A framework to define the applicability and value of Dynamic Case Management in financial and governmental service providers

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Abstract

The contemporary work landscape's dynamic nature necessitates professionals proficient in self-directed and adaptable task execution. The current advancement in process management methodologies has facilitated the adoption of process-oriented strategies in knowledge-intensive contexts. Dynamic Case Management (DCM) emerges as a potential solution to address these evolving demands. DCM entails the leveraging of technology to automate and streamline various facets of case-related activities. This study introduces a framework aimed at assessing the suitability and benefits of DCM within governmental and financial service domains. The main research question is as follows: How can a framework demonstrate the suitability and benefits of DCM for governmental and financial service providers? In pursuit of addressing this question, a comprehensive literature review is conducted to grasp the essence of DCM and its interplay with other process management paradigms. Additionally, the operational structures of governmental and financial service entities are analyzed, and the key value drivers for these organizations are identified. Complementing the literature review, expert interviews are conducted to get further insights into the practicality and advantages of implementing DCM. All gathered insights are leveraged in constructing a DCM Applicability and Value Framework (DCM-AVF) to estimate the suitability and potential benefits of DCM. The DCM-AVF is subsequently validated through expert interviews, and the outcomes are integrated into an enhanced iteration of the framework, thereby illustrating the applicability and benefits of DCM within governmental and financial service providers.
Keywords: Dynamic Case Management, Value, Applicability, Service providers, process management

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Contents

Abstract **1**

Acknowledgements **2**

List of Figures **6**

List of Tables **7**

List of Abbreviations **8**

1 Introduction **1**
1.1 Problem description 1
1.2 Research explanation 2
1.3 Research environment 3
1.4 Research questions 4
1.5 Scientific relevance 5
1.6 Document outline 5

2 Methodology **7**
2.1 Problem identification and motivation 7
2.2 Objectives of a solution 7
2.3 Design and development 8
2.4 Demonstration and evaluation 10
2.5 Communication 11

3 Literature review **12**
3.1 What is Dynamic Case Management 12
3.2 Relation with existing process management concepts 15
3.2.1 Business Process Management 15
3.2.2 Adaptive Case Management 16
3.2.3 Comparison 18
3.3 Classification of processes 19
3.4 Values drivers for a process management solution 22

4 Analysis **24**
4.1 Matching processes and DCM 24
4.2 Expert interviews 25
4.2.1 Interview participants 26
4.3 Value drivers 27
4.4 Practical applicability of DCM 28
4.5 Value of DCM 28

5 Design **30**
5.1 Dynamic Case Management Applicability Value Framework . . . 30
5.1.1 Process assessment . . . 31
5.1.2 Identification of influential factors . . . 32
5.1.3 Value estimation . . . 33
5.2 Activity and concept table . . . 37

6 Validation **38**
6.1 Validation method . . . 38
6.2 Validation content . . . 39
6.2.1 Scenario 1: . . . 39
6.2.2 Scenario 2: . . . 40
6.3 Validation results . . . 41
6.3.1 Summary of the validation interviews . . . 41
6.3.2 Participant table . . . 43
6.4 Improved DCM-AVF . . . 43
6.4.1 Process assessment . . . 43
6.4.2 Identify influential factors . . . 45
6.4.3 Value estimation . . . 46

7 Discussion **49**
7.1 Threats to validity . . . 49
7.1.1 Construct Validity . . . 49
7.1.2 Internal Validity . . . 49
7.1.3 External Validity . . . 49
7.1.4 Conclusion Validity . . . 50
7.2 Limitations . . . 50

8 Conclusion and Future Work **51**
8.1 Conclusion . . . 51
8.2 Future work . . . 53

References **55**

A Interview protocol **61**
A.1 Interview and Analysis Execution . . . 61
A.2 Informed Consent Form . . . 62
A.3 Expert interview . . . 65

B Screenshots of the application used for validation **68**
B.1 Start screen . . . 68
B.2 Process assessment . . . 69
B.3 Explanation report . . . 70
B.4 Influential factors . . . 72
B.5 Estimate value . . . 73
B.6 Full value report . . . 73

C Expert interviews summaries **75**

D Validation interviews summaries **81**

E Score calculations **86**

F Activity and concept table **88**

List of Figures

1 Participants of a process associated with the predictability of the process [50] . . . 21
2 Types of value drivers [64] . . . 23
3 DCM-AVF . . . 36
4 Improved phase 1 of DCM-AVF . . . 44
5 Improved phase 2 of DCM-AVF . . . 45
6 Improved phase 3 of PDD . . . 47
7 Complete improved DCM-AVF . . . 48
8 Start Screen . . . 68
9 Process assessment part 1 . . . 69
10 Process assessment part 2 . . . 70
11 Process assessment part 3 . . . 70
12 Influential factors . . . 72
13 Estimated value . . . 73

List of Tables

1 Quality assessment criteria, derived from Protogerou et al.[18] . . 9
2 Participants Expert Interviews 26
3 Calculation suitability level 32
4 Participants Validation Interviews 43
5 Calculation activity complexity score 86
6 Calculation control flow complexity score 86
7 Calculation data flow complexity score 86
8 Calculation decision points complexity score 87
9 Calculation stakeholders complexity score 87
10 Calculation resource complexity score 87
11 Activity table 89
12 Activity table continued from previous page 90
13 Concept table 91
14 Concept table continued from previous page 92

List of Abbreviations

ACM Adaptive Case Management

BPM Business Process Management

DCM Dynamic Case Management

DCM-AVF DCM Applicability Value Framework

PCM Production Case Management

PDD Process Deliverable Diagram

TAM Technology Acceptance Model

1 Introduction

Modern work environments necessitate highly skilled professionals who possess the ability to autonomously carry out diverse tasks. These professionals, often referred to as knowledge workers, play a significant role in determining the success of an organization[51]. Knowledge-intensive processes, which integrate data in their execution, require a considerable degree of flexibility at runtime[33]. According to Palmer's 2014 case management survey, approximately two-thirds of a knowledge worker's day is dedicated to unstructured and often unpredictable work patterns[57].

However, not all organizations possess the capability to provide the necessary level of flexibility within their processes, thus emphasizing the importance of process-oriented working. Process-oriented working has become increasingly prevalent as organizations struggle with managing numerous business process models. It is not uncommon for a single organization to handle hundreds or even thousands of business process models[19]. The optimization of process-oriented working introduces new challenges and opportunities. One such challenge is managing multiple processes with varying phases, tasks, and goals, as the complexity of today's work has reached unprecedented levels[62]. Gaining a comprehensive understanding of the various components of a process and their interconnectedness can prove highly challenging.

1.1 Problem description

The frequent and rapid changes in laws and technologies pose significant obstacles for businesses. The ability to effectively adapt to these changes is crucial for organizational success. In summary, the dynamic nature of contemporary work environments demands professionals capable of autonomous and versatile task execution. The current maturity of process management methodologies has led to application of process-oriented approaches in knowledge-intensive scenarios[33]. Knowledge-intensive processes with data integration require flexibility, while process-oriented working has emerged as a common approach to address the complexity of managing multiple business process models. However, challenges such as understanding process components and adapting to evolving laws and technologies must be navigated for organizational effectiveness.

Furthermore, there is a noticeable shift in enterprises from standardization to customization. Customers today have increasingly diverse needs and expect greater personalization in products and services[12]. This shift, coupled with the declining trust of customers, presents a new challenge for service providers. Organizations must adapt to meet the evolving demands and expectations of their customers to regain trust and enhance the customer experience.

In the 20th century, standardization gained popularity due to its efficiency and cost reduction benefits, epitomized by Henry Ford's famous quote, "You can have any color you want, as long as it's black."[38] However, the lack of customization emerged as a significant issue that was difficult to address. This challenge extends beyond enterprises that offer physical goods and extends to service-oriented businesses as well. The customer experience has become increasingly vital for many companies[17], profoundly influencing the variations that can occur within a business process. Therefore, an adaptive and dynamic process that can respond to the growing demand for personalized goods and services by customers is crucial.

Dynamic Case Management (DCM) presents a potential solution to address these challenges. DCM involves the utilization of technologies to automate and streamline various aspects of case-related work[28]. In practical terms, DCM provides the next appropriate actions in a process based on the case's information status and declarative logic. This approach facilitates the achievement of process goals with precision and efficiency, eliminating unnecessary steps. Consequently, DCM is well-suited for unpredictable case-oriented processes that require frequent modifications. However, it is essential to carefully consider the suitability of applying DCM to a particular situation or process. Organizations also seek to understand the benefits that DCM can offer and how it can contribute to their overall enterprise.

1.2 Research explanation

Firstly, it is crucial to evaluate the suitability of a process for a DCM solution. This assessment requires an analysis and explanation of the DCM concept itself, as well as an examination of business processes. Some processes may be unsuit-

able for DCM or may incur costs that outweigh the benefits of implementing the concept. Therefore, it is necessary to establish a classification system that provides an indication of whether DCM is suitable for a given situation. In this study, the focus will be on researching and classifying processes within financial and governmental service providers. These processes have clear classifications and are thus well-suited for process management solutions. Also these organizations fit with the research environment of this research. Through this analysis, the aim is to identify the relationships between the characteristics of DCM and the structure of these processes.

In addition to determining the suitability of DCM for specific processes, it is also essential to understand why DCM is particularly suitable as a solution in certain situations. To validate the concept, a comparison will be made with other process management concepts such as Business Process Management (BPM) and Adaptive Case Management (ACM).

Finally, the actual value of implementing DCM in financial or governmental service providers will be assessed. This assessment will involve identifying the value drivers specific to these service providers. These value drivers can include internal factors such as financial, organizational, or process-related values, as well as external factors like gaining a competitive advantage. Based on these value drivers, an estimation will be made regarding the impact that DCM can have on them. This estimation will be supported by existing data gathered in collaboration with the organization Blueriq and its customers. The findings will be visualized in a DCM-AVF that demonstrates the applicability and value of DCM in the context of governmental and financial service providers.

1.3 Research environment

This research is conducted in collaboration with an external organization named Blueriq, which specializes in modeling, improving, and maintaining customers' processes to enhance their personalization and efficiency. Blueriq primarily serves governmental and financial service providers such as Dutch banks, insurances and different departments of the Dutch government. One of Blueriq's propositions is the application of DCM.

1.4 Research questions

This research aims to develop a framework that defines the applicability and potential value of DCM in the context of governmental and financial service providers. The corresponding research question is as follows:
RQ:*"How can a framework show the applicability and value of DCM at governmental and financial service providers"*

To address this research question, four sub-questions have been formulated:
SRQ1:*"What is DCM and how does it compare to other process management concepts?"*
The first sub-question will delve into the detailed analysis and explanation of DCM itself. Furthermore, it will include a comparative analysis between DCM and other process management concepts.

SRQ2:*"What structures and classifications are known about the processes of governmental and financial service providers?"*
The second sub-question will investigate the characteristics of processes within governmental and financial service providers. This exploration will lead to the development of a classification system that clarifies the processes in which DCM can be effectively implemented.

SRQ3:*"What is the relationship between the structured processes and the characteristics of DCM?"*
The third sub-question aims to establish a correlation between the identified characteristics of DCM and the processes within governmental and financial service providers. This analysis will provide valuable insights into the applicability of the DCM concept.

SRQ4:*"What are the value drivers of financial and governmental service providers for a DCM solution and how can the value of DCM be estimated?"*
The final sub-question will focus on identifying the value drivers specific to financial and governmental service providers in relation to implementing a DCM solution. Once these value drivers are identified, the influence and estimation of the value that DCM can bring will be evaluated. By addressing these sub-questions, this research aims to develop a comprehensive DCM-AVF that effectively demonstrates the applicability and value of DCM in governmental

and financial service providers.

1.5 Scientific relevance

This research holds significant scientific relevance. While process management has been extensively studied and various articles and studies have explored different aspects of it, there is limited research on the concept of DCM. Additionally, the unique aspect of this study lies in the exploration of the relationship between DCM and specific process types. Although process types have been identified and the functionality of DCM has been analyzed individually in previous research, their connection has not been thoroughly investigated.

Furthermore, this research addresses a gap in the literature by linking the value drivers of financial and governmental service providers to the characteristics of DCM. This linkage can provide novel insights into the potential benefits and advantages that DCM offers to these service providers. An additional contribution of this study is the development of an artifact that can assist service providers in assessing the suitability of a DCM solution for their organization. This artifact has the potential to enhance the quality of knowledge-intensive processes within these service providers. By exploring the unique relationship between DCM and process types, investigating the alignment of value drivers with DCM characteristics, and developing a practical artifact for organizational assessment, this research adds valuable insights to the field of process management, particularly in the domains of financial and governmental service providers.

1.6 Document outline

The remainder of this paper consists of the following: Methodology, this section elucidates the chosen research method for this study. Systematic literature review, a systematic review of scientific sources, conducted in accordance with the prescribed protocol outlined in the methodology, will be presented. The primary objective of this review is to procure pertinent information that addresses the sub-research questions. Analysis, in this chapter the information derived from both the literature review and the conducted interviews will be subjected to a comprehensive analysis. This analytical process will yield fresh insights that will inform the development of the artifact. Design, this section delineates the DCM-AVF that has been crafted, elucidating the rationale underpinning the decisions made during its creation. Validation, the validation of

the artifact is expounded upon, encompassing the validation methodology and the substantive content of the validation process. Additionally, insights gleaned from expert interviews, along with the refined DCM-AVF, will be presented and deliberated upon. Discussion, this section addresses the potential threats to the validity of the research and outlines its limitations. Conclusion and future work, here the sub-research questions and the main research question are answered, and avenues for future research are delineated.

2 Methodology

This research aims to investigate the application and value of DCM in financial and governmental service providers. The outcome of the research will be a DCM-AVF in the form of a Process Deliverable Diagram (PDD) artifact that demonstrates the situations in which a DCM solution is applicable and the value it can generate. This artifact is suitable for this research because it can give a good indication about the applicability and value of DCM. It will show the activities that are needed to gather this information, and what deliverables those activities will bring in the process of identifying the value and applicability. The research follows a design science approach, as it seeks to design an artifact through research. To guide the design science methodology, the process model proposed by Pfeffers et al.[11] is employed, with slight modifications. This widely used process model in information science research aligns well with the objectives of this study and consists of five stages:

1. Problem identification and motivation
2. Objectives of a solution
3. Design and development
4. Demonstration and evaluation
5. Communication

2.1 Problem identification and motivation

In the problem identification and motivation stage, the specific research problem is defined, and the value of a solution is justified. The primary issue addressed in this research is the growth of knowledge work in service-oriented organizations, coupled with increasing process complexity. The potential solution to these challenges lies in the application of DCM, and this research aims to determine when a DCM solution is suitable and the value it can offer.

2.2 Objectives of a solution

The objectives of the solution phase involve inferring rational objectives from the problem specification. As mentioned earlier, the objective of this research is to develop a DCM-AVF that demonstrates the value of DCM by aligning the concept's characteristics with the value drivers of financial and governmental service providers. This DCM-AVF will be beneficial for service providers engaged in process modeling, enabling them to assess the suitability of DCM

for their organization. Additionally, organizations like Blueriq can utilize the DCM-AVF to decide whether to implement DCM in specific customer processes. The resulting DCM-AVF will serve as a comprehensive foundation that can be further improved and expanded over time.

2.3 Design and development

The design and development phase entail determining the desired functionality and architecture of the artifact, as well as its creation. In this research, this phase commences with a systematic literature review. The systematic literature review, as defined by Fink[39], is a rigorous and replicable method of identifying, evaluating, and synthesizing existing work produced by researchers and practitioners. The goal of the literature review is to gather information on DCM, other process management concepts, the structure of service providers' processes, and the value drivers of financial and governmental service providers. The review follows a protocol based on Kitchenham's[47] framework, which encompasses four steps: identification of research, selection of studies, study quality assessment, and data extraction and synthesis.

