

PROJECT: <SPARC PROCESS IMPROVEMENT>

SPARC



Date completed: <Datum voltooid>
Author: <Auteur>

Version: <Versie>
Status: <Status>

Document ID: <Document ID>
File name: Research Document SPARC 0.4.docx

Management Summary

This research document presents the findings and recommendations of the SPARC Process Improvement project, aimed at addressing operational inefficiencies and aligning SPARC's business processes with its strategic goals. SPARC, a collaborative platform for applied research and ICT innovation, faces challenges related to process standardization, data management, and communication, which limit its ability to grow and effectively serve its members. This project provides a structured approach to overcoming these challenges.

SPARC collaborates with Fontys ICT, industry partners, and researchers to foster ICT-related innovations through applied research projects. As the organization grows, its current processes have proven insufficient in supporting its operational complexity. Key issues include fragmented data storage, unclear workflows, inefficient project tracking, and suboptimal communication between members.

To address these challenges, the project focuses on mapping and optimizing business processes, evaluating suitable workflow tools, and recommending scalable solutions that enhance efficiency and member engagement.

Objectives and Deliverables

The main objectives of the project are:

1. **Process Mapping:** Map all SPARC processes using Business Process Model and Notation (BPMN) to improve clarity and efficiency.
2. **Workflow Optimization:** Evaluate Blueriq and alternative tools, such as Monday.com, to identify the most suitable solution for managing SPARC's workflows.
3. **Improved Communication:** Develop frameworks and tools to enhance communication and collaboration among members.
4. **Centralized Data Management:** Propose scalable solutions for efficient storage and management of member information.

Key deliverables include BPMN diagrams for SPARC's processes, a comparative analysis of workflow tools, and actionable recommendations for implementing improved processes and technologies.

Approach and Methodology

The research was conducted using a hybrid project management approach combining waterfall and agile methodologies. The project was divided into three phases:

1. **Planning Phase:** Identified challenges and defined the scope.
2. **Research Phase:** Conducted stakeholder interviews, literature reviews, and tool evaluations.
3. **Implementation Phase:** Developed prototypes, gathered feedback, and refined deliverables.

Testing and stakeholder feedback were important to ensuring alignment with SPARC's needs. Tools and methodologies were evaluated based on criteria such as scalability, usability, integration, and cost-effectiveness.

Findings and Recommendations

The research revealed several inefficiencies in SPARC's current operations, including manual workflows, fragmented data systems, and limited use of technology to streamline processes. The recommendations include:

- **Process Optimization:** Standardize workflows using BPMN to ensure clear and efficient operations.
- **Technology Adoption:** Replace Blueriq with Monday.com for workflow management due to its user-friendliness, scalability, and cost-effectiveness.

- **Data Centralization:** Develop a unified database integrated with existing systems like Exact Online and Fontys CMS to eliminate redundancies and improve accessibility.
- **Enhanced Communication:** Implement structured communication frameworks and centralized platforms to improve collaboration among members.

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1 Introduction

This research document focuses on improving SPARC's processes by identifying problems and finding ways to make things work better. It explains the purpose of the research, the issues SPARC is facing, and the steps taken to produce helpful solutions. The document also describes the tools and methods used to answer key questions and propose ideas that SPARC can implement.

1.1 Document Objective

The goal of this document is to share the research results for the SPARC Process Improvement project. It aims to:

- Highlight the challenges SPARC is currently dealing with.
- Suggest ways to make SPARC's processes smoother and more efficient.
- Review and compare tools like Blueriq and other options for mapping and managing workflows.

This document covers the following main points:

- **Research Goals:** What the research set out to achieve.
- **Challenges Identified:** A look at the problems in SPARC's current processes and why they happen.
- **Research Approach:** How the research was done and the steps taken to collect useful information.
- **Findings and Suggestions:** Practical ideas and recommendations for tools and strategies to improve SPARC's operations.

2 Context & Background

2.1 Context

Bravo Insights is a company composed of twelve students from the Advanced Business semester at Fontys University of Applied Science, working on three projects. The current project is in collaboration with **SPARC**, a sharing platform for applied research co-operation, which is a unique and unparalleled concept now. It focuses on initiating and accelerating ICT-related innovations.

Independent companies have bundled their innovative strengths in SPARC to enhance innovative strength together with education and research. SPARC collaborates with lecturers, researchers, and students of the Fontys University of Applied Sciences in research and experimentation.

Members of SPARC introduce research proposals for approval which are then implemented in educational context as applied research. In exchange, SPARC members contribute to an Innovation Fund managed by SPARC, which finances these research projects.

In 18 weeks (about 4 months), the project group will assist SPARC in implementing their new strategy. The main assignment is to map out all processes and integrate them in the Blueriq workflow tool. Additionally, the team will provide advice on alternative tools that could be used.

The project contact people for SPARC are Johan van den Heuvel and Bart van Gennip, who can be referred to as product owners. Weekly meetings will be held to discuss the project progress and results.

The Blueriq workflow tool will be available to the project group, and they will receive guidance on how to use the software.

2.2 Goal of the project

Problem/Opportunity: SPARC is working with Fontys ICT, companies, and other partners to foster ICT innovation through collaborative projects. As SPARC grows its network and professionalizes its operations, they face the task of documenting and mapping all internal processes related to member administration, project management, and reporting. This includes accurately visualizing workflows and identifying potential tools for process automation. Although they are considering Blueriq for this task, there are concerns that it might be too complex for SPARC's specific needs, and alternatives may be better suited.

Goal: The goal is to map all internal processes in a clear, standardized format (BPMN) and evaluate Blueriq alongside alternative workflow tools to determine the most appropriate solution for managing SPARC's internal processes efficiently.

3 Project definition

3.1 Assignment Description

The assignment is to map all business processes at SPARC, optimize them and implement them in the Blueriq workflow tool. In addition, we will evaluate alternative tools and recommend which one best suits SPARC's need. The assignment also includes improving communication, project tracking and data management, while also increasing member engagement.

Business Problem

SPARC faces several operational inefficiencies in business processes, communications, and data management. SPARC intends to grow but is currently held back by the lack of structured workflows and effective tools to manage projects. This prevents them from properly tracking progress on projects, for example, and limits communication among members. Without a structured approach to communication and data management, SPARC runs the risk of further inefficiencies, poorer communication with members and delays of projects.

What does SPARC really need?

- Clearly map processes to streamline workflow, reduce redundant tasks and ensure projects are managed effectively.
- Exploring a workflow tool (such as Blueriq or alternatives) suitable for SPARC's specific needs.
- Improved communication to keep stakeholders informed and involved throughout the project.
- Centralized storage to ensure that data management is easily accessible and will provide better reporting of project results.
- Improved member engagement through a more professional and transparent tracking system for the projects.

Category	Requirements/Wishes
Specific Client Requirements	-Map out all the processes within SPARC -Provide recommendations for alternative tools.
Minimum Quality Requirements	-Accurate mapping of all SPARC processes. -Review everything by Bart & Johan -Clear documentation and presentation of results to the SPARC board.
Functional Requirements	-Process mapping in Blueriq.

3.2 Project scope

This table below is created to clearly outline what is included in this project.

The project includes:	The project does not include:
1. Activities: <ul style="list-style-type: none">- Create BPMN to be implement inside Blueriq- Create database for member administration- Alternative tools recommendation as database	Activities: <ul style="list-style-type: none">- Formalize legal agreement- Database maintenance
2. Stakeholder: <ul style="list-style-type: none">- Project board	Stakeholder: <ul style="list-style-type: none">- Partners- Members
3. Process: <ul style="list-style-type: none">- All business processes	Process: <ul style="list-style-type: none">- Project of the partners- Finance

3.3 Research questions

3.3.1 Problem Statement

SPARC faces challenges regarding business processes. Processes are not clearly defined and documented. This leads to a lack of communication between SPARC members and within SPARC, inconsistency of information, leading to missing opportunities for leveraging projects and members' expertise.

3.3.2 Root cause

SPARC's focus on innovation and project delivery has led to a lack of prioritization for process management, which consequently brought issues on poor documentation and undefined workflows, causing communication issues and missed opportunities.

3.3.3 Main Research Question

How can SPARC improve their partnerships and research processes' effectiveness in terms of communication, collaboration and outcomes and achieve the new strategy's goals?

3.3.4 Sub Research Questions

1. What business processes need to be developed within SPARC?
2. How can SPARC improve project tracking and communication between members?
3. How can SPARC efficiently store and manage information about members?
4. How can SPARC map out all these processes using Blueriq?
5. What are alternative tools to Blueriq that could be used to map out SPARC's processes?

3.4 Approach

3.4.1 Research approach

The project will utilize a hybrid approach, integrating both waterfall and agile methodologies to ensure a balance between structure and flexibility. The project is divided into three 6-week sprints, each concluding with a presentation to the client that summarizes progress and sets expectations for the next sprint.

In addition to client presentations, each sprint will conclude with a retrospective among team members to review what went well, identify areas for improvement. Weekly stand-up meetings will be held at the start of each week to align the team, clarify priorities, and assign tasks.

For the first two sprints, waterfall will be combined with agile, focusing on completing the project plan and research before moving into the development phase. This ensures that the foundation is well-laid, minimizing risks and enhancing clarity.

Once development begins, the team will shift to a more agile approach, allowing for greater flexibility and faster response to changes or feedback.

Within the sprints the project will be divided in four phases:

1. **Planning** – clear out the problem, requirements, and plan a suitable approach towards the solution.
2. **Research** – answer the research questions.
3. **Development** – develop solution.
4. **Closure** – finalize documentation and knowledge transfer.

It is important to mention that although the 6 main phases are in subsequent order, unexpected challenges can arise during the project's execution which might lead to returning to previous phases which have been already executed.

3.4.1 Test Approach

Testing will be conducted regularly throughout the project, primarily through feedback reviews and functionality tests. The approach is designed to ensure that each product meets the required standards before final approval.

Document Review

Feedback will be gathered from the product owners and content coach, who will be responsible for approving the products. Their insights will be essential to refining and finalizing the deliverables.

BPMN Review

Business processes will be modelled using Business Process Model and Notation (BPMN). These models will undergo review to ensure accuracy and clarity before their implementation in Blueriq.

