



# Bachelor Thesis

Improving Market Intelligence:  
Developing a Centralised Knowledge System to  
Foster Data-Driven Decision-Making

Industrial Engineering and Management

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# **Improving Market Intelligence**

## Developing a Centralised Knowledge System to Foster Data-Driven Decision Making

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## Preface

Dear reader,

Thank you for your interest in this bachelor thesis. You are about to read the report that concludes the final phase of my bachelor's degree. It has been a true privilege to conduct this research at Company X, where I had the opportunity to enhance their market intelligence by developing a knowledge management system tailored to foster data-driven decision-making within the precision agriculture industry.

First of all, I would like to express my deepest gratitude to Company X for providing me with this invaluable opportunity. I am especially thankful to the market intelligence team, whose insights, support and guidance – both formal and informal – were essential in making this research a fulfilling experience. I sincerely hope that my contributions have added value and led to more efficient operations within the company.

Secondly, I would also like to share my sincere thanks to my university supervisors, Dr. M. Sharma and Dr. M. Koot. Your support throughout the research was greatly appreciated. Your constructive feedback, prompt responses, and expertise in both quantitative and qualitative aspects significantly enriched the quality of my work.

Lastly, I want to extend my sincere thanks to my parents, brothers, and close friends for their constant support and encouragement throughout my bachelor's degree. In both moments of joy and challenge, you have been my profound support, for which I am truly grateful.

I hope you enjoy reading this bachelor's thesis.

Marijn veth

Enschede, August 2024

## Management summary

### Introduction

This research was conducted at Company X examining the topic of market intelligence and information management. This organisation aims to foster a culture of informed decision-making initiatives. In today's information-rich environment, organisations encounter vast amounts of data daily, including external business intelligence. When utilised appropriately, this information facilitates informed decision-making, creating new business opportunities. However, within Company X, the current methods of managing information and knowledge are fragmented, inconsistent and lack a centralised system. These inadequacies result in inefficiencies such as data loss, duplicate documents and efforts and ineffective data-driven decision-making due to inaccessible data. Consequently, the need for developing an advanced knowledge management system arises to streamline processes, enhance data accessibility and stimulate data-driven decision-making initiatives. This research provides a comprehensive framework that serves as a guideline for establishing enterprise-wide content management systems with a particular focus on the external business environment of organisations.

### Problem description

The process of managing knowledge consists of four distinct phases. These phases include acquiring, storing, sharing and applying knowledge. As an international organisation, Company X acquires knowledge around the globe. To realise benefits such as improved decision-making, new market opportunities and enhanced stakeholder insights, this knowledge must be effectively stored and disseminated within the organisation. Unapplicable knowledge is deemed worthless (Ahmady et al., 2016), emphasising the importance of sufficient storing and sharing capabilities.

Currently, each department within Company X utilises its information management platforms, including Teams, SharePoint, OneDrive and Dropbox. Managing an excessive number of disparate systems within organisations leads to several issues, such as difficulty maintaining an overview of data storage location and access permissions, increased risk of data silos, duplication of information, increased operational costs and inconsistent data. These challenges result in inefficiencies and hinder the organisation's ability to effectively utilise its available data to support data-driven decision making. The importance of strategic decision-making is emphasised as it contributes to enhanced operational performance involving meeting commercial goals, alignment of the organisational portfolio with customer needs and protection against competitive threats.

To resolve these issues and enable Company X to establish a realistic representation of its external business environment, the need for a centralised market intelligence management system is emphasised. This system would facilitate the consolidation of multiple data sources, ensuring easy access, archiving and sharing of market intelligence by employees. This study examines the steps necessary to establish such a system, aligned with the needs and requirements of the organisation to ultimately increase the perceived user satisfaction with the market intelligence storage system. Consequently, this research centres around the core research question formulated as:

*“How can a centralised market information management system be developed that allows for easy access, archiving and sharing of reliable market intelligence about the external business environment of Company X, instead of utilising multiple disparate systems?”*

### Approach

This study utilises a variation of the Managerial Problem-solving Method (MPSM) to ensure structured progression of the research. The approach consists of six phases:

- I. Problem identification

The initial phase aims to understand the severity of the issue. By participating in meetings and leveraging the insights from various key stakeholders, the foundation of the research is established.

II. Current situation analysis

This phase involves an investigation and quantification of the current methods of processing knowledge and identifies potential areas for improvement. It is crucial to identify the organisation’s requirements and align them with the proposed solution.

III. Literature review

A comprehensive literature review on information management systems is conducted to establish a robust, theoretically grounded foundation. This phase leads to the selection of an appropriate system.

IV. System design

The system is designed during this phase, while constantly reflecting on the user needs. The core focus of the design revolves around being user-centric, ensuring that the system meets the user’s requirements.

V. Implementation

This phase involves the implementation of the market intelligence management system. By identifying the requirements for a successful implementation, a structured plan is developed to ensure the system’s perceived benefits are achieved.

VI. Evaluation and adjustments

The final phase involves an evaluative period to implement necessary adjustments. This ensures optimal alignment of the system’s capabilities with the identified user needs, enhancing its overall effectiveness and usability.

## Results

This research culminated in the successful development of a centralised market intelligence management system that meets the identified requirements and aligns with the organisation’s strategic goals. The system was constructed using a combination of software environments, including Pulse, SharePoint and PowerApps to create a cohesive content management system. The system encompasses various functionalities that facilitate efficient data storage, management and retrieval. Following the implementation of the market intelligence management system, an evaluative period was initiated. This period involved iterative refinements to enhance the system’s usability and ensure its alignment with user expectations. Additionally, the fulfilment of the system’s requirements was assessed. The results of these assessments are detailed in Table 1.

Table 1: Comparative analysis of the results of the research.

Requirement / key metric	Baseline score before library implementation	New score after library implementation
User-friendliness	4.7	7.7
Archiving functionalities	3.5	8.0
Search functionalities	5.0	8.0
Core problem	5.0	8.0
Knowledge dissemination	3.0	8.0
Centralisation	No	Yes
Accessibility	No	Yes
All categories of market intelligence	No	Yes
Security	Yes	Yes

Table 1 illustrates that all identified system requirements were successfully implemented, resulting in substantial improvements across various functionalities. The core problem of the research - users are dissatisfied with the current market intelligence storing system – shows an overall improvement with the satisfaction score from a baseline of 5.0 to 8.0 (Likert scale ranging from 0.0 to 10.0).

In conclusion, this research offers a detailed implementation roadmap for a centralised market intelligence management system that emphasises a user-centric approach. The findings demonstrate a marked enhancement in user satisfaction, underscoring the system’s effectiveness meeting the needs and expectations of its end users.

## Recommendations

The establishment of the market intelligence management system led to the identification of several requirements essential for its long-term success at Company X. To ensure sustained effectiveness, the following recommendations are made:

- I. **Monitor utilisation rates**  
Regularly check utilisation rates using the system’s analytics to assess performance and user adoption. This will help determine if measures need to be taken to improve engagement and usage.
- II. **Conduct a follow-up survey**  
Conduct a follow-up survey after six months to evaluate the library’s impact on business performance and identify additional areas of improvement.
- III. **Maintain the system’s content**  
Regularly review and update the system’s content. By attaching keywords, verifying correct metadata and updating archived documents the usability of the system will be maintained, ensuring its long-term success.
- IV. **Implement a market intelligence newsletter**  
Create a periodic newsletter highlighting the most relevant market intelligence insights for that period. This keeps users informed and encourages continuous usage of the system.
- V. **Develop an AI chatbot**  
Implement an AI-driven search function or ChatGPT integration to enhance the system’s effectiveness and user experience. An AI chatbot can provide significant value by quickly finding relevant information, and presenting generative answers based on internal documentation.

## Future research

Given the dynamic nature of business environments, it is crucial to further explore the effectiveness and adaptability of market intelligence management systems. Therefore, several studies are recommended as areas for continued research.

First, longitudinal studies should be conducted to assess the long-term sustainability of market intelligence management systems. This involves examining how well these systems adapt to rapidly changing external business environments. It is essential to determine how accurately external business environments can be represented to support reliable decision-making. Additionally, investigating the long-term impact on strategic decision-making and conducting performance metrics and ROI analyses will provide insights into financial and operational benefits.

Second, exploring the integration of advanced analytics and artificial intelligence within market intelligence management systems is a promising area of research. Studies could assess the impact of AI-driven search, predictive analytics and automated insights generation based on internal documentation on user experience and operational effectiveness.

Third, cross-cultural studies evaluating the acceptance of market intelligence libraries among diverse employees and organisations are valuable. These studies could identify the most effective environments and organisational types for information management systems, allowing for tailored approaches to enhance adoption and utilisation rates.

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# 1. Introduction

Research has been conducted on the topic of market intelligence and information management at Company X. The company aims to enhance these activities to foster a culture of data-driven decision-making. Market intelligence refers to the process of gathering, analysing and disseminating information about an organisation's external business environment. Company X seeks to achieve benefits such as improved decision-making, market opportunities and customer insights by increasing engagement with market intelligence. This report investigates the effects of engaging with market intelligence and establishes a framework for implementing an information management system to handle the enhanced data infrastructure.

Section 1.1 of Chapter 1 introduces Company X and elaborates upon the background of the issue. Section 1.2 initiates the research by discussing the problem identification phase. In addition, Section 1.3 covers the (sub)research questions examined throughout this research. To conclude, Section 1.4 discusses the applied problem-solving approach.

## 1.1 Company X

Company X is a multinational technology company, publicly listed on a major European stock exchange. With a workforce exceeding 1000 employees globally across multiple international locations, Company X is renowned for its innovative technological solutions. The company operates through several distinct business units, with one of the most prominent being in the field of precision agriculture.

In Particular, the Precision Agriculture division plays a key role in Company X's portfolio, employing a dedicated team of experts focused on livestock management solutions. This division specialises in creating advanced monitoring devices such as animal health tracking, location monitoring, and performance analysis, enabling farmers to enhance productivity and manage their livestock more effectively. By leveraging data-driven insights, Company X's solutions help professional farmers streamline their operations, reduce labour demands, and optimise overall farm output.

### 1.1.1 Background of the problem

At Company X, employees enjoy a creative and flexible work environment due to the company's minimal hierarchy and informal culture. Although flexibility and creativity are highly valued, this approach also leads to limited documentation within the company. This results in decreased effectiveness of informed decision-making initiatives. Company X therefore aims to adopt a more data-driven and well-documented approach to certain business processes.

Currently, Company X's business plan is composed and executed with minimal use of data insights. This method allows for agility and flexibility regarding the decision-making process. However, despite its past success, the absence of data results in a lack of awareness about the external business environment, leading to decisions based on intuition rather than empirical evidence. This lack of data-driven decision-making reduces the organisation's ability to anticipate market trends, achieve commercial goals align its portfolio with the needs of business partners and customers and leads to exposure to competitive threats.

To address these challenges, it is crucial to foster a data-driven business plan execution approach. Specifically, Company X would benefit from analysing its external business environment, including consumer analysis, competitor analysis, product analysis, and market dynamics. This data-driven approach is crucial to maintain Company X's leading position in the monitoring dairy market.

## 1.2 Problem identification

To initiate the research, an exploratory study is conducted to establish a thorough understanding of the origin of the problem. During this exploratory phase, various meetings were attended with the key

stakeholders of the problem. These meetings resulted in the initial insights into the severity of the problem. The primary issue identified is that Company X's personnel struggle with managing information. The current information management process does not meet the needs of the employees, resulting in low engagement with information. Employees are dissatisfied with the current information management systems for several reasons. For Instance, employees reported difficulties in retrieving essential documents due to the use of multiple storage platforms such as Team, SharePoint and OneDrive, leading to valuable information being unutilised. Additionally, employees are often unaware of the existence of certain relevant reports and statistical insights due to restricted access to departmental data storage platforms. Furthermore, there is a lack of clarity regarding whom to share relevant information with. These issues underscore the inadequacies of the current information management process and contribute to low employee engagement with information.

The low engagement with information results in insufficient awareness of the external business environment, ultimately leading to unachieved commercial goals, the organisation's portfolio not being aligned with the business partner's and customer's needs, and exposure to competitive threats. These insights shape the initial scope of the research, which revolves around further investigations into the information management field concerning the external business environment of Company X. After discussing and identifying the main issue with the company supervisor, interviews are conducted to continue the exploratory research phase. These interviews aim to gain insights into the root cause for the low engagement rate with information and why the current information management system does not meet the demands of the employees. International employees from France, New Zealand, South America and America were interviewed due to their experience and broadened perspectives on challenges such as time zone differences and remote communication. The transcribed interviews are discussed in [Appendix A1](#). The outcomes of the interviews and a broader analysis of the current situation are provided in Chapter 2.

### 1.2.1 Knowledge management theory

Based on the knowledge management theory (Ahmady et al., 2016), the process of managing knowledge consist of four phases. These four phases are visualised in Figure 1 and describe the process of helping an organisation find, process and utilise information, essential to support decision-making-related activities. The interviews revealed that Company X's current information management process is split up, resonating with the first three phases described by Ahmady et al., 2016. This separation of the process into three distinct phases allows for determining which phase of the current information management system needs the most improvements and causes a low engagement with information. Each phase and its corresponding applications are discussed in greater detail in the theoretical framework established in Chapter 3. For now, the main applications of the first three phases involve collecting, archiving and sharing information. The fourth phase, using knowledge, is excluded from this research as this phase pertains to knowledge utilisation rather than dissemination.

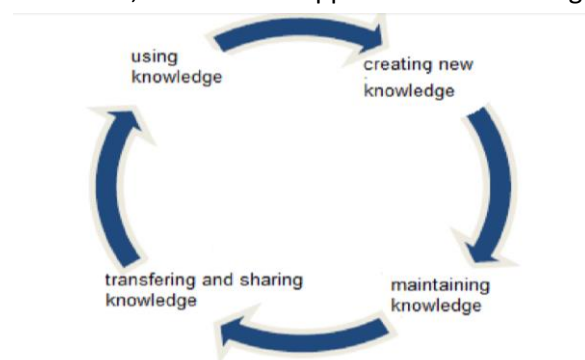


Figure 1: Knowledge Management Theory (Ahmady et al., 2016).

During the conducted interviews, questions were asked regarding which phase of the information management processes currently imposes the greatest limitations. The responses indicated that the second phase of the knowledge management theory, which encompasses the systematic organisation, storage and retrieval of data, necessitates the most significant enhancement. Specifically, respondents expressed dissatisfaction with this current information storage system. They consistently identified the

excessive number of information management systems within Company X as a major issue. The utilisation of multiple systems, including platforms such as Teams, SharePoint and Dropbox, hinders the efficiency of decision-making and collaboration due to several disadvantages as indicated by the employees:

- I. Increased complexity of IT infrastructure.  
The management of multiple systems results in elevated maintenance costs and a higher probability of system failures.
- II. Increased loss of information.  
The use of multiple systems leads to information loss due to ineffective information storage practices, with employees potentially forgetting where data is stored.
- III. Greater security risks.  
The presence of multiple systems leads to inconsistent security policies, thereby increasing the risk of data breaches.
- IV. Adoption challenges.  
Employees are required to adapt to various systems, reducing both productivity and user satisfaction.

In conclusion, managing an excessive number of information systems constitutes the main action problem (Heerkens, 2014).

#### 1.2.2 Problem cluster

In addition to identifying the bottleneck phase in the knowledge management process, the interviews provided comprehensive insights that contributed to establishing a full view of the case. These insights were utilised in a brainstorming session with the company supervisor to create a list of problems related to the action problem discussed in Section 1.2. This list subsequently served as input for designing a problem cluster. Multiple iterations were developed before finalising the version depicted in Figure 2. A problem cluster (Heerkens, 2014) illustrates the causal relationships between a set of identified issues. After visualising all causal relationships, various possible core problems can be selected. This section discusses each possible core problem and its associated causal relationships.

The first possible core problem is the absence of market intelligence-sharing protocols. Falahat et al. (2020) describe market intelligence (MI) as encompassing knowledge about various stakeholders including competitors and customers. This comprehensive understanding allows companies to gain a competitive edge by seizing market opportunities.



During the interviews, the respondents indicated that protocols for sharing market intelligence are absent. This absence of MI-sharing protocols negatively impacts business performance. Personnel at Company X are often unaware of the relevance of the collected intelligence for different stakeholders. This leads to inefficient information distribution resulting in the information not reaching the appropriate colleagues or not being shared entirely. Moreover, the absence of MI-sharing protocols compels employees to utilise multiple communication methods to share relevant MI. This leads to an excessive number of systems being utilised due to the absence of a centralised system. Therefore, a causal relationship between the elements “no MI sharing protocols” and “excessive number of information management systems in use” can be established.

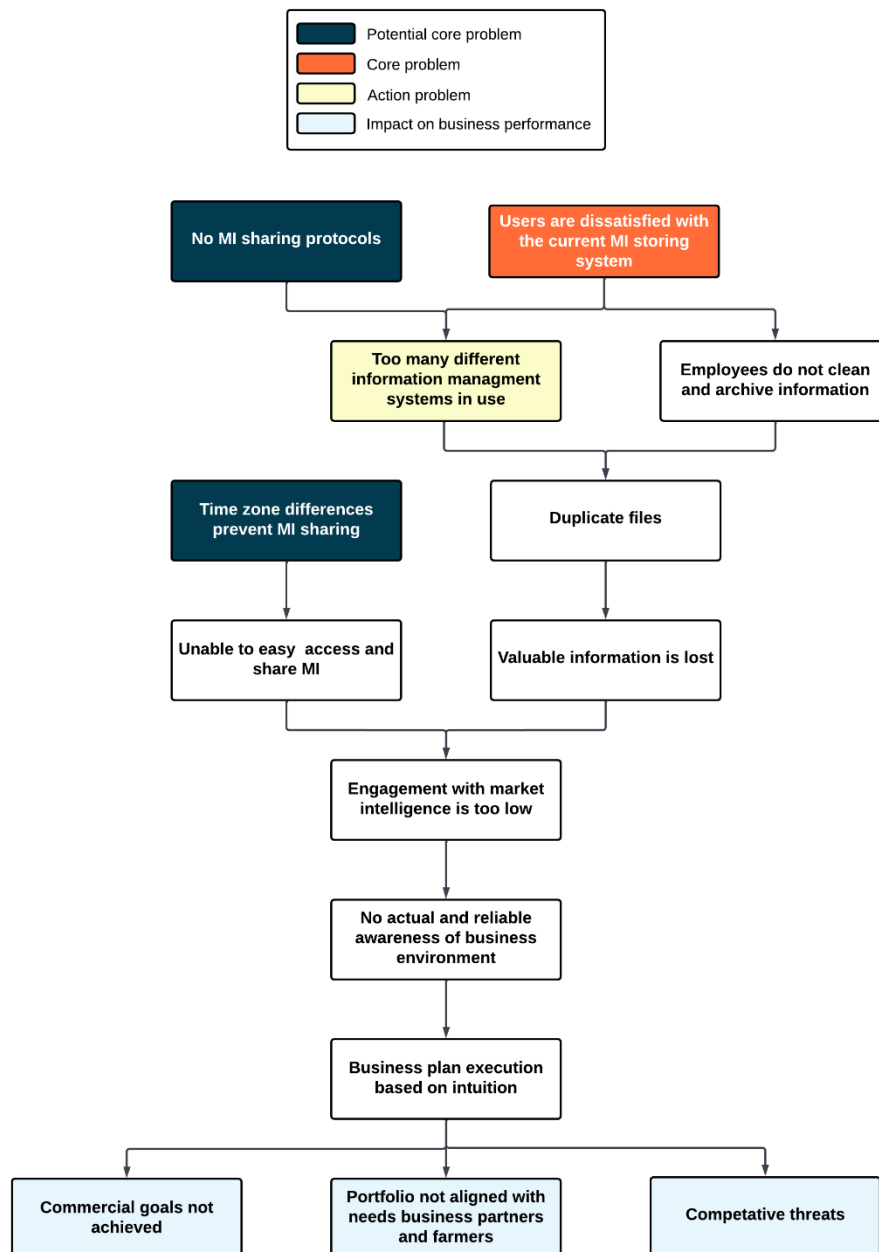


Figure 2: Problem cluster.

Utilising multiple communication methods leads to confusion and loss of information among employees. The interviews revealed that Company X’s personnel use various applications including Outlook, Teams, SharePoint and WhatsApp in addition to informal communication methods like

meetings and lunch discussions to share market intelligence. Individually, these applications operate seamlessly. However, their combined use tends to become unwieldy leading to duplicate files and information loss. Respondents indicated that the storage location of information is often forgotten, and some are even unaware of the existence of a specific information management application. The resulting disarray from using multiple communication methods creates significant confusion leading to a decreased market engagement utilisation rate. At a business level, this phenomenon results in inefficiencies and competitive tensions.

The second potential core problem pertains to the dissatisfaction that Company X’s personnel experience with the current methods of storing market intelligence. The interviews provided insights into this process and identified several reasons for the dissatisfaction. Firstly, there is no centralised system where personnel can store the information they have gathered. As previously discussed, an excessive number of information management systems are in use, including archiving systems. The current method of storing information significantly reduces efficiency and productivity. For instance, Figure 3 illustrates the way information is currently shared and stored on an international level. Each office has its channel in Teams, SharePoint or OneDrive,

which facilitates the archiving of local market information. Certain stakeholders at the headquarters have access to these channels and share relevant information with the rest of Company X. However, this system hinders easy accessibility for all personnel. Whenever information is stored in the USA channel, the other international offices cannot access this information, resulting in a lack of awareness regarding global market dynamics. Additionally, stakeholders at the headquarters determine what information is relevant for sharing with the rest of Company X. However, productivity and the efficiency of knowledge management would improve if employees individually decided which information is pertinent to them. Among personnel, these factors result in dissatisfaction with the current information storage systems.

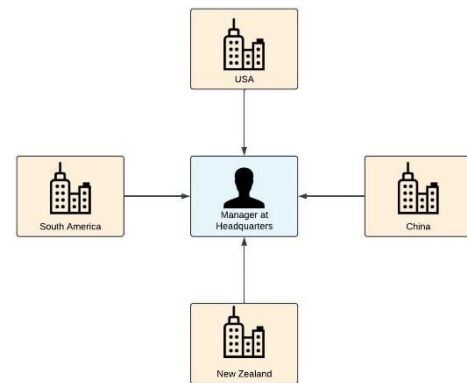


Figure 3: Current method of information sharing and storing on an international level.

Time zone differences further reduce efficiencies in information management. However, addressing this potential core problem does not yield benefits as significant compared to the other identified core problems. Additionally, respondents indicated that this issue was not as critical as the other identified issues, and thus, it is excluded from further consideration.

### 1.2.2 Core problem

By definition, core problems are not influenced by other issues and affect the most causal relationships by solving their corresponding problems (Heerkens 2014). Three distinct potential core problems are defined in Figure 2. Among these, the potential core problem “Users are dissatisfied with the current MI storing system” will have the most significant impact on the business performance when resolved. Solving this issue will establish a centralised information management system, which will indirectly enhance information sharing. Information sharing is facilitated when personnel can individually search for relevant information within the system. Therefore, the impact of storing information is greater than that of creating information-sharing protocols, as stored information will be accessible to all employees, rendering sharing protocols redundant. Consequently, the core problem of the research is defined as:

*“Users are dissatisfied with the current market intelligence storing system.”*

This core problem aligns closely with the predefined action problem, as there is a direct relationship between dissatisfaction regarding the current MI storing system and utilising multiple information management systems. With the implementation of one centralised information management system, the level of satisfaction concerning the storing system should increase accordingly.

The current information management process leads to inefficiencies, reduced engagement with information and exposure to competitive threats. These deficiencies are reflected in the user's level of satisfaction. During the interviews, questions such as "How do you collect/archive/share market intelligence?", "What do you think of the current information collecting/archiving/sharing system?" and "What is your overall level of satisfaction concerning the current process of market intelligence management?" were asked. These questions helped establish an overview of how employees work and what they think about the current information management system. These insights and an indication of the current level of satisfaction are discussed in greater detail in Chapter 2. Additionally, Chapter 2 provides the requirements, as indicated by the respondents, necessary to solve the core problem and enhance user satisfaction with the new market intelligence storing system.

In summary, to resolve the core problem, a centralised market intelligence system must be developed that facilitates easy access, archiving and sharing of reliable information about the external business environment of Company X. Accordingly, the research question of this study is formulated and defined as:

*"How can a centralised market information management system be developed that allows for easy access, archiving and sharing of reliable market intelligence about the external business environment of Company X, instead of utilising multiple disparate systems?"*

### 1.3 Research questions

To resolve the core research question, a theoretical framework is necessary to motivate decision-making initiatives, serving as the foundation for creating a reliable and valid information management system throughout this research. This framework is established by examining a set of sub-research questions. To enhance the clarity of these sub-research questions, the methods for data gathering and processing, limitations, and whether the questions are descriptive, or explanatory are defined for each research question. Additionally, the contribution of each sub-research question towards solving the core research question is discussed. Table 18 in [Appendix C1](#) defines the abovementioned elements for each sub-research question.

The following five sub-research questions are formulated and ensure progress towards solving the core research question.

- 1) *"How do employees within Company X currently engage with market intelligence to enhance strategic decision-making and operational effectiveness within the dairy industry?"*
- 2) *"What functionalities do Company X's employees require in a centralised market intelligence management system?"*
- 3) *"Which existing information management system exhibits requisite functionalities and operational demands of Company X's personnel for managing market intelligence effectively?"*
- 4) *"What design methodologies and strategies, described in scholarly literature, can be employed to design a centralised market intelligence management system fulfilling the requirements of Company X's personnel?"*
- 5) *"What critical factors must be assessed to ensure the successful implementation of the market intelligence management system within Company X?"*

Moreover, these sub-research questions ensure the logical and effective progression of the research. Each sub-research question is examined during a specific phase of the study. The distinct phases of the research are elaborated upon in Section 1.4.

## 1.4 Problem-solving approach

A structured problem-solving approach is selected to ensure the research progresses systematically. The approach chosen for this research is a variation of the Managerial Problem-Solving Method (MPSM) (Heerkens, 2014). Figure 4 visualises the six different phases of the problem-solving approach. These phases provide a step-by-step framework through which all sub-research questions from Chapter 1.3 are addressed. This framework can also be utilised as a guideline for implementing an information management system in other contexts.

### I. Problem identification

The initial phase of the problem-solving approach involves a comprehensive identification process to establish an in-depth understanding of the severity of the problem. This phase is essential as it forms the foundation of the research, providing insights that inform the subsequent phases necessary to structure the research process logically. The main method employed to complete this phase successfully was attending meetings. The company supervisor played a significant role during this phase by providing relevant information. This information was fundamental in establishing the problem cluster visualised in Figure 2. Sections 1.1 and 1.2 are dedicated to discussing the outcomes of the problem identification phase.

### II. Analysis of the current situation

In the second phase of the problem-solving approach, interviews are conducted to gain insights into the status of the current situation. The primary objective of these interviews is to establish an overview of how Company X's personnel currently utilise market intelligence during their daily work. Furthermore, they will provide insights into potential improvement areas regarding the knowledge management process (Ahmady et al., 2016). This information generates the required functionalities for the centralised market intelligence management system to exhibit and is therefore crucial towards solving the core research question. Conclusions from the second phase will answer the first and second sub-research questions. The initial insights of the interviews are discussed in Section 1.2. However, Chapter 2 elaborates upon these outcomes in greater detail.

### III. Literature review on information management systems

Once the research's foundation is established, the third phase of the problem-solving approach initiates. This phase establishes a theoretically grounded definition of information management systems and elaborates upon the concept of knowledge management in greater detail. Additionally, potential information management systems exhibiting requisite functionalities are evaluated. After analysing the advantages and disadvantages of each system, an appropriate system is selected. This section of the literature review phase examines sub-research question three. After completing the first part of the third phase, an additional literature review procedure is initiated. This literature review focuses on mapping out essential design methodologies and strategies that can be employed to develop a fulfilling centralised market intelligence management system and resolves sub-research question four.

### IV. Design of a centralised market intelligence management system

Phase four focuses on the design of the system. By utilising the information gathered in previous phases, it is feasible to construct a theoretically sound information management system. Chapter 4 focuses on motivating the design decisions made.

### V. Implementation of the market intelligence management system

A structured implementation is crucial to achieve all the perceived benefits of the information storing system. The primary objective is to ensure that all Company X's personnel are well-informed about the system's launch and comprehensively understand its functionalities. To achieve these objectives, insights from previous system launches within Company X are examined. Utilising insights from these past system implementations offers valuable knowledge which can be used to enhance the

implementation's success. Phase five of the problem-solving approach examines and answers sub-research question five.

#### VI. Evaluation and adjustments

Problem-solving phase six concludes the research. Continuous evaluation and adjustments are essential to align the system's capabilities with the user's needs. The evaluation phases consist of an evaluative round completed by the market intelligence team of Company X, followed by an evaluative round done by the system's users. The feedback and insights gained from these evaluations motivate the necessary design adjustments.

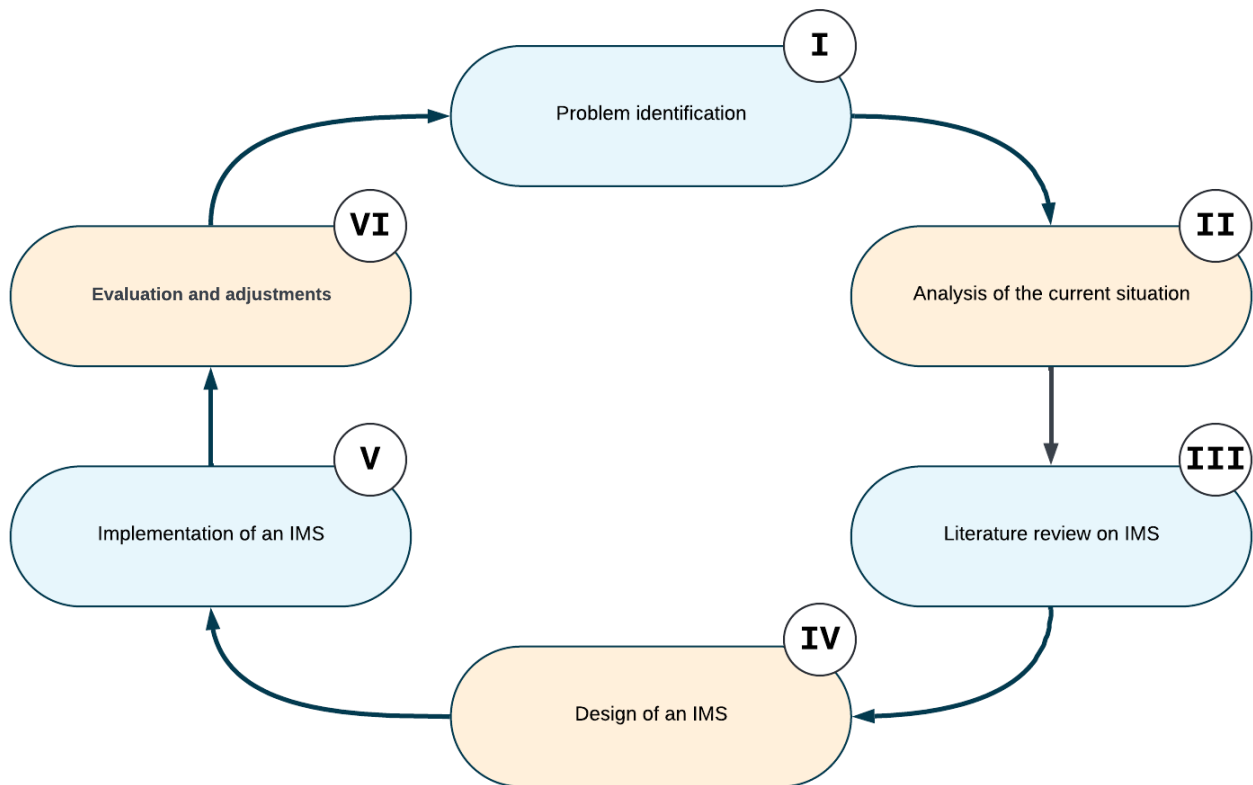


Figure 4: Six phases of the selected problem-solving approach.

## 2. Current situation

To progress with the research, the exploratory analysis is continued. This is done to acquire more detailed insights into the current situation of the problem. This chapter consists of two parts. Part one is dedicated to discussing the insights into the current situation. These insights are acquired by conducting interviews with international employees, which was briefly introduced in Section 1.2. This section of Chapter 2 answers the first sub-research question. Part two of Chapter 2 provides a list of requirements and improvements for the new information management system to exhibit, gathered from the current situation analysis. These elements ensure that the problem is solved according to the demands of the employees. This section of Chapter 2 resolves the second sub-research question.

