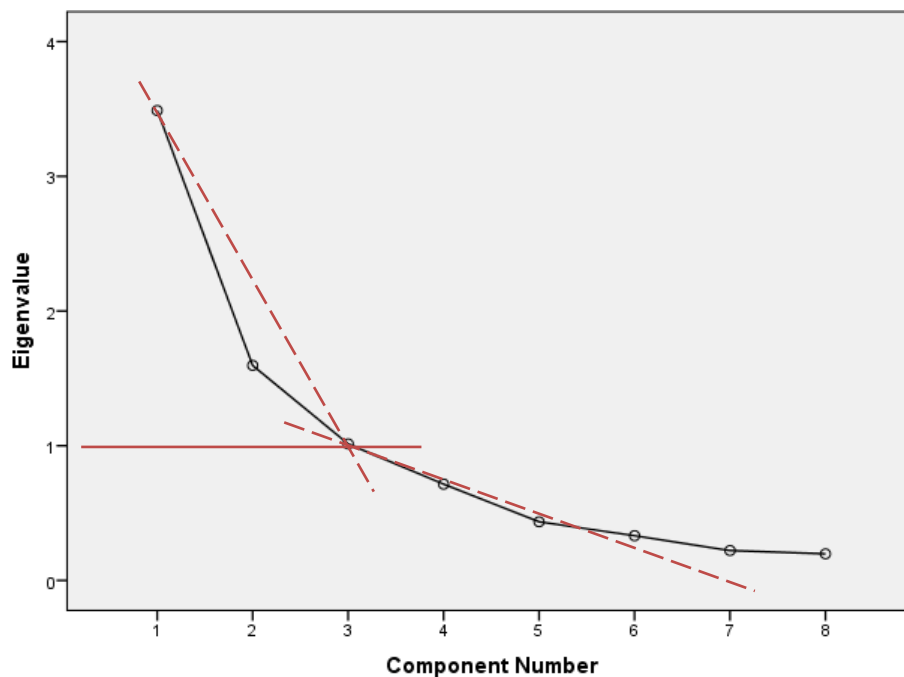
Figure 5.4 SPSS Scree Plot Output for Customer Orientation.

Factor	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	3.135	39.182	39.182
2	1.912	23.900	63.082
3	1.052	13.144	76.226

Extraction Method: Principal Component Analysis.

Table 5.8 SPSS Output of the Total Variance Explained for Customer Orientation.

Table 5.9 shows the three factors identified and the variables that make up each factor together with the factor loadings. Most variables (i.e. five) do contribute to factor 1, while there are two variables (i.e. Occupational Distress, Job Satisfaction) in factor 2 and only one variable (Engagement) in factor 3. This is consistent with the earlier observation that Engagement was not correlated significantly with other variables.

Customer Orientation Variables	Factor		
	1	2	3
Autonomy	.712		
Influence	.872		
Occupational Distress		.820	
Job Satisfaction		.900	
Engagement			.936
Achievement	.649		
Expectations	.833		
Work Quality	.778		

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in 5 iterations.

Table 5.9 SPSS Output of the Rotated Component Matrix for Customer Orientation.

The EFA for the Customer orientation variables provided results to find the impact of Customer orientation value on ECM workflow systems performance. The EFA clarified that only the Engagement variable does not link directly to the Customer orientation value, as Engagement has no relationship with any other variable. Full interpretation and discussions on Customer orientation factorability (including the two remaining factors) can be found in Chapter 6 (Section 6.2.1.1).

5.3.2 Exploratory Factor Analysis for Excellence

The correlation matrix in Table 5.10 shows the correlations between the Excellence variables. Observing this correlation matrix table, it can be seen that there are significant correlations between all Excellence variables.

The variable factorability of Excellence by KMO and Bartlett's test gives a measure of sampling adequacy of 0.894 (Table 5.11). This is above the recommended minimum of 0.5. Also, Bartlett's test of sphericity is significant (p = .000). This means that there is significant correlation present between the variables shown in the correlation matrix in Table 5.10, and so factor analysis is appropriate. Figure 5.5 shows that there is only one factor suggested as being of value in this EFA process.

Excellence Variables		Efficiency Rate	Efficiency Performance	Effectiveness Rate	Effectiveness Performance	Service Quality	Controls	CFP	Employee Initiative
Efficiency Rate	Pearson Correlation	1	.811**	.898**	.562**	.850**	.607**	.602**	.659**
	Sig. (2-tailed)		.000	.000	.001	.000	.000	.001	.000
Efficiency Performance	Pearson Correlation	.811**	1	.863**	.633**	.787**	.597**	.638**	.681**
	Sig. (2-tailed)	.000		.000	.000	.000	.001	.000	.000
Effectiveness Rate	Pearson Correlation	.898**	.863**	1	.625**	.846**	.668**	.611**	.667**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000
Effectiveness Performance	Pearson Correlation	.562**	.633**	.625**	1	.694**	.618**	.557**	.700**
	Sig. (2-tailed)	.001	.000	.000		.000	.000	.002	.000
Service Quality	Pearson Correlation	.850**	.787**	.846**	.694**	1	.778**	.750**	.812**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000
Controls	Pearson Correlation	.607**	.597**	.668**	.618**	.778**	1	.744**	.729**
	Sig. (2-tailed)	.000	.001	.000	.000	.000		.000	.000
CFP	Pearson Correlation	.602**	.638**	.611**	.557**	.750**	.744**	1	.834**
	Sig. (2-tailed)	.001	.000	.000	.002	.000	.000		.000
Employee Initiative	Pearson Correlation	.659**	.681**	.667**	.700**	.812**	.729**	.834**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

Total number (N) for all variables is 29

Table 5.10 SPSS Output of the Correlation Matrix for Excellence.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.894
Bartlett's Test of Sphericity	Approx. Chi-Square	218.440
	df	28
	Sig.	.000

Table 5.11 SPSS Output of Excellence Value KMO and Bartlett's Test.
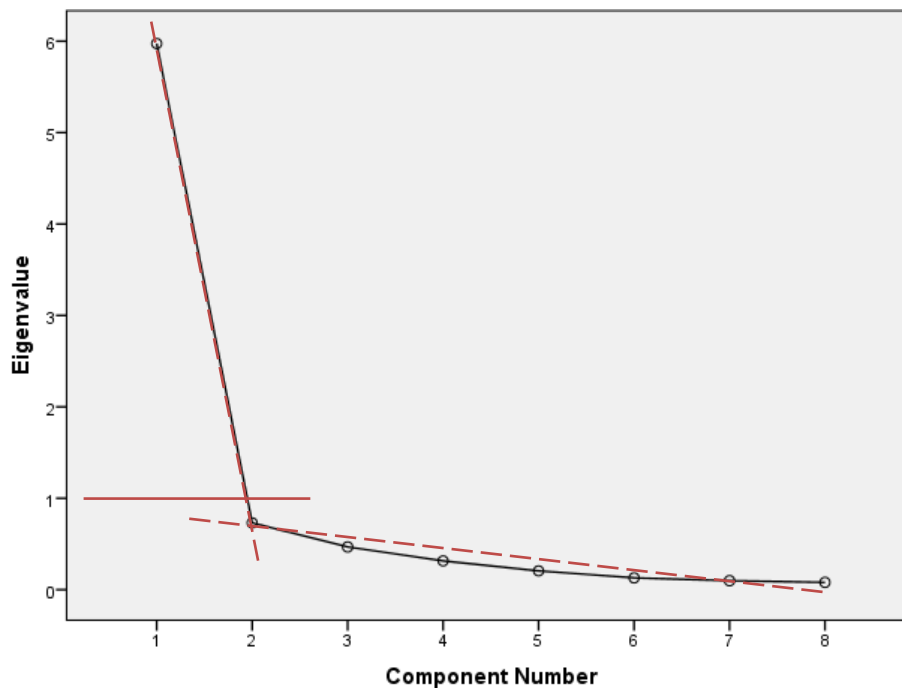
Figure 5.5 SPSS Scree Plot Output for Excellence.

The SPSS orthogonal rotation analysis (rotated component matrix) for Excellence value provided the following statement: Only one component was extracted; the solution cannot be rotated. This means that all the suggested Excellence variables are linked to one factor. Overall, the EFA for the Excellence variables provided results to find the impact of Excellence value on ECM workflow systems performance. The EFA clarified that all Excellence variables do contribute to one factor. Full interpretation and discussions on the Excellence factorability can be found in Chapter 6 (Section 6.2.1.2).

5.3.3 Exploratory Factor Analysis for Responsibility

The correlation matrix in Table 5.12 shows the correlations between variables of the Responsibility value. Observing the R-matrix table, it can be seen that there are significant correlations within the variables except for the Sustainability variable, which shows an insignificant correlation with all other variables.

Responsibility Variables		Response	Response Time	Results Time	Manageability	Sustainability	Quality Management	TTC	Skills Allocation	Employee Skills
Response	Pearson Correlation	1	.448*	.510**	.561**	.066	.624**	.472**	.623**	.304
	Sig. (2-tailed)		.015	.005	.002	.733	.000	.010	.000	.108
Response Time	Pearson Correlation	.448*	1	.787**	.752**	.198	.573**	.525**	.273	.275
	Sig. (2-tailed)	.015		.000	.000	.302	.001	.003	.152	.150
Results Time	Pearson Correlation	.510**	.787**	1	.788**	.339	.642**	.538**	.185	.266
	Sig. (2-tailed)	.005	.000		.000	.072	.000	.003	.336	.163
Manageability	Pearson Correlation	.561**	.752**	.788**	1	.112	.723**	.599**	.386*	.423*
	Sig. (2-tailed)	.002	.000	.000		.563	.000	.001	.039	.022
Sustainability	Pearson Correlation	.066	.198	.339	.112	1	.172	-.055	-.035	-.026
	Sig. (2-tailed)	.733	.302	.072	.563		.374	.779	.856	.894
Quality Management	Pearson Correlation	.624**	.573**	.642**	.723**	.172	1	.610**	.582**	.466*
	Sig. (2-tailed)	.000	.001	.000	.000	.374		.000	.001	.011
TTC	Pearson Correlation	.472**	.525**	.538**	.599**	-.055	.610**	1	.348	.632**
	Sig. (2-tailed)	.010	.003	.003	.001	.779	.000		.064	.000
Skills Allocation	Pearson Correlation	.623**	.273	.185	.386*	-.035	.582**	.348	1	.390*
	Sig. (2-tailed)	.000	.152	.336	.039	.856	.001	.064		.037
Employee Skills	Pearson Correlation	.304	.275	.266	.423*	-.026	.466*	.632**	.390*	1
	Sig. (2-tailed)	.108	.150	.163	.022	.894	.011	.000	.037	

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Total number (N) for all variables is 29

Table 5.12 SPSS Output of the Correlation Matrix for Responsibility.

The variables factorability of Responsibility by KMO and Bartlett's test gives a measure of sampling adequacy of 0.809 (Table 5.13). This is above the recommended minimum of 0.5. Also, Bartlett's test of sphericity value is significant (p = .000). This means that there is significant correlation present between the variables shown in the correlation matrix and so factor analysis is appropriate (Table 5.12).

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.809
Bartlett's Test of Sphericity	Approx. Chi-Square	137.641
	df	36
	Sig.	.000

Table 5.13 SPSS Output of Responsibility Value KMO and Bartlett's Test.

Figure 5.6 and Table 5.14 show that there are two factors recognised as being of value in this analysis, and these two factors help to explain 67.1% of the data variation.
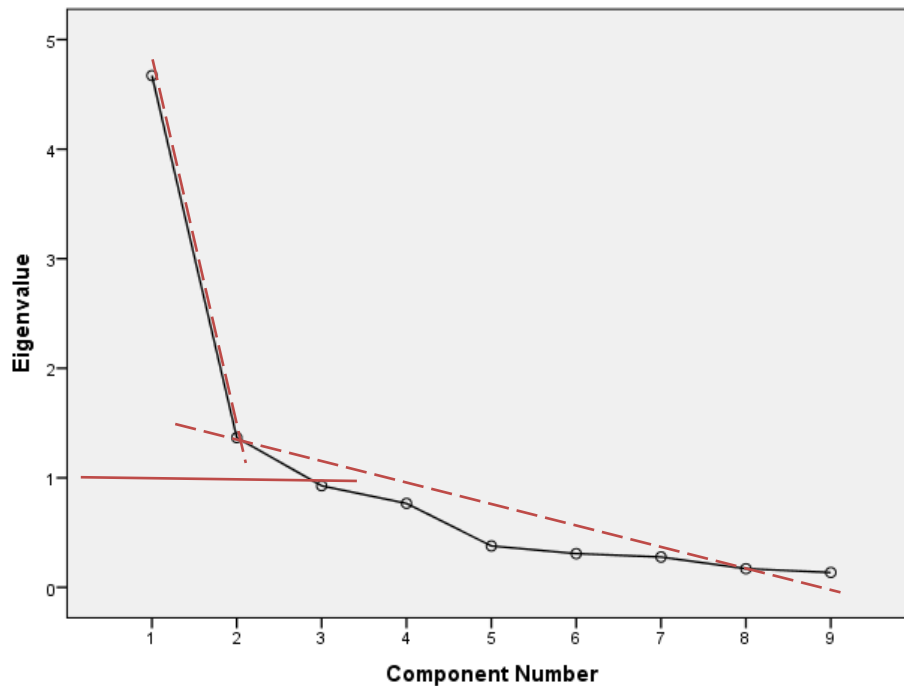
Figure 5.6 SPSS Scree Plot Output for Responsibility.

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	3.394	37.706	37.706
2	2.646	29.395	67.101

Extraction Method: Principal Component Analysis.

Table 5.14 SPSS Output of the Total Variance Explained for Responsibility.

Table 5.15 shows the two factors recognised and the variables that formulate each factor together with the factor loadings. The majority of variables (i.e. six) do contribute to factor 1, while there are four variables (i.e. Response Time, Results Time, Manageability, Sustainability) in factor 2, and the Manageability variable contributes to both factors. This also shows that the Sustainability variable contributes to factor 2, which is somewhat inconsistent with the R-matrix observation.

Responsibility Variables	Factor	
	1	2
Response	.690	
Response Time		.759
Results Time		.866
Manageability	.601	.659
Sustainability		.666
Quality Management	.714	
TTC	.746	
Skills Allocation	.767	
Employee Skills	.725	

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in 3 iterations.

Table 5.15 SPSS Output of the Rotated Component Matrix for Responsibility.

Indeed, the EFA for the Responsibility variables provided sufficient results to find the impact of Responsibility value on ECM workflow systems performance. The R-matrix in Table 5.12 shows that only the Sustainability variable has an insignificant link to the Responsibility value. The rotated component matrix in Table 5.15 shows that all variables of the Responsibility do contribute to two factors, and the majority of variables are contributing to factor 1. Full interpretation and discussions on the Responsibility factorability can be found in Chapter 6 (Section 6.2.1.3).

5.3.4 Exploratory Factor Analysis for Teamwork

The correlation matrix in Table 5.16 shows the correlation between the Teamwork variables. Observing the correlation matrix table, it can be seen that there are significant correlations between all Teamwork variables. Conversely, the variables factorability of Teamwork value by KMO and Bartlett's test demonstrated a measure of sampling adequacy of 0.843 (Table 5.17). This is above the recommended minimum of 0.5. Also, Bartlett's test of sphericity is significant (p = .000). This means that there is significant correlation present between the variables shown in the correlation matrix and so factor analysis is appropriate (Table 5.16).

Teamwork Variables		Authentic Leadership	Trust	TLI	CFC	CFC	QWL	Team Productivity	Team Learning
Authentic Leadership	Pearson Correlation	1	.747**	.582**	.705**	.622**	.875**	.641**	.528**
	Sig. (2-tailed)		.000	.001	.000	.000	.000	.000	.003
Trust	Pearson Correlation	.747**	1	.434*	.780**	.623**	.708**	.576**	.589**
	Sig. (2-tailed)	.000		.019	.000	.000	.000	.001	.001
TLI	Pearson Correlation	.582**	.434*	1	.410*	.466*	.499**	.503**	.458*
	Sig. (2-tailed)	.001	.019		.027	.011	.006	.005	.012
CFC	Pearson Correlation	.705**	.780**	.410*	1	.871**	.729**	.780**	.700**
	Sig. (2-tailed)	.000	.000	.027		.000	.000	.000	.000
CFC	Pearson Correlation	.622**	.623**	.466*	.871**	1	.685**	.739**	.763**
	Sig. (2-tailed)	.000	.000	.011	.000		.000	.000	.000
QWL	Pearson Correlation	.875**	.708**	.499**	.729**	.685**	1	.583**	.587**
	Sig. (2-tailed)	.000	.000	.006	.000	.000		.001	.001
Team Productivity	Pearson Correlation	.641**	.576**	.503**	.780**	.739**	.583**	1	.639**
	Sig. (2-tailed)	.000	.001	.005	.000	.000	.001		.000
Team Learning	Pearson Correlation	.528**	.589**	.458*	.700**	.763**	.587**	.639**	1
	Sig. (2-tailed)	.003	.001	.012	.000	.000	.001	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Total number (N) for all variables is 29

Table 5.16 SPSS Output of the Correlation Matrix for Teamwork.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.843
Bartlett's Test of Sphericity	Approx. Chi-Square	184.739
	df	28
	Sig.	.000

Table 5.17 SPSS Output of Teamwork Value KMO and Bartlett's Test.

Figure 5.7 shows that there is one factor recognised as being of value in this analysis process. Also, the SPSS rotated component matrix for Teamwork value has provided the following statement: Only one component was extracted; the solution cannot be rotated. This means that all the suggested variables of the Teamwork are linked to one factor, which can be used to represent the Teamwork value.
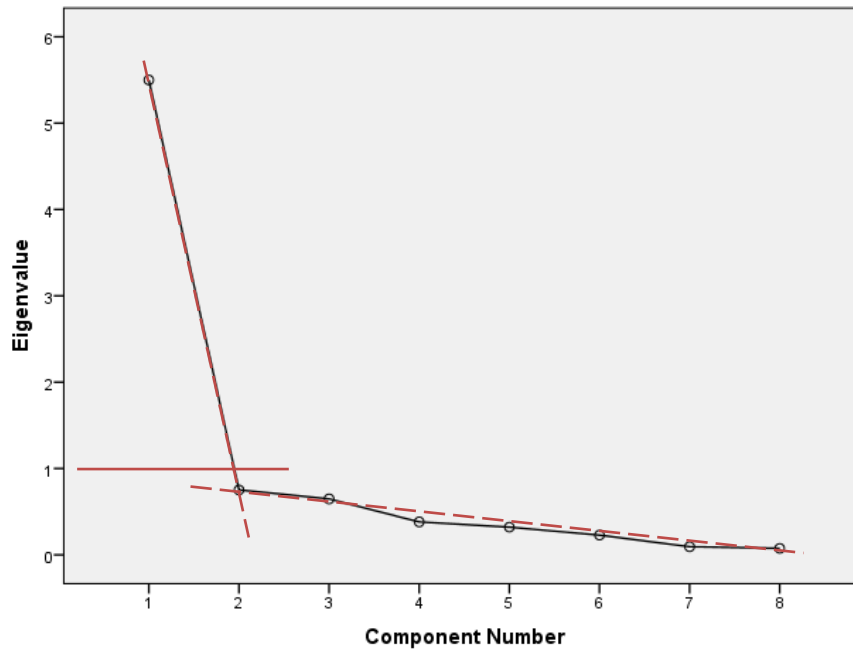
Figure 5.7 SPSS Scree Plot Output for Teamwork.

The EFA for the variables of the Teamwork provided satisfactory results to find the impact of Teamwork value on ECM workflow systems performance. The EFA approved that all Teamwork variables do contribute to one factor. Full interpretation and discussions on the Teamwork factorability can be found in Chapter 6 (Section 6.2.1.4).

5.4 Qualitative Data Analysis – Round II

In the research Round II, qualitative data have been collected using semi-structured face-to-face interviews (Section 4.7.2). This collected data have been analysed and transferred to numerical data to support the research quantitative analysis and findings from Round I after ensuring that the data is sufficient to produce findings. Indeed, the saturation for the qualitative data has been discussed to confirm the sample size in chapter 3 (Section 3.5.1.1). Also, an empirical investigation has been completed for gaining insights on the impact of CERT values using Grounded Theory inductive analytical procedures (Creswell, 2013, Chapter 3; Saunders *et al.*, 2015, Chapter 13). Hence, the coding process in GT has been implemented to construct a complete qualitative analysis (Figure 3.8). This data processing mechanism formulates the research findings and explains the importance of CERT values to improve ECM workflow system performance in order to achieve business objectives.

Further, the coding process in GT began by open coding, which has been achieved through the semi-structured interview questions (Section 3.6.2). The interview questions used CERT

values and their variables for the open coding (Table 5.18). Therefore, each interview transcript has been transferred and coded to a table (Appendix D.1). The second stage is the axial coding where the interview text has been analysed within the open coding to give context and meaning using the research Likert scale range (i.e. Strongly Agree, Agree, Neither, Disagree, Strongly Disagree). The final stage is to assign the response score based on the research Likert scale numbers (i.e. Strongly Agree = 1, Agree = 2, Neither = 3, Disagree = 4, Strongly Disagree = 5). During the coding process in GT, a qualitative codebook (i.e. Likert scale word and number for each questionnaire item) has been used to connect keywords and sentences to the correct score as illustrated by Creswell (2013, Chapter 9). Practically, the codebook can be used by the researcher to search for the relevant words in the interview that define answers to the interview questions. This supported the formulation of the findings table for each interview, which is followed by a summary table of interview findings for each ECM workflow system.

Furthermore, the research prepared data in Round I (Section 4.7.1) has been transferred to assign scores based on the Likert scale for variables of each CERT value. This formulates a set of findings tables for the Round I (Appendix D.2). Overall, the implementation to transfer words to numbers (quantitative data) in order to make the findings tables are explained in the following sections, which include details on how the coding process in GT is used in practice.

5.4.1 Interviews Coding and Empirical Analysis

The coding process in GT has been analytically applied to transfer the semi-structured interview transcripts to structured tables. This is implemented by looking at the interview transcript response codes for each variable of each CERT value using the Likert scale (Appendix D.1). After recording each variable response, the researcher transferred each recognised keyword into a score (e.g. Agree = 2) to formulate the final interview research findings table (e.g. Table 5.18).

The first semi-structured interview concerned the Microsoft SharePoint EAS workflow solution. This provided many details about the workflow procedures and business process management throughout the discussion. The coding process in GT and qualitative codebook (based on the Likert scale) have been implemented to produce the first interview findings table (Appendix D.1.1) and the summary findings table (Table 5.18).

BPM Value	Category	Variable	Score	Response codes
Customer Orientation C	Creativity	Autonomy	2	Agree
		Influence	1	Strongly agree
	Commitment	Occupational Distress	2	Agree
		Job Satisfaction	1	Strongly agree
	Communication	Engagement	2	Agree
		Achievement	2	Agree
	Customer Needs	Expectations	2	Agree
		Work Quality	2	Agree
Excellence E	Efficiency	Efficiency Rate	2	Agree
		Efficiency Performance	2	Agree
	Effectiveness	Effectiveness Rate	2	Agree
		Effectiveness Performance	2	Agree
	Empowerment	Service Quality	1	Strongly agree
		Controls	2	Agree
	Employee Orientation	CFP	2	Agree
		Employee Initiative	2	Agree
Responsibility R	Responsiveness	Response	3	Neither
		Response Time	2	Agree
	Result Orientation	Results Time	2	Agree
		Manageability	2	Agree
	Right Quality	Sustainability	2	Agree
		Quality Management	2	Agree
	Right Skills	TTC	2	Strongly agree
		Skills Allocation	3	Neither
		Employee Skills	2	Agree
Teamwork T	Transparency	Authentic Leadership	2	Agree
		Trust	2	Agree
	Transformational Leadership	TLI	2	Agree
		CFC	2	Agree
	Transactional Leadership	CFC	2	Agree
		QWL	2	Agree
	Team Collaboration	Team Productivity	3	Neither
		Team Learning	2	Agree

Table 5.18 First Interview Findings on EAS.

The second interview also concerned the EAS workflow solution, and each CERT value has been discussed using the interview questions (Section 3.5.1.3.4). The qualitative analysis produced the second interview findings table (Appendix D.1.2) and the second interview summary findings table (Table 5.19).

BPM Value	Category	Variable	Score	Response codes
Customer Orientation C	Creativity	Autonomy	2	Agree
		Influence	2	Agree
	Commitment	Occupational Distress	4	Disagree
		Job Satisfaction	2	Agree
	Communication	Engagement	2	Agree
		Achievement	2	Agree
	Customer Needs	Expectations	2	Agree
		Work Quality	2	Agree
Excellence E	Efficiency	Efficiency Rate	2	Agree
		Efficiency Performance	2	Agree
	Effectiveness	Effectiveness Rate	4	Disagree
		Effectiveness Performance	4	Disagree
	Empowerment	Service Quality	2	Agree
		Controls	3	Neither
	Employee Orientation	CFP	1	Strongly agree
		Employee Initiative	3	Neither
Responsibility R	Responsiveness	Response	4	Disagree
		Response Time	1	Strongly agree
	Result Orientation	Results Time	1	Strongly agree
		Manageability	1	Strongly agree
	Right Quality	Sustainability	4	Disagree
		Quality Management	3	Neither
	Right Skills	TTC	2	Agree
		Skills Allocation	3	Neither
		Employee Skills	1	Strongly agree
Teamwork T	Transparency	Authentic Leadership	2	Agree
		Trust	1	Strongly agree
	Transformational Leadership	TLI	5	Strongly disagree
		CFC	2	Agree
	Transactional Leadership	CFC	2	Agree
		QWL	3	Neither
	Team Collaboration	Team Productivity	1	Strongly agree
		Team Learning	4	Disagree

Table 5.19 Second Interview Findings on EAS.

The third interview also concerned the EAS workflow solution. The qualitative analysis of this interview provided a qualitative findings table (Appendix D.1.3), and summary findings, which are presented in the third interview table (Table 5.20).

BPM Value	Category	Variable	Score	Response codes
Customer Orientation C	Creativity	Autonomy	1	Strongly agree
		Influence	2	Agree
	Commitment	Occupational Distress	3	Neither
		Job Satisfaction	2	Agree
	Communication	Engagement	1	Strongly agree
		Achievement	1	Strongly agree
	Customer Needs	Expectations	2	Agree
		Work Quality	2	Agree
Excellence E	Efficiency	Efficiency Rate	2	Agree
		Efficiency Performance	1	Strongly agree
	Effectiveness	Effectiveness Rate	2	Agree
		Effectiveness Performance	2	Agree
	Empowerment	Service Quality	2	Agree
		Controls	2	Agree
	Employee Orientation	CFP	2	Agree
		Employee Initiative	2	Agree
Responsibility R	Responsiveness	Response	2	Agree
		Response Time	2	Agree
	Result Orientation	Results Time	2	Agree
		Manageability	2	Agree
	Right Quality	Sustainability	1	Strongly agree
		Quality Management	2	Agree
	Right Skills	TTC	2	Agree
		Skills Allocation	2	Agree
		Employee Skills	1	Strongly agree
Teamwork T	Transparency	Authentic Leadership	2	Agree
		Trust	2	Agree
	Transformational Leadership	TLI	4	Disagree
		CFC	2	Agree
	Transactional Leadership	CFC	2	Agree
		QWL	3	Neither
	Team Collaboration	Team Productivity	2	Agree
		Team Learning	2	Agree

Table 5.20 Third Interview Findings on EAS.

The fourth interview concerned the RAS workflow solution. As explained before, the coding process in GT and codebook have been used to produce the fourth interview findings table (Appendix D.1.4) and the fourth interview summary findings in Table 5.21.

BPM Value	Category	Variable	Score	Response codes
Customer Orientation C	Creativity	Autonomy	3	Neither
		Influence	5	Strongly disagree
	Commitment	Occupational Distress	5	Strongly disagree
		Job Satisfaction	2	Agree
	Communication	Engagement	2	Agree
		Achievement	2	Agree
	Customer Needs	Expectations	2	Agree
		Work Quality	3	Neither
Excellence E	Efficiency	Efficiency Rate	2	Agree
		Efficiency Performance	4	Disagree
	Effectiveness	Effectiveness Rate	4	Disagree
		Effectiveness Performance	3	Neither
	Empowerment	Service Quality	2	Agree
		Controls	4	Disagree
	Employee Orientation	CFP	5	Strongly disagree
		Employee Initiative	4	Disagree
Responsibility R	Responsiveness	Response	4	Disagree
		Response Time	1	Strongly agree
	Result Orientation	Results Time	3	Neither
		Manageability	2	Agree
	Right Quality	Sustainability	4	Disagree
		Quality Management	2	Agree
	Right Skills	TTC	1	Strongly agree
		Skills Allocation	2	Agree
		Employee Skills	2	Agree
Teamwork T	Transparency	Authentic Leadership	3	Neither
		Trust	1	Strongly agree
	Transformational Leadership	TLI	2	Agree
		CFC	4	Disagree
	Transactional Leadership	CFC	2	Agree
		QWL	3	Neither
	Team Collaboration	Team Productivity	4	Disagree
		Team Learning	4	Disagree

Table 5.21 Fourth Interview Findings on RAS.

The fifth interview also concerned the RAS workflow solution and the coding process in GT and codebook have been used to produce the fifth interview findings table (Appendix D.1.5) and the summary findings in Table 5.22.

BPM Value	Category	Variable	Score	Response codes
Customer Orientation C	Creativity	Autonomy	1	Strongly agree
		Influence	2	Agree
	Commitment	Occupational Distress	2	Agree
		Job Satisfaction	2	Agree
	Communication	Engagement	2	Agree
		Achievement	2	Agree
	Customer Needs	Expectations	2	Agree
		Work Quality	3	Neither
Excellence E	Efficiency	Efficiency Rate	2	Agree
		Efficiency Performance	3	Neither
	Effectiveness	Effectiveness Rate	3	Neither
		Effectiveness Performance	3	Neither
	Empowerment	Service Quality	3	Neither
		Controls	4	Disagree
	Employee Orientation	CFP	3	Neither
		Employee Initiative	3	Neither
Responsibility R	Responsiveness	Response	3	Neither
		Response Time	3	Neither
	Result Orientation	Results Time	3	Neither
		Manageability	2	Agree
	Right Quality	Sustainability	3	Neither
		Quality Management	3	Neither
	Right Skills	TTC	2	Agree
		Skills Allocation	3	Neither
		Employee Skills	2	Agree
Teamwork T	Transparency	Authentic Leadership	2	Agree
		Trust	2	Agree
	Transformational Leadership	TLI	4	Disagree
		CFC	4	Disagree
	Transactional Leadership	CFC	3	Neither
		QWL	3	Neither
	Team Collaboration	Team Productivity	4	Disagree
		Team Learning	4	Disagree

Table 5.22 Fifth Interview Findings on RAS.

The sixth interview is also concerned the RAS workflow solution. The coding process in GT and codebook have been applied to provide a qualitative findings table (Appendix D.1.6). These research findings have been used to formulate the sixth interview summary findings table (Table 5.23).

BPM Value	Category	Variable	Score	Response codes
Customer Orientation C	Creativity	Autonomy	2	Agree
		Influence	2	Agree
	Commitment	Occupational Distress	2	Agree
		Job Satisfaction	2	Agree
	Communication	Engagement	1	Strongly agree
		Achievement	2	Agree
	Customer Needs	Expectations	2	Agree
		Work Quality	2	Agree
Excellence E	Efficiency	Efficiency Rate	3	Neither
		Efficiency Performance	2	Agree
	Effectiveness	Effectiveness Rate	2	Agree
		Effectiveness Performance	1	Strongly agree
	Empowerment	Service Quality	2	Agree
		Controls	2	Agree
	Employee Orientation	CFP	2	Agree
		Employee Initiative	2	Agree
Responsibility R	Responsiveness	Response	2	Agree
		Response Time	4	Disagree
	Result Orientation	Results Time	2	Agree
		Manageability	2	Agree
	Right Quality	Sustainability	2	Agree
		Quality Management	4	Disagree
	Right Skills	TTC	2	Agree
		Skills Allocation	5	Strongly disagree
		Employee Skills	2	Agree
Teamwork T	Transparency	Authentic Leadership	1	Strongly agree
		Trust	3	Neither
	Transformational Leadership	TLI	2	Agree
		CFC	2	Agree
	Transactional Leadership	CFC	2	Agree
		QWL	2	Agree
	Team Collaboration	Team Productivity	2	Agree
		Team Learning	2	Agree

Table 5.23 Sixth Interview Findings on RAS.