Blueriq Process Testing

Once the BPMN processes are implemented in Blueriq, functionality testing will be conducted to identify and resolve any potential issues or bugs. A detailed test case document will be created to capture the results and ensure thorough documentation of the testing process.

Testing Schedule

Regular meetings will be scheduled to gather feedback and conduct reviews, ensuring that testing is an ongoing process. This will allow for continuous improvement and quicker resolution of issues as they arise.

3.5 Research methods

Main research question

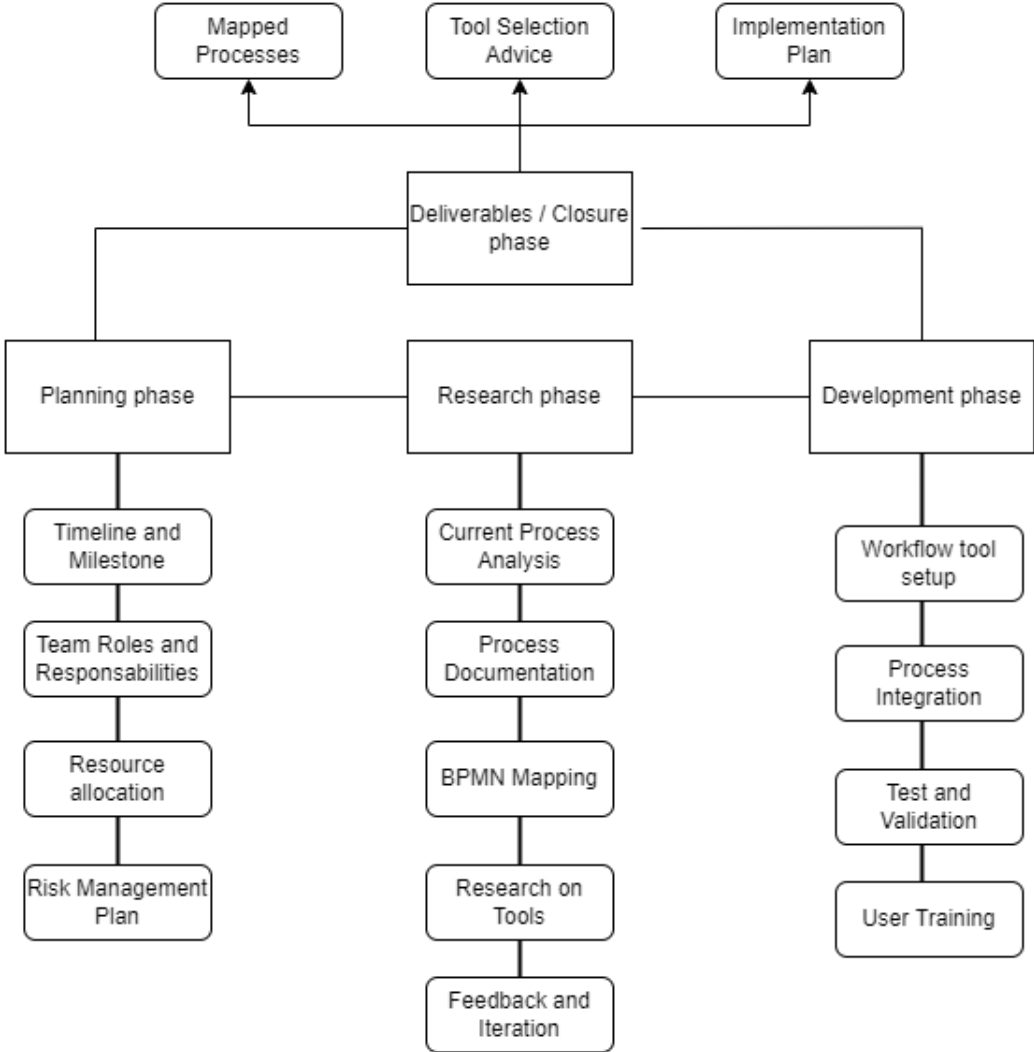
How can SPARC improve their effectiveness of partnerships and research, to better achieve their new strategy?

3.6 Product Breakdown Structure (PBS)

The project will be divided into three sprints:

- Sprint 1: this sprint will be focused on planning
- Sprint 2: this sprint will be focused on research
- Sprint 3: this sprint will be focused on implementation

It has been decided to blend **waterfall** and **agile** to have a clear structure of the project while keeping the flexibility of agile methodology each sprint. In this way, it will be possible to adapt quickly and efficiently to feedback loops received by stakeholders.







4 Execution

4.1 What business processes need to be developed within SPARC?

4.1.1 Introduction

To standardize SPARC processes and give a clear business insight for their members, it's important for SPARC to map out the organization's business processes. This research objective is to identify the current processes of SPARC that will be visualized using the business process notation model (BPMN). The goal is to develop BPMN that clearly shows all of SPARC processes to help member understand the organizational workflow. The conducted research methods for this section are explains as follows:

4.1.2 Research strategies and methods

DOT Framework Phase	Research Strategy	Research Method	Description	Product
Research phase	 Library  Field	Literature study Stakeholders' interviews	<ul style="list-style-type: none"> - Research on best practice to map in BPMN - Interview with SPARC stakeholders to get the details of the processes. 	<ul style="list-style-type: none"> - Written research on BPMN - Interview transcript and documents with the process analysis.
<i>Development phase</i>	 Workshop	<ul style="list-style-type: none"> - Prototyping - Feedback workshop 	<ul style="list-style-type: none"> - Map out the processes using BPMN. - Workshop with stakeholders to review the BPMN and gather feedback for refinement. 	<ul style="list-style-type: none"> - BPMN. - Feedback summary and improvement notes.
<i>Deliverable phase</i>	 Showroom	- Solution Demonstration	- Show the refined BPMN to stakeholders, gathering final feedback for alignment with SPARC's strategic goals.	- Feedback report and validation summary

4.1.3 Research Phase

Literature study

The literature study is conducted to gain knowledge on what is the best practice to map the processes in BPMN.

Map the process in BPMN requires a structured approach to ensure the diagrams are clear and accurate. One of the best practices to implement BPMN is to engage with the stakeholders to gain information about the current process and validate iteratively revise the BPMN. It is important to conduct a weekly meeting with the stakeholders to meet their needs and ensure the BPMN reflects the current process.

The BPMN is crucial for SPARC to explain the process to the members. It could improve communication among stakeholders by visually describing the process flow, roles, and decision points. By creating a model of a business process, stakeholders can improve their process by analysing the BPMN and spot the bottleneck to optimize their processes.

Implementing the proper approach to the stakeholder to create BPMN, will support the team to have a smooth deliverable to achieve the desired outcomes.

Stakeholder Interview

Meetings with stakeholders were conducted to gather detailed information about SPARC's current business processes. These interviews focused on understanding each process comprehensively, from start to finish. They provided insights into the complete workflow including the stakeholders involved, and the tools used at various stages.

Based on the stakeholders' input, the process flows were mapped, capturing the start and end points, as well as key activities in between. This section presents a detailed explanation of the five processes identified from the interviews.

The 6 processes flows conducted from the interviews will be explain as follows:

- 1. Member registration**
- 2. Co-fundings**
- 3. Invoicing**
- 4. Semester Projects**
 - 1.3 From research**
 - 2.3 From partners**
- 5. Project Reporting**
- 6. Member Onboarding Process**

Each of them was developed in multiple steps, including initial interview with stakeholders, BPMN mapping and feedback loop. Detailed information about the processes can be found in the Process Analysis document. In this chapter each process will be briefly explained only in text format.

Below is a table which displays the research strategies and methods used to answer the sub-question.

Member registration process

The process starts when a lead is generated, meaning the company initiates contact with SPARC. SPARC selects an appropriate contact person for communication with the company. An introduction meeting is conducted, and details are shared with the company via emails. If the company is not interested the process ends. If it is

interested, then the Treasurer of SPARC needs to create a Legal Agreement (LA), which must be signed by the company and the SPARC's chairman.

The process ends after the chairman signs the Legal Agreement, formalizing the partner.

Co-funding

The process starts when a co-funding request is submitted by a professor from Fontys.

If the request is less than 40,000, then it can be handled via email. Otherwise, a meeting with the SPARC board must be held to review the proposal. If it is approved, then the board must schedule a payment to Fontys and register the project in Exact. If not, then the board needs to explain the reasons for the rejection and review of rework is possible. If rework is possible the proposal is resubmitted for re-evaluation. Otherwise, feedback is sent explaining the reasons for the rejection, and the process ends.

The process ends after payment is made or after feedback is provided without further rework.

Invoice Process

The process starts when a legal agreement is signed by the chairman of SPARC and the company.

The Treasurer requests invoice information from the company. The request is sent via email or another communication channel. If a purchase order is required, then it should be requested and signed by both parties. When all the information is received then the Treasurer can enter it in Exact. After the start of the semester the Treasurer sends an invoice to the company. After 30 days he checks if the invoice is paid. If not, a reminder is sent via email. After two reminders the Treasurer contacts the company that a debt collector company will be involved.

The process ends when the invoice is paid, or the debt collector company is involved.

Semester Project

Main Process

The Semester Coordinator evaluates whether more projects are required for the upcoming semester.

If no additional projects are needed, the process ends. If more projects are required, the Semester Coordinator can choose to source projects either from the research group or from partners. The Semester Coordinator selects either the *Project from Research Group* or *Project from Partners* sub-process based on the availability and suitability of potential projects. After selecting a suitable project from either source, the Semester Coordinator registers the project for the upcoming semester. After each project is registered, the process returns to the initial decision point to determine if more projects are needed. This loop continues until no further projects are required.

Sub-process: Project from Research Groups

The Research Group Manager asks researchers to propose new projects for the next semester. Researchers decide on potential projects and present them to the Semester Coordinator for review. The Semester Coordinator assesses whether there is a spot available for the proposed project in the next semester. If yes, the

project is approved and listed for the semester. Otherwise, the research tries to find another semester that would be suitable for this project. If no other semester is available, the researcher looks for an intern to carry out the project.

Sub-process: Project from Partners

During the "Meet and Match" event or other discussions, the Semester Coordinator and Partner Coordinator explore potential projects from external companies. The Semester Coordinator determines if the company is interested in collaborating on a project. If not, the Partner Coordinator contacts the company to understand their decision and address any concerns. If yes, the Semester Coordinator assesses whether the proposed project aligns with the semester's requirements. If it does, then the project is approved, detailed, and listed for the upcoming semester. Otherwise, the Partner Coordinator contacts the company for potential adjustments to the project, or the project is dropped if no changes can be made.