- 1) *“How do employees within Company X currently engage with market intelligence to enhance strategic decision-making and operational effectiveness within the dairy industry?”*
- 2) *“What functionalities do Company X’s employees require in a centralised market intelligence management system?”*

### 2.1 Market intelligence management process

Interviews are conducted to describe how employees within Company X currently engage with market intelligence to support decision-making activities. International employees from South America, America, France and New Zealand were chosen as interviewees to ensure a diverse perspective on the current market intelligence management processes.

The involvement of international personnel is particularly significant because they have access to valuable local information that can enhance the comprehensiveness of market intelligence within Company X. An effective centralised market intelligence management system is crucial as it facilitates access and utilisation of this local knowledge for all employees working at Company X, thus enhancing informed decision-making initiatives. Furthermore, international personnel experience unique challenges, such as time zone differences caused by remote communication. These challenges can provide more insights into which requirements are essential for a new information management system. A full transcription of the interviews is addressed in [Appendix A1](#). As identified in Chapter 1, the current process of market intelligence management within Company X is split up into a collection, archiving and sharing phase also reflecting the knowledge management theory (Ahmady et al., 2016). Sections 2.1.3 – 2.1.5 of Chapter 2 discuss the current situation of these different phases in Company X.

#### 2.1.1 The concept of market intelligence

Market intelligence consists of four categories that provide data-driven insights into an organisation’s external business environment. These categories include consumer analysis, competitor analysis, product analysis, and market dynamics. These forms represent the broad spectrum of a generic external business environment covered by market intelligence. Market intelligence mostly consists of explicit knowledge and primarily occurs in data formats such as presentations, spreadsheets, documents, visuals, datasets, articles, publications, surveys and dashboards.

In the specific context of Company X, market intelligence involves the same four categories. Consumer analysis involves understanding the needs and behaviours of farmers who use Company X’s products. This includes gathering data on farmers’ preferences and feedback, which facilitates the alignment of Company X’s portfolio with the farmer’s needs. Competitor analysis involves monitoring and evaluating the activities of other companies in the livestock monitoring and management industry. By understanding the strengths and weaknesses, Company X can identify potential areas of differentiation. Product analysis focuses on the performance of Company X’s products in the market. This involves tracking sales data, but also monitoring the product lifecycles. Understanding the product lifecycle provides insights into the technical performance of products, enabling the establishment of

realistic customer expectations. Market dynamics involves analysing trends and changes within the global livestock management market. This includes studying economic indicators such as feed and milk prices, monitoring regulatory changes, and observing technological advancements

### 2.1.2 Strategic advantages of managing market intelligence

The outcomes of the interviews indicate that Company X's personnel utilise market intelligence primarily to support data-driven decision-making. The interviewees were questioned about which type of market intelligence they utilise most in Company X's context. However, the interviewees indicated that they do not prioritise any specific category of market intelligence, as all four forms of market intelligence are equally essential for establishing a comprehensive understanding of the external business environment.

However, the interviewees did emphasise the importance of market intelligence to make data-driven decisions. Utilising market intelligence empowers employees to predict future market trends, enabling an organisation to discover and keep up with market dynamics (Endres et al., 2020). This concept is known as sensing and aims to understand the external environment by exploring opportunities and threats. Whether a firm is responsive to its market environment depends on its ability to detect opportunities and threats in the external business environment. In other words, a business's capacity to address rapidly changing environments depends on its engagement with market intelligence. Additionally, it involves making strategic decisions to shape the current markets. The advantage of engaging with market intelligence correctly is that it results in a higher likelihood of discovering changes and trends (Endres et al., 2020). To innovate successfully, Company X must be receptive to external insights, identify new market opportunities and accurately assess the value of these insights correctly. This emphasises the significance of an increased market intelligence engagement rate within Company X.

### 2.1.3 Collecting market intelligence

The first phase of Company X's market intelligence management process involves collecting market intelligence. Questions were posed to the interviewees to determine how market intelligence is currently collected within Company X. Three primary methods for collecting market intelligence emerged from the interviews. The most common method of gathering information was from internal stakeholders. The interviewees indicated that information is primarily collected through participation in meetings and informal discussions with colleagues about newly acquired information. Although Company X, as a large company, acquires substantial knowledge from external stakeholders, the primary intelligence collection method mentioned during the interview was gathering information from internal stakeholders, mainly due to the extensive number of colleagues and the internal flow of communication.

The second most mentioned method of gathering information involving the four categories of market intelligence is through external stakeholders. This also includes consulting the internet to collect information provided by certified institutes. However, the respondents indicated that the public data provided by these institutes is often outdated or unreliable. For instance, market dynamics data, such as milk prices or the number of milking cows in a specific country, often becomes outdated due to rapid changes in the livestock management sector and the limited availability of publicly accessible data. These factors significantly diminish the reliability of such information. Collecting reliable information varies in difficulty across countries. For instance, New Zealand has numerous certified institutes that provide reliable information, while institutes in Mexico and France lack considerably in this regard. Market intelligence is also gathered through other external stakeholders including business partners and suppliers. These external stakeholders provide Company X with business-related information on competitors and market dynamics including global milk prices and feed costs.

Combining the market intelligence acquired from institutes and business partners results in a more reliable view of Company X's external business environment as validation is possible.

The third method of data collection involves gathering primary data. Company X conducts market research, with the outcomes being exclusively available to the organisation. These market research efforts are targeted at specific countries and provide insights into several market intelligence categories. For instance, this involves collecting data on the structure of a country-specific dairy market, herd management software adoption rates and potential adoption rates for future technologies. Primary data sources provide the most reliable market intelligence because they are original and collected firsthand specifically for the designated research purpose. However, gathering primary data necessitates significant resource allocation, including substantial time and financial investments. Interviewees from South America and North America requested more frequent market research, as it provides valuable insights into the external business environment. Additionally, they recommend establishing a roadmap for future market research to create insights and align with Company X's business strategy.

Overall, all interviewees believe that more market intelligence should be collected. However, two main issues currently hinder this process:

- I. Time constraints.

Collecting market intelligence is time-consuming, requiring significant effort to gather, verify and discuss. All interviewees indicated that time is scarce, leading to collecting unreliable or incomplete information which impacts the quality of the created market insights. Furthermore, being unable to gather market intelligence due to time constraints results in the absence of valuable information, leading to increased exposure to business-related threats from competitors.

- II. Reliability of information.

Finding reliable information proved to be challenging. Publicly available information from institutes and other organisations is often outdated or unreliable. This complicates the tasks of making informed decisions. Cross-verifying data would ensure a more accurate picture of market dynamics.

#### 2.1.4 Archiving market intelligence

The second process of market intelligence management is archiving information. Ode & Ayavoo (2020) studied the relationship between knowledge storage and firm innovation, demonstrating a positive association that underscores its organisational significance. The current market intelligence storing process involves multiple locations and organisational departments, each utilising platforms such as Teams channels or SharePoint sites to store the four categories of gathered market intelligence. This process is schematically illustrated in Figure 3 at an international level.

Each international location has its own Teams channel or SharePoint site for local market intelligence storage. Stakeholders in Location X can access these channels and determine which data to share with the other Company X employees. However, this process reduces operational performance, as information is not accessible to every employee. For example, personnel in North America cannot access stored information in New Zealand if the stakeholders in Location X do not share this information. Nationally this phenomenon is also present, where each department within a location utilises distinct information storing platforms. Consequently, information relevant to employees outside that department remains inaccessible due to restricted access.

The inaccessibility of valuable knowledge, combined with the delay caused by needing to request specific information instead of accessing archived information directly, results in a lack of awareness of global market dynamics. Furthermore, the disarray caused by managing multiple information systems leads to increased information loss, as personnel forget where certain documents are stored



due to the absence of a centralised system. Additionally, this situation contributes to the overall increased complexity of IT infrastructure, further causing low engagement with market intelligence.

### 2.1.5 Sharing market intelligence

Sharing knowledge represents the final phase of the market intelligence management process. Given Company X's organisational scale and extensive workforce, knowledge distribution occurs at a rapid pace. During the interviews, two primary methods for sharing knowledge were identified. These involve employing offline knowledge-sharing mechanisms and utilising IT systems for knowledge-sharing.

In Location X, information can be distributed easily through offline sharing methods. This involves knowledge dissemination through participation in meetings or informal discussions. The ease of informally approaching a colleague in their office facilitates this rapid knowledge distribution. However, such informal channels are unavailable for international personnel. Remote communication caused by geographical distance prevents informal discussions and emphasises the necessity of IT systems for effective communication. This shows that utilising satisfactory IT systems is crucial.

The current IT systems that directly facilitate knowledge dissemination include Outlook for email conversations and Microsoft Teams for participation in online meetings. Overall, the interviewees are satisfied with online meetings, expressing that a live, free flow of information is facilitated. However, limitations are evident in email conversations, primarily twofold. First, the interviewees indicated uncertainty regarding which stakeholders should receive specific information. They usually share information with the most familiar colleagues. Subsequently, these colleagues then share the information with other relevant employees. However, this approach to knowledge dissemination is time-consuming and may lead to information not reaching the appropriate person. Secondly, email conversations are time-consuming. Cultural differences in response time hinder swift information dissemination.

Figure 5 illustrates a schematic overview, summarising Company X's current market intelligence management process.

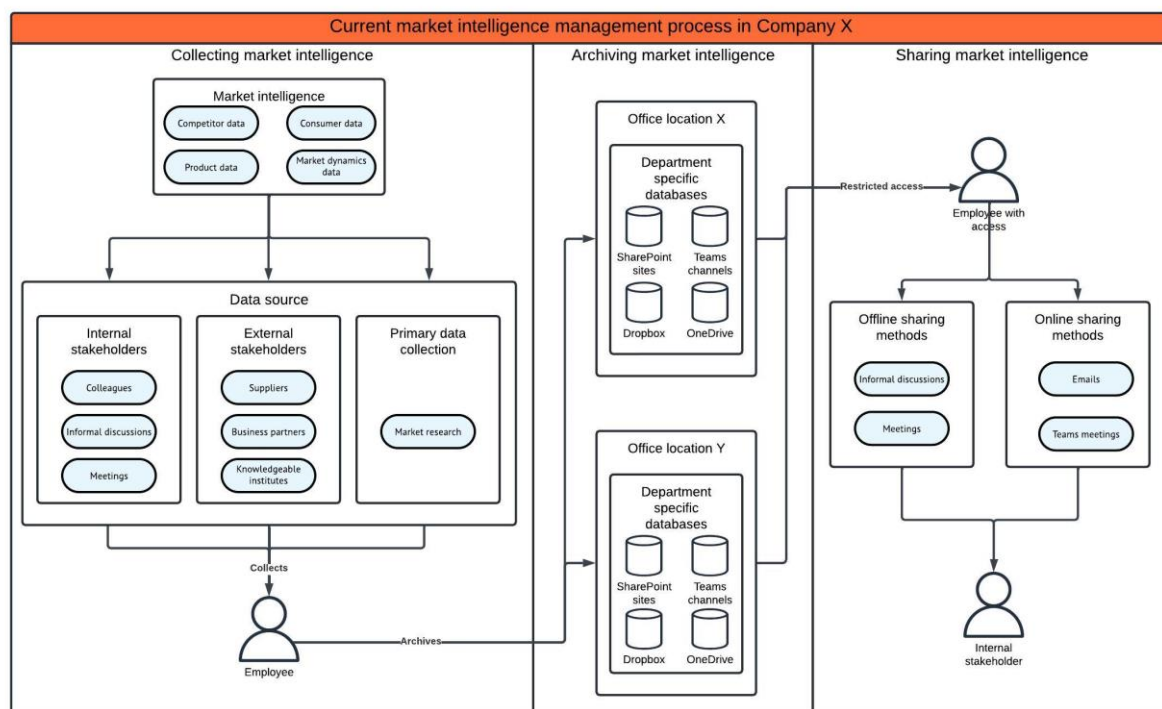


Figure 5: Overview of the current market intelligence management process in Company X.

### 2.1.6 Quantitative evaluation

A quantitative survey was conducted to measure satisfaction with the current market intelligence storage process. The survey involved the company supervisor and assessed various components of the market intelligence management process that contribute to the overall satisfaction with the current market intelligence management system. The achieved scores are outlined in Table 2.

Table 2: Assessment measuring the satisfaction with the current market intelligence management storing system.

Question	Satisfaction rate (Likert scale from 0.0 to 10.0)
It is easy to navigate and use the market intelligence management system(s).	5.0
The overall design of the market intelligence system(s) enhances my user experience.	4.0
The effort required to upload files is minimal.	5.0
The steps to upload market intelligence files are clear and intuitive.	4.0
It is possible to clearly describe files with metadata.	3.0
The process of searching for documents is intuitive and effective.	5.0
What is your overall experience with the methods of managing (storing and accessing) market intelligence?	5.0
I would recommend the methods of managing market intelligence to my colleagues.	3.0

The scores indicate that Company X’s personnel are dissatisfied with the current market intelligence management system. The overall experience with the methods of managing market intelligence is rated at 5.0. This aligns with the identified core problem: users are dissatisfied with the current market intelligence storing system.

### 2.1.7 Summary

This section provides a summary that directly resolves the first sub-research question.

*“How do employees within Company X currently engage with market intelligence to enhance strategic decision-making and operational effectiveness within the dairy industry?”*

Sections 2.1.3 to 2.1.5 revealed the current market intelligence management process based on interviews with international employees of Company X. This process encompasses three key phases: knowledge collection, archiving and sharing. Company X’s personnel engage with both internal and external stakeholders and utilise primary data collection methods to acquire knowledge. Internally, they actively participate in meetings and informal discussions with colleagues to facilitate information dissemination. Externally, business partners, suppliers and certified institutes are contacted to inquire about market dynamics, consumers and competitors. Furthermore, primary data collection is facilitated through market research initiatives.

Once collected, the archiving and sharing phase are initiated. Archiving is facilitated through various local Microsoft Teams channels or SharePoint sites ensuring accessibility for stakeholders in Location X. Sharing market intelligence within Company X occurs through both online and offline methods. Offline, informal discussions and in-person meetings facilitate information dissemination. Meanwhile,

online methods such as meetings and email conversations facilitate information exchange, particularly in the context of remote communication

While this approach to managing market intelligence has been effective in the past, the excessive volume of information available, both nationally and internationally, poses challenges in data management. To foster a culture of data-driven decision-making and remain agile in dynamic market environments, it is essential to evolve the current market intelligence management system. This will improve strategic decision-making and the operational effectiveness of Company X within the dairy industry. Section 2.1.6 discusses the current satisfaction scores with the market intelligence management process as depicted in Figure 5. The overall experience with the system is rated at a 5. Section 2.2 examines the second sub-research question and discusses the requisite functionalities of an effective information management system.

## 2.2 Desired situation

The current market intelligence management process requires enhancements to improve the current satisfaction scores. These enhancements involve implementing a new information management system that fosters a flow of information acquisition and dissemination. Based on the conducted exploratory analysis, the requirements of the new system have been established through a systematic approach. These requirements will be implemented into the new system and serve as a guideline to increase the current satisfaction scores.

Structured interviews were conducted with international employees from France, Latin America, North America, and New Zealand. The same set of questions was asked to all participants to maintain consistency. Next, the interview responses were transcribed to facilitate the analysis. These transcriptions are outlined in [Appendix A1](#). After transcribing the interview responses, a code frequency analysis was performed on the transcriptions. This involved counting the frequency of mentions for each requirement, resulting in an overview of the most essential requirements for the new market intelligence management system. Table 3 outlines the list of identified requirements for the new market intelligence management system with the corresponding frequencies.

In addition to the conducted interviews, meetings and discussions with employees in Location X contributed to the validation of the set of identified requirements which resolves the second sub-research question:

*“What functionalities do Company X’s employees require in a centralised market intelligence management system?”*

Table 3: List with the identified requirements.

Requirement	Source	Elaboration	Frequency
User-friendliness	Interviews	Intuitiveness and simplicity are essential elements for the new system to exhibit. Tasks such as archiving and accessing information should be simpler rather than complex. Whether these tasks can be performed rapidly and efficiently influences the adoption rate of the new system among Company X’s personnel. This significance is emphasised as interviewees indicated that time is scarce and less is more in this context.	7

Centralisation	Interviews	The new market intelligence management system should consolidate information about the external business environment into one centralised system, eliminating the need for managing multiple information systems.	6
Accessibility	Interviews	Market intelligence should be accessible to all employees. Interviews revealed that certain relevant information is inaccessible to international employees.	4
All categories of market intelligence	Interviews	Personnel expressed interest in all categories of market intelligence. Therefore, the new system should encompass all categories, providing a complete view of the external business environment of Company X.	3
Search functionalities	Interviews	Logical filtering and search functionalities are required to improve the system's effectiveness, ensuring that relevant information can be accessed more efficiently.	2
Archiving functionalities	Interviews	The system should support archiving functionalities. Logical archiving ensures that data is stored properly and easily accessible.	2
Security	Interviews	Respondents indicated that much of the information is confidential. Specifically, primary data that has been gathered through market research. Therefore, the new system must be secure. Additionally, it is essential to consider whether certain information should be accessible to internal stakeholders only.	2
Newsletter	Interviews	Periodic newsletters should be introduced, containing relevant updates on global market dynamics. Documents archived in the new system can be used as input for the newsletter.	5
Dashboard	Interviews	Including a dashboard to visually represent where information is dense was a functionality mentioned by an interviewee. This dashboard will provide insights into which geographical areas or forms of market intelligence need more data collection, ensuring a complete representation of the external business environment is established.	1

Table 3 shows the requirements mentioned by the interviewees. Some requirements are mentioned more frequently than others and are therefore prioritised. The most important and frequently mentioned requirements include user-friendliness, centralisation, newsletters and accessibility. The core problem of the research is the dissatisfaction users have expressed with the existing market intelligence storing system. Consequently, the primary focus is enhancing the current system to address the core problem.

While the development of newsletters is noted as important, it can be addressed after the improvement of the market intelligence storage system. As a result, the implementation of newsletters falls outside the immediate scope of this research, as it is not directly essential for resolving the core issue at hand. However, developing newsletters will be recommended to the organisation as it can still provide benefits in terms of increased user satisfaction in the later phases of system improvement. These recommendations are discussed in Section 7.2. This also involves the dashboard requirement, as it was mentioned only once, indicating less demand. Furthermore, developing and integrating a dashboard would require significant resources, which could be better allocated to addressing the more frequently mentioned requirements. These two requirements are for this reason marked red in Table 3.

The significant need for enhanced user-friendliness and search and archive functionalities is reflected in the satisfaction scores of the current market intelligence management system. Table 4 details how these requirements align with the assessments.

Table 4: Relationship between requirements and questions.

Associated requirement	Question assessing current market intelligence system	Satisfaction rate (Likert scale from 0.0 to 10.0)
User-friendliness	It is easy to navigate and use the market intelligence management system(s).	5.0
	The overall design of the market intelligence system(s) enhances my user experience.	4.0
	The effort required to upload files is minimal.	5.0
Archiving functionalities	The steps to upload market intelligence files are clear and intuitive.	4.0
	It is possible to clearly describe files with metadata.	3.0
Search functionalities	The process of searching for documents is intuitive and effective.	5.0
Core problem	What is your overall experience with the methods of managing (storing and accessing) market intelligence?	5.0
Knowledge dissemination	I would recommend the methods of managing market intelligence to my colleagues.	3.0

In Table 4, the first three rows represent the dissatisfaction with the user-friendliness of the current market intelligence management system. This is the most frequently mentioned requirement for the new system, emphasising its necessity.

The fourth row involves uploading files. Currently, employees do not perceive the steps to upload files as clear and intuitive. This dissatisfaction is reflected in the requirement analysis, where the need for logical archiving and increased user-friendliness is highlighted.

The fifth row also references the need for logical archiving. Employees are dissatisfied with the degree to which it is possible to describe documents with metadata, which involves archiving functionalities. The sixth row involves searching for and retrieving market intelligence documents. Currently, Company X perceives searching for and retrieving market intelligence documents as difficult. Employees often forget the storage locations due to multiple systems being utilised, complicating file retrieval. This resonates with the requirement analysis, where the need for centralisation, search functionalities and accessibility were identified as critical improvements for the new system. These

requirements will be implemented to enhance satisfaction with the intuitiveness and effectiveness of searching for and retrieving market intelligence.

The seventh and eighth rows do not directly reflect a requirement from Table 3. However, these two key metrics indicate how the current market intelligence system is perceived by its users in terms of effectiveness and whether it fulfils its intended purpose. The first key metric resonates with the core problem identified in the research, which is that Company X's personnel are dissatisfied with the current market intelligence management system. Implementing all requirements mentioned in Table 3 within the research scope will contribute to an improved overall satisfaction with the market intelligence management system, which currently has a score of 5.0.

The ninth row is a great indicator of the significance of the current system's capabilities and directly contributes to the degree to which market intelligence is shared within the organisation.

The requirements represent the core improvements necessary. By implementing these main changes, the goal is to enhance the current satisfaction scores with the system. Enhancing satisfaction rates will improve engagement with market intelligence, resulting in increased awareness of Company X's external business environment. This will allow Company X to make more data-driven decisions and execute its business plan based on insights supported by data. Ultimately, this will result in increased capabilities towards achieving commercial goals, better alignment of Company X's portfolio with the needs of business partners and farmers, and reduced exposure to competitive threats.

After discussing all improvements, a new overview of market intelligence management can be established, visualising the enhanced market intelligence management process and the improved storing and archiving system. This new overview is presented in Figure 6.

Figure 6 outlines the improvements made in the archiving phase of the market intelligence management process. Instead of utilising multiple disparate systems, a unified market intelligence repository will be established, accessible to all employees within Company X. By centralising multiple storage and access systems into one system, the sharing phase, as depicted in Figure 5, is automatically simplified. Every employee will have access to the repository, eliminating the need for excessive sharing and document requests. This new system with its associated requirements will enhance satisfaction with the current market intelligence management system and address the core problem of the research.

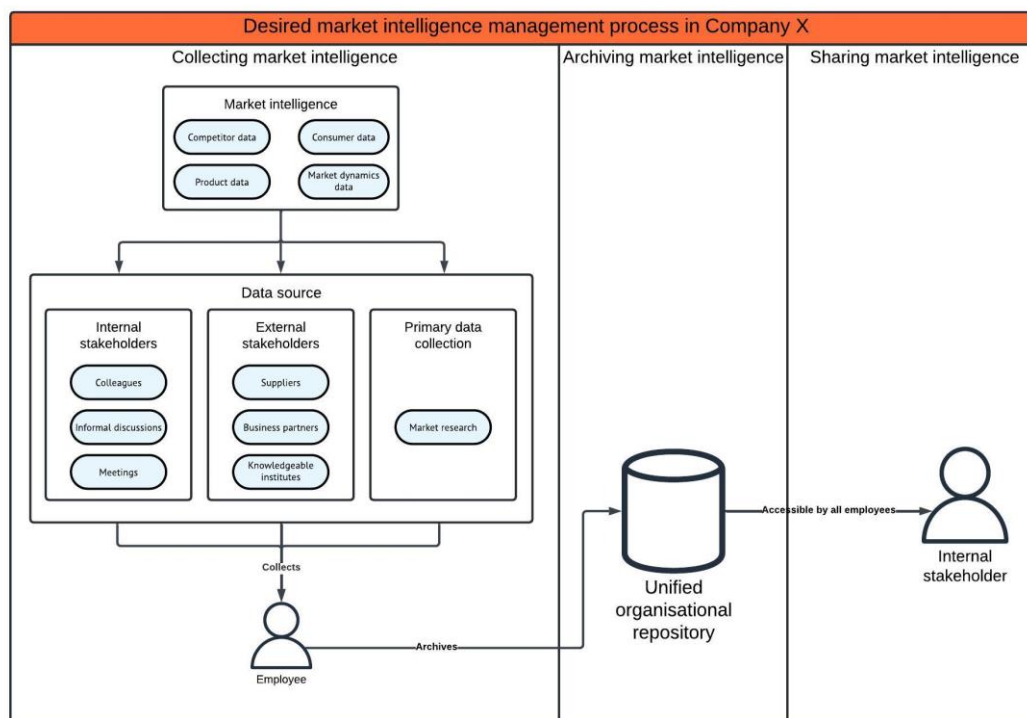


Figure 6: Overview of the desired market intelligence management process in Company X.

### 2.3 Intranet Pulse

Beyond the scope of this research, Company X is developing an Intranet, named Pulse, to consolidate several applications even beyond market intelligence management. Pulse is a pseudonym of the original intranet name. Applications such as a company directory and an internal social networking environment are being discontinued and integrated into this centralised intranet, powered by Interact Software. Pulse aims to enhance internal communication and collaboration, providing a more unified and efficient experience for all Company X's personnel worldwide.

Regarding this research, stakeholders emphasise the integration of the new market intelligence management system into Pulse. However, due to limitations in Pulse's development capabilities, the system cannot be built using exclusively Pulse software. Therefore, the system must be developed utilising an alternative solution, while being compatible with Pulse for centralised operations. This compatibility can be achieved by providing a direct link or using an iframe within Pulse. An iframe allows the incorporation of another application within the existing HTML application. In this context, the application represents the new market intelligence management system.

To conclude, the new system must be seamlessly embeddable within the Pulse intranet environment. This new requirement is added to the predefined set of requirements discussed in Section 2.2.

### 3. Literature review

This chapter discusses the possibilities and limitations of intranet Pulse in Section 3.1. Subsequently, a literature review is conducted to establish a formal understanding of information management. Additionally, potential information management systems are assessed based on the set of requirements identified in Chapter 2, ensuring that the system's capabilities align with the user's needs. This section of Chapter 2 examines sub-research question 3. After selecting an appropriate information management software, design strategies are required. These strategies are utilised to motivate certain design decisions and ensure logical structuring and enhanced system user-friendliness. The second literature review identifies these essential design methodologies and strategies, addressing sub-research question 4. Finally, section 3.4.4 summarises the key findings and presents the conclusions of Chapter 3.

- 3) *“Which existing information management system exhibits requisite functionalities and operational demands of Company X's personnel for managing market intelligence effectively?”*
- 4) *“What design methodologies and strategies, described in scholarly literature, can be employed to design a centralised market intelligence management system fulfilling the requirements of Company X's personnel?”*

#### 3.2 Knowledge management

Before examining suitable information management software for resolving the third sub-research question, it is essential to establish a more defined theoretical definition of managing information and knowledge. Chapters 1 and 2 already touch upon the surface of knowledge management and discuss the knowledge management theory (Ahmady et al., 2016). This section builds on that foundation, providing a more complete explanation of knowledge management.

The past decade has shown explosive growth in research on knowledge management (Laudon, 2014), with significant changes in how organisations face globalisation, data and information (Branco et al., 2020). Knowledge that cannot be disseminated is considered worthless, highlighting the necessity of research on knowledge management strategies. A firm's value depends on its ability to create and manage knowledge (Endres et al., 2020). Moreover, multiple studies have proved a positive relationship between organisational performance and the ability to manage knowledge (Rakthin et al., 2016), (Ode & Ayavoo, 2020). Successful knowledge-based projects also yield significant returns on investments. Without knowledge, firms are inefficient in both resource allocation and utilisation and are prone to failure. The process of adjusting management decision-making based on learning is referred to as organisational learning (Laudon, 2014) or sensing (Endres et al., 2020). It is arguable that organisations with significant sensing capabilities, which respond adeptly to dynamic market environments, tend to have greater longevity than those unable to do so.

As argued by Laudon (2014) there is a distinction between data, information, knowledge and wisdom. Data is defined as a stream of events recorded by an organisation's system. While this raw data is useful for conducting transactions, its value is limited beyond that. Therefore, data must be converted into meaningful information. A company must allocate its resources to categorise and structure data. Transforming data into knowledge can be achieved by applying visualisation techniques such as reports. Further, to transform information into knowledge, additional resources must be allocated to identify patterns, derive insights and understand the contexts in which this knowledge applies. Finally, the collective and individual experience of applying knowledge to solve problems is referred to as wisdom. This concept was also studied by Alawan (2012) which is illustrated in Figure 7. The four terms – data, information, knowledge and wisdom – as outlined by Laudon (2014) and Alawan (2012) are closely integrated with the four principles of the knowledge management theory (Ahmady et al., 2016) as discussed in Chapter 1.2.1.



Within knowledge management, there are two primary forms of knowledge: tacit knowledge and explicit knowledge. Tacit knowledge resides in the minds of employees and has not yet been documented, whereas explicit knowledge has been documented. The new market intelligence system aims to increase the amount of explicit knowledge within Company X, by providing a system that employees can utilise to store and access (semi)structured market intelligence.

The activities of knowledge management refer to a set of business processes dedicated to creating, storing, transferring and applying knowledge (Laudon, 2014), (Ahmady et al., 2016). Figure 8 illustrates five steps that add value to the knowledge management value chain. As the chain progresses, each stage enhances raw data and information, transforming them into usable knowledge. In Figure 8, activities related to information systems are distinctly illustrated from management and organisational

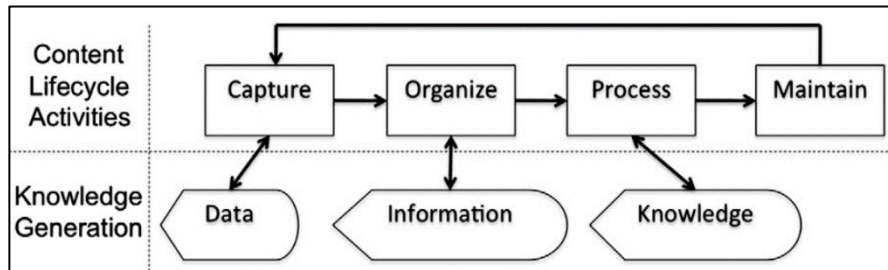


Figure 8: Process of adding value to create knowledge (Alawan, 2012).

activities, emphasising that “effective knowledge management is 80 percent managerial and organisation, and 20 percent technology” (Laudon, 2014). Laudon argues that investments in information systems are essential to maximise the return on investment in knowledge management projects. This resonates with the need of the Company X organisation to enhance its current information storing system.

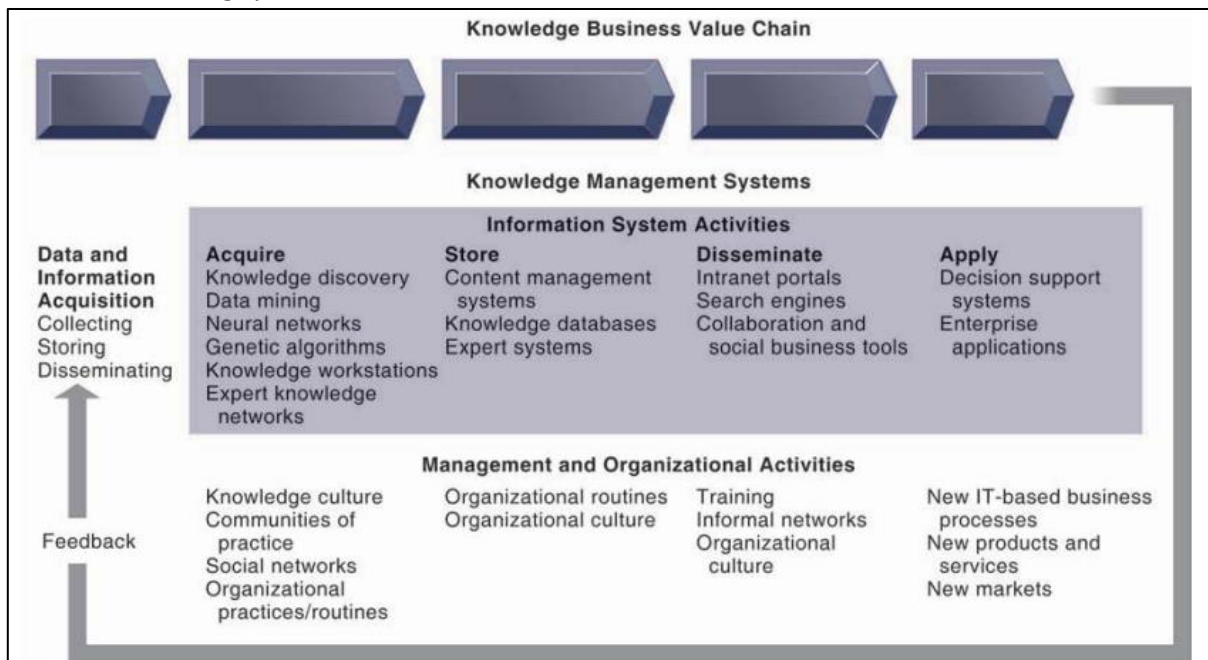


Figure 7: The knowledge management value chain (Laudon, 2014).

### 3.2.1 Knowledge Acquisition

Knowledge is acquired through various methods within an organisation. Knowledge can be obtained by accessing a company’s knowledge management system, designed for storing documents, reports,

presentations and best practices. Additionally, tacit knowledge can be accessed by utilising online expert networks where employees with personal expertise can be found.