Finally, the seventh interview concerned the EAS workflow solution. The qualitative analysis of this interview provided a qualitative findings table (Appendix D.1.7). This table has been used to produce the seventh interview finding table (Table 5.24).

BPM Value	Category	Variable	Score	Response codes
Customer Orientation C	Creativity	Autonomy	2	Agree
		Influence	2	Agree
	Commitment	Occupational Distress	2	Agree
		Job Satisfaction	2	Agree
	Communication	Engagement	2	Agree
		Achievement	1	Strongly agree
	Customer Needs	Expectations	4	Disagree
		Work Quality	4	Disagree
Excellence E	Efficiency	Efficiency Rate	4	Disagree
		Efficiency Performance	4	Disagree
	Effectiveness	Effectiveness Rate	4	Disagree
		Effectiveness Performance	4	Disagree
	Empowerment	Service Quality	3	Neither
		Controls	4	Disagree
	Employee Orientation	CFP	4	Disagree
		Employee Initiative	4	Disagree
Responsibility R	Responsiveness	Response	3	Neither
		Response Time	2	Agree
	Result Orientation	Results Time	1	Strongly agree
		Manageability	4	Disagree
	Right Quality	Sustainability	2	Agree
		Quality Management	4	Disagree
	Right Skills	TTC	4	Disagree
		Skills Allocation	4	Disagree
		Employee Skills	2	Agree
Teamwork T	Transparency	Authentic Leadership	5	Strongly disagree
		Trust	4	Disagree
	Transformational Leadership	TLI	4	Disagree
		CFC	4	Disagree
	Transactional Leadership	CFC	3	Neither
		QWL	5	Strongly disagree
	Team Collaboration	Team Productivity	4	Disagree
		Team Learning	4	Disagree

Table 5.24 Seventh Interview Findings on EAS.

5.4.2 Questionnaires Coding and Empirical Analysis

The collected datasets from the questionnaires (Round I) in section 4.7.1 have now been summarised and analytically transferred to produce a table for each ECM approval system, and then produce a final overall table covering both ECM workflow systems. These tables have been developed and structured using the coding process in GT and the research findings (Appendix D.2). The results are shown in Tables 5.25, 5.26 and 5.27.

BPM Value	Category	Variable	Score	Response codes
Customer Orientation C	Creativity	Autonomy	2	Agree
		Influence	5	Strongly disagree
	Commitment	Occupational Distress	3	Neither
		Job Satisfaction	2	Agree
	Communication	Engagement	2	Agree
		Achievement	2	Agree
	Customer Needs	Expectations	2	Agree
		Work Quality	2	Agree
Excellence E	Efficiency	Efficiency Rate	2	Agree
		Efficiency Performance	3	Neither
	Effectiveness	Effectiveness Rate	2	Agree
		Effectiveness Performance	2	Agree
	Empowerment	Service Quality	4	Disagree
		Controls	4	Disagree
	Employee Orientation	CFP	4	Disagree
		Employee Initiative	4	Disagree
Responsibility R	Responsiveness	Response	3	Neither
		Response Time	3	Neither
	Result Orientation	Results Time	2	Agree
		Manageability	2	Agree
	Right Quality	Sustainability	3	Neither
		Quality Management	3	Neither
	Right Skills	TTC	3	Neither
		Skills Allocation	5	Strongly disagree
		Employee Skills	2	Agree
Teamwork T	Transparency	Authentic Leadership	5	Strongly disagree
		Trust	3	Neither
	Transformational Leadership	TLI	4	Disagree
		CFC	3	Neither
	Transactional Leadership	CFC	3	Neither
		QWL	5	Strongly disagree
	Team Collaboration	Team Productivity	3	Neither
		Team Learning	3	Neither

Table 5.25 Findings from the EAS Questionnaire.

BPM Value	Category	Variable	Score	Response codes
Customer Orientation C	Creativity	Autonomy	2	Agree
		Influence	3	Neither
	Commitment	Occupational Distress	3	Neither
		Job Satisfaction	2	Agree
	Communication	Engagement	2	Agree
		Achievement	2	Agree
	Customer Needs	Expectations	2	Agree
		Work Quality	2	Agree
Excellence E	Efficiency	Efficiency Rate	2	Agree
		Efficiency Performance	3	Neither
	Effectiveness	Effectiveness Rate	2	Agree
		Effectiveness Performance	2	Agree
	Empowerment	Service Quality	2	Agree
		Controls	2	Agree
	Employee Orientation	CFP	2	Agree
		Employee Initiative	2	Agree
Responsibility R	Responsiveness	Response	3	Neither
		Response Time	3	Neither
	Result Orientation	Results Time	3	Neither
		Manageability	3	Neither
	Right Quality	Sustainability	3	Neither
		Quality Management	2	Agree
	Right Skills	TTC	2	Agree
		Skills Allocation	2	Agree
		Employee Skills	2	Agree
Teamwork T	Transparency	Authentic Leadership	3	Neither
		Trust	3	Neither
	Transformational Leadership	TLI	3	Neither
		CFC	2	Agree
	Transactional Leadership	CFC	2	Agree
		QWL	3	Neither
	Team Collaboration	Team Productivity	2	Agree
		Team Learning	2	Agree

Table 5.26 Findings from the RAS Questionnaire.

BPM Value	Category	Variable	Score	Response codes
Customer Orientation C	Creativity	Autonomy	2	Agree
		Influence	3	Neither
	Commitment	Occupational Distress	3	Neither
		Job Satisfaction	2	Agree
	Communication	Engagement	2	Agree
		Achievement	2	Agree
	Customer Needs	Expectations	2	Agree
		Work Quality	2	Agree
Excellence E	Efficiency	Efficiency Rate	2	Agree
		Efficiency Performance	3	Neither
	Effectiveness	Effectiveness Rate	2	Agree
		Effectiveness Performance	2	Agree
	Empowerment	Service Quality	2	Agree
		Controls	3	Neither
	Employee Orientation	CFP	2	Agree
		Employee Initiative	3	Neither
Responsibility R	Responsiveness	Response	3	Neither
		Response Time	3	Neither
	Result Orientation	Results Time	3	Neither
		Manageability	3	Neither
	Right Quality	Sustainability	3	Neither
		Quality Management	3	Neither
	Right Skills	TTC	2	Agree
		Skills Allocation	3	Neither
		Employee Skills	2	Agree
Teamwork T	Transparency	Authentic Leadership	3	Neither
		Trust	3	Neither
	Transformational Leadership	TLI	3	Neither
		CFC	3	Neither
	Transactional Leadership	CFC	3	Neither
		QWL	5	Strongly disagree
	Team Collaboration	Team Productivity	3	Neither
		Team Learning	2	Agree

Table 5.27 ECM Approval Systems Overall Findings.

In conclusion, the coding process in GT has provided responses for both ECM workflow approval systems based on the research Round I (Table 5.27). These research findings can be applied to measure the ECM workflow system performance, as well as compare the Round I (questionnaires) findings with Round II (interviews) findings. The Round II findings have provided many insights, which can be used for further analysis to make the final decision on the ECM workflow system performance. Also, these findings are able to provide a Likert score for each variable of each CERT value, which can be used for implementing the Round III (PMM framework) to evaluate the ECM workflow system performance in order to meet business objectives and organisational goals.

5.5 Weighing the Findings – Round III

Comparisons of the research Round I and Round II findings are required for the weighing of CERT values (Round III). This provides a final measurement of the ECM approval systems performance. Table 5.28 shows the Likert score for the variables of each CERT value, including the overall questionnaire responses score (QRS) and the interview responses score (IRS). The QS number resulted from the overall score of each questionnaire item, which is transferred to a Likert score (Section 4.7.1). The IS number resulted from each interview responses, which are transferred to the Likert scores (Section 5.4.1).

BPM Value	Category	Variable	QRS	1st IRS	2nd IRS	3rd IRS	4th IRS	5th IRS	6th IRS	7th IRS
Customer Orientation	Creativity	Autonomy	2	2	2	1	3	1	2	2
		Influence	3	1	2	2	5	2	2	2
	Commitment	Occupational Distress	3	2	4	3	5	2	2	2
		Job Satisfaction	2	1	2	2	2	2	2	2
	Communication	Engagement	2	2	2	1	2	2	1	2
		Achievement	2	2	2	1	2	2	2	1
	Customer Needs	Expectations	2	2	2	2	2	2	2	4
		Work Quality	2	2	2	2	3	3	2	4
Excellence	Efficiency	Efficiency Rate	2	2	2	2	2	2	3	4
		Efficiency Performance	3	2	2	1	4	3	2	4
	Effectiveness	Effectiveness Rate	2	2	4	2	4	3	2	4
		Effectiveness Performance	2	2	4	2	3	3	1	4
	Empowerment	Service Quality	2	1	2	2	2	3	2	3
		Controls	3	2	3	2	4	4	2	4
	Employee Orientation	CFP	2	2	1	2	5	3	2	4
		Employee Initiative	3	2	3	2	4	3	2	4
Responsibility	Responsiveness	Response	3	3	4	2	4	3	2	3
		Response Time	3	2	1	2	1	3	4	2
	Result Orientation	Results Time	3	2	1	2	3	3	2	1
		Manageability	3	2	1	2	2	2	2	4
	Right Quality	Sustainability	3	2	4	1	4	3	2	2
		Quality Management	3	2	3	2	2	3	4	4
	Right Skills	TTC	2	2	2	2	1	2	2	4
		Skills Allocation	3	3	3	2	2	3	5	4
		Employee Skills	2	2	1	1	2	2	2	2
Teamwork	Transparency	Authentic Leadership	3	2	2	2	3	2	1	5
		Trust	3	2	1	2	1	2	3	4
	Transformational Leadership	TLI	3	2	5	4	2	4	2	4
		CFC	3	2	2	2	4	4	2	4
	Transactional Leadership	CFC	3	2	2	2	2	3	2	3
		QWL	5	2	3	3	3	3	2	5
	Team Collaboration	Team Productivity	3	3	1	2	4	4	2	4
		Team Learning	2	2	4	2	4	4	2	4

Score (S) ranges are: Strongly Agree = 1, Agree = 2, Neither = 3, Disagree = 4, Strongly Disagree = 5.

Table 5.28 The Overall Findings for the Questionnaires and Each Interview.

The coding process for weighing the variables of each CERT value is explained in the following sections. In each section, an explanation is provided along with findings table to demonstrate how the weighing process has been implemented. After the completion of the weighing process, the overall findings are presented to show the final weighing outcomes of the coding process. This is used to complete the research Round III. Additionally, a discussion about the findings resulting from the quantitative and qualitative analysis with details concerning the ECM workflow system performance can be found in Chapter 6: Research Findings, Interpretations and Discussions.

5.5.1 Weighing Customer Orientation Findings

The Customer orientation variables received predominately "Agree" responses (Table 5.29). Analytically, almost all responses received "Agree" as the final rating after weighing each variable and comparing the overall score of each interview. This provided the weighing score (WS), which is the final decision for each variable. The WS number resulted from the median score that measures the average in each case (Arcidiacono, 2017; Field, 2013, Chapter 1).

Variable	QRS	1st IRS	2nd IRS	3rd IRS	4th IRS	5th IRS	6th IRS	7th IRS	WS	Reason / Why?
Autonomy	2	2	2	1	3	1	2	2	2	Interview 1: The system allows the visibility of tasks. The system enables us to be creative. Interview 2: The system design itself is a 1 (good), the only issue is the people who don't use it at all, and we are currently sitting on them.
Influence	3	1	2	2	5	2	2	2	2	Interview 1: The system solves a business problem. For me it's a good thing, it makes my job easier. Interview 2: It is a fairly simple system. Interview 3: I would agree.
Occupational Distress	3	2	4	3	5	2	2	2	3	Interview 2: The system enables people to show commitment. Interview 3: I would say I am undecided on that one. Interview 4: My determination to do my work well? No, strongly disagree, it does not affect it anyway.
Job Satisfaction	2	1	2	2	2	2	2	2	2	Interview 3: Yes, not an exceptional amount but it does make a few things slightly easier.
Engagement	2	2	2	1	2	2	1	2	2	Interview 4: When there is a bigger problem or we need any changes, I report it to my manager. I spoke to my manager and the manager spoke to whoever is in charge of SharePoint.
Achievement	2	2	2	1	2	2	2	1	2	Interview 2: Yes, it definitely does. Interview 7: Yes, agree, it does, it does.
Expectations	2	2	2	2	2	2	2	4	2	Interview 2: Yes, it does because it tells you if something has been correctly approved. Interview 4: Yes, it does meet my expectations, but it doesn't necessarily impact on my performance.
Work Quality	2	2	2	2	3	3	2	4	2	Interview 2: Yes, it does. Interview 4: We would need an integrated system for the whole of REI.

Score (S) ranges are: Strongly Agree = 1, Agree = 2, Neither = 3, Disagree = 4

Table 5.29 Customer Orientation Overall Findings.

In detail, the Autonomy variable of the ECM approval systems has received "Agree" as most participants have responded that the system allows them to complete their tasks as required (Table 5.29). However, the main issue is that the staff are hesitant to use the system. The Influence variable has received "Agree" by most participants, and the Round I data shows "Neither", but "Agree" also was high among the participants. The Occupational Distress variable has received different responses, and many participants were undecided, which make "Neither" an overall response. The Job Satisfaction, Engagement, and Achievement variables have received "Agree" by most participants. The Expectations and Work Quality variables also have received a majority of "Agree" with only one interviewee disagreeing.

5.5.2 Weighing Excellence Findings

Excellence variables have received a high number of responses toward both "Agree" and "Neither" (Table 5.30). Qualitatively, all of the final weighing scores to each Excellence variable received "Agree" or "Neither".

Variable	QRS	1st IRS	2nd IRS	3rd IRS	4th IRS	5th IRS	6th IRS	7th IRS	WS	Reason / Feedback
Efficiency Rate	2	2	2	2	2	2	3	4	2	Interview 2: The system quality is good. Interview 6: I wouldn't say it is completely efficient, you said from cost, quality and time… I semi-agree.
Efficiency Performance	3	2	2	1	4	3	2	4	3	Interview 1: The staff "have a lot to say about the system, and we did lots of solving the problems. Interview 4: I disagree with the fact that there is an improvement.
Effectiveness Rate	2	2	4	2	4	3	2	4	2	Interview 3: Yes, I agree with that. Interview 6: I think it is very time consuming, but it is effective for the outputs that we require.
Effectiveness Performance	2	2	4	2	3	3	1	4	2	Interview 3: The changes have been quite incremental. Interview 6: Yes, agree. It can do more but for what it is doing it is good since last year.
Service Quality	2	1	2	2	2	3	2	3	2	Interview 1: The staff "tell us the problem and we catch them and then send them back to IT on how to solve some of these. Yes, high Interview 3: The system "replaces some things that we would do in other ways and it does that well.
Controls	3	2	3	2	4	4	2	4	3	Interview 2: You might argue that it is a neither to me. I don't disagree but it is a neither.
CFP	2	2	1	2	5	3	2	4	2	Interview 2: Yes, it does. I will agree on that.
Employee Initiative	3	2	3	2	4	3	2	4	3	Interview 2: No, I am not a user, remember, so you are probably better putting me down as neither.

Score (S) ranges are: Strongly Agree = 1, Agree = 2, Neither = 3, Disagree = 4, Strongly Disagree = 5

Table 5.30 Excellence Overall Findings.

In detail, the Efficiency Rate variable received an overall "Agree" from the Round I and most Round II interviews (Table 5.30). The Efficiency Performance responses were less clear as participants have shown different views, which result in an overall "Neither" response. The responses to Effectiveness Rate and Effectiveness Performance have shown an overall "Agree" toward the Effectiveness category. The Service Quality has received an overall "Agree", and the Controls has received "Neither" from the Round I and contradictory responses from Round II. The Corporate Financial Performance has received an overall "Agree", and the Employee Initiative has received "Neither" from the Round I and contradictory responses from the Round II.

5.5.3 Weighing Responsibility Findings

Responsibility variables have received a high number of responses toward both "Agree" and "Neither" (Table 5.31). This matches the final weighing rate to each Responsibility variable.

Variable	QRS	1st IRS	2nd IRS	3rd IRS	4th IRS	5th IRS	6th IRS	7th IRS	WS	Reason / Feedback
Response	3	3	4	2	4	3	2	3	3	Interview 3: If you are making an enquiry about where something is, what stage a project is at in the workflow, then yes, I can find out. Interview 4: It is ineffective in reporting.
Response Time	3	2	1	2	1	3	4	2	3	Interview 1: From the compliance point of view, what the system was designed to do, it does. Interview 6: Because a lot of the time the content that goes into the approval system is after the actual delivery of the project. It defeats the purpose of an approval system
Results Time	3	2	1	2	3	3	2	1	3	Interview 4: There is no question of right and wrong with SharePoint.
Manageability	3	2	1	2	2	2	2	4	2	Interview 1: So, it does what's it supposed to do. Interview 4: It goes according to plan
Sustainability	3	2	4	1	4	3	2	2	3	Interview 3: Yes, I agree. It is a very small part of my overall job role but for that part it is the core aspect of it. Interview 4: There is this lack of privacy.
Quality Management	3	2	3	2	2	3	4	4	3	Interview 2: Not really.
TTC	2	2	2	2	1	2	2	4	2	Interview 2: Yeah, it is, that is an agree
Skills Allocation	3	3	3	2	2	3	5	4	3	Interview 2: I think neither is fair. Interview 4: Just to that small extent of approvals. Interview 6: We don't have training, if we did it would be very good.
Employee Skills	2	2	1	1	2	2	2	2	2	Interview 4: The skills I have are enough for using SharePoint.

Score (S) ranges are: Strongly Agree = 1, Agree = 2, Neither = 3, Disagree = 4, Strongly Disagree = 5

Table 5.31 Responsibility Overall Findings.

In more detail, the Response and Response time variables have received an overall "Neither" from the Round I and contradictory responses from Round II (Table 5.31). Also, the Results time received an overall "Neither". Conversely, an overall "Agree" was received for Manageability from the majority of the Round II participants. Moreover, the Sustainability and Quality management variables have received an overall "Neither" from the Round I and contradictory responses from Round II (Table 5.31). This gives the Right Quality category an overall "Neither" (Table 5.33). Also, the Time to Completion and Employee Skills variables have received an overall "Agree" by majority from both rounds. Conversely, the Skills allocation responses were uncertain, as the Round II participants have shown contradictory responses, which makes an overall "Neither" score suitable (Table 5.33).

5.5.4 Weighing Teamwork Findings

The variables of the Teamwork value show that participants feedback is mostly toward "Agree" and "Neither" except for the QWL variable, which has some "Disagree" and one "Strongly Disagree" (Table 5.32). Qualitatively, when the final responses (i.e. WS) were evaluated, it was clear that "Agree" and "Neither" represent most Teamwork variables.

More specifically, the Authentic Leadership variable received "Neither" from the Round I, but most Round II participants "Agree" with one "Neither" and one "Strongly disagree". This leads to a weighing of the variable as "Neither". Conversely, responses to the Trust variable have shown an overall "Agree" as three interviewees indicated to "Agree" and two interviewees indicated to "Strongly agree". Conversely, the Transformational leadership-behaviour inventory variable received "Neither" from the Round I, but the Round II participants have shown contradictory responses. This leads to a weighing of the variable as "Neither". Conversely, responses to the Consideration of future consequences variable have received an overall "Agree" from the Round I and most participants from the Round II (Table 5.32). Also, the Consideration of future consequences variable received an overall "Agree" by the majority of participants from both rounds. Conversely, the Quality of work life variable has shown an overall "Strongly disagree" from the Round I, and one interviewee indicated to "Strongly disagree" with a "Neither" majority from the Round II (Table 5.32).

The Team Productivity variable received "Neither" from the Round I, but the Round II participants have shown contradictory responses. This makes "Neither" as the overall WS. Conversely, responses to the Team Learning variable had an overall "Agree" from the Round I supported by some participants from Round II (Table 5.32).

Variable	QRS	1st IRS	2nd IRS	3rd IRS	4th IRS	5th IRS	6th IRS	7th IRS	WS		Reason / Feedback
Authentic Leadership	3	2	2	2	3	2	1	5	3	Interview 2: I agree with that, because my core task is evidencing contractual compliance. Interview 4: It doesn't really give me hope and optimism. It is just something that I do. Interview 7: I think, I would strongly disagree.
Trust	3	2	1	2	1	2	3	4	2	Interview 1: Because its automated, so when somebody uses it, I get an automated email. So, for me yes. Interview 2: The system is really reliable, but because it is user dependant for forwarding it is really difficult to decouple... the system has no problem.
TLI	3	2	5	4	2	4	2	4	3	Interview 3: The system is quite rigid. It does not encourage innovation. Interview 4: It does challenge us to think up new processes, just because this one is not perfect.
CFC	3	2	2	2	4	4	2	4	2	Interview 2: Yes, it does.
CFC	3	2	2	2	2	3	2	3	2	Interview 2: Yes, I suppose it does that.
QWL	5	2	3	3	3	3	2	5	5	Interview 2: It is not a big part of my working life. Interview 7: Disagree, strongly disagree.
Team Productivity	3	3	1	2	4	4	2	4	3	Interview 1: Neither. Interview 4: Disagree. Interview 6: Yes, agree.
Team Learning	2	2	4	2	4	4	2	4	2	Interview 3: The learning option is in the sense that we sort of teach each other how to use it and as each change comes through, that information passes from person-to-person but beyond that not that much.

Score (S) ranges are: Strongly Agree = 1, Agree = 2, Neither = 3, Disagree = 4, Strongly Disagree = 5

Table 5.32 Teamwork Overall Findings.

Overall, the Teamwork value final weighing scores have shown contradictory results as four variables indicate to "Agree" and four indicate to others (i.e. three to "Neither" and one to "Strongly disagree"). This means that the ECM workflow approval systems are most likely able to support Teamwork in order to achieve business objectives.

5.5.5 Final Qualitative Findings

Recognising the final weighing score for each variable, category and each CERT value using the coding process in GT can support measuring the ECM workflow approval systems performance. The median of the weighing score of each set of variables for a category that measures the average in each case is used to identify each category score (Arcidiacono, 2017; Field, 2013, Chapter 1). Also, the mode of the category scores of each CERT value is used to identify each value score. Table 5.33 shows the weighing scores for each category and CERT value.

BPM Value	Category	Variable	Weighing Score	Category Score	Value Score
Customer Orientation	Creativity	Autonomy	2	2	2
		Influence	2		
	Commitment	Occupational Distress	3	2	
		Job Satisfaction	2		
	Communication	Engagement	2	2	
		Achievement	2		
	Customer Needs	Expectations	2	2	
		Work Quality	2		
Excellence	Efficiency	Efficiency Rate	2	2	2
		Efficiency Performance	3		
	Effectiveness	Effectiveness Rate	2	2	
		Effectiveness Performance	2		
	Empowerment	Service Quality	2	2	
		Controls	3		
	Employee Orientation	CFP	2	2	
		Employee Initiative	3		
Responsibility	Responsiveness	Response	3	3	3
		Response Time	3		
	Result Orientation	Results Time	3	3	
		Manageability	2		
	Right Quality	Sustainability	3	3	
		Quality Management	3		
	Right Skills	TTC	2	2	
		Skills Allocation	3		
		Employee Skills	2		
Teamwork	Transparency	Authentic Leadership	3	3	3
		Trust	2		
	Transformational Leadership	TLI	3	3	
		CFC	2		
	Transactional Leadership	CFC	2	4	
		QWL	5		
	Team Collaboration	Team Productivity	3	3	
		Team Learning	2		

Score ranges are: Strongly Agree = 1, Agree = 2, Neither = 3, Disagree = 4, Strongly Disagree = 5

Table 5.33 Findings for Each Category and CERT Values.

In detail, the Customer orientation findings lead to an overall "Agree" for achieving customer business objectives (Table 5.29). Also, all categories of Customer orientation value scored "Agree", because all Customer orientation variables received "Agree" with the exception of Occupational distress, which received "Neither". Hence, Customer orientation value has scored an overall "Agree" (Table 5.33).

The majority of the Excellence variables have received an "Agree" (Table 5.30), as only three variables received "Neither" and the rest received "Agree". In regards to the categories of the Excellence value: First, Efficiency received an "Agree" score as a majority of the Efficiency performance interviews supported this; Second, Effectiveness received an overall "Agree"; Third, the majority of the Control variable responses supported an overall "Agree"; Forth, Employee orientation received an overall "Agree" as the median of the weighing scores is "Agree". Table 5.33 shows all the findings, which confirm that the Excellence value scored an overall "Agree".

The Responsibility value has received a "Neither", as only three out of nine variables have "Agree" and the rest received "Neither" (Table 5.31). In more detail: First, the Responsiveness category received an overall "Neither" score; Second, the Result orientation received an overall "Neither" as the mode of the weighing scores is "Neither"; Third, the Right quality received an overall "Neither" score; Forth, the Right skills received an overall "Agree" score supported by the overall in Round I and the final weighing score. Table 5.33 shows all the Responsibility findings, which confirm that an overall "Neither" is obtained, as six variables of the Responsibility out of nine have received "Neither" with all category scores are "Neither". This confirms that the ECM approval systems could now achieve the workflow responsibilities (tasks) to meet business objectives.

The Teamwork value has received an overall "Neither", as a result of the mode of the category scores of Teamwork (Table 5.32). In more detail, the Transparency category has an overall "Neither". The Transformational leadership category has an overall "Neither" as a result of the responses to the research rounds. Correspondingly, the Transactional leadership category has an overall "Disagree" as the median of the weighing scores is "Disagree". Lastly, the Team collaboration category has an overall "Neither" as a result of the responses to the weighing score for Team productivity and Team learning variables. Table 5.33 shows all the Teamwork categories result, which are "Neither". This confirms that the Teamwork value scored an overall "Neither".

In conclusion, the Customer orientation value has scored "Agree", which means the ECM approval systems can achieve customer orientation objectives for the HEI. Also, the Excellence value has scored "Agree", which means the ECM approval systems have an excellence performance. Conversely, the Responsibility value has scored "Neither", which means the ECM approval systems could meet the required workflow tasks for the staff. Also, the Teamwork value has scored "Neither", which means the ECM approval systems could support Teamwork for the assigned business objectives and organisational goals.

5.6 Performance Measurement and Management

The performance measurement and management of ECM approval systems can be assessed by the competing values framework with the use of recognised scores of CERT values and their categories and variables (Cameron and Quinn, 2011, Chapter 3; Schmiedel *et al.*, 2015). This framework is a diagnostic tool to analytically determine business strategic initiatives and effective characteristics in order to improve the organisation's business strategies and performance through its ECM workflow solutions (Lincoln, 2010; Quinn and Rohrbaugh, 1983). The CVF can be used in conjunction with CERT values (Section 3.6.3) as a measurement instrument with dimensions for evaluating a BPM workflow system to improve the organisation's ECM workflow system performance and achieve the organisational goals (Schmiedel *et al.*, 2013, 2014).

According to Lincoln (2010), the competing values framework has four major (core) quadrants: Collaborate, Create, Control and Compete. These are defined by two axes, which are Structure and Focus. This measurement framework originated from the human relations model, open system model, internal process model, and rational goal model. However, The CVF dimensions are here combined with CERT values to measure ECM workflow system performance. Figure 5.8 shows the distribution of CERT values weighing scores on the CVF as a PMM framework to evaluate the enterprise's BPM workflow system.

The CVF structure axis/column represents Excellence and Responsibility (ER), which received "Agree" and "Neither" (2, 3), based on the weighing scores for each CERT value (Figure 5.8). This demonstrates that the ECM workflow approval systems performance in term of structure can achieve satisfactory Excellence and could strengthen the responsibility toward achieving business objectives. This means that the ECM workflow approval systems structure needs improvements only with slight changes in the BPM workflow system.

Structure
ER
2 , 3

Flexibility
Excellence
2

Stability
Responsibility
3

	Collaborate **ET** **2 , 3**	Create **EC** **2 , 2**
	Control **RT** **3 , 3**	Compete **RC** **3 , 2**

Internal Focus
Teamwork
3

External Focus
Customer orientation
2

Focus
TC
3 , 2

Rate ranges are: Strongly Agree = 1, Agree = 2, Neither = 3, Disagree = 4, Strongly Disagree = 5

Figure 5.8 Performance Measurement and Management of ECM Approval Systems.

The CVF focus axis/row represents Teamwork and Customer orientation (TC) values, which received "Neither" and "Agree" (3, 2) scores, based on the weighing scores for each CERT value (Figure 5.8). Hence, ECM approval systems performance in terms of focus could achieve Teamwork activities and can satisfy Customer orientation business objectives.

Regarding the PMM four quadrants, the Excellence and Teamwork (ET) quadrant represent the Collaborate dimension, which received "Agree" and "Neither" (2, 3); the Excellence and Customer orientation (EC) quadrant represent the Create dimension, which received "Agree" for both values (2, 2); the Responsibility and Teamwork (RT) quadrant represents the Control dimension, which received "Neither" for both values (3, 3); the Responsibility and Customer orientation (RC) quadrant represents the Compete dimension, which received "Neither" and "Agree" (3, 2).

Lastly, the PMM of ECM workflow approval systems has indicated a satisfactory and just adequate performance to achieve the intended business objectives. Indeed, improvements to the ECM workflow systems performance are still required using the PMM dimensions as key performance indicators to improve performance in achieving business objectives and organisational goals.

5.7 Synopsis

The research data analysis methodology and methods, which are explained in chapter three have been implemented to provide insights, clarifications and supports validation of the research aims and objectives. This includes recognising the significant relationships in the variables of each CERT value by evaluating how these BPM values impact on ECM workflow approval systems performance (RO4) and validating the variables of each CERT value to be used as KPIs in order to implement the PMM framework (RO5). Indeed, empirical evidence has been formulated using datasets from the research Round I and Round II to make sense of such datasets and the prepared data in chapter four (Section 4.7).

Further, the research analytical procedures of the collected data revealed many business analytic and statistical findings. These procedures and their results validated that CERT business process management values and the Delphi method can be applied to measure ECM workflow system performance. In addition, the data collected from the research Round I have been analysed using explanatory factor analysis based on each set of variables of each CERT value. This has been analytically conducted to validate that CERT values are four key performance indicators (factors) of ECM workflow approval systems to evaluate workflow information system performance.

Furthermore, the data collected from Round I and Round II have been analysed using the coding process in GT. This allows weighing of the findings (Round III) to formulate a set of findings' tables, which support the implementation of the PMM framework in order to calculate the CVF quadrants and its axes to recognise the performance characteristics of the ECM workflow system. Hence, CERT values can provide a set of PMM dimensions to measure the ECM workflow system structure and focus with the support of the collaborate, create, control and compete as major quadrants. This recognises the qualities of the ECM workflow system and improves the system performance to achieve business objectives.

Overall, the research framework and strategic procedures have been analytically implemented. Also, the ECM workflow approval systems have been measured using the coding process in GT and the PMM framework for weighing the study results (Round III). This shows the impact of CERT values on the ECM workflow systems performance. However, chapter 6 provides more details along with explanations, interpretations and extensive discussions about this data analysis, insights and findings.

Chapter 6: The Research Findings, Interpretations and Discussions

Overview

Interpreting the outcomes from the research data analysis is the purpose of this chapter. It is important to clarify and discuss the data analysis results in order to formulate the research findings. This chapter looks at what the research data collection and analysis tell us with support from the literature review and related studies. The first part focuses on developing interpretations of the research explanatory factor analysis. The second part explains applying the performance measurement and management (PMM) framework to evaluate ECM workflow systems performance. Afterwards, the research hypotheses will be tested to validate what has been found and demonstrate the significant implications of the research in order to meet the research aims and objectives. Lastly, the research study results are summarised by presenting the research key findings and accepted facts and ideas.