Project Reporting

The process begins when the Partner Coordinator initiates a request for project information from relevant stakeholders or sources. The PLOU receives the request and forwards the required project information to the next stage. The Innovation Lab Secretary registers the gathered project information in the PIM system, making it available for students, SPARC members, and other stakeholders.

By **Week 16**, students submit their final project information into the PIM system, fulfilling their reporting obligations.

The process ends once all student project information has been successfully submitted and recorded in the PIM system.

Member Onboarding Process

The process starts when the new member signed LA&NDA and the sent the signed document to Fontys Partner Coordinator. The partner coordinator and PLOU will be assign with the new member to establish communication between SPARC, Fontys and the new member. After week 6, the meeting will be held to discuss about the progress of the project.

The process ends when the progress meeting has been successfully scheduled, ensuring the new member has been fully onboarded into SPARC.

Conclusion

Conducting interview with the stakeholders resulting in having an overview of current processes of SPARC. This information will be used to develop draft version of BPMN along with the process documentation explaining the BPMN thoroughly.

4.1.4 Development Phase

Prototyping

The purpose of this prototyping section is to design a draft version of BPMN to avoid unsatisfactory outcomes from the client. Creating a draft version will benefit the team and client to have the same ideas based on the discussion from the interviews. Based on the stakeholder information from the interviews, we created the BPMN and the process documentation explaining the process overview, process description, and bottleneck of those BPMNs. Hereby is a detailed explanation of the content:

- **Process Overview**
The process overview provides a high-level synopsis of the key activities and aspects of the process. It provides a brief overview of the main tasks involved in the process. This section includes the purpose of the process, the scope that defines the outline from start to finish point as well as the action it includes, and the stakeholders involved during the process
- **Process Description**
The process description consists of a more detailed version of the process. It defines who is assigned to do the task, what is the task, and what is the document related to the task. This section aims to give a clear identifier for each task
- **Bottleneck**
The bottleneck analysis aims to focus on identifying points in the process that are not efficient. This section also contains suggestions to improve the issues.

Addressing the BPMN as well as the process documentation, will establish the understanding between the team and the stakeholders regarding SPARC business processes before having the final version and meeting organizational goals. The detailed version of the BPMN is provided in [Process Analysis Document](#)

Feedback Workshop

To meet stakeholders' expectations, the draft of the BPMN and process documentation is shown to seek improvement from the stakeholder's feedback. The feedback is gathered and discussed to implement a better version of the BPMN and the process documentation. The feedback workshop provided valuable insights to enhance the draft BPMN diagrams and process documentation.

The main areas of feedback concerned updates and clarifications on the roles, decision paths, and project reporting, mainly for processes regarding Member Registration and Semester Projects. Contrasting that, Co-funding and Invoicing processes did not need any further comments.

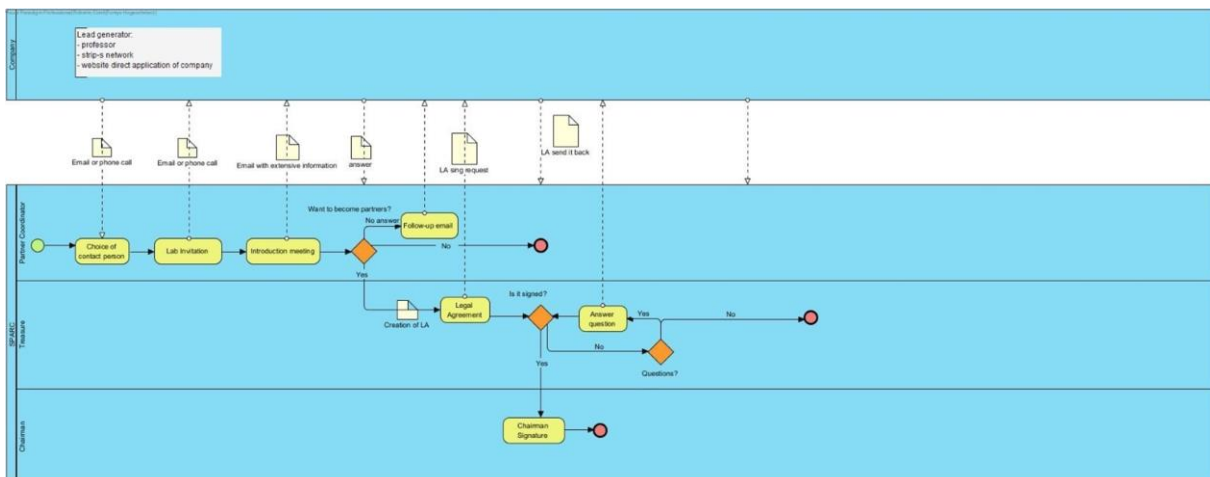
Regarding process documentation, stakeholders emphasized the following aspects that could be improved: consistent formatting, clearer BPMN graphics, and structured numbering of titles for better readability. Inclusion of the feedback will ensure that the revised version of the BPMN diagrams and process documentation better meet the expectations of the stakeholders and improve on clarity, hence effectiveness of the documented processes.

The details of this feedback workshop are provided in the appendix [6.1 Feedback Workshop](#)

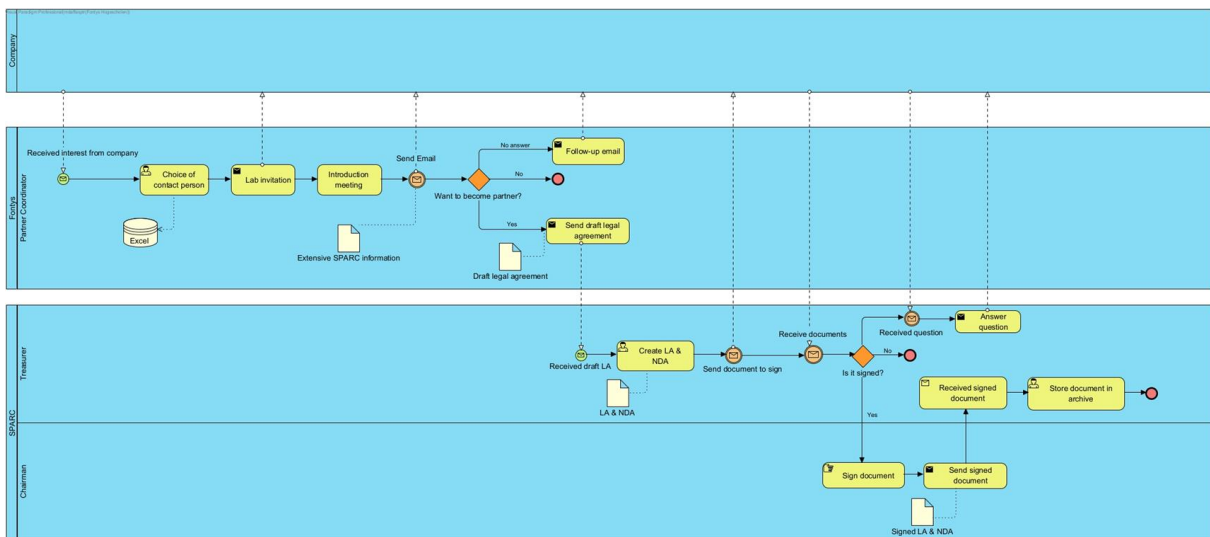
1.1.1 Deliverable phase

This phase is where the BPMN and documentation are refined based on a structured process of feedback (collection, analysis, improvement). This approach refines our BPMN through feedback loops and stakeholder collaboration, resulting in a more effective BPMN that meets the specific needs of the stakeholders. Here is the BPMN visualization for one of SPARC processes.

Previous version BPMN



Improved version BPMN



The feedback for this improvement is provided in ([6.1 Feedback Workshop: Member registration](#)).

4.1.5 Conclusion

Processes are carried out through stakeholder collaboration. On another note, the key processes identified include member registration, member onboarding, the co-funding process, invoicing, semester projects, and project reporting. These processes are written up with BPMN as well as process overview, stakeholders, process flow, and identified bottlenecks.

The feedback is checked with the stakeholders in a weekly meeting to make sure that the delivery meets the SPARC goals. The feedback provides updates and clarifications about the roles, decision paths, and process documentation. This feedback moves us closer to getting the BPMN and documentation finalized to give a clear, standardized visualization of the SPARC processes.

Successful implementation will result in a well-defined mapping and documentation that aligns the organizational processes completely and aligns with SPARC objectives. The structured mapping and process improved SPARC's workflows in terms of clarity and efficiency, setting the stage for improved collaboration and decision-making by stakeholders.

4.2 How can SPARC improve project tracking and communication between members?






4.2.1 Introduction

In this sub-question, the goal is to understand how SPARC can improve their project tracking and communication between members. To comprehend why this is important, referring to SPARC's long-term strategic goals is key; increase the number of members and ensure that each member can benefit from the projects of other partners. To achieve this, it is essential to have adequate project tracking and efficient communication between members.

Now, project tracking needs to be refined and structured and communication between SPARC members is not well defined. By pursuing in improving these aspects, will align with SPARC's needs.

Therefore, this section aims to understand and define techniques and best practices to improve these two aspects (project tracking and communication).

4.2.2 Research strategies and methods

DOT Framework Phase	Research Strategy	Research Method	Description	Product
<i>Research phase</i>	Library 	<ul style="list-style-type: none"> - Literature review on communication and project tracking techniques - Available product analysis 	<ul style="list-style-type: none"> - Conduct research to learn best practices and frameworks to improve communication and project tracking - Research on available product 	<ul style="list-style-type: none"> - Written research on findings regarding communication and project tracking
	Field 	<ul style="list-style-type: none"> - Stakeholder's interviews 	<ul style="list-style-type: none"> Interview with SPARC stakeholders to gather information about current communication and project tracking 	<ul style="list-style-type: none"> Final insights from interview
<i>Development Phase</i>	Field Workshop  	<ul style="list-style-type: none"> - Document analysis - Feedback workshop 	<ul style="list-style-type: none"> - Tool exploration analysis - feedback on architecture 	<ul style="list-style-type: none"> - Tool exploration analysis document - Feedback report
<i>Deliverable Phase</i>	Showroom 	<ul style="list-style-type: none"> - Pitch 	<ul style="list-style-type: none"> Show the advice document 	<ul style="list-style-type: none"> Presentation of the advice document

4.2.3 Research Phase

Literature review on communication and project tracking techniques

Introduction

In relation to SPARC, project tracking and member communication are critical to ensure that their long-term goals are met. The focus is to identify strategies, tools, and workflows that facilitate clear communication among SPARC members, while also ensuring that projects are tracked correctly and kept up to date. This section focuses on these challenges, looking for ways to improve member communication and project tracking.