The *Identification of research* step aims to collect as many primary studies relevant to the research question as possible, utilizing an unbiased search strategy primarily through Google Scholar. Specific search terms derived from the research question, sub-questions, and problem statement will be employed to retrieve pertinent papers. The keywords are:
- Dynamic Case Management
- Business Process Management
- Adaptive Case Management
- Incident Management
- Financial service providers AND value drivers
- Governmental service providers AND value drivers
- Dynamic Case Management AND comparison
- Business Process Management AND comparison
- Adaptive Case Management AND comparison
- Incident Management AND comparison
- Process classification
- Process categorization

Additionally, the snowballing method will be utilized to expand the pool of relevant papers. The snowballing method is a study selecting method based on a reference list[69]. The used reference lists are retrieved from the papers that are selected with the search strategy mentioned above. Forward and backward snowballing will be used, backward snowballing uses the references of the selected papers, while forward snowballing identifies new papers based on the citations of the papers.

The *Selection of studies* step entails establishing criteria for the identification of relevant and unbiased papers. The inclusion criteria are based on the research question, while exclusion criteria encompass papers published more than 20 years ago and papers written in languages other than English. The selection process has three steps:
1. Screening of titles, relevant terms need to be included.
2. Abstracts of the papers selected from the first step are analyzed and again selected on relevance.
3. The selected papers after the second step will be read thoroughly and selected if it provides good information about the elements named in the keywords.

Study quality assessment is an integral part of this research to ensure the inclusion of high-quality papers. The assessment criteria used are adapted from Protogerou et al.[18], a set of reliable criteria that have undergone expert consensus evaluation. All quality criteria must be met for a paper to be included in this study. Table 1 below shows the criteria, a paper which is included should have all quality criteria answered with 'yes'.

Quality Assessment Criteria	**Yes or no?**
Are hypotheses or research questions cleary stated?	
Are the data analysis techniques justified?	
Are the measures fully provided in the report?	
Is the evidence provided for the validity of all the measures used?	
Are funding sources or conflicts of interest disclosed?	
Is information provided aobut the context of data collection?	
Is the paper peer reviewed?	

Table 1: Quality assessment criteria, derived from Protogerou et al.[18]

Data extraction and synthesis involves extracting the most relevant data

from the selected studies. The approach includes thoroughly reading the selected studies and summarizing the most useful data related to the characteristics of DCM and other process management concepts to address SRQ1. Process classification for service providers to answer SRQ2, and value drivers of process management solutions for governmental and financial service providers to address SRQ4. This step completes the literature review component of the design and development stage..

To gather more qualitative data and delve deeper into the information gathered from the literature review, expert interviews will be conducted. Expert interviews involve qualitative semi-structured or open interviews with individuals possessing relevant expertise[26]. In this study, semi-structured interviews will be conducted to guide the conversation while allowing for the exploration of new knowledge. The interviews will mainly focus on complementing and expanding the information gathered to address SRQ4. Expert interviews are the preferred method as they enable a more in-depth exploration of the subject matter with individuals who possess proven knowledge. The interviewees will include employees of Blueriq who have worked on projects with customers and have experience with different customer processes. Additionally, customers of Blueriq will be interviewed as they possess valuable insights into the important values of process management solutions. The interview protocol and structure can be found in Appendix A.

Using the information gathered from the systematic literature review and expert interviews, a DCM-AVF will be created to demonstrate the applicability of DCM in classified processes and its impact on the value drivers of governmental and financial service providers.

2.4 Demonstration and evaluation

The *demonstration and evaluation* phase aims to observe and measure how effectively the created DCM-AVF supports a solution to the problem. This phase serves as the validation of the artifact developed through the aforementioned methods. The validation will be conducted using the expert opinion approach, where experts imagine how the artifact interacts with the problem context and predict its effects. If the predicted effects do not align with the requirements, the artifact will be redesigned[67].

2.5 Communication

The final step in the design science process model is *communication*. The outcomes of the research will be documented in a written thesis, providing a comprehensive record of the research. Additionally, a presentation will be delivered to visually present the results and clearly explain the research.

3 Literature review

In this chapter, several topics related to the research will be discussed. Section 3.1 provides an explanation of the concept of DCM itself and its usefulness in organizational processes. This information can be used to answer SRQ1. Subsequently, section 3.2 introduces several related concepts to DCM, compares their core features, and discusses their applicability in the research environment. This information also adds to answering SRQ1. Building upon these concepts, section 3.3 identifies and classifies the processes of governmental and financial service providers to answer SRQ2. Finally, section 3.4 delves into the value drivers for process management solutions in these service providers to help answer SRQ4. The techniques used to gather the literature on these topics are described in section 2.1.

3.1 What is Dynamic Case Management

DCM can be defined as "systems that support decision making and data capture while providing knowledge workers the freedom to apply their expertise in response to unique or changing circumstances within the business environment"[63]. This definition by Swenson captures the key features of decision making, data capturing, and flexibility. However, these features are built upon the core concept of case management. Case management is characterized by its non-deterministic nature, as it does not predetermine the specific sequence of tasks required to achieve a case's goal[30]. In DCM, the case is a central entity that encompasses both the goal to be achieved and all the relevant information necessary to accomplish that goal. Additionally, DCM employs a case template, which serves as a baseline approach for handling the case[63]. The case goal often represents the desired business outcome, and DCM provides considerable flexibility in determining how that goal is achieved. But in general the aim of DCM is to find the shortest or fastest way to reach the goal of the case. The responsibility for accomplishing the case goal lies with the employee working on the case, while ensuring that all tasks performed within the case are aligned with the case goal.

Another crucial aspect of DCM is its focus on the next best step, rather than dwelling on the past of the process. This approach minimizes unnecessary steps and enhances process efficiency. Dynamic processes are not strictly sequential;

instead, all activities can contribute to the process at any given time[52]. Each activity within the process has a predefined precondition that determines when it can or should be performed, based on available data and the current state or phase of the process. A dynamic process engine then decides which activities are selected for execution at a particular moment. A phase represents a specific time period within the overall process when end-users can perform tasks relevant to that phase and contribute to achieving the associated milestone or goal. Tasks within a phase are automated, and their availability depends on data availability rather than completion of other tasks. Tasks can generate data or artifacts, such as documents, while preconditions are decision points that dictate when tasks can or must be performed. These preconditions also rely on data and artifacts[9].

DCM adopts a top-down modeling approach, the first step is to identify the case. The case brings together various concepts to achieve its goal. Decisions are made within one or more processes, and the case progresses through time phases, with a phase changing upon reaching a milestone. Data is persisted within a case, and the case can be related to other cases or organized hierarchically. Collaboration is fundamental to cases, and they play a significant role in time management and leveraging the history of other cases. In essence, a case in DCM comprises three main dimensions:
- Process, a set of activities that can or must be performed to reach a goal
- Rules, determining when an activity is relevant
- Case context, the contextual information and data associated with the case

DCM enables workers to define and execute case tasks on an ad-hoc basis, eliminating the need for prior process analysis and design[23]. However, it is crucial that these ad-hoc actions comply with laws, regulations, and business rules. This compliance is ensured through logical and temporal dependencies or rules between tasks, which are enforced by the DCM system during runtime[22]. DCM systems operate based on data-driven and event-driven principles, where case instances progress through events based on case data and the case goal[42, 65]. Tasks within DCM can be executed by different system users and are assigned roles. Each task is associated with a specific role, and users with the corresponding role(s) can perform the task. This enables tasks to be executed by multiple users, enhancing process efficiency and flexibility. DCM ensures that relevant information is provided to the right individuals at the appropriate time and assigns high-priority work to the suitable personnel. This continuous

engagement empowers individuals by highlighting the importance of their work. DCM also offers automation opportunities, leveraging policy and business rules, including predictive and adaptive analytics. Additionally, all actions within a DCM system are recorded for auditing purposes, facilitating process improvement and adaptation to changes[9].

Case templates play a vital role within DCM systems as they contribute to knowledge preservation and learning. Continuous improvement of case templates is crucial, especially when a template is used repeatedly, ensuring its alignment with related cases and reducing the need for runtime changes in future cases[21]. Transparency is an essential characteristic of DCM as it facilitates ongoing learning and optimization of processes. Users can leverage collective experiences from previous cases to create new case templates or enhance existing ones. The availability of templates to all users promotes knowledge sharing and continuous improvement[21].

DCM offers various advantages, as highlighted by C. Le Clair and D. Miers[37]. For instance, it allows the execution of multiple procedures for a given case, enabling multiple processes to influence the management of an individual case. DCM also supports the association of different types of objects with a case, including processes, documents, structured data attributes, and resources. Enterprises often adopt DCM solutions to address untamed processes, which are characterized by spanning across departments, technologies, information, and packaged applications to achieve end-to-end business outcomes[37]. DCM aligns well with untamed processes as it combines human- and system-controlled processes, facilitates knowledge and expert guidance, and aligns process outcomes with organizational goals. It enhances agility for case workers, business managers, and IT stakeholders, providing visibility and control over tasks by leveraging corporate knowledge and enabling the transition between structured and unstructured process paths[8, 7]. Furthermore, DCM's agility and traceability capabilities enable businesses to capitalize on uncertainty without attempting to control or eliminate it[37].

3.2 Relation with existing process management concepts

This section aims to provide insights into process management concepts related to DCM, highlighting the differences, advantages, and disadvantages of DCM compared to other concepts. The main concepts used in this comparison are BPM and ACM, because these concepts have the most information available and are most well known. Other concepts will be shortly mentioned, but not used for the full comparison because there is too little information available. This section will provide information to answer SRQ1.

3.2.1 Business Process Management

BPM, derived from workflow management, is a process management concept where each process step is executed exclusively with the necessary data visible only to the relevant actors. Activity execution follows routing rules defined by process definitions, keeping them strictly separated from processed data. Upon completion of an activity, subsequent activities become active[6]. Most BPM initiatives focus on managing a select few processes based on their significance, dysfunctionality, and feasibility[15].

The benefits of BPM include cycle time reduction, automation of routine processes, standardization and compliance, business integration, and end-to-end performance visibility[44]. Process flexibility is a notable limitation of the BPM concept. To better understand DCM's strength in this area, it is essential to precisely define process flexibility. Generally, process flexibility refers to the ability of business processes to accommodate changes in the operating environment, such as new laws, shifts in business strategy, or emerging technologies. This ability is termed process flexibility[1]. Modern processes and information systems must handle expected and unexpected changes. Schonenberg et al.[10] identified four types of flexibility:

Flexibility by definition allows alternative execution paths within a process definition at design time, enabling the selection of the most appropriate path at runtime for each process instance. BPM systems can incorporate parallelism at design time to introduce more flexible sequential routing. However, this falls short compared to the inherent flexibility of DCM, where such flexibility is standard. Flexibility by deviation refers to a process instance's ability to deviate from the original execution path without modifying the process definition itself.

Deviations can include undoing, redoing, or skipping activities. Case management makes it easier to realize such flexibility as users can undo, redo, or skip activities at any point in the process. Additionally, data can be entered at various phases, and the state is continuously recomputed based on available data.

Flexibility by underspecification enables the execution of incomplete process specifications. For example, a model may lack sufficient information to be executed to completion. In BPM, a process fragment must be selected from an existing set of fully predefined fragments, preventing the construction of new process fragments. In DCM, new process fragments can be constructed, and information can be added at any point in the process. Flexibility by change involves modifying a process definition at runtime, migrating one or all currently executing process instances to a new definition. Schonenberg et al.[10] identified two types of change: momentary change, affecting the execution of selected process instances, and evolutionary change, modifying the process definition and affecting all new process instances. BPM does not support both types of change, whereas the declarative style of case management does.

Various research and workshops have attempted to enhance BPM's flexibility. Some authors propose simplifying process models to maximize flexibility. However, keeping the model simple only supports a less idealized version of the preferred process, while the real runtime process tends to be more variable than the design-time specification[2]. Other authors suggest advanced techniques to support workflow evolution and case migration between different workflow models. Nevertheless, contemporary workflow technology often requires circumventing the system to handle changes, making it more of a liability than an asset. Trying to capture all possible exceptions in a complex process model becomes unmanageable and challenging to maintain[2]. Thus, offering flexibility without sacrificing control proves difficult with BPM.

3.2.2 Adaptive Case Management

There are various case handling approaches, such as Case Management, Adaptive Case Management, Dynamic Case Management, Production Case Management, and Emerging Case Management, all aimed at managing relevant data and actions processed by case workers to achieve specific goals[51]. Initially, case

handling was a central concept in processes, with less rigid activities compared to workflow activities, striking a balance between data-centric and process-centric approaches. In this approach, the process was driven not only by the process flow but also by data, providing workers with more control while still requiring awareness of the entire case. Case handling was defined with four core features in mind[2]:
- Case handling provides case workers with comprehensive information about the case, rather than limiting information to specific activities
- Case handling is data driven, enabling activities based on available information, not solely relying on control flow
- It separates work distribution from authorization
- It allows workers to view, add, and modify data outside an activity

However, case handling was eventually superseded by case management, which took a different approach by focusing on the tasks within a process. A task was decomposed into work content and activities, with the work content providing the necessary flexibility for case management without compromising the control flow offered by workflow systems[51]. Although the definition of case management has evolved over time, it highlights the distinction from case handling. Case management emphasizes the collaborative and non-deterministic nature of work, where human decision-making and content play a more significant role than predefined processes[46]. Users of a ACM system have the option to adapt existing case templates or define their processes at runtime[23]. Run time process definition allows users to dynamically respond to occurrences that were not considered during the initial process design.

Besides ACM, there is another concept known as Production Case Management (PCM). The distinction between ACM and PCM lies in who creates the case and when it is created. In ACM, the knowledge worker creates the case when it is needed, whereas in PCM, developers create the case during a design phase, which is then used by knowledge workers[54]. Both concepts provide knowledge workers with a high level of flexibility and discretion in completing cases. PCM, specifically, distributes the process logic across multiple smaller process fragments that collectively define the process model. Fragments can be added at any time, even during runtime, increasing the degree of freedom. At runtime, the fragments are dynamically combined based on data dependencies[20]. PCM distinguishes between control flow enablement and data enablement, where an

activity is considered control flow enabled when the control flow reaches it and data flow enabled when a specified input data set is completely available. To be enabled, an activity needs to be both data flow and control flow enabled. PCM refers to highly specialized case management systems that knowledge workers cannot significantly modify. In comparison, ACM is a "do-it-yourself" system for knowledge workers, while PCM is customized by professional solution developers into domain-specific applications, offering more precise actions for users to take[54].

3.2.3 Comparison

Now some process management concepts are introduced, it is interest to compare some of those. BPM, ACM and DCM will be compared because those are the most prominent with most information available about them.

BPM's focus on static structure stems from the limitations of traditional workflow technology, which often hindered its application in dynamic settings. In such cases, case management proves more suitable due to its support for knowledge-intensive processes and loose structuring. Case management grants knowledge workers greater freedom in organizing and performing their work[16]. BPM operates with highly structured processes and has more constraints compared to case management processes, making it challenging to adapt in dynamic and knowledge-intensive environments. Due to their lower level of predictability compared to standard processes, knowledge-intensive processes must balance structured elements for repetitive aspects with unstructured elements to allow creative solutions for complex problems[51]. Moreover, knowledge-intensive processes are goal-oriented, emergent, and contribute to knowledge creation[55].

Additional clear differences exist between DCM, with its case management approach, and BPM, with its workflow approach. In workflow management systems, an activity is considered atomic and is either completed entirely or not at all. In contrast, case handling views activities as chunks of work recognized by workers, allowing for transfer between workers and recognizing the relatedness of activities[3]. Several case management approaches divide end-to-end process models into smaller fragments that can be combined, resulting in increased flexibility. Data plays a central role, driving the case[48]. Case models consist of data classes, object life cycles, and a set of process fragments dynamically in-

stantiated and combined at runtime based on data object states[43].

DCM is a specific form of case management described by Clair et al.[7] as a highly structured but collaborative, dynamic, and information-intensive process driven by events. In DCM, all the necessary information to process and manage the case is contained within a case folder. ACM shares similarities with DCM according to some authors like Burns[32], but a closer analysis reveals crucial differences. Puncher[58] notes that DCM is dynamic at runtime, whereas ACM creates cases just-in-time when needed, implying case adaptation based on previous instances. However, case templates still provide guidance for more typical situations[49]. In this manner, DCM actively empowers users to modify their working processes, making process adaptation a regular activity[63].