6.1 Introduction

Applying business process management values to achieve business objectives and organisational strategy plays an essential role that supports the performance of the organisation's information management, systems and technology (Rahimi *et al.*, 2016; vom Brocke *et al.*, 2016). Thus, many research studies have applied BPM organisational values, which confirms their importance for accomplishing the organisation's mission. For example, the Hadasch *et al.* (2016); Müller *et al.* (2016); Schmiedel *et al.* (2013, 2014, 2015); Tarhan *et al.* (2015) research studies have focused on specific variables of BPM values to assess their importance in optimising BPM practice and improve organisational performance.

In this research study, the focus is primarily on using CERT values as a BPM strategy to evaluate ECM workflow system performance, as explained in chapter two (Figure 2.7). Therefore, this chapter seeks to validate the suggested variables of each CERT value and assess the impact of these variables on ECM workflow systems performance.

In chapter five, the data analysis results from the EFA implementation have been used to recognise the significance of CERT values based on data collected from HEI (Section 5.3). Thus, the variables of each CERT value are assessed in this chapter to recognise how these variables can measure ECM workflow system performance. Also, the results from the three Delphi stages (EFA, qualitative data analysis and weighing the findings) are used to discuss the implementation of the PMM framework in order to evaluate ECM workflow system performance (Sections 5.4, 5.5 and 5.6). This validates the use of CERT values and their variables and shows how CERT values can be used to improve ECM workflow systems performance (RO5). Additionally, the research hypotheses are tested to ensure that the study results and findings have answered the research questions stated in chapter 1 (Section 1.6). This provides many insights, which shed light on sets of contributions to business practice and knowledge within the research areas of study.

Finally, this chapter is summarised by outlining the research findings, which are validated through interpreting the research implementation. This provides a clear answer to the research main question, which is "How CERT values impact on ECM workflow information systems performance". Thus, the research aims have been reached, and the research objectives are achieved. This is sufficient for the recognition of the findings, which recommend the application of the research framework and strategy to other organisations.

6.2 Interpretation of Explanatory Factor Analysis

The explanatory factor analysis results have been analysed to reveal the research findings. Indeed, the EFA interpretation indicates the importance of the core factors and highlights their important effect as an agreed solution (Field, 2013, Chapter 17). Also, the interpretation of the EFA framework makes the research findings more accessible by showing the significance of each identified factor. Changes in factor loadings and other factor analysis values are extracted to establish the validity of the variables and their contribution to each factor (Field, 2013, Chapter 16). The is applied to discuss how CERT values are recognised as factors to measure the ECM workflow system performance to ensure achieving the business objectives and organisational goals (RO5).

In the following sections, changes to each variable of the CERT values are discussed to show their effect on the ECM workflow systems and business processes performance. Afterwards, the significance of the identified factors is explained with the support of EFA results. Then, the outcomes of these sections are used to formulate the final section, which produces a complete interpretation.

6.2.1 Changes to Variables

The explanatory factor analysis framework was applied to recognise the strengths of relationships between the suggested variables of each CERT value (Chen and Fong, 2012). This confirms the appropriateness of the CERT values as a BPM construct to evaluate ECM workflow system performance. Thus, the EFA framework analytical insights are used to determine what each variable of each CERT value can contribute to a BPM system and ECM workflow solution (Schmiedel *et al.*, 2015; vom Brocke *et al.*, 2016). This process confirms the variables in each category (dimension) and CERT value (KPI). Consequently, possible changes to the variables used in the assessment of CERT values can be identified through the EFA (Dikici *et al.*, 2018). Then, the identified variables, which have a significant impact, can be used to measure ECM workflow system performance.

6.2.1.1 Changes to Variables of Customer Orientation

Customer orientation variables have shown significant correlations with each other apart from the "Engagement" variable (Section 5.3.1). The correlation matrix in Table 6.1 shows significant correlations between all variables at either the 0.01 level (**) or the 0.05 level (*), excluding the Engagement variable where insignificant correlations have been noticed with

all other variables. However, the KMO and Bartlett's Test in Table 5.7 shown variables of Customer orientation are sufficiently correlated (with the adequacy of 0.726) and a significant Bartlett's sphericity value of p = 0.000. Hence, it has been confirmed that the identified Customer orientation variables are correlated with each other with the exception of Engagement, and the EFA is a valid analytical process for this study data.

Further, the observation of the scree plot in Figure 5.4 and the total variance in Table 5.8 have confirmed that three different factors are recognised. This demonstrates the following: Factor 1, explains 39.182% of the total data variation; Factor 2, explains 23.9% of the data variation (a total of 63.08% with Factor 1); Factor 3, explains just 13.14% of the data variation (a total of 76.23% with Factor 1).

Table 6.1 shows Customer orientation categories and their linked variables, which confirmed the significance of the correlation between variables at two levels of significance (indicated by ** and *). This reveals a tight link (**) between the Creativity and Customer needs categories within their variables and across these categories. Also, there is a tight link (**) between the Commitment variables themselves, as well as between Commitment and Customer needs categories. This links Factor 1 and Factor 2 in the rotated component matrix which can be considered as one larger factor to represent the Customer orientation value.

Furthermore, the rotated component matrix in Table 6.2 confirms that three different factors are recognised. The variables for each factor are: Factor 1, Autonomy, Influence, Achievement, Expectations and Work Quality; Factor 2, Occupational Distress and Job Satisfaction (both related to Commitment); Factor 3, includes Engagement only. It seems that the Engagement variable (Factor 3) has an insignificant relationship with all other customer orientation variables, including Achievement (i.e. Factor 1 and Factor 2).

Table 6.2 is the Customer orientation value rotated component matrix that shows Creativity, Communication and Customer needs categories and their variables within Factor 1, except for the Engagement variable, which is within Factor 3, and the Commitment category has formed Factor 2. Indeed, Factor 1 and Factor 2 are correlated as there are significant correlations between all Customer orientation categories and their linked variables (Table 6.1). It has been concluded that although EFA has separated Commitment variables into a separate factor, this has links with other variables in Factor 1. Thus, it has been decided to treat Commitment as a distinct and related axis of Customer orientation.

Customer Orientation Value

Category	Variable		Creativity		Commitment		Communication	Customer needs	
		Variable	Autonomy	Influence	Occupational Distress	Job Satisfaction	Achievement	Expectations	Work Quality
Creativity	Autonomy	Pearson Correlation	1	.570**	.210	.176	.193	.571**	.591**
		Sig. (2-tailed)		.001	.274	.361	.317	.001	.001
	Influence	Pearson Correlation	.570**	1	.361	.183	.455*	.660**	.707**
		Sig. (2-tailed)	.001		.054	.343	.013	.000	.000
Commitment	Occupational Distress	Pearson Correlation	.210	.361	1	.679**	.011	.407*	.549**
		Sig. (2-tailed)	.274	.054		.000	.956	.028	.002
	Job Satisfaction	Pearson Correlation	.176	.183	.679**	1	-.190	.116	.370*
		Sig. (2-tailed)	.361	.343	.000		.324	.550	.048
Communication	Achievement	Pearson Correlation	.193	.455*	.011	-.190	1	.356	.231
		Sig. (2-tailed)	.317	.013	.956	.324		.058	.228
Customer needs	Expectations	Pearson Correlation	.571**	.660**	.407*	.116	.356	1	.684**
		Sig. (2-tailed)	.001	.000	.028	.550	.058		.000
	Work Quality	Pearson Correlation	.591**	.707**	.549**	.370*	.231	.684**	1
		Sig. (2-tailed)	.001	.000	.002	.048	.228	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Total number (N) for all variables is 29

Table 6.1 The Significant Variables of the Correlation Matrix for Customer Orientation.

Moreover, the Commitment category represents variables, which are related to employees who are using the ECM workflow system to support customers (users) in order to meet business objectives, as described by Aghdasi *et al.* (2011) and Malhotra *et al.* (2013). Whereas, the Creativity, Communication and Customer needs categories are more related to customers who need the ECM workflow system and employees support (i.e. managers, administrators) in order to provide the required services. This explains the distinction made by the EFA. Indeed, the Martins and Martins (2002) and Sousa and Coelho (2011) studies have shown that Creativity has benefits to customers as it increases their satisfaction by considering customer issues with more diverse, flexible and customised ECM workflow solutions. Also, the Leo and Russell-Bennett, (2014) and Škrinjar and Trkman (2013) studies

have demonstrated that Communication supports customers by providing them with full open information to establish trust and manage relationships. This contributes to the ECM workflow system's success in meeting business objectives and promotes credibility, honesty, fairness and kindness.

Customer Orientation Value		Factor		
Category	Variables	**1**	**2**	**3**
Creativity	**Autonomy**	.712		
	Influence	.872		
Commitment	**Occupational Distress**		.820	
	Job Satisfaction		.900	
Communication	**Engagement**			.936
	Achievement	.649		
Customer needs	**Expectations**	.833		
	Work Quality	.778		

Factor 1 category / variable

Factor 2 category / variable

Factor 3 category / variable

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.a

a. Rotation converged in 5 iterations.

Table 6.2 The Rotated Component Matrix for Customer Orientation.

Indeed, the Customer needs variable ensures that customers receive the right quality of information to meet the optimum level of service (Chuang and Lin, 2013; Korunka *et al.*, 2007). This supports customer relationship management (CRM) performance by confirming that employees conduct meets the required work quality and expectations.

Overall, the EFA for the variables of Customer orientation validated the contributions of each identified variable apart from Engagement. The EFA framework confirmed that all variables have significant correlations between them, except Engagement (Table 6.2). This variable has no relationship even with the Achievement variable of the Communication category. As a result, factors 1 and 2 are seen as representing different aspects of Customer orientation, and so both contribute to the Customer orientation value. Thus, Customer orientation categories and their significant variables have relationships that can measure the Customer orientation value of an ECM workflow system performance.

6.2.1.2 Changes to Variables of Excellence

The variables of the Excellence value have shown an overall significant correlation (Section 5.3.2). The correlation matrix for Excellence in Table 6.3 shows significant relationships between all variables at the 0.01 level (**). Also, the KMO and Bartlett's Test in Table 5.11

shows that the variables of the Excellence value are sufficiently correlated, with the adequacy of 0.894, and a significant Bartlett's sphericity value of p = 0.000. Hence, it has been confirmed that the recognised variables are correlated with each other, and the EFA is a suitable analytical process for this study data. Also, the observation of the scree plot for Excellence confirms that only one factor can be recognised, and the orthogonal rotation analysis has extracted one factor (Figure 5.5).

Excellence Value			Efficiency Rate	Efficiency Performance	Effectiveness Rate	Effectiveness Performance	Service Quality	Controls	CFP	Employee Initiative
Category	Variable									
Efficiency	Efficiency Rate	Pearson Correlation	1	.811**	.898**	.562**	.850**	.607**	.602**	.659**
		Sig. (2-tailed)		.000	.000	.001	.000	.000	.001	.000
	Efficiency Performance	Pearson Correlation	.811**	1	.863**	.633**	.787**	.597**	.638**	.681**
		Sig. (2-tailed)	.000		.000	.000	.000	.001	.000	.000
Effectiveness	Effectiveness Rate	Pearson Correlation	.898**	.863**	1	.625**	.846**	.668**	.611**	.667**
		Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000
	Effectiveness Performance	Pearson Correlation	.562**	.633**	.625**	1	.694**	.618**	.557**	.700**
		Sig. (2-tailed)	.001	.000	.000		.000	.000	.002	.000
Empowerment	Service Quality	Pearson Correlation	.850**	.787**	.846**	.694**	1	.778**	.750**	.812**
		Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000
	Controls	Pearson Correlation	.607**	.597**	.668**	.618**	.778**	1	.744**	.729**
		Sig. (2-tailed)	.000	.001	.000	.000	.000		.000	.000
Employee orientation	CFP	Pearson Correlation	.602**	.638**	.611**	.557**	.750**	.744**	1	.834**
		Sig. (2-tailed)	.001	.000	.000	.002	.000	.000		.000
	Employee Initiative	Pearson Correlation	.659**	.681**	.667**	.700**	.812**	.729**	.834**	1
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	

**. Correlation is significant at the 0.01 level (2-tailed).
Total number (N) for all variables is 29

Table 6.3 The Significant Variables of the Correlation Matrix for Excellence.

Overall, Excellence variables have shown highly significant relationships. Notably, the Efficiency and Effectiveness categories and their variables. Table 6.3 shows Efficiency Rate and Efficiency Performance variables are correlated to Effectiveness Rate by 0.898** and 0.863**, which is a highly significant relationship. Also, Efficiency and Empowerment categories show a highly significant relationship, as the Efficiency Rate and Efficiency Performance variables are correlated to Service quality by 0.850** and 0.787**. Hence, all the recognised variables contribute positively to the assessment of Excellence value.

6.2.1.3 Changes to Variables of Responsibility

Variables of the Responsibility value have shown significant correlation apart from the Sustainability variable (Section 5.3.3). The correlation matrix in Table 5.12 shows significant relationships between all variables at both levels, p = 0.01 (**) and p = 0.05 (*), excluding the Sustainability variable where insignificant correlations have been noticed with all other variables. Hence, it has been confirmed that the recognised Responsibility variables are correlated with each other, as these variables have achieved significant relationships except for the Sustainability variable (Table 6.4).

Responsibility Value			Category	Responsiveness		Result orientation		Right quality		Right skills		
Category	Variable		Variable	Response	Response Time	Results Time	Manageability	Quality Management	TTC	Skills Allocation	Employee Skills
Responsiveness	Response	Pearson Correlation	1		.448*	.510**	.561**	.624**	.472**	.623**	.304
		Sig. (2-tailed)			.015	.005	.002	.000	.010	.000	.108
	Response Time	Pearson Correlation	.448*		1	.787**	.752**	.573**	.525**	.273	.275
		Sig. (2-tailed)	.015			.000	.000	.001	.003	.152	.150
Result orientation	Results Time	Pearson Correlation	.510**	.787**		1	.788**	.642**	.538**	.185	.266
		Sig. (2-tailed)	.005	.000			.000	.000	.003	.336	.163
	Manageability	Pearson Correlation	.561**	.752**	.788**		1	.723**	.599**	.386*	.423*
		Sig. (2-tailed)	.002	.000	.000			.000	.001	.039	.022
Right quality	Quality Management	Pearson Correlation	.624**	.573**	.642**	.723**		1	.610**	.582**	.466*
		Sig. (2-tailed)	.000	.001	.000	.000			.000	.001	.011
Right skills	TTC	Pearson Correlation	.472**	.525**	.538**	.599**	.610**		1	.348	.632**
		Sig. (2-tailed)	.010	.003	.003	.001	.000			.064	.000
	Skills Allocation	Pearson Correlation	.623**	.273	.185	.386*	.582**	.348		1	.390*
		Sig. (2-tailed)	.000	.152	.336	.039	.001	.064			.037
	Employee Skills	Pearson Correlation	.304	.275	.266	.423*	.466*	.632**	.390*		1
		Sig. (2-tailed)	.108	.150	.163	.022	.011	.000	.037		

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
Total number (N) for all variables is 29

Table 6.4 The Significant Variables of the Correlation Matrix for Responsibility.

In detail, the KMO and Bartlett's Test in Table 5.13 shows the Responsibility variables are highly correlated, with the adequacy of 0.809, and a significant Bartlett's sphericity value of p = 0.000. Also, the observations of outputs from the scree plot in Figure 5.6 and the total

variance in Table 5.14 have confirmed that only two factors are recognised. These factors are: Factor 1 with 37.71% of the data variation; Factor 2 with nearly 30% of the data variation. Both Factor 1 and Factor 2 together explain a total of 67% of the data variation.

Further, the rotated component matrix in Table 5.15 confirms that two allied factors are recognised. The variables for each factor are: Factor 1, which includes Response, Manageability, Quality Management, TTC, Skills Allocation and Employee Skills; Factor 2, which includes Response Time, Results Time, Manageability and Sustainability. These factors have a close relationship through sharing the Manageability variable. Also, the rotated component matrix in Table 6.5 shows that all categories contribute to both factors excluding the Right Skills category and its variables, which represent Factor 1 (core factor).

Responsibility Value		Factor	
Category	Variables	**1**	**2**
Responsiveness	**Response**	.690	
	Response Time		**.759**
Result orientation	**Results Time**		**.866**
	Manageability	**.601**	**.659**
Right Quality	**Sustainability**		**.666**
	Quality Management	.714	
	TTC	.746	
Right Skills	**Skills Allocation**	.767	
	Employee Skills	.725	

Factor 1 category / variable
Factor 2 category / variable
Cross factors category / variable

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.[a]
a. Rotation converged in 3 iterations.

Table 6.5 The Rotated Component Matrix for Responsibility.

Furthermore, Responsiveness has Response at Factor 1 and Response Time at Factor 2; Result orientation has Results Time at Factor 2 and Manageability at both factors; Right Quality has Sustainability at Factor 2 and Quality Management at Factor 1. This shows the existence of significant relationships between Responsibility categories and variables, which supports the view that these factors can be considered as linked, but slightly different perspectives of the Responsibility value. Hence, the Responsibility value represents a single factor. Indeed, Factor 1 variables (i.e. Response, Manageability, Quality Management, TTC, Skills Allocation and Employee Skills) represent variables, which are more related to employees' responsibility (Danese *et al.*, 2013; De Waal, 2010; e Silva and Costa, 2013; Jinhui Wu *et al.*, 2011). Factor 2 variables (i.e. Response Time, Results Time, Manageability, Sustainability) represent variables, which focus on the ECM workflow system responsibility (De Waal, 2010; Gu *et al.*, 2014; Schmiedel *et al.*, 2013; Staiculescu, 2014).

Moreover, the research literature review revealed that Responsibility motivates employees to be accountable for their tasks, but they require BPM workflow systems to enable individuals to meet their organisational goals (Section 2.6.2.3). Thus, the EFA has validated all variables as significantly contributing aspects that measure the Responsibility value.

6.2.1.4 Changes to Variables of Teamwork

Teamwork variables show significant inter-variable correlation (Section 5.3.4). According to the correlation matrix for the Teamwork value in Table 6.6, significant relationships occur between all variables at both levels, p = 0.01 (**) and p = 0.05 (*).

Teamwork Value			Transparency		Transformational leadership		Transactional leadership		Team collaboration	
Subcategory	Variable	Variable	Authentic Leadership	Trust	TLI	CFC	CFC	QWL	Team Productivity	Team Learning
Transparency	Authentic Leadership	Pearson Correlation	1	.747**	.582**	.705**	.622**	.875**	.641**	.528**
		Sig. (2-tailed)		.000	.001	.000	.000	.000	.000	.003
	Trust	Pearson Correlation	.747**	1	.434*	.780**	.623**	.708**	.576**	.589**
		Sig. (2-tailed)	.000		.019	.000	.000	.000	.001	.001
Transformational leadership	TLI	Pearson Correlation	.582**	.434*	1	.410*	.466*	.499**	.503**	.458*
		Sig. (2-tailed)	.001	.019		.027	.011	.006	.005	.012
	CFC	Pearson Correlation	.705**	.780**	.410*	1	.871**	.729**	.780**	.700**
		Sig. (2-tailed)	.000	.000	.027		.000	.000	.000	.000
Transactional leadership	CFC	Pearson Correlation	.622**	.623**	.466*	.871**	1	.685**	.739**	.763**
		Sig. (2-tailed)	.000	.000	.011	.000		.000	.000	.000
	QWL	Pearson Correlation	.875**	.708**	.499**	.729**	.685**	1	.583**	.587**
		Sig. (2-tailed)	.000	.000	.006	.000	.000		.001	.001
Team collaboration	Team Productivity	Pearson Correlation	.641**	.576**	.503**	.780**	.739**	.583**	1	.639**
		Sig. (2-tailed)	.000	.001	.005	.000	.000	.001		.000
	Team Learning	Pearson Correlation	.528**	.589**	.458*	.700**	.763**	.587**	.639**	1
		Sig. (2-tailed)	.003	.001	.012	.000	.000	.001	.000	

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
Total number (N) for all variables is 29

Table 6.6 The Significant Variables of the Correlation Matrix for Teamwork.

Further, the KMO and Bartlett's Test in Table 5.17 shows that variables of the Teamwork value are correlated with the adequacy of 0.843 and a significant Bartlett's sphericity value of p = 0.000. Hence, it has been confirmed that the identified variables are sufficiently

correlated to allow a meaningful EFA. Observation of the scree plot in Figure 5.7 and the orthogonal rotation analysis have confirmed that only one factor can be extracted.

In detail, Teamwork variables have shown significant relationships with each other. Particularly, Transparency, Transformational leadership and Transactional leadership categories and their variables. Table 6.6 shows, the Authentic Leadership and Trust are correlated to CFC by 0.705** and 0.780**. This confirms a significant relationship between Transparency and Transformational leadership. Also, Authentic Leadership and Trust are correlated to QWL by 0.875** and 0.708**, which confirms a significant relationship between Transparency and Transactional leadership.

To summarise, applying explanatory factor analysis on the variables of the Teamwork value has revealed coherence and significance in their relationships. The correlation matrix for Teamwork in Table 6.6 shows significant correlations across all recognised variables.

6.2.2 An Overall Interpretation of the EFA

The effects of CERT business process management values in business practice have been recognised through the implementation of the EFA framework. Each CERT value shows a correlation between its recognised variables with the exception of the Engagement variable.

To clarify, the research literature confirmed that Engagement is part of the Communication category and Customer orientation value. However, the implementation of the EFA has resulted in the exclusion of Engagement. Indeed, Engagement has not been correlated to any other Customer orientation variable and presented insignificant relationships with all variables (Section 6.2.1.1). In other words, the Engagement variable seems to measure a concept not related to other suggested Customer orientation variables. Table 6.7 shows the overall changes to variables of CERT values after applying the EFA framework.

The research EFA framework validated the variables, which are used to establish CERT values for measuring workflow information systems performance. The Schmiedel *et al.* (2014) study supports using CERT values as an organisational BPM culture concept that can be implemented for measuring the workflow system to improve BPM performance. Thus, it is clear that the examination of variables of each CERT value using the EFA reveals insights, which show the importance of each variable and the relationships between these variables (Schmiedel et al., 2015). Also, all variables had positive correlations with each other showing a direct positive influence between variables in each CERT value.

BPM Value	Category	Variables
Customer Orientation	Creativity	Autonomy | Influence
	Commitment	Occupational Distress | Job Satisfaction
C	Communication	Achievement
	Customer Needs	Expectations | Work Quality
Excellence	Efficiency	Efficiency Rate | Efficiency Performance
	Effectiveness	Effectiveness Rate | Effectiveness Performance
E	Empowerment	Service Quality | Controls
	Employee Orientation	CFP | Employee Initiative
Responsibility	Responsiveness	Response | Response Time
	Result Orientation	Results Time | Manageability
R	Right Quality	Sustainability | Quality Management
	Right Skills	TTC | Skills Allocation | Employee Skills
Teamwork	Transparency	Authentic Leadership | Trust
	Transformational Leadership	TLI | CFC
T	Transactional Leadership	CFC | QWL
	Team Collaboration	Team Productivity | Team Learning

Table 6.7 Exploratory Factor Analysis Changes to CERT Variables.

CERT values as a BPM construct can be used to find the workflow KPIs in order to recognise the performance features of the ECM workflow system to improve the system in achieving organisational goals. For instance, the HEI research projects approval process uses the RAS to manage the process of each project. Therefore, the RAS customer needs (external effect) and effectiveness (internal effect) can be evaluated by examining the Customer orientation and Excellence values. According to the EFA results, the suggested variables for each CERT value identified from published studies in the research literature review have significant correlation and the only contradiction is with the suggestion of Leo and Russell-Bennett (2014) that Engagement correlated to Customer orientation. These studies are listed in tables, as Customer orientation in Table 2.9, Excellence in Table 2.10, Responsibilities in Table 2.11 and Teamwork in Table 2.12.

In conclusion, the applied EFA framework illustrates that all variables of each CERT value have important relationships within their allocated CERT value, excluding the Engagement variable (Table 6.7). The list of CERT value categories and their variables are able to measure ECM workflow system performance. Based on each CERT value's set of variables, it is possible to evaluate BPM workflow systems using these variables as KPIs to find improvements, boost business performance, and achieve BPM success (Schmiedel *et al.*, 2013, 2015). Hence, CERT values and their recognised variables are key performance dimensions to implement a performance measurement and management framework.

6.3 Workflow System Performance Evaluation

Examining the workflow information system performance is essential to discover how the organisational performance can achieve business objectives and find the strengths of the BPM workflow structure and focus (Kohlbacher *et al.*, 2013; Schmiedel *et al.*, 2014).

Further, the research Round III applied CERT values and the competitive values framework for performance measurement and management in order to weigh the study results (Section 3.6.3). Also, the Schmiedel *et al.* (2013, 2015) studies on organisation cultural values in BPM have examined CERT values by the use of the CVF multidimensional as a PMM framework to measure BPM workflow system performance (Figure 3.9).

Furthermore, the organisational culture assessment instrument has been constructed using the CVF to evaluate an organisation's cultural BPM values (Patterson et al., 1997, Chapter 3; Schmiedel et al., 2015). Both the CVF and CERT values can provide insights on the current levels of the BPM workflow system performance and identify areas of improvement to boost organisational performance. Therefore, the CERT values in the performance measurement and management framework has been implemented to be executed as an OCAI (Figure 3.9).

Moreover, after the research Round I and Round II, the research PMM framework (Round III) was implemented to evaluate the ECM workflow approval systems (i.e. EAS, RAS) performance based on the results of weighing the findings (Section 5.6). Consequently, the CVF four primary quadrants have been applied to the research findings of CERT values (Figure 5.8). Also, the two key axes of the CVF are discussed in relation to their dimensions, which are used to provide the final assessment scores for the ECM workflow approval systems performance.

Lastly, the PMM framework results are collected to make an ECM workflow system performance profile using the OCAI, which is supported by Cameron and Quinn (2011, Chapter 2). This provides the "Now" (present) and the "Preferred" (future) situations of the ECM workflow system based on the CVF scores. The final OCAI scores table can be used to improve ECM workflow system performance (Table 6.8). The OCAI scores table can also be used to improve the organisation's BPM performance by making the employees aware of the current levels of the CERT values. Further details about the use of the research results and contributions to business practice are explained in Section 7.3 (chapter 7).

6.3.1 Workflow System Structure

The structure of the ECM workflow system is the first axis of the CVF. This seeks to assess flexibility using the Excellence value and stability using the Responsibility value (Figure 6.1). Both, the Excellence and Responsibility values final score using the Likert scale can provide the scores for the structure of the ECM workflow system performance.

According to Schmiedel *et al.* (2013, 2015), the flexibility of the ECM workflow system structure can be measured using the Excellence value. Conversely, the stability of the workflow system structure can be measured using the Responsibility value. Together, flexibility and stability of the ECM workflow system can provide the final scale, which is used as a score (level) to measure the ECM workflow system structure (Figure 6.1). The following sections provide more details about the way to assess flexibility and stability.
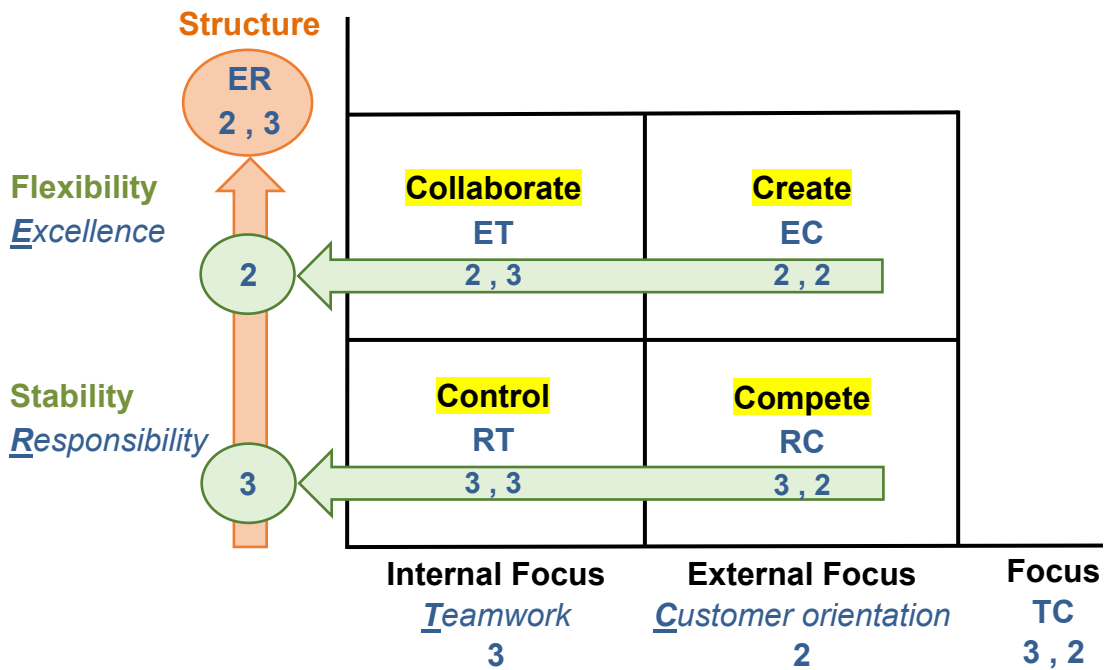
Rate ranges are: Strongly Agree = 1, Agree = 2, Neither = 3, Disagree = 4, Strongly Disagree = 5

Figure 6.1 The Structure Scales of the ECM Workflow Approval System.

The ECM workflow system structure was assessed at an ER of (2, 3), (Figure 6.1). This validates the workflow system structural quality to achieve the Excellence and Responsibility requirements of the organisational strategy and goals. In detail, "Agree" (2) demonstrates agreement about achieving the required tasks, but some improvements are required to be more efficient and effective; where the "Neither" (3) response indicates that the workflow system structure requires further improvements to ensure fulfilling the responsibility for supporting staff to achieve their tasks and meet the organisational objectives smoothly.

6.3.1.1 Workflow System Flexibility

The ECM workflow system structure has flexibility, which can be assessed by measuring the collaborate and create characteristic dimensions of the organisational culture in relation to CERT values (Schmiedel *et al.*, 2015). The collaborate dimension is connected to the Excellence and Teamwork (ET) values, which are assessed at an ET of (2, 3), (Figure 6.1).

Further, the create dimension is connected to the Excellence and Customer orientation (EC) values, which are assessed at an EC of (2, 2). Thus, the combination of CERT values that describes the collaborate and create dimensions of the ECM workflow system is the collection of ET and EC scores (i.e. 2, 3, 2, 2). This confirms that flexibility has a modal response of "Agree" (2).

6.3.1.2 Workflow System Stability

The ECM workflow system structure has stability, which can be assessed by measuring the control and compete characteristic dimensions of organisational culture in relation to CERT values (Schmiedel *et al.*, 2015). The control dimension is connected to Responsibility and Teamwork (RT) values. This has been assessed at an RT of (3, 3), (Figure 6.1). The compete dimension is connected to Responsibility and Customer orientation (RC) values. This dimension is assessed at an RC of (3, 2). Thus, the combination of CERT values that describes the control and compete dimensions of the ECM workflow system is the collection of RT and RC scores (i.e. 3, 3, 3, 2). This confirms that stability has a modal response of "Neither" (3).