In a company, having effective communication and tracking of projects is essential to achieve the objectives and having clear communication between members and stakeholders. There are different strategies that help to achieve these objectives such as having clear goals, using tracking tools, establishing milestones and having regular feedback.

- Clear goals: Define specific, measurable, and reachable goals for each project. Clear goals provide focus and ensure that all stakeholders are aligned regarding the desired outcomes.
- Using tracking tools: Implement centralized tools to monitor progress, assign tasks and keep updates only in one place. This allow for transparency and consistency.
- Establishing milestones: break projects into phases with clearly defined milestones. This helps monitor progress at each iteration, identify issues, and provide sense of accomplishment at each milestone reached.
- Regular feedback: having regular feedback sessions will helps in addressing challenges, align expectations, and fix issues as they arise.

Communication is a key factor in project tracking but not only: effective communication strategies drastically improve stakeholder alignment and quality of information during projects. There are different communication strategies that can be used such as having a clear and defined framework, using centralized platforms, having a constant feedback loop and having custom communications depending on the stakeholder you interface with.

Available product analysis

Introduction

Knowing which tools are available in the market that improve communication and project tracking is important in order to understand the potential benefits for SPARC. Below is an overview of frequently used tools, with an explanation on how they contribute to enhance communication and project tracking.

- Monday.com: Monday.com is a project management platform with visual tracking of tasks and workflows. It provides customizable dashboards, real-time progress updates, and centralized task management, which improve transparency and collaboration between members.
- ClickUp: ClickUp is a project management tool that combine task tracking, communication, and documentation. It allows teams to manage workflows, set deadlines, and real-time collaboration via integrated communication tools like comments and notifications.
- Smartsheet: Smartsheet focuses on spreadsheet-like project tracking but with extra features like automated workflows, Gantt charts, and collaboration tools. It helps teams to track milestones, automate updates regarding status of tasks, and improve project transparency.

- Asana: Asana is a user-friendly tool for task and project management. Its features include task assignments, deadlines dates, project timelines, and a centralized view of progress. It helps teams stay aligned and make sure that tasks are tracked efficiently in one place.

These tools share core features that address SPARC's challenges in communication and project tracking:

- Real-time collaboration: Updates are shared instantly, making sure that all members stay informed and align.
- Centralized tracking: All projects information are stored in one platform, reducing manual data sharing.
- Clear communication: These tools integrate messaging, notifications, and status updates, this improve team alignment and information flow.

By implementing these type of tools, SPARC can make a structured and efficient way to manage projects, increasing efficient communication, and monitor progress successfully in a centralized system.

Stakeholders interview

Introduction

Conducting stakeholder interviews is key to understand the current situation and ensure that needs and issues are well understood to address them correctly.

Several meetings have been conducted with SPARC's stakeholder to understand the current situation related to project tracking and communication between members. The interviews have been conducted in two different ways: with all the stakeholders together to gather the general current situation, and individually with each stakeholder to have a more detailed interview specific to the stakeholder. The outcome of these meetings provided a detailed understanding of the current situation which led to an analysis and definition of challenges.

Analysis of Current Issues

Communication Challenges

- Poor Information Flow: There are several issues regarding how information is exchanged, for example there are cases where information is available, but stakeholders are still not informed correctly.
- Manual Data Sharing: Data exchange is mainly managed manually; this can lead to delays and potential misunderstandings.
- Information stored and exchange in different channels: information is stored on different systems, this led to inconsistency of data and communication issues

Project Tracking Challenges

- Lack of centralized tracking: the absence of a system where project status can be monitored leads to inefficiencies and difficulties in assessing project status
- Inconsistent update: Current systems do not enforce regular updates or reporting; this leads to incomplete information.
- Limited collaboration Tools: Tools like PIM lack advanced features that support real-time tracking and different inputs from multiple stakeholders

Advice

To improve project tracking and communication between SPARC members, we will not go into the technical details of the implementation here as it will be discussed in other sub questions, but we will focus on the high-level approach. The approach is to integrate strategies that allow SPARC workflows to be smooth and that improve information exchange.

First, SPARC would benefit if they used a centralized way to track their projects. Tools like PIM, lack important features like real-time tracking and collaborative features. Implementing a system that allows in one place to track project progress, and to be able to edit and collaborate would ensure that all stakeholders are aligned. This brings greater benefit in project tracking and added value. In addition to a centralized system, SPARC should include a structured way to communicate. This means defining key roles and responsibilities in relation to the information flow, having regular meetings and creating customized communications depending on the stakeholder. Furthermore, inserting feedback loop sessions can help to resolve problems at early stages. Another factor that can improve communication could be to ask the different stakeholders on their preferences in terms of communication, in this way it is possible to integrate the feedback in the communication framework.

4.2.4 Development Phase

Document analysis

Tool exploration

In order to improve project tracking and communication, the focus in this phase is on exploring tools, strategies, and think of a smooth integration with SPARC's workflows. A document with advice will be realised exploring the different tools, with final advice in regarding of the tool.

Feedback workshop

The feedback workshop will focus on discussing the possible solutions and gather requirements that align with SPARC's needs, with the goal of proposing the most suitable advice for SPARC

4.2.5 Deliverable Phase

Pitch

The final advice document with the feedback applied will be presented to SPARC, it will include a detailed explanation of the decision behind the recommendations.

4.2.6 Conclusion

In conclusion, to address this sub-question, a systematic approach (DOT framework) was used to identify how SPARC can improve communication and project tracking. By splitting the research into focuses phases: literature review, available product analysis, stakeholders' interview and tool exploration, a structured set of recommendations was created. To answer how can SPARC improve project tracking and communication between members, the research focuses and shows that SPARC faces several challenges: poor communication

flow, decentralized project tracking, and inconsistent updates. These problems come from manual data sharing, multiple communication channels, and the absence of tools supporting real-time collaboration.

Improved Project Tracking:

SPARC needs to implement tools that allow for a centralized way to track projects: centralise project progress, task assignments, and updates in one platform. These tools provide real-time tracking, automated workflows, to ensure efficiency. Additionally, by setting clear milestones, SPARC can efficiently monitor progress and resolve issues sooner.

Improve communication strategies:

Defining clear communication framework helps define clear goals and accountability within SPARC in relation to communication flows. Using tools that allows for centralized communication will help improve communication for SPARC.

To summarize, SPARC should integrate tools that improve project tracking management, and setting communication frameworks, leveraging the capability of tools that allow for centralized communication

4.3 How can SPARC efficiently store and manage information about members?

4.3.1 Introduction

To enable SPARC to efficiently store and manage member information, it is crucial to identify optimal data storage solutions to the SPARC's requirements. This research focuses on analysing current practices, identifying necessary requirements, and designing a database that ensures both efficiency and accessibility. With this research, we aim to develop a solution for managing SPARC's data needs. The following methodologies guide this research:

4.3.2 Research strategies & methods

DOT Framework Phase	Research Strategy	Research Method	Description	Product
<i>Research phase</i>	Library 📖	Document Analysis	Analyse existing documentation and gain insight on how the system works.	Initial knowledge and tool suitability assessment for the SPARC project.
	Field 🏠	Stakeholder Interviews	To gather detailed insights from stakeholders about challenges and needs regarding member data management.	A clear list of user requirements and insights into operational challenges and improvement opportunities.
<i>Development phase</i>	Workshop 🗺️	Prototyping	Develop and refine a conceptual design for a database or system (e.g., CRM integration) based on gathered requirements.	A functional prototype or model addressing SPARC's data storage and management needs.
<i>Deliverable phase</i>	Showroom 🏪	Pitch/Product Review	Present the refined prototype or solution to stakeholders for validation and alignment with organizational goals.	Finalized prototype and feedback report, ensuring the solution meets SPARC's strategic and operational goals.

4.3.3 Research Phase

Document Analysis

The purpose of this document analysis is to understand how SPARC currently uses Exact Online (EOL) for managing member information and financial processes. By examining EOL's functionalities as described in the manual, this analysis will identify any gaps or limitations in SPARC's current system for managing member data and explore how these gaps impact the organization's efficiency in data management.

The document selected for this analysis is the "**20230823 Handleiding EOL SPARC**" used by SPARC, which contains procedures for creating member records and handling invoicing within EOL. This document provides insight into SPARC's current data handling.

Exact Online (EOL) is currently SPARC's tool for managing member information, and it fulfils functions related to financial management and invoicing. For instance, EOL allows SPARC to add new members to the system, assigning them a membership code, defining their invoicing preferences, and storing basic contact information. This setup provides SPARC with a clear and consistent approach to managing its financial interactions with members. Furthermore, the manual explains in clear steps how to update member information and processing non-active members, ensuring that SPARC can keep its records up-to-date and organized.

However, the most notable gap is its limited scope: EOL is primarily designed for financial and billing data and lacks functionality to capture and manage non-financial information about members. While EOL records essential details like billing preferences and contact information, it does not provide fields for data that could support deeper engagement and insights, such as member participation history, engagement level, or preferences. As a result, SPARC's ability to build comprehensive member profiles is restricted, which may impact efforts to enhance member relationships and target engagement strategies.

In addition, SPARC's use of EOL relies heavily on manual processes. Key tasks, including creating invoices for each member and updating records when members' information changes, require manual entry. This dependence on manual input not only increases the workload for SPARC's staff but also raises the risk of data entry errors and inconsistencies. Given that SPARC is a growing organization, these manual processes may become increasingly burdensome, impacting efficiency as the volume of data increases.

In conclusion, the document analysis of SPARC's Exact Online usage has shown that, while EOL is good for basic financial and membership data management, it does not meet SPARC's requirements for member engagement and strategic insight. By expanding data management capabilities, integrating a CRM or dedicated database, and automating routine tasks, SPARC can improve its efficiency and create a system for managing member information. This approach will ultimately support SPARC in building stronger relationships with its members and making more informed, data-driven decisions.