Conversely, knowledge needs to be created. This knowledge can be acquired by tracking both internal business performances such as sales and inventory as well as external business dynamics including consumer, competitor, product and general market performances (Laudon, 2014).

### 3.2.2 Knowledge storage

Once acquired, knowledge needs to be stored. Accessing stored knowledge enables employees to retrieve and engage with the information when required. Various systems can be used to store information; however, it generally involves the development of a database. Enterprise content management systems (ECMS) digitalise, index and tag documents according to a framework. Management plays an active role in the success of an enterprise content management system, including supporting its development, creating a coherent framework for document storage, and rewarding employees for proper system engagement (Laudon, 2014). This research focuses on developing and implementing an enterprise content management system for Company X to resolve the core problem.

### 3.2.3 knowledge dissemination

Many applications have been developed to support knowledge dissemination. Any tool that aims to enhance collaboration can be interpreted as facilitating knowledge dissemination. Due to the vast amounts of available information, it is increasingly significant to maintain an overview and engage only with information necessary for decision-making activities. Training programs and shared experiences help managers focus their attention on important knowledge (Laudon, 2014).

### 3.2.4 knowledge application

As discussed in Section 3.2, knowledge is only valuable when it is disseminated and applied. Knowledge that is not shared and applied can be considered worthless. Organisational knowledge must become a systematic part of management decision-making activities to stimulate increased return on investment. It is essential to incorporate new knowledge into a firm's business processes and key application systems. The management has a crucial role in this integration by developing innovative business practices, products and markets based on newly acquired knowledge (Laudon, 2014).

## 3.3 Types of knowledge management systems

Generally, there are three primary types of knowledge management systems. These three include enterprise-wide knowledge management systems, knowledge work systems and intelligent techniques. Each form of system serves distinct purposes, as illustrated in Figure 9. Enterprise-wide knowledge management systems are comprehensive efforts that apply the four principles of the knowledge management theory discussed by Ahmady et al. (2016) and Laudon (2014). These systems facilitate information search, the storage of structured and unstructured data, and the identification of expertise among employees. Applications such as portals, search engines, collaboration tools and learning management systems support these efforts.

Knowledge work systems (KWS) are specialised tools designed for knowledge workers such as, engineers and scientists, who are responsible for creating new knowledge within a company. Knowledge work systems include applications such as computer-aided design (CAD), visualisation and simulation systems.

Intelligent techniques represent a diverse set of technologies that serve various purposes including discovering patterns in data and optimising solutions to complex issues. These technologies include data mining, expert systems and intelligent agents (Laudon, 2014).

Enterprise-wide knowledge management systems have the most potential for resolving the core research question and fulfilling the user’s needs. Therefore, the scope of this research focuses on ECMS. Section 3.3.1 explores the concept of ECMS in greater detail and defines its organisational benefits.

### 3.3.1 Enterprise-wide knowledge management systems

Organisations encounter three primary types of knowledge. Firstly, structured knowledge exists within organisations as formal text documents such as reports and presentations. Secondly, decision-makers

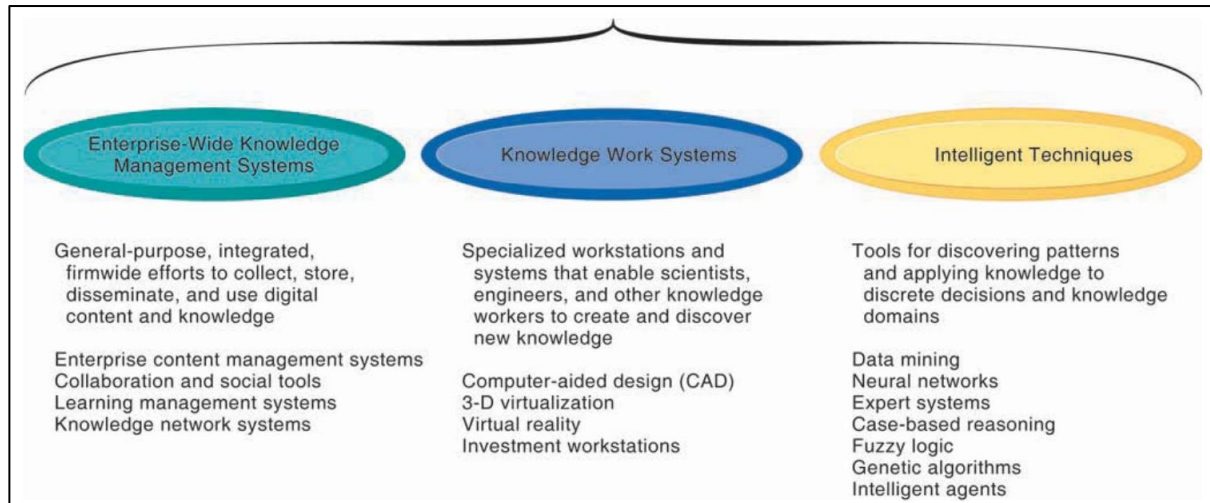


Figure 9: Primary types of knowledge management systems (Laudon, 2014).

are required to have access to semi-structured knowledge. This includes emails, chat transcripts and videos. Thirdly, a significant amount of knowledge includes tacit knowledge, which has not been documented. Enterprise-wide knowledge management systems encompass all three of the above-described types of organisational knowledge.

Structured knowledge is explicit knowledge existing in recorded documents and governed by organisational rules derived from decision-making processes. However, it is estimated that up to 80% of organisational content exists of semi-structured and unstructured data, encompassing diverse formats such as folders, messages and emails stored across multiple locations.

Enterprise content management systems (ECMS) play a crucial role in managing both types of information. ECMS facilitate the capture, storage, retrieval and distribution of both structured and semi-structured data, helping a firm improve its business performance. Figure 10 represents a schematic content management system.

A primary challenge in knowledge management lies in establishing an appropriate classification scheme, or taxonomy. A taxonomy categorises information systematically for easy retrieval. ECMS facilitate this by enabling tagging and interfacing with corporate databases and content repositories (Laudon, 2014). The metadata classification scheme that facilitates document tagging and filtering within the new market intelligence management system is discussed in Section 3.4.2.

An enterprise content management system can exhibit all the requisite functionalities the new market intelligence management system must possess. Therefore, this system type is selected for the remainder of this research. Chapter 3.3.2 elaborates on enterprise content management systems in more detail. Finally, Chapter 3.3.3 selects the appropriate enterprise content management software to create a system suitable for solving the core problem of the research.

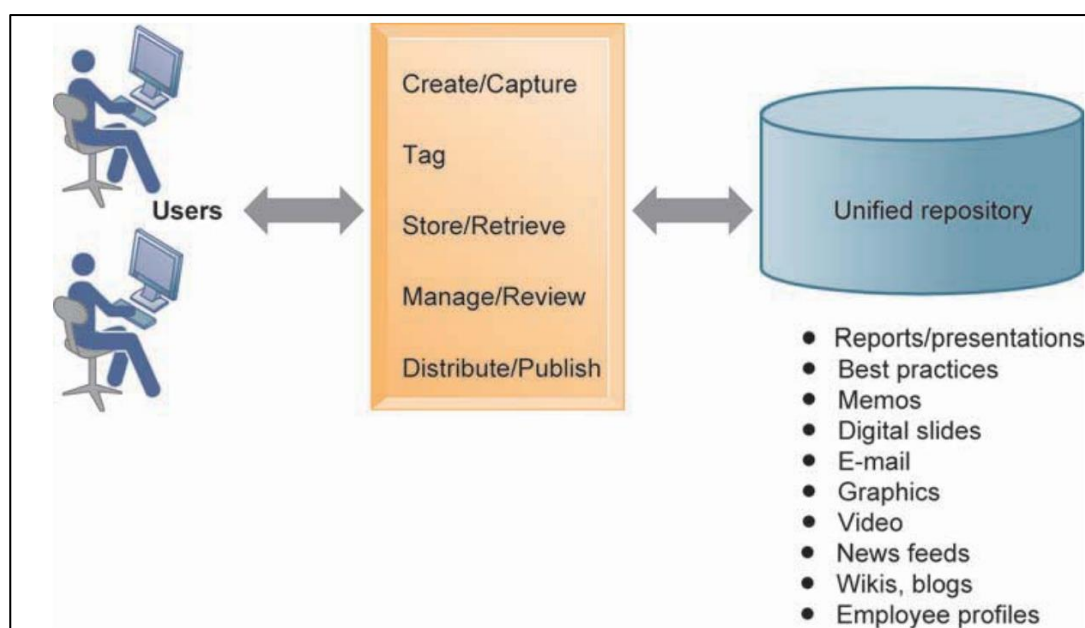


Figure 10: Enterprise content management system (Laudon, 2014).

### 3.3.2 ECMS to enhance decision-making capabilities

Over the last decades, multiple changes have occurred in how organisations face globalisation and manage existing data and information. This evolution resulted from the constant shifts in paradigms associated with productive systems as argued by Branco et al. (2020). Currently, we are evolving towards a more information-dependent society, necessitating means to manage both the internal and external business environment of an organisation (Martins et al., 2019). Within Company X, there is a need for a more advanced enterprise content management system to replace their current methods of processing knowledge. An ECMS enables users to enhance business processes through workflow, information sharing and managing documents throughout their lifecycle, resulting in improved operational performance (Hammer & Hershman, 2010).

Alalwan (2012) studied whether ECMS could support the decision-making capabilities of four categories of decision-support systems. These four systems include classic decision support systems (DSS), executive information systems (EIS), expert systems (ES) and group decision support systems (GDSS). Alalwan (2012) concluded that the use of ECMS positively impacts problem definition, alternative generation, alternative analysis, and choice. Additionally, the study emphasised the positive impact of ECMS on accessing internal and external information, extracting critical data, integrating a broad range of internal and external data, and providing trend analysis. Furthermore, a positive relationship was found between the use of ECMS and preserving scarce expertise and disseminating scarce expertise.

conversely, Adam (2007) examined the aspects related to ECMS implementation to ensure its successful execution and maximise its perceived benefits. He identified several necessary elements for an effective implementation. Firstly, training of personnel is required. Training personnel enhances the adoption rate of the new ECMS, thereby increasing the likelihood of successful implementation. Furthermore, post-implementation reviews are perceived as a necessity. Evaluating the performance of the new ECMS to identify potential areas for improvement is essential to ensure that the user's requirements are met.

### 3.3.3 Scoring different ECMS

To select the most appropriate ECMS, various systems must be evaluated against a set of requirements that reflect users' needs. These predefined requirements are outlined in Table 3 and discussed in

Section 2.2. In this section, several widely used ECMS are examined and assessed based on these criteria. Following this assessment, the most suitable ECMS is selected for design and implementation. The candidates for examination in this research were chosen based on their widespread adoption, features and variety of use case. Subsequently, a more in-depth analysis was conducted to score each ECMS. After this analysis, four commonly used ECMS emerged as suitable options for managing market intelligence. These systems are:

- I. DocuWare
- II. SharePoint
- III. M-files
- IV. Laserfiche

Table 5 presents the results of evaluating these four ECMS based on the predefined requirements. Given that these ECMS exhibit similar functionalities, their scores are nearly identical. Consequently, a clear selection cannot be made solely based on the findings outlined in Table 5. To progress with the selection process, a meeting with the company supervisor was arranged to discuss the four potential ECMS in detail. Section 3.3.4 explains the rationale behind selecting Microsoft SharePoint as the preferred ECMS, detailing its tool and capabilities.

Table 5: Scorecard with the examined candidate ECMS.

Requirement	DocuWare	Microsoft SharePoint	M-files	Laserfiche
Centralisation	Yes	Yes	Yes	Yes
Security	High	High	High	High
User-friendly	Yes	Yes	Yes	Yes
Search functionalities	Advanced	Advanced	Metadata-driven, Advanced	Advanced
Accessibility	Cloud and on-premises	Cloud and on-premises	Cloud and on-premises	Cloud and on-premises
Logical archiving	Yes	Yes	Yes	Yes
Integration with Power BI	Limited	Yes	Yes	Yes
Integration with Pulse	Yes	Yes	Yes	Yes

### 3.3.4 Microsoft SharePoint

Microsoft SharePoint was selected as the most suitable system after discussing the four candidate ECMS with the company supervisor. This decision was based on additional benefits provided by Microsoft SharePoint, beyond the outlined functionalities in Table 5. Three primary advantages led to the selection of SharePoint:

- I. Microsoft applications, including SharePoint, are already employed within Company X. Consequently, all personnel have access to these applications. SharePoint is currently used as an ECMS in several Company X departments. Section 2.1.3 examines the current information storage status and concludes that an excessive number of ECMS are in use, emphasising the absence of a centralised ECMS. Jones (2012) argued that the effectiveness of an implemented ECMS depends on the training provided to enhance user adaptiveness. However, since SharePoint is already familiar among Company X's personnel, they will perceive SharePoint as rather intuitive compared to the other

candidate ECMS options, thereby requiring less additional training. Consequently, the implementation of SharePoint as the ECMS does not necessitate extensive additional training to be successful, thereby reducing requisite financial resource allocation.

- II. Next, SharePoint's seamless integration with other Microsoft products, including Power BI, allows for enhanced cooperation and future developments of the new ECMS, as discussed in Chapter 7. These integrations potentially offer significant opportunities for improving information management processes.
- III. Given that Company X already holds Microsoft 365 licenses, the procurement of additional software, which would be required when opting for one of the other candidate ECMS, becomes unnecessary. This significantly saves financial resources, as enterprise-wide licences for ECMS are typically expensive. Additionally, maintenance and support are simplified with the selection of Microsoft SharePoint.

In summary, familiarity, integration potential and reduced costs, in addition to the outlined functionalities in Table 5 led to the selection of Microsoft SharePoint as the most suitable ECMS.

### 3.3.5 Conclusion

Sections 3.2 and 3.3 transition from discussing the general knowledge management theory to selecting a specific enterprise-wide content management system. These sections delve into the knowledge management theory and its role in modern organisational strategy. Subsequently, enterprise-wide knowledge management systems are examined, leading to the selection of enterprise-wide content management systems as the most appropriate version of information systems for this research. The significance of ECMS is discussed, focussing on its functionalities to enhance organisational performance and knowledge dissemination.

Ultimately, Microsoft SharePoint is selected as the suitable ECMS for Company X due to its integration potential with present Microsoft applications, user familiarity and cost-efficiency. This decision reflects the predefined requirements outlined in Table 3, ensuring that the user's needs are aligned with the system's capabilities.

In summary, Sections 3.2 and 3.3 examined and answered the third research question.

*“Which existing information management system exhibits requisite functionalities and operational demands of Company X's personnel for managing market intelligence effectively?”*

## 3.4 ECMS design methodologies and strategies

This section addresses the primary functional components that an ECMS should exhibit, along with the design and architecture of an ECMS. As outlined in Section 3.3, an ECM system facilitates the capture, storage, retrieval and distribution of both structured and unstructured information (Laudon, 2014). Sections 3.2 and 3.3 also identified the operational benefits including saving costs, improving search and retrieval of crucial information and enhancing decision-making capabilities. However, to ensure optimal utilisation of such a system among Company X's personnel several important considerations should be addressed before the implementation phase initiates. These considerations include clearly identifying users' needs and data types (Hullavarad et al., 2015). User needs have been identified in Chapter 2 and data types are elaborated upon in section 3.4.2. First, the general architecture of enterprise content management systems is examined.

### 3.4.1 General ECMS architecture

ECMS typically consists of four primary components (Hullavarad et al., 2015). A schematic view of a generic ECMS architecture is illustrated in Figure 11. The first component is the user interface. Through the user interface, digital information, either structured or unstructured is uploaded into the ECMS. Next, an information governance module is activated. Incoming information is designated as an official record, allowing specific retention rules to be assigned. These rules ensure that the system automatically deletes records after their retention period, ensuring regulatory compliance. Component three involves various ECMS solutions, including intelligent data archiving. A systematic approach is implemented by archiving and retrieving the information using select keywords. Additionally, this component facilitates workflows. Workflows are an automated process where information flows through various stages based on per-configured logic. The fourth component involves the repository. An ECMS should offer a secure method for storing information and allow for on-demand access. Typically, the repository is cloud-based.

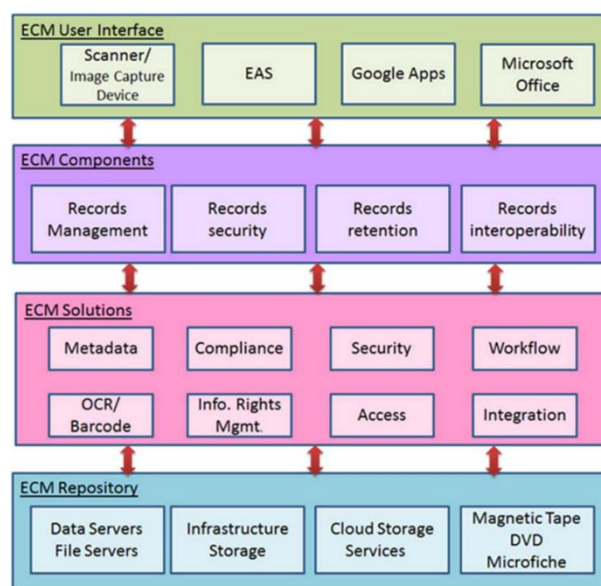


Figure 11: Generic ECMS architecture (Hullavarad et al., 2015).

In the context of designing the ECMS for Company X, certain components of the generic ECMS architecture, as depicted in Figure 11, are prioritised over others. Based on the identified user needs, outlined in Table 3, and considering the aim of the ECMS, the following considerations have been made.

The first module involving the user interface plays a crucial role in shaping the ECMS for Company X. A structured and intuitive user interface ensures improved user-friendliness and enhanced user adoption rates. Therefore, this component is considered significant and is elaborated upon in Chapter 4.

The next component of the generic ECMS architecture involves record management. This component ensures regulatory compliance. However, the Company X management should define the organisational policies and regulatory requirements, which is beyond the scope of this research.

The third component of the generic ECMS plays a crucial role in designing the new ECMS system, particularly data classification, which is elaborated upon in Section 3.4.2. Data classification enhances user-friendliness and accessibility by facilitating the efficient access and retrieval of information. This process supports robust search functionalities and logical archiving through using keywords.

The fourth component of the generic ECMS involves the ECMS repository. This component is essential as it facilitates the centralisation of knowledge. Since this component is automatically integrated into Microsoft SharePoint using cloud storage services, it is beyond the scope of this research.

Figure 12 illustrates the distinct phases involved in establishing an ECMS. Within the development

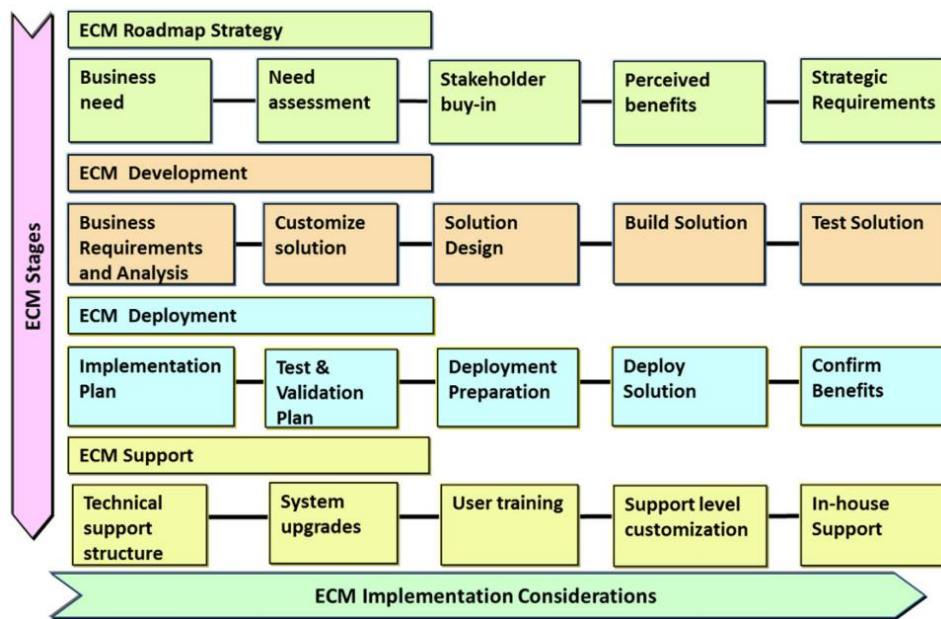


Figure 12: Various phases of ECMS establishment (Hullavarad et al., 2015).

phase, various generic requirements should be considered, in addition to the necessities outlined in Table 3. A primary requirement involves that the system should encompass automated processes This eliminates inconsistency associated with manual processes (Hullavarad et al., 2015). This requirement, along with its application for Company X, is further examined in Chapter 4.

### 3.4.2 Metadata-based classification

Data classification is essential to facilitate efficient access and retrieval of information. Specifically, metadata significantly impacts the capability of ECMS to access and retrieve content (Poppe et al., 2008). Furthermore, it enhances data security while reducing data loss (Tankard, 2015). Figure 13

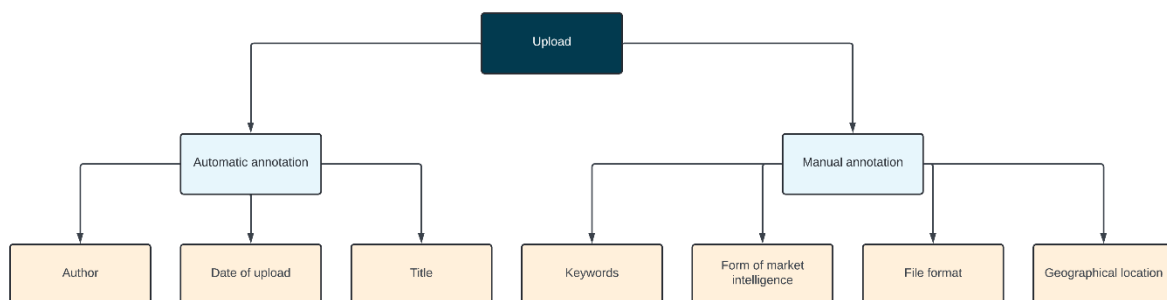


Figure 13: Metadata-based classification scheme.

depicts a scheme of the metadata-based classification system that will be used to store market intelligence in the ECMS. The metadata is separated into automatic annotation and manual annotation. The user is not required to provide the metadata that is automatically annotated to the corresponding file. However, the user must input the other metadata. The decision to incorporate automatic metadata annotation stems from the necessity to eliminate inconsistencies associated with manual processes. This concept is elaborated upon in Chapter 4. The set of requisite metadata variables was selected during a meeting with the company supervisor.

### 3.4.3 MAU structural model

The MAU structural model can be utilised to assess design choices involving certain usability principles on the overall usability of an application (Putra et al., 2022). The framework, visualised in Figure 14,



was developed based on Apple’s user experience guidelines, recognising Apple’s success is often associated with its user-friendly design. This framework therefore provides a good indication of the degree to which an application is user-friendly. Table 3 shows that user-friendliness is the most mentioned requirement of the new market intelligence management system. Therefore, Chapter 4 employs the MAU structural framework to justify design decisions related to the usability and user-friendliness of the system.

The structural model consists of three distinct levels. The first-order construct covers more specified

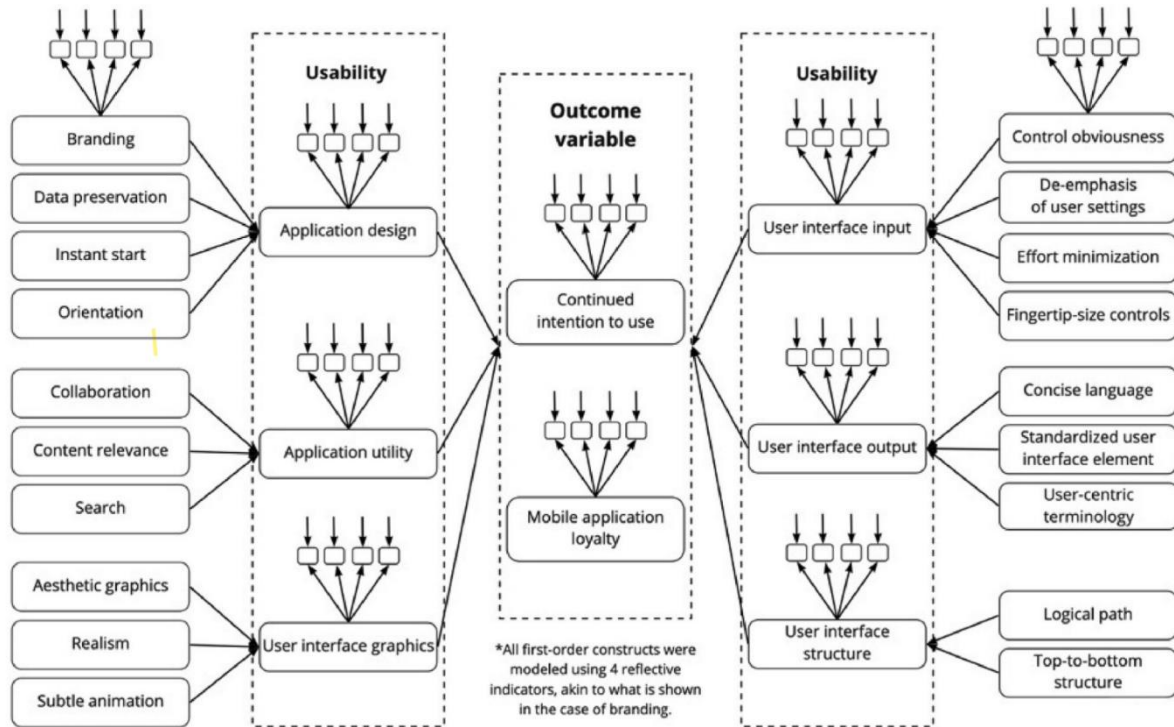


Figure 14: The MAU structural model (Putra et al., 2022).

usability factors. The second-order construct involves more general usability factors. The third-order construct contains the outcome variables.

### 3.4.4 Conclusion

Section 3.4 examines the essential requirements and design considerations for an Enterprise Content Management System. It outlines the general architecture of an ECMS and discusses the four primary corresponding components. These components include the user interface, information governance, various ECMS solutions and the repository. For Company X, certain components are prioritised over others based on alignment with user needs. Chapter 4 elaborates upon the design of a structured interface and utilises the metadata-based classification scheme to enhance structured search functionalities. Additionally, Section 3.4 introduced the MAU structural model, used in Chapter 4 to justify design decisions related to usability and user-friendliness.

In conclusion, Section 3.4 applies the generic ECMS architecture to Company X, focusing on user interface design, record management and data classification answering the fourth research question.

*“What design methodologies and strategies, described in scholarly literature, can be employed to design a centralised market intelligence management system fulfilling the requirements of Company X’s personnel?”*

## 4 Enterprise content management system design

This chapter is dedicated to the design of the market intelligence management system. It utilises the methodologies discussed in Chapter 3 to develop a new market intelligence management system that exhibits the required functionalities by Company X's employees. This chapter aims to create a new market intelligence management system that receives higher satisfaction scores compared to the satisfaction scores discussed in Section 2.1.6. Chapter 3 elaborates on the rationale for selecting Microsoft SharePoint as ECMS and examines various design strategies. The four components of the generic ECMS architecture, illustrated in Figure 11, are used as a guideline throughout this chapter to develop the system's requirements. Component one, the ECM user interface, and component three, the ECM solutions, are prioritised over the other two components and are examined in more detail as these require the most design considerations. Additionally, Figure 10 in Chapter 3 is used to create a schematic ECMS for Company X. Furthermore, Figure 12 in Chapter 3 is used to create a roadmap specific to Company X. Finally, the MAU model introduced in Chapter 3 is employed to justify design choices aimed at increasing the usability and user-friendliness of the market intelligence management system. These methodologies are used to develop the new market intelligence management system throughout Chapter 4

### 4.1 Market intelligence management system roadmap

Based on the ECMS roadmap shown in Figure 12, a roadmap specific to Company X can be established. By combining the roadmap in Figure 12 and the steps of the problem-solving approach outlined in Figure 4, the roadmap depicted in Figure 15 is created. The roadmap illustrates the phases required to establish a market intelligence management system within an organisation. Each phase has its corresponding considerations. Phases 1 and 2 of the problem-solving approach shown in Figure 4 have been merged into the first phase of the market intelligence management system roadmap in Figure 15. This consolidation is due to the overlapping considerations in these two phases, which can be

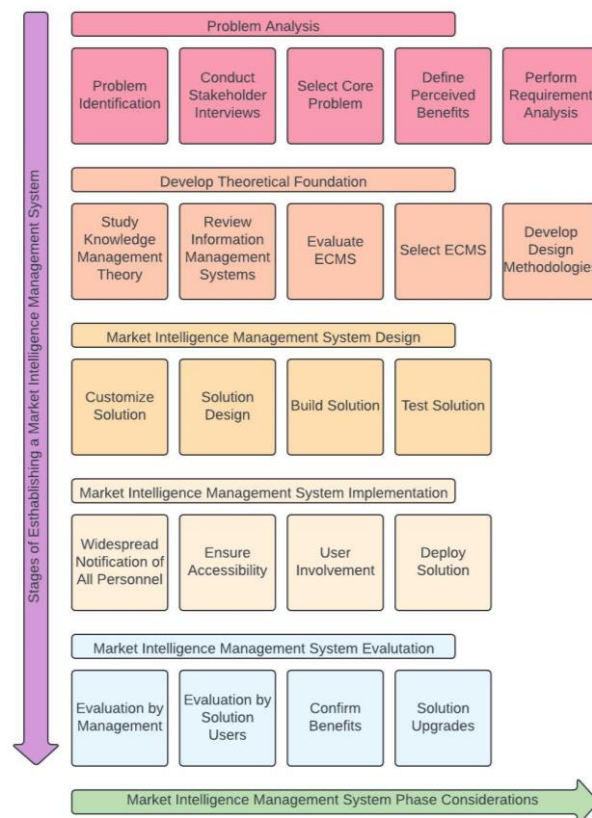


Figure 15: Market intelligence management system roadmap.

addressed within a single phase. The problem analysis phase corresponds to Chapters 1 and 2 of this report, while the develop theoretical foundation phase is discussed in Chapter 3. The market intelligence management system design is addressed in Chapter 4, the market intelligence management system implementation corresponds to Chapter 5 and the system evaluation is covered in Chapter 6.

#### 4.2 Market intelligence management system architecture

The architecture used to design the SharePoint ECMS is illustrated in Figure 16. It is a variation of the architecture outlined in Figure 11 and consists of three primary components. These components

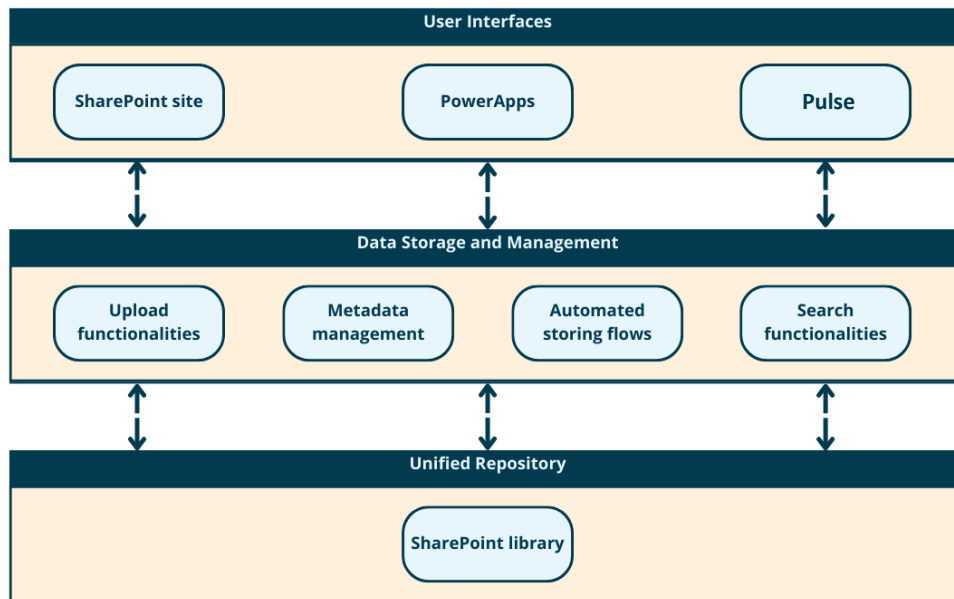


Figure 16: System architecture of the market intelligence management system.

include the user interfaces, data storage and management solutions and a unified repository. The arrows between the components represent the flow of data. This data involves market intelligence and can exist in various forms as discussed in Chapter 2. When data is uploaded through an interface, data storage and management solutions are activated to store the data in the unified repository. Conversely, data can be retrieved from the repository using the data storage and management solution, which are accessed through the user interfaces. Each component and its corresponding elements in the architecture are discussed in Chapter 4.