6.3.2 Workflow System Focus

The focus of the ECM workflow system is the second axis of the CVF. This seeks to assess the internal focus using the Teamwork value and the external focus using the Customer orientation value (Figure 6.2). Both, the Teamwork and Customer orientation (TC) values final Likert scales provide the scores for the focus of the ECM workflow system performance. The Schmiedel *et al.* (2013, 2015) studies confirmed that the internal focus of the ECM workflow system focus can be measured using the Teamwork value. Conversely, the external focus of the ECM workflow system focus can be measured using the Customer orientation value. Together, the internal focus and external focus of the ECM workflow system are able to provide the final scale, which can be used as a score (level) to measure the ECM workflow system focus. The following sections provide more details about the approach, which is used in to assess the internal focus and external focus dimensions.
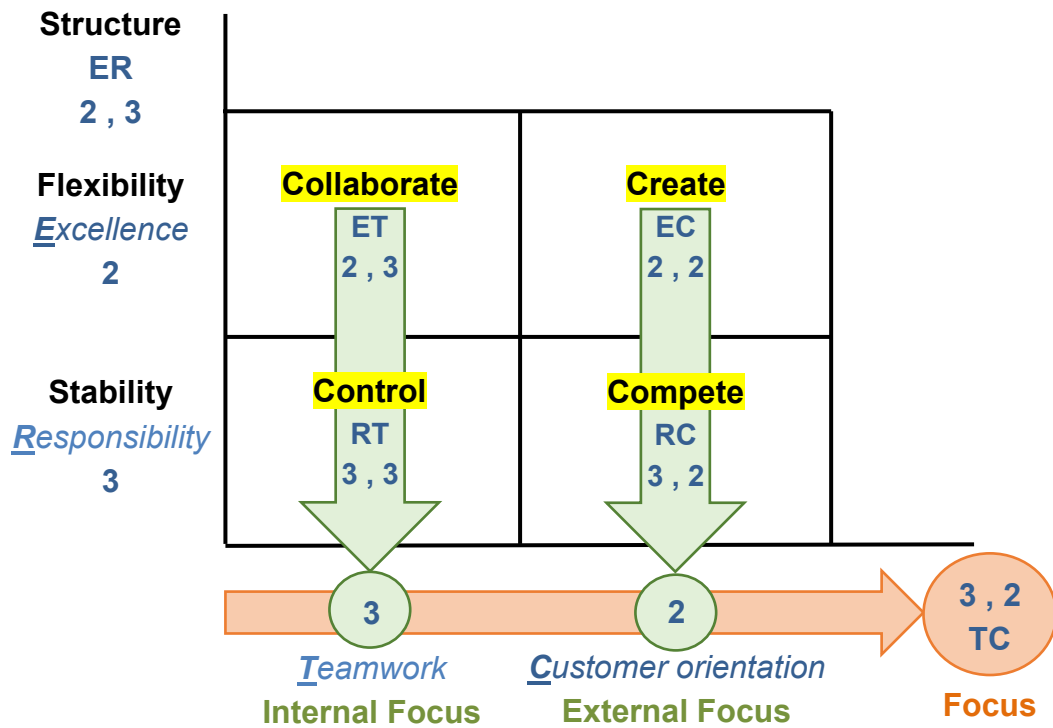
Rate ranges are: Strongly Agree = 1, Agree = 2, Neither = 3, Disagree = 4, Strongly Disagree = 5

Figure 6.2 The Focus Scales of the Workflow Approval System.

The ECM workflow system focus assessed at TC of (3, 2). This proves (validates) the ECM workflow system focus meets the Teamwork and Customer orientation requirements of the organisational goals. "Neither" (3) demonstrates that the ECM workflow system could make sufficient teamwork activities in order to achieve the required organisational internal focus. Conversely, "Agree" (2) indicates acceptable (satisfactory) Customer orientation processes to achieve the organisation's external focus and objectives.

6.3.2.1 Workflow System Internal Focus

The internal focus of the ECM workflow system focus can be assessed by measuring the collaborate and control characteristic dimensions of the organisational culture in relation to CERT values (Schmiedel *et al.*, 2015). The collaborate dimension is connected to Excellence and Teamwork (ET). This dimension assessed at ET of (2, 3), (Figure 6.2). The control dimension is connected to Responsibility and Teamwork (RT). This dimension was assessed at RT of (3, 3). Thus, the combination of CERT values that describe the collaborate and control dimensions of the ECM workflow system is the collection of ET and RT scores (i.e. 2, 3, 3, 3). This confirms that the internal focus has a modal response of "Neither" (3).

6.3.2.2 Workflow System External Focus

The external focus of the ECM workflow system structure can be assessed by measuring the create and compete characteristic dimensions of the organisational culture in relation to CERT values (Schmiedel *et al.*, 2015). The create dimension is connected to Excellence and Customer orientation (EC). This dimension was assessed at EC of (2, 2), (Figure 6.2). The compete dimension is connected to Responsibility and Customer orientation (RC). This dimension was assessed at RC of (3, 2). Thus, the combination of CERT values that describe the create and compete dimensions of the ECM workflow system is the collection of EC and RC scores (i.e. 2, 2, 3, 2). This confirms that the external focus has a modal response of "Agree" (2).

6.3.3 Workflow Information Systems Performance Profile

The PMM framework consists of the CVF four quadrants, which are implemented to provide the OCAI scores based on variables of each CERT value (Cameron and Quinn, 2011, Chapter 2). These scores can be used as KPIs to recognise the "Now" and "Preferred" situations (Table 6.8). This provides workflow system measurements that indicate where to improve ECM workflow system performance. Hence, the CERT values in the PMM framework can be used to produce an OCAI current performance profile (Figure 3.9).

The research findings revealed no "Strongly agree" (1) among all CERT values. In contrast, only the QWL variable received "Strongly disagree" (5) as a Transactional leadership variable of the Teamwork value. Table 6.8 illustrates how CERT values as KPIs in the PMM framework can be used to recognise the OCAI to develop a profile for improving ECM workflow systems performance (Schmiedel *et al.*, 2013, 2015). Also, the OCAI profile provides a set of indications by showing the current (now) and future (preferred) situations, as well as three future improvement levels (FILs) to improve ECM workflow systems performance. The three future improvement levels are: First FIL is improving "Agree" (2) to "Strongly Agree" (1); Second FIL is improving "Neither" (3) to "Agree" (2); Third FIL is improving "Strongly disagree" (5) or "Disagree" (4) to "Neither" (3). The objective of the three FILs is to improve all dimensions of the profile by one level and all disagreements to at least a neutral ("Neither") score.

Further, the CERT values in the PMM framework provides an OCAI current ECM workflow approval systems profile (Table 6.9). This simplifies the "Now" and "Preferred" situations of the BPM complementary variables for improving the ECM workflow systems performance.

In detail, the "Now" situation of the Customer orientation value is Agree (2), which reveals satisfactory WIS performance, as shown in Table 6.8. The research findings illustrated that all Customer orientation categories are Agree (2), and only the Occupational distress variable is Neither (3). Thus, only one aspect is identified to improve from 3 to 2 (second FIL), and therefore, all other aspects of the Customer orientation value are Agree (2), and these are preferred to improve from 2 to 1 (first FIL).

BPM Value	Category	Variable	Variable Now	Variable Preferred	Category Now	Category Preferred	BPM Value Now	BPM Value Preferred
Customer orientation	Creativity	Autonomy	2	1	2	1	2	1
		Influence	2	1				
	Commitment	Occupational Distress	3	2	2	1		
		Job Satisfaction	2	1				
	Communication	Achievement	2	1	2	1		
	Customer Needs	Expectations	2	1	2	1		
		Work Quality	2	1				
Excellence	Efficiency	Efficiency Rate	2	1	2	1	2	1
		Efficiency Performance	3	2				
	Effectiveness	Effectiveness Rate	2	1	2	1		
		Effectiveness Performance	2	1				
	Empowerment	Service Quality	2	1	2	1		
		Controls	3	2				
	Employee Orientation	CFP	2	1	3	2		
		Employee Initiative	3	2				
Responsibility	Responsiveness	Response	3	2	3	2	3	2
		Response Time	3	2				
	Result Orientation	Results Time	3	2	2	1		
		Manageability	2	1				
	Right Quality	Sustainability	3	2	3	2		
		Quality Management	3	2				
	Right Skills	TTC	2	1	2	1		
		Skills Allocation	3	2				
		Employee Skills	2	1				
Teamwork	Transparency	Authentic Leadership	3	2	3	2	3	2
		Trust	2	1				
	Transformational Leadership	TLI	3	2	3	2		
		CFC	2	1				
	Transactional Leadership	CFC	2	1	3	2		
		QWL	5	3				
	Team Collaboration	Team Productivity	3	2	3	2		
		Team Learning	2	1				

Rate ranges are: Strongly Agree = 1, Agree = 2, Neither = 3, Disagree = 4, Strongly Disagree = 5
Notations of the FILs: First, Second, **Third**

Table 6.8 CERT Values OCAI Profile for the Workflow Approval Systems.

Furthermore, the "Now" situation of the Excellence value is Agree (2), which is satisfactory performance. Excellence categories scored Agree (2) with the exception of Employee orientation, which is Neither (3). Also, Efficiency Performance, Controls, and Employee initiative variables scored Neither (3) as their "Now" situation. Thus, the Employee orientation category and three variables are required to improve to the second FIL, and all other variables preferred to improve to the first FIL. Hence, the Excellence value and all its categories, except for Employee orientation, are preferred to improve to the first FIL.

Moreover, the "Now" situation of the Responsibility value is "Neither" (3), which shows an average performance (Table 6.8). This comes as a result of the Responsibility categories as two scored "Neither" (3) and two others scored "Agree" (2). Also, six Responsibility variables scored Neither (3), and only three others scored "Agree" (2). Thus, two categories and six variables are highlighted to improve to the second FIL, and the other two categories and three variables required to improve to the first FIL. Overall, the Responsibility value is required to improve to the second FIL.

Finally, the "Now" situation of the Teamwork value is "Neither" (3), which shows an average performance (Table 6.8). Actually, all the Teamwork value categories "Now" situation scored "Neither" (3). Also, the findings of the Teamwork value variables have shown varying results, as the QWL variable received "Strongly disagree" (5), three variables received "Neither" (3) and four variables received "Agree" (2). Thus, the QWL variable is preferred to improve to the third FIL. The Authentic Leadership, TLI, and Team Productivity variables, along with all Teamwork value categories are required to improve to the second FIL. Overall, the Teamwork value required to improve to the second FIL.

WIS Dimensions	BPM Complementary Aspects	Now	Preferred
Structure	Flexibility (Excellence)	**2**	**1**
	<u>Stability (Responsibility)</u>	<u>3</u>	<u>2</u>
Focus	<u>Internal Focus (Teamwork)</u>	<u>3</u>	<u>2</u>
	External Focus (Customer Orientation)	**2**	**1**

Rate ranges are: Strongly Agree = 1, Agree = 2, Neither = 3, Disagree = 4, Strongly Disagree = 5
Notations of the FILs: **First**, <u>Second</u>, Third

Table 6.9 OCAI Scoring Profile of the Workflow Approval Systems.

The calculation of the four action imperatives (CERT values) provide scores for the "Now" and "Preferred" situations to measure complementary aspects of BPM, which balance them with their dimensions to improve the ECM workflow system performance (Table 6.9).

Indeed, the BPM workflow systems complementary aspects (i.e. Flexibility, Stability, Internal Focus, External Focus) can be improved by the CERT values action imperatives, which are connected to them (Schmiedel *et al.*, 2015). Hence, CERT values can be used to improve the ECM workflow system performance from the "Now" situation to the "Preferred" situation using the PMM multidimensional framework (Figure 6.3).
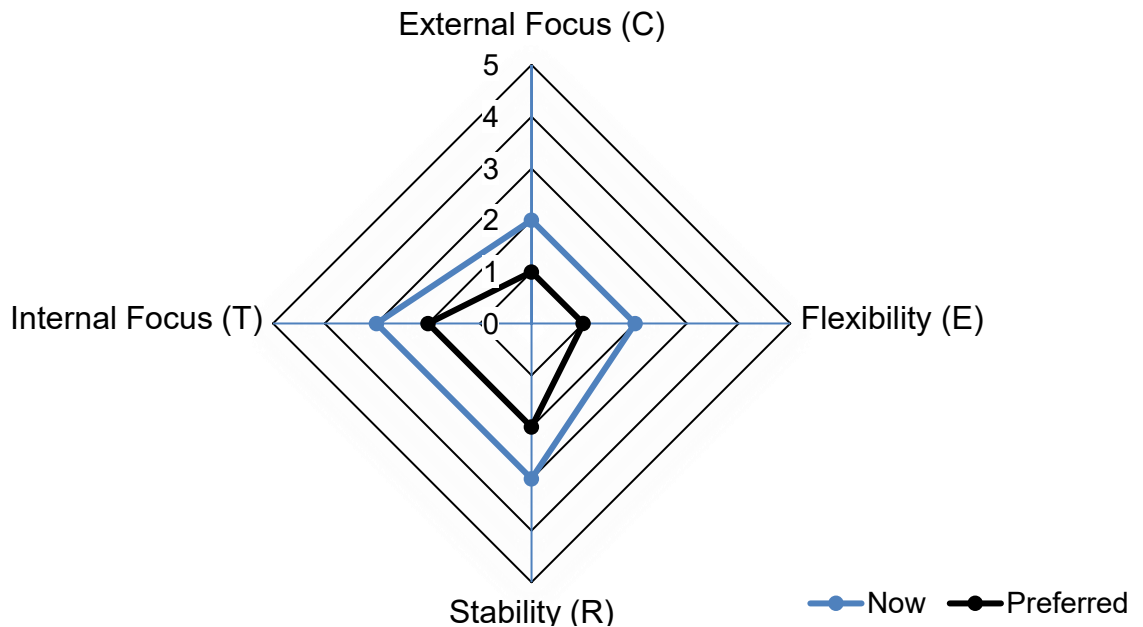
Figure 6.3 A Spider Diagram of the OCAI Profile for the Workflow Approval Systems.

The current OCAI scoring profile shows the "Now" scores of CERT values in relation to CVF aspects and dimensions in Figure 6.3. As a result, the ECM workflow approval systems structure profile shows a satisfactory level of Flexibility (Excellence) and an average level of Stability (Responsibility). Predictably, the preferred Structure situations are to improve Flexibility towards the first FIL and Stability towards the second FIL.

Conversely, the ECM workflow approval systems Focus profile shows an average level of Internal Focus (Teamwork) and satisfactory level of External Focus (Customer orientation). Predictably, the preferred Focus would be to improve the Internal Focus towards the second FIL and the External Focus towards the first FIL.

6.4 Testing of Assumptions and Hypotheses

The final stages of examining the research assumptions and hypotheses will be explained in this section to prove the reliability of applying CERT values to improve ECM workflow system performance. Theoretically, the research assumptions and hypotheses are formulated for predicting the relationships and levels of significance between CERT values,

categories and variables (Saunders *et al.*, 2009, Chapter 5, 2015, Chapter 5). Practically, before testing the basic assumptions and hypotheses, a comparison between the results from the EFA and the descriptive statistical analysis has been conducted to support the research findings and contributions (Field, 2013, 2009, Chapter 7). This comparison confirms the significance of relationships and levels of confidence for each CERT value to meet the research objective five (RO5). Hence, the CERT values can be applied to confirm the research hypotheses and performance evaluation strategic framework (Figure 2.7).

Finally, the research hypotheses have been tested using the collected analytical insights and empirical evidence to verify how CERT values impact on ECM workflow system performance. This generates a variety of interpretations and discussions, which are added to the research contributions and conclusions (details in chapter 7).

6.4.1 Comparison of EFA and Descriptive Analysis Results

The research data analysis methodology and methods provided results using descriptive statistical analysis and exploratory factor analysis. These have provided analytical insights to validate the impact of CERT values on ECM workflow system performance in order to achieve RO5. Also, the descriptive statistical analysis results consist of general descriptive statistics (Table 5.1) and Mann-Whitney U tests (Section 5.2) for CERT values (Field, 2013, Chapter 6; Saunders *et al.*, 2015, Chapter 12). The EFA results consist of four analytical procedures that recognise the significant relationships between variables of each CERT value (Section 5.3). These analytical results are used to provide the research findings.

The Customer orientation value general descriptive statistical analysis results have shown a 2.80 mean, a standard deviation of 0.97 and a range from "Strongly agree" (1) to "Strongly disagree" (5). Also, the Mann-Whitney U test showed that the responses from both ECM workflow approval systems have insignificant differences (Table 5.2). The EFA confirmed that only the Engagement variable should be excluded (Section 6.2.1.1). This confirms that all identified variables, excluding Engagement, contribute to the Customer orientation value.

The Excellence value general descriptive statistical analysis results have shown a 3.22 mean, a standard deviation of 1.123 and a range from "Agree" (2) to "Strongly disagree" (5). The Mann-Whitney U test showed that the responses from both ECM workflow approval systems have insignificant differences except for the Employee initiative variable (Table 5.3). Overall, the EFA confirmed that all the identified variables contribute to the Excellence value.

The Responsibility value general descriptive statistical analysis results have shown a 3.00 mean, a standard deviation of 0.845 and a range from "Agree" (2) to "Strongly disagree" (5). Also, the Mann-Whitney U test showed that the responses from both ECM workflow approval systems have insignificant differences, except for the Sustainability variable (Table 5.4). Consequently, the EFA correlation matrix procedure confirms that only the Sustainability variable has an insignificant correlation with other variables, but other EFA confirmed that all the identified variables contribute to the Responsibility value (Table 6.4).

The Teamwork value general descriptive statistical results have shown a 3.36 mean, a standard deviation of 1.085 and a range from "Agree" (2) to "Strongly disagree" (5). The Mann-Whitney U test showed that the responses from both ECM workflow approval systems have insignificant differences, except for the TLI variable (Table 5.5). However, the EFA confirmed that all the identified variables contribute to the Teamwork value.

Overall, the general descriptive statistical analysis for the CERT values has an average of 3.10, a standard deviation of 1.005, and a range between "Strongly agree" (1) and "Strongly disagree" (5). Also, the Mann-Whitney U test has shown insignificant differences between variables of each CERT value (excluding one rejected variable). Indeed, the EFA for each CERT value demonstrates that all suggested variables of CERT values are connected to their allocated value, excluding the Engagement variable. These results have approved that CERT values can be a BPM construct to measure ECM workflow systems performance.

6.4.2 Hypotheses Testing

Validating the research hypotheses is essential to confirm the impact of CERT values as a BPM construct on ECM workflow system performance, as described by Saunders *et al.* (2015, Chapter 14) and vom Brocke *et al.* (2016). Hence, the research hypotheses, which have been suggested in chapter 1 are investigated using the results from the research findings (Section 1.6). Each research hypothesis is tested based on the research implementation outcomes as follows:

Hypothesis One – H1.

CERT values have a significant impact on ECM workflow system performance

CERT values have been applied as KPIs to measure the performance of ECM workflow systems. In this research, the variables of each CERT value have been used to implement quantitative and qualitative analysis procedures (Chapter 5). Thus, the research findings

allowed the implementation of the PPM framework. This provided a weighing score to the CVF dimensions (Figure 5.8). Also, the use of CERT values to implement the PMM framework support formulating an OCAI scoring profile to recognise the ECM workflow system performance situations (i.e. "Now", "Preferred") in order to improve the system performance. For example, the OCAI scoring profile has been implemented to measure the ECM workflow approval systems performance with the "Now" and "Preferred" situations calculated (Table 6.9 and Figure 6.3). This supports the research hypothesis one (H1).

Hypothesis Two – H2.

Relationships between CERT values and employees' impact on ECM workflow performance

Studying a set of variables of each CERT value using the Delphi method requires controlled feedback from employees, which demonstrated a comprehensive connection between ECM workflow systems and business process management (Chapter 2). This comes as a result of the employees' feedback through CERT values in the Delphi rounds to measure ECM approval systems performance. Conversely, the EFA has validated variables of each CERT value. These variables have shown significant correlations to connect them as factors based on each CERT value (Section 5.3). Thus, each CERT value has its list of categories and variables (Table 6.7). Indeed, the use of employees' feedback and CERT values, as KPIs, along with the Delphi method, supports an organisation to meet its business objectives and organisational goals. This can be achieved by measuring ECM workflow systems performance using the PMM framework to produce a scoring profile (Figure 6.3). These findings support the research hypothesis two (H2).

Hypothesis Three – H3.

CERT values have a consequential impact on organisational performance

The Rahimi *et al.* (2016) and Trisnawati *et al.* (2017) studies agreed that BPM systems are implemented by workflow information systems to ensure that employees can achieve their tasks and support business decision-making activities in order to meet business objectives. Also, the improvements to ECM workflow systems performance by studying the impact of CERT values can significantly affect organisational performance. The use of CERT values has been analytically demonstrated in chapter 5 and discussed in this chapter. Indeed, CERT values do significantly impact on workflow systems performance and can be applied to measure ECM workflow systems performance. CERT values allow the provision of constructive feedback on organisational performance using the Delphi rounds and PMM

framework. Indeed, CERT values demonstrated a significant impact on workflow system performance by measuring the ECM approval system's "Now" situation and delivering the "Preferred" situation to improve the system performance. This supports the research hypothesis three (H3) as CERT values impact on organisational performance by measuring workflow systems performance.

Hypothesis Four – H4

CERT values can increase efficiency by improving ECM workflow system performance

Applying CERT values, Delphi rounds, and the PMM framework to measure ECM workflow systems performance is considered as a BPM approach, which aims to make organisations operate efficiently using BPM systemic workflow systems rather than organisational functional mechanisms (AbouGrad *et al.*, 2019; Müller *et al.*, 2016). Also, the Marrewijk et al. (2004) and Schmiedel et al. (2014) implementation of the PMM enables a change that increases efficiency by understanding the "Now" and "Preferred" situations to improve ECM workflow system performance. Conversely, the Excellence value can achieve organisational excellence to ensure continuous business improvement and access the highest organisational performance. Excellence is about reaching individual and organisational goals by mutual trust and formal arrangements (e.g. service level agreements).

Overall, organisations always look to optimise their employees' capabilities and strengthen the organisational involvement between them to increase motivation in order to ensure achieving organisational strategic goals. Hence, ECM workflow system performance can be improved using the Excellence value to accomplish organisational goals and business success. Lastly, the research findings have shown support for the research hypothesis four.

Hypothesis Five – H5

Variables of each CERT value can be used to improve ECM workflow system performance

Regularly, key performance indicators are utilised for the purpose of organisational quality control and management. Indeed, it has been proven that employees should be involved in identifying their business KPIs (De Waal, 2010). Hence, the accepted variables of CERT values can be used as KPIs to ensure the employees' involvement by collecting their insights to measure ECM workflow system performance (Table 6.10).

Lastly, CERT values as represented by their accepted variables (Table 6.10) can be applied to change the "Now" (current) situation of ECM workflow system into a "Preferred" (better)

situation in order to meet the required BPM and workflow system performance (Section 6.3). Accordingly, the recognised variables of each CERT value can improve ECM workflow system performance by changing the situations of the system. This means that these research findings support the research hypothesis five (H5).

BPM Value	Category	Variable	Outcome
Customer Orientation **C**	Creativity	Autonomy	Accepted
		Influence	Accepted
	Commitment	Occupational Distress	Accepted
		Job Satisfaction	Accepted
	Communication	Engagement	Rejected
		Achievement	Accepted
	Customer Needs	Expectations	Accepted
		Work Quality	Accepted
Excellence **E**	Efficiency	Efficiency Rate	Accepted
		Efficiency Performance	Accepted
	Effectiveness	Effectiveness Rate	Accepted
		Effectiveness Performance	Accepted
	Empowerment	Service Quality	Accepted
		Controls	Accepted
	Employee Orientation	CFP	Accepted
		Employee Initiative	Accepted
Responsibility **R**	Responsiveness	Response	Accepted
		Response Time	Accepted
	Result Orientation	Results Time	Accepted
		Manageability	Accepted
	Right Quality	Sustainability	Accepted
		Quality Management	Accepted
	Right Skills	TTC	Accepted
		Skills Allocation	Accepted
		Employee Skills	Accepted
Teamwork **T**	Transparency	Authentic Leadership	Accepted
		Trust	Accepted
	Transformational Leadership	TLI	Accepted
		CFC	Accepted
	Transactional Leadership	CFC	Accepted
		QWL	Accepted
	Team Collaboration	Team Productivity	Accepted
		Team Learning	Accepted

Table 6.10 The outcome of the variables associated with CERT values.

6.5 Synopsis

The research findings have been discussed in this chapter to validate the impact of CERT values on ECM workflow system and organisational performances. This clarifies the different aspects of the explanatory factor analysis, including changes to variables of each CERT value, and provided interpretation to the EFA procedures. Therefore, the effect of CERT values and their validated variables clarified how these variables can be used as KPIs to measure ECM workflow system performance for improving the workflow system to meet business objectives. Also, this research is based on the studies by Müller *et al.* (2016), Schmiedel *et al.* (2013, 2014, 2015, 2016) and vom Brocke *et al.* (2010, 2015, 2016), and the findings of this chapter confirm the use of CERT values in relation to measuring ECM workflow system performance. Thus, the research confirms these studies' findings and extends their results in further areas of study.

Further, the discussions of research data analysis have revealed important results from measuring the ECM workflow systems performance using CERT values, the Delphi method and PPM framework. This includes explaining the CVF dimensions, the OCAI scoring profile and how to utilise these to provide performance outcomes for aspects of the ECM workflow system to improve the system performance. Thus, the research hypotheses have been approved by explaining how the research findings support these hypotheses (Table 6.11).

No.	Hypothesis	Outcome
1.	CERT values have a significant impact on ECM workflow system performance	Accepted
2.	Relationships between CERT values and employees' impact on ECM workflow performance	Accepted
3.	CERT values have a consequential impact on organisational performance	Accepted
4.	CERT values can increase efficiency by improving ECM workflow system performance	Accepted
5.	Variables of each CERT value can be used to improve ECM workflow system performance	Accepted

Table 6.11 Final Outcomes of the Research Hypotheses.

Finally, the analytical procedures validated the assumptions that the Delphi method, CERT values and PMM framework are recommended to other organisations who may use them as a framework to measure ECM workflow systems performance, but an initial study needs to be developed to validate their practicality. Also, the PMM framework uses the CVF dimensions to provide KPIs using the CERT construct to improve ECM workflow system performance. Indeed, CERT values as a BPM construct can be used for other organisational performance purposes. All these will be discussed in the following chapter (Chapter 7).

Chapter 7: Research Contributions, Reflective Commentary and Conclusions

Overview

The research study has produced tangible contributions to knowledge, business practice and the profession, which are reviewed and discussed in this chapter. Also, a reflective commentary on business practice and professional learning to summarise what was learned is presented in this chapter. Indeed, conclusions on the implications of the research findings are provided. This is supported by the researcher's learning experience from conducting this research. As a result, answers to the research questions are presented in order to fully explain the research contributions to business practice and knowledge in the field of information systems. To conclude, the research limitations, further studies and recommendations are described for further development in this area of study and body of knowledge.

7.1 Introduction

Workflow information systems for enterprise content management are used to manage the organisation's business processes and support employees' tasks to accomplish an organisation's goals. This requires decision-makers to apply business management theories, models and methods in order to obtain the expected organisational performance by improving workflow information systems (AbouGrad *et al.*, 2019). Thus, researchers have been motivated to develop new approaches to explore business processes, ECM workflow solutions, organisational performance, BPM values, BPM modelling and other related themes. These published research studies were the resources used to conduct this research to improve ECM workflow systems performance in order to meet business objectives.

This research has produced a theoretical solution regarding, *how CERT business process management values impact on* ECM workflow system performance and the validation of each CERT value's impact on ECM workflow systems performance (Section 1.4). This chapter also addresses the learning experience by reflecting on the research objectives and discussing the results from the research findings (Saunders *et al.*, 2015, Chapter 14). Consequently, a comprehensive structured conclusion is provided to explain the research outcomes obtained through this research, the importance of the research findings and confirm that the research hypotheses are accepted.

Further, the research contributions are discussed to provide the benefits of the research findings. The research contributions have been centralised in three key areas, which are business practice, applied research studies and knowledge. These contributions illustrate the theoretical usage of CERT values as a BPM construct along with the Delphi method to improve ECM workflow system performance in order to meet business objectives.

Furthermore, the implications of the research findings are discussed to explain the implementation choices of the validated CERT values model. The research implications include those for organisational practice, professionals and business practice research studies. These implications provide a full explanation of how, in practice, CERT values can support a variety of areas in business life.

Finally, further discussion outlines the limitations of this research, suggests possible further research studies and offers valuable recommendations for business practice based on the research findings and contributions.

7.2 Research Objectives Success

Achieving the research objectives (ROs) has a significant impact on the research findings and contributions (Saunders *et al.*, 2015, Chapter 14). These ROs have been described at the beginning of the thesis (Section 1.4), and they were derived from the main research question and its sub-questions (Section 1.5). It is important to describe how these ROs have been achieved by explaining the relevant sources within this research. There are five ROs, and each of these objectives is now discussed to link them to the findings from previous chapters. This process plays a key role to explain how each research objective is achieved using evidence from the research and what has been learnt by conducting this research.

RO1: *Building a Complete Literature Review with a Solid Background in Business Process Management, Workflows Information Systems, CERT Values and Enterprise Content Management*.

The research literature review has been continued through the research process, including the writing up of this thesis to formulate a complete background on the research areas of study. From the beginning of the research, the literature review started by finding the research gap (problem). This is supported by identifying the areas of study and focusing on the required topics (subjects), and from this, the research study progressed to find an appropriate research framework. In chapter 1, detailed explanations of the first steps to develop the research literature review have been provided.

The research literature review has been provided in chapter 2 to achieve the RO1. This includes explaining the research context as an introductory section, business process management, enterprise content management, workflow information systems, decision-making techniques, key performance indicators and the research strategy model. These research areas of study are explained to relate different elements together and find the relationships between them. A subset of key published research sources has been identified and these have been used to provide the focus for this research. Thereafter, research methodology and methods have been identified to support data collection and analysis. Also, the research strategy KPIs have been identified based on CERT values to measure ECM workflow system performance. This supports the development of a strategy to answer the research questions and achieve the objectives, as well as and formulate the research findings, which can be used to provide reliable insights to improve ECM workflow system performance to meet business objectives (Figure 2.7).

RO2: *Identify key variables of CERT values which have an impact on ECM workflow systems performance*.

Key variables of CERT values have been identified throughout the research stages. In chapter 2, the literature review identified the relevant research studies, which have been used to collect the appropriate categories and variables of each CERT value. Also, the literature review recognised each set of variables to formulate the research methodology, methods and techniques in order to achieve the RO2.

In chapter 3, the research methodology and methods have provided the variables of each CERT value to measure the ECM workflow systems performance. These variables have been used in the implementation to provide the research data and insights, which can be used as empirical evidence for the research findings.

In chapter 5, the variables of each CERT value have been validated using the exploratory factor analysis procedures and the Grounded Theory coding process. The qualitative coding process in GT and the PMM weighing process demonstrated that the CERT values model is capable of evaluating ECM workflow system performance to meet business objectives.

RO3: *Methodologically find the relationships between ECM workflow systems and employees using CERT values*.

The implementation of the Delphi method supported the research framework, which is a decision-making process to find the relationships between the identified variables for improving the ECM workflow systems performance (AbouGrad *et al*., 2019). In this study, the relationships between the variables of each CERT value have been examined through three different Delphi rounds. These decision-making rounds have been discussed in chapter 3, and their implementation explained in chapter 4 and chapter 5 to achieve RO3. This includes the research questionnaire (Round I), the face-to-face interviews (Round II) and the PMM framework (Round III).

Indeed, the research data collected during Round I and Round II from employees was used to validate the relationships between variables. As a result, two structurally different datasets were collected, which have been explained in chapter 4. However, the Round I quantitative dataset has been quantitively analysed, whereas the Round II qualitative dataset has been qualitatively analysed and then coded for weighing. Conversely, the strengths of the relationships between variables of each CERT value have been discussed in chapter 6 using the empirical evidence.

RO4: *Analytically evaluate CERT values impact on ECM performance to improve business processes and workflow systems in order to meet business objectives.*

The research quantitative and qualitative analyses have been applied to measure each CERT value, and the CERT values impact on ECM workflow systems performance. This supports the development of the organisation's BPM and ECM workflow systems to meet business objectives. The research testing and analytical measures have been discussed in chapter 5, which provided empirical evidence, facts and insights to achieve RO4. Chapter 5 generates the research findings to implement the PMM framework in order to evaluate ECM workflow systems performance (Figure 5.8).

Furthermore, the research findings from the analysis and testing have been discussed in chapter 6 to explain the significance of the variables of each CERT value. Also, the workflow information systems performance has been discussed to explain the possible approaches for improving organisational performance. This supports achieving the business objectives using a BPM workflow structure based on CERT values to measure its performance.

RO5: *Validate CERT values key performance indicators that can be used to improve business processes and workflow systems performance. These CERT values key variables ensure the required reliability and validity to meet business objectives.*

In chapter 5, the validation of CERT values is achieved through the research rounds, which are implemented through the data analysis and evidence collection research stage (Figure 3.3). This includes the Mann-Whitney non-parametric significance test to examine the differences between each CERT value based on the collected data from two ECM workflow approval systems (Field, 2013, Chapter 6; Mann and Whitney, 1947).