Stakeholder Interview

Introduction

To answer the question, “**How can SPARC efficiently store and manage information about members?**”, interviews with key stakeholders were held. These interviews highlighted problems like inefficient workflows, different storage systems, and limited tools. This section explains the findings and lays the groundwork for creating a centralized system to manage member information.

Findings from Stakeholder Interviews

The stakeholder interviews identified challenges and inefficiencies in SPARC’s current processes for storing and managing member information. These findings are detailed below:

1. Fragmentation of Data

SPARC’s current data management approach relies on three separate systems, which are poorly integrated:

- **Excel Files:**
 - Partner coordinators use Excel informally to track prospect information during onboarding. However, this approach is inconsistent, and data is often incomplete or outdated.
 - Excel lacks any centralized sharing or tracking mechanism, leading to silos of data managed individually by coordinators.
- **Fontys CMS:**
 - Designed for general administrative tasks and connected to the website, the CMS holds limited member information. However, its functionality for SPARC’s needs is restricted, and key member administration occurs outside this system.
 - The CMS does not differentiate between types of members (e.g., potential vs. confirmed) or provide detailed insights into member engagement.
- **Exact Online:**
 - This financial management tool handles invoicing and basic financial records. While it ensures consistency in financial tracking, it cannot capture non-financial member data, such as participation in innovation projects or engagement levels.

2. Manual and Non-Standardized Processes

SPARC’s current workflows for managing member information are labour-intensive and lack standardization, which hinders efficiency:

- **Onboarding Workflow:**
 - The onboarding process for new members is managed informally by partner coordinators through emails and spreadsheets. There is no standardized template or system for collecting all necessary data from prospects, leading to variations in the quality and completeness of member records.
 - The transition from prospect to member is often manual and disjointed, requiring coordinators to input data multiple times across different systems.
- **Data Sharing:**
 - Collaboration between SPARC and Fontys is manual, requiring stakeholders to transfer information between systems using files or emails. This creates delays, increases the

likelihood of errors, and complicates the management of joint activities such as innovation projects.

- **Invoicing and Financial Processes:**

- Invoicing relies heavily on manual input into Exact Online, which increases the risk of errors and consumes significant time. Moreover, the lack of integration between Exact Online and other systems forces treasurers to track and verify financial records separately from member data.

3. Limited Data Scope

The systems currently in use fail to provide SPARC with the comprehensive insights needed to support its strategic goals:

- **Member Profiles:**

- Exact Online focuses solely on financial records, leaving gaps in capturing broader member engagement metrics, such as participation in projects or events.
- Fontys CMS, while partially functional, lacks fields or features to distinguish between different types of members or to track engagement over time.

- **Project and Activity Tracking:**

- SPARC lacks a system for connecting member data to their participation in innovation activities. This limits SPARC's ability to assess member contributions and tailor services to member needs.

- **Transparency:**

- The inability to consolidate data from multiple systems prevents stakeholders from accessing real-time, accurate information about members, projects, and finances.



Recommendations Based on Findings

To address the identified challenges, SPARC should focus on four key solutions to improve the efficiency of its member information management processes:

1. Centralization of Data

The first step is to develop a unified system that consolidates all critical data into a single platform. This system should house member information, financial records, and project data in one place, eliminating the fragmentation currently caused by using multiple disconnected tools. By creating a single source of truth, SPARC can ensure that stakeholders access consistent, accurate, and up-to-date information, reducing redundancies and improving collaboration.

2. Standardization of Processes

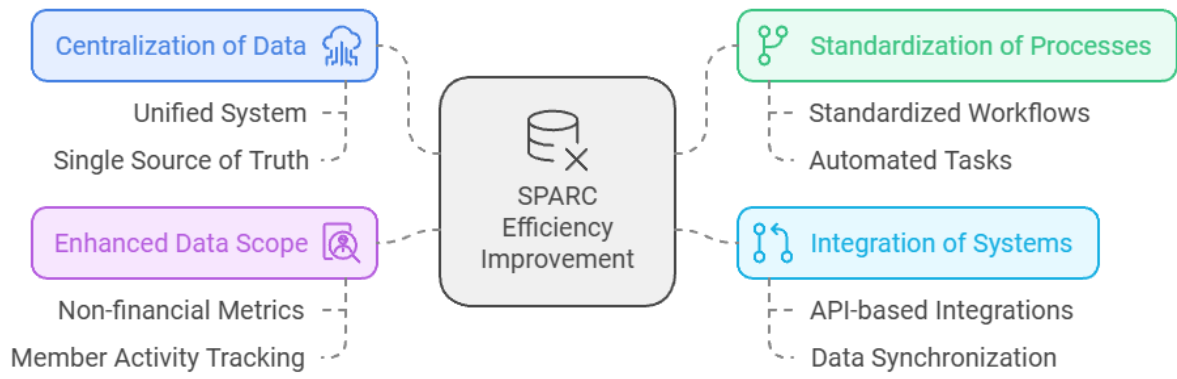
Introducing standardized workflows will significantly enhance the quality and consistency of data management. Templates should be created for onboarding new members, ensuring that all relevant information is collected in a uniform manner. Additionally, automating repetitive tasks, such as data entry and invoicing, will save time, minimize errors, and free up resources for more strategic initiatives. These measures will streamline operations and make SPARC's processes more scalable as the organization grows.

3. Integration of Systems

To bridge the gap between its existing tools, SPARC should implement API-based integrations. This will allow seamless synchronization between Exact Online for financial data and Fontys CMS for website and collaboration needs. By connecting these systems, SPARC can streamline data sharing, reduce manual data transfers, and maintain consistency across platforms. This integration will provide stakeholders with a more comprehensive view of member and project information without requiring additional manual effort.

4. Enhanced Data Scope

Finally, the new system should expand its data capture capabilities to include non-financial metrics. This includes tracking member participation in projects, engagement levels, and membership types (e.g., potential vs. confirmed members). Features to link member activities with specific projects will provide SPARC with deeper insights into member contributions and outcomes. Such capabilities will not only enhance decision-making but also enable SPARC to tailor its services more effectively to meet member needs.



4.3.4 Development Phase

Prototyping

Database design

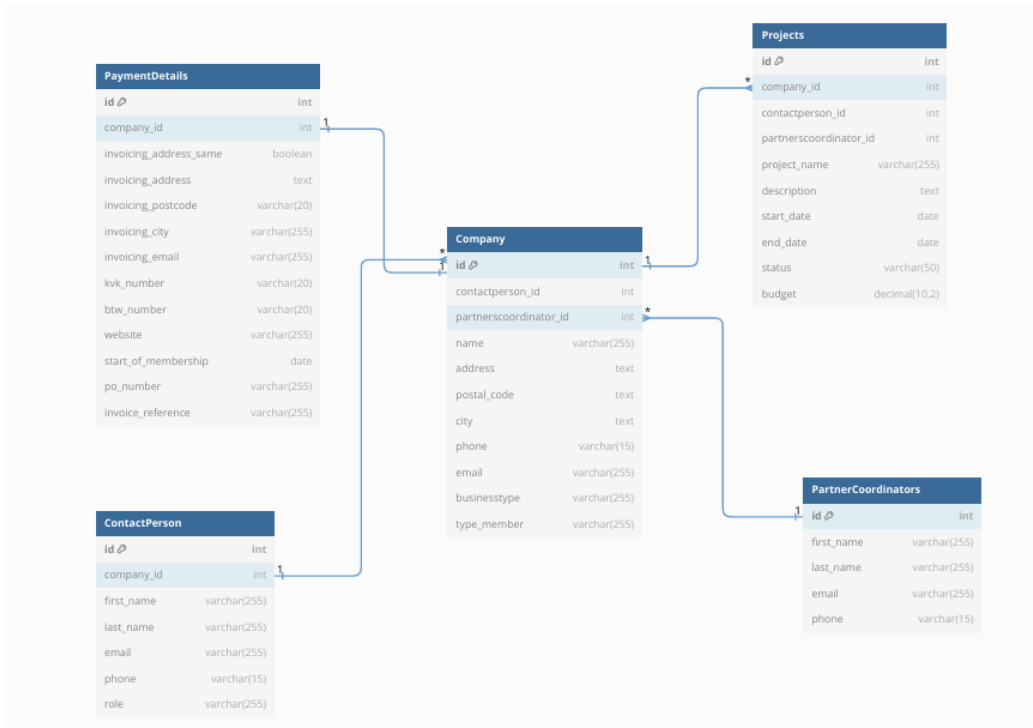
The purpose of this database design is to establish a structure for a member information management system that will meet SPARC's needs for efficient data storage, retrieval, and management. Based on the findings, this design aims to capture member information, financial tracking, and enable future expansion to incorporate more detailed data. This structure will be flexible enough to incorporate further input from stakeholders as requirements are refined.

Design Objectives

The goals of this database design are:

1. **Combine All Data in One Place:** Bring together all information about members, projects, and finances into one system to remove scattered and inconsistent data.
2. **Make Processes Easier:** Automate important tasks like onboarding new members, tracking project progress, and managing finances to save time and reduce mistakes.
3. **Improve Data Access:** Allow SPARC to get real-time information about members and projects while keeping the system secure with role-based access.
4. **Allow for Growth:** Design the system to grow with SPARC, making it easy to add more features or handle larger amounts of data.
5. **Connect with Current Tools:** Ensure the database works smoothly with existing systems like Exact Online and Fontys CMS for better data flow and fewer manual steps.

Entity-Relationship (ER) Diagram



This

diagram follows a normalized relational database design focused on operational data management, rather than a star schema typically used for analytical purposes. Unlike a star schema, which has a central fact table surrounded by dimensions, this design uses the Company table as the main entity to organize related information. The absence of a measurable fact table and the inclusion of normalized relationships make this approach suitable for managing SPARC's member data and daily operations, rather than complex analytical queries.