3.3 Classification of processes

In an organizational context, various processes with distinct characteristics and goals are present. To assess a specific process effectively, it is essential to first identify the different types of processes that exist. Dumas et al.[50] classified processes based on the nature of the participants involved. These classifications include:
- Person-to-person processes: These processes primarily involve human participants, and the tasks require human intervention. Interaction between individuals is crucial in these processes.
- Application-to-application processes: These processes solely involve tasks performed by software systems. The logic of such processes is typically represented through process models or coded into the participating programs.
- Person-to-application processes: These processes combine human tasks and interactions with tasks that do not require human intervention. Case-handling systems and workflow systems often fall into this category as they facilitate integrated collaboration between people and applications.

Furthermore, specific classifications of processes exist, particularly focused on knowledge management processes. Abubakar et al.[5] identified six types of knowledge processes, which include:
- Knowledge creation process: This dynamic, multidimensional, and complex process involves the generation of knowledge through knowledge assets, which encompass the outputs, inputs, and brokers of the knowledge creation process.

It encompasses transforming tacit knowledge into explicit knowledge and adopting a communal perspective for knowledge creation.[27][14].
- Knowledge capture process: This process involves the creation of new content and the replacement of existing knowledge. Capturing explicit and implicit knowledge can be achieved through active or passive means, such as leveraging personnel knowledge and experiences, trial and error practices, or learning by doing.[59].
- Knowledge organization process: These processes revolve around knowledge sharing and structuring. They typically involve three stages: selection and evaluation, organization, and re-selection. Continuous selection and evaluation are necessary to regularly update and refine knowledge. Knowledge organization should be defined based on four development phases: knowledge creation, knowledge implementation/adaptation, knowledge dissemination/sharing, and knowledge modification/revision.
- Knowledge storage process: In addition to creating new knowledge, mechanisms for storing and retrieving knowledge when needed are crucial. Knowledge should be available in various structures and formats, including electronic databases, written documentation, individual and team tacit knowledge, and codified knowledge.
- Knowledge dissemination process: This process entails sharing knowledge by transferring it between individuals, groups, or organizations using different communication channels. The behavior of knowledge sharing among individuals can be influenced by "soft issues" such as motivation, personal values, organizational culture, trust, and access to knowledgeable individuals, as well as "hard issues" related to technologies and modern tools.[35].
- Knowledge application process: Ensuring productive application of knowledge within an organization is essential. This process involves utilizing knowledge for action, problem-solving, decision-making, and ultimately generating new knowledge. Knowledge Management Systems play a role in supporting these processes by enabling individuals to effectively apply others' knowledge, resulting in cost reduction and increased efficiency.[29].

Another classification of processes, based on predictability, was proposed by Dumas et al.[50]. Processes can be classified as follows:
- Unframed processes: These processes lack an explicit process model associated with them, often observed in collaborative processes supported by groupware systems that do not define process models.

- Ad-hoc framed processes: These processes are defined beforehand but are executed only once or very few times before being changed or discarded.
- Loosely framed processes: These processes are defined in advance, with constraints describing the "usual" way of execution. However, actual process execution can deviate from these constraints within certain limits, commonly observed in case handling processes.
- Tightly framed processes: These processes are consistent and strictly follow a predefined process model. The execution adheres closely to the defined model.
Figure 1 illustrates the relationship between the nature of participants involved in a process and the predictability of the process.

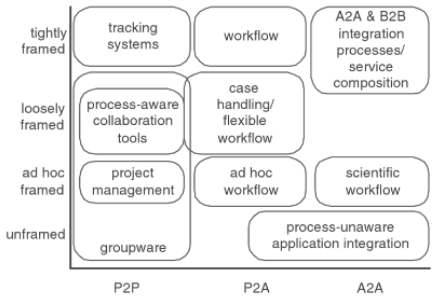

Figure 1: Participants of a process associated with the predictability of the process [50]

3.4 Values drivers for a process management solution

"Value drivers are variables that exert significant influence on the value generated by organizations and can be controlled by organizational management"[45]. However, according to Tiwari and Kumar[64], establishing a unified approach for classifying and investigating value drivers in a general context is challenging. Nevertheless, Amit and Zott[25] identified four distinct value drivers applicable to e-business activities: efficiency, complementarities, lock-in, and novelty. Efficiency pertains to the value created by changes in the activity system that reduce transaction costs. In a service-oriented business, this could involve optimizing processes to minimize time or resource wastage. Complementarity focuses on the value resulting from the synergy between different services, achieved by integrating various business activities. For instance, when a student applies for a grant, they could be simultaneously offered the opportunity to request a public transport card, saving them time. The lock-in value driver concerns the value derived from maintaining customer loyalty, leading to repeat transactions. Service providers often achieve this by personalizing the customer experience. The novelty value driver relates to the value generated by offering entirely new solutions to existing problems. For example, the emergence of Airbnb introduced a new type of service to customers.

Value-based management has been a prominent model in the academic literature on shareholder wealth creation[4]. MacDiarmid et al.[45] stress the significance of identifying value drivers, as they contribute to the definition of financial strategies for shareholder value creation and the maintenance of organizational competitive advantages. Academic literature presents various classifications of value drivers. Examples include macro drivers versus micro value drivers[61], financial drivers versus non-financial drivers[70], and differentiating capabilities drivers versus financial strategy drivers[56]. Rappaport[60] further identifies four types of strategic business value drivers: general, operational, investment, and financing. General value drivers pertain to the duration of value growth, representing the period of competitive advantage. Operational value drivers may include sales growth, operating profit, margin, or income tax rate. Investment-related value drivers encompass fixed capital investments and working capital investments. Financing drivers refer to the cost and structure of capital.

Value drivers can be classified into two dimensions[40]. The first dimension dis-

tinguishes between internal and external aspects. Internal value drivers relate to the inherent performance of a firm, while external value drivers encompass factors associated with the macroeconomic environment. The second dimension considers the qualitative and quantitative aspects of value drivers. Quantitative value drivers involve the collection and analysis of numerical data, whereas qualitative value drivers describe characteristics or qualities of the firm. Although qualitative value drivers significantly impact a firm's value, gathering information on them can be challenging. Moreover, measuring their impact is difficult due to their non-quantifiable nature. Figure 2 provides a visualization of these value driver types.

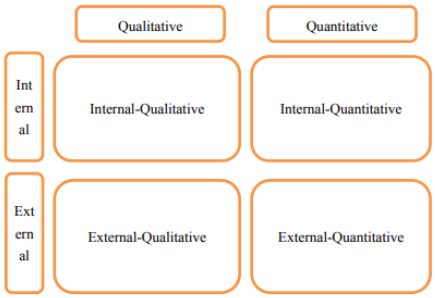

Figure 2: Types of value drivers [64]

Unfortunately there is no specific literature available about value drivers related to the financial and governmental service providers. But this literature can be used to gather better information about the value drivers in the expert interviews. Those will help to gain more insights into the specific value drivers of those organizations.

4 Analysis

This chapter will combine the information gather in the literature review of chapter 3 to answer SRQ3. On top of that the interviews conducted to answer SRQ4 will be analyzed.

4.1 Matching processes and DCM

In order to determine the appropriate processes for implementing a DCM solution, it is necessary to compare the characteristics of DCM with different types of processes. The relevant information can be found in sections 3.1 and 3.3 of this paper. DCM is a concept in process modeling that treats a process as a case. Its primary objective is to efficiently and expediently achieve the end goal of the case. Throughout the process, the most efficient approach to reaching the end goal is evaluated. An important aspect of DCM is the management of data and information. Stakeholders involved in the process have access to the necessary information and data at any given time. Furthermore, making changes to a part of the process is easily accomplished with a DCM application.

Considering the nature of process participants as identified by Dumas et al.[50], a person-to-application process is most suitable for a DCM solution. Such processes involve interactions between human tasks and tasks that do not require human intervention. Case-based systems facilitate integrated interactions between people and applications, making them well-suited for person-to-application processes. DCM is specifically focused on knowledge-intensive processes. The six types of knowledge processes outlined by Abubakar et al.[5] can be linked to the nature of DCM. The following process types align with the DCM approach: knowledge creation, knowledge dissemination, and knowledge application. Knowledge creation processes are dynamic, multidimensional, and complex, which aligns with the flexible nature of DCM. Knowledge creation occurs through the transformation of tacit knowledge into explicit knowledge. Knowledge dissemination processes involve sharing knowledge by transferring it between individuals, groups, or organizations. DCM, with its ability to share and transfer data and information among stakeholders, is well-suited for these processes. Finally, knowledge application processes involve the effective utilization of knowledge. DCM supports knowledge application by providing the right information to the right person at the right time, thereby enhancing the effec-

tiveness of knowledge application.

The predictability of a process, as discussed by Dumas et al.[50], can also be aligned with the nature of DCM. An ad-hoc framed process, which is defined in advance but executed only once or a few times, can be well-suited for DCM due to its ability to handle exceptions and changing processes. However, loosely framed processes are the most compatible with a DCM application. These processes have predefined constraints that dictate the execution approach, but they allow for deviations within certain limits. DCM is adept at managing these exceptions because it possesses a flexible predefined process structure.

These types of knowledge processes often arise in service-oriented processes within the financial and governmental sectors. For instance, when the Dutch Food and Consumer Product Safety Authority receives a consumer complaint, there are numerous potential ways to execute the process. Moreover, the process is strongly rule-based and involves multiple stakeholders. The complaint must be processed and verified, and there may be inspections that vary depending on the case. This can lead to follow-up actions with diverse consequences or advice that may involve legal proceedings. Additionally, at each step of the process, individuals have the right to raise objections that must be addressed. Consequently, organizations of this nature often possess processes suitable for a DCM application. However, there are also simple rule-based processes that do not change or require sharing information with numerous stakeholders. For instance, when a school applies for a subsidy based on student enrollment. Thus, it is crucial to explicitly evaluate the suitability of DCM for each specific scenario.

4.2 Expert interviews

To gather more information about the three different themes discussed in this research, 15 experts have been interviewed. These have all experience with DCM in different ways and roles, they can be found in table 2. The three main themes that are discussed in these interviews are: value drivers, applicability of DCM and value of DCM. Full summaries of each interview can be found in Appendix C, in this section the main themes will be discussed based on the information retrieved from the interviews.

4.2.1 Interview participants

The participants for the expert interviews were approached with the help of Blueriq. Some internal experts with experiences of applying DCM applications at different organizations were included. And also some experts of those organizations having experience with working with a DCM application were interviewed. In this way the two different perspectives are included to provide multiple insights.

ID	**Role**
P1	Business Consultant Blueriq
P2	Customer Success Manager Blueriq
P3	Customer Success Manager Blueriq
P4	Functional Architect Blueriq
P5	Customer Success Manager Blueriq
P6	Business Engineer Blueriq
P7	Senior Business Engineer Blueriq
P8	Project Manager/ Case Manager Dutch governmental organization
P9	Solution Manager Blueriq
P10	Business Engineer Blueriq
P11	Inspector/ Superuser Dutch governmental organization
P12	Senior Advisor / Product Owner Dutch governmental organization
P13	Business Engineer Dutch governmental organization
P14	Senior Business Engineer Blueriq
P15	Business Engineer Blueriq

Table 2: Participants Expert Interviews

4.3 Value drivers

In section 3.4, value drivers were introduced and identified. However, the existing literature on value drivers primarily focuses on financial motivations, overlooking the more concrete motivations that may be associated with implementing a DCM application. To address this gap, multiple expert interviews were conducted to identify specific value drivers for the adoption of a DCM application at financial and governmental service providers. The perspectives of Customer Success Managers at Blueriq, who have experience working with financial and governmental service providers, were obtained, as well as project managers and product owners of financial and governmental organizations.

Improving process efficiency emerges as a crucial motivation for implementing a DCM application. By streamlining processes, the time spent by case managers on each process can be reduced. This increase in efficiency allows case managers to handle more processes within the same time frame, enabling the organization to assist a larger number of customers. Additionally, organizations are motivated to automate common tasks, freeing up employees' time to focus on knowledge-intensive work and ultimately enhancing process quality. Implementing a standardized approach to work is also important for organizations as it ensures consistent service quality and reduces dependence on individuals with specific work methods or process workarounds.

Personalization emerges as a recurring theme in the motivations expressed. This aligns with the shift observed in recent years from standardization to personalization in service-oriented industries. However, financial and governmental organizations have different reasons for pursuing personalization. In financial organizations, competition drives the need to personalize services in order to retain customers, as a lack of personalization can result in customer loss. One of Blueriq's customers experienced this firsthand prior to adopting DCM, as their previous application was overly complex and resulted in slow customer interactions, leading to a loss of interest. They observed that competitors offered a more personalized service, necessitating an increase in personalization to prevent customer attrition. Thus, creating a competitive advantage is a common motivation for financial service providers.

Governmental organizations, although lacking competitors, still recognize the

importance of personalization. This is partly driven by customers' expectations, influenced by the level of personalization they experience in other sectors, such as finance. Consequently, governmental services are expected to provide the same level of personalization to ensure customer satisfaction. Hence, personalization is not merely an opportunity for these organizations, as it is in the financial sector, but a necessity. Digitization is another critical necessity for some governmental organizations. In fact, some governmental departments still rely on non-digital administration and communication processes, requiring a shift towards digitized process management, which may not necessarily be DCM. However, there is an increasing trend in governmental service providers towards adopting case-oriented working, driven by positive experiences in other departments.

Another motivation for implementing a DCM application is cost-saving. Financial organizations tend to have a greater desire to save costs compared to the governmental sector. Nevertheless, every organization and management team must consider cost implications when adopting a new application. Phasing out legacy systems is a common approach to reducing costs, often involving the replacement or removal of expensive applications from the organization's architecture.

4.4 Practical applicability of DCM

During the expert interviews, the practical applicability of DCM was thoroughly discussed. The questions centered around identifying processes that were suitable for a DCM application, as well as processes that were not well-suited for DCM adaptation. Across all projects, successful DCM implementations shared similar process characteristics. These included being data and information-intensive, involving multiple stakeholders, and featuring numerous exceptions and diverse execution methods. Moreover, the processes themselves needed to be knowledge-intensive, encompassing interconnected knowledge-based decision-making tasks.

4.5 Value of DCM

Experiences with integrating DCM applications into organizations revealed that not all organizations are fully aware of the potential benefits offered by DCM, particularly when working with case management for the first time. Adopting a

case-based perspective on the existing processes often brings new insights into how the processes should be executed. While organizations primarily consider the process perspective and how actors navigate through it, the case management approach examines the perspective of individual cases and identifies the necessary steps to complete them. Case managers who begin working with a new DCM application often realize that it can eliminate workarounds they were accustomed to. However, this adjustment may take time, highlighting the importance of continuous improvement to fully realize the potential of DCM.

One factor that can affect the performance of a DCM application within an organization is the presence of other existing systems and applications. The new DCM application must integrate seamlessly with the organization's current architecture. The value that DCM brings can depend on the integration with database-oriented systems such as SAP and Salesforce. One advantage of DCM is that it provides clearer and more relevant tasks to knowledge workers, enabling them to quickly access the necessary data for their work. This, in turn, improves their knowledge work, as the DCM application presents a list of tasks to be executed. Although primarily benefiting case managers, these improvements lead to other advantages as well. For instance, customers receive better and faster service, resulting in increased customer satisfaction, as observed in a DCM project at a Dutch financial service provider. Ultimately, enhanced customer satisfaction leads to an increase in customer base and revenue.

5 Design

With the information gathered via the expert interviews and the literature review, a Process Deliverable Diagram is created. This artifact shows the process of how a business engineer can assess if the process of an organization is suitable for a DCM application and what value it can bring. The deliverable of the artifact is then the total value of the DCM application. In this section the DCM-AVF is explained with two tables explaining all activities and concepts of the DCM-AVF.

5.1 Dynamic Case Management Applicability Value Framework

In this research a DCM-AVF is created to visualize the information gathered from the expert interviews and literature review. A PDD is built to analyze, store, select and assemble method fragments. It can reveal relations between activities at the process side of the method and concepts which are the deliverables produced in the process[66]. A method fragment is a coherent piece of an IS development method. They are distinguished in process fragments, for modeling the development process, and product fragments, for modeling the structure of the products of the development process[31].