Afterwards, the EFA analytical procedures have been implemented to test whether the identified variables are related to each CERT value, which can be used as KPIs to evaluate workflow systems performance in order to meet business objectives (Field, 2013, Chapter 17). This is supported by weighing all the research findings for the recognised variables of each CERT value, followed by measuring CERT values with the use of PMM framework (Figure 5.8). Conversely, possible changes to variables of each CERT value have been discussed in chapter 6. This identified the accepted and rejected variables of each CERT value, which are used to measure the ECM workflow system performance in order to improve the system performance to achieve organisational goals and business objectives.

7.3 Contributions

The research framework and findings provided multiple contributions to business practice and the body of knowledge. To be specific, these contributions are important to the research areas of study for many different purposes, but the primary contribution of this research is measuring the impact of CERT business process management values on ECM workflow systems performance to meet business objectives. Hence, the measurement and management of ECM workflow system performance using CERT values and the Delphi method can be applied to support decision-making in order to improve system performance (Figure 7.1). AbouGrad *et al.* (2019) explained that the Delphi method, with the application of BPM values, can construct KPIs to measure workflow system performance.

Nowadays, organisations have workflow information systems and workflows to run their daily business activities using the most suitable BPM approaches to meet their business objectives (Müller *et al.*, 2016; Schmiedel *et al.*, 2013, 2014). The CERT values model that consists of categories and variables for each CERT value can be applied as a KPI construct to develop a performance profile in order to measure ECM workflow systems performance (Figure 7.1). Also, the Delphi method has three fundamental rounds that enable the evaluation of the ECM workflow system performance. This provides the organisation's decision-makers and workflow solution developers with insights to improve ECM workflow system performance. Hence, the "Now" and "Preferred" ECM workflow system performance can be examined to formulate a plan of action (business process activities) in order to effectively achieve business objectives and organisational goals.

Indeed, the research provided many contributions, including measuring workflow system performance, improved business practice, applied research studies and knowledge in general (Harr *et al.*, 2019; Patterson *et al.*, 1997, Chapter 3; Schmiedel *et al.*, 2015). For example, the ECM workflow system performance profile can be used to make training programmes for employees to boost their performance in order to improve the quality of services (Figure 6.3). Also, the research confirmed the performance profile development model (PPDM), which uses CERT values as an OCAI to evaluate an organisation's BPM and workflow structure to enhance the flow of the business processes (Figure 7.1). The core contributions of this research are listed and briefly discussed in Table 7.1. This provides evidence that supports organisations to develop their business practice and professional development, as well as conducting further BPM and information systems research studies.

Workflow Information Systems & Business Process Management							

Customer orientation		**E**xcellence		**R**esponsibility		**T**eamwork	
Categories	Variables	Categories	Variables	Categories	Variables	Categories	Variables
Creativity	Autonomy	Efficiency	Efficiency Rate	Responsiveness	Response	Transparency	Authentic Leadership
	Influence		Efficiency Performance		Response Time		Trust
Commitment	Occupational Distress	Effectiveness	Effectiveness Rate	Result orientation	Results Time	Transformational leadership	TLI
	Job Satisfaction		Effectiveness Performance		Manageability		CFC
Communication	Achievement	Empowerment	Service Quality	Right quality	Sustainability	Transactional leadership	CFC
			Controls		Quality Management		QWL
Customer needs	Expectations	Employee orientation	CFP	Right skills	TTC	Team collaboration	Team Productivity
					Skills Allocation		
	Work Quality		Employee Initiative		Employee Skills		Authentic Leadership

Delphi Rounds

Round I

Round II

PMM Framework Round III

Enterprise Content Management Workflow System Performance Profile

Figure 7.1 Performance Profile Development Model (PPDM).

Table 7.1 shows the research contributions by discussing them based on the research stages, topics and areas of study.

Stage and Approach	Discipline	Discussion
Research Choice: Mixed methods	Methodology	*Outlook:* This research study implemented Mixed methods to combine both the deductive and inductive approaches. This allowed the use of different data collection methods to produce quantitative and qualitative research findings.
		Results: The implementation of mixed research approaches allow the analysis of the problem based on the main research question (Section 1.4) from different angles (positions). This makes use of different data types to measure ECM workflow systems performance. Therefore, this can be used as an example to follow by Researchers for further research studies in this area of study.
Research Strategic Procedures: Delphi Method	Method	*Outlook:* The Delphi method has been applied to formulate the research strategic process and stages. This provides decision-making procedures to measure ECM workflow systems in order to improve WIS performance (Figure 3.3). Also, the enhancements to the WIS performance ensure that business objectives are achieved.
		Results: The Delphi method validated the use of CERT values to measure ECM workflow systems performance. Also, the Delphi rounds provided the research findings to develop a profile to improve WIS performance.
Decision-making model Development: CERT business process management values	Theory Development	*Outlook:* The research was implemented using variables of each CERT value (Figure 7.1). These variables have been applied to develop a decision-making model for measuring the ECM workflow systems performance.
		Results: The research developed a model (i.e. PPDM) to measure workflow systems performance using variables based on each CERT value. This model can provide an indicator of the current performance situation and provide a detailed preferred situation to improve workflow systems performance and meet the organisation's goals and business objectives.
Delphi Round I: Survey (questionnaire)	Quantitative Data Collection and Analysis	*Outlook:* The online web questionnaire platform was used to collect quantitative data (Section 4.6). The Likert scale was used to collect ordinal scale data in order to measure responses from the research participants (Section 4.7.1). The questionnaires were structured based on variables of each CERT value to provide responses that evaluate the significance of each CERT value.
		Results: Quantitative data for measuring the BPM values of CERT have been collected to validate the research hypotheses, as well as achieving the research objectives. This provides insights to answer the research question and motivates the use of the Delphi rounds and the questionnaire structure for further research studies.

Delphi Round II: Semi-structured face-to-face Interviews	Qualitative Data Collection	*Outlook:* The Delphi Round II was implemented using semi-structured face-to-face interviews to collect qualitative data (Section 4.6). The participants in these interviews provided different qualitative data (Section 4.7.2). This produced datasets for qualitative analysis to examine CERT values in order to assess ECM workflow systems performance.
		Results: The semi-structured interviews provide more and different research findings and insights to look at CERT values from another angle. This supports the research Round I and improves confidence in the research findings.
Delphi Round III: Descriptive Statistics and Exploratory Factor Analysis	Quantitative Data Analysis	*Outlook:* The quantitative data have been analysed using the descriptive analysis to test the significance of CERT values (Section 5.2). Also, the EFA is implemented to validate the relationships between the variables of each CERT value to measure WIS performance (Section 5.3).
		Results: Applying quantitative data analysis methods provided a validation framework to recognise the significance of CERT values and relationships between their variables. This includes validating each variable for its contribution based on the EFA procedure.
Delphi Round III: Coding process in the Grounded Theory	Qualitative Data Analysis	*Outlook:* The qualitative data analysed using the coding process in GT (Section 5.4). This allowed the processing of the interview data and the transfer of the collected qualitative data to quantitative results.
		Results: Qualitative data can be transferred to quantitative data using the coding process in GT. This can also find specific statements, which can be used to support and validate the research findings from Round I.
Delphi Round III: Weighing the Findings	CVF Data Analysis and OCAI	*Outlook:* The research data from Round I and Round II were processed to produce the research findings and datasets (Section 5.5). These datasets have been used as OCAI for the CVF to implement the PMM framework using CERT values (Figure 3.9). This provides many measurements and KPIs to improve the ECM workflow system performance to meet business objectives.
		Results: The weighing of the findings in Round III gathers all data and provide datasets, which formulate an overall view (profile). This allowed the processing of data from two different rounds to produce a coherent finalised dataset. Also, datasets of the CERT values are used as OCAI to produce PMM for the structure and focus dimensions based on the CVF.
Delphi Round III: Performance Measurement and Management	PMM Framework Implementation	*Outlook:* The PMM framework has been implemented to complete the Round III in order to measure the ECM workflow system performance (Section 6.3). This also examines how the ECM workflow system performance can achieve business objectives.
		Results: The PMM framework can be used to find the strengths of the workflow system structure and focus. The structure consists of flexibility and stability, which are based on Excellence and Responsibility values. The focus consists of internal and external views, which are based on Teamwork and Customer orientation values.

Organisational Performance Model: ECM Workflow System Performance Profile	Decision-making Process and BPM Workflow System Performance Profile Development Model	*Outlook:* This research has developed a model to produce an OCAI scoring profile that represents the "Now" and "Preferred" situations of the system performance (Figure 6.3). Hence, CERT values can be used to implement the PMM framework in order to formulate an ECM workflow system performance profile, which can improve workflow performance (Figure 7.1).
		Results: Organisations can measure their ECM workflow systems performance using CERT values and Delphi's decision-making rounds. This enables decision-makers to generate insights, which support their decisions to improve the ECM workflow system performance, business process management and organisational performance.

Table 7.1 Mapping of the Research Contributions and Approaches.

The use of CERT values in the performance profile development model to be implemented across organisations are explained and discussed in the following sections. These explain the contributions of this research and give answers to the main research question (Section 1.4), including the usage of the research findings and contributions to support decision-makers, managers and researchers in their studies in the field of information systems.

7.3.1 Contributions to Business Practice

Applying the Delphi method and CERT values as the BPMC enhance organisational performance by evaluating workflow information systems performance (AbouGrad *et al.*, 2019). Also, the performance profile development model supports organisations to find the appropriate workflow mechanism in order to meet the organisation's required levels of services, quality and productivity (Figure 7.1). The PPDM runs as a decision-making process to measure ECM workflow systems performance (Table 7.1). This profile development model uses CERT values and Delphi's rounds to provide OCAI scores to understand the workflow system's current and expected settings in order to improve ECM workflow system performance. Hence, decision-makers are recommended to apply the PPDM to make changes in order to enhance their workflow systems to meet business objectives.

7.3.2 Contributions to Applied Research Studies

The research applied mixed methods research to find answers to the research question using a range of positions (Saunders *et al.*, 2009, Chapter 4). This pragmatic worldview enables the collection of different types of data and uses both quantitative and qualitative methods to formulate the research findings (Table 7.1). Hence, researchers can use this research as a resource to conduct further mixed methods research studies.

In this research study, the different research approaches and the pragmatic worldview was supported through Delphi's rounds. The Delphi method as a decision-making framework made a coherent research strategic procedure to formulate the research findings. Hence, other research studies may apply the Delphi method in relevant studies such as business process management, workflow systems or enterprise content management. Additionally, the PMM framework achieved the evaluation of the ECM workflow system performance using the competitive values framework and CERT values as an OCAI model (Table 7.1). This structure supports research studies mainly in the areas of organisational performance and workflow system performance and ECM workflow solution development.

7.3.3 Contributions to Knowledge

The research has numerous contributions to knowledge that benefit business process management and workflow information systems performance in general. Indeed, the performance profile development model can be applied to validate the ECM workflow system's performance (Figure 7.1). This supports organisations to implement the PPDM for organisational performance issues, such as developing a BPM performance pattern, an approach to find a reliable BPM construct in order to speed-up and refine business tasks, recognise efficient and effective business processes to analytically meet the organisation's internal and external requirements, and evaluate the achievement levels of business objectives through assessing the performance of the workflow lifecycle (Müller *et al.*, 2016; Schmiedel *et al.*, 2013, 2014, 2015). Indeed, CERT values with the Delphi method proved that business actions can be examined to enhance a variety of issues regarding workflow systems and organisational performance.

Further, CERT values are an appropriate measurement instrument to formulate a decision-making portfolio. CERT values are a BPM construct that provides opportunities for identifying a score for the variables of each value to implement such BPM criteria. For instance, the PPDM enables the support of different organisational sections in their workflows, such as the selection of employees for a set of professional tasks to achieve defined business objectives, recognise the organisational procedures required to restructure the organisation's hierarchy based on the employees profile and recruit candidates for projects or roles to accomplish a set of defined organisational goals. Furthermore, PPDM can be used as a multi-dimensional competitive process to identify the characteristics of business activities. Thus, PPDM supports the following corporate activities:

- Finding the appropriate BPM services and tools to achieve the required levels of workflow systems performance in order to meet business objectives and organisational goals.

- Weighing the effect of ECM workflow solutions regarding the organisation's capabilities to ensure the achievement of the organisation BPM plans, procedures and operations.

- Developing the organisation's business process management related initiatives including standardisation, outsourcing services, ECM workflow system migration and redesign.

- Enhancing overall organisational performance by measuring the ECM workflow system to recognise the challenges and the current and future performance situations.

7.4 The Implications of the Research Results

Organisations can use the research findings and contributions to achieve organisational objectives strategically. The PPDM can be applied to various business process management and workflow systems for weighing the WIS performance to support decision-makers to achieve the organisational goals. In the following sections, the most important implications of this research are explained to demonstrate the practical benefits of the research findings and how the PPDM can be implemented for organisational purposes.

7.4.1 Implications for Organisational Practices

The stakeholders of an organisation are the ECM workflow system drivers to manage the workflow information system lifecycle, which includes BPM procedures (Jaakonmäki *et al.*, 2018; Schmiedel *et al.*, 2014, 2015). Accordingly, organisations need a PPDM to monitor the present workflow system performance and produce future performance profiles in order to continue achieving their organisational goals (Figure 7.1). This supports the organisation in listening to their employees who are experts in the organisation. On the other hand, the PPDM allows organisations to analyse how far the current BPM and ECM workflow solutions are able to achieve organisational goals. Hence, the PPDM supports organisations in understanding their ECM workflow systems performance, which makes organisational performance sustainable by realising the impact of CERT values.

7.4.2 Implications for Professionals

Decision-makers and experts can apply the PPDM concept as a BPM instrument to leverage their work experience. The PPDM can reveal workflow performance issues that guide decision-makers to develop BPM and ECM systems. The PPDM defines the important factors that impact ECM workflow systems performance. Thus, the use of PPDM by the

decision-makers provides them with a decision-making mechanism to develop their organisational performance through understanding such BPM performance aspects. This allows professionals and employees to monitor their job performance, achievements and accumulated skillsets. The PPDM is a business process performance measurement tool for weighing aspects of employee performance. As a result, CERT values with the Delphi method can be used for employee and workflow performance review using the PPDM concept (Figure 7.1). The PPDM as a framework can ensure the delivery of the "Now" and "Preferred" performance situations and recognises the employees' key characteristics (through which performance can be optimised) through identifying training programmes and study areas related to the organisation's BPM and ECM workflow systems.

7.4.3 Implications for Business Practice Research

Research studies in areas such as business practice, BPM and organisational processes can use the research findings to learn how to build KPIs in order to measure workflows performance. Researchers can implement the PPDM concept to find answers to their research questions, especially in the area of ECM workflow system performance. Also, the research implementation of the PPM framework revealed that researchers can use CERT values to examine the ECM workflow system structure (Table 7.1). This supports formulating BPM studies to change business strategy, procedures, technologies and environments (Melnyk *et al.*, 2014). Hence, the PPDM can be applied to support organisational performance by looking at the current workflow and building the preferred workflow. For example, the PPDM can support developing a selection workflow for optimal recruitment and making a systematic workflow to provide training programmes for their employees.

7.5 Limitations

Focusing on a specific study direction and one worldview are natural for any research that looks to generate theory. As Goodhue (2007) explained, a good theory is like a lens that allows focusing on a view of reality in order to find significant relationships; it is like any lens, it just takes some matters into focus and blurs others. This leaves a field of study with many blind spots. Hence, this research is like a lens that looks around by focusing on one view only. Also, the research findings and the emerging PPDM concept should be treated like any research as capable of improvement. Indeed, some limitations of the research have been already presented and discussed through this thesis. Consequently, some key limitations of the research are presented, which include several aspects relevant to BPM,

KPIs and ECM workflow systems. Also, this research was constrained to only look at how CERT values impact on ECM workflow systems performance. The following discussions include several limitations within the different research stages:

Limitations in Research Design

Limitation 1. The research implemented the pragmatism paradigm as a methodology to explore the research phenomena. This allowed the examination of business practice using multiple data collection methods (i.e. quantitative, qualitative). It is possible to conduct the research using other research philosophical worldviews (e.g. the positivism paradigm). For example, the research could be implemented by collecting data based on highly structured large sample quantitative and qualitative measurements. Overall, this research study made efforts to analyse, communicate and look at the best possible paradigm to conduct the research in order to provide the research findings and develop the PPDM concept.

Limitation 2. The research targeted BPM values using many research studies, but these are based on CERT values as a modelling grammar and scope of inquiry. Another research may target other BPM values by focusing on other research studies to allocate different values. This research has focused on four BPM values (i.e. CERT) based on the research literature review and following the important studies of Schmiedel *et al.* (2013, 2014, 2015), but this may expand to include a different number of BPM values.

Limitation 3. The research investigation process, modelling grammars and scope of inquiry followed explanatory and predictive research approaches. Still, other approaches could be adopted (e.g. design, action), as using other research approaches may yield further improvements to workflow information systems and ECM workflow solutions. This may lead to better modelling and structure to improve ECM workflow system performance.

Limitations in Data Collection

Limitation 4. The research collected data using questionnaires and interviews are used to triangulate the research data in order to improve the quality of the data. However, there are other data collection methods, which may provide better data quality, such as telephone interviews, internet interviews (e.g. skype) and focus group interviews (Saunders *et al.*, 2015, Chapter 10). Also, the questionnaire design may include different types of questions to receive various types of responses (Saunders *et al.*, 2015, Chapter 11). The use of other data collection methods may increase the number of participants and data quality, as the research sample size was small due to limitations, including the research timeline and the

availability of participants and consent procedures. This small data sample restricted the research to considering only a single technological platform within a single organisation. With this sharper focus, however, the data collected spanned a variety of system users and it was felt that the implementation of the research data collection was satisfactory for its exploratory purposes.

Limitation 5. The research data quality and findings can be supported by secondary data from documents (e.g. databases, videos) and multiple other sources (e.g. organisational reports) (Saunders *et al.*, 2015, Chapter 8). These data types are capable of expanding the research findings and provide higher levels of validity and reliability. However, it was decided that it is appropriate to only focus on primary data for the purposes of this research.

Limitations in Data Analysis

Limitation 6. The research has a limited number of core factors (i.e. CERT values) applied in the research strategic framework, which produced the PPDM. Yet, there could be other factors with an influence on ECM workflow system performance. Actually, during the research development efforts were made to find the best theories and factors to measure ECM workflow system performance. Indeed, more factors may influence the improvement of ECM workflow system performance using further empirical research studies.

Limitation 7. The research focuses on the impact of CERT values on ECM workflow systems performance without looking at the role of other aspects such as competence supply. An exploratory study by Gorbacheva *et al.* (2016) shows the role of gender and the importance of the BPM professionals in competence supply. These BPM categories may influence the ECM workflow system performance, and therefore, further research investigation could be carried out on these BPM characteristics.

Limitations in Model Development and Testing Methods

Limitation 8. The research hypotheses are usually developed based on the researcher's ability to make informed decisions about the research phenomenon. This makes the hypotheses vulnerable to errors and may need further development. Also, the PPDM concept has the potential of more in-depth exploration, as other possible significant relationships may remain undiscovered.

Limitation 9. The implementation of the Delphi method has developed a BPM instrument using CERT values. This decision-making framework has limitations, including:

First. The research context and literature review have covered sufficient research studies to carry out this research within its timescale. These supported the research framework and decision-making processes. Other studies, though, may develop similar research context in a different methodological way, which could provide more improvements to the research contributions.

Second. The research testing processes are guided by specific questions, which could be changed or refined, and therefore, the research findings may be adjusted.

Third. The BPM construct of CERT values could be conceptualised in a different way, which may lead to varying findings in order to support other organisational strategies.

Fourth. The PPDM concept could be improved using other theoretic lenses by adapting different business analytical models. However, the use of such studies may lead to different findings, which focus on other BPM characteristics. This may change the PPDM structure or framework. Overall, many efforts have been made to follow accepted procedures to select the most appropriate ECM workflow system performance measurement methods for developing the PPDM. Also, well-known validation and reliability procedures have been applied to provide sufficient evidence and research findings.

7.6 Conclusions

This research has produced findings, which are used to construct an appropriate performance profile development model for measuring ECM workflow systems performance. Indeed, the PPDM concept is capable of weighing the ECM workflow system to improve its performance and meet business objectives. As a result, this business practice research provided empirical evidence as a first attempt to develop this body of knowledge and area of research. Hence, further research studies are suggested to improve the PPDM concept and measurement of the ECM workflow system performance. Also, recommendations are proposed based on the research findings. Therefore, further research studies and recommendations are discussed in the following sections.

7.6.1 Further Research Studies

Areas for further development are recognised by this research, especially in business practice and professional improvement. The research promotes using the Delphi method for measuring workflows to improve ECM workflow systems performance. Hence, it is clear that the Delphi method shows an ability to enhance decision-making processes and WIS using

Delphi's rounds (AbouGrad *et al.*, 2019). Indeed, future case studies may also implement the Delphi method to examine other organisational strategies and business practices. Additionally, in order to further generalise the findings of this research, there is need to be further research within other organisations using other technological platforms. This research focussed on a single organisation and a single platform so the results of this research should be read within the context of this being an exploratory study.

In research, the performance profile development model is suitable for other studies; especially in the areas of BPM, decision science and information systems performance (Figure 7.1). Also, the PPDM supports the development of other relevant business studies, mainly the information systems and management information systems (MIS) research fields.

Lastly, scientists are able to apply the research findings in their research studies. Also, the research framework can be used to analyse other BPM concepts and the challenges of workflow information system initiatives. Indeed, further studies can apply the PPDM concept to find other impacts, such as the impact of information systems on user performance. Also, further studies can be implemented to look at other BPM values to measure workflow systems performance. Thus, further studies can use other BPM values for such purpose; for example, looking at efficiency using Responsibility and Teamwork values only. Analysing other concepts and relationships could provide decision-making findings and analytical insights, which may support organisations to optimise their BPM systems and workflows.

7.6.2 Recommendations

The research findings and the PPDM can achieve sustainable improvements to ECM workflow and BPM systems performance (Figure 7.1). Indeed, the research can inspire various ideas and innovations about ECM workflow solutions, workflow information systems, BPM values and key performance indicators. Also, there are many approaches that researchers may apply to expand the research body of knowledge based on this research. Hence, the following are recommendations for improving professional activities and suggestions of business practice based on the research findings and contributions:

Recommendation 1. The research found that the performance profile development model can serve as a business analytical tool to measure ECM workflow system performance in order to find the impact of CERT values (Figure 7.1). Hence, The PPDM is suggested to support decision-makers in their decision-making process to improve ECM workflow systems performance using employees' feedback to achieve organisational goals.

Recommendation 2. The PPDM is suggested as a prediction framework and BPM forecasting tool to recognise the ECM workflow system's "Now" and "Preferred" performance situations (Figure 6.3). This supports the improvement of organisational performance.

Recommendation 3. The PPDM is suggested as a testing process or pilot study framework to make predictions for BPM and workflow systems performance and enhance an ECM workflow system in order to meet business objectives.

Recommendation 4. The research strategy can be adopted by researchers to examine a workflow model (Figure 3.2). The research pragmatic philosophical worldview position applied a combination of research approaches using mixed methods, which motivate further research studies to triangulate data collection processes.

Recommendation 5. The CERT value strategy model (i.e. PPDM) can be adopted by researchers to study the performance of other business frameworks, such as the performance of service level agreements (Figure 2.11). This motivates applying BPM values and the Delphi method for improving other BPM features to achieve business objectives. Also, the use of CERT values for the improvement of ECM workflow system performance is a new area of research and this thesis has begun to shed some light on the management of such systems. It is hoped that other researchers will explore some of the suggestions for further work arising as a consequence of this research.

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Appendices

Appendix A: Questionnaire

Appendix A.1: Questionnaire Introduction

Questionnaire for a research study: Workflow information systems CERT values impact on enterprise content management performance

The questionnaire will take approximately 20 minutes to complete. This research study is contributing toward a doctorate degree at London South Bank University (LSBU). The research investigates the impact of CERT values on enterprise content management (ECM) systems performance.

CERT values are Customer orientation (C), Excellence (E), Responsibility (R) and Teamwork (T). CERT values are business process management (BPM) organisational values, which are used to manage business workflows for an organisation to meet its objectives. The research seeks to answer: How do CERT values impact on ECM systems workflow performance.

Enterprise content management (ECM) is core strategic information management system for managing enterprise's content. ECM systems are complete software suite with applications and add-ons to manage the flow of information from capture to archiving and distribution. It's simple to administrate, flexible to deploy, and available on premises in the cloud or hybrid. ECM can be considered as integrated approach to information systems that covers and aligns established concepts, e.g. document management systems (DMS), (web) content management, and records management (RM) systems at an enterprise-wide scale. In fact, ECM is an information process system to manage digital content, e.g. images, documents, reports, records, etc. in a way that its electronic storage is supposed to be managed in a simple searchable flow. ECM support organisations to make better, faster, and effective decisions, as content handling becomes easy.

The research focuses on ECM Software Solutions (e.g. Microsoft SharePoint, OPENTEXT Content Suite Platform, OPENTEXT Document Management) to study ECM performance.

The research uses CERT values to measure ECM performance based on collected data from employees who are using ECM Suite at their work environment and from other ECM systems recent studies. In fact, CERT values are used to measure workflow in order to improve ECM performance. CERT values are ideals that influence behavioural and organisational patterns of a team and major business objectives.

CERT values have an impact on behaviour and configurations of business environment. Thus, CERT values have an effect to optimise ECM systems performance by managing its impact on business workflows. This study is a practical balanced approach that ensures CERT values could be used for the institutionalisation of workflow visible actions and structures, training programs, a guide in project team selection, performance evaluations, and a guide on how to recognise and reward employees.

Appendix A.2: Letter of Invitation to the Questionnaire Participant by Email

To: 'Participants list of emails or Principal Investigator email if BCC line is used'

From: 'Principal Investigator, Lead Applicant email < abougrah@lsbu.ac.uk >'

BCC: Participants list of emails

Subject: An invitation to participate in business practice research study at London South Bank University

Attached: Questionnaire Participant Information Sheet (PDF Document) – Available at Appendix A.3

Dear (Insert Organisation Name) staff member,

I am pleased to inform you that you have been chosen to participate in a business practice research study "Workflow Information Systems CERT Values: The Impact on Enterprise Content Management Performance" at London South Bank University (LSBU). You have been chosen because you are an employee who is using the (Insert ECM System Name) ECM system at work for business workflows.

Please read the attached information sheet to get a full view of the research study. This includes the research purpose, a statement of anonymity and confidentiality, the anticipated time required for participation, and the voluntary nature of participation. There are no incentives for participating.

The research (UREC 1579) was approved by the LSBU research ethics committee on (Insert approval date) as part of a Doctorate in Business Administration (DBA) degree.

Please read the information sheet carefully before proceeding to the questionnaire.

You can complete the questionnaire (Likert rating scale questions) by clicking at (Insert website link).

Please note that by submitting the online questionnaire you consent to participate in the research study.

(Insert Organisation Name) has given a permission for the research to be conducted to get feedback from employees on (Insert ECM System Name). The questionnaire takes about 20 minutes to complete. If you have any questions about the research, the questionnaire or any other related issues, please contact me at the contact details below. Please complete the questionnaire within two weeks by clicking on (Insert questionnaire website link). Your feedback is important for the research findings, so I would be grateful for your participation in this research.

Many thanks for reading this email, along with attached information sheet; your time is appreciated.

Kind regards

HISHAM ABOUGRAD   HDip (BSc), MSc, MBA | MBCS | DBA Researcher | School of Business
London South Bank University | 103 Borough Road | London | SE1 0AA | E: abougrah@lsbu.ac.uk

Appendix A.3: Questionnaire Participant Information Sheet

Research Study Title: Workflow Information Systems CERT Values:

The Impact on Enterprise Content Management Performance (UREC 1579)

You are being invited to take part in a research study, but before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Talk to others about the study, if you wish.

This research study is being completed as part of a Doctorate in Business Administration (DBA) degree at London South Bank University. It has been reviewed and ethically approved by the London South Bank University Research Ethics Committee (UREC 1579).

Ask me if there is anything that is not clear or if you would like more information. Please take time to decide whether or not you wish to take part.

The research investigates the impact of CERT values on enterprise content management (ECM) systems performance. CERT values are Customer orientation (C), Excellence (E), Responsibility (R) and Teamwork (T). CERT values are business process management (BPM) organisational values, which are used to manage business processes (workflows) for an organisation to meet its objectives.

The research seeks to answer the main question of How CERT values impact on ECM systems workflow performance?

You have been invited to participate in this research study as you are a member of staff who is using (Insert ECM System Name) ECM system at work. In total, the study includes (Data collection phase number of participants) employees.

It is up to you to decide whether or not to take part. If you do, by completing all required questions on the online questionnaire you are consenting to participate. You are free to withdraw at any-time up to the time of submission of the thesis (2 years) and without giving a reason. A decision to withdraw, or a decision not to take part, will not affect the research study. Your decision to withdraw will remain confidential at all times. After that time, it would be impossible for the researcher to comply. You must contact the researcher, if you intend to withdraw in order to remove your data from the database. This will be done by issuing a database query using the key personal details.

If you are willing to participate, you can do so by clicking at (Questionnaire website link). The questionnaire takes about 20 minutes to complete.

It is not anticipated that you will suffer any disadvantage or be at risk from this research study as it is only asking for your feedback from using the (Insert ECM System Name) ECM system at (Insert Organisation Name). If you experience any emotional upset due to completing this questionnaire, you need to note this and contact the researcher or the research supervisor. Also, if there are any professional issues, which require reporting, then please note this and contact the researcher or the research supervisor.

It is unlikely that you will gain any personal benefit from participating in this research. However, the information you share with the researcher by answering the questionnaire will help you gain some knowledge about business behaviours and measuring information systems performance.

All information received from you will be handled in a confidential manner and safely stored in a locked filing cabinet and on password protected computers in an environment locked when not occupied. Only the researcher and supervisor will have direct access to the information. Any reference to you will be coded by secured reference codes (unreferenced characters). This information will be held until 5 years after completing the research thesis in order to be used for publishing research study papers, and then the data will be destroyed.

If you have a concern about any aspect of this research study, you should contact the researcher who will do the best to answer your questions; Name: HISHAM ABOUGRAD, Email: abougrah@lsbu.ac.uk. If you wish any further information regarding this research study or have any complaints about the way you have been dealt with during the research study or other concerns you can contact the research supervisor: Professor Jon Warwick, Work Telephone: +44 (0) 20 7815 7436, Email: warwick@lsbu.ac.uk

Finally, if you remain unhappy and wish to complain formally, you can contact the Chair of London South Bank University Research Ethics Committee. Details can be obtained from the university website: https://my.lsbu.ac.uk/page/research-degrees-ethics

Appendix A.4: Enterprise Approval System Questionnaire

Page 1: Questionnaire Introduction

The research investigates the impact of CERT values on enterprise content management (ECM) systems performance. The questionnaire will take approximately 20 minutes to complete. This research study is contributing toward a doctorate degree at London South Bank University (LSBU).

CERT values are Customer orientation (C), Excellence (E), Responsibility (R) and Teamwork (T). CERT values are business process management (BPM) organisational values, which are used to manage business workflows for an organisation to meet its objectives. The research seeks to answer: How do CERT values impact on ECM systems workflow performance.

Enterprise content management (ECM) is core strategic information management system for managing enterprise's content. ECM systems are complete software suite with applications and add-ons to manage the flow of information from capture to archiving and distribution. It's simple to administrate, flexible to deploy, and available on premises in the cloud or hybrid. ECM can be considered as an integrated approach to information systems that covers and aligns established concepts, e.g. document management systems (DMS), (web) content management, and records management (RM) systems at an enterprise-wide scale. In fact, ECM is an information process system to manage digital content, e.g. images, documents, reports, records, etc. in a way that its electronic storage is supposed to be managed in a simple searchable flow. ECM support organisations to make better, faster, and effective decisions, as content handling becomes easy.