Figure 17 provides a schematic representation of the market intelligence system based on Figure 10. It outlines the components of Figure 16 involving the user interfaces that the user will encounter. Furthermore, it shows which data storage and management solutions are used when market intelligence data is uploaded or retrieved. It also indicates that the data is stored in a unified repository containing all categories of market intelligence. Finally, the different data formats are specified in the Figure. Sections 4.3 to 4.5 discuss the design of the user interfaces and explain the data management solutions in detail.

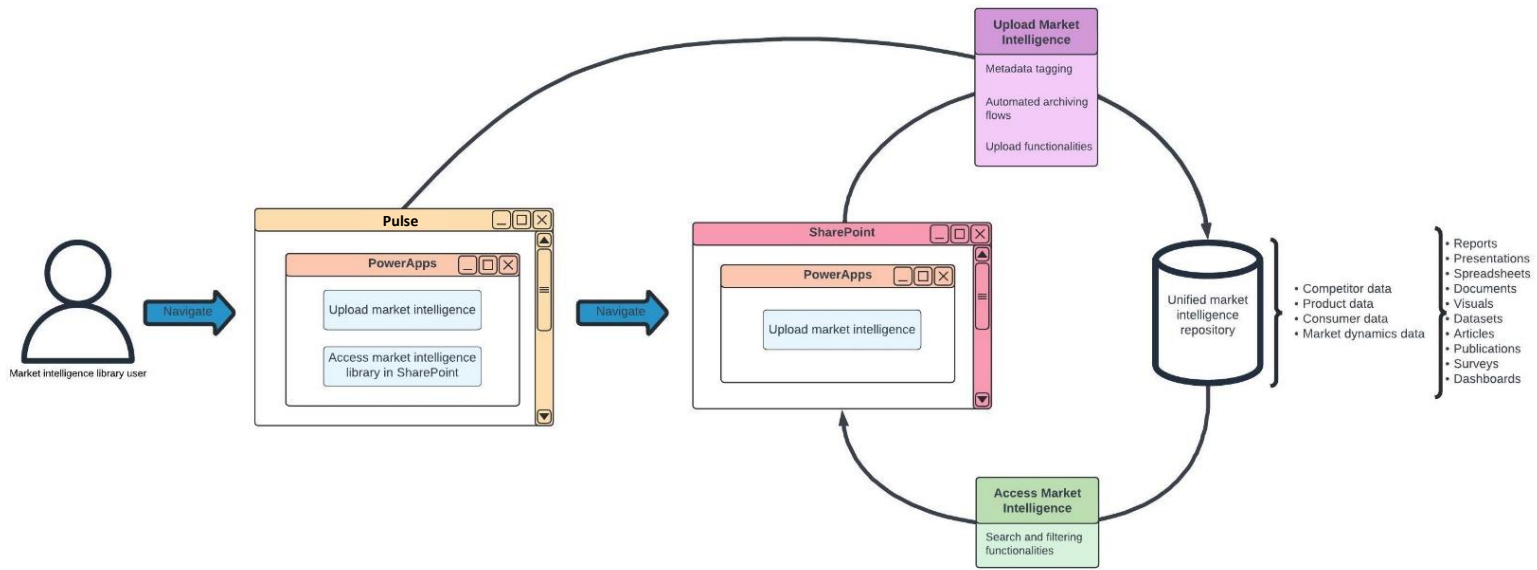


Figure 17: Schematic representation of the market intelligence management system.

### 4.3 User interfaces

Within the ECMS, there are six distinct user interfaces: one in Pulse, two in SharePoint and three in PowerApps. To consider an interface usable, it must exhibit user-friendly and intuitive elements. Additionally, the interfaces should function such that all user requirements are fulfilled. This ensures users can effectively interact with the ECMS, enhancing user satisfaction and adoption rates. Sections 4.2.1 – 4.2.4 are dedicated to elaborating upon the initial outline of each user interface. The official name of the market intelligence management system is designated as the “Market Intelligence Library”.

#### 4.2.1 Pulse interface

The initial interface users will encounter when entering the market intelligence management environment is Pulse. As discussed in Section 3.1, Pulse is the new intranet designed to centralise various applications. When users enter the Pulse environment and navigate to the “Market Intelligence Library” page they should be provided with several functionalities, as outlined in Table 6. The first functionality involves a description of the library which elaborates upon the purpose, benefits and various functionalities of the market intelligence system. Additionally, the Pulse interface contains a user guide, offering clear instructions on how to effectively utilise the library.

Next, the information storage functionality is included in Pulse. Due to the limited development capabilities of Pulse, Microsoft SharePoint cannot be directly embedded. However, centralisation remains essential. Therefore, a PowerApps application is developed, facilitating efficient uploading of files from the Pulse environment into the SharePoint environment. This integration allows users to add documents to the market intelligence library while remaining within Pulse. The rationale for choosing PowerApps and its requisite functionalities is discussed in Section 4.2.3.

Table 6: Requisite functionalities of the Pulse user interface.

Pulse Functionalities
Description of the market intelligence library.
Market intelligence library user guide.
Facilitate market intelligence data storage.
Facilitate access to the market intelligence library.

Pulse must also facilitate access to the document stored in the library. Direct integration of a SharePoint document library in Pulse is not feasible. Therefore, a direct link is embedded in the PowerApps interface within Pulse, redirecting users to the Microsoft SharePoint environment.

Figure 18 in [Appendix B1](#) visualises the initial outline of Pulse's interfaces including the different components and their optimal placement. This layout is used as a guideline during the design phase of the market intelligence library. Components related to navigation, account information, and the functionality to write comments are automatically provided by Pulse.

#### 4.2.2 SharePoint interfaces

The SharePoint site comprises two distinct interfaces, each serving a specific purpose in managing market intelligence. The first interface appears when the SharePoint environment is entered, either directly or via Pulse. This interface primarily facilitates the storage of market intelligence in a unified repository and provides access to archived files through filtering functionalities. By keeping all files at the same level without employing a folder hierarchy, this interface facilitates effective filtering, enabling users to locate and retrieve market intelligence efficiently.

The second user interface is designed for structured access to market intelligence. In this interface, information is organised using a folder hierarchy, which supports the logical storage of documents. However, the use of a folder hierarchy limits filtering functionalities. SharePoint's filters are only applied to the files displayed in the current folder view, excluding those in subfolders. To resolve this limitation and ensure comprehensive filtering is facilitated, the first interface omits the folder hierarchy, maintaining all files at a single level. A more detailed elaboration on these limitations is provided in Section 4.4, where these interfaces are designed.

The initial outline of the first SharePoint interface is visualised in Figure 19 in [Appendix B1](#).

Figure 19 primarily outlines three components that enhance the functionality and usability of the SharePoint interface. The first component involves the integration of PowerApps into SharePoint. This integration is crucial because it facilitates advanced upload functionalities. Using PowerApps as the upload mechanism obligates users to insert metadata, which is beneficial for maintaining a structured repository. Metadata variables, selected in the metadata classification scheme visualised in Figure 13, enable effective filtering and organisation of documents. A more detailed discussion of this process and the selected metadata variables is provided in Section 4.3.1.

The second component is the SharePoint document library, which serves as the central repository for market intelligence documents. This library is identical to the library in the second SharePoint interface. However, in this interface, a custom view is applied that hides the folders, presenting the files to the user as if they are on the same level. Despite this flat presentation, the files are still uploaded within the same folder hierarchy as used in the second interface. This design choice facilitates effective filtering using metadata variables while maintaining the underlying folder structure. This approach ensures that users can easily find and access documents while preserving organisational integrity.

The third component involves market intelligence events. This section allows the market intelligence team to add upcoming events, such as webinars and meetings about market intelligence. These events can be added by the market intelligence team of Company X. Including these events fosters an enhanced knowledge management culture by keeping users informed about relevant opportunities and promoting continuous professional development within the organisation. The design and functionality of this first SharePoint interface are further examined in Section 4.3.2.

The second SharePoint user interface is visualised in Figure 20 in [Appendix B1](#). This interface primarily features a single component: the SharePoint document library. This library is designed to systematically organise and provide structured access to market intelligence stored in the repository. Unlike the first SharePoint interface, this version employs a folder hierarchy to enhance structured data management.

This hierarchical structure facilitates structured navigation and retrieval. The primary target group for this interface is the market intelligence team at Company X. This team can utilise the interface to efficiently overview all files stored within a specific year or categorised under a specific type of market intelligence. These categorisations allow for quick exportation of all files exhibiting identical metadata values, eliminating the need for manual selection.

Files uploaded to the market intelligence library are automatically stored in the appropriate folder using Power Automate. This automation is part of the logical archiving requirement and ensures that each document is accurately organised based on its metadata. By leveraging Power Automate, inconsistencies associated with manual processes are eliminated. The design of the SharePoint interfaces, the selection of the folder hierarchy, and the development of the Power Automate process are addressed in Section 4.3.3.

#### 4.2.3 PowerApps interfaces

The PowerApps application is designed to require users to insert metadata when uploading files, a function crucial for effective data management that is not inherently available in SharePoint. By categorising files with metadata, users can utilise filters for searching and ensure accurate archiving within their corresponding folders.

The PowerApps application consists of three distinct interfaces, visualised in Figures 21, 22 and 23 in [Appendix B1](#) respectively. The first interface facilitates the decision to upload a file or access the market intelligence library. This interface is integrated into Pulse, hence the necessity for a direct link to the market intelligence library. Clicking this link navigates the user to the first SharePoint interface, as illustrated in Figure 18. The user can click the “Upload File” button to upload a file to the market intelligence repository, which navigates them to the second interface of PowerApps.

This second interface allows the user to attach files stored in both on-premises and cloud locations. Once a file is attached, the user is prompted to insert the corresponding metadata. The specifics of the metadata fields are discussed in greater detail in Section 4.3.4.

Upon entering the required metadata and clicking the upload button, the file is submitted to the market intelligence repository. Once the upload process is completed successfully, the user is redirected to the third interface, which confirms the successful upload. This interface provides the options to either upload another file or access the library.

This three-step process ensures that all uploaded files are systematically categorised and stored, enhancing the retrievability and reliability of information, while maintaining the process user-friendly. Overall, these interfaces collectively ensure that the process of uploading and retrieving files is streamlined and effective, thereby fostering enhanced knowledge management and data-driven decision-making within Company X. Section 4.3 examines the design of the six distinct interfaces.


Logo	Navigation Row	Account
Navigation Column	<b>Title - "Market Intelligence Library"</b>	
	Description of market intelligence library <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	
	User guide for market intelligence library <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	
	PowerApps integration  <div style="text-align: center;"> <div style="background-color: black; color: white; padding: 2px 10px; display: inline-block; margin-bottom: 10px;">Upload File</div> <div style="background-color: black; color: white; padding: 2px 10px; display: inline-block;">Access Market Intelligence Library</div> </div>	
	 Write a comment...	
About information		

Figure 18: The initial outline of the Pulse interface.

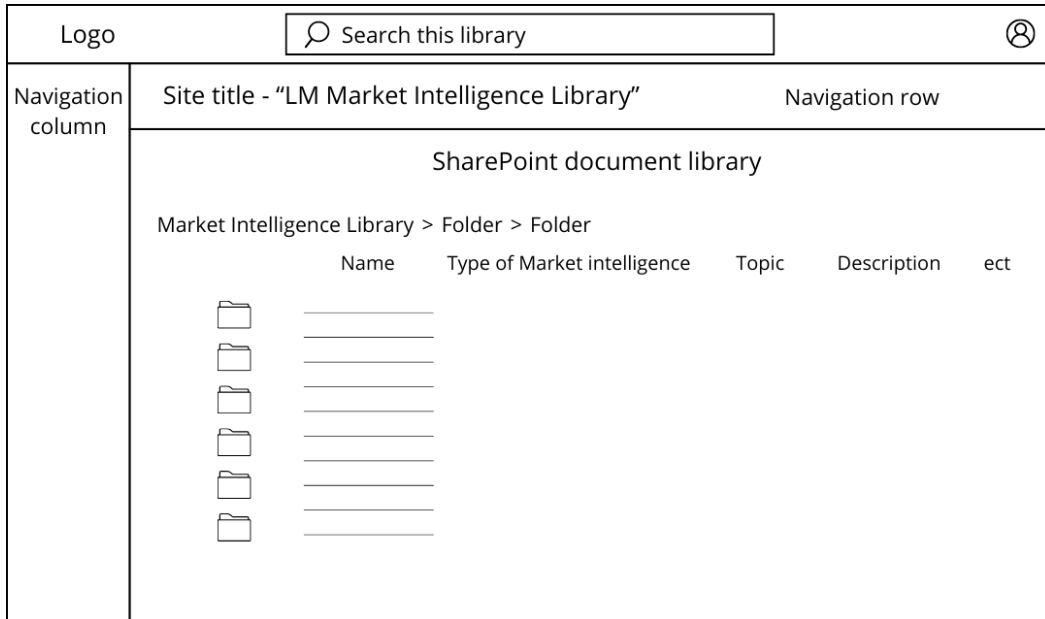


Figure 20: The initial outline of the second SharePoint interface.

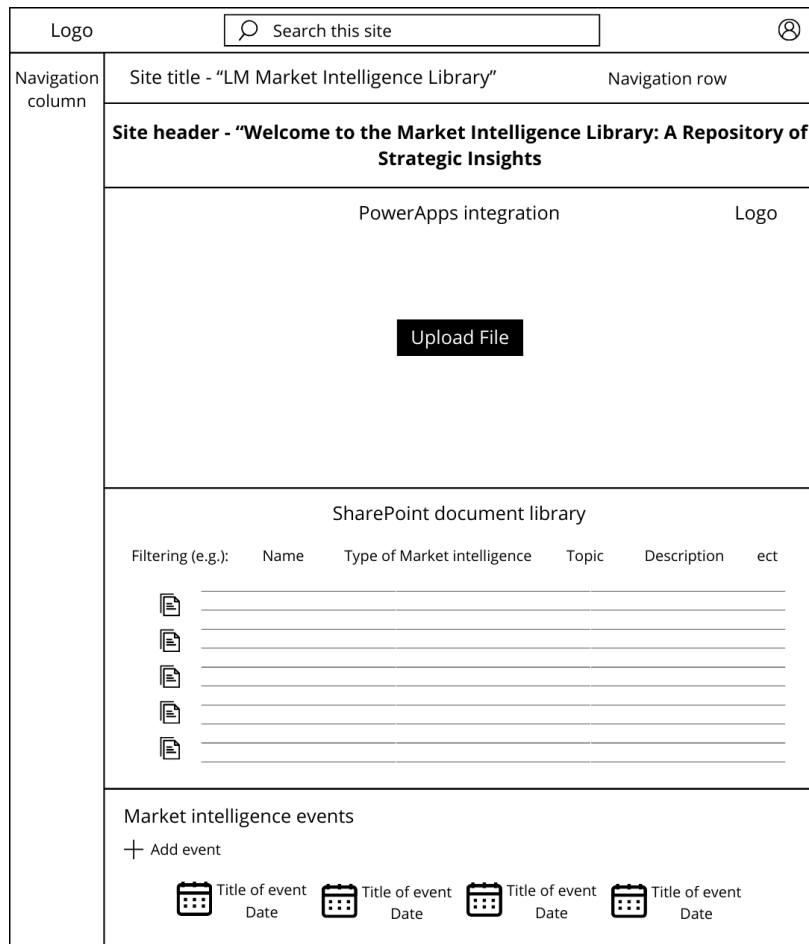


Figure 19: The initial outline of the first interface in SharePoint.





Figure 21: The initial outline of the first interface in PowerApps.

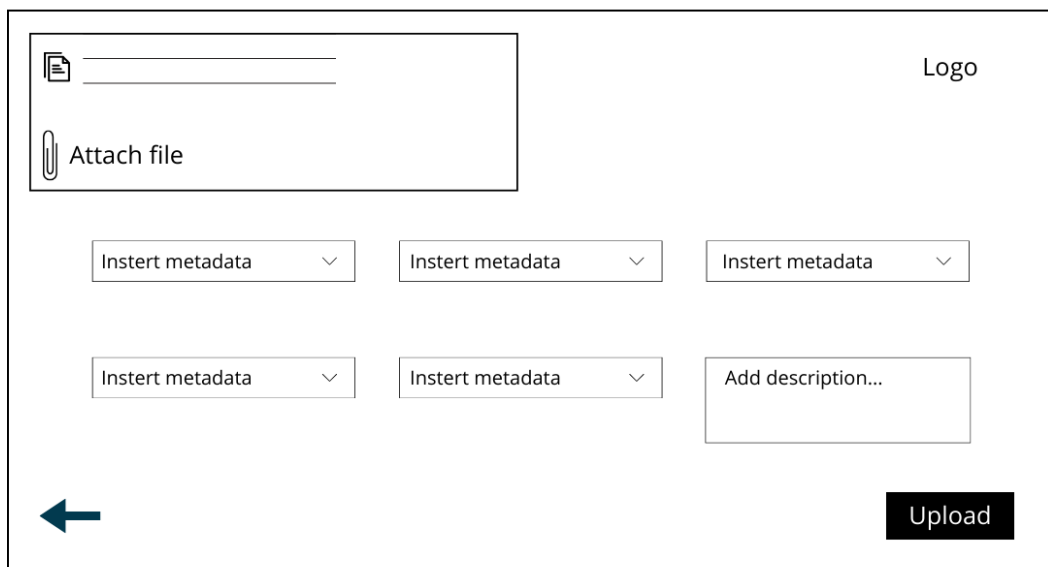


Figure 23: The initial outline of the second interface in PowerApps.



Figure 22: The initial outline of the third interface in PowerApps.

### 4.3 PowerApps design

In this section, the overall design, and various functionalities of the PowerApps application are explained. The application aims to enhance the efficiency of the storing process within a content management system as discussed in Section 3.2.1. Several considerations must be made during this design process to develop a successful application that includes all user needs. These considerations are outlined in Table 7, established using the insights gathered from the previous chapters. Figures 24, 25 and 26 represent the complete designs of the three interfaces of the PowerApps application respectively. While explaining the various functionalities, the MAU structural model is applied to motivate certain design decisions concerning user experience.

Table 7: Requisite functionalities of PowerApps.

PowerApps functionalities
Facilitate centralisation
Optimal user-friendliness
Facilitate upload functionalities
Facilitate integration with Pulse

#### 4.3.1 Centralisation and integration with Pulse

The first requirement is centralisation. The purpose of the market intelligence library is to store all information in a single, accessible repository. Developing an additional application serving as the upload mechanism risks decentralisation of the system. Moreover, if the application is not integrated into the repository's interface, users must open an additional application to upload files. This is inconvenient and contrary to the user's need to minimise the number of applications. Therefore, it is crucial to integrate the PowerApps application into both SharePoint and Pulse. The methodology for achieving this integration is discussed in section 4.4.

#### 4.3.2 User experience

The application must be user-friendly to optimise user experience and adoption rates. Putra et al. (2022) suggested that the usability of an application is essential for enhancing the user experience. Usability deficiencies are seen as a significant factor influencing customer rejection rates of applications. The positive relation between usability and continued intention to use an application emphasises the necessity of developing a user-friendly application. This section evaluates the user experience of the application based on its usability.

In the context of applications, usability is defined as the extent to which users can achieve specific goals with effectiveness, efficiency and satisfaction (Putra et al., 2022). Usability involves making an application intuitive and easy to navigate, thereby reducing the learning curve and need for additional training.

The MAU structural model, introduced in Chapter 3, can be utilised to evaluate an application's usability. This framework, illustrated in Figure 14, outlines the features needed to enhance the usability of an application and subsequently the user experience. This framework is based on Apple's user experience guidelines, which are often credited for their user-friendly interfaces.

The MAU model posits three levels:

- I. The first-order construct which covers more specified usability factors.
- II. The second-order construct which covers more general usability factors.
- III. The third-order construct which contains the outcome variables.

The second-order construct involving the application design refers to the degree to which users perceive that a feature within a mobile application is effectively designed to support its main objective.

Several factors can be used to assess whether an application is effectively designed to support its main utility. These factors include branding, data preservation, instant start and orientation as outlined in Figure 14.

Branding positively influences users' satisfaction with the overall design, enhancing recognition, trust and credibility. This justifies the placement of a subtle Company X logo in the top right corner of the PowerApps interfaces. Consistent logo placement supports intuitive navigation. The logo is placed in the top right corner to avoid obstruction by the "attach file" component in the second user interface, which is crucial for the primary functionality of the application. Since users read from left to right, this component draws their attention first. The elements within the interfaces are filled utilising the original Company X colour palette, ensuring additional brand recognition.

Data preservation involves automatic data saving by the PowerApps application. Requiring users to enter similar data numerous times can lead to frustration and dissatisfaction. In the current design, users need to insert data only once, with the metadata variables being mutually exclusive to prevent overlap. This streamlines data entry and enhances the usability of the application.

Instant start defines the degree to which an application starts immediately, including loading times. The PowerApps application exhibits no delay in starting. When the "Upload File" button is clicked, the user is instantaneously navigated to the second interface. The average loading time for uploading a document varies between 1 to 3 seconds, depending on the file attachment size.

Since PowerApps is a web-based application, orientation is irrelevant as this factor only involves mobile applications.

The second-order construct involving application utility assesses how well an application serves its main purpose. Factors influencing application utility include content relevance, search and collaboration.

Content relevance defines the degree to which the user perceives that the most relevant information is displayed. To enhance user satisfaction, applications must focus on displaying solely relevant content. The PowerApps application minimises additional functionalities and interfaces to display only relevant content. In the first interface integrated into Pulse, the user can navigate to the market intelligence library in SharePoint or upload a file. When accessing the library in SharePoint, the "access market intelligence library" button is removed to avoid redundancy, thereby enhancing content relevance and increasing user adoption rates. The second user interface of PowerApps also solely supports the primary objective of the application, providing only file attachment and metadata functionalities. The third interface confirms the file upload process and, when accessed through Pulse, offers options to upload another file or access the market intelligence library. When already in the library, the option to access is removed.

The search and collaboration determinants to assess the second-order construct involving application utility do not apply to the PowerApps integration. Search refers to the degree to which a user perceives that the application helps to find information and collaboration refers to the functionality to connect with other individuals within the application. Given the application's specific focus on uploading files, these determinants are rendered unnecessary.

The second-order construct involving user interface graphics refers to how effectively the user interface graphics are perceived by its users. Determinants include subtle animations, realism and aesthetic graphics.

The PowerApps design employs two animations. The first animation initiates when the user clicks the "Upload" button in the second interface. Figure 36 in [Appendix D](#) illustrates this animation, which indicates that the uploading process is still ongoing. Once the animation ends, the upload is complete and the user is redirected to the third interface. The second animation involves a hover mode. Figure 38 in [Appendix D4a](#) depicts the hover mode, where a clickable button changes colour as a mouse cursor moves above it. This animation informs the user that an element in the interface is interactive.

Realism defines the degree to which the application implements realistic icons or images. The icons in the PowerApps application, such as an arrow in the second interface and a checkmark in the third interface, are standard in the PowerApps developer's menu and can thus be considered realistic. Including realistic icons enhances the overall user experience by providing familiar visual cues.

Aesthetic graphics assess whether the application displays visually pleasing graphics. Considering the relatively simple purpose of the application, combined with its professional application and objective to maintain content relevance, no extensive graphics are included. The graphics used are standard offerings from PowerApps. However, the selected elements are placed symmetrically to enhance aesthetic appeal. Furthermore, a consistent colour palette is used to improve aesthetics.

The second-order construct involving user interface input defines how easily users can input data into the application. Several determinants impact the interface input, including fingertip-size controls, control obviousness, effort minimisation and the de-emphasis of user settings.

Fingertip-sized controls involve the degree to which controls are fingertip-sized. Although the PowerApps integration involves a web-based version of the application, making fingertip-sizing redundant, it remains essential that controls have an appropriate format. Figure 33 in [Appendix D4a](#) illustrates the integration of the PowerApps application into Pulse. The controls within PowerApps exhibit a similar format as those in Pulse, ensuring design consistency and facilitating efficient user task completion.

Control obviousness defines the degree to which the application employs controls that are immediately apparent and comprehensible. The application should be intuitive, with minimal functions focusing solely on providing relevant content. This design choice enhances the intuitiveness by maintaining an overview and drawing attention to relevant content.

Minimising the effort required to use the application and input data is essential. This can be achieved by implementing drop-down menus, to facilitate decision-making within a predefined set of choices. Drop-down menus reduce the effort needed to insert metadata corresponding to the attached file, as shown in Figure 40. Only the "Description" component in the second interface requires the user to write an appropriate description, allowing users to determine the extent of the description to minimise effort.

User settings do not apply to the PowerApps integration and are considered redundant.

The second-order construct involving user interface output refers to the extent to which contents are presented effectively on an application. The determinants influencing this include user-centric terminology and concise language.

User-centric terminology is utilised, avoiding jargon, to maintain the intuitiveness of the application. While the term "market intelligence" could be considered jargon, Pulse's interface defines this term and elaborates upon the concept of the market intelligence library.

Concise language should be employed to enhance communication. The interfaces use minimal words, and text is written directly to prevent miscommunication. This approach ensures that users can quickly understand and utilise the application without unnecessary complexity.

The second-order construct involving user interface structure refers to the degree to which the application is well-structured. Users are influenced by both a logical path and a top-to-bottom structure.

The top-to-bottom structure refers to the extent to which frequently used content is displayed at the top of the interface. Users intuitively start at the top of a screen and progressively scan downward. Therefore, the core information should be placed at the top. In the first interface, the "Upload File" button is placed above the "Access Market Intelligence Library" button, reflecting the primary purpose of facilitating file uploads. In the second interface, the file attachment element is placed first, followed by the metadata variables input. The third interface prominently displays the confirmation of a successful upload above other elements, reflecting the purpose of the third interface.

Applications need to exhibit logical steps to facilitate the predictiveness of the process. This is achieved by placing the elements in a logical sequence and minimising the complexity of the overall process. Overall, by incorporating the determinants of the MAU structural model in the interfaces, the usability of the PowerApps application is enhanced, directly impacting its user experience.

#### 4.3.3 Upload functionalities

The PowerApps application facilitates file upload functionalities of the market intelligence library. The user starts at the initial interface, where they have the option to either upload a file or access the market intelligence library. Selecting “Upload a file” navigates the user to the second screen, where attachment and metadata forms are reset to ensure empty cells.

On the second screen, the user attaches a file, with the system set to allow only one attachment to ensure structured metadata entry. The maximum attachment size is set to 200MB, though this can be adjusted as needed. The user then inputs metadata that describes the file the user wishes to upload. The “Upload” button remains disabled until all metadata fields are filled and a file is attached. This ensures that all information is provided before uploading. Once enabled, clicking the “Upload” button initiates the uploading process, transferring the file and its metadata to the unified market intelligence repository in SharePoint.

After a successful upload, the user is navigated to the final screen, where they can choose to either upload another file or access the market intelligence library, completing the upload process.

The corresponding technical functionalities of uploading a file are elaborated upon in [Appendix D4b](#). Additionally, the code reflecting the discussed steps is presented accordingly.

#### 4.3.4 Summary

Sections 4.3 to 4.3.4 discuss the design of the PowerApps application. The elements covered in this discussion include the various functionalities of the system and an application of the MAU framework to assess PowerApps’ current usability, aiming to enhance the user experience. Furthermore, the user’s journey throughout the file-uploading process is elaborated upon and presented with the corresponding technical functionalities and code. The evaluation of the PowerApps system is discussed

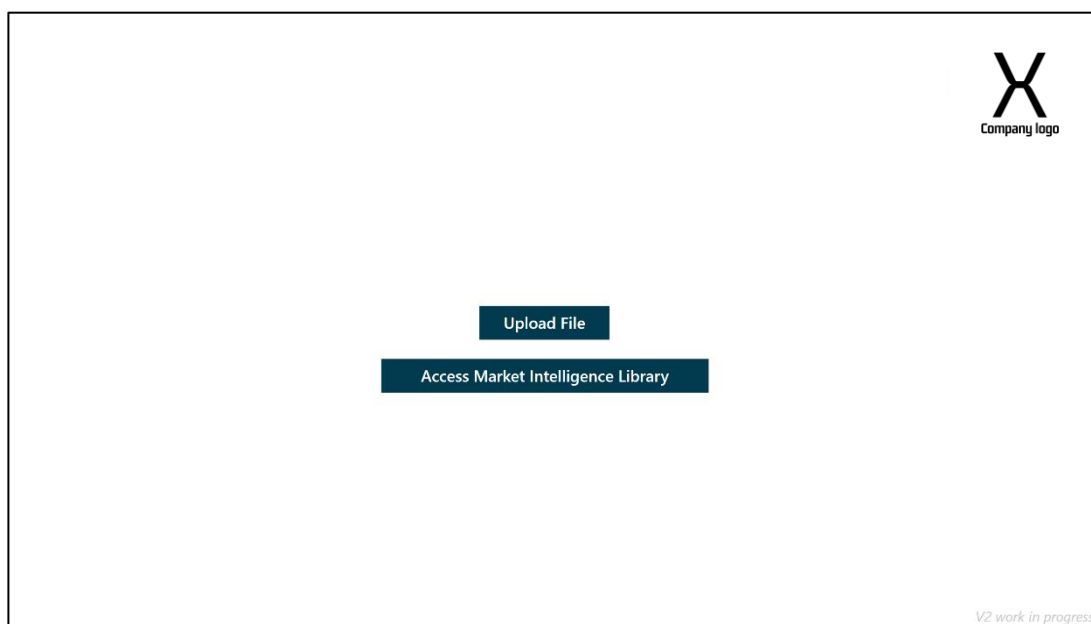


Figure 24: Design of the first PowerApps interface.

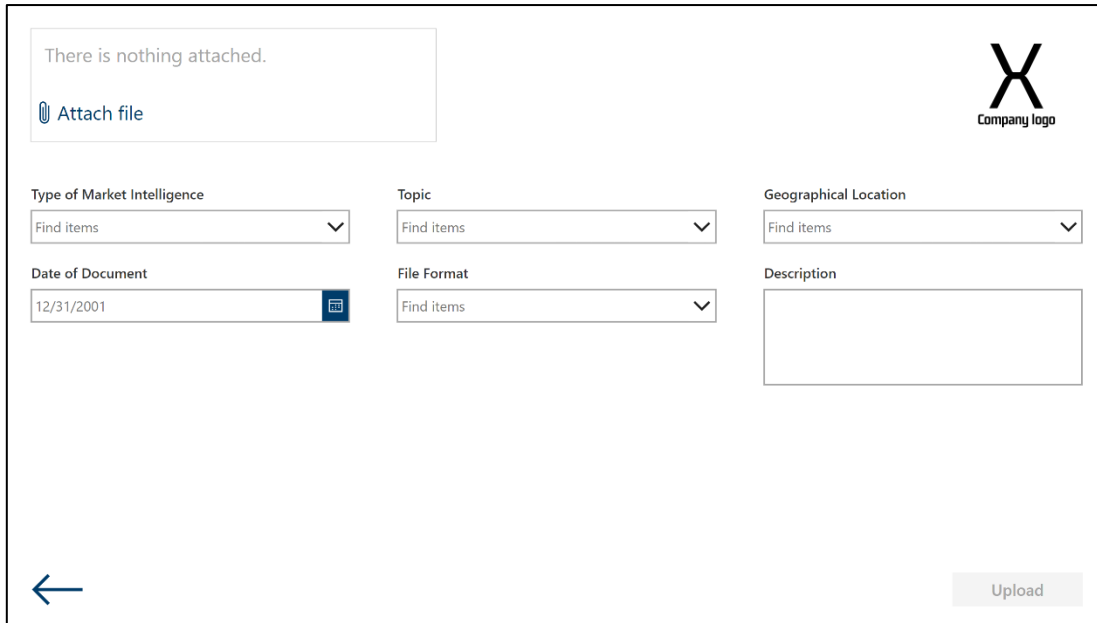


Figure 26: Design of the second PowerApps interface.