The diagram has two sides, the left side is the process view. It contains activities and sub-activities, which can be standard or complex. Standard activities do not contain further sub-activities, while complex activities do contain sub-activities. There is another separation in open and closed complex activities. An open complex activity has sub-activities which are visualized in the diagram. Closed complex activities have sub-activities which are not relevant or known and therefore not shown in the diagram.

The deliverable side of the diagram consists of a concept diagram. As with the activities, there are standard, complex, open and closed concepts. An activity of the process side always needs to be linked to at least one concept at the deliverable side. The different concepts can also have different relationships. One of those is generalization to express a relationship between a general and more specific concept. The generalization can be overlapping, disjoint or categories. Overlapping indicates that there may be occurrences of one of the

generalized concepts, but also both. Disjoints implies that occurrence of one concept is incompatible with the occurrence of the other concept. Categories mean that the disjoint concepts have no occurrences in common and that the decomposition is exhaustive.

5.1.1 Process assessment

Figure 3 depicts the developed DCM-AVF, providing a comprehensive overview of the steps involved in evaluating the appropriateness and value of a DCM application within an organizational context. The initial phase, referred to as process assessment, entails discerning the nature of participants involved. In scientific terminology, this pertains to categorizing participants as engaging in application-to-application, person-to-application, or person-to-person interactions. Processes falling within the person-to-application category are deemed conducive to a DCM application.

Subsequently, an evaluation of process predictability is conducted, accounting for levels of exceptions and adaptability. The framing of the process significantly influences this assessment. Processes characterized as loosely framed are considered suitable. Furthermore, it is imperative to identify the type of knowledge process employed, encompassing activities such as knowledge creation, capture, organization, storage, dissemination, and application. Processes centered around knowledge creation, dissemination, or application are deemed conducive to a DCM application.

In assessing process complexity, four dimensions of complexity, as identified by J. Cardoso[34], are taken into account. Activity complexity gauges the number of activities entailed in the process. Control-flow complexity focuses on the behavior of the control-flow, influenced by splits, joins, and loops within the process. Data-flow complexity scrutinizes the data structure of the process, including the number of parameters associated with activities and the mappings between data. Lastly, resource complexity pertains to activities necessitating access to resources during execution. Additionally, factors such as the number of stakeholders and decision points further contribute to the overall complexity assessment. Each factor is assigned a distinct complexity score based on input. The computations for these scores are detailed in Appendix E. The result is six complexity scores, each falling within the range of 1, 2, or 3. These scores

are aggregated and divided by six to derive the overall complexity score for the process. The suitability level is similarly assigned a value of 1, 2, or 3, signifying "not suitable," "medium suitable," and "highly suitable," respectively. This determination is predicated on the collective information garnered from the aforementioned assessments. If the suitability level score is 2 or higher, the process is deemed suitable. Consequently, the total complexity score must also be 2 or higher, as outlined in table 3.

Nature of participants	NOT Person-to-application	Person-to-application	Person-to-application
Process predictability	NOT Loosely framed	Loosely framed	Loosely framed
Type knowledge process	NOT Knowledge creation, dissemination, or application	Knowledge creation, dissemination, or application	Knowledge creation, dissemination, or application
Total complexity score	NA	2	3
Suitability level	1	2	3

Table 3: Calculation suitability level

5.1.2 Identification of influential factors

The second phase of the assessment encompasses the identification of influential factors. Initially, this entails ascertaining the types of motivations that drive an organization's decision to adopt a new application. Given the expansive scope of the term "motivation," this study concentrates on specific motivations directly linked to DCM. These motivations, derived from conducted interviews, encompass process digitalization, process personalization, and process efficiency. In cases where customer satisfaction serves as the motivation type, an additional input is required to gauge the current level of customer satisfaction, utilizing a Likert scale.

Subsequently, an evaluation of case management experience is conducted, primarily among case managers who will extensively engage with the new DCM application. Experience levels are categorized as none, medium, or high, as-

signed respective scores of 1, 2, and 3. Medium experience is designated for case managers with prior exposure to case management in a different organization, while high experience denotes familiarity with other case-based working applications within the current organization.

The architectural landscape is then scrutinized, accounting for the number of existing systems and applications that necessitate interaction with the new DCM application. Furthermore, an assessment is made regarding the level of support extended by existing systems for the new application. A higher number of existing systems and applications that necessitate interaction with the DCM application leads to a more adverse contribution to the influence level. Conversely, a favorable level of support from existing legacy systems positively impacts the influence level. The number of collaborating systems is assigned a score ranging from one to three, with a higher score indicating a more complex interaction. Similarly, the level of support also receives a score between one and three, with a lower score indicating inadequate support. The cumulative score of these two factors yields the total architectural situation score. To compute the influence level, the scores for architectural situation and experience level are aggregated, and the result is divided by two. This yields an influence level ranging from one to three, with the equation detailed in 1.

In summary, this phase entails a comprehensive evaluation of multiple factors, encompassing motivation types, case management experience, and the architectural situation. The amalgamation of these factors culminates in the determination of the influence level, offering valuable insights into how these elements impact the suitability and value of the DCM application.

$$Influencelevel = ((Collaboratingsystemsscore + Levelofsupportscore)/2 + Experiencelevel)/2 \quad (1)$$

5.1.3 Value estimation

In the third and final phase of the assessment, the value proposition of the DCM application will be estimated. Commencing with an analysis of process efficiency, crucial metrics including process duration and productivity will be meticulously examined. These efficiency parameters, as elucidated by Weske[16], will serve as a foundational guide. It is anticipated that the application of DCM

will yield an average reduction in process duration by 35%. The initial process duration, as determined in the process assessment phase, will furnish the basis for this estimation.

Subsequently, productivity will be gauged based on the number of activities within the process. Implementation of a DCM application is anticipated to result in an average increase of 20% in the number of activities accomplished within the same timeframe. Moreover, an assessment of employee workload reduction will be conducted, predicated on the number of decision points embedded within the process. A higher number of decision points implies that the DCM application will substantially alleviate employee workload due to its inherent nature. Consequently, the complexity score of decision points will be employed, with a higher score indicative of a more pronounced reduction in employee workload. Additionally, if the organization's motivation encompasses customer satisfaction, an evaluation of the enhanced customer satisfaction level will be undertaken, drawing on the input from the Likert scale pertaining to current customer satisfaction.

Furthermore, an estimation of process quality enhancement will be derived from the influence level determined in the influential factors phase. A higher influence level is anticipated to yield a more substantial improvement in process quality. Finally, an assessment of the potential for continuous improvement within the organization will be conducted. The overall complexity score of the process will serve as the yardstick for appraising this potential. It is posited that a highly intricate process will derive greater benefits from a DCM application compared to a less intricate counterpart. DCM is renowned for its proficiency in expediting and refining continuous improvement initiatives. Should the organization demonstrate a steadfast commitment to perpetually enhancing the application, and possess the requisite resources, the DCM application is poised to furnish significant added value.

By integrating these multifaceted assessments, this phase furnishes a comprehensive grasp of the potential value proposition that the DCM application could offer the organization. It systematically considers facets germane to process efficiency, employee workload, customer satisfaction, and avenues for sustained enhancement. All the aforementioned insights will be synthesized to generate a comprehensive value report for the DCM application. This estimation will be

contingent upon both the suitability level and the value-related assessments.

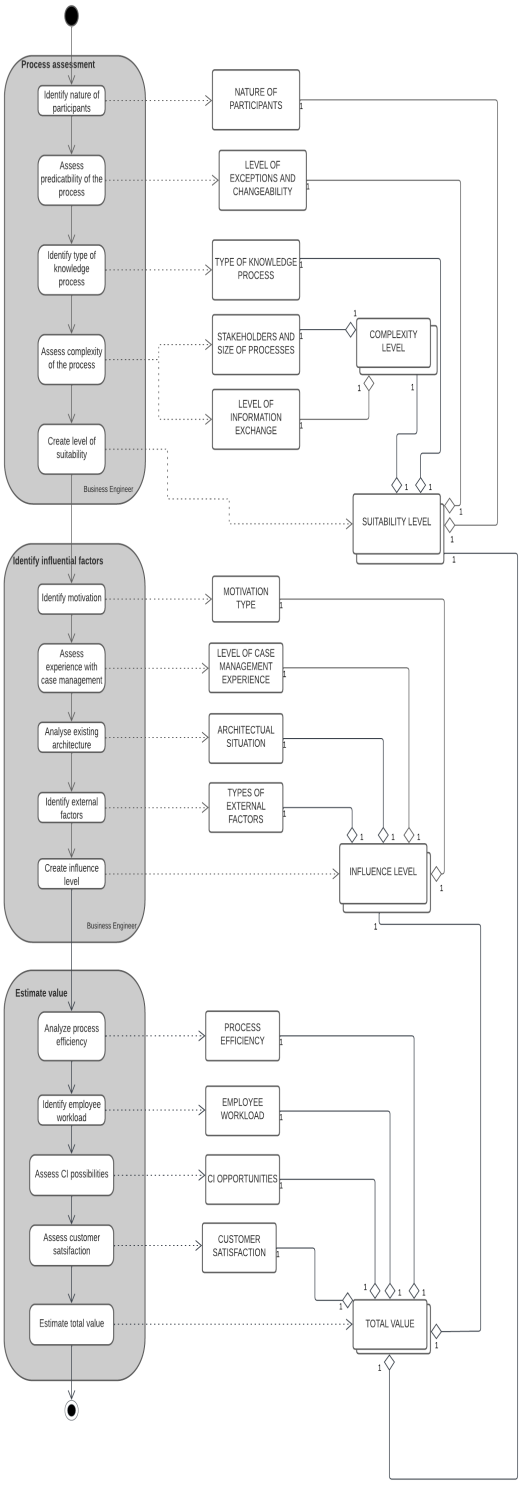

Figure 3: DCM-AVF

5.2 Activity and concept table

To explain all activities and concepts separately and in more detail, an activity table and concept table are created. These can be found in Appendix F.

6 Validation

6.1 Validation method

There are different methods to validate a created artifact. One of the oldest methods is the Technology Acceptance Model (TAM). Which is designed in 1986 and has developed over time. In the beginning of technology entering user's life, there was a growing necessity for comprehending reasons why a technology is accepted or rejected[53]. Therefore the TAM was created to predict the actual use of any specific technology. But there have been several critics on the model, Chuttur[36] concluded that the model lacks sufficient and rigorous research. Turner et al.[13] stated that care should be taken using the model outside the context in which it has been validated. For this research the TAM is not the most suitable method, because it is more a prediction model than a validation technique. On top of that the TAM is created a long time ago and could therefore be not very optimal in the current time.

Therefore Wieringa's structured validation method[68] will be employed in this study to validate the created DCM-AVF. This is a more recent and widely used method to validate multiple types of artifacts. One of the techniques within this method involves seeking expert opinions to assess the usability and practicality of the artifact in real-world contexts. This is the technique that will be used for this research. The assessment can be conducted through various means, such as interviews, questionnaires, or focus groups. In this case, five experts will be interviewed individually. They are are business engineers at Blueriq and possess experience working with applications for financial or governmental organizations. Through these interviews, the aim is to gather their feedback and opinions.

The validation process will primarily focus on assessing the completeness, ease of use, usefulness, and the intention to use the artifact. To facilitate this validation, a small application has been developed within the Blueriq environment. This application serves to present the DCM-AVF in a more comprehensible manner for the business engineers at Blueriq. The experts will be provided with three different scenarios related to organizations and processes, which they will use to evaluate the artifact's effectiveness.

6.2 Validation content

During the validation interviews, the participants will receive two different scenarios to use in the created application of the DCM-AVF. There are five main questions to gain information about the artifact during the validation:
- Which scenario do you think is suitable for a DCM application? - How would you assess the usability of the application?
- How would you assess the ease of use of the application?
- How would you assess the understandability of the application?
- Is the artifact complete?
- Why would you use the application and why not?
During the interview there could be more extensive feedback and follow up questions which will be used in the modification of the DCM-AVF. In Appendix B.1 some screenshots of the application can be found which is used to perform the validation.

6.2.1 Scenario 1:

The Dutch government has a procurement process for awarding their contracts. It starts with identifying the needs and requirements for goods, services, or infrastructure. The procurement department develops a specification of the desired outcome. Then interested suppliers or contractors are invited to prequalify. Their capabilities, experience and financial stability are assessed. Then they solicit bids by issuing a request for proposal. The suppliers create their proposals and send them to the procurement department. They evaluate the proposals based on different predefined criteria. In some cases there can be negotiations or clarifications between the bidder and the department. After that, the a bidder will be selected and the contract will be finalized. The improvement department captures and documents knowledge throughout the process to improve future procurement practices. This documentation is stored in a big database. Throughout the process the compliancy department constantly reviews if relevant laws, regulations and ethical standards are followed. They recommend corrective actions if necessary.

This process contains 11 different activities, 2 flow points, 5 data exchanges, 1 data resource, 4 stakeholders, 2 decision points. The average process time is

120 hours. The Dutch government wants to improve the process efficiency and has some experience with case oriented working. There are 3 different collaborating systems the new application has to interact with. But 2 of those systems are old and do not support many new applications.

6.2.2 Scenario 2:

The Volksbank wants to improve the customer experience of their complete loan process. Currently they have quite some unhappy comments from their customers about their process time and interaction with the customer. They approach Blueriq to see if they can create a dynamic application to help improve their process. The Volksbank has a lot of experience with working in a case oriented way. They have three different systems supporting the whole process, and those support the newest applications very well. You are asked to consider if a DCM application would be suitable for the process of giving loans of the Volksbank.

The process starts with a potential customer who contacts the Volksbank to inquire about a loan and provides information about their financial needs. The customer service employee of the Volksbank gathers details of the customer like loan amount, purpose and eligibility criteria. Then an overview of the loan offerings will be provided to the customer. The customer needs to fill out a loan application form with personal and financial information, employment details, and supporting documents. The employee of the Volksbank then verifies the authenticity and completeness of the document. Next a credit check is performed to assess the customer's creditworthiness, it involves the credit history, outstanding debts and repayment behavior. The application undergoes then an screening process which is then also reviewed for completeness, accuracy and adherence to loan requirements.

Then the application is assigned to a loan officer who specializes in the specific loan type requested by the customer. He reviews the application and conducts an analysis of the customer's financial situation and assesses the risks. If there is collateral involved, the appraisers of the Volksbank will evaluate the value and marketability of the collateral to determine its suitability for securing the loan.

Based on the risk analysis, the loan officer structures the loan, determining the loan term, interest rate, repayment schedule, and any special conditions. Then a recommendation report is prepared by the loan officer with the assessment and proposed terms, this is then submitted to the loan approval committee. This committee reviews the recommendation and makes the final decision whether to approve or reject the loan application. Following the customer is notified of the loan approval decision, along with the terms and conditions of the loan.

If approved, the loan officer prepares the loan agreement and related documentation. This agreement will then be signed by the customer and will provide additional requirement documents if necessary. The payment officer arranges the payment of the approved loan amount to the customer's account, then the load in activated and the repayment period starts as per the agreed terms.
The whole process contains 34 different activities, there are 10 flow points, 20 types of data flows, 3 data resources, 8 different stakeholders involved, 8 decision points, and the average process time is 150 hours.

6.3 Validation results

The validation interviews were conducted with 8 experts all working at Blueriq. In table 4 the participants and roles are shown. In Appendix D the summaries per interview can be found, in this section the most important findings of the interviews will be discussed.

6.3.1 Summary of the validation interviews

The nine validation interviews yielded valuable feedback for refining the artifact and provided intriguing insights for potential discussions and future research avenues. Notably, a key issue in terms of comprehensibility arose in the process assessment section, particularly pertaining to inquiries about the nature of process participants, predictability of the process, and types of knowledge processes. Therefore, in the enhanced artifact, these questions will be reformulated for greater clarity. Additionally, some feedback was received regarding the six distinct factors influencing process complexity. Specifically, considerations for the "unhappy flow" of a process should be taken into account when determining the number of activities, and a deeper level of granularity regarding activities should be factored in during process evaluation. Moreover, the complexity of each individual activity should be considered in conjunction with the total num-

ber of activities.