The research focuses on ECM Software Solutions (e.g. Microsoft SharePoint, OPENTEXT Content Suite Platform, OPENTEXT Document Management) to study ECM performance. The research uses CERT values to measure ECM performance based on collected data from employees who are using ECM Suite at their work environment and from other ECM systems recent studies. In fact, CERT values are used to measure workflow in order to improve ECM performance. CERT values are ideals that influence behavioural and organisational patterns of a team and major business objectives.

CERT values have an impact on behaviour and configurations of the business environment. Thus, CERT values have an effect to optimise ECM systems performance by managing its impact on business workflows. This study is a practical balanced approach that ensures CERT values could be used for the institutionalisation of workflow visible actions and structures, training programs, a guide in project team selection, performance evaluations, and a guide on how to recognise and reward employees (staff).

Next >

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Page 2: Part I: Customer orientation (C)

Enterprise Approval ECM System completes my tasks under my own supervision. ✳
Required

➕ More info

- ⚪ Strongly Agree
- ⚪ Agree
- ⚪ Neither
- ⚪ Disagree
- ⚪ Strongly Disagree

Enterprise Approval ECM System solves specialist problems and individual customer needs. ✳ *Required*

➕ More info

- ⚪ Strongly Agree
- ⚪ Agree
- ⚪ Neither
- ⚪ Disagree
- ⚪ Strongly Disagree

Enterprise Approval ECM System has an effect on my commitment to work. ✳ *Required*

➖ Less info

Please provide your rate (score) on how much Enterprise Approval ECM System effect your commitment to work, e.g. Project Management, Time Management, tasks Schedule.

- ⚪ Strongly Agree
- ⚪ Agree
- ⚪ Neither
- ⚪ Disagree
- ⚪ Strongly Disagree

Enterprise Approval ECM System has an effect on my job satisfaction. ✳ *Required*

➕ More info

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

I do raise Enterprise Approval ECM System errors, issues, or solve problems when it's necessary to do so. ✳ *Required*

➕ More info

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

Enterprise Approval ECM System complete my job responsibilities, when it's required to do so. ✳ *Required*

➕ More info

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

Enterprise Approval ECM System gives information for better service quality and performance to meet customer expectations. ✳ *Required*

➖ Less info

Please give your rate based on how much Enterprise Approval ECM System meet your expectations to complete tasks.

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

Enterprise Approval ECM System satisfies my work activities. ✱ *Required*

➕ More info

- ⚪ Strongly Agree
- ⚪ Agree
- ⚪ Neither
- ⚪ Disagree
- ⚪ Strongly Disagree

Page 3: Part II: Excellence (E)

Enterprise Approval ECM System has high efficiency rate for my business process resources, e.g. cost, time, and quality. ✱ *Required*

➕ More info

- ⚪ Strongly Agree
- ⚪ Agree
- ⚪ Neither
- ⚪ Disagree
- ⚪ Strongly Disagree

My ECM efficiency performance has been highly developed since last year, as Enterprise Approval ECM System improved my work productivity, communication, planning, and service control. ✱ *Required*

➕ More info

- ⚪ Strongly Agree
- ⚪ Agree
- ⚪ Neither
- ⚪ Disagree
- ⚪ Strongly Disagree

Enterprise Approval ECM System has high effectiveness rate for my business objectives and outputs, e.g. cost, time, and quality. ✱ *Required*

⊟ Less info

Please provide your rate on how high Enterprise Approval ECM System meets your tasks objectives and required outputs.

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

My ECM effective performance has been highly developed since last year, as Enterprise Approval ECM System improved my service quality, problem-solving, delivery, and customer satisfaction. ✱ *Required*

⊞ More info

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

Enterprise Approval ECM System empowers my activities to make-decisions and confidently communicate for the internal service quality. ✱ *Required*

⊞ More info

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

Enterprise Approval ECM System controls my job decision-making, which empowers my team performance. ✱ *Required*

➕ More info

○ Strongly Agree
○ Agree
○ Neither
○ Disagree
○ Strongly Disagree

Enterprise Approval ECM System strengthen my work relationships and team performance. ✱ *Required*

➕ More info

○ Strongly Agree
○ Agree
○ Neither
○ Disagree
○ Strongly Disagree

Enterprise Approval ECM System effects my own performance level to be more positive, capable, and initiative. ✱ *Required*

➕ More info

○ Strongly Agree
○ Agree
○ Neither
○ Disagree
○ Strongly Disagree

Page 4: Part III: Responsibility (R)

Enterprise Approval ECM System has high response level on my internal and external inquiries. ✴ *Required*

➕ More info

- ⚪ Strongly Agree
- ⚪ Agree
- ⚪ Neither
- ⚪ Disagree
- ⚪ Strongly Disagree

Enterprise Approval ECM System performs high for on-time delivery. ✴ *Required*

➕ More info

- ⚪ Strongly Agree
- ⚪ Agree
- ⚪ Neither
- ⚪ Disagree
- ⚪ Strongly Disagree

Enterprise Approval ECM System gives me the right results on-time. ✴ *Required*

➕ More info

- ⚪ Strongly Agree
- ⚪ Agree
- ⚪ Neither
- ⚪ Disagree
- ⚪ Strongly Disagree

Enterprise Approval ECM System reaches my expected results and complete my tasks as planned. ✱ *Required*

➕ More info

- ⚪ Strongly Agree
- ⚪ Agree
- ⚪ Neither
- ⚪ Disagree
- ⚪ Strongly Disagree

Enterprise Approval ECM System is my core business process and implementation system for my job duties, commitments, and quality. ✱ *Required*

➕ More info

- ⚪ Strongly Agree
- ⚪ Agree
- ⚪ Neither
- ⚪ Disagree
- ⚪ Strongly Disagree

Enterprise Approval ECM System improves my work quality in terms of customer service, teamwork, and personal development plan. ✱ *Required*

➕ More info

- ⚪ Strongly Agree
- ⚪ Agree
- ⚪ Neither
- ⚪ Disagree
- ⚪ Strongly Disagree

Enterprise Approval ECM System reduce information management (IM) tasks time and enable me to be more productive. ✱ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Employees training programmes on Enterprise Approval ECM System make us more productive and enable me to reduce IM tasks time. ✱ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Employees skills are enough to carry out content management tasks using various Enterprise Approval ECM System functions and tools. ✱ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Page 5: Part IV: Teamwork (T)

Enterprise Approval ECM System gives me hope, resiliency, optimism, and efficacy to complete my tasks as planned. ✶ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Enterprise Approval ECM System is trusted to manage information on-time. ✶ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Enterprise Approval ECM System motivates me to solve-problems in new ways, changing the way of business processes and automations, and Self-reporting (Self-worth) attitude and behaviour toward others, so that my level of achievement become higher. ✶ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Enterprise Approval ECM System gives better vision, time management, and cost reduction, so that improves business continuance. ✳ *Required*

➕ More info

○ Strongly Agree
○ Agree
○ Neither
○ Disagree
○ Strongly Disagree

Enterprise Approval ECM System gives the ability toward information exchange, business commitment, and improve service performance, which help employees to adapt the behaviour to maximise achievements and accessibility. ✳ *Required*

➕ More info

○ Strongly Agree
○ Agree
○ Neither
○ Disagree
○ Strongly Disagree

Enterprise Approval ECM System rewarded me good performance and achieve better quality of work-life. ✳ *Required*

➕ More info

○ Strongly Agree
○ Agree
○ Neither
○ Disagree
○ Strongly Disagree

Enterprise Approval ECM System has the performance and productivity to reach the right service level and team goals. ✱ *Required*

⊞ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Enterprise Approval ECM System gives me the experience to improve services and productivity, trust among team members, and better team commitment and communication, so that team members always have the capability to learn. ✱ *Required*

⊞ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Page 6: Part V: General Information

Job title   *Optional*

Email (Your email is required to send you the research study results and we prefer your work email)
Optional

➕ More info

Which of the following best describes your industry sector   ✳ *Required*

If you selected Other, please specify:

Department / Section / Unit   *Optional*

Years of work experience   ✳ *Required*

➕ More info

- ○ Less than one Year
- ○ 7 to 10 Years
- ○ 21 to 25 Years
- ○ 36 to 40 Years
- ○ +50 Years

- ○ 1 to 3 Years
- ○ 11 to 15 Years
- ○ 26 to 30 Years
- ○ 41 to 45 Years

- ○ 4 to 6 Years
- ○ 16 to 20 Years
- ○ 31 to 35 Years
- ○ 46 to 50 Years

Which of the following best represent your most recent education background ✱ *Required*

➕ More info

○ 1 - 4 Levels / CSEs / GCSEs, Entry, Foundation Diploma, NVQ Level 1, Foundation GNVQ, Basic Skills

○ 5+ O Levels – passes / CSEs – Grade 1 / GCSEs – Grades A*-C, School Certificate, NVQ Level 2, Intermediate GNVQ, City and Guilds Craft, BTEC First/General Diploma Apprenticeship

○ 2+ A Levels/VCEs, 4+ AS Levels, Higher School Certificate, Progression/Advanced, NVQ Level 3, Advanced GNVQ, City and Guilds Advanced Craft, ONC, OND, BTEC Nation

○ Undergraduate degree, e.g. BSc, BA

○ Master degree, e.g. MSc, MBA

○ Doctorate degree, e.g. PhD, DBA

○ Professional and other work-related qualifications

○ Other

If you selected Other, please specify:

Gender *Optional*

➕ More info

○ Male   ○ Female

Age range ✱ *Required*

➕ More info

○ 18-20	○ 21-24	○ 25-30
○ 31-35	○ 36-40	○ 41-45
○ 46-50	○ 51-55	○ 56-60
○ 61-65	○ 66-70	○ +70

Comments / Notes

➕ More info

Questionnaire Completed

Your responses to this survey have been submitted.

If you need a formal record of your submission, please use the following details:

Completion receipt

Receipt number: 1-1-1
Submission time: 2018-10-02 20:29:53 BST

🖶 Print   ⬇ Download PDF   ✉ Email

Thank you for participating

The research study results will be sent by email upon completion

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Survey copyright

London South Bank University is responsible for running this survey. This organisation either owns the copyright for this survey, or is using this survey under agreement with the copyright holder. All rights reserved.

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Contact Us

For questions relating to this study, please contact the researcher who will do the best to answer your questions, Name: HISHAM ABOUGRAD, Email: abougrah@lsbu.ac.uk.   If you wish any further information regarding this study or have any complaints about the way you have been dealt with during the study or other concerns you can contact: Professor Jon Warwick at Work Telephone: +44 (0) 20 7815 7436, Email: warwick@lsbu.ac.uk, who is the Academic Supervisor for this study.

Appendix A.5: Research Approval System Questionnaire

Page 1: Questionnaire Introduction

The research investigates the impact of CERT values on enterprise content management (ECM) systems performance. The questionnaire will take approximately 20 minutes to complete. This research study is contributing toward a doctorate degree at London South Bank University.

CERT values are Customer orientation (C), Excellence (E), Responsibility (R) and Teamwork (T). CERT values are business process management (BPM) organisational values, which are used to manage business workflows for an organisation to meet its objectives. The research seeks to answer: How do CERT values impact on ECM systems workflow performance.

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CERT values have an impact on behaviour and configurations of the business environment. Thus, CERT values have an effect to optimise ECM systems performance by managing its impact on business workflows. This study is a practical balanced approach that ensures CERT values could be used for the institutionalisation of workflow visible actions and structures, training programs, a guide in project team selection, performance evaluations, and a guide on how to recognise and reward employees (staff).

Next >

Page 2: Part I: Customer orientation (C)

Research Approval ECM System completes my tasks under my own supervision. ✻
Required

➕ More info

- ⚪ Strongly Agree
- ⚪ Agree
- ⚪ Neither
- ⚪ Disagree
- ⚪ Strongly Disagree

Research Approval ECM System solves specialist problems and individual customer needs. ✻ *Required*

➖ Less info

Please give your rate based on how Research Approval System could help you to solve different problems and individual needs.

- ⚪ Strongly Agree
- ⚪ Agree
- ⚪ Neither
- ⚪ Disagree
- ⚪ Strongly Disagree

Research Approval ECM System has an effect on my commitment to work. ✻ *Required*

➕ More info

- ⚪ Strongly Agree
- ⚪ Agree
- ⚪ Neither
- ⚪ Disagree
- ⚪ Strongly Disagree

Research Approval ECM System has an effect on my job satisfaction. ✱ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

I do raise Research Approval ECM System errors, issues, or solve problems when it's necessary to do so. ✱ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Research Approval ECM System complete my job responsibilities when it's required to do so. ✱ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Research Approval ECM System gives information for better service quality and performance to meet customer expectations. ✱ *Required*

➕ More info

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

Research Approval ECM System satisfies my work activities. ✱ *Required*

➕ More info

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

Page 3: Part II: Excellence (E)

Research Approval ECM System has high efficiency rate for my business process (workflow) resources, e.g. cost, time, and quality. ✱ *Required*

➕ More info

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

My ECM efficiency performance has been highly developed since last year, as Research Approval ECM System improved my work productivity, communication, planning, and service control. ✻ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Research Approval ECM System has high effectiveness rate for my business objectives and outputs, e.g. cost, time, and quality. ✻ *Required*

➖ Less info

Please provide your rate on how high Research Approval ECM System meets your tasks objectives and required outputs.

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

My ECM effective performance has been highly developed since last year, as Research Approval ECM System improved my service quality, problem-solving, delivery, and customer satisfaction. ✻ *Required*

➖ Less info

Please provide your score on how Research Approval ECM System improves your effectiveness in terms of service quality, problem-solving, delivery, and customer satisfaction (e.g. Help to solve different problems for the project).

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Research Approval ECM System empowers my activities to make decisions and confidently communicate for the internal service quality. ✴ *Required*

➕ More info

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

Research Approval ECM System controls my job decision-making, which empowers my team performance. ✴ *Required*

➕ More info

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

Research Approval ECM System strengthen my work relationships and team performance. ✴ *Required*

➕ More info

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

Research Approval ECM System effects my own performance level to be more positive, capable, and initiative. ✴ *Required*

➕ More info

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

Page 4: Part III: Responsibility (R)

Research Approval ECM System has high response level on my internal and external inquiries. ✱ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Research Approval ECM System performs high for on-time delivery. ✱ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Research Approval ECM System gives me the right results on-time. ✱ *Required*

➖ Less info

Please provide your rate on how quick Research Approval ECM System could give you the right results

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Research Approval ECM System reaches my expected results and completes my tasks as planned. ✱ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Research Approval ECM System is my core business process and implementation system for my job duties, commitments, and quality. ✱ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Research Approval ECM System improves my work quality in terms of customer service, teamwork, and personal development plan. ✱ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Research Approval ECM System reduce information management (IM) tasks time and enable me to be more productive. ✱ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Employees training programmes on Research Approval ECM System make us more productive and enable me to reduce IM tasks time. ✱ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Employees skills are enough to carry out content management tasks using various Research Approval ECM System functions and tools. ✱ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Page 5: Part IV: Teamwork (T)

Research Approval ECM System gives me hope, resiliency, optimism, and efficacy to complete my tasks as planned. ✴ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Research Approval ECM System is trusted to manage information on-time. ✴ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Research Approval ECM System motivates me to solve problems in new ways, changing the way of business processes and automation, and Self-reporting (Self-worth) attitude and behaviour toward others, so that my level of achievement become higher. ✴ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Research Approval ECM System gives better vision, time management, and cost reduction, which improves business continuance. ✱ *Required*

➕ More info

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

Research Approval ECM System gives the ability toward information exchange, business commitment, and improve service performance, which helps staff to adapt the type of behaviour to maximise achievements and accessibility. ✱ *Required*

➕ More info

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

Research Approval ECM System rewarded me good performance and achieve a better quality of work activities. ✱ *Required*

➕ More info

○ Strongly Agree

○ Agree

○ Neither

○ Disagree

○ Strongly Disagree

Research Approval ECM System has the performance and productivity to reach the right service level and team goals. ✱ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Research Approval ECM System gives me the experience to improve services and productivity, trust among team members, and better team commitment and communication; so team members always have the capability to learn. ✱ *Required*

➕ More info

- ○ Strongly Agree
- ○ Agree
- ○ Neither
- ○ Disagree
- ○ Strongly Disagree

Page 6: Part V: General Information

Job title *Optional*

Email (Your email is required to send you the research study results and we prefer your work email)
Optional

➕ More info

Which of the following best describes your industry sector ⚠ **Required**

Please select ▾

If you selected Other, please specify:

Department / Section / Unit *Optional*

Years of work experience ✱ *Required*

➕ More info

○ Less than one Year   ○ 1 to 3 Years   ○ 4 to 6 Years
○ 7 to 10 Years   ○ 11 to 15 Years   ○ 16 to 20 Years
○ 21 to 25 Years   ○ 26 to 30 Years   ○ 31 to 35 Years
○ 36 to 40 Years   ○ 41 to 45 Years   ○ 46 to 50 Years
○ +50 Years

Which of the following best represent your most recent education background ✳ *Required*

➕ More info

- ◯ 1 - 4 Levels / CSEs / GCSEs, Entry, Foundation Diploma, NVQ Level 1, Foundation GNVQ, Basic Skills
- ◯ 5+ O Levels – passes / CSEs – Grade 1 / GCSEs – Grades A*-C, School Certificate, NVQ Level 2, Intermediate GNVQ, City and Guilds Craft, BTEC First/General Diploma Apprenticeship
- ◯ 2+ A Levels/VCEs, 4+ AS Levels, Higher School Certificate, Progression/Advanced, NVQ Level 3, Advanced GNVQ, City and Guilds Advanced Craft, ONC, OND, BTEC Nation
- ◯ Undergraduate degree, e.g. BSc, BA
- ◯ Master degree, e.g. MSc, MBA
- ◯ Doctorate degree, e.g. PhD, DBA
- ◯ Professional and other work-related qualifications
- ◯ Other

If you selected Other, please specify:

Gender *Optional*

➕ More info

- ◯ Male
- ◯ Female

Age range ✳ *Required*

➕ More info

- ◯ 18-20
- ◯ 21-24
- ◯ 25-30
- ◯ 31-35
- ◯ 36-40
- ◯ 41-45
- ◯ 46-50
- ◯ 51-55
- ◯ 56-60
- ◯ 61-65
- ◯ 66-70
- ◯ +70

Comments / Notes

➕ More info

‹ Previous   Finish ✔

Questionnaire Completed

Your responses to this survey have been submitted.

If you need a formal record of your submission, please use the following details:

Completion receipt

Receipt number:	1-1-1
Submission time:	2018-10-02 21:12:31 BST

🖶 Print   ⬇ Download PDF   ✉ Email

Thank you for participating

The research study results will be sent by email upon completion

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London South Bank University is responsible for running this survey. This organisation either owns the copyright for this survey, or is using this survey under agreement with the copyright holder. All rights reserved.

Software copyright

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Contact Us

For questions relating to this study, please contact the researcher who will do the best to answer your questions, Name: HISHAM ABOUGRAD, Email: abougrah@lsbu.ac.uk.   If you wish any further information regarding this study or have any complaints about the way you have been dealt with during the study or other concerns you can contact: Professor Jon Warwick at Work Telephone: +44 (0) 20 7815 7436, Email: warwick@lsbu.ac.uk, who is the Academic Supervisor for this study.

Appendix B: Interviews

Appendix B.1: Letter of Invitation to an Interview Participant

To: 'Participants list of emails or Principal Investigator email if BCC line is used'

From: 'Principal Investigator, Lead Applicant email < abougrah@lsbu.ac.uk >'

BCC: Participants list of emails

Subject: An invitation to participate in business practice research study at London South Bank University

Attached: Questionnaire Participant Information Sheet (PDF Document) – Available at Appendix A.3, Interview Participant Information Sheet (PDF Document) – Available at Appendix B.2, and

Interview participant Consent Form (PDF Document) – Available at Appendix B.3

Dear (Manager's Name),

I am pleased to inform you that you have been chosen to participate in a business practice research project entitled "Workflow Information Systems CERT Values: The Impact on Enterprise Content Management Performance" at London South Bank University (LSBU). You have been selected, because you are (manager's title) for employees who are using the (Insert ECM System Name) ECM System at work for business workflows. Please read the attached information sheets to get a full view of the research study. This includes the research purpose, a statement of anonymity and confidentiality, the anticipated time required for participation, and the voluntary nature of participation. There are no incentives for participating.

The research (UREC 1579) was approved by the LSBU research ethics committee on (Insert approval date) as part of a Doctorate in Business Administration (DBA) degree.

Please read the information sheets carefully before deciding whether to participate in the research study.

The data collection exercise has two parts. The first is a questionnaire and the second is an interview.

You can complete the questionnaire (Likert rating scale questions) by clicking at (Insert website link).

Please note that by submitting the online questionnaire you consent to participate in this part of the research. (Insert Organisation Name) has given permission for the research to be conducted to get feedback from employees on (Insert ECM System Name). The questionnaire takes approximately 20 minutes to complete. Please complete the questionnaire within two weeks (Insert questionnaire website link).

You can consent to participate in the research study interview by replying to this email and booking an interview within four weeks at which time the consent form will be signed. The interview will take approximately 45 minutes to complete.

If you have any inquiries about the research study, the questionnaire, the interview or any other related issues, please contact me at the contact details below.

Your feedback is important for the research findings, so I would be grateful if you would consent to be part of this research study.

Many thanks for reading this email, along with attached sheets; your time is appreciated.

Kind regards

HISHAM ABOUGRAD   HDip (BSc), MSc, MBA | MBCS | DBA Researcher | School of Business

London South Bank University | 103 Borough Road | London | SE1 0AA | E: abougrah@lsbu.ac.uk

Appendix B.2: Interview Participant Information Sheet

Research Study Title: Workflow Information Systems CERT Values:

The Impact on Enterprise Content Management Performance (UREC 1579)

You are being invited to take part in a research study. Before you decide whether to participate, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully. Talk to others about the study, if you wish. Ask me if there is anything that is unclear or if you would like more information. Please take time to decide whether or not you wish to take part.

This research study is being completed as part of a Doctorate in Business Administration (DBA) degree at London South Bank University. It has been reviewed and ethically approved by the London South Bank University Research Ethics Committee (UREC 1579).

The research investigates the impact of CERT values on enterprise content management (ECM) systems performance. CERT values are Customer orientation (C), Excellence (E), Responsibility (R) and Teamwork (T). CERT values are business process management (BPM) organisational values, which are used to manage business processes (workflows) for an organisation to meet its objectives.

The research seeks to answer the main question of How do CERT values impact on ECM systems workflow performance?

You have been chosen to participate in this research study as you are (manager's title) for employees who are using (Insert ECM System Name) ECM system at work. In total, the study includes (Data collection phase number of participants) employees and (Data collection phase number of participants) managers. (Insert Organisation Name) has given a permission for the research to be undertaken to get feedback from employees on (Insert ECM System Name) including your team who are invited to complete the online questionnaire.

It is up to you to decide whether or not to take part. If you do, please reply to the invitation email that you are happy to take part in order to book a time for the interview meeting within four weeks at which time the participant consent form will be signed. This will take approximately 45 minutes at an agreeable date and time. You are free to withdraw at any-time up to the submission of the thesis (2 years) and without giving a reason. After that time, it would be impossible for the researcher to comply. Your decision to withdraw will remain confidential at all times. You must contact the researcher if you intend to withdraw

in order to remove your data from the database. This will be done by issuing a database query using the key personal details. A decision to withdraw, or a decision not to take part, will not affect the research.

During the interview, the researcher will explore with you the research questions and for ease of later analysis, record the conversation (with your permission) and take notes. If you do not wish to be recorded but are still willing to participate, the researcher will take notes only.

It is not anticipated that you will suffer any disadvantage or be at risk from this research study as it only requires your feedback from using the (Insert ECM System Name) ECM at (Insert Organisation Name).

If you experience any emotional upset due to completing the interview questions, you may stop the interview immediately. Also, if there are any professional issues, which require reporting, then please note this and contact the researcher or the research supervisor.

It is unlikely that you will gain any personal benefit from participating in this research. However, the information you share with the researcher by answering the interview questions will help you gain some knowledge about business behaviours, workflow visible actions and structures, performance evaluations, a guide on how to recognise and reward employees, and measuring information systems performance.

All information received from you will be handled in a confidential manner and safely stored in a locked filing cabinet and on password protected computers in an environment locked when not occupied. Only the researcher and supervisor will have direct access to the information. Any reference to you will be coded by secured reference codes (unreferenced characters). This information will be held until 5 years after completing the research thesis in order to be used for publishing research study papers, and then the data will be destroyed.

If you have a concern about any aspect of this research study, you should contact the researcher who will do the best to answer your questions; Name: HISHAM ABOUGRAD, Email: abougrah@lsbu.ac.uk. If you wish any further information regarding this research study or have any complaints about the way you have been dealt with during the research study or other concerns you can contact the research supervisor: Professor Jon Warwick, Work Telephone: +44 (0) 20 7815 7436, Email: warwick@lsbu.ac.uk

Finally, if you remain unhappy and wish to complain formally, you can contact the Chair of London South Bank University Research Ethics Committee (UREC Ref.). Details can be obtained from the university website: https://my.lsbu.ac.uk/page/research-degrees-ethics

Appendix B.3: Interview Participant Consent Form

LSBU RESEARCH STUDY CONSENT FORM:

Research Study Title: Workflow Information Systems CERT Values:

The Impact on Enterprise Content Management Performance (UREC 1579)

As an interview participant, I agree that:

Please tick to consent

• I have read the attached information sheets on the research in which I have been asked and agree to participate and have been given a copy to keep. I have had the opportunity to discuss the details and ask questions about this information.	Yes ☐ No ☐
• The Researcher has explained the nature and purpose of the research and I believe that I understand what is being proposed.	Yes ☐ No ☐
• I understand that my personal involvement and my particular data from this study will remain strictly confidential. Only the study researchers will have access.	Yes ☐ No ☐
• I have been informed about what the data collected will be used for, to whom it may be disclosed, and how long it will be retained.	Yes ☐ No ☐
• I have received satisfactory answers to all of my questions.	Yes ☐ No ☐
• I hereby fully and freely consent to participate in the study, which has been fully explained to me.	Yes ☐ No ☐
• I understand that I am free to withdraw from the study at any time, without giving a reason.	Yes ☐ No ☐
• I consent to have the have the interview audio recorded using a digital recorder and transcribed.	Yes ☐ No ☐
• I consent to having anonymised direct quotations from the interviews used in publications.	Yes ☐ No ☐

Participant's Name (Block Capitals): ……………………..

Participant's Signature: ……………………..

As the Researcher responsible for this study, I confirm that I have explained to the participant named above the nature and purpose of the research to be undertaken.

Researcher's Name: ……………………..

Researcher's Signature: ……………………..

If you have a concern about any aspect of this study, you should contact the researcher who will do the best to answer your questions, HISHAM ABOUGRAD, Email: abougrah@lsbu.ac.uk

If you wish any further information regarding this research study or have any complaints about the way you have been dealt with during the research study or other concerns you can contact the research supervisor: Professor Jon Warwick, Work Telephone: +44 (0) 20 7815 7436, Email: warwick@lsbu.ac.uk

If you wish to speak to someone not directly related to the research, please contact the Chair, London South Bank University Research Ethics Committee (UREC 1579), Email: ethics@lsbu.ac.uk

Appendix C: Data Collection

Appendix C.1: Invitation Email to an Organisation to Participate

To: 'Participants list of emails or Principal Investigator email if BCC line is used'

From: 'Principal Investigator, Lead Applicant email < abougrah@lsbu.ac.uk >'

Subject: An invite to participate in business practice research study at London South Bank University

Attached: Questionnaire Participant Information Sheet (PDF Document) – Available at Appendix A.3,

Interview Participant Information Sheet (PDF Document) – Available at Appendix B.2, and

Interview participant Consent Form (PDF Document) – Available at Appendix B.3

Dear (Gatekeeper's Name/Job Title),

I would like to invite (Organisation name) to allow me to have access to participants in order to take part in my doctoral research project entitled "Workflow Information Systems CERT Values: The Impact on Enterprise Content Management Performance" at London South Bank University (LSBU). I am looking to collaborate with (Organisation name) so that your employees can provide me with their confidential views on (Insert ECM System Name) ECM system.

Please read the following information carefully and then decide whether or not you can allow me access to employees who I will contact by email.

(Organisation name) has been chosen to be part of the research study, because you have employees who are using the (Insert ECM System Name) ECM at work for business workflows.

Please read the attached information sheets to get a full view of the research study. This includes the research purpose, a statement of anonymity and confidentiality, the anticipated time required for participation, and the voluntary nature of participation. There are no incentives for participating.

The research (UREC 1579) was approved by LSBU research ethics committee on (Insert approval date) as part of a Doctorate in Business Administration (DBA) degree that I am undertaking.

Employees will be able to participate in the research questionnaire (Likert rating scale questions) by clicking on (Insert website link), and by submitting the online questionnaire participants are indicating consent to participate.

The questionnaire takes approximately 20 minutes to complete and should be submitted within two weeks from the email date.

Managers can participate in the research study interview stage by replying to the invitation email in order to book an interview meeting within four weeks from the email date. Managers will formally consent to take part at the interview where consent form will be signed (Attached pdf consent form). The interview is approximately 45 minutes in length.

It is anticipated that the results of this research study will be beneficial to (Organisation name), and you will get a copy of the results when the research study is completed.

This research study will help (Organisation name) to improve its ECM business performance and get employees feedback about any performance issues.

If you have any questions about the research study, the questionnaire, the interview or any other related issues, please contact me at the contact details below.

Many thanks for reading this email, along with attached sheets; your time is appreciated. Please let me know whether you will allow me to have access to employees in your organisation. If you consent to this then please could you provide me with (Organisation name) employees email contact details.

I look forward to hearing from you.