Detailed Table Specifications

The database is designed to manage information about companies, their projects, payment details, partner coordinators, and contact persons. It comprises the following tables:

Company Table

Column Name	Data Type	Description
Company_ID	INT (primary key)	Unique identifier for each company
Contactperson_ID	INT	Foreign key of Contact person
PartnerCoordinator_ID	INT	Foreign key of PartnerCoordinator
Name	VARCHAR (255)	Name of the company
Address	Text	Address of the company
Postal_Code	Text	Postal code of the company

City	Text	City of the company
Phone	VARCHAR (15)	Phone number
Email	VARCHAR (255)	Email address
BusinessType	VARCHAR (255)	Industry type of the company
Type_Member	VARCHAR (255)	Type of member

PaymentDetails Table

Column Name	Data Type	Description
PaymentDetails_ID	INT (primary key)	Unique identifier for each payment detail
Company_ID	INT	Foreign key referencing Company
Invoicing_adress_same	Boolean	Indicates if invoicing address is the same as company address
Invoicing_adress	Text	Invoicing address
Invoicing_postal_code	VARCHAR (20)	Invoicing postal code
Invoicing_city	VARCHAR (255)	Invoicing city
Invoicing_email	VARCHAR (255)	Invoicing email
Kvk_number	VARCHAR (20)	KvK number
BTW_number	VARCHAR (20)	BTW number
Website	VARCHAR (255)	Company website
Start_of_membership	Date	Date of membership start
PO_number	VARCHAR (255)	Purchase order number
Invoice_reference	VARCHAR (255)	Invoice reference for tracking

Projects Table

Column Name	Data Type	Description
Projects_ID	INT (primary key)	Unique identifier for each project
Company_ID	INT	Foreign key referencing Company
Contactperson_ID	INT	Foreign key referencing Contactperson
PartnerCoordinator_ID	INT	Foreign key referencing PartnerCoordinators
Project_name	VARCHAR (255)	Name of the project
Description	Text	Detailed project description
Start_Date	Date	Start date of the project
End_Date	Date	End date of the project
Status	VARCHAR (50)	Project status (e.g., ongoing, completed)
Budget	Decimal (10,2)	Budget allocated to the project

PartnerCoordinator Table

Column Name	Data Type	Description
PartnerCoordinator_ID	INT (primary key)	Unique identifier for each partner coordinator
First_Name	VARCHAR (255)	First name of the partner coordinator
Last_Name	VARCHAR (255)	Last name of the partner coordinator
Email	VARCHAR (255)	Email address
Phone_Number	VARCHAR (15)	Phone number

ContactPerson Table

Column Name	Data Type	Description
ContactPerson_ID	INT (primary key)	Unique identifier for each contactperson
Company_ID	INT	Foreign key referencing Company
First_Name	VARCHAR (255)	First name of the contact person
Last_Name	VARCHAR (255)	Last name of the contact person
Email	VARCHAR (255)	Email address
Phone_number	VARCHAR (15)	Phone number
Role	VARCHAR (255)	Role in the company

This documentation provides a detailed overview of the database schema and can be used as a reference for designing SQL queries, creating tables, or developing applications that interact with this database. As an example, for the SQL Queries that could be made with this.

```

SELECT *
FROM DemoInput
-- Create Company table
CREATE TABLE Company (
    Company_ID INT IDENTITY(1,1) PRIMARY KEY, -- Unique identifier for each company
    ContactPerson_ID INT, -- Foreign key linking to ContactPerson
    PartnersCoordinator_ID INT, -- Foreign key linking to PartnerCoordinators
    Name NVARCHAR(255) NOT NULL, -- Company name
    Address NVARCHAR(255), -- Address of the company
    Postal_Code NVARCHAR(20), -- Postal code
    City NVARCHAR(100), -- City of the company
    Phone NVARCHAR(15), -- Phone number
    Email NVARCHAR(255), -- Email address
    BusinessType NVARCHAR(255), -- Type of business/industry
    Type_Member NVARCHAR(255) -- Membership type
);

```

The Company table will be created with the right datatype.

```
-- Insert demo data into Company table
INSERT INTO Company (ContactPerson_ID, PartnersCoordinator_ID, Name, Address, Postal_Code, City, Phone, Email, BusinessType, Type_Member)
VALUES
(NULL, 1, 'Innovate Corp', '123 Innovation Road', '1234AB', 'Eindhoven', '0612345678', 'info@innovatecorp.com', 'Technology', 'Innovation Partner'),
(NULL, 2, 'Tech Solutions', '456 Tech Avenue', '5678CD', 'Rotterdam', '0687654321', 'contact@techsolutions.com', 'Consulting', 'Standard Member');
```

After that you could insert some data inside these tables, for now it was dummy data as you can see. This could also be filled automatically with the connections between the source data.

4.3.5 Deliverable Phase

Solution Demonstration

The feedback that we got back was that there are several approaches we can take for the prototyping, Bart specifically wants us to research these approaches and give him a comparison table. The four main approaches are:

1. **New Database / System**
2. **Implementing an API that can work with the current system and export the data to the Exact online environment**
3. **Give Johan access to the CMS-system**
4. **Hire an administrative worker.**

Approach 1: New Database/System

Developing a new database and system tailored to SPARC's needs. This would consolidate all data (e.g., member information, financial details, and projects) into one centralized system, replacing the CMS and directly integrating with Exact Online for automation. The system would be designed with role-based access control (RBAC) for secure and granular permissions.

Pros:

1. **Full Control:**
 - a. SPARC and Fontys own and control the system completely, ensuring no dependency on third-party solutions.
2. **Scalability:**
 - a. The system can grow with SPARC, supporting new features, data types, or workflows as needed.
3. **Advanced Automation:**
 - a. Supports workflows like member onboarding, reporting, and integration with Exact Online.
4. **Custom Features:**
 - a. Tailored to SPARC's specific needs, eliminating redundant functionality.
5. **Security:**
 - a. Allows implementation of RBAC to control data access and permissions at a granular level.
6. **Data Integrity:**
 - a. Centralized database ensures consistent, up-to-date data across the organization.

Cons:

1. **High Initial Cost:**
 - a. Significant investment required for development, hosting, and ongoing maintenance.
2. **Long Implementation Time:**
 - a. Designing, building, and deploying a new system may take months.
3. **Technical Expertise Required:**

- a. Requires skilled developers to design and maintain the database and related systems.
- 4. Data Migration Complexity:**
 - a. Transferring existing data from the CMS and other sources may require careful planning to avoid errors.

Approach 2: API for Integration

Developing an API to connect the existing CMS with Exact Online. The API automates data synchronization, exporting data from the CMS to Exact Online without replacing the current CMS. RBAC can be implemented at the API level to ensure role-based access to data and endpoints.

Pros:

- 1. Cost-Effective:**
 - a. Cheaper than building a new system; focuses only on the integration layer.
- 2. Preserves Existing System:**
 - a. Keeps the CMS intact, minimizing disruption to current workflows.
- 3. Improved Efficiency:**
 - a. Automates data synchronization, reducing Johan's manual workload.
- 4. Quick Deployment:**
 - a. Developing an API can take less time than building a new system.
- 5. Role-Based Access:**
 - a. Role-based endpoints ensure that only authorized users access specific data.
- 6. Adaptability:**
 - a. The API can be extended to integrate with other systems in the future.

Cons:

- 1. Dependency on CMS:**
 - a. Relies on the current CMS for data management, which may have limitations.
- 2. Ongoing Maintenance:**
 - a. The API requires updates and monitoring as systems evolve (e.g., Exact Online or CMS changes).
- 3. Limited Data Scope:**
 - a. The API only handles data export and synchronization; it doesn't address other CMS limitations.
- 4. Security Complexity:**
 - a. Requires robust authentication (e.g., OAuth2) and monitoring to prevent unauthorized access.

Approach 3: CMS Access for Johan

Grant Johan direct access to the CMS system, allowing him to retrieve data manually for use in Exact Online. No technical changes are made to the system, and Johan relies on CMS features to export or copy data.

Pros:

- 1. Low Cost:**
 - a. No additional software development or hosting costs.
- 2. Quick Setup:**
 - a. Can be implemented immediately without requiring new tools.
- 3. Preserves Current System:**
 - a. No changes are made to the existing CMS.

Cons:

1. **Manual Workload:**
 - a. Johan must manually retrieve data, increasing the risk of human error.
2. **Scalability Issues:**
 - a. As SPARC grows, this approach becomes impractical for handling large volumes of data.
3. **Limited Automation:**
 - a. Does not solve the core issue of data synchronization between systems.
4. **Security Risks:**
 - a. Providing Johan with CMS access may expose sensitive data if permissions are not carefully configured.
5. **Auditability:**
 - a. Manual actions are harder to track, and audit compared to automated processes.

Approach 4: Hire an Administrative Worker

Employing a dedicated administrative worker to handle the manual data entry and management tasks between the CMS and Exact Online.

Pros:

1. **Human Oversight:**
 - o Allows for nuanced decision-making and addressing edge cases that automated systems might miss.
2. **Low Initial Investment:**
 - o No technical setup or development costs are required.
3. **Immediate Availability:**
 - o Once hired, the worker can start performing tasks without waiting for system development or integration.
4. **Flexibility:**
 - o The worker can adapt to new tasks beyond the scope of data synchronization if needed.

Cons:

1. **Recurrent Costs:**
 - o Salaries and benefits represent ongoing expenses.
2. **Scalability Issues:**
 - o As SPARC grows, the workload might become unmanageable for one worker or require hiring additional staff.
3. **Risk of Human Error:**
 - o Manual data handling increases the chance of mistakes compared to automated systems.
4. **Limited Efficiency:**
 - o Cannot match the speed or reliability of automated workflows for repetitive tasks.
5. **Knowledge Dependency:**

Criteria

New Database/System

API for Integration

CMS Access for Johan

Hire Administrative worker

Cost	High (development, hosting, maintenance)	Medium (API development and hosting)	Low (no additional infrastructure needed)	Medium (ongoing salary)
Implementation Time	Long (custom development and migration)	Medium (depends on CMS and API compatibility)	Immediate (no technical setup required)	Immediate (after the hiring process)
Maintenance	Complex (requires RBAC and system updates)	Moderate (requires monitoring and updates)	Minimal (no maintenance beyond CMS updates)	Moderate (requires oversight for consistency)
Ease of Use	Moderate (training required for staff)	High (automates processes for users)	Moderate (Johan uses CMS manually)	Moderate (requires oversight for consistency)
Automation	Full (supports advanced workflows)	Partial (syncs data but retains CMS reliance)	None (manual data handling by Johan)	None (entirely manual processes)
Scalability	High (scales with SPARC's growth and needs)	High (scales with SPARC's growth and needs)	Low (manual processes won't scale well)	Low (limited to human capacity)
Error Risk	Low (automated processes minimize errors)	Moderate (requires robust authentication)	High (risk of human error in manual work)	High (human error risk in manual tasks)
Customization	High (fully customizable for SPARC's needs)	Medium (flexible but relies on CMS features)	Low (limited to existing CMS features)	Medium (worker can adapt tasks as needed)
Functionality	Comprehensive (supports granular roles)	Good (role-based endpoints for access control)	Minimal (basic roles in CMS)	Good (worker handles tasks manually)
Data Storage	High (centralized database with scalability)	Good (improves current workflow efficiency)	Limited (manual processes hinder growth)	Limited (human-dependent scalability)

- Relies heavily on the individual's skills and commitment; turnover could disrupt operations.