Regarding the implementation of these suggestions into the artifact, providing supplementary explanations within the question pertaining to the number of activities can address concerns about the level of detail and intricacy. However, directly incorporating the complexity of each activity may lead to excessive complexity and hinder the overall user-friendliness and comprehensibility of the artifact. Another dimension influencing process complexity is the involvement of stakeholders. Participants expressed interest in understanding which stakeholders are engaged in a process and the extent of their contributions. While obtaining such detailed stakeholder information could potentially enhance accuracy, it may also pose challenges in terms of user-friendliness and comprehensibility. As a result, this aspect may be more suitable for future research endeavors.

Participants consistently emphasized the significance of the number of stakeholders as a pivotal factor in assessing process complexity. Consequently, this factor will be accorded greater weighting in the improved artifact. The frequency with which the number of activities, flow points, and decision points were cited underscores their importance as well. Estimating the scales for these six factors proved to be challenging, prompting consideration of utilizing existing data within Blueriq. While this approach holds promise, time constraints prevent its implementation in this study, making it a valuable suggestion for future research.

Overall, the artifact's comprehensiveness received positive evaluations, with only a few recommendations for refinement. The number of times a process execution emerged as a potentially crucial factor in assessing process complexity, warranting inclusion in the improved artifact. Furthermore, the number of rules contingent on specific outcomes within a process was identified as a valuable indicator. However, its practical applicability and measurement complexity within the artifact led to its consideration for discussion in future research, rather than immediate integration. Lastly, concerns were raised about the directness of certain questions, particularly in relation to influential factors such as the level of support from existing systems or experience with case-oriented work. A more indirect approach to soliciting the same information was proposed as a potential avenue for improvement in question formulation.

6.3.2 Participant table

In this table the functions of the nine participants of the validation interviews are shown.

ID	Role
P1	Business Engineer Blueriq
P2	Business Engineer Blueriq
P3	Business Engineer Blueriq
P4	Business Engineer Blueriq
P5	Business Engineer Blueriq
P6	Business Engineer Blueriq
P7	Functional Architect Blueriq
P8	Solution Manager Blueriq
P9	Business Engineer Blueriq

Table 4: Participants Validation Interviews

6.4 Improved DCM-AVF

Based on all the information and new insights from the validation interviews, the created DCM-AVF has been improved.

6.4.1 Process assessment

The improvements of the phase 'process assessment' can be seen in figure 4. Firstly, the naming of the concept 'level of exceptions and changeability' is changed in the renewed artifact. The new name is 'process predictability' which can be strictly framed, ad-hoc framed, loosely framed, or unframed. The cardinality of the 'type of knowledge process' concept is also adapted, because one or more types of a knowledge process can be fitting in a process. As biggest change in this phase of the process is the increase in detail in the activity 'assess complexity of the process'. Seven different factors are now shown which are used for the calculation of deliverable 'complexity level'. An added activity 'assess average process time' results in a new deliverable 'average process time', these are used as input for later in the process in the value estimation. Finally, the level of suitability is changed into creating a 'suitability report' by doing a suitability check. This contains checking if the right nature of participants, process predictability and types of knowledge processes are in place for a DCM

application. And if the process has a sufficient complexity level to be viable for a DCM application.

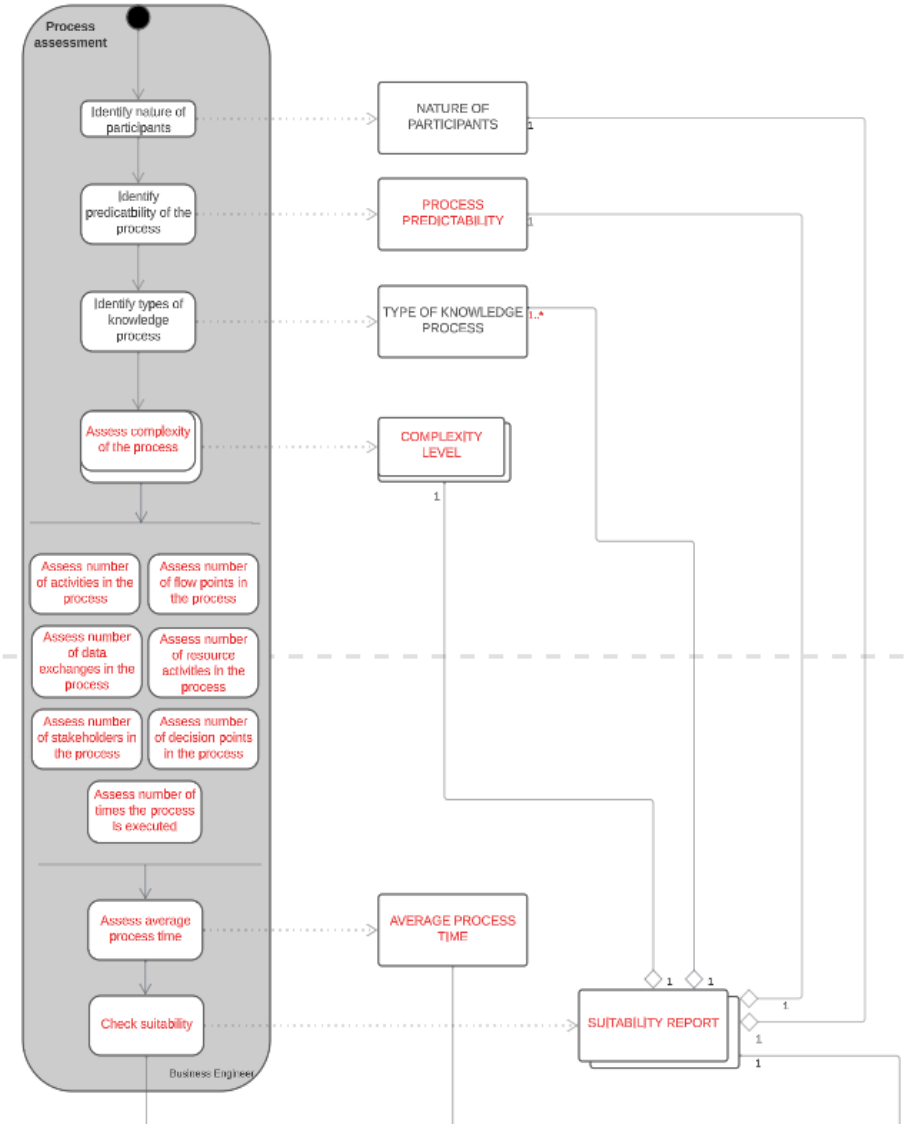

Figure 4: Improved phase 1 of DCM-AVF

6.4.2 Identify influential factors

The second phase has an improved name from 'identify influential factors' to 'influential factors identification'. This improves the correctness of the model according to the general PDD guidelines. As can be seen in figure9, there have been two small improvements. The 'identify external factors' activity with the corresponding deliverable has been removed. From the expert interviews it came known that there are external factors in an organizations that can influence the value of DCM. But for this research it is difficult to clearly identify those factors individually and use them in this particular artifact. Therefore they could be interesting for future research. Secondly, the identification of the current architecture has been shown in more detail. It depends on the existing number of systems the new DCM application has to interact with, and the level of support those systems can offer to the new DCM application. The higher number of systems, the worse the architectural situation will be assessed.

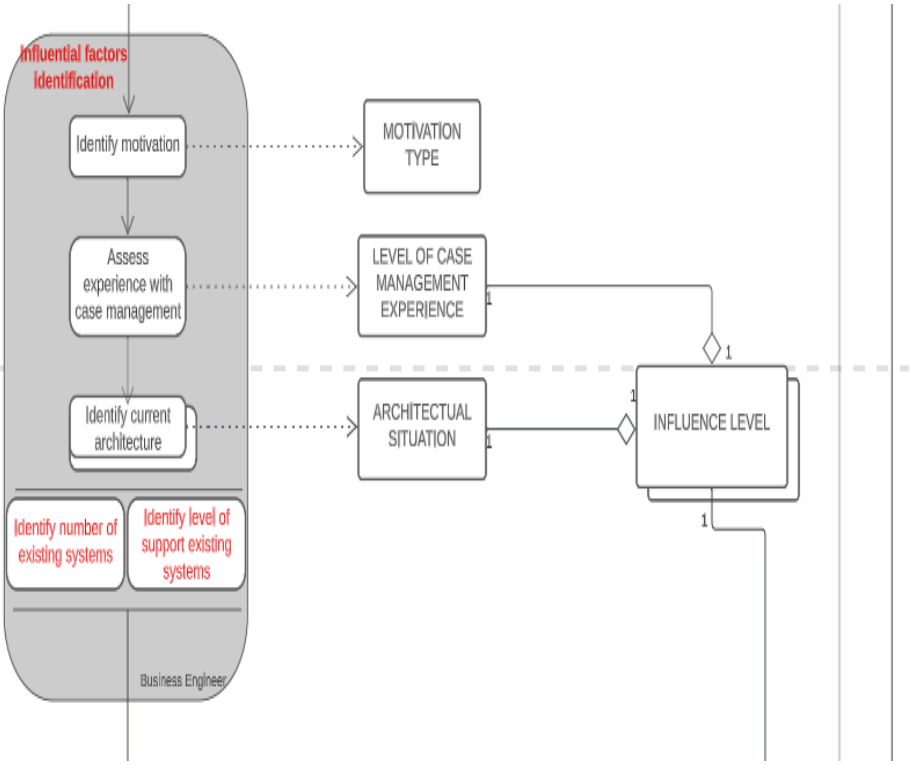

Figure 5: Improved phase 2 of DCM-AVF

6.4.3 Value estimation

As third and final phase there is the value estimation part of the process which is shown in figure 10. The process efficiency is based on the number of activities part of the process complexity and the average process time. The number of activities per process will increase with 20 percent and the average process time will be reduced with 35 percent. The employee workload reduction level is based on the amount of decision points in a process. With more decision points, the value of DCM increases for the knowledge workers in the process. Their workload will decrease with the DCM approach of a process helping reducing the workload. The activity of assessing the customer satisfaction has been changed and made optional. The new activity is the estimation of the quality improvement of the process, resulting in a quality improvement level. This level is dependent on the architectural situation and case management experience of the organization. And optionally influenced by the motivation type of the business. When this involves customer satisfaction, the current customer satisfaction will be analyzed. Based on that input an estimation of the new customer satisfaction will be created. Finally, a total suitability and value report will be created with an general overview. This shows whether the process is suitable for a DCM application, and how that conclusion is created. Secondly, the value for the organization is estimated based on the earlier described deliverables.

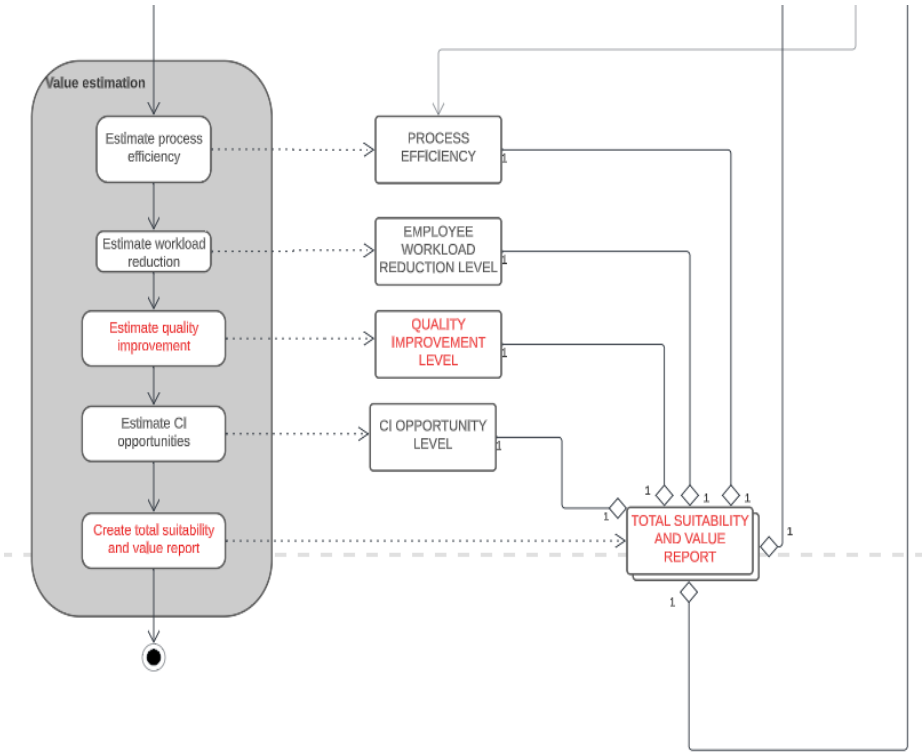

Figure 6: Improved phase 3 of PDD

The complete improved DCM-AVF will can be seen in figure 7 below.

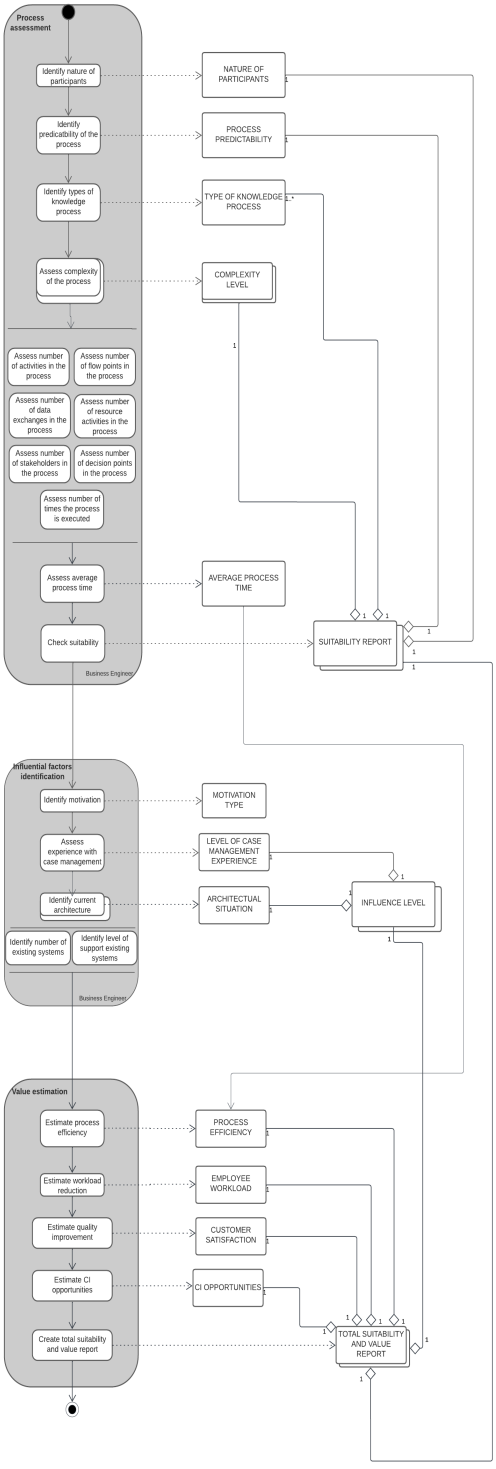

Figure 7: Complete improved DCM-AVF

7 Discussion

7.1 Threats to validity

To ensure the scientific value of the results derived from this research, an assessment of validity is necessary. Zhou et al.[24] have identified common threats to validity, which will be discussed within the scope of this research project.

7.1.1 Construct Validity

Construct validity is about how well a test measures the concept it was designed to evaluate. Threats to construct validity may arise at two points in this research. Firstly, from limitations in the online libraries where the papers were sourced, as well as biases in the proposed inclusion and exclusion criteria for the systematic literature review. To minimize these threats, each step of the literature review process is documented meticulously, and only concepts that have been widely utilized are considered relevant for this study. Secondly, the validation interviews performed with the experts of Blueriq should be constructed properly. To prevent this threat, the participants of the interviews have different experiences and knowledge about DCM. And a possible biased opinion or perspective from their experiences at Blueriq is minimized.

7.1.2 Internal Validity

Internal validity aims to establish a causal relationship, differentiating genuine relationships from spurious ones. Threats to internal validity often emerge in case studies and interviews, where biases can influence participants, organizations, and even the interview questions. To mitigate these threats, the selection of participants and the preparation of interviews have been conducted rigorously. Additionally, potential threats to internal validity during the screening of papers in the literature review were minimized by clearly documenting the decision-making process and rationale.