Kind regards

HISHAM ABOUGRAD   HDip (BSc), MSc, MBA | MBCS | DBA Researcher | School of Business
London South Bank University | 103 Borough Road | London | SE1 0AA | E: abougrah@lsbu.ac.uk

Appendix C.2: Attended Professional Conferences and Events

Microsoft Future Decoded, ExCeL London, 1st November 2018, Royal Docks, London

OpenText Innovation Tour London 2017, etc. venues, County Hall, Riverside Building, 21st March 2017, Lambeth, London

Oracle Modern Business Experience, ExCeL London, 1st – 2nd February 2017, Royal Docks, London

Big Data London Conference, Olympia Conference Centre, 3rd – 4th November 2016, Kensington, London

7th Fujitsu Information Capture Conference, Park Plaza Westminster Bridge, 12th – 13th September 2016, Lambeth, London

OpenText Innovation Tour London 2016, etc. venues, St Pauls, 19th – 20th March 2016, Barbican, London

Information & Content Management 2015/16, AIIM Forum UK, 24th June 2015, ILEC, Earl's Court, London

OpenText Innovation Tour London 2015, Twickenham Stadium, 19th – 20th March 2015, Twickenham, London
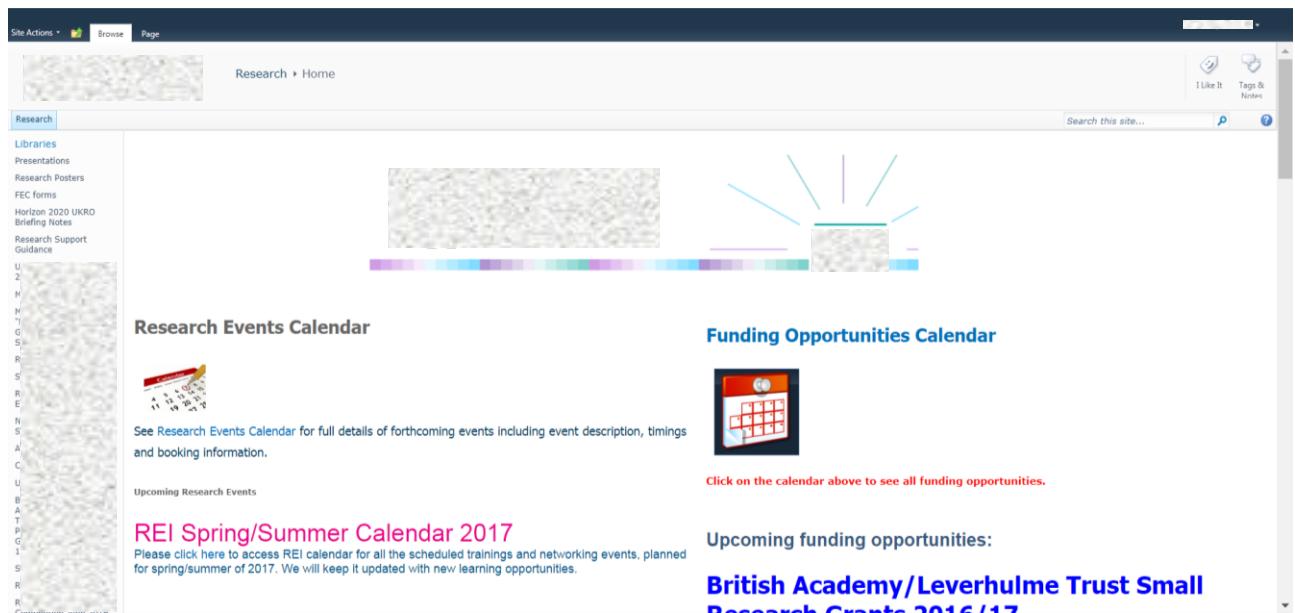
Information & Content Management 2014/15, AIIM Forum UK, ILEC - Ibis London Earls Court, 5th June 2014, Earl's Court, London

OpenText Innovation Tour London 2014, ExCeL London, 11th – 12th March 2014, Royal Docks, London

Appendix C.3: The HEI Approval System Outline Workflow

Appendix C.4: The HEI Approval Systems User Interfaces

Appendix C.4.1: Current HEI Approval System User Interfaces
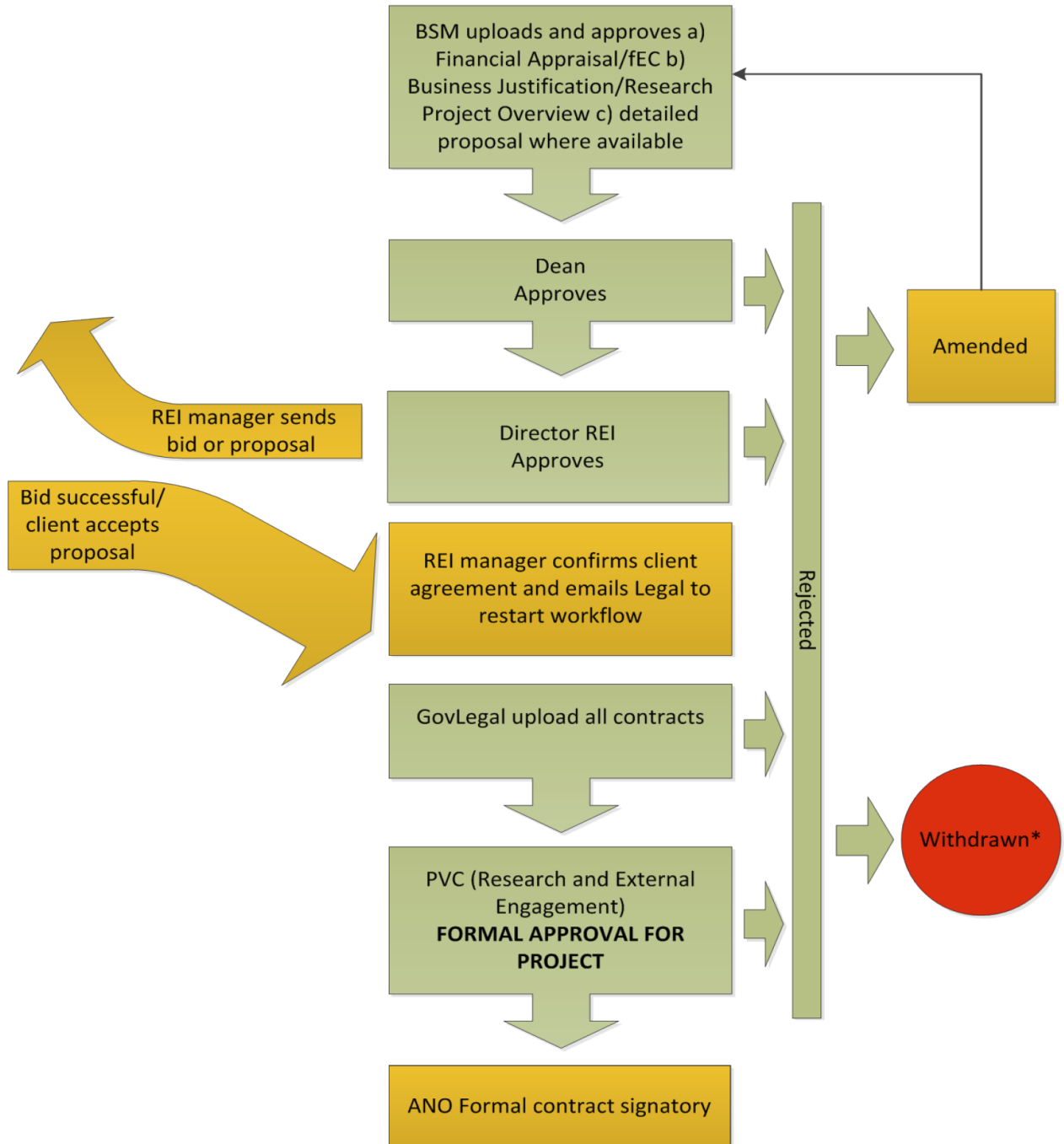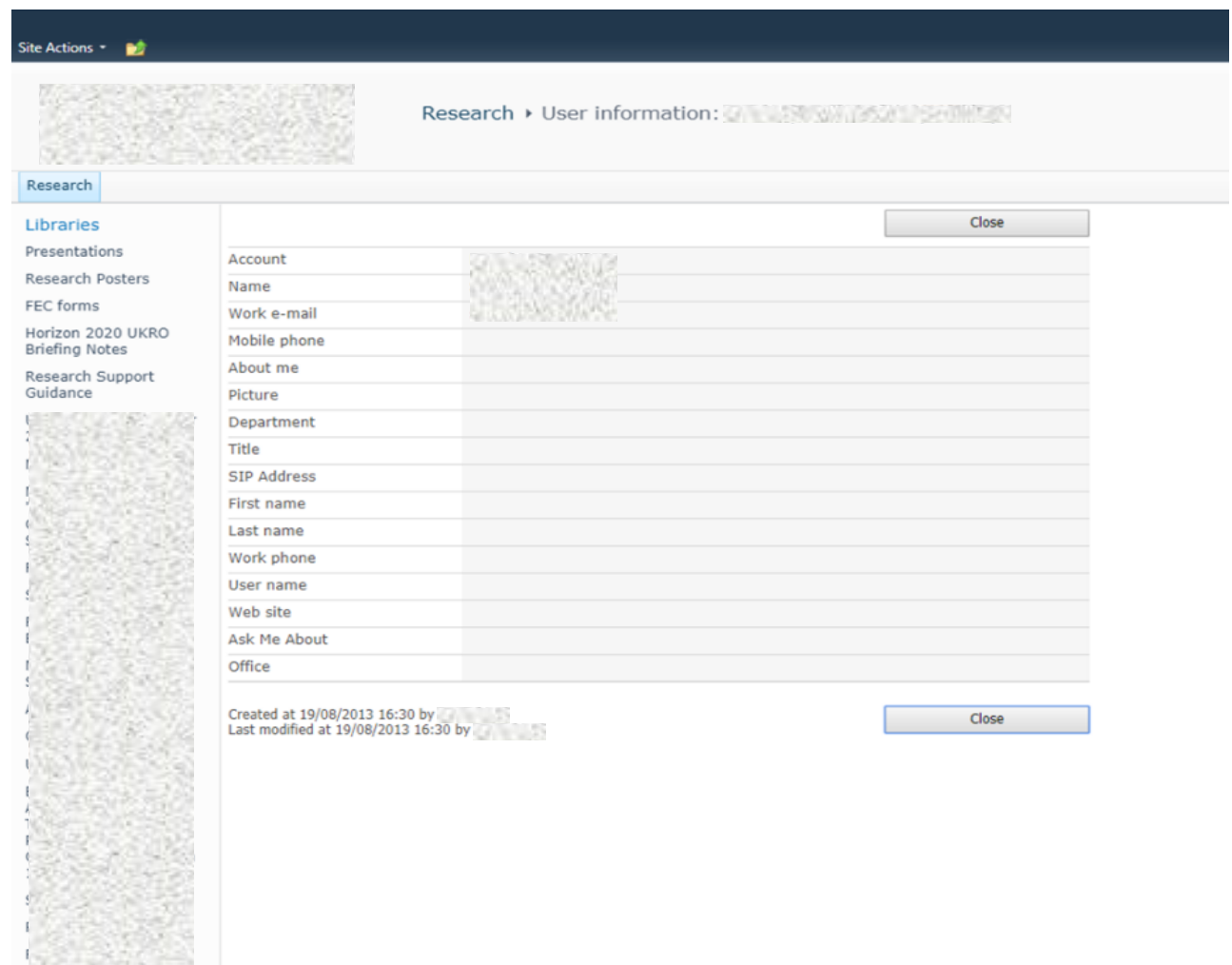
Appendix C.4.2: Previous Research Approval System User Interfaces

Appendix D: Data Analysis

Appendix D.1: Tables of Qualitative Findings for the Interviews

Appendix D.1.1: Table of Qualitative Findings for the 1st Interview

BPM Value (Core Category)	Topic statement (Issue)	Variable (Subcategory)	Aspect (Scale)	Response codes
Customer Orientation **C**	Enterprise Approval ECM System completes my tasks under my own supervision.	Creativity	Autonomy	- The system allows the visibility of tasks. - The system enables us to be creative. - Agree
	Enterprise Approval ECM System solves specialist problems and individual customer needs.		Influence	- The system solves a business problem. - The system "might be a little bit of more work for the people who are actively putting things on the system or people who have to do their jobs differently now, but for me it's a good thing, it makes my job easier". - Strongly agree.
	Enterprise Approval ECM System has an effect on my commitment to work.	Commitment	Occupational Distress	- The system enables people to show commitment (Agree). - Agree
	Enterprise Approval ECM System has an effect on my job satisfaction.		Job Satisfaction	- Strongly Agree
	I do raise Enterprise Approval ECM System errors, issues, or solve problems when it's necessary to do so.	Communication	Engagement	- Agree
	Enterprise Approval ECM System complete my job responsibilities, when it's required to do so.		Achievement	- Agree
	Enterprise Approval ECM System gives information for better service quality and performance to meet customer expectations.	Customer Needs	Expectations	- Agree
	Enterprise Approval ECM System satisfies my work activities.		Work Quality	- Agree
Excellence **E**	Enterprise Approval ECM System has high efficiency rate for my business process resources, e.g. cost, time, and quality.	Efficiency	Efficiency Rate	"Yes it does, because it saves problems later on that will be a waste of time trying to sort out. So, there may be a time investment now which will be saving a waste of time later. We had these wastes of time before, where something went wrong because you are not following the regulations, and then there's problems. So, I think yah, its efficient". - Agree
	My efficiency performance has been highly developed since last year as Enterprise Approval System improved my work productivity, communication, planning, and service control.		Efficiency Performance	- The staff "have a lot to say about the system, and we did lots of solving the problems" (Agree). - Agree
	Enterprise Approval System has high effectiveness rate for my business objectives and outputs, e.g. cost, time, and quality.	Effectiveness	Effectiveness Rate	- Agree
	My effective performance has been highly developed since last year as Enterprise Approval System improved my service quality, problem-solving, delivery, and customer satisfaction.		Effectiveness Performance	- Agree

	Enterprise Approval ECM System empowers my activities to make-decisions and confidently communicate for the internal service quality.	Empowerment	Service Quality	The staff "tell us the problem and we catch them and then send them back to IT on how to solve some of these. Yes, high". - Strongly agree
	Enterprise Approval ECM System controls my job decision-making, which empowers my team performance.		Controls	- Agree
	Enterprise Approval ECM System strengthen my work relationships and team performance.	Employee Orientation	Corporate Financial Performance (CFP)	- Agree
	Enterprise Approval ECM System effects my own performance level to be more positive, capable, and initiative.		Employee Initiative	- Agree
Responsibility **R**	Enterprise Approval ECM System has high response level on my internal and external inquiries.	Responsiveness	Response	"I have to agree, so we have to tell them or they have to be proactive enough to make sure they are checking the status of their project, and you can easily put filters on to see what's going on. So, you see, its not that hard, but yah if we built into it that they get notifications that would be a good thing". - Neither
	Enterprise Approval ECM System performs high for on-time delivery.		Response Time	- "From the compliance point of view, what the system was designed to do, it does". - Agree
	Enterprise Approval ECM System gives me the right results on-time.	Result Orientation	Results Time	- Agree
	Enterprise Approval ECM System reaches my expected results and complete my tasks as planned.		Manageability	- The system "does what's designed to do, and even in the flowchart, they are out of the system activities, which it's not supposed to be handled by the system. So, it does what's it supposed to do". - Agree
	Enterprise Approval ECM System is my core business process and implementation system for my job duties, commitments, and quality.	Right Quality	Sustainability	- Agree
	Enterprise Approval ECM System improves my work quality in terms of customer service, teamwork, and personal development plan.		Quality Management	"For instance, we have a problem where if you put in documents with a long file title, it will not accept them. So, I am always vigilant as to, what the limitations of the system, so how do I need to make sure, I can sort that to make it good for them and its always for me, how can I look underneath it to see that I can track everything". - Agree
	Enterprise Approval ECM System reduce information management (IM) tasks time and enable me to be more productive.	Right Skills	Time to Completion (TTC)	- Strongly Agree
	Employees training programmes on Enterprise Approval ECM System make us more productive and enable me to reduce IM tasks time.		Skills Allocation	- Neither
	Employees' skills are enough to carry out content management tasks using various Enterprise Approval ECM System functions and tools.		Employee Skills	- Agree

Teamwork **T**	Enterprise Approval ECM System gives me hope, resiliency, optimism, and efficacy to complete my tasks as planned.	Transparency	Authentic Leadership	- Agree
	Enterprise Approval ECM System is trusted to manage information on-time.		Trust	"Because its automated, so when somebody uses it, I get an automated email. So, for me yes" (Agree). - Agree
	Enterprise Approval ECM System motivates me to solve-problems in new ways, changing the way of business processes and automations, and Self-reporting (Self-worth) attitude and behaviour toward others, so that my level of achievement become higher.	Transformational Leadership	Transformational Leadership-Behaviour Inventory (TLI)	- Agree
	Enterprise Approval ECM System gives better vision, time management, and cost reduction, so that improves business continuance.		Consideration of Future Consequences (CFC)	- Agree
	Enterprise Approval ECM System gives the ability toward information exchange, business commitment, and improve service performance, which help employees to adapt the behaviour to maximise achievements and accessibility.	Transactional Leadership	Consideration of Future Consequences (CFC)	- Agree
	Enterprise Approval ECM System rewarded me good performance and achieve better quality of work-life.		Quality of Work Life (QWL)	- Agree
	Enterprise Approval ECM System has the performance and productivity to reach the right service level and team goals.	Team Collaboration	Team Productivity	- Neither
	Enterprise Approval ECM System gives me the experience to improve services and productivity, trust among team members, and better team commitment and communication, so that team members always have the capability to learn.		Team Learning	- Agree

Appendix D.1.2: Table of Qualitative Findings for the 2nd Interview

BPM Value (Core Category)	Topic statement (Issue)	Variable (Subcategory)	Aspect (Scale)	Response codes
Customer Orientation C	Enterprise Approval ECM System completes my tasks under my own supervision.	Creativity	Autonomy	- "if you say that the task is defined as evidencing robust compliance in line with the financial regulations then… we are probably at a 3. The system itself is a 5 but we have issues with users not using it all". - "The system design itself is a 5, the only issue is the people who don't use it at all and we are currently sitting on them". - Agree
	Enterprise Approval ECM System solves specialist problems and individual customer needs.		Influence	- "we are diverting, giving options, A and B, because it is a fairly simple system". - Agree
	Enterprise Approval ECM System has an effect on my commitment to work.	Commitment	Occupational Distress	- The system "is about being able to evidence that things have been approved, that is all and we don't report on that in any way, shape or form". - "It was designed to make them do something which is evidence contractual compliance and many people haven't bought into the need… you have been told you must do it but I think there is an emotional rejection underneath". - Disagree
	Enterprise Approval ECM System has an effect on my job satisfaction.		Job Satisfaction	- "it is not an important element in my working life, remember, but it did at a point in time". - Agree
	I do raise Enterprise Approval ECM System errors, issues, or solve problems when it's necessary to do so.	Communication	Engagement	- Agree
	Enterprise Approval ECM System complete my job responsibilities, when it's required to do so.		Achievement	- "Yes, it definitely does, integral part of being a compliance person". - Agree
	Enterprise Approval ECM System gives information for better service quality and performance to meet customer expectations.	Customer Needs	Expectations	- "Yes, it does because it tells you if something has been correctly approved". - Agree
	Enterprise Approval ECM System satisfies my work activities.		Work Quality	- "Yes, it does". - Agree
Excellence E	Enterprise Approval ECM System has high efficiency rate for my business process resources, e.g. cost, time, and quality.	Efficiency	Efficiency Rate	- "The system quality is good the only problem is the people that avoid the system completely". - Agree
	My efficiency performance has been highly developed since last year as Enterprise Approval System improved my work productivity, communication, planning, and service control.		Efficiency Performance	- "Yeah, it does, because it is what I am required to do". - Agree
	Enterprise Approval System has high effectiveness rate for my business objectives and outputs, e.g. cost, time, and quality.	Effectiveness	Effectiveness Rate	- "The users of the system don't see themselves as benefiting". - "A lot of the system users aren't people who, you know, finance didn't want to do it particularly because it meant that they had to suddenly check a load of costs and sign them off". - Disagree
	My effective performance has been highly developed since last year as Enterprise Approval System improved my service quality, problem-solving, delivery, and customer satisfaction.		Effectiveness Performance	- "I don't think it did". - Disagree

	Enterprise Approval ECM System empowers my activities to make-decisions and confidently communicate for the internal service quality.	Empowerment	Service Quality	- "It doesn't do the first bit but it definitely does the second bit. I suppose you would argue that it does the first bit … , so, I agree". - Agree
	Enterprise Approval ECM System controls my job decision-making, which empowers my team performance.		Controls	- "You might argue that it is a neither to me. I don't disagree but it is a neither, it is not applicable to my team, so there is no decision-making arising from the use of the system for us. The decision making is for another type of user". - Neither
	Enterprise Approval ECM System strengthen my work relationships and team performance.	Employee Orientation	Corporate Financial Performance (CFP)	- "Yes, it does. I will agree on that". - Strongly agree
	Enterprise Approval ECM System effects my own performance level to be more positive, capable, and initiative.		Employee Initiative	- "No, I am not a user, remember, so you are probably better putting me down as neither. It is more like a not applicable". - Neither
Responsibility **R**	Enterprise Approval ECM System has high response level on my internal and external inquiries.	Responsiveness	Response	- "No, we don't.". - "Performance wise it has not been structured to deliver that. We don't use it for reporting.". - Disagree
	Enterprise Approval ECM System performs high for on-time delivery.		Response Time	- "Yes, it does. There are no problems on that. It one of the few IT systems … that doesn't glitch and delay". - Strongly agree
	Enterprise Approval ECM System gives me the right results on-time.	Result Orientation	Results Time	- "We have never had a problem with the system". - Strongly agree
	Enterprise Approval ECM System reaches my expected results and complete my tasks as planned.		Manageability	- "The system is perfect". - Strongly agree
	Enterprise Approval ECM System is my core business process and implementation system for my job duties, commitments, and quality.	Right Quality	Sustainability	- "No, it is not". - "Disagree or strongly disagree? Just Disagree". - Disagree
	Enterprise Approval ECM System improves my work quality in terms of customer service, teamwork, and personal development plan.		Quality Management	- "Not really". - Neither
	Enterprise Approval ECM System reduce information management (IM) tasks time and enable me to be more productive.	Right Skills	Time to Completion (TTC)	- "Yeah, it is, that is an agree". - Agree
	Employees training programmes on Enterprise Approval ECM System make us more productive and enable me to reduce IM tasks time.		Skills Allocation	- "No, it has had no effect". - "I think neither is fair. It is unfair to write disagree. Neither is fair". - Neither
	Employees' skills are enough to carry out content management tasks using various Enterprise Approval ECM System functions and tools.		Employee Skills	- "Yes, definitely". - Strongly agree
Teamwork **T**	Enterprise Approval ECM System gives me hope, resiliency, optimism, and efficacy to complete my tasks as planned.	Transparency	Authentic Leadership	- "I agree with that, because my core task is evidencing contractual compliance". - Agree
	Enterprise Approval ECM System is trusted to manage information on-time.		Trust	- "The system is really reliable but because it is user dependant for forwarding it is really difficult to decouple... the system has no problem". - "Yes, if it is just the IT system, yeah, totally agree". - Strongly agree

Enterprise Approval ECM System motivates me to solve-problems in new ways, changing the way of business processes and automations, and Self-reporting (Self-worth) attitude and behaviour toward others, so that my level of achievement become higher.	Transformational Leadership	Transformational Leadership-Behaviour Inventory (TLI)	- "No". - Strongly disagree
Enterprise Approval ECM System gives better vision, time management, and cost reduction, so that improves business continuance.		Consideration of Future Consequences (CFC)	- "Yes, it does". - Agree
Enterprise Approval ECM System gives the ability toward information exchange, business commitment, and improve service performance, which help employees to adapt the behaviour to maximise achievements and accessibility.	Transactional Leadership	Consideration of Future Consequences (CFC)	- "Yes, I suppose it does that". - Agree
Enterprise Approval ECM System rewarded me good performance and achieve better quality of work-life.		Quality of Work Life (QWL)	- "Neither, It is not a big part of my working life". - Neither
Enterprise Approval ECM System has the performance and productivity to reach the right service level and team goals.	Team Collaboration	Team Productivity	- "Yes, it does". - "Okay, so, agree? Yes, I would strongly agree with that". - Strongly agree
Enterprise Approval ECM System gives me the experience to improve services and productivity, trust among team members, and better team commitment and communication, so that team members always have the capability to learn.		Team Learning	- "No, I don't think it is that type of workplace system". - "Yes, I do disagree, yes but that doesn't mean that the system failed it means that it wasn't designed for that". - Disagree

Appendix D.1.3: Table of Qualitative Findings for the 3rd Interview

BPM Value (Core Category)	Topic statement (Issue)	Variable (Subcategory)	Aspect (Scale)	Response codes
Customer Orientation **C**	Enterprise Approval ECM System completes my tasks under my own supervision.	Creativity	Autonomy	- Strongly agree
	Enterprise Approval ECM System solves specialist problems and individual customer needs.		Influence	- "I would agree with that" - Agree
	Enterprise Approval ECM System has an effect on my commitment to work.	Commitment	Occupational Distress	- "I would say I am undecided on that one" - Neither
	Enterprise Approval ECM System has an effect on my job satisfaction.		Job Satisfaction	- "yes, not an exceptional amount but it does make a few things slightly easier" - Agree
	I do raise Enterprise Approval ECM System errors, issues, or solve problems when it's necessary to do so.	Communication	Engagement	- "do I raise them, yes, strongly agree, I raise them directly" - Strongly agree
	Enterprise Approval ECM System complete my job responsibilities, when it's required to do so.		Achievement	- "There are obviously things to do once the system has finished, it doesn't do the entire pathway but the things that it does, it does to completion" - Strongly agree
	Enterprise Approval ECM System gives information for better service quality and performance to meet customer expectations.	Customer Needs	Expectations	- Agree
	Enterprise Approval ECM System satisfies my work activities.		Work Quality	- "Does the system fulfil my job responsibilities? Yes, agree" - Agree
Excellence **E**	Enterprise Approval ECM System has high efficiency rate for my business process resources, e.g. cost, time, and quality.	Efficiency	Efficiency Rate	- "It is relatively fast but because of the many layers of approvals and because the documents I create need to be uploaded by a different person" - "Many, many different people need to put their hands on it before it is finished" - Agree
	My efficiency performance has been highly developed since last year as Enterprise Approval System improved my work productivity, communication, planning, and service control.		Efficiency Performance	- "Having worked with it for a year, yeah" - "Yes, in terms of using the system and working, yes" - Strongly agree
	Enterprise Approval System has high effectiveness rate for my business objectives and outputs, e.g. cost, time, and quality.	Effectiveness	Effectiveness Rate	- "Yes, I agree with that" - Agree
	My effective performance has been highly developed since last year as Enterprise Approval System improved my service quality, problem-solving, delivery, and customer satisfaction.		Effectiveness Performance	- "The changes have been quite incremental" - "They haven't been big changes" - "They have been small refinements which means while it is better it is not a huge shift in my workflow" - Agree
	Enterprise Approval ECM System empowers my activities to make-decisions and confidently communicate for the internal service quality.	Empowerment	Service Quality	- The system "replaces some things that we would do in other ways and it does that well" - Agree
	Enterprise Approval ECM System controls my job decision-making, which empowers my team performance.		Controls	- Agree
	Enterprise Approval ECM System strengthen my work relationships and team performance.	Employee Orientation	CFP	- Agree
	Enterprise Approval ECM System effects my own performance level to be more positive, capable, and initiative.		Employee Initiative	- Agree

Responsibility **R**	Enterprise Approval ECM System has high response level on my internal and external inquiries.	Responsiveness	Response	- "There are very few enquiries that you can make to the system but the ones that you can make it answers" - "If you are making an enquiry about where something is, what stage a project is at in the workflow, then yes, I can find out, I can make that enquiry, so, yes" - Agree
	Enterprise Approval ECM System performs high for on-time delivery.		Response Time	- Agree
	Enterprise Approval ECM System gives me the right results on-time.	Result Orientation	Results Time	- "The system itself, yes, the problems are in terms of people" - "As I mentioned, because there are so many people, if any one person doesn't fulfil their responsibility the entire thing stops" - Agree
	Enterprise Approval ECM System reaches my expected results and complete my tasks as planned.		Manageability	- Agree
	Enterprise Approval ECM System is my core business process and implementation system for my job duties, commitments, and quality.	Right Quality	Sustainability	- "Yes, I agree. It is a very small part of my overall job role but for that part it is the core aspect of it, yes" - Strongly agree
	Enterprise Approval ECM System improves my work quality in terms of customer service, teamwork, and personal development plan.		Quality Management	- "Now that we have it and can run it through with staff members… I suppose you could say it does help with that relationship" - Agree
	Enterprise Approval ECM System reduce information management (IM) tasks time and enable me to be more productive.	Right Skills	Time to Completion (TTC)	- Agree
	Employees training programmes on Enterprise Approval ECM System make us more productive and enable me to reduce IM tasks time.		Skills Allocation	- Agree
	Employees' skills are enough to carry out content management tasks using various Enterprise Approval ECM System functions and tools.		Employee Skills	- "Yes, I agree. All of the staff members who have access to the system have the skills to use it, yes" - Strongly agree
Teamwork **T**	Enterprise Approval ECM System gives me hope, resiliency, optimism, and efficacy to complete my tasks as planned.	Transparency	Authentic Leadership	- Agree
	Enterprise Approval ECM System is trusted to manage information on-time.		Trust	- Agree
	Enterprise Approval ECM System motivates me to solve-problems in new ways, changing the way of business processes and automations, and Self-reporting (Self-worth) attitude and behaviour toward others, so that my level of achievement become higher.	Transformational Leadership	Transformational Leadership-Behaviour Inventory (TLI)	- "The system is quite rigid. It does not encourage innovation" - Disagree
	Enterprise Approval ECM System gives better vision, time management, and cost reduction, so that improves business continuance.		Consideration of Future Consequences (CFC)	- Agree
	Enterprise Approval ECM System gives the ability toward information exchange, business commitment, and improve service performance, which help employees to adapt the behaviour to maximise achievements and accessibility.	Transactional Leadership	Consideration of Future Consequences (CFC)	- Agree
	Enterprise Approval ECM System rewarded me good performance and achieve better quality of work-life.		Quality of Work Life (QWL)	- Neither
	Enterprise Approval ECM System has the performance and productivity to reach the right service level and team goals.	Team Collaboration	Team Productivity	- Agree
	Enterprise Approval ECM System gives me the experience to improve services and productivity, trust among team members, and better team commitment and communication, so that team members always have the capability to learn.		Team Learning	- "The learning option is in the sense that we sort of teach each other how to use it and as each change comes through, that information passes from person-to-person but beyond that not that much" - Agree

Appendix D.1.4: Table of Qualitative Findings for the 4th Interview

BPM Value (Core Category)	Topic statement (Issue)	Variable (Subcategory)	Aspect (Scale)	Response codes
Customer Orientation C	Research Approval ECM System completes my tasks under my own supervision.	Creativity	Autonomy	- "The whole point of the system is to connect my office with the Dean, yeah, so, basically my task is to upload the things on the system but then my task is considered finished once the Dean has seen it, checked it and has approved it. It is a collaborative" - Neither
	Research Approval ECM System solves specialist problems and individual customer needs.		Influence	- "No, it is standardised procedures, strongly disagree. For anything that is abnormal we send emails - Strongly disagree
	Research Approval ECM System has an effect on my commitment to work.	Commitment	Occupational Distress	- "My enjoyment of work and my determination to do my work well? No, strongly disagree, it does not effect it any way" - Strongly disagree
	Research Approval ECM System has an effect on my job satisfaction.		Job Satisfaction	- "The only thing it does is it makes my work a bit easier because I don't have to chase people around with papers" - Agree
	I do raise Research Approval ECM System errors, issues, or solve problems when it's necessary to do so.	Communication	Engagement	- "there is a series of small issues that we learnt to live with and we don't report it" - "When there is a bigger problem or we need any changes, I report it to my manager" - "SharePoint is flexible enough, you can add categories, remove categories, you can tweak it. It wasn't an error per say, it was small adjustments that I wanted done to SharePoint, I spoke to my manager and the manager spoke to whoever is in charge of SharePoint" - Agree
	Research Approval ECM System complete my job responsibilities, when it's required to do so.		Achievement	- Agree
	Research Approval ECM System gives information for better service quality and performance to meet customer expectations.	Customer Needs	Expectations	- "yes, it does meet my expectations but it doesn't necessarily impact on my performance" - Agree
	Research Approval ECM System satisfies my work activities.		Work Quality	- "for my needs at work Share-point is inefficient. It is good for the small piece of work assigned to it which is getting approvals but in my office and in my line of work we would need a system that would bring together Share-point with a lot of spreadsheets that they keep with a post the work system that we have. We would need an integrated system for the whole of REI" - Neither
Excellence E	Research Approval ECM System has high efficiency rate for my business process resources, e.g. cost, time, and quality.	Efficiency	Efficiency Rate	- "It is efficient for it's small, limited purpose of getting approvals. For that it is good, it is efficient, it is okay. It saves me time, I don't have to chase people around with papers" - Agree
	My efficiency performance has been highly developed since last year as Research Approval System improved my work productivity, communication, planning, and service control.		Efficiency Performance	- "I disagree with the fact that there is an improvement" - Disagree