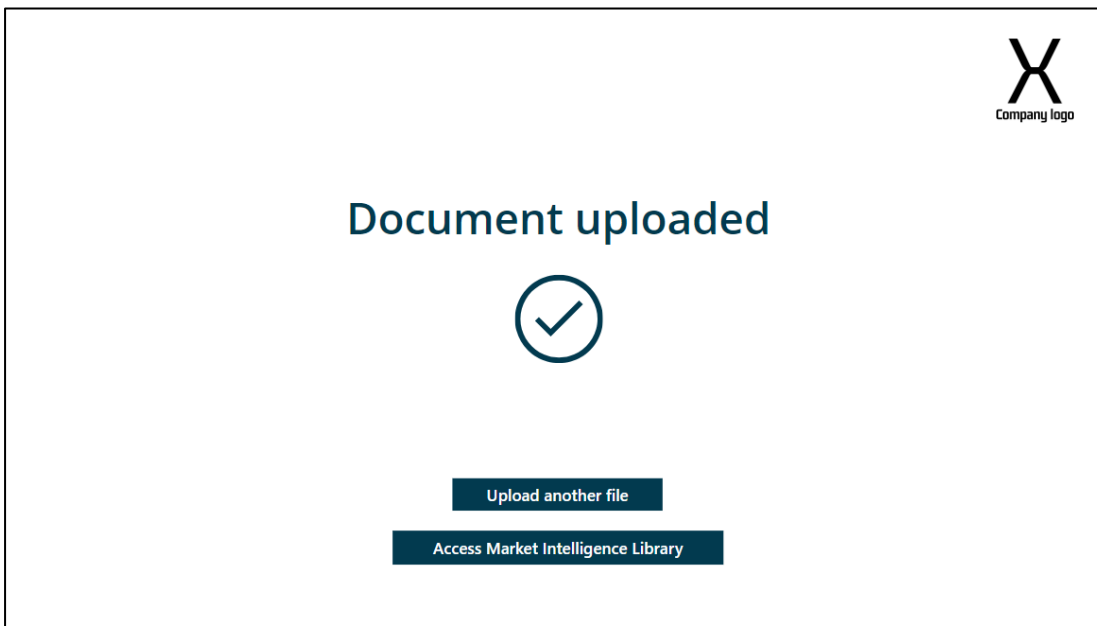


Figure 25: Design of the third PowerApps interface.

in Chapter 7, where further evaluations and adjustments are made. The design of the SharePoint market intelligence library and Pulse environment is discussed in Sections 4.4 and 4.5 respectively.

#### 4.4 SharePoint design

This section elaborates upon the complete design of the market intelligence library in Microsoft SharePoint and explains the system's technical functionalities. The primary objective of the SharePoint site is to facilitate effective retrieval of archived market intelligence. The SharePoint environment forms the core component of the ECMS, acting as the unified repository outlined in Figure 17. The requirements necessary to meet user needs are depicted in Table 8. Figures 27 and 28 represent the designs of both interfaces of the market intelligence library in SharePoint.

Table 8: List of requisite SharePoint functionalities.

SharePoint market intelligence library functionalities
Centralisation
User-friendly
Logical archiving
Accessibility
Security
Search functionalities
Include all forms of market intelligence

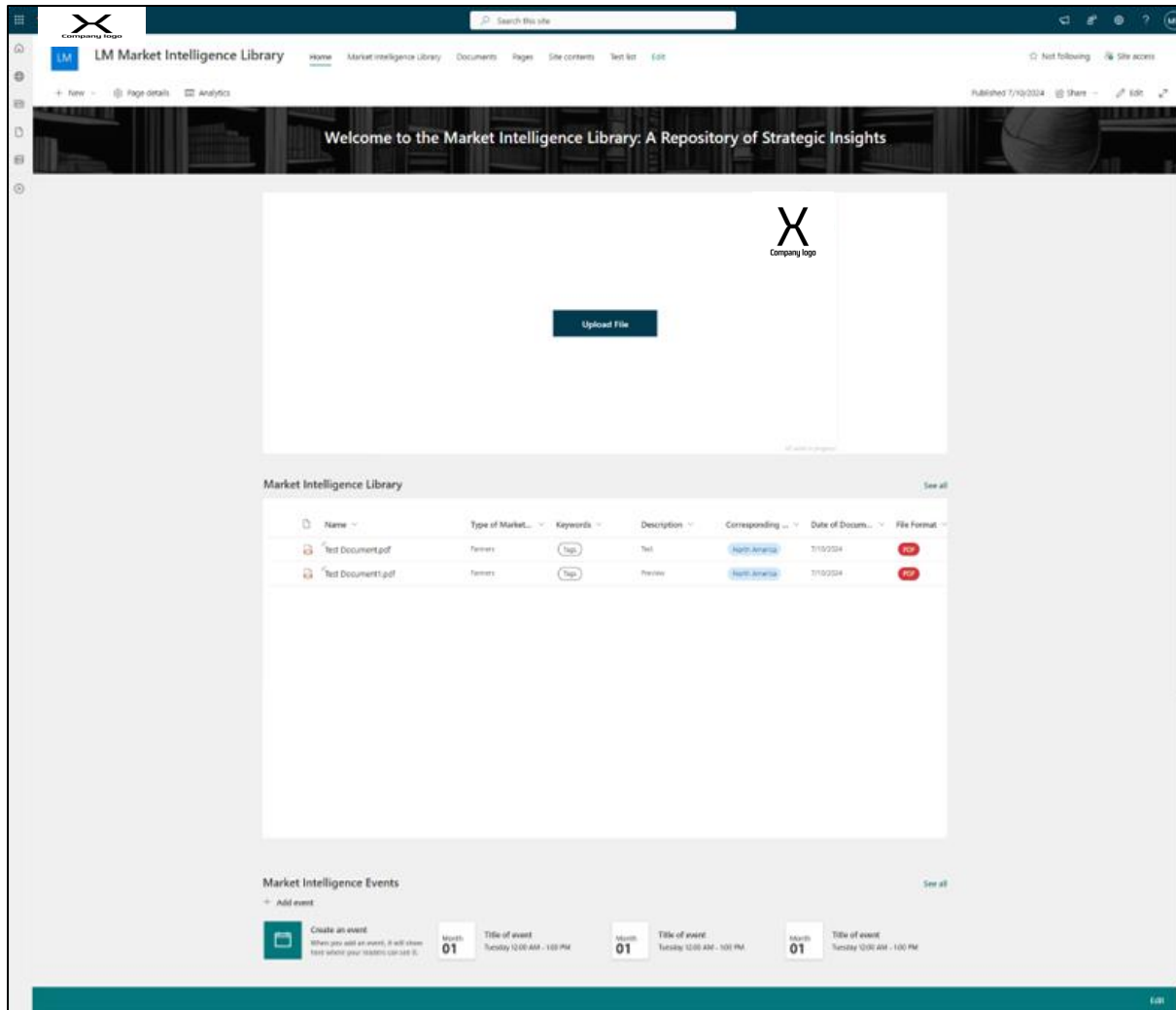


Figure 27: Design of the first interface of the market intelligence library.

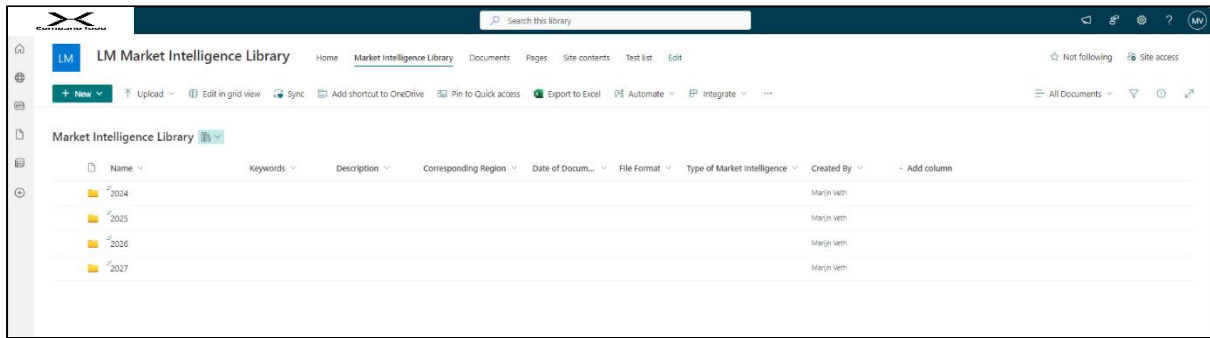


Figure 28: Design of the second interface of the market intelligence library.

#### 4.4.1 Centralisation

In alignment with the PowerApps application, centralisation is a primary requirement of the market intelligence library. The library, accessible through two distinct interfaces, is configured to store documents within a unified repository. This configuration allows users to interact with either interface while accessing the same library, ensuring consistency in document management and retrieval across the interfaces.

#### 4.4.2 User experience

As with the PowerApps application, the MAU framework is applied to justify design decision-making for the market intelligence library concerning application usability. Starting with the second-order construct involving application design.

Regarding branding, the Company X logo is shown in the top left corner of the two interfaces to enhance trust and familiarity. Additionally, the PowerApps integration displays the logo as discussed in Section 4.3.2. Regarding data preservation, users are not required to insert data within the SharePoint environment, since this is only prompted in the PowerApps integration. There are no loading times in the SharePoint environment, ensuring an instant start for the users. The orientation determinant is only relevant for mobile applications and involves ensuring the application is displayed appropriately in landscape mode.

Content relevance is a primary determinant of the second-order construct involving application utility. The first SharePoint interface serves as the landing page, aimed at facilitating file uploads to the repository or accessing stored files. This landing page contains four primary components. These components include a site title; “Welcome to the Market Intelligence Library: A Repository of Strategic Insights”, a PowerApps integration, a document library and an event list. The document library differs from the document library in the second user interface by applying a custom view that excludes folders, enabling metadata-based filtering. Filters in SharePoint cannot find files within subfolders, emphasising the need for a custom view. The event list is designed for the market intelligence team of Company X. The team can add data about upcoming events, including webinars or congresses on market intelligence. Adding these events enhances knowledge management by keeping personnel informed and engaged with the latest developments.

The collaboration determinant is not applied to the market intelligence library. Section 4.4.5 elaborates on why document sharing is deliberately not allowed.

The search determinant plays a crucial role within the library. Implementing effective search functionalities allows personnel to retrieve stored documents effectively and efficiently, enhancing the overall user experience. Three distinct methods within the library facilitate search functionalities to retrieve archived files. The first method involves a filtering mechanism. The document library displayed in Figure 31 with the applied custom view allows for filtering. Additionally, Figure 31 illustrates the filtering system, where personnel can click on the desired column to filter the content according to the



corresponding metadata. The system allows for combinations of filters to be selected facilitating diverse search queries. The second search method involves a search bar, integrated into the second

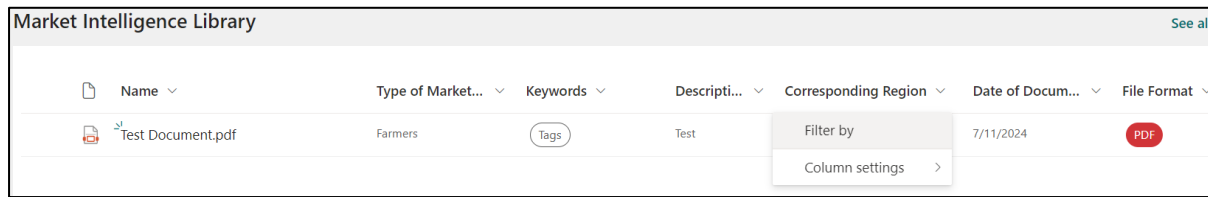


Figure 31: First search method integrated into the first interface of the library.

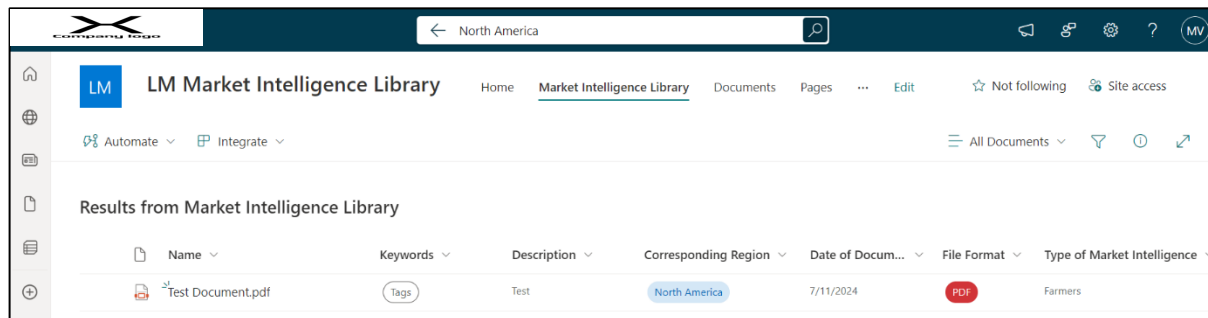


Figure 30: Second search method integrated into the second interface of the library.

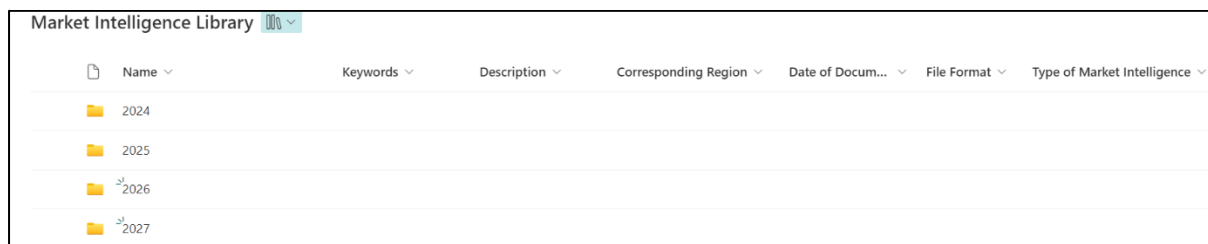


Figure 29: Third search method integrated into the second interface of the library.

user interface of the library, as visualised in Figure 30. The search bar, located at the top of the screen, enables users to search directly for a file name or insert metadata that the file should exhibit. The third search method, visualised in Figure 29, is also integrated into the second user interface and involves a folder hierarchy. This allows users to browse through folders and navigate a preferred route. The current folder hierarchy consists of two layers. The first layer shows the dates on which the files are uploaded and the second layer involves folders corresponding to different types of market intelligence. The archiving system automatically stores files in the correct folder using the corresponding metadata, as elaborated upon in Section 4.4.4.

Regarding user interface graphics determinants, SharePoint does not specifically utilise different animations compared to the PowerApps application. The primary animation SharePoint implements is hover animations, that correspond with the PowerApps hover animations. SharePoint utilises different realistic icons, which enhance recognisability and user experience. The header in Figure 27 represents a schematic image of a library, used to emphasise the title.

Overall, these three distinct search methods enable users to retrieve relevant documents effectively. Users can select the method that best aligns with their needs, whether it is metadata-based filtering, direct searching through the search bar, or browsing through the folder structure.

The control obviousness determinant of the second-order construct involving user interface input does not play a significant role in the SharePoint design, as the placement of certain controls is not customisable. However, to ensure effective system utilisation, a manual of the system is included in the Pulse environment, further elaborated upon in Section 4.5. The determinant involving effort minimisation is essential. The effort to use and navigate through the SharePoint environment must be

minimised. The filtering mechanism, visualised in Figure 31, significantly assists in this context, as it is intuitive. Additionally, aspects such as content minimisation contribute to this effort. The determinants de-emphasis of user settings and fingertip-size controls are redundant for this design due to identical considerations discussed in Section 4.3.2.

Regarding the determinants of the second-order construct involving user interface output, concise language is used and jargon is avoided. The interface of the SharePoint environment exhibits identical structural elements as other SharePoint sites, owing to standardised development tools. This contributes to recognisability and intuitiveness.

Finally, the user interface structure of the market intelligence library exhibits a logical path and has a top-to-bottom structure.

Overall, by incorporating the determinants of the MAU structural model in the interfaces, the usability of the SharePoint environment is enhanced, directly impacting its user experience.

#### 4.4.4 Logical archiving

Logical archiving plays an essential role in ensuring the effectiveness of the market intelligence library. After the ECMS has been integrated, the system must remain structured and usable over time. The metadata tagging system already facilitates the effective retrieval of documents, but there is also a necessity for logical archiving. Over an extended period, it is effective to store files chronologically. Using Power Automate, an automatic document-storing flow is developed to stimulate effort minimisation and remove inconsistencies associated with manual processes... Figure 32 represents a schematic overview of the flow's components.

The flow initiates when SharePoint detects that a user uploads a document. Power Automate retrieves the file properties and collects corresponding metadata. The first condition checks if the file is a document, excluding folders from the flow. If the file appears to be a folder, the flow is terminated. If the file is a document, the second condition checks if the file was created before 01/01/2025. If true, the document is moved to the 2024 folder. If not, the flow checks whether the file was created before

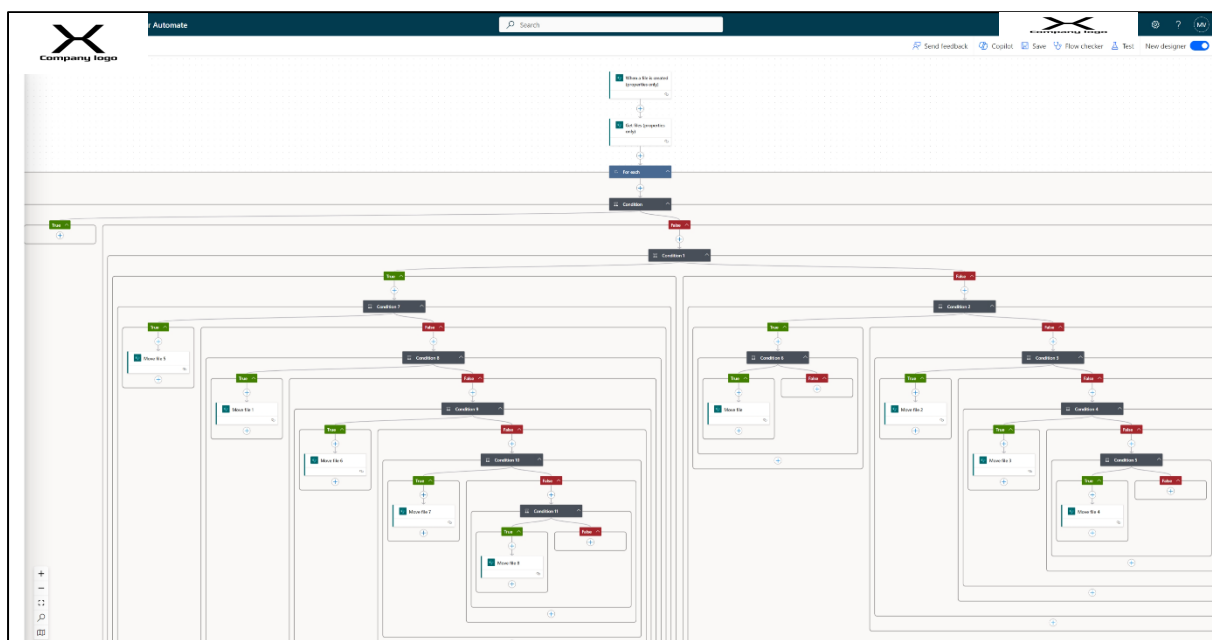


Figure 32: Schematic overview of the Power Automate document-storing flow.

01/01/2026. This process continues until the matching creation date is found. Once the creation date is found, the flow applies a new condition based on the corresponding type of market intelligence, inserted by the user. For instance, if the document is classified as competitor intelligence and created in 2024, then the document is moved to the “competitor intelligence” subfolder within the 2024 folder.

In addition to logical archiving, this system enhances effort minimisation and user experience while removing manual inconsistencies.

#### 4.4.5 Accessibility

A primary requirement that emerged during the interviews is that market intelligence should be accessible to all Company X's personnel. Resolving this issue is straightforward. Access to the market intelligence library can be granted by utilising the "AllPrecisionAgriculture" Microsoft group, configured by Company X. This group is automatically updated when personnel are hired or depart from Company X. The library can be configured so that every individual in this group has access, thereby eliminating the need to manually grant access.

#### 4.4.6 Security

The library will contain valuable insights into Company X's external business environment. As most of these documents provide competitive advantages, it is crucial to restrict their use for internal purposes only, underscoring the significance of robust security measures. One of SharePoint's selection criteria was that the system should encompass advanced security levels. Upon accessing the library, users are required to undergo two-step verification using Microsoft Authenticator.

To prevent accidental knowledge sharing with external stakeholders, sharing documents from the library is prohibited. By configuring the setting of the market intelligence library, users are unable to share files without the approval of the document owner.

#### 4.4.8 Summary

This section elaborates on the complete design of the market intelligence library in Microsoft SharePoint and explains the system's technical functionalities. The primary objective of the SharePoint interfaces is to facilitate effective and efficient market intelligence storage and retrieval. The key requirements, depicted in Table 8 are individually examined and ensure alignment of the system's competencies with the user's needs.

### 4.5 Pulse design

This section elaborates on the complete design of the market intelligence page in Pulse. Pulse, discussed in Section 3.1, is the new intranet of Company X Stakeholders emphasise integrating the library into Pulse to enhance centralisation. However, due to limited development capabilities within Pulse, SharePoint is utilised to create the library. The new library is embedded into Pulse via the PowerApps integration to ensure centralisation is maintained. This integration, forming the main component of the Pulse page, facilitates access to the market intelligence library through a direct link and supports file uploads. In addition, the Pulse page contains a section detailing the purpose of the library and a section that briefly provides a user manual. Figure 33 visualises the design of the Pulse page.

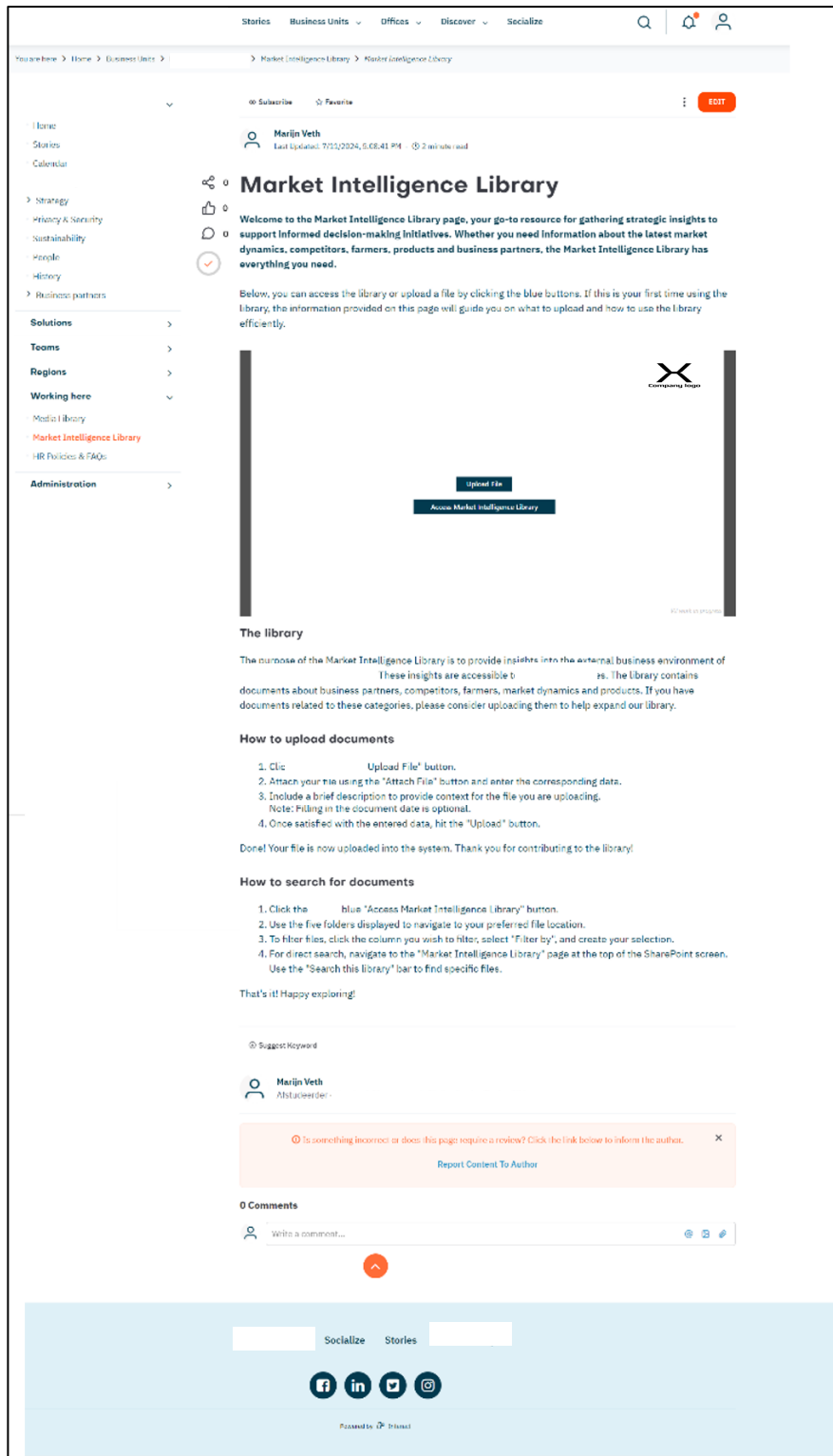


Figure 33: Design of the Pulse interface.

The main difference between the actual design of the interface, as illustrated in Figure 33, and the initial outline, depicted in Figure 18, lies in the positioning of the text. Initially, the user manual was placed before the PowerApps integration. However, considering the second-order construct of the MAU model involving the determinants of effort minimisation and content relevance, it is more effective to position the majority of the text below the PowerApps integration. This decision is based on two primary factors. Firstly, the process of uploading documents and navigating through the library

is intuitive, rendering it unnecessary for most users to consult the user manual to effectively engage with the library. Consequently, the integration has greater relevance than the manual, explaining its superior positioning. Secondly, the user manual is most likely to be referenced only once per unique visitor. In contrast, recurring users aim to perform their tasks as efficiently as possible, necessitating the placement of the PowerApps integration at the top of the interface.

Other relevant second-order construct determinants of the MAU model include concise language and user-centric terminology. To enhance the efficiency of the ECMS, it is essential to prioritise concise language. This involves writing effective text by eliminating redundant words. Consequently, the first section on the Pulse interface briefly introduces the library and directs users to the appropriate resources. The section after the PowerApps integration elaborates upon the library in more detail and provides users with sequential instructions. One section outlines the uploading documents process, while another addresses document search techniques, both presented with clarity and directness. Additionally, user-centric terminology is applied. Terms including “market dynamics” or “strategic insights” may potentially be complex but are considered suitable given the library’s educated audience.

#### 4.6 Conclusion

Chapter four is dedicated to the design of the enterprise-wide content management system, specifically the market intelligence library. The library spans three primary environments: Pulse, SharePoint and PowerApps and encompasses six distinct user interfaces, facilitating various data storage and management functionalities including search capabilities and archiving techniques.

The design process commenced with the conceptual outline of the user interfaces, followed by their actual design. Each design decision was justified by aligning with stakeholder requirements fostering an optimised user experience. The application of the MAU framework (Putra et al., 2022) further substantiated these decisions, emphasising the integration of user-centric principles to optimise usability, efficiency and knowledge management practices.

Following this design, Chapter 6 focuses on evaluating the current ECMS to identify areas of improvement and ensure that the system meets its intended objectives in facilitating effective knowledge management and supporting informed decision-making within Company X.

## 5 Implementation

Chapter 5 discusses the various considerations essential for the successful implementation of the market intelligence library. Moreover, the fifth sub-research question is examined throughout this chapter.

- 5) *“What critical factors must be assessed to ensure the successful implementation of the market intelligence management system within Company X?”*

Implementation refers to all organisational activities that enhance the adoption, management and routinisation of an innovation such as an information system (Laudon, 2014). One of the primary advantages of using SharePoint is its existing utilisation among Company X’s personnel. This eliminates the risk of incompatibility between the ECM platform and the current technological environment, a common issue that often hinders implementation. (Hullavarad et al., 2015). Furthermore, employing SharePoint as ECMS obviates the need for extensive training methods to enhance adoption rates and routinisation, as Company X users are already familiar with SharePoint’s general interfaces. This familiarity reduces the required additional effort by the market intelligence team to develop effective and personalised training methods (Hullavarad et al., 2015).

Despite the lack of extensive implementation methods and training requirements, two primary objectives must be pursued to ensure implementation success. These objectives include accessibility and widespread notification of all personnel. First, every employee within Company X must be granted access to the library and be able to engage with all employed functionalities. This is accomplished by providing access using the “AllPrecisionAgriculture” Microsoft group, which automatically includes all new employees. This ensures that every employee has access to the library and that newly hired employees are automatically admitted.

Second, all employees must be notified of the market intelligence library launch. This is achieved by creating a thread in the intranet Pulse, announcing the completed market intelligence library. In addition, the thread includes a call-to-action, encouraging users to explore the market intelligence library and complete the corresponding evaluative survey, which is further elaborated upon in Chapter 6. Additionally, a presentation is delivered to Company X’s employees to raise awareness and provide detailed explanations regarding the library’s purpose and usage instructions.

Additionally, the library is pre-filled with existing documents, including competitor analysis and market research reports, to help users familiarise themselves with navigation and search functionalities upon access.

System implementation benefits significantly from high user involvement (Laudon, 2014). Engaging users throughout the implementation process offers opportunities to better align the system’s capabilities with the users’ needs. Furthermore, users’ satisfaction levels are higher due to enhanced active involvement during the implementation. To engage users, a survey is positioned in the first interface of the market intelligence library. The objective is to gather additional insights into necessary adjustments to fulfil user needs. The survey questions are outlined in Figures 45 to 50 in [Appendix F1](#). To conclude, the successful implementation of the market intelligence library at Company X depends on ensuring accessibility, comprehensive notification and significant user involvement. The selection of SharePoint as ECMS reduces the requisite extensive training compared to other candidate systems due to enhanced familiarity. These factors combined address sub-research question 5, providing a structured approach to effective system adoption and utilisation with the organisation.

## 6. Evaluation

This chapter evaluates the market intelligence library as designed in Chapter 4. The evaluation process consists of two distinct rounds. The first round of evaluation was conducted by the market intelligence team, which is discussed in Section 6.1. Section 6.2 elaborates upon the second round of feedback provided by the market intelligence library users.

### 6.1 Evaluation by the market intelligence team

The market intelligence team provided feedback to foster a more effective ECMS. Through active participation in meetings and discussions, several necessary adjustments emerged, as detailed in Table 9. The first adjustment involves renaming the metadata fields depicted in the second interface of PowerApps, Figure 26, and columns in SharePoint, Figure 30 & 31. The renamed metadata fields include the type of market intelligence and geographical location. The initial selection of market intelligence types – competitor intelligence, market dynamics/research, product intelligence, and consumer intelligence – has been revised to encompass more concise terminology: competitors, farmers, market dynamics, product, and business partners. This categorisation enhances user experience due to improved concise language and includes an additional category specifically addressing the role of Company X’s business partners in distribution channels. Furthermore, the geographical location category has been renamed to “corresponding region” to maintain concise language. The revised metadata variables provide a more complete representation of Company X’s external business environment.

A second adjustment involves the removal of the topic metadata category, which was previously used to specify each document’s category. Users previously had to attach their files, select the corresponding type of market intelligence and designate a topic. However, this category has been eliminated due to the user effort required to select an appropriate topic and the potential for extensive topic lists that hinder productivity and increase error probability. Over time, the market intelligence team anticipates that users might opt for convenience and select the first topic listed, which led to the decision to remove the topic category. However, to ensure documents remain specified and filterable, members of the MI team will individually review each uploaded document and assign appropriate keywords. The MI team does not anticipate an overwhelming volume of documents stored weekly, enabling them to tag keywords to enhance user experience and efficiency of the market intelligence library. The other metadata categories have remained unchanged.

The third adjustment involves the custom view implemented on the first interface of SharePoint. This view ensures only documents are displayed by filtering out folders, as depicted in Figure 31. The MI team recommended that while this system allows for filtering within subfolders, it is more effective to initially display a layer of folders corresponding to the different types of market intelligence. This approach assumes that users typically search within specific types of market intelligence rather than across all documents. Although this method restricts filtering across multiple types of market intelligence, it enhances intuitiveness by reducing the immediate need for applying filters. To determine the preferred method of document retrieval by the library’s users, both the filtering view and folder structure are implemented in the first interface of SharePoint. The evaluative survey includes a question that assesses the preferred method of document retrieval based on user preference. After an appropriate evaluation period, the market intelligence team can decide whether to retain both search methods or to maintain only the preferred method.

The fourth adjustment involves a modification in the folder hierarchy. This initial hierarchy consists of two layers: the year of upload followed by the type of market intelligence. The MI team recommends deleting the folder layer “year of upload” as it is deemed irrelevant to the user. Instead, the folder hierarchy depicted in Figure 44 in [Appendix E1](#) is established, encompassing a comprehensive range of subfolders that significantly cover the fields of Company X’s external business environment. If a

document does not fit in one of the established categories, the file is moved to the corresponding “other” folder. Given the dynamic nature of an organisation's external business environment, this revised folder structure will not remain static. When adjustments are requisite, the market intelligence team can correct the structure as desired.

The fifth adjustment involves a minor modification. Initially, the first interface of SharePoint positioned the PowerApps integration above the document library integration. The MI team anticipates that users will more frequently visit the library to retrieve files rather than to upload files. Consequently, it is more effective to display the document library above the PowerApps integration.