7.1.3 External Validity

External validity pertains to the generalizability of a study's findings to a specific domain. The results of this study primarily focus on financial and governmental service providers. But generalizing the findings to all service providers could be realised when adapting the value drivers used in this research to those providers.

Also the literature study can be more broadly generalized since it incorporates all available information on DCM and can thus be applied to other studies.

7.1.4 Conclusion Validity

Conclusion validity demonstrates that the operations of a study, such as the data collection procedure, can be replicated with consistent results. To ensure conclusion validity, every step of this research is thoroughly documented and clearly described, making the information publicly available.

7.2 Limitations

One limitation of this study pertains to the relatively restricted pool of participants involved in data collection for both the artifact development and interview validation phases. This constraint is inherently linked to the time constraints faced during the research process, which hindered the inclusion of a more diverse range of participants for interviews. With additional time at our disposal, a broader spectrum of individuals from various organizations could have been engaged, potentially enhancing the representativeness and providing a more expansive perspective on the findings.

Moreover, it is worth noting that the participants involved in the interviews for the artifact's development primarily stem from the Blueriq company. While some initial interviews did feature participants from external organizations, it is important to acknowledge that these individuals were still clients of Blueriq. This context could introduce a potential bias in the responses obtained during the interviews and in the subsequent validation of the developed artifact. Additionally, the evaluation of the artifact's user-friendliness faced challenges due to the limited number of participants. This was further compounded by the fact that the application designed for artifact validation had not been fully optimized at the time.

8 Conclusion and Future Work

8.1 Conclusion

In chapter 1 of this research the sub-research questions and main research question were stated. To draw a conclusion of the main research question, the sub-research questions will firstly be answered.

SRQ1: What is DCM and how does it compare to other process management concepts? The question can be addressed by drawing upon the preceding findings elucidated in the literature review conducted in Chapter 3. DCM emerges as a dynamic process management paradigm, wherein the case serves as the focal point for achieving case objectives with optimal efficiency. This framework affords significant latitude in determining the approach to goal attainment, with an overarching emphasis on expeditious accomplishment. In contrast, BPM adheres to a comparatively more static structural framework characterized by heightened constraints. This differential nature renders BPM less adaptable to the exigencies of dynamic and knowledge-intensive environments.

When comparing DCM and ACM, the main differences is the dynamic at runtime. ACM creates cases just-in-time when needed, implying case adaptation based on previous instances. While DCM is dynamic at runtime, it empowers users to modify their working processes, making process adaptation a regular activity.

SRQ2: What structure and classifications are known about the processes of governmental and financial service providers? As elucidated in the literature review of Chapter 3, various established structures and classifications of processes have been identified. Processes may be categorized based on the composition of participants engaged in the process, providing a broader understanding of its nature. A more refined classification system encompasses the delineation of six distinct types of knowledge processes, serving as an indicator of the level of dynamism and knowledge intensity inherent to a given process. Furthermore, the predictability of a process can be assessed. When assessed in conjunction with the nature of participants involved, it furnishes an indication of the dynamic nature of the process.

SRQ3: What is the relationship between the structured processes and the characteristics of DCM? This research question finds its primary resolution in Section 4.1 of this paper. In essence, there exist specific relationships between diverse classifications of a process and the applicability of DCM. Notably, processes classified under the nature of "person-to-application" exhibit a higher suitability for integration with a DCM solution. This is owing to the fact that such processes entail interactions between human-operated tasks and automated tasks, a dynamic that aligns seamlessly with case-based systems' capacity to facilitate integrated interactions between individuals and applications.

Regarding the various types of knowledge processes, it is observed that knowledge creation processes exhibit characteristics of being dynamic, multidimensional, and complex, aligning well with the inherently flexible nature of DCM. Knowledge dissemination processes, on the other hand, involve the sharing of knowledge by means of transfer between individuals, groups, or organizations. In this context, DCM proves adept at swiftly disseminating and transferring data and information amongst the stakeholders of a given process, rendering it particularly suitable. Lastly, knowledge application processes center on the effective utilization of knowledge. Here, DCM plays a supportive role by ensuring timely delivery of pertinent information to the relevant parties, ultimately enhancing the efficacy of knowledge application.

SRQ4: What are the value drivers of financial and governmental service providers for a DCM solution and how can the value of DCM be estimated? Throughout the expert interviews, a multitude of value drivers pertinent to financial and governmental service providers were discerned. A pivotal impetus for these organizations to integrate a DCM application lies in the endeavor to enhance process efficiency. Such an enhancement not only yields intrinsic benefits but also aligns with the overarching goals of cost reduction, diminished employee workload, and augmented process quality. Additionally, a recurrent motif in the motivations stems from the aspiration to heighten process personalization, a reflection of the broader trend shifting from standardization to customization driven by customer preferences.

The valuation of DCM is contingent upon an assessment of the refined process efficiency, which encompasses both process duration and productivity. More-

over, the extent of workload alleviation and potential for augmenting customer satisfaction serve as vital contributors to the overall value proposition of DCM. This evaluation is further supplemented by an appraisal of the level of process quality enhancement, contingent upon the prevailing architectural landscape of the organization and the proficiency in case-oriented working. Finally, the potential for fostering continuous improvement within the organizational framework serves as a pivotal dimension bolstering the value of DCM, underscoring one of its core strengths.

MRQ: How can a framework show the applicability and value of DCM at governmental and financial service providers? In summary, this research culminated in the development of a comprehensive DCM-AVF, delineating the process for evaluating the feasibility and potential benefits of deploying DCM within governmental or financial service providers. Constructed through the synthesis of scholarly literature and insights gleaned from subject matter experts, the DCM-AVF functions as a structured framework. It gauges the applicability of DCM by scrutinizing various process classifications and the intricacies associated with a given process.

To gauge the value proposition, the DCM-AVF leverages organizational motivations for adopting a DCM application, as well as considerations related to the architectural landscape and experience with case-oriented working. The amalgamation of these assessments yields a holistic report, providing estimations on both the applicability and the prospective value that a DCM application could offer upon implementation within the organization. This value encompasses facets such as process efficiency, workload reduction, heightened customer satisfaction, quality enhancement, and avenues for sustained improvement.

8.2 Future work

This research has paved the way for several promising avenues for future investigation. Firstly, in appraising the value of a DCM application within financial or governmental service providers, the associated costs have not been factored in. This presents an opportunity for subsequent research to delve into the financial implications of implementing a DCM application, offering a more comprehensive assessment of its actual value.

Secondly, the intricacies and granularity of activities emerged as a topic of discussion during the validation interviews. Initially assessing the number of activities in a process can be a nuanced task, with individuals potentially having varying perspectives on the level of detail each activity entails. Exploring this aspect further in a new study could yield valuable insights.

Additionally, the type of stakeholder actively involved in a process was raised in the validation interviews. This factor can significantly influence the complexity of a process, contingent on the stakeholder's proximity to the process and the extent of their impact within it. If a stakeholder is only engaged in a limited portion of the process, their contribution to its overall complexity is diminished.

Finally, the scaling of different factors contributing to the complexity of a process could benefit from real-time data. For instance, within Blueriq, numerous DCM applications are operational at customer sites. By deriving the average number of activities, flow points, decision points, etc., a more accurate estimation of process complexity could be achieved. The current scaling methodology, not being grounded in real-time data due to time and resource constraints, could be augmented with such data to enhance the precision of process complexity assessment. Consequently, this would refine the suitability assessment of a process for DCM.

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A Interview protocol

A.1 Interview and Analysis Execution

The semi-structured interviews that are conducted as part of the case study follow a protocol. It is drafted from research by Halcomb and Davidson[41], who emphasize the benefits of recordings and field notes of interviews. It is a reflexive and iterative process of data management. The resulting process of conducting and analysing the interviews and their results consists of the following steps:

Step 1 - Recording of interview and concurrent note taking: The interview is recorded and concurrent note taking consists of the researcher's impressions of an interaction rather than on transcribing verbatim sections of the interviewee's responses.

Step 2 - Reflective journalizing immediately after the interview: The field notes are reviewed and initial impressions are expanded where necessary. Additionally, the conduct of the interview is reflected on.

Step 3 - Listening to the recordings and amending/revising field notes and observations: Familiarization of the data takes place. Recordings are reviewed in consultation with the field notes to ensure that the field notes provide an accurate representation of the interview, and the researcher is aware of the breadth and depth of the data.

Step 4 - Definition of themes: Theme definitions should tell the story of each theme, its central concept, scope and boundaries, and how it relates to the other themes and to the research question. The recordings are relistened to identify examples to demonstrate the meaning of themes from the interviewee's perspectives. A theme name should encapsulate the essence of the theme and be concise and vivid.

Step 5 - Report of the results: The results are written down in a report, including the themes, descriptions, and examples.

A.2 Informed Consent Form

See next page.

Informed Consent Form

Researcher: Martijn Jansen

Organization: Utrecht University

Department: Information and Computing Sciences

Email: m.g.jansen@students.uu.nl

This Informed Consent Form consists of two parts:

- Information Sheet (to share information about the research with you)
- Certificate of Consent (for signature if you agree to take part)

PART I: Information Sheet

You are asked to participate in an interview as part of research on the value and applicability of Dynamic Case Management at financial and governmental service providers. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. Please read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information.

General introduction

This research aims to create a framework to estimate the value and applicability of Dynamic Case Management at financial and governmental service providers. You will be asked questions in regard to your expertise. This interview is conducted by Martijn Jansen. The interview will be recorded, analysed and potentially used in an anonymous manner within the master's thesis of Martijn Jansen for the study Business Informatics at Utrecht University. Martijn is supervised by dr. Jens Gulden and dr. Inge van de Weerd of Utrecht University. The interview will take approximately 60 minutes.

Burden and benefits

There will be no direct benefit to you for your participation in this study. However, the information obtained from this interview may contribute substantially to the achievement of the goals of this study. This might help with the creation of a framework to estimate the value and applicability of DCM at financial and governmental service providers.

Confidentiality

The information that we collect from this research project will be kept confidential. No-one but the involved researchers will be able to see the information that will be collected during the research. All data will be securely stored following the rules and guidelines of Utrecht University and will only be used for research purposes.

Sharing the results

The knowledge that we obtain from doing this research will be shared through scientific publications in conferences and journals. Confidential information will never be shared.

Right to refuse or withdraw

Your participation in this study is voluntary. If you decide to take part in this study, you will be asked to sign this consent form. After you sign the consent form, you are still free to withdraw without giving a reason. Withdrawing from this study will not affect the relationship you have, if any, with the researcher. If you withdraw from the study before data collection is completed, your data will be returned to you or destroyed. Note that if you withdraw after a paper regarding this project is submitted for publication, we cannot exclude your data from the current research project.

PART II: Certificate of Consent

I have read and I understand the provided information. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I voluntarily agree to participate as a participant in this research.

Name of Participant _____

Signature of Participant _____

Date _____

A.3 Expert interview

Introduction

My name is Martijn Jansen, and I am conducting a graduate research for the Master in Business Informatics on Utrecht University. This research aims to create a framework to estimate the value and applicability of Dynamic Case Management at financial and governmental service providers.

I'd like to thank you for your cooperation in this research by taking the time for this interview. You have been selected as a participant, because you have been identified as an expert of Dynamic Case Management. This interview is scheduled for a duration of no longer than 60 minutes. During this time, we will discuss several open questions, which can be reviewed upfront. The questions rather function as a guidance, hence we are not bound to solely those. The results of this interview can form the input for framework designed for DCM value and applicability. In order to adequately process the results of this interview, I would like to audio-record the interview. Only the interviewer and supervisors on the project will be privy to the tapes. Please sign the consent form that I will deliver to you upfront. Essentially, this document states that: (1) all information will be held as confidential as possible, and (2) your participation is entirely voluntary and you may stop at any time. Thank you for agreeing to participate.