Comparison Table

4.3.6 Conclusion

To efficiently store and manage member information, SPARC requires a centralized solution that integrates its fragmented data sources while addressing the inefficiencies in its current workflow. The analysis of SPARC's existing system, combined with the stakeholder interview, revealed some limitations in the use of Excel, Fontys CMS, and Exact Online. These systems rely on manual data entry and fail to provide the insights needed to support the strategic goals of SPARC. The optimal solution involves adopting the API Integration between the CMS and Exact Online, which is the most practical and cost-effective mid-term approach. By connecting these systems, SPARC can automate data synchronization, which reduces manual effort, and will improve the quality of the data.

In addition to API Integration, SPARC should prioritize the following measures to ensure efficient data storage and management:

1. **Centralization of Data:** Implement a unified system that will have all the needed information such as member data and financial data into a single source of truth.
2. **Standardization of Workflow:** Establish standardized templates and automated processes for tasks like onboarding and invoicing to increase the data quality.

For long-term scalability SPARC may consider a custom database/system to address future growth and provide full control over its data. However, this requires significant more time than the API Integration.

In conclusion, API Integration provides the most efficient, scalable, and cost-effective solution for SPARC's current needs, while a centralized system and standardized workflows ensure consistency and accuracy. By implementing these measures, SPARC will establish a good framework for managing member information, enabling data-driven decisions and growing a stronger member relationship.





4.4 How can SPARC map out all these processes using Blueriq?

4.4.1 Introduction

SPARC came to the project group with a request to map out all their process in Blueriq. To answer the question each process will be reviewed individually to identify how Blueriq's features can best support SPARC's operational needs. The research consists of 3 phases – Research, Development and Deliverable phase. Different research methods have been used, following the DOT Framework methodology.

Below there is a table which displays the research strategies and methods will be used to answer the sub-question.

4.4.2 Research strategies & methods

DOT Framework Phase	Research Strategy	Research Method	Description	Product
<i>Research phase</i>	 Library	Literature review	Conduct research to learn best practices to use in Blueriq.	Written research on what is Blueriq.
	 Field	Stakeholder's interviews	Interview with SPARC stakeholders to gather initial requirements and representatives from Blueriq, which explained the capabilities of the tool.	Interview transcript and documents with Blueriq functionalities.
<i>Development Phase</i>	 Workshop	- Prototyping - Feedback workshop	- Develop a prototype of the desired solution in Blueriq. - Workshop stakeholders to review the prototype and gather feedback for refinement.	- Prototype. - Feedback summary and improvement notes
<i>Deliverables phase</i>	 Showroom	Pitch	Show the refined prototype to stakeholders, gathering final feedback for alignment with SPARC's strategic goals.	Feedback report and validation summary

4.4.3 Research Phase Literature Review

SPARC came to the project group with a request to map out all their process in Blueriq. To successfully do this, it is important to understand what Blueriq is.

Blueriq is a decision-driven platform designed to simplify complex processes. Its architecture is easy to comprehend and work with since it follows a simple flow: analyse, model, execute, and display. By employing decision models to create applications that swiftly adjust to changes in policy and enhance the user experience, Blueriq allows us to concentrate on the important things.

Its logic is organized according to principles, ranging from simple recommendations to more formal, logical rules, which enable flexible decision-making and assist us in determining the best course of action to accomplish our objectives. Additionally, it facilitates dynamic case management, which increases agility by allowing us to link Blueriq to other systems as needed.

On a technical level, Blueriq offers a variety of tools to help customize the application, such as pages and containers that arrange material and facilitate seamless user interactions. To express business data and rules using "IF-THEN" logic, the platform additionally offers entities, characteristics, and relationships in the domain model. Multiple conditions can be defined using decision tables, and it's simple to define default values, whether they be constants or expressions like sums and averages.

It's also important to note Blueriq's backward-chaining inference engine, helps in producing intelligent answers to user input and offers choices for validating, saving, or cancelling input activities. For decision-focused applications, this structure maintains organization, usability, and responsiveness—exactly what is required.

In summary, Blueriq is a tool that can support the business processes within an existing application or website.

Stakeholders interview

To continue the research, it is important to not only understand what Blueriq is, but also what are the more technical features of the tool. We had the possibility to conduct interviews with Blueriq representatives, where they provided a lot of information about it. We had 3 workshops with the company, they answered a lot of questions and gave us 2 exercises, serving as an example for the functionalities of Blueriq.

In summary, in Blueriq the user can create an application, with multiple pages, navigate through the pages, create entities and their attributes, and set up the logic of the application.

However, the data cannot be stored in Blueriq. An external database should be connected to application and ideally the company needs to have a website where the application can be hosted.

Finding these functionalities changes the direction of the project and further considerations must be made to establish if Blueriq is the right tool for SPARC.

4.4.4 Development Phase

Prototype and workshop

One of the main requirements of the project is to map out the business processes of SPARC in Blueriq. The project group made a prototype of the cofunding process, to further explore the functionalities of Blueriq and present it to the Product Owner.

The following pictures present how the prototype looks:

Login Page:

There are two types of user that will utilize the system. The researcher, who would like to request a cofunding amount and a member of SPARC board. Based on the user credentials the system will direct them to a new page.



The image shows a web browser window displaying the login page of the Blueriq system. The page has a blue and purple header with the 'blueriq' logo on the left. The main content area is white and contains a login form with two input fields: 'Fill in your username' and 'Password *'. A 'LOGIN' button is located below the password field. The 'blueriq' logo is also visible at the bottom center of the page.

Funding Request Page

If the researcher logs into the system, he will be directed to a page where he can fill the project details and the requested co-funding amount.

Project Overview

The details are saved and uploaded to another page – Project Overview, where members of the SPARC board can view the information about all the projects.

Email	First Name	Last Name	Project Name	Project Description	Fund Amount	Meeting Schedule	Status	Project Evaluation	Remove Project?
Tsvetan@gmail.com	Tsvetan	Ivanov	SPARC	Improve communication and project tracking	€ 12,000.00	20 December 2024 2:18 AM	Approved	<input checked="" type="checkbox"/>	<input type="checkbox"/>
mdaffasptr@gmail.com	Muhammad Daffa	Saputra	SPARC	Mapped out all SPARC process	€ 490,000.00	20 December 2024 2:18 AM	Not Approved	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Approval

They can select to either approve or not the co-funding, as is shown in the column “Status” in the picture above.

Project Approval

Do you want to approve this project?

Approve

Not approve

[# GO BACK](#) [SUBMIT](#)

Member Registration Process

To map this process in Blueriq, a form can be made where the Company can send an enquiry. The partner coordinator will have access to a page where he can see all the enquires. He will be able to select an enquiry, assign a contact person for the company and propose a date and time for a meeting.

The rest of the process could be done outside of Blueriq.

Invoicing Process

The process begins once a company officially joins SPARC and signs a legal agreement. An automated email can be sent to them, containing a link to an online form in Blueriq, where the company can fill in their invoice details (like billing address, contact email, etc.) and their purchase order details if it is necessary.

Once the company fills out the form, the information is saved in Blueriq, and a notification is sent to the Treasurer. If all the information is filled the Treasurer can proceed to the next step. If an integration with Exact exists, the invoice details can be automatically synchronized, else the Treasurer can manually enter the invoice information into Exact.

When the semester starts, an invoice can be automatically generated and sent to the company's contact email address. If a connection with Exact is possible, Blueriq will check if the invoice is paid within 30 days, if yes, the process ends. If not, an automated reminder will be sent to the company. The process repeats until the invoice is sent or after 2 reminders, the Treasurer is notified, and he can contact a debt collector company.

Semester Project Selection Process

The **Semester Coordinator** logs in through a Blueriq login page. Then they are redirected to a **Project Dashboard** page where they can view current projects and determine if additional projects are needed. If more projects are needed the Semester Coordinator will have the choice of selecting Research Group or Company Partners project.

Research Group Sub-process

Research Group Manager requests new projects from researchers via a Project Proposal Form in Blueriq, (This step could be optional).

The **Researchers** will have a Project Proposal Form, where they can enter details like project title, description, and academic alignment. This form will be saved and available to the Semester Coordinator who can select which of the projects can be added for the new semester.

Partners Sub-process

The Semester Coordinator discuss potential projects from partners at a Meet and Match event. If a company is interested in offering a project and the project fits the semester, the Semester Coordinator enters project details into Blueriq and contacts the **Partner Coordinator**.

Project Reporting

The semester coordinator will receive a link where they can fill in the project details. These details are saved in Blueriq, and the Partner Coordinator can forward them to the Innovation Lab Secretary, who can register them in PIM.

Students can submit their project information in PIM without the need for Blueriq.

4.4.5 Deliverable Phase

In this phase the final pitch is presented to the stakeholders; a demo of the final prototype made in Blueriq is presented, with the goal of receiving final feedback and aligning with SPARC's stakeholders. Specifically, the process that was mapped out in Blueriq is co-funding. The demo will be carried out by first explaining the context and the process in detail, and then a live demo in Blueriq.

4.4.6 Conclusion

By the end of the research the project grouped reached the conclusion that Blueriq might not be the right tool for SPARC. Some of the reasons for that are the price of it and the big learning curve. Storing data is also an important feature, Blueriq is missing. In the end the tool is intended to improve an already existing program, while SPARC does not have it.

However, if they decide to go with it, the text above will guide them into mapping out their business processes.