The final adjustment involves revising the automatic archiving system in Power Automate. Originally, the system would store documents based on the upload date and the type of market intelligence. However, with the removal of the upload year folder layer, the Power Automate must be adjusted to store the documents directly in the appropriate type of market intelligence folder. The revised Power Automate archiving flow is schematically illustrated in Figure 43 in [Appendix E1](#).

Table 9: Adjustments made during the first evaluation round.

Adjustments
Rename metadata terms in PowerApps & SharePoint
Remove topics from metadata in PowerApps & SharePoint
Removal of custom view in SharePoint
Change in folder hierarchy in SharePoint
Change in component positioning in SharePoint
Revised automatic archiving system in Power Automate

## 6.2 Evaluation by the market intelligence library users

The second round of evaluation involves gathering feedback from the library's users, encompassing all personnel at Company X. The primary objective is to understand whether the market intelligence library meets the established requirements and to measure its effectiveness in enhancing satisfaction with market intelligence management. Additionally, the survey aims to uncover potential areas for further improvement.

The survey is positioned on the initial interface of SharePoint, as detailed in Chapter 5. The survey consists of three distinct parts. The first part measures satisfaction with two key metrics, which involve assessing the progress towards addressing the core problem and contribution to knowledge dissemination. These scores align with the previous assessments detailed in Table 2. The second evaluative part of the survey involves open questions, allowing respondents to provide qualitative feedback and highlight areas needing enhancements. The third evaluation part assesses specific requirements to determine how well the library fulfils them, as measured by satisfaction scores. Given that not all requirements are assessable through user feedback – such as accessibility, which is inherently met for all employees – only measurable requirements like user-friendliness, search functionalities and archiving functionalities are included in the survey. The satisfaction scores are obtained by asking the same questions as for the satisfaction scores in Table 2 to pursue reliability. This ensures that an evaluative comparison can be performed.

Within one week post-implementation, six responses to the evaluative survey were collected. While this initial sample is limited, it offers valuable preliminary insights into the library's reception among personnel. It is recommended that Company X extend the survey period to accumulate a more comprehensive set of responses, which will aid in refining the library further. The recommended duration of the evaluative period is discussed in Chapter 7.2.

Table 10 presents an overview of the received satisfaction rates related to the three assessed requirements, whereas Table 11 outlines the received satisfaction rates for the two key metrics. Table 19 in [Appendix F2](#) depicts the received feedback on the open survey questions.



Table 10: Evaluative survey scores for user-friendliness and archiving and search functionalities requirements.

Requirements	Survey questions assessing satisfaction	New scores. Likert scale from 0 (strongly disagree) to 10 (strongly agree)
User-friendliness	It is easy to navigate and use the market intelligence management system(s).	8 8 8 6 8 8
	The overall design of the market intelligence system(s) enhances my user experience.	8 6 8 6 9 6
	The effort required to upload files is minimal.	7 8 8 5 6 9
Archiving functionalities	The steps to upload market intelligence files are clear and intuitive.	9 8 8 5 2 9
	It is possible to clearly describe files with metadata.	7 8 8 7 6 9
Search functionalities	The process of searching for documents is intuitive and effective.	8 5 8 6 8 8

Table 11: Evaluative survey scores for key metrics on the core problem and general knowledge dissemination.

Key metrics	Survey questions assessing satisfaction	New scores. Likert scale from 0 (strongly disagree) to 10 (strongly agree)
Core problem	What is your overall experience with the methods of managing (storing and accessing) market intelligence?	8 6 10 4 8 10
Knowledge dissemination	I would recommend the methods of managing market intelligence to my colleagues.	9 7 8 6 9 8

### 6.2.1 Comparing the received scores

Table 12 consolidates data from Tables 2, 10 and 11. The scores in Table 12 are derived by calculating the mean score of each respondent for each requirement and key metric. Typically, the mean of ordinal data should not be calculated. However, since this concerns scores given by the same respondent it is assumed that the same consistent scale is used. Subsequently, the median overall score for each requirement and key metric is derived.

Table 12: Overview of the old and new mean scores for the requirements and key metrics.

Requirement / Key metric	Previous scores (Likert scale: 0 to 10)	Median new scores (Likert scale: 0 to 10)	Mean scores per respondent
User-friendliness	4.7	7.7	7.7 7.3 8.0 5.7 7.7 7.7
Archiving functionalities	3.5	8.0	8.0 8.0 8.0 6.0 4.0 9.0
Search functionalities	5.0	8.0	8.0 5.0 8.0 6.0 8.0 8.0
Core problem	5.0	8.0	8.0 6.0 10.0 4.0 8.0 10.0
Knowledge dissemination	3.0	7.8	9.0 7.0 8.0 6.0 9.0 8.0

A statistical analysis determines whether the improvements made are statistically significant. However, there are some limitations due to the ordinal nature of the data and the limitation of having only one previous score. This results in non-parametric paired tests not being applicable. Therefore, descriptive statistics are employed for comparison. Table 13 summarises the mode, median and IQR for the measured requirements and key metrics, calculated using RStudio. Figure 34 visualises these results using boxplots.

Table 13: Descriptive statistics comparing the previous and new scores.

Requirement	Previous score	New mode	New median	New IQR (Q3- Q1)
User-friendliness	4.7	7.7	7.7	0.3
Archiving functionalities	3.5	8.0	8.0	1.5
Search functionalities	5.0	8.0	8.0	1.5
Core problem	5.0	8.0, 10.0	8.0	3.0
Knowledge dissemination	3.0	8.0, 9.0	8.0	1.5

The comparison of new median scores with previous scores demonstrates notable advancements in all assessed dimensions. These advancements are visualised in Figure 35 employing a spider chart. Specifically, user-friendliness has notably risen, while its IQR remains low. This means that the variability between the scores is low, which suggests a more uniform positive response among users. An improved user-friendliness aligns with the selected user-centric design approach for the market intelligence library.

Also archiving and search functionalities show improvements. Although both requirements exhibit the same median and IQR values, archiving functionalities have shown the greatest improvement relative to its baseline score. The added capability of describing documents with metadata contributes to this enhancement, as reflected in a median score of 7,5 and an IQR of 1.0 for the second survey question on archiving functionalities in Table 13. This means that the responses show consistency which suggests a reliable improvement. However, the first question reveals a higher IQR of 3.0, indicating more variable responses. This feedback corresponds to the score “2” that was received for the first survey question on archiving functionalities:

*“I find the window where you first have to log in and then upload files not very intuitive. How do you find that place now if you don't have the link from the email? I couldn't find it through the menu on the left side at least.”*

The user indicates that the PowerApps interface for file uploads cannot be found in the Pulse environment. This valuable feedback suggests that more user training is required to familiarise the user with the new market intelligence library. Therefore, enhanced user training is included in the recommendations discussed in Section 7.2. Improved user training should resolve navigational issues concerning the market intelligence library which suggests that a more consistent set of responses on the survey can be achieved. This will result in a lower IQR for the archiving functionalities, suggesting improved reliability and validity for this requirement.

The key metric involving the core problem also reflects improvement, but the significant IQR (3.0) indicates a broad range of user experiences. The lowest scores given to this metric include 4.0 and 6.0. By analysing the corresponding feedback additional recommendations can be established to increase the overall user satisfaction with the market intelligence library. This feedback includes:

*“I would have only put the library online if it had a bit more content. Right now, you're mainly looking at an empty folder structure. It doesn't immediately provide the best user experience.”*

and

*“Once you're in, you see that you can also access that folder structure directly from OneDrive. Then you'll bookmark it to easily access it. And once you're in that folder structure, you can also just upload files without providing all the meta-information. If you want to keep this a bit organized, I think some adjustments still need to be made.”*

In the first feedback section, the user expected more market intelligence documents in the library after implementation. The user mentions the positive relationship between the number of uploaded documents and user experience, which is a valid point. Filling the library is an ongoing process which requires time. During implementation, most documents available within Company X were uploaded. However, not every folder location contained files still which might have led to a reduced user experience. Therefore, recommendations include ongoing document uploads. The second part of feedback is not directly solvable with the development capabilities of SharePoint. Therefore, it is important to monitor whether users upload files through OneDrive. Currently, this is not the case. When it does happen, additional user training is required to inform the user about the file upload process. Therefore, library monitoring is included in the recommendations discussed in Section 7.2. The key metric involving knowledge dissemination has a median of 8.0 and an IQR of 1.5. this key metric suggests substantial improvement compared to the previous baseline score of 3.0. Recommending the library to colleagues is crucial as when users share their positive experiences, it

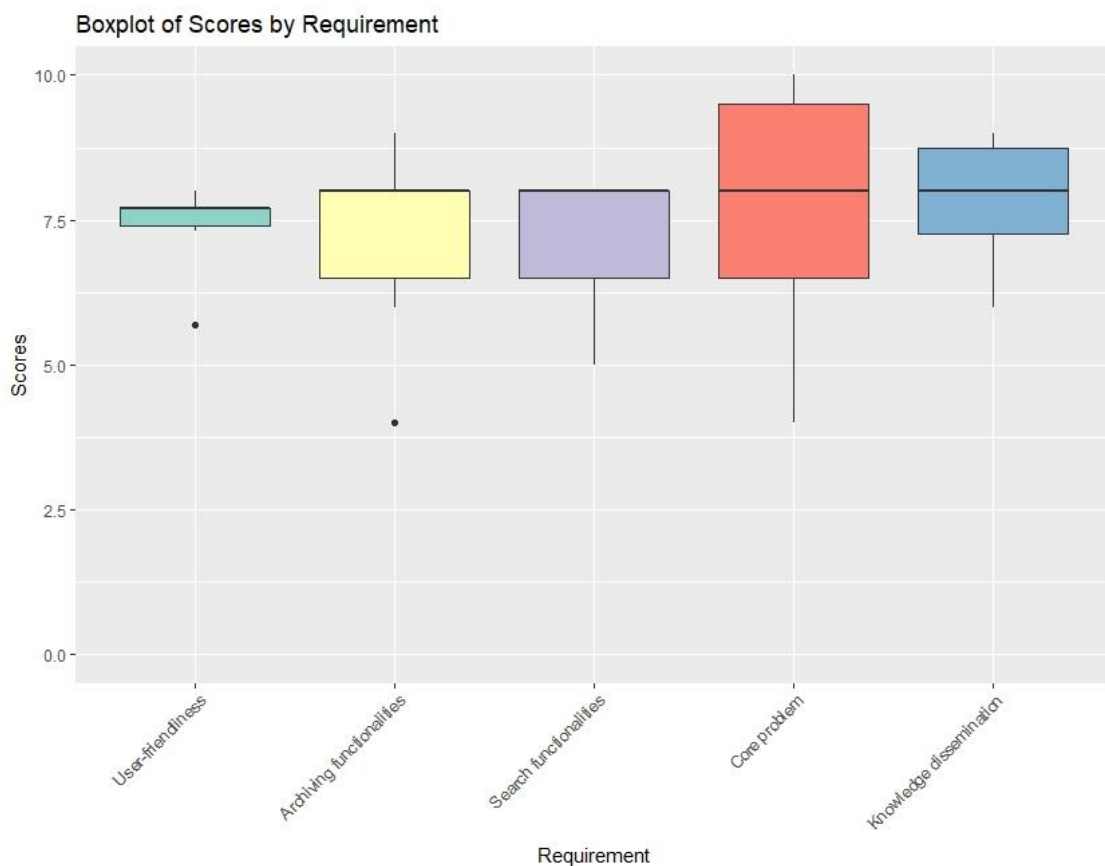


Figure 34: Boxplot visualising the scores of the requirements and key metrics.

can motivate others to explore and utilise the library. Furthermore, it signifies that users perceive the library as valuable and effective. Positive word-of-mouth suggests that the library is fulfilling its intended purpose.

In summary, the measured requirements and key metrics show substantial improvements. Selecting a user-centric design approach increased the user-friendliness from a 4.7 to a 7.7. Additionally, archive and search functionalities of market intelligence management have improved from 3.5 and 5.0 to 8.0 and 8.0 respectively. These requirements, in addition to the requirements discussed in Chapter 6.3, contribute to enhanced satisfaction with the market intelligence storing system. This is seen in the increase in the key metrics including core problem and knowledge dissemination. The core problem - Users are dissatisfied with the market intelligence storing system - has increased from 5.0 to 8.0, while knowledge dissemination has improved from 3.0 to 8.0.

These improvements indicate that the requirements contribute to an overall increase in satisfaction with the market intelligence storing system. To sustain and further these improvements, it is essential to implement the recommendations provided. These actions are expected to reduce variability in user responses and enhance overall satisfaction, which can be continuously monitored through future survey iterations. Therefore, stimulating feedback and promoting the survey is also included in Section 7.2.

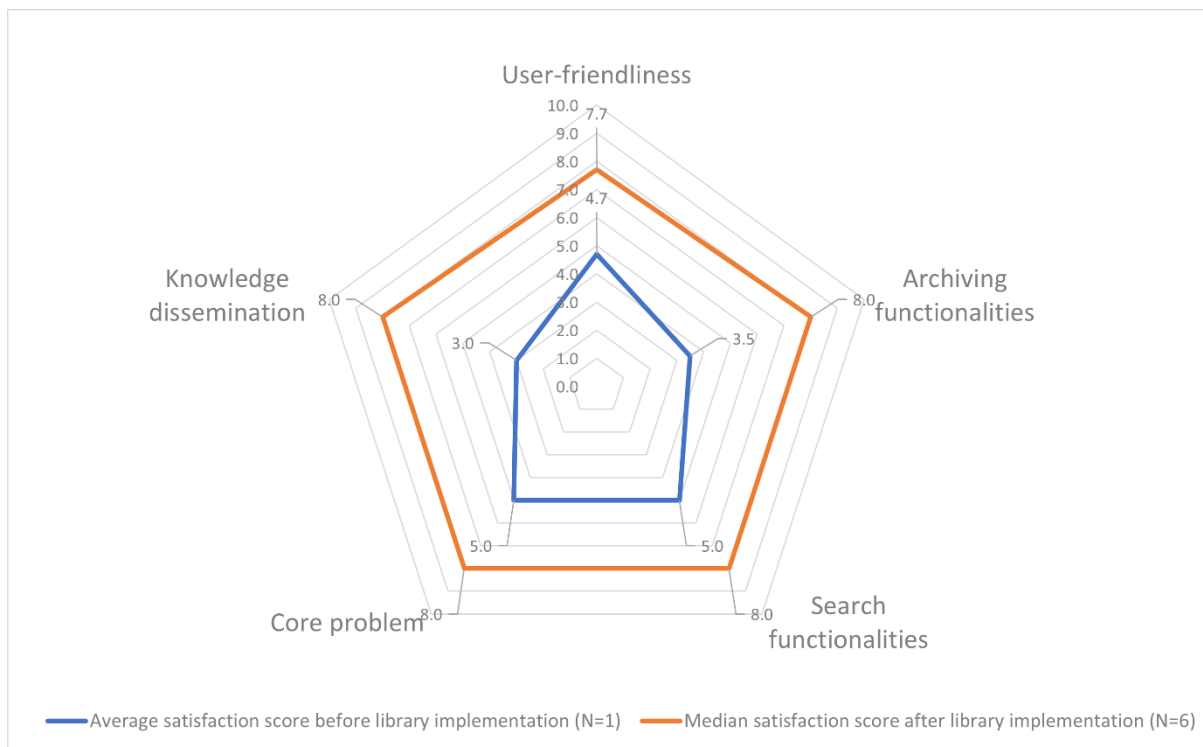


Figure 35: Radar chart displaying satisfaction rates before and after the library's implementation.

### 6.3 Evaluation of the remaining requirements

Contrarily to the measured requirements discussed in Section 6.2, the four remaining requirements are not directly assessable through user feedback. Nevertheless, these requirements, discussed in Table 3, play a crucial role in enhancing the overall performance on the key metrics and are therefore subject to evaluation in this section. These requirements include accessibility, centralisation, inclusion of all categories of market intelligence, and security.

First, the requirement for organisational-wide accessibility has been successfully achieved. Prior to the implementation of the market intelligence library, access was limited to a small subset of employees,

significantly restricting the dissemination of market intelligence. This issue has been resolved, with access extended to all personnel within Company X.

The requirement for centralisation has also been fulfilled. The market intelligence library has become the centralised repository for all market intelligence resources within Company X. This centralisation is substantiated by usage analytics, which reveal that the library attracted 72 unique visitors in the past 30 days, including 41 unique visitors within the last week. Given that Company X comprises approximately X employees, these figures represent a significant proportion of the workforce actively engaging with the library. While exact comparative data on previous market intelligence systems is unavailable, these metrics suggest a significant enhancement in engagement levels. Notably, previous systems did not exceed access for more than 20 employees, limiting the maximum number of unique visitors for these systems. Additionally, the average time spent per user, recorded at 4 minutes and 58 seconds, indicates a high level of engagement with market intelligence and increased reliance on the library as the primary source for market intelligence. These findings underscore the success of the centralisation initiative. To ensure the sustained success of this requirement, it is essential to continuously monitor the library's usage analytics. This ongoing evaluation is included as a recommendation and is discussed in detail in Section 7.2. By closely tracking changes in usage statistics, the market intelligence team can make informed decisions about whether additional promotional efforts are necessary to maintain or enhance engagement levels.

Furthermore, the requirement for coverage of all categories of market intelligence has been met. Section 6.1 elaborates on this implementation and discusses the revised categories of market intelligence, which currently include competitors, farmers, market dynamics, products, and business partners. The library's users can store market intelligence documents in the appropriate folder corresponding to a specific category of market intelligence. This enhancement ensures that the library accommodates all categories of market intelligence, thus meeting the predefined requirement.

Lastly, the requirement for security has been addressed. Access to the library necessitates authentication via the Microsoft Authenticator. Additionally, users are explicitly informed that the library's contents are for internal use only, prohibiting the sharing of market intelligence with external stakeholders without prior approval from the document owner. This framework ensures the confidentiality and integrity of the market intelligence present within the library.

## 6.4 Conclusion

This chapter evaluates the post-implementation market intelligence library through two distinct evaluative rounds. The initial round consists of feedback provided by the market intelligence team, with a primary focus on optimising the library for an enhanced user experience. Modifications made during this phase are primarily aimed at fine-tuning the system to meet user-centric objectives.

The second evaluation round focuses on assessing the library's performance using the library's end users' input. This assessment is structured around fulfilling the requirements outlined in Table 3, which are essential in determining the library's impact on employee satisfaction with the market intelligence storing system. The requirements are split up into those that can be quantitatively assessed via user feedback and those necessitating a qualitative appraisal.

Quantifiable requirements, including user-friendliness, and search and archive functionalities, exhibit significant improvement when benchmarked against the baseline scores provided in Table 2. The qualitative assessment focused on requirements such as centralisation, accessibility, coverage of all market intelligence categories, and security. These requirements are also deemed successfully implemented.

Additionally, two key metrics - core problem and knowledge dissemination – are evaluated based on user input. These metrics are crucial as they reflect the users' perceived value and effectiveness of the library. Both metrics demonstrated considerable enhancement, suggesting that the implemented

requirements contribute to solving the core problem, leading to improved satisfaction with the market intelligence storing system.

In conclusion, the implementation of the market intelligence library, along with its associated requirements, has resulted in a marked increase in user satisfaction, as evidenced by the improvement in the market intelligence satisfaction rate from 5.0 to 8.0. To sustain and further enhance these improvements various recommendations have been proposed in Section 7.2. The adoption of these recommendations is expected to reduce variability in user satisfaction responses and contribute to an overall increase in user satisfaction rates.

## 7. Conclusions and Recommendations

The primary objective of this research was to address dissatisfaction with the existing market intelligence storage system at Company X. The current methods of managing information and knowledge are fragmented, inconsistent and lack a centralised system. These inadequacies result in inefficiencies such as data loss, duplicate documents and efforts and ineffective data-driven decision-making due to inaccessible data. Consequently, the demand for an enterprise-wide content management system focused on the external business environment arose. By developing and implementing a centralised market intelligence library along with its associated requirements, the goal was to enhance employee satisfaction and overall engagement with market intelligence, ultimately improving strategic decision-making. By assessing each sub-research question and the primary research question, a structured ECMS implementation roadmap is developed to avoid additional unexpected resource allocations.

This research resolves the issue presented by Company X and provides a framework that serves as a guideline for the establishment of an ECMS, ultimately enhancing knowledge management practices within an organisation. The research is centred around a primary research question, with five subsequent questions examined to acquire the requisite information to resolve the core question. The primary research question is formulated as follows:

*“How can a centralised market information management system be developed that allows for easy access, archiving and sharing of reliable market intelligence about the external business environment of Company X, instead of utilising multiple disparate systems?”*

Section 7.1 addresses the core research question, while Section 7.2 provides specific recommendations for Company X. Section 7.3 is dedicated to the limitations associated with this research.

### 7.1 Conclusions

Chapter 1 conducts an initial exploratory analysis and sets the scope of the research. This phase leads to constructing a problem cluster, visualised in Figure 2. This cluster is used to identify the core problem of the study, which involves dissatisfaction with the current market intelligence storage system. Chapter 2 advances the initial exploratory analysis and assesses sub-research question 1, which is formulated as:

*“How do employees within Company X currently engage with market intelligence to enhance strategic decision-making and operational effectiveness within the dairy industry?”*

Based on interviews with international employees of Company X, Chapter 2 reveals that the current method of engaging with market intelligence consists of three key phases. These phases are visualised in Figure 5 and align with the first three phases of the knowledge management theory discussed by Ahmady et al. (2016). These phases include collecting, archiving and sharing knowledge. Within this process, archiving knowledge proves to be the primary bottleneck. The excessive number of market intelligence storing systems poses challenges in data management practices. These challenges hinder engagement with market intelligence, leading to exposure to business-related threats, unachieved commercial goals and misalignment between the company’s portfolio and the needs of farmers and business partners. To remain agile in dynamic market environments, it is essential to evolve the current methods of archiving knowledge. Emphasising the importance of improving knowledge archiving processes resonates with Ayavoo & Ode’s (2020) findings on the positive correlation between effective knowledge storage and organisational innovation.

Based on the interviews various requirements are identified for an enhanced market intelligence system to exhibit. Table 3 outlines the primary requirements and resolves the second sub-research question:

*“What functionalities do Company X’s employees require in a centralised market intelligence management system?”*

The identified requirements align with the findings from various authors. Centralisation should be prioritised within the system, as supported by Laudon (2014), who states that a centralised cloud enhances service quality levels and reduces capital and operating costs. Moreover, Laudon argues that the higher consolidation density achieved, the greater the return on investment is. The significance of user-friendliness resonates with the findings of Putra et al. (2022). The baseline score for user-friendliness as assessed by the market intelligence team is 4.7. Additionally, the new system must incorporate search functionalities, global accessibility, automated and logical archiving, and advanced security, reflecting the identified ECM solutions by Hullavarad et al. (2015). Search functionalities has a baseline score of 5.0, while archiving functionalities is assessed with a 3.5. The need for a market intelligence newsletter is based on the importance of knowledge dissemination, which aligns with the positive correlation between knowledge diffusion, knowledge application and organisational innovation as proved by Ayavoo & Ode’s (2020). Including all forms of market intelligence is essential for optimally representing an organisation’s external business environment. This approach enhances sensing capabilities, ultimately leading to increased revenue growth, as stated by Endres et al. (2020). Based on existing literature, Chapter 3 constructs a theoretical framework to establish a formalised definition of a “market intelligence management system” and maps out its use cases. Starting with the general knowledge management theory, Chapter 3 narrows down to selecting a specific enterprise-wide content management system. The significance of an ECMS is emphasised through its examined benefits regarding organisational performance and knowledge dissemination. After creating a theoretically grounded overview of different knowledge-archiving practices, Chapter 3 progresses with selecting a suitable ECMS for Company X and elaborates on the considerations made. Reflecting on the identified requirements in Chapter 2, Microsoft SharePoint is found to exhibit most functionalities needed to fulfil the needs of Company X’s personnel. Due to its additional functionalities, including integration with existing Microsoft applications, user familiarity and cost efficiency, SharePoint is selected, thereby resolving sub-research question 3:

*“Which existing information management system exhibits requisite functionalities and operational demands of Company X’s personnel for managing market intelligence effectively?”*

The remainder of Chapter 3 provides theoretically grounded design methodologies and strategies used to design a centralised market intelligence management system in Chapter 4. The general architecture of an ECMS is outlined along with its four primary corresponding components (Hullavarad et al., 2015). Subsequently, metadata-based classification schemes along with the use cases are discussed (Tankard, 2015). Finally, Chapter 3 introduces the MAU structural model, developed based on Apple’s user experience guidelines (Putra et al., 2022). Consolidated, this section of Chapter 3 provides a theoretical framework established to resolve sub-research question 4:

*“What design methodologies and strategies, described in scholarly literature, can be employed to design a centralised market intelligence management system fulfilling the requirements of Company X’s personnel?”*

Chapter 4 addresses the design of the ECMS, introducing the “Market Intelligence Library”. The library spans three distinct software environments and encompasses six user interfaces. The identified



requirements form the fundamental guiding principle during the design process to ensure optimal user-centricity. The MAU structured model (Putra et al., 2022) is applied to justify various design considerations from an application usability perspective.

Chapter 5 discusses the implementation of the market intelligence library, addressing the critical factor necessary for its successful integration with Company X. Utilising Microsoft SharePoint mitigates compatibility issues and reduces the need for extensive training since Microsoft is already a standard platform provided by Company X. However, accessibility and effective notification about the library remain crucial implementation considerations. Finally, Chapter 5 introduces an evaluative survey to enhance user involvement and alignment of the system's capabilities and user needs. These implementation considerations align with the requisite implementation considerations discussed in the work of Hullavarad et al. (2015). Overall, leveraging SharePoint's familiarity, ensuring accessibility and widespread notification, and fostering user involvement answer sub-research question 5:

*“What critical factors must be assessed to ensure the successful implementation of the market intelligence management system within Company X?”*

Chapter 6 evaluates the market intelligence library by leveraging two distinct evaluative rounds. In the first round, feedback from the market intelligence team of Company X led to several adjustments. These adjustments primarily revolve around enhancing clarity and user experience. The second round, involving user feedback via an evaluative survey, focuses on assessing the current level of satisfaction with the search functionalities, archiving functionalities, user-friendliness, core problem and knowledge dissemination. Furthermore, the requirements for centralisation, accessibility, coverage of all categories of market intelligence, and security have been qualitatively assessed. These improvements are detailed in Table 1. Overall, the market intelligence library along with its associated requirements has enhanced user satisfaction with the previous market intelligence storage system from a baseline score of 5.0 to 8.0.

Finally, all sub-research questions and corresponding chapters culminate in a framework that resolves the primary research question:

*“How can a centralised market information management system be developed that allows for easy access, archiving and sharing of reliable market intelligence about the external business environment of Company X, instead of utilising multiple disparate systems?”*

This research concludes that developing a centralised market intelligence management system involves several key steps: requirement identification, theoretical framework and system selection, design, implementation and evaluation.

Requirement identification ensures alignment between the system's capabilities and the user's needs. Constructing a theoretical framework and selecting an appropriate system provides a robust foundation based on existing technologies encompassing the organisational needs and demands. The design phase, guided by user-centric principles and usability models, ensures the system is intuitive and efficient, thereby enhancing adoption, retention and productivity rates. Successful implementation is crucial to realise the perceived benefits. Finally, the importance of evaluation is emphasised to optimally align the system's capabilities with the user's needs and assess the solutions' performance.

Furthermore, this research demonstrates that a centralised market intelligence management system with a user-centric design approach can enhance user satisfaction and market intelligence engagement. An ECMS positively influences data creation and dissemination, enabling a more comprehensive external business environment analysis. This, in turn, supports strategic decision-making and helps organisations remain agile in dynamic market environments.

By following this structured approach, organisations like Company X can establish a centralised market intelligence management system that effectively supports easy access, efficient archiving and sharing of market intelligence throughout the entire organisation.

## 7.2 Recommendations

During this research, several requirements emerged that impact the long-term success of the market intelligence library. This section provides a list of recommendations to the market intelligence team of Company X to ensure the library's sustained effectiveness.

- I. Monitor usage rates of the market intelligence library.  
It is strongly recommended that the market intelligence team monitors the utilisation rates of the market intelligence library. These insights, automatically provided by SharePoint's analytics, include insights into indicators such as unique viewers, site visits, and average time spent per user. By analysing these indicators, the market intelligence team can determine whether the library is performing adequately or if additional promotion is required to stimulate knowledge management practices.
- II. Conduct a follow-up survey.  
To identify additional areas of improvement for the library, it is recommended that the market intelligence team conducts a follow-up survey. The team can utilise the questionnaire outlined in [Appendix F1](#) to monitor indicators such as satisfaction and efficiency rates for an extended period. Monitoring satisfaction rates and qualitative feedback also suggest when additional user training is required. It is recommended that the evaluation period lasts at least six months to implement necessary changes and pursue an optimised user experience.
- III. Maintain the content within the market intelligence library.  
To ensure the library functions optimally, it is essential to maintain high-quality and up-to-date content and sustain ongoing document uploads. It is recommended that the market intelligence team reviews every document uploaded into the system. This includes attaching keywords, checking whether the correct metadata is inserted and updating archived documents. The system automatically notifies the market intelligence team when a file is uploaded, allowing for efficient and repeated reviews.
- IV. Implement a market intelligence newsletter.  
To enhance knowledge management practices, it is recommended that the market intelligence team implements newsletters. The demand for periodical newsletters outlining the most relevant documents emerged during the interviews. SharePoint's analytics provides insights into the most popular documents, which can be used as input for the newsletter. This approach keeps users informed about valuable resources and encourages continuous usage of the library.
- V. Develop an AI chatbot as a search engine.  
During the development of the library, the idea of developing an AI chatbot as a search engine was proposed. After conducting desk research and participating in meetings with personnel specialising in AI and IT from Company X, it became evident that AI has significant potential for the market intelligence library. Additionally, personnel at Company X confirmed its technical feasibility. A chatbot assists users in finding relevant information quickly and efficiently. For instance, users can insert comparative questions, and the AI assistant will provide a comparative analysis based on the internal documentation of the market intelligence library. To significantly improve the usability and effectiveness of the market intelligence library, it is recommended that the market intelligence team implements an AI-driven search function or ChatGPT integration.

### 7.3 limitations

This section examines the possible limitations of the research and addresses the validity and reliability of the outcomes. During this research, several factors influenced the validity and reliability of the study. First, the sample size of the performed interviews is relatively small. Four interviews were conducted with employees from North America, South America, France and New Zealand. A larger sample size could have led to additional identified requirements for the ECMS. However, the company supervisor reviewed and approved the current list of requirements. Furthermore, the selection of SharePoint as the ECMS to fulfil user needs was approved by the market intelligence team.

Additionally, the baseline scores for the previous market intelligence storing system were assessed by only the market intelligence team. This resulted in a sample size of 1, which significantly limits the statistical methods available for assessing the improvements made. Moreover, due to the nature of the satisfaction scores being ordinal, only IQRs and medians can be utilised. This hindered a more thorough analysis of the evaluative comparison performed in Section 6.2.

Another limitation is that the full effect of the library cannot be measured at this stage. While the evaluation phase provided initial insights into the employees' first impressions, several key factors remain unknown. These factors include insights into the long-term utilisation rates of the library. Also, the extent to which the market intelligence library will enhance data-driven decision-making initiatives remains uncertain. A transitional period will be necessary for employees to adapt to the new system, shifting from ad hoc document storage to a structured approach within the library. If the utilisation rates of the market intelligence library do not increase, decentralisation will reoccur. Consequently, the market intelligence team must schedule period reviews to assess the library's utilisation rate, as discussed in Section 7.2.

### 7.4 Theoretical implications

This study contributes to the existing literature in the fields of knowledge management, enterprise content management systems and market intelligence management. This section elaborates on how this research advances the theoretical understanding within these domains.

Firstly, this study extends the application of the knowledge management theory by demonstrating the practical benefits of a centralised approach to market intelligence. Traditional knowledge management frameworks such as the knowledge management theory as discussed by Ahmady et al. (2016), emphasise the significance of each phase within the process of knowledge management. This research reaffirms the importance of these phases and specifically underscores the importance of efficient knowledge archiving in facilitating strategic decision-making. To extend the traditional understanding of the archiving phase, this study proposes developing an enterprise-wide content management system focused on the external business environment of an organisation to enhance engagement with market intelligence and foster data-driven decision-making.

Secondly, this study contributes to the theoretical discourse on participatory design and engagement in market intelligence management system development. By involving end-users throughout the system development process, in particular during the requirement analysis, design, implementation and evaluation, the research demonstrates that a user-centric approach lead to higher user satisfaction. This finding supports the idea that systems designed with a user-centric approach are more likely to be effective and adopted. It highlights the essential role of user-centric design in the successful implementation of a market intelligence management system and offers a roadmap for organisations to follow.