Introductory Questions

1. Who are you and how would you describe your job?

2. How many years of experience do you have in your current job?

3. What project(s) did/do you work on, and in which industry? Can you shortly describe those projects?

General Questions

4. How would you define Dynamic Case Management?

5. Did you ever encounter any problems with a DCM application in your projects? What kind of issues?

DCM Applicability Questions

6. Why is your current or most recent project suitable for a DCM application?

7. Have you encountered projects which were not suitable for DCM and why?

8. Can you give clear indicators for suitability of a process for a DCM application?

Value Drivers Questions

9. What motivations did the customers have/ did you have to adapt a DCM application?

10. Did the customer/did you consider other application then a DCM solution?

11. Did the customer/you have clear what the DCM application should improve or deliver in the organization?

DCM Value Estimation Questions

12. Which aspect of the application has been the most beneficial at the customers/your organization?

13. What is the biggest value this application can bring to any organization?

14. Are there measurable benefits of the DCM application?

B Screenshots of the application used for validation

B.1 Start screen

Figure 8: Start Screen

B.2 Process assessment

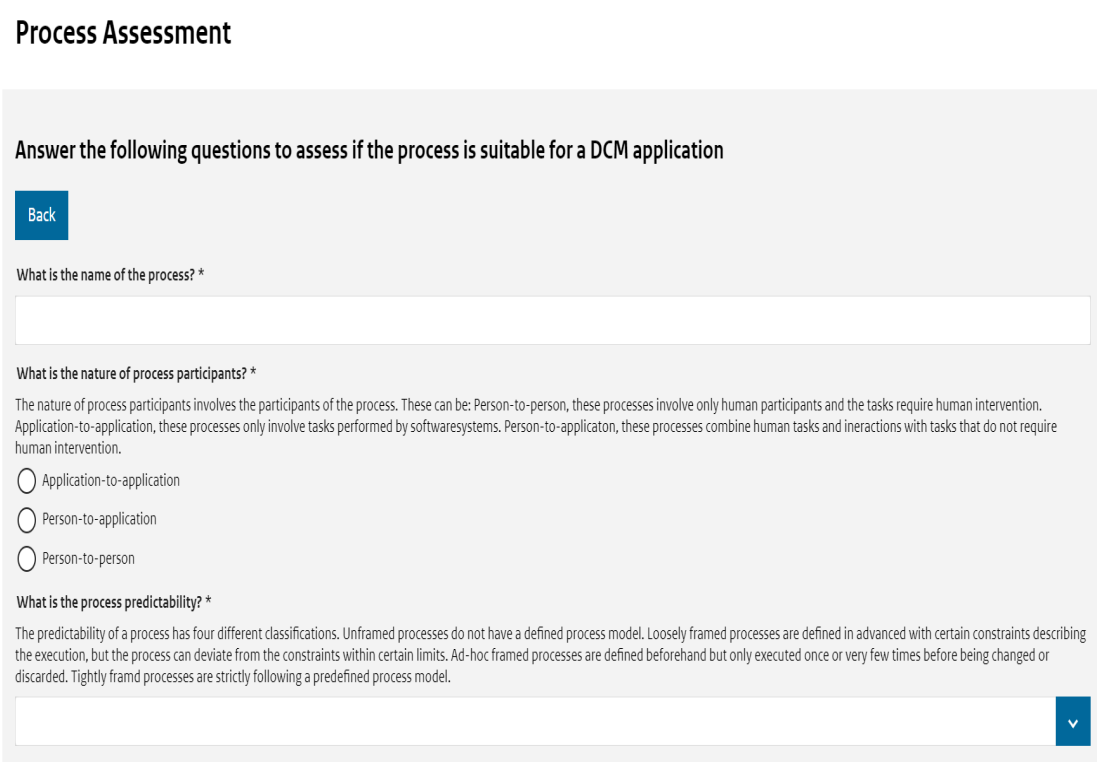

Figure 9: Process assessment part 1

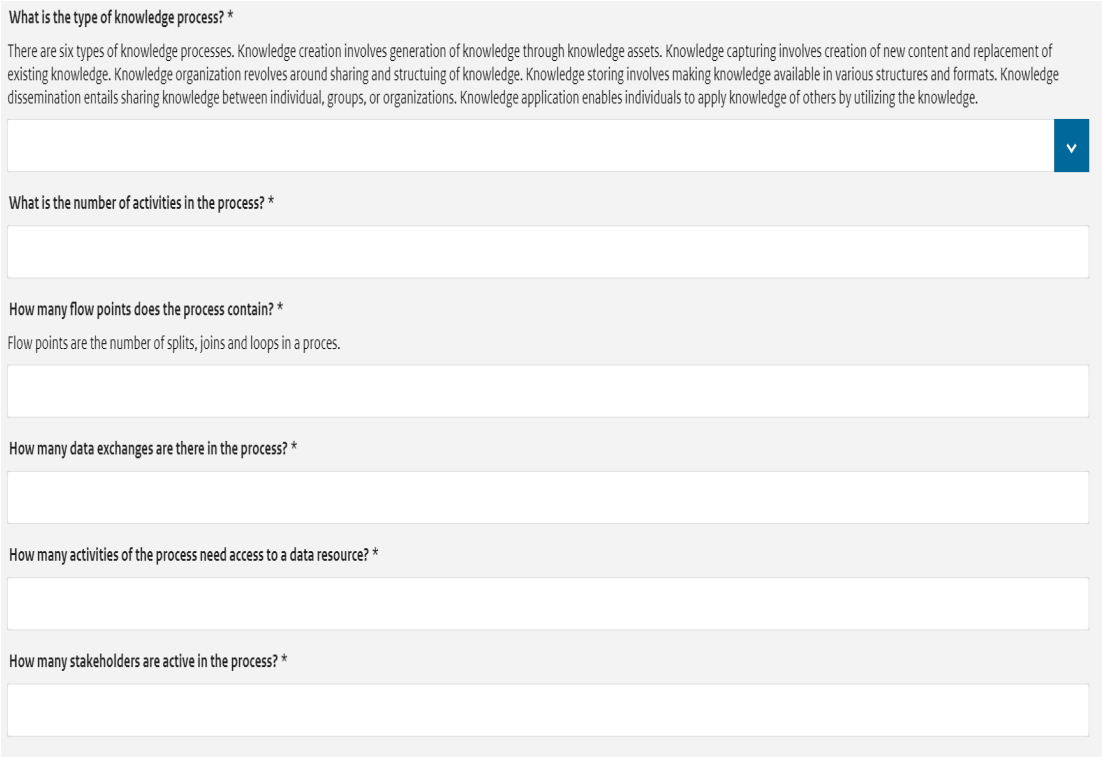

Figure 10: Process assessment part 2

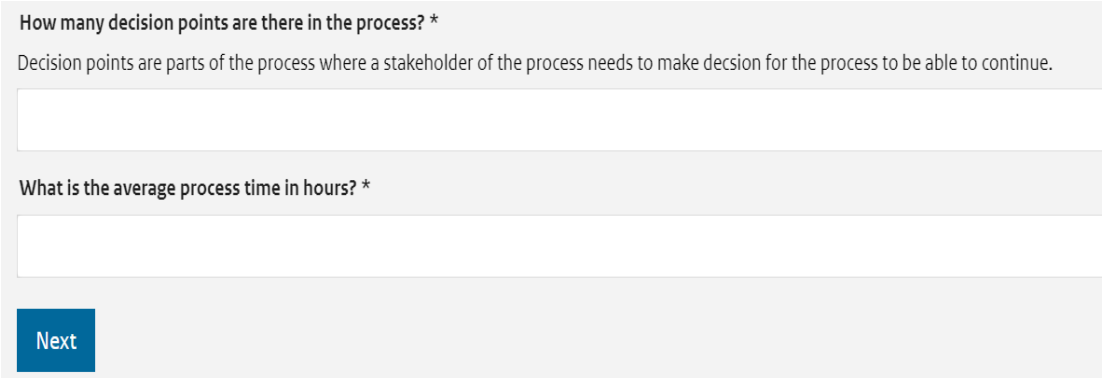

Figure 11: Process assessment part 3

B.3 Explanation report

Explanation report

Process name: Lening

Required nature of participants: **Person-to-application**
Your input nature of participants: **Person-to-application**

Required process predictability: **Loosely framed**
Your input process predictability: **Ad-hoc framed**

Required type of knowledge process: **Knowledge creation, Knowledge dissemination, Knowledge application**
Your input type of knowledge process: **Knowledge capturing**

Process complexity score: **1,6667**
The process complexity score is between 1 and 3, the complexity is sufficient with a score of 2 or higher.

B.4 Influential factors

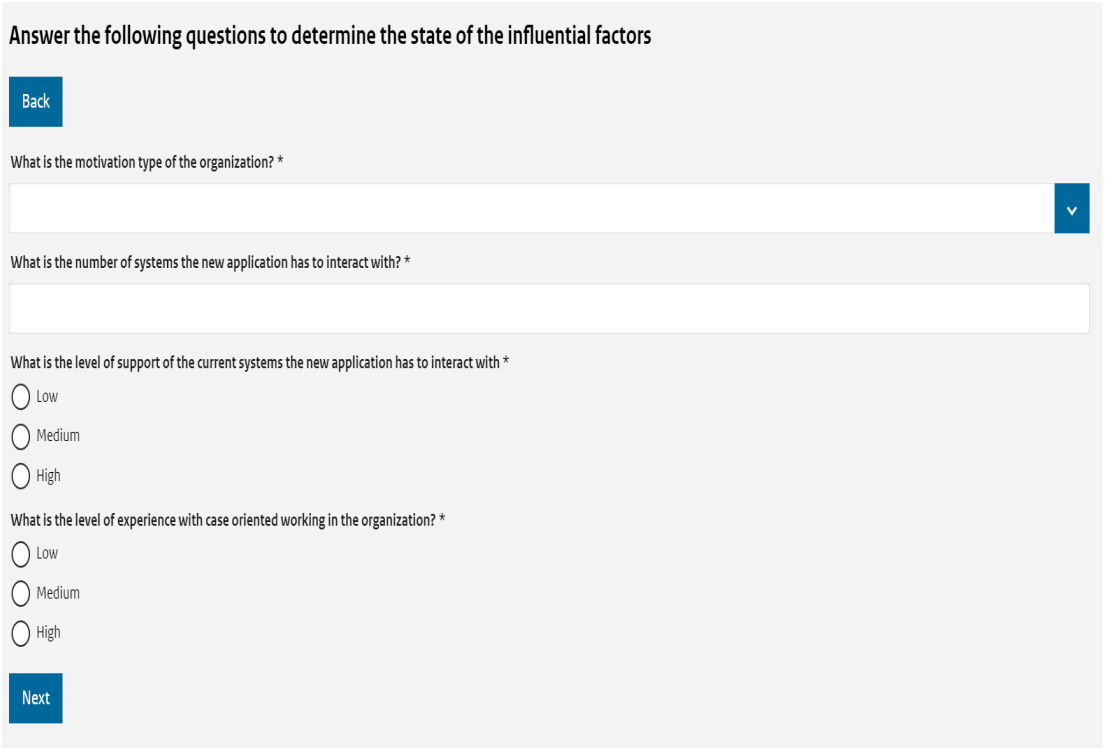

Figure 12: Influential factors

B.5 Estimate value

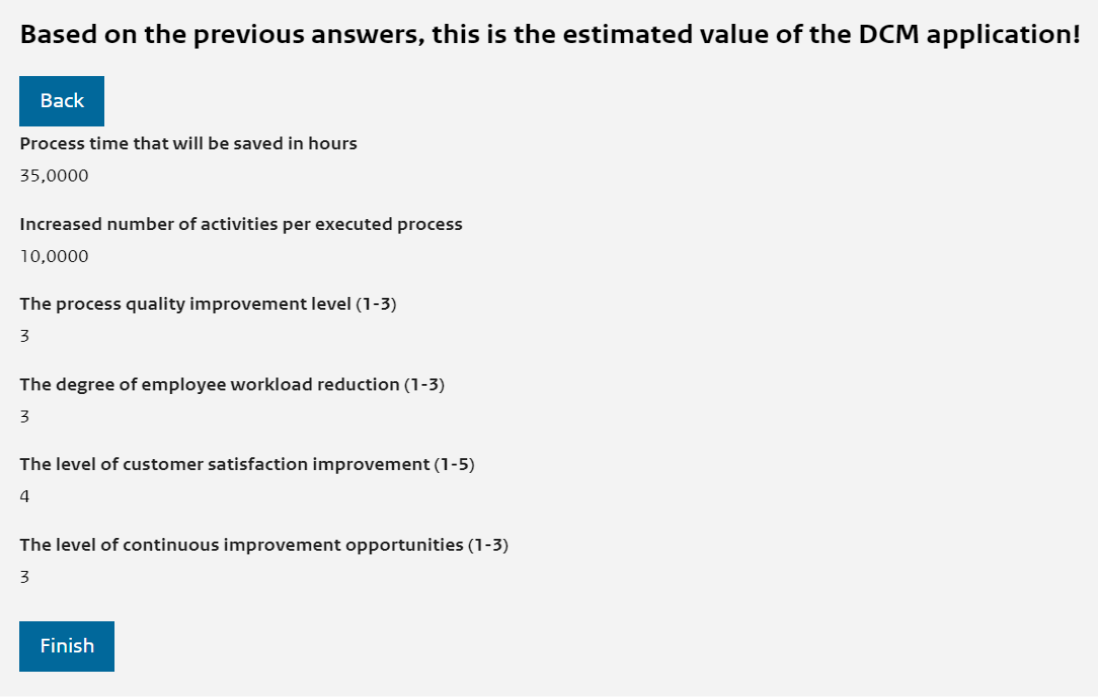

Figure 13: Estimated value

B.6 Full value report

Estimated value report

Process name: Aanvraag

Process time saved in hours: 35,0000
With the implementation of a DCM application, the average process time is reduced by 35%. Therefore your original process time of **100** will be reduced to **65,0000**.

Increased number of activities per executed process: 10,0000
The average employee productivity increases with 20% when adapting a DCM application. Therefore the original number of activities executed per process **50** will increase to **60,0000**.

Process quality improvement level (1-3): 3
The process quality improvement is dependent on the current situation of the organization. An influence score is calculated based on the experience level of the organization and the architectural situation. With a high experience level and a positive architectural situation, the process quality improvement will be higher.

Degree of employee workload reduction (1-3): 3
To calculate the degree of employee workload reduction, the number of decision points in the process is used. A high number of decision points in the process will result in a higher employee workload reduction degree.

Level of continuous improvement opportunities (1-3): 3
For the calculation of the continuous improvement level, the total process complexity is considered. This is calculated by looking at the number of activities, flow points, data exchanges, activities containing data, number of stakeholders, and decision points of the process. The scores of these values create a total process complexity score. A higher score will result in a higher level of continuous improvement opportunities. Because a complex process will have more opportunities to keep improving and adapting.

Customer satisfaction improvement level (1-5): 4
Based on the current customer satisfaction level of the organization, the possible improvement is calculated. If the current customer satisfaction level is low, then the improvement will be large with a new DCM application. When the customer satisfaction is already at a high level, the DCM application will have a lower improvement.

C Expert interviews summaries

Participant 1

The first participant has a lot of experience with DCM projects at different organizations. One of the experiences was a limited possibility to express the full potential of DCM at that organization. This was because of the different systems and collaborations of the organization with other parties. When implementing a DCM application in an organization without case oriented working experience, the understanding of the possibilities improves throughout the project. At first it can be difficult for an organization to properly understand the possibilities of DCM. Also some organizations do not also know the problems they have within their processes because the employees of the process often use their own workarounds. Therefore, some important problems within a process stay unknown. This is also one of the reasons why it is difficult to analyze the whole process in the right way for an organization. Because some ways of working are made familiar just because they are used to it, and it is not always the most efficient way of working.

DCM is suitable for process of governmental and financial service providers because they are often rule based and different actors and departments active in the process need to receive the right information quickly. DCM offers efficiency and a universal way of working which reduces the workload of employees. It gives clear tasks with priorities and makes working in the process more goal oriented. Continuous improvement is also an important factor because over time organizations increasingly understand the possibilities of DCM and therefore keep improving the application.

Participant 2

According to participant 2 one of the important motivations for some governmental organizations to adapt a DCM application is digitalization. Sometimes it is very much necessary because they do not have a digital process management system at all. The most difficult part of adapting is changing the working habits of the process participants. But when DCM is adapted correctly, the employees will save themselves time and can focus on personalizing their work within the process. Which benefits the customers of the organizations.

To use the full potential of a DCM application, the process should be knowledge

intensive and case oriented. If there are many rules in the process that do not change or are simple, DCM will not be the most efficient solution. DCM looks at the case itself and not reason on a process perspective. You will not look at the process and look at every step the customer needs to take to complete the process. But you will look at the case of the customer and try to bring it as fast and correct as possible to the goal.

The governmental organizations have a different motivation to improve the personalization of their processes. It is mostly to satisfy the national citizen, while financial organizations try to create a competitive advantage. In big organizations it can be difficult to fully adapt a DCM application because there are often many other systems which need to be collaborated with. Some external systems offer better support than others.

Participant 3
The third participant had experienced a financial organization who lost customers because there process was too difficult and took a lot of time. The interaction with the customer was too slow which resulted in a loss of customers. This was an important reason to adapt a DCM application because it helped to improve the interaction between the customers and other stakeholders in the process. After applying the DCM application there was a measured improvement of customer satisfaction and user experience.

According to this participant the financial sector is a lot more focused on trying to keep up or be ahead of new trends and improvements. While the governmental sector is more reactive and acts when it really needs to. Again the architecture within the organization was mentioned as possible hinder for the full value of a DCM application within the organization.

Participant 4
Participant four was primarily focused on the value of DCM for the people involved in the process. The case managers mostly benefit because they can execute many more cases with the reduction of unnecessary administrative work by the DCM application. Also the data driven nature of DCM is a big advantage because it enables the users to receive the right information at the right time.

Participant 5

This participant mentioned that the key advantage of DCM is having access to the right information without unnecessarily gathering other information. Within the government, there is a growing popularity of working in a case-oriented manner because it makes the work easier. The biggest benefit of using DCM for government services is that it allows for helping more people, thus increasing efficiency. People are often convinced of its effectiveness when they see it in action. DCM primarily provides support for employees and customers, with other benefits following automatically.

In the financial sector, competition and profitability often drive decisions for new systems like DCM. In contrast, in the government, decisions are frequently influenced by political interests. In some companies and situations, there is insufficient consideration of the business case and evaluation for implementing DCM. Some want to implement DCM everywhere without assessing if it's worth the time and energy for a particular process.

Participant 6

A Dutch governmental organization had an outdated BPM system that no longer functioned, and they wanted a renewed system, not necessarily a case-oriented one. There wasn't really anything in place, so there wasn't a "difficult" transition to getting used to a new system. They often experienced issues with the old way of working, such as missing information or not having access to the right information.

The new application greatly helped in processing more appeals and objections on time, resulting in significant time savings. Appeals and objections involve many exceptions and a complex process, making DCM highly suitable. Financing doesn't have as many exceptions but involves a significant transformation of data. While other systems don't directly affect DCM itself, they can impact the application's performance, potentially causing it to work slower.

A different governmental organization performed inspection which involves many exceptions and information exchanges, making a universal way of working a major advantage. For example, reporting is fairly standard, but appeals and objections fall under DCM. The government typically has more DCM processes because it is costly, but they are more suitable than in the financial world due

to having more exceptions and being more complex.

Participant 7

Participant seven emphasizes the importance of having a case-oriented system, as it allows users to focus only on the tasks that need to be performed. P7 contrasts this with systems that display all tasks, which require a lot of knowledge to prioritize. Another comment was that the Agile methodology complements the DCM application. P7 highlights that DCM is always a customized application, and its value depends on where it's integrated into the architecture and landscape. If users lack control over task prioritization and are dependent on other systems, DCM may be less useful.

Participant 8

P8 mentions that they considered custom solutions, workflow systems, and DCM. They find automating simple tasks with DCM to be highly beneficial. The front end is handled by a separate company. Case managers and candidates appreciate having a portal with clear tasks. The new system provides more personalization, and its effectiveness greatly influences candidate satisfaction and the speed at which candidates can return to work.