	Research Approval System has high effectiveness rate for my business objectives and outputs, e.g. cost, time, and quality.	Effectiveness	Effectiveness Rate	- "In my workflow, I need to get approval from finance and from the dean. But Share-point doesn't allow me to get approval from finance it just allows me to get approval from the dean. Every time I need approval from finance we exchange email and then I attach the email from finance to Share-point so the dean sees both approval from myself and finance in order for the dean to approve it. So, basically, ideally, in this workflow there should be room on Share-point for finance and there isn't. We've just limited Share-point to the fact that it is between me and the dean, although in truth, in the workflow, there is also finance" - Disagree
	My effective performance has been highly developed since last year as Research Approval System improved my service quality, problem-solving, delivery, and customer satisfaction.		Effectiveness Performance	- "I would say neither because we've established that not much progress has been done and nothing has changed basically in the past year with Share-point" - Neither
	Research Approval ECM System empowers my activities to make-decisions and confidently communicate for the internal service quality.	Empowerment	Service Quality	- "Not for making decisions but for internal services" - Agree
	Research Approval ECM System controls my job decision-making, which empowers my team performance.		Controls	- "It doesn't control decision-making for myself in any way and any problem I have with the dean, like I said, that is solved with emails" - "It doesn't empower me or help in decision-making" - Disagree
	Research Approval ECM System strengthen my work relationships and team performance.	Employee Orientation	Corporate Financial Performance (CFP)	- Strongly disagree
	Research Approval ECM System effects my own performance level to be more positive, capable, and initiative.		Employee Initiative	- Disagree
Responsibility **R**	Research Approval ECM System has high response level on my internal and external inquiries.	Responsiveness	Response	- "Pulling out reports and things like that, no, we have a parallel reporting system" - "It is ineffective in reporting" - Disagree
	Research Approval ECM System performs high for on-time delivery.		Response Time	- "Yes, at least for on time delivery that is true, that is good because the deans can approve it even if they are travelling, they just need internet access" - Strongly agree
	Research Approval ECM System gives me the right results on-time.	Result Orientation	Results Time	- "There is no question of right and wrong with Share-point" - Neither
	Research Approval ECM System reaches my expected results and complete my tasks as planned.		Manageability	- "it goes according to plan" - Agree
	Research Approval ECM System is my core business process and implementation system for my job duties, commitments, and quality.	Right Quality	Sustainability	- "It has got a lot of things that aren't quite right with it. For example, although this is supposed to be a private approval system between me and the dean and the academic involved in the proposal should also see it, basically, if you go on SharePoint you can see the proposals of all the people and a lot of details that they might not always want to share" - "There is this lack of privacy" - Disagree

	Research Approval ECM System improves my work quality in terms of customer service, teamwork, and personal development plan.		Quality Management	- Agree
	Research Approval ECM System reduce information management (IM) tasks time and enable me to be more productive.	Right Skills	Time to Completion (TTC)	- Strongly agree
	Employees training programmes on Research Approval ECM System make us more productive and enable me to reduce IM tasks time.		Skills Allocation	- "To a certain extent but just to that small extent of approvals" - Agree
	Employees' skills are enough to carry out content management tasks using various Research Approval ECM System functions and tools.		Employee Skills	- "Yes, I think the skills I have are enough for using SharePoint" - Agree
Teamwork **T**	Research Approval ECM System gives me hope, resiliency, optimism, and efficacy to complete my tasks as planned.	Transparency	Authentic Leadership	- "It doesn't really give me hope and optimism. It is just something that I do" - Neither
	Research Approval ECM System is trusted to manage information on-time.		Trust	- Strongly agree
	Research Approval ECM System motivates me to solve-problems in new ways, changing the way of business processes and automations, and Self-reporting (Self-worth) attitude and behaviour toward others, so that my level of achievement become higher.	Transformational Leadership	Transformational Leadership-Behaviour Inventory (TLI)	- "It does challenge us to think up new processes just because this one is… not perfect. Because it has problems it does make us think about alternative workflows" - Agree
	Research Approval ECM System gives better vision, time management, and cost reduction, so that improves business continuance.		Consideration of Future Consequences (CFC)	- "I think we need a more modern system" - "There are systems that are designed for universities that take into account the whole workflow instead of breaking it down into ten thousand pieces like we have now" - Disagree
	Research Approval ECM System gives the ability toward information exchange, business commitment, and improve service performance, which help employees to adapt the behaviour to maximise achievements and accessibility.	Transactional Leadership	Consideration of Future Consequences (CFC)	- "It doesn't really help business development or anything" - "business commitment, okay" - Agree
	Research Approval ECM System rewarded me good performance and achieve better quality of work-life.		Quality of Work Life (QWL)	- "it gives it such a positive feeling that it is very hard for me to agree with it. It is not the system that rewards me with good performance" - Neither
	Research Approval ECM System has the performance and productivity to reach the right service level and team goals.	Team Collaboration	Team Productivity	- Disagree
	Research Approval ECM System gives me the experience to improve services and productivity, trust among team members, and better team commitment and communication, so that team members always have the capability to learn.		Team Learning	- "I would say disagree. It is not the system that makes us learn things" - Disagree

Appendix D.1.5: Table of Qualitative Findings for the 5th Interview

BPM Value (Core Category)	Topic statement (Issue)	Variable (Subcategory)	Aspect (Scale)	Response codes
Customer Orientation **C**	Research Approval ECM System completes my tasks under my own supervision.	Creativity	Autonomy	- Strongly agree
	Research Approval ECM System solves specialist problems and individual customer needs.		Influence	- Agree
	Research Approval ECM System has an effect on my commitment to work.	Commitment	Occupational Distress	- Agree
	Research Approval ECM System has an effect on my job satisfaction.		Job Satisfaction	- Agree
	I do raise Research Approval ECM System errors, issues, or solve problems when it's necessary to do so.	Communication	Engagement	- Agree
	Research Approval ECM System complete my job responsibilities, when it's required to do so.		Achievement	- Agree
	Research Approval ECM System gives information for better service quality and performance to meet customer expectations.	Customer Needs	Expectations	- Agree
	Research Approval ECM System satisfies my work activities.		Work Quality	- Neither
Excellence **E**	Research Approval ECM System has high efficiency rate for my business process resources, e.g. cost, time, and quality.	Efficiency	Efficiency Rate	- Agree
	My efficiency performance has been highly developed since last year as Research Approval System improved my work productivity, communication, planning, and service control.		Efficiency Performance	- Neither
	Research Approval System has high effectiveness rate for my business objectives and outputs, e.g. cost, time, and quality.	Effectiveness	Effectiveness Rate	- Neither
	My effective performance has been highly developed since last year as Research Approval System improved my service quality, problem-solving, delivery, and customer satisfaction.		Effectiveness Performance	- Neither
	Research Approval ECM System empowers my activities to make-decisions and confidently communicate for the internal service quality.	Empowerment	Service Quality	- Neither
	Research Approval ECM System controls my job decision-making, which empowers my team performance.		Controls	- Disagree
	Research Approval ECM System strengthen my work relationships and team performance.	Employee Orientation	Corporate Financial Performance (CFP)	- Neither
	Research Approval ECM System effects my own performance level to be more positive, capable, and initiative.		Employee Initiative	- Neither
Responsibility **R**	Research Approval ECM System has high response level on my internal and external inquiries.	Responsiveness	Response	- Neither
	Research Approval ECM System performs high for on-time delivery.		Response Time	- Neither

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	Research Approval ECM System gives me the right results on-time.	Result Orientation	Results Time	- Neither
	Research Approval ECM System reaches my expected results and complete my tasks as planned.		Manageability	- Agree
	Research Approval ECM System is my core business process and implementation system for my job duties, commitments, and quality.	Right Quality	Sustainability	- Neither
	Research Approval ECM System improves my work quality in terms of customer service, teamwork, and personal development plan.		Quality Management	- Neither
	Research Approval ECM System reduce information management (IM) tasks time and enable me to be more productive.	Right Skills	Time to Completion (TTC)	- Agree
	Employees training programmes on Research Approval ECM System make us more productive and enable me to reduce IM tasks time.		Skills Allocation	- Neither
	Employees' skills are enough to carry out content management tasks using various Research Approval ECM System functions and tools.		Employee Skills	- Agree
Teamwork **T**	Research Approval ECM System gives me hope, resiliency, optimism, and efficacy to complete my tasks as planned.	Transparency	Authentic Leadership	- Agree
	Research Approval ECM System is trusted to manage information on-time.		Trust	- Agree
	Research Approval ECM System motivates me to solve-problems in new ways, changing the way of business processes and automations, and Self-reporting (Self-worth) attitude and behaviour toward others, so that my level of achievement become higher.	Transformational Leadership	Transformational Leadership-Behaviour Inventory (TLI)	- Disagree
	Research Approval ECM System gives better vision, time management, and cost reduction, so that improves business continuance.		Consideration of Future Consequences (CFC)	- Disagree
	Research Approval ECM System gives the ability toward information exchange, business commitment, and improve service performance, which help employees to adapt the behaviour to maximise achievements and accessibility.	Transactional Leadership	Consideration of Future Consequences (CFC)	- Neither
	Research Approval ECM System rewarded me good performance and achieve better quality of work-life.		Quality of Work Life (QWL)	- Neither
	Research Approval ECM System has the performance and productivity to reach the right service level and team goals.	Team Collaboration	Team Productivity	- Disagree
	Research Approval ECM System gives me the experience to improve services and productivity, trust among team members, and better team commitment and communication, so that team members always have the capability to learn.		Team Learning	- Disagree

Appendix D.1.6: Table of Qualitative Findings for the 6th Interview

BPM Value (Core Category)	Topic statement (Issue)	Variable (Subcategory)	Aspect (Scale)	Response codes
Customer Orientation **C**	Research Approval ECM System completes my tasks under my own supervision.	Creativity	Autonomy	- Agree
	Research Approval ECM System solves specialist problems and individual customer needs.		Influence	- Agree
	Research Approval ECM System has an effect on my commitment to work.	Commitment	Occupational Distress	- Agree
	Research Approval ECM System has an effect on my job satisfaction.		Job Satisfaction	- Agree
	I do raise Research Approval ECM System errors, issues, or solve problems when it's necessary to do so.	Communication	Engagement	- "Yes, Agree . . . Yah yah …" - Strongly agree
	Research Approval ECM System complete my job responsibilities, when it's required to do so.		Achievement	- Agree
	Research Approval ECM System gives information for better service quality and performance to meet customer expectations.	Customer Needs	Expectations	- Agree
	Research Approval ECM System satisfies my work activities.		Work Quality	- Agree
Excellence **E**	Research Approval ECM System has high efficiency rate for my business process resources, e.g. cost, time, and quality.	Efficiency	Efficiency Rate	- "I wouldn't say it is completely efficient, you said from cost, quality and time… I semi-agree" - "let's go with neither" - Neither
	My efficiency performance has been highly developed since last year as Research Approval System improved my work productivity, communication, planning, and service control.		Efficiency Performance	- Agree
	Research Approval System has high effectiveness rate for my business objectives and outputs, e.g. cost, time, and quality.	Effectiveness	Effectiveness Rate	- "I think it is very time consuming, but it is effective for the outputs that we require" - Agree
	My effective performance has been highly developed since last year as Research Approval System improved my service quality, problem-solving, delivery, and customer satisfaction.		Effectiveness Performance	- "Yes, agree. It can do more but for what it is doing it is good since last year" - Strongly agree
	Research Approval ECM System empowers my activities to make-decisions and confidently communicate for the internal service quality.	Empowerment	Service Quality	- Agree
	Research Approval ECM System controls my job decision-making, which empowers my team performance.		Controls	- Agree
	Research Approval ECM System strengthen my work relationships and team performance.	Employee Orientation	Corporate Financial Performance (CFP)	- Agree
	Research Approval ECM System effects my own performance level to be more positive, capable, and initiative.		Employee Initiative	- Agree
Responsibility **R**	Research Approval ECM System has high response level on my internal and external inquiries.	Responsiveness	Response	- Agree
	Research Approval ECM System performs high for on-time delivery.		Response Time	- "Because a lot of the time the content that goes into the approval system is after the actual delivery of the project. It defeats the purpose of an approval system" - "It is retrospective. A lot of the content that goes on is after it has been signed and there is a side process that has been signed off and then it goes onto the system but then it defeats the purpose of it being

				approved because it has been approved outside. It is just a matter of putting it on the system rather than using the system for approval" - Disagree
	Research Approval ECM System gives me the right results on-time.	Result Orientation	Results Time	- Agree
	Research Approval ECM System reaches my expected results and complete my tasks as planned.		Manageability	- Agree
	Research Approval ECM System is my core business process and implementation system for my job duties, commitments, and quality.	Right Quality	Sustainability	- "It is a part of my job" - Agree
	Research Approval ECM System improves my work quality in terms of customer service, teamwork, and personal development plan.		Quality Management	- "No, neither" - Disagree
	Research Approval ECM System reduce information management (IM) tasks time and enable me to be more productive.	Right Skills	Time to Completion (TTC)	- Agree
	Employees training programmes on Research Approval ECM System make us more productive and enable me to reduce IM tasks time.		Skills Allocation	- "Are you saying we've had staff training or staff training would enable us?" - "No" - "Disagree, we don't have training, if we did it would be very good" - "I strongly disagree" - Strongly disagree
	Employees' skills are enough to carry out content management tasks using various Research Approval ECM System functions and tools.		Employee Skills	- "Disagree … they've never seen it before. If they haven't seen it before their skills aren't in that area so they would need to be trained up or are you talking about actually navigating the system" - "Yes, okay, so it is the system, not the content? … Then agree" - Agree
Teamwork **T**	Research Approval ECM System gives me hope, resiliency, optimism, and efficacy to complete my tasks as planned.	Transparency	Authentic Leadership	- No, disagree - Strongly disagree
	Research Approval ECM System is trusted to manage information on-time.		Trust	- Neither
	Research Approval ECM System motivates me to solve-problems in new ways, changing the way of business processes and automations, and Self-reporting (Self-worth) attitude and behaviour toward others, so that my level of achievement become higher.	Transformational Leadership	Transformational Leadership-Behaviour Inventory (TLI)	- Agree
	Research Approval ECM System gives better vision, time management, and cost reduction, so that improves business continuance.		Consideration of Future Consequences (CFC)	- Agree
	Research Approval ECM System gives the ability toward information exchange, business commitment, and improve service performance, which help employees to adapt the behaviour to maximise achievements and accessibility.	Transactional Leadership	Consideration of Future Consequences (CFC)	- Agree
	Research Approval ECM System rewarded me good performance and achieve better quality of work-life.		Quality of Work Life (QWL)	- Agree
	Research Approval ECM System has the performance and productivity to reach the right service level and team goals.	Team Collaboration	Team Productivity	- "Yes, agree" - Agree
	Research Approval ECM System gives me the experience to improve services and productivity, trust among team members, and better team commitment and communication, so that team members always have the capability to learn.		Team Learning	- Agree

Appendix D.1.7: Table of Qualitative Findings for the 7th Interview

BPM Value (Core Category)	Topic statement (Issue)	Variable (Subcategory)	Aspect (Scale)	Response codes
Customer Orientation **C**	Enterprise Approval ECM System completes my tasks under my own supervision.	Creativity	Autonomy	- Agree
	Enterprise Approval ECM System solves specialist problems and individual customer needs.		Influence	- Agree
	Enterprise Approval ECM System has an effect on my commitment to work.	Commitment	Occupational Distress	- Agree
	Enterprise Approval ECM System has an effect on my job satisfaction.		Job Satisfaction	- "It has an impact, yes. It is not a positive impact but it has an impact, it is a negative impact" - Agree
	I do raise Enterprise Approval ECM System errors, issues, or solve problems when it's necessary to do so.	Communication	Engagement	- Agree
	Enterprise Approval ECM System complete my job responsibilities, when it's required to do so.		Achievement	- "Yes, agree, it does, it does" - Strongly agree
	Enterprise Approval ECM System gives information for better service quality and performance to meet customer expectations.	Customer Needs	Expectations	- Disagree
	Enterprise Approval ECM System satisfies my work activities.		Work Quality	- Disagree
Excellence **E**	Enterprise Approval ECM System has high efficiency rate for my business process resources, e.g. cost, time, and quality.	Efficiency	Efficiency Rate	- Disagree
	My efficiency performance has been highly developed since last year as Enterprise Approval System improved my work productivity, communication, planning, and service control.		Efficiency Performance	- Disagree
	Enterprise Approval System has high effectiveness rate for my business objectives and outputs, e.g. cost, time, and quality.	Effectiveness	Effectiveness Rate	- Disagree
	My effective performance has been highly developed since last year as Enterprise Approval System improved my service quality, problem-solving, delivery, and customer satisfaction.		Effectiveness Performance	- Disagree
	Enterprise Approval ECM System empowers my activities to make-decisions and confidently communicate for the internal service quality.	Empowerment	Service Quality	- Neither
	Enterprise Approval ECM System controls my job decision-making, which empowers my team performance.		Controls	- Disagree
	Enterprise Approval ECM System strengthen my work relationships and team performance.	Employee Orientation	Corporate Financial Performance (CFP)	- Disagree
	Enterprise Approval ECM System effects my own performance level to be more positive, capable, and initiative.		Employee Initiative	- Disagree

Responsibility **R**	Enterprise Approval ECM System has high response level on my internal and external inquiries.	Responsiveness	Response	- "Not sure, I would say neither because it is very mixed" - Neither
	Enterprise Approval ECM System performs high for on-time delivery.		Response Time	- "The system seems to generate correctly once it is in there" - Agree
	Enterprise Approval ECM System gives me the right results on-time.	Result Orientation	Results Time	- "Yes, agree" - Strongly agree
	Enterprise Approval ECM System reaches my expected results and complete my tasks as planned.		Manageability	- Disagree
	Enterprise Approval ECM System is my core business process and implementation system for my job duties, commitments, and quality.	Right Quality	Sustainability	- Agree
	Enterprise Approval ECM System improves my work quality in terms of customer service, teamwork, and personal development plan.		Quality Management	- Disagree
	Enterprise Approval ECM System reduce information management (IM) tasks time and enable me to be more productive.	Right Skills	Time to Completion (TTC)	- Disagree
	Employees training programmes on Enterprise Approval ECM System make us more productive and enable me to reduce IM tasks time.		Skills Allocation	- Disagree
	Employees' skills are enough to carry out content management tasks using various Enterprise Approval ECM System functions and tools.		Employee Skills	- Agree
Teamwork **T**	Enterprise Approval ECM System gives me hope, resiliency, optimism, and efficacy to complete my tasks as planned.	Transparency	Authentic Leadership	- "I think I would strongly disagree" - Strongly disagree
	Enterprise Approval ECM System is trusted to manage information on-time.		Trust	- Disagree
	Enterprise Approval ECM System motivates me to solve-problems in new ways, changing the way of business processes and automations, and Self-reporting (Self-worth) attitude and behaviour toward others, so that my level of achievement become higher.	Transformational Leadership	Transformational Leadership-Behaviour Inventory (TLI)	- Disagree
	Enterprise Approval ECM System gives better vision, time management, and cost reduction, so that improves business continuance.		Consideration of Future Consequences (CFC)	- Disagree
	Enterprise Approval ECM System gives the ability toward information exchange, business commitment, and improve service performance, which help employees to adapt the behaviour to maximise achievements and accessibility.	Transactional Leadership	Consideration of Future Consequences (CFC)	- "Sometimes, not always ... Let's go with neither" - Neither
	Enterprise Approval ECM System rewarded me good performance and achieve better quality of work-life.		Quality of Work Life (QWL)	- "Disagree, strongly disagree" - Strongly disagree
	Enterprise Approval ECM System has the performance and productivity to reach the right service level and team goals.	Team Collaboration	Team Productivity	- Disagree
	Enterprise Approval ECM System gives me the experience to improve services and productivity, trust among team members, and better team commitment and communication, so that team members always have the capability to learn.		Team Learning	- Disagree

Appendix D.2: Tables of Findings for the Questionnaires

Appendix D.2.1: Table of Findings for the EAS Questionnaire

BPM Value (Core Category)	Topic statement (Issue)	Variable (Subcategory)	Aspect (Scale)	Response codes
Customer Orientation **C**	Enterprise Approval ECM System completes my tasks under my own supervision.	Creativity	Autonomy	Agree
	Enterprise Approval ECM System solves specialist problems and individual customer needs.		Influence	Strongly disagree
	Enterprise Approval ECM System has an effect on my commitment to work.	Commitment	Occupational Distress	Neither
	Enterprise Approval ECM System has an effect on my job satisfaction.		Job Satisfaction	Agree
	I do raise Enterprise Approval ECM System errors, issues, or solve problems when it's necessary to do so.	Communication	Engagement	Agree
	Enterprise Approval ECM System complete my job responsibilities, when it's required to do so.		Achievement	Agree
	Enterprise Approval ECM System gives information for better service quality and performance to meet customer expectations.	Customer Needs	Expectations	Agree
	Enterprise Approval ECM System satisfies my work activities.		Work Quality	Agree
Excellence **E**	Enterprise Approval ECM System has high efficiency rate for my business process resources, e.g. cost, time, and quality.	Efficiency	Efficiency Rate	Agree
	My efficiency performance has been highly developed since last year as Enterprise Approval System improved my work productivity, communication, planning, and service control.		Efficiency Performance	Neither
	Enterprise Approval System has high effectiveness rate for my business objectives and outputs, e.g. cost, time, and quality.	Effectiveness	Effectiveness Rate	Agree
	My effective performance has been highly developed since last year as Enterprise Approval System improved my service quality, problem-solving, delivery, and customer satisfaction.		Effectiveness Performance	Agree
	Enterprise Approval ECM System empowers my activities to make-decisions and confidently communicate for the internal service quality.	Empowerment	Service Quality	Disagree
	Enterprise Approval ECM System controls my job decision-making, which empowers my team performance.		Controls	Disagree
	Enterprise Approval ECM System strengthen my work relationships and team performance.	Employee Orientation	Corporate Financial Performance (CFP)	Disagree
	Enterprise Approval ECM System effects my own performance level to be more positive, capable, and initiative.		Employee Initiative	Disagree

	Statement	Dimension	Metric	Response
Responsibility **R**	Enterprise Approval ECM System has high response level on my internal and external inquiries.	Responsiveness	Response	Neither
	Enterprise Approval ECM System performs high for on-time delivery.		Response Time	Neither
	Enterprise Approval ECM System gives me the right results on-time.	Result Orientation	Results Time	Agree
	Enterprise Approval ECM System reaches my expected results and complete my tasks as planned.		Manageability	Agree
	Enterprise Approval ECM System is my core business process and implementation system for my job duties, commitments, and quality.	Right Quality	Sustainability	Neither
	Enterprise Approval ECM System improves my work quality in terms of customer service, teamwork, and personal development plan.		Quality Management	Neither
	Enterprise Approval ECM System reduce information management (IM) tasks time and enable me to be more productive.	Right Skills	Time to Completion (TTC)	Neither
	Employees training programmes on Enterprise Approval ECM System make us more productive and enable me to reduce IM tasks time.		Skills Allocation	Strongly disagree
	Employees' skills are enough to carry out content management tasks using various Enterprise Approval ECM System functions and tools.		Employee Skills	Agree
Teamwork **T**	Enterprise Approval ECM System gives me hope, resiliency, optimism, and efficacy to complete my tasks as planned.	Transparency	Authentic Leadership	Strongly disagree
	Enterprise Approval ECM System is trusted to manage information on-time.		Trust	Neither
	Enterprise Approval ECM System motivates me to solve-problems in new ways, changing the way of business processes and automations, and Self-reporting (Self-worth) attitude and behaviour toward others, so that my level of achievement become higher.	Transformational Leadership	Transformational Leadership-Behaviour Inventory (TLI)	Disagree
	Enterprise Approval ECM System gives better vision, time management, and cost reduction, so that improves business continuance.		Consideration of Future Consequences (CFC)	Neither
	Enterprise Approval ECM System gives the ability toward information exchange, business commitment, and improve service performance, which help employees to adapt the behaviour to maximise achievements and accessibility.	Transactional Leadership	Consideration of Future Consequences (CFC)	Neither
	Enterprise Approval ECM System rewarded me good performance and achieve better quality of work-life.		Quality of Work Life (QWL)	Strongly disagree
	Enterprise Approval ECM System has the performance and productivity to reach the right service level and team goals.	Team Collaboration	Team Productivity	Neither
	Enterprise Approval ECM System gives me the experience to improve services and productivity, trust among team members, and better team commitment and communication, so that team members always have the capability to learn.		Team Learning	Neither

Appendix D.2.2: Table of Findings for the RAS Questionnaire

BPM Value (Core Category)	Topic statement (Issue)	Variable (Subcategory)	Aspect (Scale)	Response codes
Customer Orientation **C**	Research Approval ECM System completes my tasks under my own supervision.	Creativity	Autonomy	Agree
	Research Approval ECM System solves specialist problems and individual customer needs.		Influence	Neither
	Research Approval ECM System has an effect on my commitment to work.	Commitment	Occupational Distress	Neither
	Research Approval ECM System has an effect on my job satisfaction.		Job satisfaction	Agree
	I do raise Research Approval ECM System errors, issues, or solve problems when it's necessary to do so.	Communication	Engagement	Agree
	Research Approval ECM System complete my job responsibilities, when it's required to do so.		Achievement	Agree
	Research Approval ECM System gives information for better service quality and performance to meet customer expectations.	Customer Needs	Expectations	Agree
	Research Approval ECM System satisfies my work activities.		Work Quality	Agree
Excellence **E**	Research Approval ECM System has high efficiency rate for my business process resources, e.g. cost, time, and quality.	Efficiency	Efficiency rate	Agree
	My efficiency performance has been highly developed since last year as Research Approval System improved my work productivity, communication, planning, and service control.		Efficiency performance	Neither
	Research Approval System has high effectiveness rate for my business objectives and outputs, e.g. cost, time, and quality.	Effectiveness	Effectiveness rate	Agree
	My effective performance has been highly developed since last year as Research Approval System improved my service quality, problem-solving, delivery, and customer satisfaction.		Effectiveness performance	Agree
	Research Approval ECM System empowers my activities to make-decisions and confidently communicate for the internal service quality.	Empowerment	Service quality	Agree
	Research Approval ECM System controls my job decision-making, which empowers my team performance.		Control	Agree
	Research Approval ECM System strengthen my work relationships and team performance.	Employee Orientation	Corporate Financial Performance (CFP)	Agree
	Research Approval ECM System effects my own performance level to be more positive, capable, and initiative.		Employee initiative	Agree

Responsibility **R**	Research Approval ECM System has high response level on my internal and external inquiries.	Responsiveness	Response	Neither
	Research Approval ECM System performs high for on-time delivery.		Response time	Neither
	Research Approval ECM System gives me the right results on-time.	Result Orientation	Results time	Neither
	Research Approval ECM System reaches my expected results and complete my tasks as planned.		Manageability	Neither
	Research Approval ECM System is my core business process and implementation system for my job duties, commitments, and quality.	Right Quality	Sustainability	Neither
	Research Approval ECM System improves my work quality in terms of customer service, teamwork, and personal development plan.		Quality Management	Agree
	Research Approval ECM System reduce information management (IM) tasks time and enable me to be more productive.	Right Skills	Time to Completion (TTC)	Agree
	Employees training programmes on Research Approval ECM System make us more productive and enable me to reduce IM tasks time.		Skills Allocation	Agree
	Employees' skills are enough to carry out content management tasks using various Research Approval ECM System functions and tools.		Employee Skills	Agree
Teamwork **T**	Research Approval ECM System gives me hope, resiliency, optimism, and efficacy to complete my tasks as planned.	Transparency	Authentic Leadership	Neither
	Research Approval ECM System is trusted to manage information on-time.		Trust	Neither
	Research Approval ECM System motivates me to solve-problems in new ways, changing the way of business processes and automations, and Self-reporting (Self-worth) attitude and behaviour toward others, so that my level of achievement become higher.	Transformational Leadership	Transformational Leadership-Behaviour Inventory (TLI)	Neither
	Research Approval ECM System gives better vision, time management, and cost reduction, so that improves business continuance.		Consideration of Future Consequences (CFC)	Agree
	Research Approval ECM System gives the ability toward information exchange, business commitment, and improve service performance, which help employees to adapt the behaviour to maximise achievements and accessibility.	Transactional Leadership	Consideration of Future Consequences (CFC)	Agree
	Research Approval ECM System rewarded me good performance and achieve better quality of work-life.		Quality of Work Life (QWL)	Neither
	Research Approval ECM System has the performance and productivity to reach the right service level and team goals.	Team Collaboration	Team Productivity	Agree
	Research Approval ECM System gives me the experience to improve services and productivity, trust among team members, and better team commitment and communication, so that team members always have the capability to learn.		Team Learning	Agree

Appendix D.2.3: Table of Overall Findings for the Questionnaires

BPM Value (Core Category)	Topic statement (Issue)	Variable (Subcategory)	Aspect (Scale)	Response codes
Customer Orientation **C**	Enterprise Approval ECM System completes my tasks under my own supervision.	Creativity	Autonomy	Agree
	Enterprise Approval ECM System solves specialist problems and individual customer needs.		Influence	Neither
	Enterprise Approval ECM System has an effect on my commitment to work.	Commitment	Occupational Distress	Neither
	Enterprise Approval ECM System has an effect on my job satisfaction.		Job Satisfaction	Agree
	I do raise Enterprise Approval ECM System errors, issues, or solve problems when it's necessary to do so.	Communication	Engagement	Agree
	Enterprise Approval ECM System complete my job responsibilities, when it's required to do so.		Achievement	Agree
	Enterprise Approval ECM System gives information for better service quality and performance to meet customer expectations.	Customer Needs	Expectations	Agree
	Enterprise Approval ECM System satisfies my work activities.		Work Quality	Agree
Excellence **E**	Enterprise Approval ECM System has high efficiency rate for my business process resources, e.g. cost, time, and quality.	Efficiency	Efficiency Rate	Agree
	My efficiency performance has been highly developed since last year as Enterprise Approval System improved my work productivity, communication, planning, and service control.		Efficiency Performance	Neither
	Enterprise Approval System has high effectiveness rate for my business objectives and outputs, e.g. cost, time, and quality.	Effectiveness	Effectiveness Rate	Agree
	My effective performance has been highly developed since last year as Enterprise Approval System improved my service quality, problem-solving, delivery, and customer satisfaction.		Effectiveness Performance	Agree
	Enterprise Approval ECM System empowers my activities to make-decisions and confidently communicate for the internal service quality.	Empowerment	Service Quality	Agree
	Enterprise Approval ECM System controls my job decision-making, which empowers my team performance.		Controls	Neither
	Enterprise Approval ECM System strengthen my work relationships and team performance.	Employee Orientation	Corporate Financial Performance (CFP)	Agree
	Enterprise Approval ECM System effects my own performance level to be more positive, capable, and initiative.		Employee Initiative	Neither

Responsibility **R**	Enterprise Approval ECM System has high response level on my internal and external inquiries.	Responsiveness	Response	Neither
	Enterprise Approval ECM System performs high for on-time delivery.		Response Time	Neither
	Enterprise Approval ECM System gives me the right results on-time.	Result Orientation	Results Time	Neither
	Enterprise Approval ECM System reaches my expected results and complete my tasks as planned.		Manageability	Neither
	Enterprise Approval ECM System is my core business process and implementation system for my job duties, commitments, and quality.	Right Quality	Sustainability	Neither
	Enterprise Approval ECM System improves my work quality in terms of customer service, teamwork, and personal development plan.		Quality Management	Neither
	Enterprise Approval ECM System reduce information management (IM) tasks time and enable me to be more productive.	Right Skills	Time to Completion (TTC)	Agree
	Employees training programmes on Enterprise Approval ECM System make us more productive and enable me to reduce IM tasks time.		Skills Allocation	Neither
	Employees' skills are enough to carry out content management tasks using various Enterprise Approval ECM System functions and tools.		Employee Skills	Agree
Teamwork **T**	Enterprise Approval ECM System gives me hope, resiliency, optimism, and efficacy to complete my tasks as planned.	Transparency	Authentic Leadership	Neither
	Enterprise Approval ECM System is trusted to manage information on-time.		Trust	Neither
	Enterprise Approval ECM System motivates me to solve-problems in new ways, changing the way of business processes and automations, and Self-reporting (Self-worth) attitude and behaviour toward others, so that my level of achievement become higher.	Transformational Leadership	Transformational Leadership-Behaviour Inventory (TLI)	Neither
	Enterprise Approval ECM System gives better vision, time management, and cost reduction, so that improves business continuance.		Consideration of Future Consequences (CFC)	Neither
	Enterprise Approval ECM System gives the ability toward information exchange, business commitment, and improve service performance, which help employees to adapt the behaviour to maximise achievements and accessibility.	Transactional Leadership	Consideration of Future Consequences (CFC)	Neither
	Enterprise Approval ECM System rewarded me good performance and achieve better quality of work-life.		Quality of Work Life (QWL)	Strongly disagree
	Enterprise Approval ECM System has the performance and productivity to reach the right service level and team goals.	Team Collaboration	Team Productivity	Neither
	Enterprise Approval ECM System gives me the experience to improve services and productivity, trust among team members, and better team commitment and communication, so that team members always have the capability to learn.		Team Learning	Agree