Thirdly, the research emphasises the significance of integrating advanced system functionalities related to archiving and retrieving market intelligence documents. Traditional models often overlook the practical aspects of data retrieval and document organisations, focusing on broader theoretical constructs (e.g. Alavi & Leidner, 2001). This research provides empirical evidence that these

functionalities can enhance user satisfaction. By including these elements, the study extends existing theories and offers a more comprehensive understanding of the implications of effective knowledge management.

Additionally, this research mentions the potential of AI in the fields of market intelligence management systems. The recommendation to develop AI-driven search functions or ChatGPT integration underscores the potential impact of AI on ECMS. Future research can build upon these insights to examine the theoretical implications of AI integration in greater detail.

Lastly, this study bridges the gap between theoretical knowledge management, ECMS and user-centric design frameworks and practical applications by demonstrating how a centralised market intelligence management system can increase user satisfaction. By bridging these theoretical domains, a holistic overview of how a centralised market intelligence management system can be developed and implemented is provided.

In summary, this research contributes to the theoretical literature in knowledge management, ECMS and market intelligence management.

### 7.5 Practical implications

This research offers valuable insights for organisations seeking to enhance the documentation and management of market intelligence, particularly in the herd management technology sector. By implementing a user-centric market intelligence management system, organisations can improve user satisfaction, increase employee engagement, and enhance their ability to make data-driven decisions, allowing their business plan to be executed based on data rather than intuition. This ultimately leads to better alignment with business goals, improved portfolio management, and reduced exposure to competitive threats. This section highlights the practical implications based on the findings of this research.

Firstly, this study highlights the critical need for centralising information management systems. Company X previously utilised multiple disparate platforms (e.g., Teams channels, SharePoint sites, OneDrive and Dropbox) across various office locations and organisational departments. This fragmented approach led to challenges in maintaining data integrity and efficient information storage. By consolidating all market intelligence into a unified enterprise-wide repository, organisations can streamline document archiving and retrieval processes. This approach minimises the risk associated with data silos and enhances overall data management efficiency. By centralising market intelligence and eliminating the use of multiple disparate systems, the user experience and satisfaction with the process of managing market intelligence are improved.

Secondly, this research stresses the significance of a user-centric design approach to ensure successful implementation and realisation of the perceived system's benefits. This study demonstrates that involving end-users in the requirement analysis, design, implementation and evaluation phases, results in a system that aligns with their needs and demands, ultimately increasing satisfaction with managing market intelligence. User involvement enhances system usability, fosters adoption and improves overall satisfaction. To ensure that market intelligence management systems are intuitive, effective and meet user expectations, organisations should adopt this approach.

The integration of advanced search functionalities and logical archiving is another essential practical implication. Providing a market intelligence management system with these functionalities facilitates efficient file retrieval and structured file archiving. Describing files with metadata allows for the development of a taxonomy that ensures documents are stored logically and in the correct locations. Metadata tagging also enables advanced filtering functionalities, allowing users to efficiently retrieve relevant market intelligence. These features significantly impact satisfaction rates with the market intelligence management system.

Furthermore, the study underscores the importance of continuous monitoring and evaluation to maintain the system's effectiveness. By involving the user during the evaluation process, organisations can gain better insights into potential areas for improvement, further enhancing user satisfaction. Regular performance tracking and utilising evaluation methods such as surveys help ensure that the system evolves with the organisation's requirements and changing external business environment. Based on the requirement analysis, implementing a periodic newsletter is another practical implication derived from this research. Interviewees frequently mentioned this, emphasising its demand and potential to keep users updated of the latest market intelligence in a brief overview. This strategy enhances organisational awareness of the external business environment and keep employees engaged with the system. Other organisations can adopt this approach to enhance knowledge dissemination and keep employees engaged allowing for increased system adoption rates. The potential of integrating artificial intelligence into market intelligence management systems is also significant. Developing an AI-driven search function or ChatGPT integration has the potential to significantly enhance system usability and effectiveness, aiding users in making better-informed decisions. For instance, by assisting users in finding relevant information quickly and efficiently and facilitating generative answer generation based on the internal documentation of a company. Organisations can explore AI technologies to enhance their market intelligence management systems, offering advanced search functionalities, predictive analytics and automated insight generation. In conclusion, the practical implications of the research provide a roadmap for organisations looking to enhance their knowledge management practices with a focus on archiving information about the external business environment of an organisation. By centralising multiple information management systems and adopting a user-centric approach, organisations can significantly improve engagement with market intelligence and support more informed decision-making. These practical considerations offer a comprehensive strategy for successfully implementing an enhanced centralised market intelligence management system that increases user satisfaction and organisational performance.

## 7.6 Future research

This section provides four potential areas for continued research based on the findings of this study and the identified organisational needs. Given the dynamic nature of business environments and the evolving needs of organisations, it is essential to further research the effectiveness and adaptability of market intelligence libraries.

First, a promising area for future research involves longitudinal studies to assess the long-term sustainability of market intelligence libraries. This includes examining the degree to which libraries can adapt to rapid changing external business environments. For instance, as factors including competitors and suppliers of an organisation are constantly evolving, it is crucial to determine the extent to which market intelligence libraries can accurately represent an external business environment, thereby ensuring reliable informed decision-making. Additionally, it is valuable to investigate the long-term impact of market intelligence libraries on strategic decision-making. Future research could explore how well market intelligence libraries enhance strategic decision-making over time. Furthermore, conducting performance metrics and ROI analyses on the library's impact could provide useful insights into its financial and operational benefits.

Second, exploring the integration of advanced analytics and artificial intelligence within market intelligence libraries presents a compelling area for future research. This could include investigating the impact of AI-driven search functionalities, predictive analytics and automated insights generation based on internal documentation. Such research could assess how these technologies enhance user experience and operational effectiveness of market intelligence libraries.

Third, conducting cross-cultural studies to evaluate the acceptance of market intelligence libraries among diverse employee groups and types of organisations across different geographical locations is

another valuable area for future research. This research could identify the environments or types of organisations in which market intelligence libraries are most effective. Understanding cultural and organisational factors that influence the adoption and utilisation rates of these systems can help tailor libraries to better align with the needs of various groups of users.

## Appendix A1

This appendix contains the transcriptions of the conducted interviews. Please note that AI was used for the transcription process, and as a result, the transcribed responses may not perfectly match the original answers given during the interviews. Furthermore, information that is not relevant to this research has been excluded. International employees from France, New Zealand, South America and America were interviewed to gain insights from their experience and broadened perspectives on challenges such as time zone differences and remote communication.

Table 14: Transcribed interview with an employee from New Zealand.

Speaker	Text
Marijn Veth	What is your job within Company X?
Interviewee	So I'm the General Manager of Oceania, looking after the Australian business and building the New Zealand business. It involves overseeing operations, sales, and strategic growth initiatives in both countries.
Marijn Veth	How do you currently use market information in your work?
Interviewee	We gather customer information from our dealers, who inform us about potential customers and their interests. This helps us target specific customers. We also gather general market information about product interests and competitor pricing strategies. This allows us to adjust our marketing and sales strategies accordingly.
Marijn Veth	Do you feel like any form of market information is currently missing or not being utilised effectively?
Interviewee	The information is there, but it's not centralised. We could document and record more to improve how we look back and forecast future actions. For example, having a clearer understanding of trends and do forecasting would be beneficial.
Marijn Veth	So you feel a centralised place for storing information is missing at the moment?
Interviewee	Yeah, I think so. Uh, I mean we will be implementing kind of a CRM in New Zealand and we'll we'll start to collect some of that. Globally there's a lot of insight out there which would either be kind of lead indicators for my market or equally my market might be lead indicate have lead indicators for other markets. I mean, even if you could have a, you know, part of the Internet or even a, you know, a quarterly kind of update as to kind of the the global position that would be great, you know.
Marijn Veth	Do you think you would use a centralised information management system?
Interviewee	I would use it in two ways. Firstly, if there was a specific document that I thought summarised everything that I could go to and get a a really good summary of what was going on. And then I would secondly use it if it if it was, UM, if the search functionality was really good. And what I found over the years is you can store some formation, but if you can't get at it easily without knowing exactly what you're specifically looking for, that's kind of useless, right?
Marijn Veth	And with one document, what do you exactly mean?
Interviewee	So I would suggest that from my perspective it would be a summary of the you know the you know the global market position. Yeah, because all all of us are really time poor. Summary or whatever that might be that I think that would be really useful
Marijn Veth	And on what time scale would you like to receive that document? Like is it daily or monthly?
Interviewee	So I I think most frequently would probably be monthly. I think it would probably, yeah, by monthly, but because the market doesn't change that quickly, so, like bimonthly might be, might be the way to go or quarterly, yeah
Marijn Veth	Do you have some functionalities that you would prefer or wish for the system or document to exhibit?

Interviewee	I'll certainly made so umm for me it would be competitor insights from from the globe. It would be, you know, because we're in Dairy, it would be Dairy price kind of outlook, commodity kind of outlook. And the other, the other really important thing for our market is you know, what is the global supply and demand for essentially milk powder or milk.
Marijn Veth	So how do you usually share the information with your colleagues?
Interviewee	Uh, personally, at the moment it's either by discussion or email
Marijn Veth	Are you satisfied with how that works?
Interviewee	Yeah, the discussion is good. I think yeah, culturally emails treated different. No, but that's no one's fault.
Marijn Veth	Is there any additional feedback or suggestions you would like to share regarding the process of information management?
Interviewee	No not, my only shout-out would be, you know, you have to kind of get the structure right as to what you want to be and collecting and sharing before you kind of start otherwise and agreed that actually that would be useful. Otherwise, you just end up collecting and sharing a lot of information. That's not very useful to anyone, and so some of the you know, the planning and agreeing Yep, this is useful. Like less is more for me.

Table 15: Interview with an employee from North America.

Speaker	Text
Marijn Veth	Could you maybe tell me what your daily work within Company X exactly entails?
Interviewee	I work in marketing and execute the marketing plan for North America. This includes trade shows, conference involvement, advertising placements, podcasts, print articles, web articles, and a robust social media strategy.
Marijn Veth	How do you currently use market information in your work?
Interviewee	It's not super officially organized. Some of it is anecdotal information, and some is from industry numbers I pull myself. We have internal discussions and projects, and we are wrapping up a market research project for North American dairy soon.
Marijn Veth	Do you have a preference for market trends, competitor analysis, or customer analysis?
Interviewee	I think that it's kind of a combination of all of them that's really important. So like with my local team, we talk about all three of those categories quite a bit because I interact with our local like Technical Support and those that are helping on the sales side as well. So we're always having conversations about what competitors popping up in the countryside and what they're doing or what are customers seem to be having a keen interest in.
Marijn Veth	How do you collect market information from your colleagues?
Interviewee	Through discussions with local colleagues and I'm also very active online and on social platforms as well. So sometimes it's even something as simple as seeing someone from another company post an announcement on LinkedIn, and I'll grab it and I'll screenshot it and send it to all of our internal stakeholders like, hey, this announcement just passed or hey, this legislation just opened up XYZ opportunity or,
Marijn Veth	Do you always know which stakeholder to send information to?
Interviewee	I usually send it to those I am close with within the company that I think could use that information.
Marijn Veth	Do you feel that some market information is lacking?



Interviewee	Uh yes, because a lot of times I'll, I'll hear people talking or see something where people reference something that a certain company is doing in another market and I'll be like, well, that would have been really good to know because that's probably happening here and we just don't know about it
Marijn Veth	Are you satisfied with the process of collecting market information?
Interviewee	There's definitely opportunity for improvement.
Marijn Veth	How do you think it can be improved?
Interviewee	It would be cool to have a big live dashboard focused on our tier one countries with important market intelligence factors. It should compare things like connected cows, key features, leading competitors, and investment trends. So that it's like an apples to apples comparison between our focus countries in the focus areas that we do business to always be able to look at and reference and then maybe have some click through some from there of if this is something about competitor like a click through to an article or research piece or something that gives more supporting information about it or whatever the case may be.
Marijn Veth	Do you currently store market information somewhere?
Interviewee	Umm, usually this is probably gonna sound really bad, but we have a Microsoft Teams chat with some key stakeholders from North America, which is where I'm at and headquarters and so a lot of times I'll drop it in there.
Marijn Veth	Do you feel that information is sometimes lost?
Interviewee	Oh yeah.
Marijn Veth	Would you use a centralized information storing system?
Interviewee	Depends how it is made. Who's keeping it updated and how it's presenting if it's made in a not user friendly way or in a way that's only accessible in Location X which I struggle with because there are many files that I cannot access that are in that room office. So as a remote employee, it needs to be globally accessible easily. If it is relatively simple to view and use, and I feel like it's got credible sources behind it that are keeping it very updated and active. Then I would use it, but if it falls short in any of those areas, I'll be honest, I'm not looking for more things to take up time in my work day.
Marijn Veth	Would you accept a newsletter with relevant information?
Interviewee	Yes, but not daily. Bi-weekly or monthly would be fine.
Marijn Veth	Do you have any additional feedback or suggestions for improving the process of sharing and collecting market information?
Interviewee	It would be nice to have a dedicated plan or roadmap for market research, like what we're doing with Hammer. Knowing the long-term strategy for market research would help us build our plans better.

Table 16: Interview with employee from Latin America.

Speaker	Text
Marijn Veth	Could you please tell me how you currently use market information in your daily work?

Interviewee	In Latin America, I gather market information from various sources across different countries. Some countries like Chile have organized institutions providing data, while others like Mexico require networking to obtain accurate information. However, institutions are not so reliable and the information is sometimes quite outdated
Marijn Veth	Are you satisfied with the amount of information that is available to collect?
Interviewee	No, I'm not. I would like to have more, but yeah, you need to work with what you have at the moment.
Marijn Veth	Which form of market intelligence do you feel like you need more information about?
Interviewee	I would say all forms. it's important not only competition and customer, but also having a better idea of the whole spectrum. What is the market? What is the mindset?
Marijn Veth	Does your colleague also send you market information sometimes?
Interviewee	We share information because we're both in the same position. We're both application sales and application manager so we are on the sharing base. He's in charge of some countries. I'm in charge of some other countries and we share information about the different countries and what we do and some of those countries we act together like top to your countries, we act together. My manager is Hakeem. So each month we report to him, send him some reports and he shares it with the different key account managers or sales directors and this year and years before we've done several presentations about the Latin American market and our plans and what we need from the different stakeholders. Also, to some information we don't have access like Company X information. Company X is an international institution and gathers information records from different farms on the dairy industry around the world and it provides you with information on different countries.
Marijn Veth	Do you have an example for what you use market information for, for example decision making in your work?
Interviewee	Well, everything. And yeah, to do any Sales study, you need to have market information. Otherwise, you don't know what to plan and you will be off overshooting or undershooting.

Marijn Veth	If the process could be improved for you, uh, the engaging, sharing, collecting market information process, what would you like to have improved?
Interviewee	I believe more should be invested in market across tier two countries and improve the reliability and accessibility of market data, possibly through a centralized platform. It's good to keep that information up to date. So we can use it constantly.
Marijn Veth	If you would have access to such a system, you would also regularly uh upload for example articles or maybe events on that system, you will keep it up to date?
Interviewee	Yeah, my side, yes. Of course, if I only do that type of thing, it's gonna take too much time off me.
Marijn Veth	Do you use a database at the moment to store information?
Interviewee	We have SharePoint that we use. Within the team to share information about mostly related to products
Marijn Veth	Would you find a newsletter with updates on global dairy market information useful?
Interviewee	Yeah, that will be definitely interesting. But be careful not to get our mail box full of newsletters of the different domains.
Marijn Veth	Is there any additional feedback or suggestions you have regarding market information or maybe the development of the system?
Interviewee	Yeah, whatever we do, it's important to ensure accessibility.

Table 17: Interview with an employee from France.

Speaker	Text
Marijn Veth	How do you currently use market information in your work?
Interviewee	I gather information from colleagues and meetings. I also search on the internet and use my existing network. However, I need to verify the accuracy of the information I collect.
Marijn Veth	Which types of market information do you find most useful: consumer analysis, competitor information, or market trends
Interviewee	It's good to use whole because you can have a better picture, but in France, we don't have lots of good analysis or sometimes with some numbers, for example, if we want to know exactly how many machines were installed during one year, we have some numbers, but is it the right one? I don't know. It's not completely official. And if you ask to one brand, sometimes they lie, they say

	that we have a lot. What you say a lot. And they can put more numbers just to be the strongest.
Marijn Veth	Are there specific areas where you feel there is a lack of information?
Interviewee	Yes, especially in getting reliable and up-to-date data. We often have to rely on intuition and past experience.
Marijn Veth	How do you think the process can be improved of collecting information?
Interviewee	It's difficult. It's difficult. But for me, if you have one people who centralized all data, all information. These people can select and put because it's a big task, especially for older world to have connection with official organize. With official numbers, take time to, as I said, to read papers or to collect information on the whole company. It's a big task
Marijn Veth	How do you share the information you gather with your colleagues and do you know with who to share the information?
Interviewee	Not especially. My first action could be to speak with my team. Share together and imagine the future.
Marijn Veth	Would you like to receive a newsletter once in a while with updates, for example, on the most important articles that are stored in that month?
Interviewee	It could be for important information. Yeah. Because the information killed the information if you are too much. Because if you receive a mail every day, you don't take time to read it. It's important to have principle or main information and to know if it's possible to have a bibliotech. And okay. Competitors. I can go. And the different information you can go to collect them. Like a filtering. So if you want exactly information on competitors, you get only the information on competitors.
Marijn Veth	And on the newsletter, if you would want to receive one, how often do you want to receive one, you think?
Interviewee	It could be good. One per month. Just two lines. Oh, we collect info about comapny X for this subject. We collect the information for this company. And go to the website or the place where you can read more. It could be. For me, more simple. And after, because how to use it, but how to made it. It's important for the people who made that, that it's simple. And it needs to be simple to collect. Fast. You know, it's too difficult then nobody uses it
Marijn Veth	Are you satisfied with the way colleagues share information with you?
Interviewee	It's difficult to give an answer. I just arrived. Globally, for the moment, I'm happy.

## Appendix B1

### References

- 1) Ahmady, G. A., Nikooravesh, A., & Mehrpour, M. (2016). Effect of Organizational Culture on knowledge Management Based on Denison Model. *Procedia - Social and Behavioral Sciences*, 230, 387-395. <https://doi.org/10.1016/j.sbspro.2016.09.049>
- 2) Heerkens, H. (2014). mpsm phase 1[video]. Vimeo. [mpsm phase 01 on Vimeo](https://vimeo.com/101616161)
- 3) Falahat, M., Ramayah, T., Soto-Acosta, P., & Lee, Y. (2020). SMEs internationalization: The role of product innovation, market intelligence, pricing and marketing communication capabilities as drivers of SMEs' international performance. *Technological Forecasting and Social Change*, 152, 119908. <https://doi.org/10.1016/j.techfore.2020.119908>
- 4) [Exploratory Research | Definition, Guide, & Examples \(scribbr.com\)](https://www.scribbr.com/definition/exploratory-research/)
- 5) [Descriptive Research | Definition, Types, Methods & Examples \(scribbr.com\)](https://www.scribbr.com/definition/descriptive-research/)
- 6) Cruz-Martínez, R. R. (2022). Practice guide: Setting up your systematic search strategy (Version 1). Zenodo. <https://doi.org/10.5281/zenodo.7062727>
- 7) Endres, H., Helm, R., & Dowling, M. (2020). Linking the types of market knowledge sourcing with sensing capability and revenue growth: Evidence from industrial firms. *Industrial Marketing Management*, 90, 30-43. <https://doi.org/10.1016/j.indmarman.2020.06.004>
- 8) Ode, E., & Ayavoo, R. (2020). The mediating role of knowledge application in the relationship between knowledge management practices and firm innovation. *Journal of Innovation & Knowledge*, 5(3), 210-218. <https://doi.org/10.1016/j.jik.2019.08.002>
- 9) Gonzalez, R. V. D., & De Melo, T. M. (2018). The effects of organization context on knowledge exploration and exploitation. *Journal of Business Research*, 90, 215-225. <https://doi.org/10.1016/j.jbusres.2018.05.025>
- 10) Branco F, Gonçalves R, Moreira F, Au-Yong-Oliveira M, Martins J. An integrated information systems architecture for the agri-food industry. *Expert Systems*. 2021;38:e12599. <https://doi.org/10.1111/exsy.12599>
- 11) Martins, J., Branco, F., Gonçalves, R., Au-Yong-Oliveira, M., Oliveira, T., Naranjo-Zolotov, M., Cruz-Jesus, F., 2019. Assessing the success behind the use of education management information systems in higher education. *Telematics and Informatics* 38, 182–193.. <https://doi.org/10.1016/j.tele.2018.10.001>
- 12) Adam, A., 2007. Implementing Electronic Document and Record Management Systems.. <https://doi.org/10.1201/9780849380600>
- 13) Hammer, M., & Hershman, L. W. (2010). *Faster, cheaper, better: The 9 levers for transforming how work gets done*. Crown Business.
- 14) Jones, S. (2012). EGovernment Document Management System: A case analysis of risk and reward. *International Journal of Information Management*, 32(4), 396-400. <https://doi.org/10.1016/j.ijinfomgt.2012.04.00>
- 15) [Kenneth C.Laudon,Jane P .Laudon - Management Information Sysrem 13th Edition .pdf \(dinus.ac.id\)](https://www.dinus.ac.id/management-information-systems-13th-edition/)
- 16) Alalwan, J. A. (2012). A taxonomy for decision support capabilities of enterprise content management systems. *The Journal of High Technology Management Research*, 24(1), 10-17. <https://doi.org/10.1016/j.hitech.2013.02.001>

- 17) Hullavarad, S., O'Hare, R., & Roy, A. K. (2015). Enterprise Content Management solutions—Roadmap strategy and implementation challenges. *International Journal of Information Management*, 35(2), 260-265. <https://doi.org/10.1016/j.ijinfomgt.2014.12.008>
- 18) Poppe, C., Martens, G., Mannens, E., & Van de Walle, R. (2009). Personal content management system: A semantic approach. *Journal of Visual Communication and Image Representation*, 20(2), 131-144. <https://doi.org/10.1016/j.jvcir.2008.12.002>
- 19) Tankard, C. (2015). Data classification – the foundation of information security. *Network Security*, 2015(5), 8-11. [https://doi.org/10.1016/S1353-4858\(15\)30038-6](https://doi.org/10.1016/S1353-4858(15)30038-6)
- 20) Putra, P. O. H., Dewi, R. A. W. W. C. K., & Budi, I. (2022). Usability factors that drive continued intention to use and loyalty of mobile travel application. *Heliyon*, 8(9), e10620. <https://doi.org/10.1016/j.heliyon.2022.e10620>
- 21) Alavi, Maryam & Leidner, Dorothy. (2001). Review: Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues. *MIS quarterly*. 1. 107-. 10.2307/3250961

## Appendix C1

The sub-research questions discussed in Chapter 1.3 are elaborated upon further in this section. The data gathering and -processing methods and limitations are discussed for each sub-research question. In addition, the nature (e.g., descriptive, or explanatory) of the sub-research question is mentioned. Finally, the sub-research question’s contribution to solving the main research question is addressed. Table 18 consolidates each of the abovementioned elements with the appropriate sub-research question.

Exploratory research is defined by George (2021) as a methodological approach focused on investigating research questions that study a field that has not been extensively examined previously. The outcomes of exploratory research usually exhibit a qualitative nature. Selecting a descriptive research approach is appropriate when the aim is to accurately describe a situation according to McCombes (2019).

Table 18: Components per sub-research question.

Sub-research question	Data gathering and processing method	Nature	Limitations	Progress towards solving the core research question
“How do employees within Company X currently engage with market intelligence to enhance strategic decision-making and operational effectiveness within the dairy industry?”	This data-gathering method involves conducting interviews and attending meetings, allowing for in-depth insights from national and international personnel. This data-gathering method results in a qualitative data analysis. The interviews consist of open-ended questions to understand how market intelligence is utilised. By identifying the current way of working, potential areas of improvement can be identified in addition.	This knowledge question’s research type is descriptive to fully understand how market intelligence is currently managed.	Potential limitations involved with this research question include subjectivity and bias. Personal preferences concerning the method of engaging with market intelligence can influence the outcomes of the conducted interviews. One specific method might be mentioned more frequently than other valuable information management methods. In addition, there will be variability among employees. Employees engage with market intelligence differently depending on their roles and level of access to information. Therefore, they will have a different vision and opinion regarding	By examining how Company X’s personnel currently engage with market intelligence, existing practices and processes can be identified. This provides insights into where potential areas of improvement lie. Furthermore, an indication can be made of the current level of satisfaction towards the market intelligence management processes.

			the current market intelligence management system. To minimize the influence of these limitations, it is crucial to consider all insights gathered from the interviews and create a coherent rational answer.	
<i>“What functionalities do Company X’s employees require in a centralised market intelligence management system?”</i>	Interviews are conducted to identify the needs and requirements for the market intelligence management to exhibit. Questions about their current market intelligence needs are asked. The data type resulting from the interviews is qualitative.	This knowledge question exhibits an exploratory nature. The goal is to explore the needs of Company X’s personnel.	Potential limitations corresponding to this research question involve diverse requirements. Personnel have different roles, needs and priorities. This might complicate the process of identifying an appropriate market information management system satisfying all users. In addition, due to personal preference, some functionalities might be mentioned more than other important functionalities. To limit the influence of these limitations it is crucial to evaluate all answers and establish a rational coherent list of functionalities, satisfying as many users as possible.	By identifying the required functionalities of the centralised market intelligence management system, user needs are understood. Including these needs as requirements for the new system to exhibit, will lead to increased usability and effectiveness of the system. This ensures practicality in day-to-day operations.



<p><i>“Which existing information management system exhibits requisite functionalities and operational demands of Company X’s personnel for managing market intelligence effectively?”</i></p>	<p>A literature review is conducted to explore potential information management systems matching the previously identified requirements of Company X’s personnel. Additionally, a meeting with the company supervisor will lead to the final selection of an information management system.</p>	<p>This research question exhibits an explorative nature. The goal is to investigate existing information management systems.</p>	<p>Potential limitations involve the availability of information. The number of scholarly articles discussing the functionalities of an information management system might be limited, which could restrict the scope of the research.</p>	<p>By identifying potential information management systems, an informed decision can be made regarding selecting a centralised market information management system. This leads to optimised resource allocation and an optimal alignment between user needs and functionalities.</p>
<p><i>“What design methodologies and strategies, described in scholarly literature, can be employed to design a centralised market intelligence management system fulfilling the requirements of Company X’s personnel?”</i></p>	<p>A systematic literature review is performed on methodologies and strategies for designing an information management system. This ensures well-informed decision-making and an optimised system design.</p>	<p>This research question exhibits an explorative nature. The goal is to investigate existing methodologies and strategies regarding designing an information management system.</p>	<p>Potential limitations involve the availability of information. The number of scholarly articles discussing existing methodologies and strategies regarding designing an information management system might be limited, which could restrict the scope of the research. Additionally, some strategies might be too complex or require expertise to implement.</p>	<p>This question contributes to solving the main research question by providing a theoretical foundation necessary to answer the main research question.</p>

<p>"What critical factors must be assessed to ensure the successful implementation of the market intelligence management system within Company X?"</p>	<p>To ensure the successful implementation of the information management system, it is essential to inform Company X's personnel about its launch and provide a user manual. Meetings with experts are conducted to gather the information necessary for a successful implementation. Company X has implemented similar systems in the past. Analysing these implementations can provide useful information on critical factors.</p>	<p>This research question exhibits an exploratory nature. The goal is to explore the wide range of factors that could influence the implementation's success.</p>	<p>Potential limitations include incomplete information. The data collection method involves gathering information from Company X experts. However, certain critical factors may not be apparent, leading to oversights. Therefore, it is essential to rationalise the gathered information and discuss the results with the company supervisor, ensuring no crucial factors are overlooked.</p>	<p>This sub-research question contributes by successfully implementing the information management system, allowing for risk minimisation and optimised resource allocation. The main research question also involves an information system that allows for easy access, archiving and sharing of market intelligence. The achievability of this partially depends on its implementation, to which this question is dedicated.</p>
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## Appendix D1

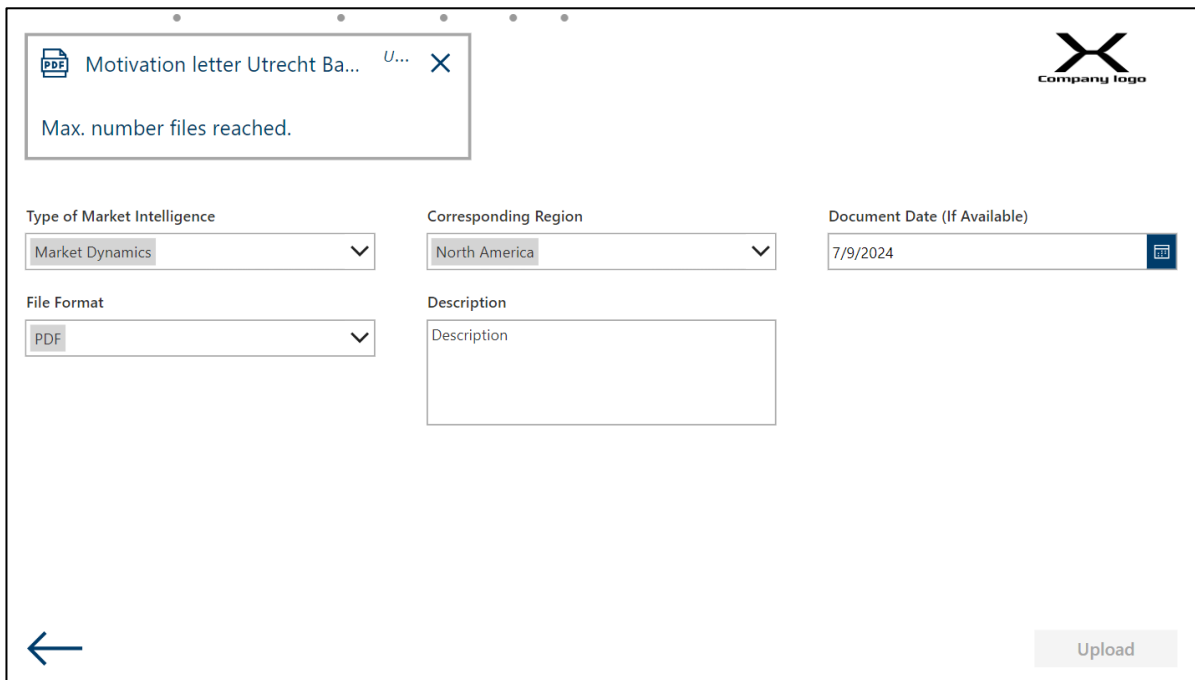


Figure 36: Subtle animation in the second user interface of Pulse.

Figure 36 illustrates the second user interface after the upload button is clicked. The five dots at the top of the interface move from left to right, indicating that the upload process is initiated and the user must wait until it has finished.

Figure 37 illustrates the control size of Pulse which is depicted on the left side compared to the control size of the PowerApps integration shown on the right side of the figure. The controls exhibit similar formats ensuring consistency in design, and enhancing user experience.

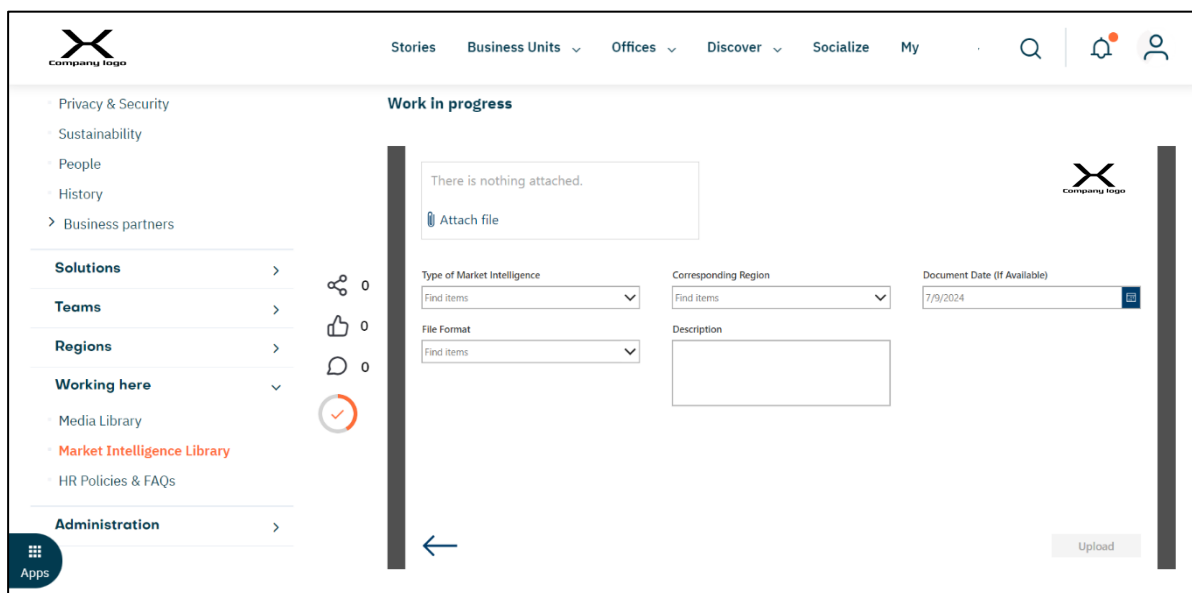


Figure 37: Control size Pulse compared to control size PowerApps integration.