Participant 9

Participant 9 highlights the importance of quick access to the right data, particularly in scenarios like mortgage applications. P9 notes that there's currently limited individual demand for DCM due to its perceived complexity. Many organizations prefer creating their systems and have limited knowledge of DCM. Implementing DCM requires a substantial transformation in the ICT landscape. Companies prefer flexible technology over custom solutions, but the requirements for flexibility often lead to customization. Mortgage applications are knowledge-intensive, involving many changing rules and numerous parties. In the financial sector, DCM is particularly beneficial for consumers, as it should work across various handlers in the process. Currently, consumers have limited visibility and personalization. P9 emphasizes that data belongs to the customer, and it would be even better if the process also belonged to the customer.

Participant 10

P10 emphasizes that DCM aligns well with government clients due to the presence of numerous phases and decisions within their processes. While processes

may appear straightforward from an external perspective, they often involve many exceptions and modifications. DCM proves to be ideal for handling these complexities.

In practice, processes tend to have more exceptions than initially anticipated. Government agencies frequently deal with processes involving interactions between the government, its clients, and various departments, making DCM particularly effective in such cases. For optimal functionality, DCM should serve as the main application and possess all necessary information about the process. Governments typically have one or two major applications, while the financial sector tends to utilize a greater variety.

DCM fosters collaboration within the organization and streamlines processes. While Business Process Management (BPM) could potentially model every process, DCM is often easier and quicker in specific cases. This doesn't mean that BPM is incapable; it's simply a matter of efficiency. Governments recognize the need to provide better support to their clients, focusing on increased personalization and ensuring access to accurate information.

Participant 11 and 12
These participants shared experience with the use of a DCM application in their organization. The benefits were quickly recognized and the case managers experienced a lot of benefits and improvement. The continuous improvement was also largely present. They started adapting DCM at one department of the organization, but the experience was very good and resulted in adapting it in different departments as well. The experience with the first implementation of the DCM application helped making the other implementations much smoother. The main motivation was to improve their efficiency and user experience of the case managers, and this was succeeded rightly.

Participant 13 P13 worked at a governmental organization that needed a new system and a case-oriented approach because their old system was no longer functioning effectively. They had a large volume of work with many cases, making DCM a suitable choice, especially for the planning part where customers don't create cases themselves, but rather have many planned cases that need to be executed.

The greatest advantage of DCM is having the right information quickly for the right case. It also provides better guidance for case managers in their tasks. Subsequent DCM projects at the organization were easier to implement due to its proven effectiveness, resulting in fewer skeptics and more convinced staff.

Performance benefits of DCM are particularly noticeable in handling bulk processes. An important consideration for using the DCM application is whether there is a significant amount of business logic in the process and if it is dynamic.

Participant 14

According to participant 14 DCM is particularly useful when processes are not clearly defined and when gathering the right data is crucial. Customers often prefer more flexibility in their processes. The ability to easily migrate and add new tasks or activities to the process is a notable advantage of DCM.

If a customer frequently requests changes in the application and it's deemed worthwhile to alter the architecture, implementing DCM is recommended. It's more flexible to have separate DCM applications for different parts of processes rather than one large application.

Processes in both the financial and government sectors share similar characteristics in terms of the changes they want to make, as well as the importance of data placement and timing. Both are motivated by digitization, financial transparency, and data visibility, although the financial sector has a slightly higher urgency for speed.

Participant 15

Participant 15 told that the regulation of a governmental organization is complex due to the involvement of various stakeholders, and the application process can vary significantly from case to case. In terms of efficiency, the DCM application works better, but employees are so accustomed to the old functionalities that they firstly want them all back. But over time this improves quickly. Creating a DCM application for all parts of the process at once is challenging, so it's being done incrementally. This means it will take longer before it works optimally across the entire process.

D Validation interviews summaries

Participant 1

The first participant found the understandability of the type of knowledge process quite difficult, and added that people without much knowledge about knowledge processes could struggle with this part of the process assessment. When the application would be used for organizations doubting about adapting a DCM application it would benefit from good understandability and would need a more clear explanation or a more simple question to answer. For the process assessment, the process complexity will mainly be assessed by the number of activities and stakeholders in the process. For a Business Engineer of Blueriq it would be a nice tool to use as confirmation. All aspects for assessing the suitability of a process for a DCM application are present and therefore the model is complete.

Participant 2

In the interview with participant two the question about the process predictability was mentioned to be unclear. In some processes a part could be ad-hoc framed and some parts loosely framed, so the question should be more clear about the whole process. Also the difference between the happy flow of a process and the unhappy flow came to the light. This is an important factor in assessing the complexity of a process which is important for the suitability for DCM. A part of the assessment of the process complexity is the number of activities in the process. When first looking at a process the activities happy flow will be the most known and obvious to identify. But the unhappy flow can bring a lot more different activities, and they often increase the complexity of a process. So identifying the complete unhappy flow in detail will be important for the assessment of the complexity of a process.

The second participants also mentioned an important difference in the process time. The distinction between the active and passive process time is important to consider. A DCM application can decrease both sorts of process time in different ways. The active process time is reduced by more efficiently performing the known activities. While the passive process time is reduced by faster and better interaction between different stakeholders in the process. But it is difficult for an organization to measure these two different types of process time within a process. Therefore the complete process time will be used in this research. Finally, the times a process is executed can be a factor in assessing the

suitability of a process for a DCM application. When a process is only executed a few times on a yearly basis, then it is less useful to adapt a complete new application to improve the process.

Participant 3

Participant three mentioned the weighting of the different factors in calculating the process complexity. From the six different factors used in the calculation, the number of stakeholders, decision points, and number of activities were considered more important for the calculation of the complexity of a process by participant three. Therefore these factors could be weighted more heavily in the calculation. Also the scales of the six different factors calculating the process complexity itself need to be looked at. From which number of activities a process can be called complex can be difficult to determine. For future research these factors could be based on existing data of processes that have a DCM application. From these processes the average number of activities can be taken as an indication of when a process is complex. This can also be done for the flow points, data exchanges, data resources, stakeholders, and decision points. The questions of the application are understandable and the different factors give a complete representation of process complexity, which is a good representation of process suitability for a DCM application.

Participant 4

The fourth participant gave some insights into the questions to gather the process information. To receive correct information about the nature of participants, predictability of the process, and the type of knowledge process, the questions could be less direct. Someone could have a personal opinion about when a process is ad-hoc framed or loosely framed, or can have a different view about the types of knowledge process. Therefore the questions could be framed differently and less direct to gather the right information. This is also the case for the influential factors of the process. An organization can think that their systems offer good support for the new DCM application, and that they have lots of knowledge about case oriented working. But in reality it can be different than the organization sees themselves.

This participant also mentioned the difference between the happy flow and the unhappy flow, and the possible difficulty of exactly knowing how many activities a process contains. The question could be stated differently in a way that gives

the amount of activities with the most exceptions and the most complex execution of the process possible. The question about the nature of participants was difficult to understand and needs a more clear explanation. The question about the number of stakeholders could require more information, because which kind of stakeholders are involved in the process is also important. If there are a lot stakeholders in the same department who can communicate easily with each other, it will be less complex than stakeholders of different departments.

Participant 5

Participant five raised the question about the detail of an activity. When filling out the process assessment information the number of activities can be seen different depending on how detailed you look at an activity. This could make differences between different persons filling out the same information about the same process. Therefore the level of detail needs to be as high as possible so that the information will be correct. This participant also mentioned a possible additional factor as the times a process takes place in a year.

In the interview the stakeholders factor was also discussed, because the number of activities a stakeholder performs can also be important. Because there can be a lot of different stakeholders in a process, but if they do not perform a lot of activities, then the impact of the number of different stakeholders will be lower. So this decreases the importance of the stakeholders factor a little bit. But of the six different factors calculating the process complexity, this participant still found the number of activities and number of stakeholders the most important. The tool itself was reviewed as a good way to validate an idea the Business Engineer itself could have about a certain process.

Participant 6

The question about nature of participant was interpreted wrongly by the participant, which showed the lack of understandability of the question. The scales of the different factors determining the complexity of a process could be more transparent in the application. It will be difficult to create an absolute distinction between the different levels of complexity score for the six factors. But the six factors were seen as a complete representation of the complexity assessment of a process. From the six different factors, the number of stakeholders in a process was considered to be the most important one. Also the influential factors created a nice extra view on the value in the organization. It would be a

handy tool as guideline for Business Engineers with sufficient knowledge about processes.

Participant 7

The interview with participant seven resulted in some interesting feedback. Firstly, the question about the process predictability was discussed. Different parts of a process could be ad-hoc framed and loosely framed, so it could be difficult to assess a process as fully ad-hoc or fully loosely framed. The different knowledge types were understandable, but there could be appear more different types in the same process. In the current application only one of the types could be selected, so this should be changed to being able to select more different types. Regarding the complexity of a process, the number of activities in a process does not always clearly indicate the complexity. It is in combination with how dynamic the activities are and if it are simple or complex activities with different exceptions.

Regarding the process complexity, the number of stakeholders is a good indication together with the number of information exchanges in the process. But the different factors are all together important for the process complexity, it is not possible to get an indication of the complexity based on one factor, for example number of stakeholders, being very high. The cohesion between the different indicators makes a good assessment of the process complexity. The participant found the number of resources in the process not very relevant for the complexity. The amount of splits and joins mainly shows that from a certain number of splits and joins a process becomes too complex for a BPM solution and indicates a DCM application could be fitting. The process time indicator is now in hours, but most governmental and financial service processes take days to fully complete. Therefore the question in hours made it confusing if the whole process was meant or a part of the process.

Participant 8

Participant eight initially had difficulties with understanding the answer options of the process predictability question. The tightly framed, loosely framed, unframed, and ad-hoc framed terms were difficult to place in relation to the predictability of a process. Regarding the complexity of a process, the participant found the flow points of a process very relevant, because the amount of flow points shows how many exceptions appear in a process.

A factor which was missing was the type of rules in a process. If different rules are dependent on the each others outcome, it creates more exceptions and complexity. Not in definition the number of rules, because there can also be simple rules in a process, but the rules with different outcomes which influence other rules. Finally, the quantitative way of assessing the different factors of complexity was questioned. The participant mentioned that it is difficult to create a clear distinction between a lower or medium level of complexity from a certain factor like number of activities. He suggested a qualitative way of asking the different questions to create a less strict assessment of the suitability of a process for a DCM application.

Participant 9

The understandability of the questions about the nature of participants of the process, predictability of the process and knowledge processes was low. It was difficult to understand the questions completely because the used concepts were not familiar for the participant. Regarding the complexity of the process, the number of stakeholders and flow points were indicated as most important of the six factors. But also the predictability of a process plays an important part in assessing the suitability of an process for a DCM application according to the participant. Finally, the idea of using existing data from DCM applications within Blueriq to determine the scales of the six factors for process complexity was brought up.

E Score calculations

This section shows the calculations of the different complexity scores which are used to calculate the total complexity of a process.

Number of activities	0-15	16-45	>45
Activity complexity score	1	2	3

Table 5: Calculation activity complexity score

Number of control flow points	0-5	6-20	>20
Control flow complexity score	1	2	3

Table 6: Calculation control flow complexity score

Number of data flow points	0-7	8-25	>25
Data flow complexity score	1	2	3

Table 7: Calculation data flow complexity score

Number of decision points	0-6	7-18	>18
Decision points complexity score	1	2	3

Table 8: Calculation decision points complexity score

Number of stakeholders	0-2	3-5	>5
Stakeholders complexity score	1	2	3

Table 9: Calculation stakeholders complexity score

Number of external resources	0-3	4-9	>9
Resource complexity score	1	2	3

Table 10: Calculation resource complexity score

F Activity and concept table

This section introduces the activity and concept table belonging to the DCM-AVF. The activity table 11 provides an overview of the activities that are part of the DCM-AVF. The concept table 13 provides an overview of the deliverables that are produced by the activities.

Activity	Sub-activity	Description
Process assessment	Identify nature of participants	Identify the nature of participants involved in the process.
	Assess predictability of the process	Assessing how predictable the process is by looking at how it is defined beforehand and its execution.
	Identify type of knowledge process	Identify which of the six types of knowledge processes the process fits into.
	Assess complexity of the process	Assess the complexity of the process by reviewing the number of stakeholders for the process and the size of the process. In combination with the level of information exchange in the process.
	Create level of suitability	Create the level of suitability by using all information of the nature of participants, predictability of the process, type of knowledge process, and complexity of the process.
Influential factors identification	Identify motivation	Identify the motivation for adapting a dynamic case management application.
	Assess experience with case management	Assess the experience within the organization with working in a case-oriented way.
	Analyse existing architecture	Analyze the existing architectural situation of the organization and exiting applications which can influence the new DCM application.
Continued on next page		

Table 11: Activity table

Activity	Sub-activity	Description
Influential factors identification	Identify external factors	Identify if there are external factors in the organization or outside the organization that can influence the way of adapting the new application.
	Create influence level	Create a level of influence the identified factors have in and around the organization. The motivation, experience with case management, architecture and external factors are used to create this level.
Estimate value	Analyze process efficiency	Analyze the efficiency of the process regarding cycle time and times executed.
	Identify employee workload	Identify the workload for the employees within the process.
	Assess CI possibilities	Assess the opportunities and desire of the organization to have continuous improvement within their process and the application.
	Assess customer satisfaction	Assess customer satisfaction and opportunities to improve it.
	Estimate total value	Estimate the total value of a DCM application. The suitability level of the process in combination with the influence level of the identified factors will be combined with the information of the other activities in estimating value.

Table 12: Activity table continued from previous page

Concept	Definition
NATUTRE OF PARTICIPANTS	The NATURE OF PARTICIPANTS involved in the process can be person-to-person, person-to-application, or application-to-application.
LEVEL OF EXCEPTIONS AND CHANGEABILITY	The LEVEL OF EXCEPTIONS AND CHANGEABILITY is derived by how it is framed. It can be ad-hoc framed, loosely framed, unframed, and tightly framed.
TYPE OF KNOWLEDGE PROCESS	There are six types of knowledge processes: knowledge creation, knowledge capturing, knowledge organization, knowledge storing, knowledge dissemination, and knowledge application
STAKEHOLDERS AND SIZE OF PROCESSES	This involves the number of stakeholders concerned in the process and the number of activities in the process.
LEVEL OF INFORMATION EXCHANGE	The LEVEL OF INFORMATION EXCHANGE is created by analyzing the number of times information is exchanged between two or more different stakeholders.
COMPLEXITY LEVEL	The COMPLEXITY LEVEL of the process is derived from the number of stakeholders and size of the process in combination with the level of information exchange.
SUITABILITY LEVEL	The SUITABILITY LEVEL of the process is created by the nature of participants, level of exceptions and changeability, type of knowledge process, and complexity level.
MOTIVATION TYPE	The MOTIVATION TYPE will be the main motivation an organization has for adapting the DCM application. It can be efficiency, requisite, employee satisfaction, universal working, customer satisfaction.
LEVEL OF CASE MANAGEMENT EXPERIENCE	This regards the knowledge about working in a case-oriented way within the company in possibly other processes or applications.
ARCHITECTUAL SITUATION	The ARCHITECTUAL SITUATION regards other systems and parts of the organizational architecture which can influence the new DCM application. This can be a positive or negative rating.
TYPES OF EXTERNAL FACTORS	The types of external factors are external competitors, internal politics or interests, external politics or interests. These all have an influence factor.
Continued on next page	

Table 13: Concept table

Concept	Definition
PROCESS EFFICIENCY	It reflects the PROCESS EFFICIENCY within the organization regarding the cycle time and execution of the process. It results in one of three possible levels of process efficiency.
EMPLOYEE WORKLOAD	The EMPLOYEE WORKLOAD for the employees involved in the process, divided into three different levels.
CI OPPORTUNITIES	The continuous improvement opportunities are a reflection of the desire and opportunities within the organization to perform the continuous improvement. It has a scale of three different levels.
CUSTOMER SATISFACTION	The current level of CUSTOMER SATISFACTION and opportunity to improve it with the new application.
TOTAL VALUE	This is the total estimated value which the new DCM application can bring to the new organization. Derived from the suitability level of the process and influence level of different factors, and estimated values.

Table 14: Concept table continued from previous page