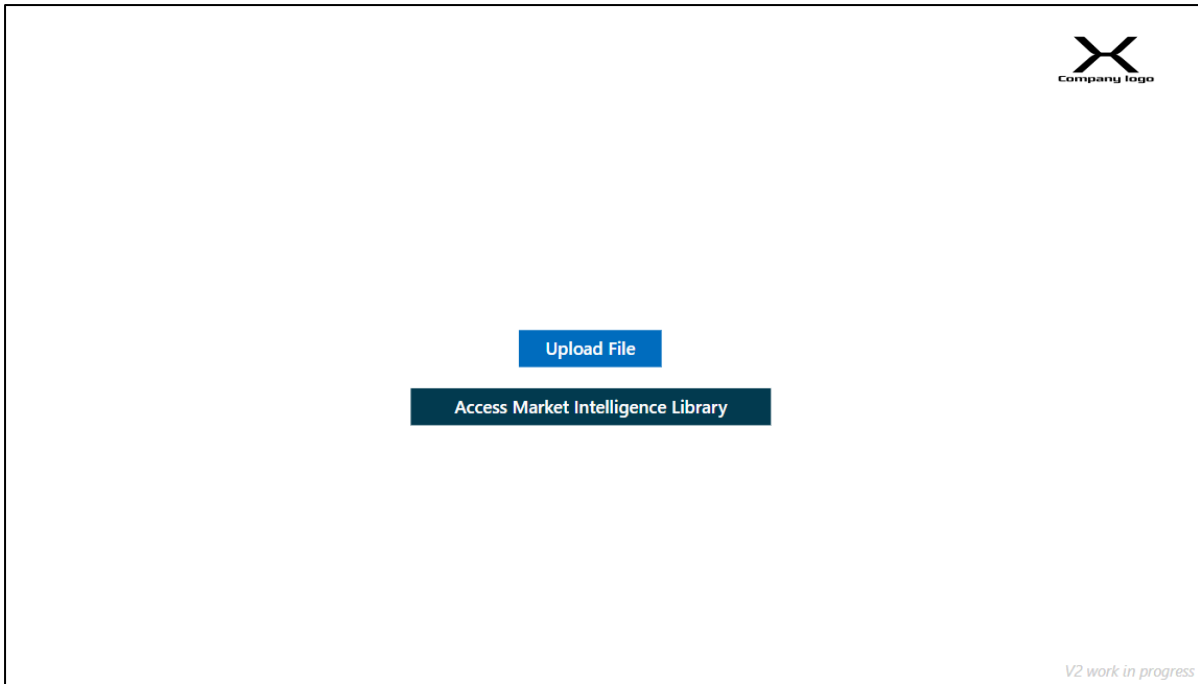


Figure 38: Hover mode on the "Upload File" button.

Figure 38 depicts the animation of the hover mode. The button changes colour whenever a user navigates their cursor above a clickable button in the PowerApps interface. This notifies the user that the element is clickable.

## Appendix D2

The user's journey throughout the uploading files process via the PowerApps application is mapped out in this section. Furthermore, the corresponding code is added respectively.

At the first interface, the user decides whether to click "Upload a file"

(1) `Navigate(Screen2)`

Or access the market intelligence library.

(2) `Launch("Site_Address")`

When the user selects the "Upload a file" button, the user is navigated to the second screen. Whenever the second interface is initiated, the attachment and metadata forms are reset.

(3) `Reset(Attach);ResetForm(FormMI)`

The user has the option to select the arrow in the bottom left corner of the interface to navigate to the previous visited screen.

(4) `Back()`

The user can attach a file, a component provided standard by PowerApps. The maximum number of attachments is set to one in this research to ensure metadata is entered for every single file. However, when metadata does not play an essential role, the number of attachments can be increased. The maximum attachment size is set to 200MB, however this can also be adjusted according to preferences. Next, the user is prompted to insert metadata. The metadata control is a standard component of PowerApps. The data is connected to the corresponding market intelligence library in SharePoint. Whenever the columns of the library, called contents in SharePoint, get adjusted and specified with metadata, the PowerApps connection needs to be refreshed to update the form in PowerApps. Figure 40 illustrates a column in the SharePoint library and depicts the corresponding choices for the region. Figure 39 represents the same set of regions in the PowerApps integration. This connection functions identically for the other metadata forms.

Inserting the document date is facilitated by a date picker. The format of the date picker is illustrated in Figure 41.

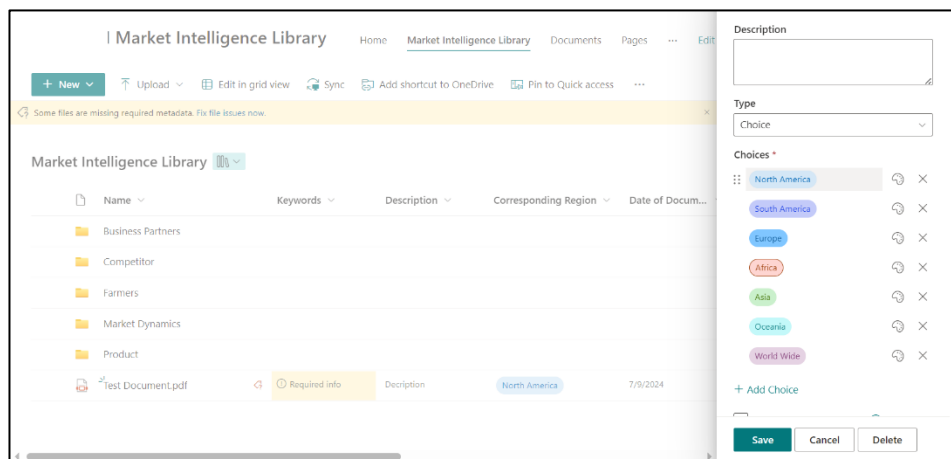


Figure 40: Column in SharePoint involving regional metadata.

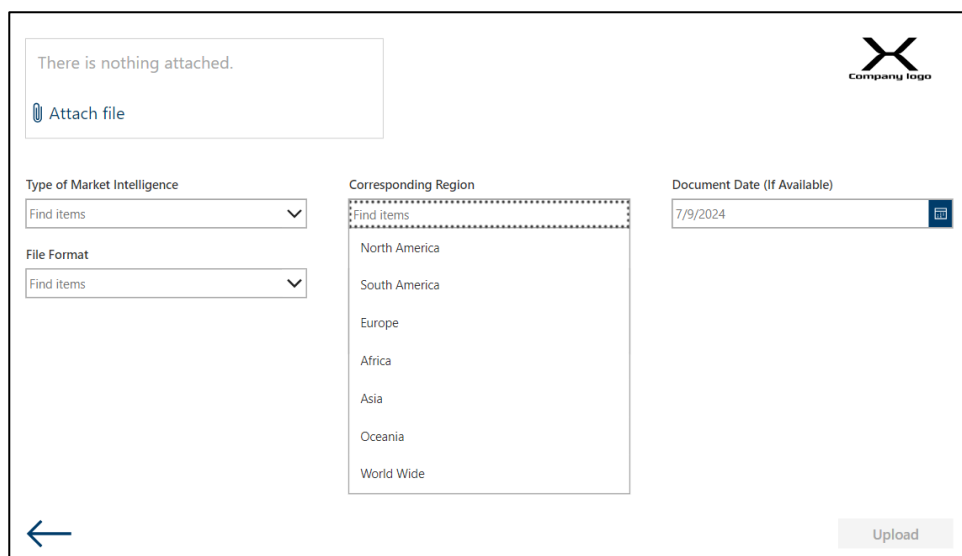


Figure 39: Corresponding choices for region in PowerApps.

The user is only able to click the “Upload” button if all metadata has been added and a file has been attached.

```
(5) If(
    IsBlank(DataCardValue13.SelectedItems) ||
    IsBlank(DataCardValue14.SelectedItems) ||
    IsBlank(DataCardValue5.SelectedItems) ||
    IsBlank(DataCardValue16.Text) ||
    CountRows(Attach.Attachments) = 0,
    DisplayMode.Disabled,
    DisplayMode.Edit
)
```

When all metadata has been inserted, the user is able to click the “Upload” button. This initiates code (6).

(6)

```
UploadfiletoSharePoint.Run(JSON(FormMI.Updates,JSONFormat.IncludeBinary Data), {file:{name: First(Attach.Attachments).Name,contentBytes: First(Attach.Attachments).Value}}); Navigate(Screen3)
```

First, the “Upload file to SharePoint” flow is started. Figure 42 depicts the components of this flow. The flow has two main purposes. The first objective is to upload the file that has been attached to the market intelligence repository. In addition, the flow inserts the corresponding metadata. The first component is used to name the functions of the flow as preferred. As this flow has two functions, two names should be given. The second component creates a new file in the SharePoint Library. The input for the file name is identical to the file attached to the second interface. In addition, the content of the file content to the file attached to the second interface. In summary, the inputs for the second component of the flow are derived from the attachment component in the second user interface. The third component of the flow is used to provide the market intelligence library in the correct format for the fourth component. The fourth component of the flow facilitates updating the file contents with the corresponding metadata. It uses the created file in component two as itemid and outputs the metadata in JSON format. The purpose of the last component of the flow is to notify the system that the flow was successful, and the process can be terminated.

After the flow is concluded successfully, the user is navigated to the third interface. The user can upload another file (1) or launch the market intelligence library (2).

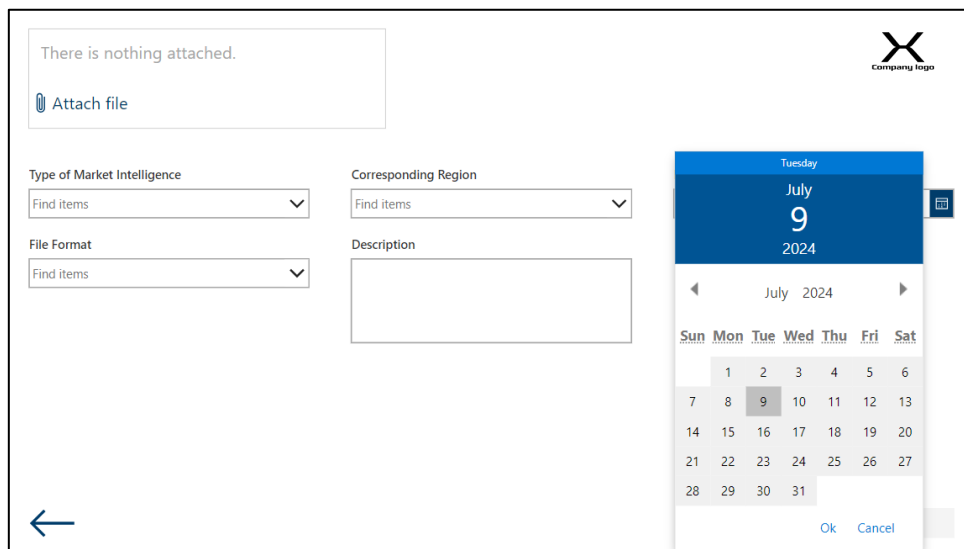


Figure 41: Date picker component format.

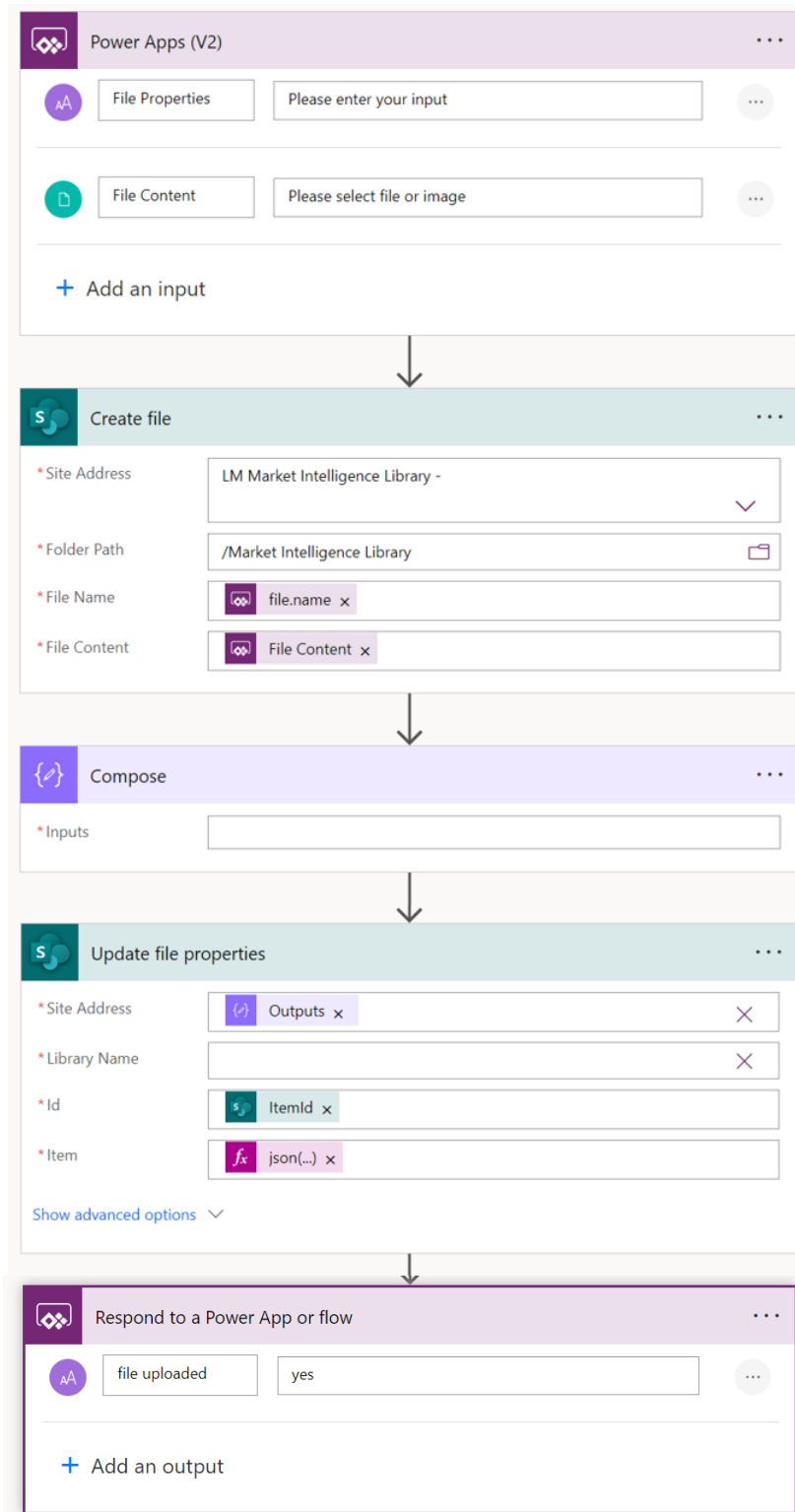


Figure 42: Dynamic flow in PowerApps used to upload files and attach metadata to the SharePoint library.

# Appendix E1

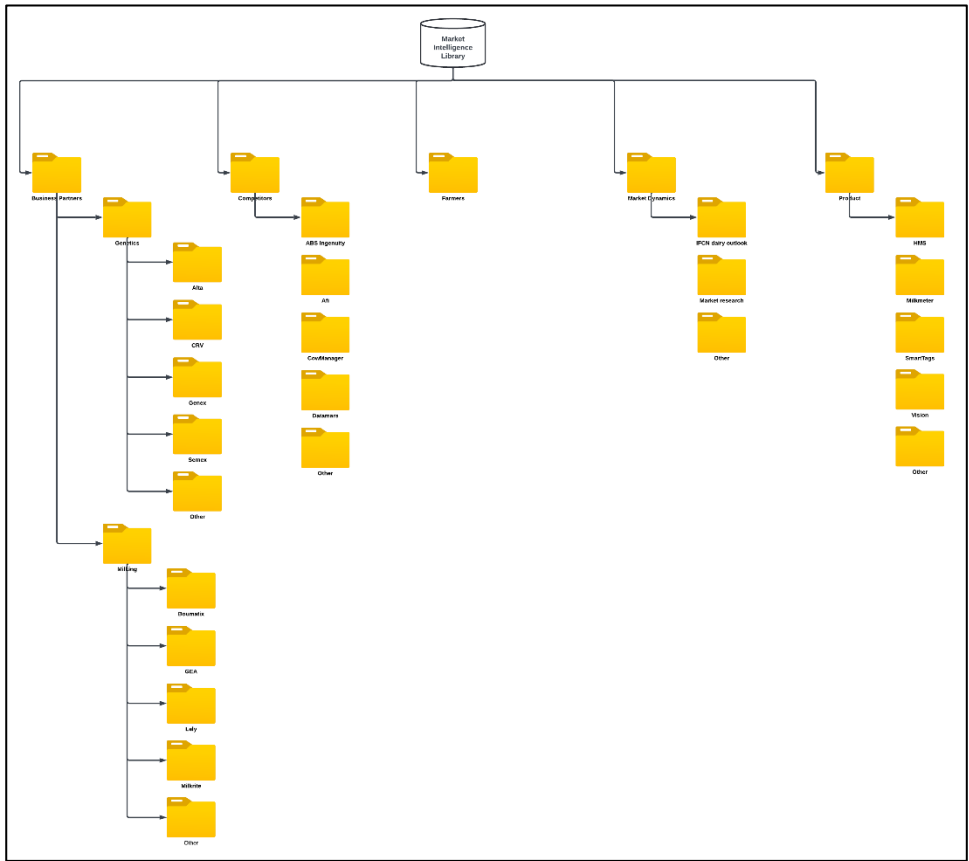


Figure 43: Revised folder hierarchy.

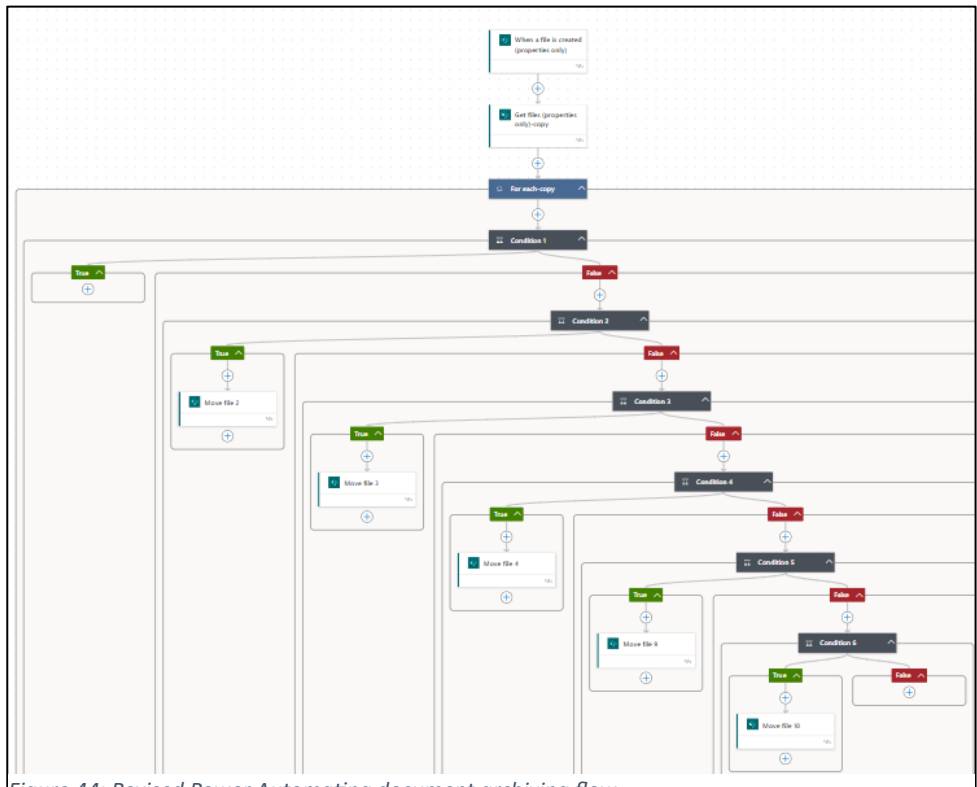


Figure 44: Revised Power Automating document archiving flow.



## Appendix F1

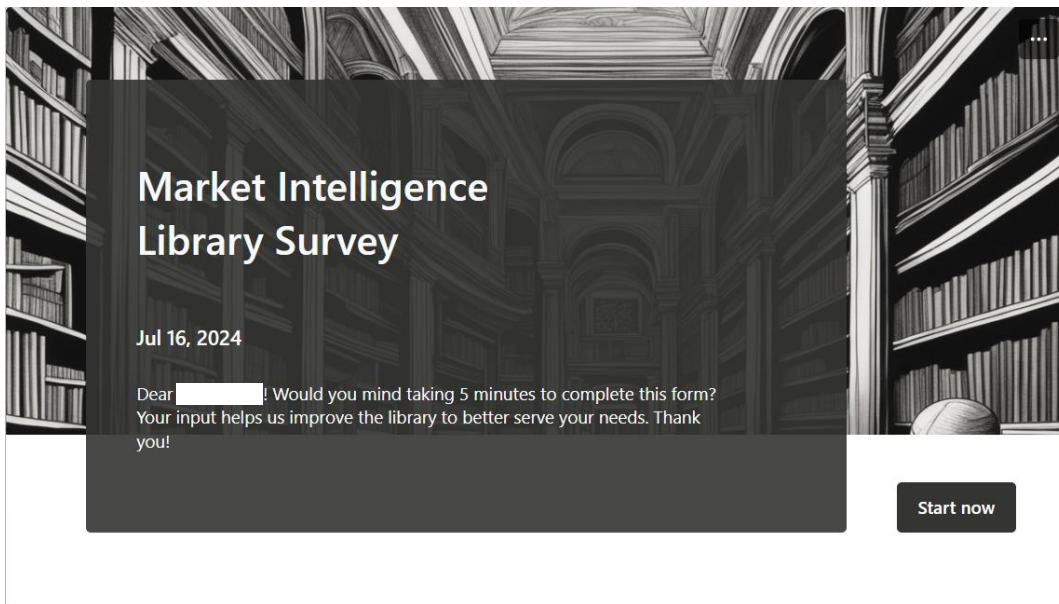


Figure 46: Survey interface.

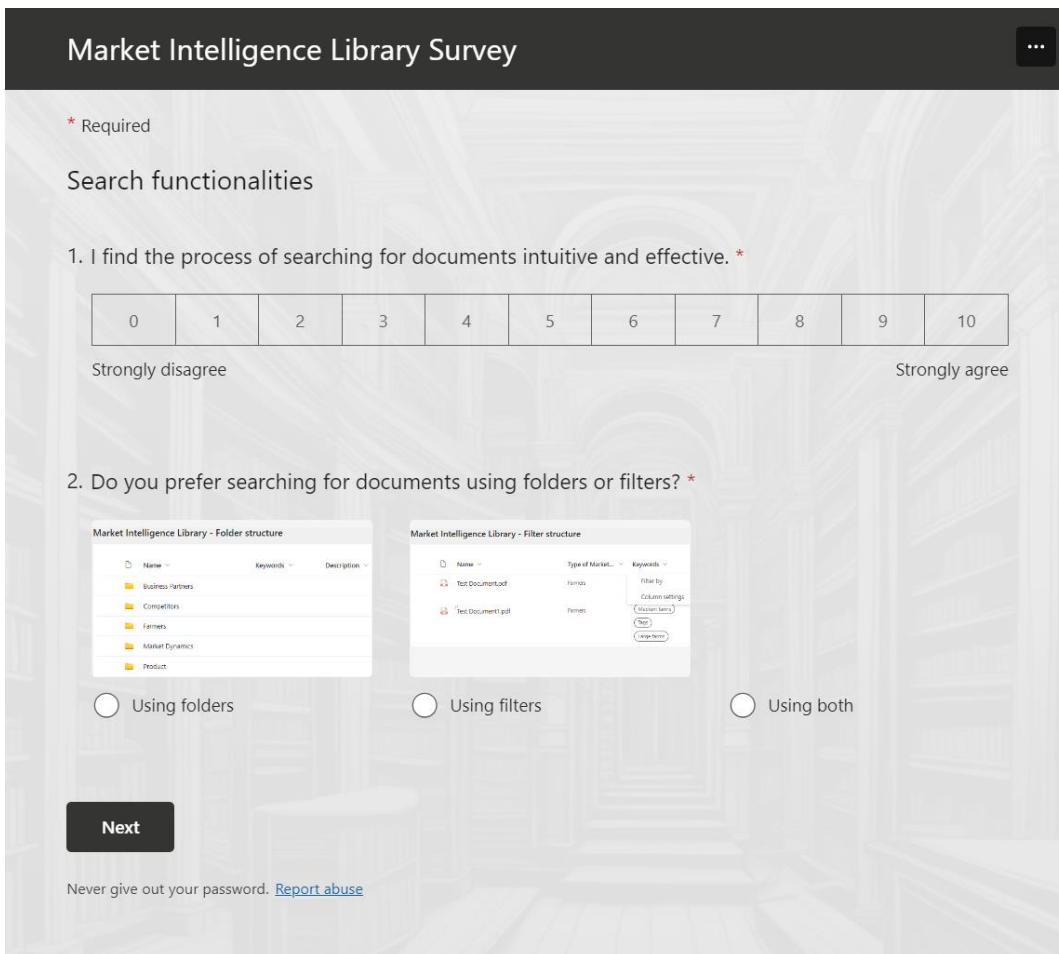


Figure 45: Evaluative survey - Search functionalities.

Market Intelligence Library Survey

\* Required

### Uploading functionalities

3. I find the steps to upload a file clear and intuitive. \*

0	1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	---	----

Strongly disagree Strongly agree

4. I find that the necessary details are asked to describe the file clearly when uploading. \*

0	1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	---	----

Strongly disagree Strongly agree

5. I find that uploading files requires minimal effort. \*

0	1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	---	----

Strongly disagree Strongly agree

[Back](#) [Next](#)

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Figure 48: Evaluative survey upload functionalities

Market Intelligence Library Survey

\* Required

### User-friendliness

6. I think that the library is easy to navigate. \*

0	1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	---	----

Strongly disagree Strongly agree

7. I think that the library interface is intuitive and user-friendly. \*

0	1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	---	----

Strongly disagree Strongly agree

[Back](#) [Next](#)

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Figure 47: Evaluative survey – User-friendliness.

Market Intelligence Library Survey

\* Required

### Design

8. I find the design of the library interface visually appealing. \*

0	1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	---	----

Strongly disagree Strongly agree

9. I find the layout of the library well-organised. \*

0	1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	---	----

Strongly disagree Strongly agree

10. I think that the overall design enhances my user experience. \*

0	1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	---	----

Strongly disagree Strongly agree

[Back](#) [Next](#)

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Figure 50: Evaluative survey – Design.

\* Required

### Overall satisfaction

11. What is your overall experience with the Market Intelligence Library? \*

Very poor ☆ ☆ ☆ ☆ ☆ Excellent

12. I would recommend the library to my colleagues. \*

0	1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	---	----

Not at all likely Extremely likely

13. What improvements would you suggest for the library?

Enter your answer

14. Do you have any additional feedback, comments, or suggestions you would like to provide?

Enter your answer

[Back](#) [Submit](#)

Figure 49: Evaluative survey - Overall satisfaction.

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**Marijn Veth**  
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## Market Intelligence Library

0 1 0

Welcome to the Market Intelligence Library page, your go-to resource for gathering strategic insights to support informed decision-making initiatives. Whether you need information about market dynamics, competitors, farmers, products and business partners, the Market Intelligence Library has everything you need.

Below, you can access the library or upload a file by clicking the blue buttons. If this is your first time using the library, the information provided on this page will guide you on what to upload and how to use the library efficiently.

Company logo

Upload File  
Access Market Intelligence Library

The library

The purpose of the Market Intelligence Library is to provide insights into the external business environment of

Figure 51: Pulse environment with the navigation pane on the left.

## Appendix F2

Based on the survey scores, the library received a median score of 8.0 out of 10. Although this indicated that the market intelligence library is on the right path to meeting user's needs, there is still room for improvement. Specifically, the file upload process received relatively low scores compared to other elements. Comments related to this aspect include:

*"I think that the biggest point of feedback is that when adding a file, you can't choose the subfolders. This would be a great feature that you could add, as it would reduce the time for yourselves to move the different uploaded documents around."*

And

*"Ik vind dat window waar je eerst moet inloggen en daarna files kunt uploaden niet super intuïtief. Hoe vind je die plek nu als je niet de link uit de mail hebt? Ik kon hem via het menu aan de linkzijde in ieder geval niet vinden."*

Translated:

*I find the window where you first have to log in and then upload files not very intuitive. How do you find that place now if you don't have the link from the email? I couldn't find it through the menu on the left side at least.*

The first comment, which suggests the option to upload files in specific sub-folders using the PowerApps integration, is a valid point. During the design phase discussed in Chapter 4, a user-centric approach was chosen. This approach involves displaying only relevant content and ensuring that processes are efficient and effective while requiring minimal user effort. This, combined with the consideration that over time the library could become unstructured if users are required to insert various metadata, led to the decision to simplify the uploading process and have a member of the MI team verify and structure all uploaded documents. However, if more responses are collected and this concern is frequently mentioned, it will be necessary to reconsider this decision.

The second comment highlights that the PowerApps integration in Pulse, which facilitates file uploads and access to the market intelligence library, is not easily accessible. Currently, users must select the "Working here" tab in the left pane, which shows the option to navigate to the market intelligence library, as depicted in Figure 37 in [Appendix F1](#). This is indeed unintuitive, and it is therefore recommended that the Pulse development team create a direct header for the market intelligence library in the left navigation pane. Overall, the Pulse environment is new to most Company X's personnel and will require time for familiarisation.

The feedback received provides valuable insights into the initial impressions of the market intelligence library's users. The feedback has been communicated to the market intelligence team and can be used to identify and prioritise areas of the library that require the most urgent improvements.

Table 19: Evaluative survey qualitative responses.

Evaluative survey topic	Original response	Translation
Do you prefer searching for documents using folders or filters?	40% Using folders 20% Using Filters 40% Using both	

What improvements would you suggest for the library?		
1.	<p>"I have to say that the library, for being a first version is really cool! I think that the biggest point of feedback is that when adding a file, you can't choose the subfolders. This would be a great feature that you could add, as it would reduce the time for yourselves to move the different uploaded documents around. Also, when I was browsing the library, I saw that there is currently no integrated AI feature. This would be really beneficial in many different instances. As for example, when uploading documents, you could allow AI to do the sorting for you. Not only that, it could be a great way to gain new insights into the data."</p>	
2.	<p>"perhaps a search button on top, to find a specific document"</p>	
3.	<p>"Ik vind dat window waar je eerst moet inloggen en daarna files kunt uploaden niet super intuïtief. Hoe vind je die plek nu als je niet de link uit de mail hebt? Ik kon hem via het menu aan de linkerzijde in ieder geval niet vinden. Als je er eenmaal in zit zie je dat je die folderstructuur ook gewoon vanuit OneDrive kunt benaderen. Dan ga je die bookmarken om het makkelijk te kunnen benaderen. En als je eenmaal daar in die folderstructuur zit kun je ook gewoon bestanden uploaden maar dan zonder alle meta-informatie op te geven. Als je dit een beetje georganiseerd wilt houden moet er denk ik nog</p>	<p>I find the window where you first have to log in and then upload files not very intuitive. How do you find that place now if you don't have the link from the email? I couldn't find it through the menu on the left side at least. Once you're in, you see that you can also access that folder structure directly from OneDrive. Then you'll bookmark it to easily access it. And once you're in that folder structure, you can also just upload files without providing all the meta-information. If you want to keep this a bit organized, I think some adjustments still need to be made.</p>

	wel het één en ander afgeblokt worden."	
Do you have any additional feedback, comments, or suggestions you would like to provide?		
1.	"Great job with the library, it looks awesome!"	
2.	"its good that we now have such a collection of those files and information, important is to make this visible into the organisation, so that more people are aware and add relevant information themselves, so that the intel is growing."	
3.	"Who will ensure that uploaded documents at Company X are relevant, meet quality standards,, maintain the folder structure, have correct tags, and are in English?"	
4.	"Ik had de library pas online gezet als er iets meer content in zou staan. Nu zit je vooral tegen een lege folderstructuur aan te kijken. Geeft niet direct de beste user experience."	I would have only put the library online if it had a bit more content. Right now, you're mainly looking at an empty folder structure. It doesn't immediately provide the best user experience.