4.5 What are alternative tools to Blueriq that could be used to map out SPARC's processes?





4.5.1 Introduction

Blueriq is widely regarded as a robust tool for process mapping and business rule management. However, it may not always meet the specific needs or requirements of every project. This section explores alternative tools that could better suit SPARC's processes, particularly focusing on the co-funding process.

We chose to concentrate on the co-funding process because Blueriq's steep learning curve create challenges for the team. This complexity affects our ability to create a prototype within the limited timeframe. To address this, we are proceeding with the development of the co-funding process in Blueriq while preparing a business recommendation to present at the end of the project.

The purpose of this research is to identify solutions that align more closely with SPARC's needs, prioritizing user-friendliness, cost-efficiency, scalability, and compatibility with existing systems.

4.5.2 Research Strategies and Methods

DOT Framework Phase	Research Strategy	Research Method	Description	Product
<i>Research phase</i>	Field 	Stakeholder interview	Attend meeting with stakeholder to show the draft process in Blueriq and ask for further requirement	Have a complete requirement for desire outcome
<i>Development phase</i>	- Field  - Library 	- Explore user requirements - Available product analysis	- Gather requirements from client and analyze to do requirement prioritization - Find software tools and analyse it based on requirements	- List of requirements - Tools evaluation
<i>Deliverables phase</i>	Workshop 	Multi-criteria decision making	Create a table matrix to compare the alternative tools with Blueriq	Create advice on which tools are suitable to map out processes

4.5.3 Research Phase

Stakeholder interview

The interview with stakeholder is a first step of the process. We conducted an interview to gather the requirement to find alternative tools.

Since our objective is to explore alternative tools to Blueriq and we decided to focus on the co-funding process, the requirements for selecting an alternative tool were developed based on this specific process.

Here are the requirements that we gathered based on weekly meetings with SPARC:

1. Business Requirements

- Tools that enhance project tracking.
- Tools that improve communication.
- Tools that support centralized information management.

2. User Requirements

- Role-based access control (e.g., different permissions for members, SPARC, and Fontys).
- Customizable workflows to adapt to specific project needs.
- Feedback mechanisms for users to provide input or report issues.

3. Functional Requirements

- Compatibility with specific functionalities (Co-Funding Process):
 - Proposal submission workflows.
 - Detailed project tracking capabilities.
- Integration with other systems, including:
 - Excel for data manipulation and reporting.
 - Exact for financial and operational data management.

This requirement will be used to narrow the scope of finding a compatible alternative tools to Blueriq.

4.5.4 Development Phase

Explore user requirements

The following table represents the criteria on which the tools will be compared. It includes three columns – Criteria, Description, Weight. The weight is distributed in percentages across the criteria.

Criteria	Description	Weight (%)
----------	-------------	------------

Scalability	Ability to handle growing number of users, data, and increasing process complexity	15%
Usability	User-friendly interface for all stakeholders, including professors, managers, and board members.	10%
Customization	Ability to tailor workflows, and notifications to align with SPARC's processes.	20%
Integration	Seamless compatibility with external systems such as Excel, Exact, PIM.	15%
Project Tracking	Features for real-time status updates, centralize information, and tracking mechanisms.	20%
Feedback Mechanism	Automated feedback and notifications for proposal approvals and rejections.	5%
Cost	Affordable pricing that aligns with SPARC's budget constraints.	5%
Security	Role-based access control and data protection measures.	10%

Available product analysis

SPARC's main problems include a lack of streamlined workflows, difficulty in clearly visualizing and communicating processes to team members. SPARC's also have a problem with having separate information stored. Based on these issues, we come to a solution for SPARC to implement project management or workflow tools.

Project management and workflow tools provide clear visualizations of processes, making them easier to understand and follow. They enhance transparency, streamline task assignments, and ensure team members can track progress in real time. By centralizing process details, these tools improve communication and help explain workflows effectively to all stakeholders.

The project group found two potential tools that will be good alternatives for Blueriq, which is Monday.com and Airtable. These tools were chosen based on their popularity, ease of use, and advanced project management features that better align with SPARC needs.

Airtable



Airtable is a user-friendly interface that contains spreadsheets with database functionality, making it easier for non-technical stakeholders to manage and track workflows. Airtable is customizable with features like Kanban boards and automation that could streamline SPARC's co-funding process. It's cost effective with a free plan and scalable option that makes this option cost effective.

Key Features

- **Custom views**
- **Record management**
- **Team collaboration**
- **Integration with other tools**

Monday.com



Monday.com is a tool that includes project tracking with features like Gantt charts and real-time updates, which Blueriq lacks. Its visual layout and customizable dashboards allow all stakeholders to stay aligned. Additionally, it offers robust automation and integrates well with external systems, centralizing information effectively.

Key Features

- **Resource and workload management**
- **Templates for easy setup**
- **Collaboration tools**
- **Visual project tracking with dashboard**
- **Advance reporting and analysis**

4.5.5 Deliverables Phase

Multi-criteria Decision Making

In the following table they are compared based on every criteria. The score is from 1 to 5 (5 being the best).

Criteria	Blueriq	Monday.com	Airtable
Scalability	4	4	3
Usability	3	5	4
Customization	5	4	5
Integration	3	5	5

Project Tracking	3	5	4
Feedback Mechanism	2	4	3
Cost	3	4	5
Security	5	4	4

Reasoning

1. Scalability

Blueriq (4): Built for large-scale enterprise solutions but require technical expertise for scaling.

Monday.com (4): scales well but has limitations for highly complex systems.

Airtable (3): Suited for smaller to medium-scale teams, making it less robust for enterprise.

2. Usability

Blueriq (3): Requires expertise from developers to navigate effectively.

Monday.com (5): Easy setup and interface for non-technical users.

Airtable (4): Combined spreadsheet and a database functionality, with a moderate learning curve.

3. Customization

Blueriq (5): Highly customizable.

Monday.com (4): Decent, but less flexible.

Airtable (5): Highly customizable.

4. Integration

Blueriq (3): Integrates well, but may require significant setup.

Monday.com (5): Seamless integration with numerous apps and tools.

Airtable (5): Extensive API support and native integrations.

5. Project Tracking

Blueriq (3): Focused on automation and workflow rather than project tracking.

Monday.com (5): Excellent project management features.

Airtable (4): Offers basic project tracking.

6. Feedback Mechanism

Blueriq (2): Limited built-in feedback tools.

Monday.com (4): Includes tools for collaboration but not specialized.

Airtable (3): Allows comments on records but not an advanced mechanism.

7. Cost

Blueriq (3): Tailored pricing for enterprises, potentially expensive.

Monday.com (4): Reasonable pricing for features offered; scalable plans available.

Airtable (5): Affordable, with a robust free tier.

8. Security

Blueriq (5): Great security.

Monday.com (4): Reliable security.

Airtable (4): Reliable security.

4.5.6 Conclusion

Every tool could be used for different scenarios, but to determine which tool is the best based on the criteria, their score needs to be examined by the weight of the criteria. The following formula is used to calculate it:

Weighted Score = Score × Weight (% in decimal)

The total weighted scores for the tools are:

Blueriq: 3.70

Monday.com: 4.45

Airtable: 4.20

The best tool based on the weighted criteria is Monday.com, with a total score of 4.45, making it the most balanced choice across the evaluated criteria.

Advice

Blueriq's is outstanding tools to provide comprehensive, precise features for organizing and managing every stage of a business process. Because of its regulated methodology, users may specify precise requirements,

actions, and workflows, enabling highly detailed process customization. Blueriq aligns well with SPARC's workflow customization, integration, and security needs.

However, Blueriq's usability is more suited to technical users. Blueriq require expertise to leverage its full potential. It also lacks project tracking and feedback mechanisms, relying on external integrations or custom development to fill these gaps. Additionally, leveraging Blueriq effectively requires significant training, which may not align with the team's current experience level or project timeline. This issues which may impact in time constrain and cost-effectiveness.

User-friendly tools like Monday.com or Airtable offer quicker setup with cheaper price. By creating a user-friendly tool to develop and customize for next project, SPARC's can improve their process effectively without being constrained by complicated settings or high learning curves. For future development, it would be easier for SPARC to make a change without needing to hire expertise and spend more cost because how user friendly the tools are.

5 Conclusion

5.1 Conclusion & Recommendations

To answer the main research question; 'How can SPARC improve their partnerships and research processes' effectiveness in terms of communication, collaboration, and outcomes, and achieve the new strategy's goals?' The research highlights the need for streamlined workflows, centralized tools, and efficient data management to enhance communication, foster collaboration, and achieve stronger results in line with SPARC's strategic goals.

A structured approach is essential to overcoming SPARC's challenges, particularly in establishing clear data ownership, improving process efficiency, and ensuring scalability. The implementation of clear roles and responsibilities for data governance will enhance accountability and decision-making. Transitioning away from outdated and fragmented systems, SPARC should adopt a centralized database supported by modern tools and automation. This will improve data accuracy, reduce redundancy, and provide stakeholders with seamless access to reliable information.

System integration via APIs between a centralized database and essential platforms such as CMS and Exact Online will enable automated data transfers, significantly reducing manual effort and increasing operational efficiency. Automating workflows will further enhance consistency, reduce errors, and streamline SPARC's processes. All recommended improvements are designed with scalability in mind, ensuring SPARC is well-prepared for future growth and an expanding membership base.

In conclusion, these recommendations provide a clear path for SPARC to replace inefficient systems and align its business processes with its strategic goals. By adopting centralized, scalable solutions and automating workflows, SPARC will enhance its communication, collaboration, and operational outcomes, positioning itself for long-term success and sustainable growth.

5.2 Business Advice

By implementing a central data source and standardised workflows, duplication and errors are eliminated, while data quality and efficiency are improved.

With clear roles, such as Data Owners and Data Stewards, responsibilities are clearly defined, ensuring better management and compliance with regulations such as the AVG. Automation with Microsoft Forms and Power Automate streamlines processes and ensures SPARC can rely on a single source of truth.

To address SPARC's data challenges and inefficiencies, the recommended solution is API Integration between the CMS and Exact Online. This approach offers an effective balance between cost, scalability, and automation, making it a practical mid- to long-term solution that aligns with SPARC's operational needs and growth goals.

This approach is cost-effective, leverages existing systems, and automates data flows, reducing manual processes and errors while ensuring real-time updates. It supports SPARC's current and near-future needs with moderate scalability and can be implemented quickly compared to building a custom system.

For immediate relief during implementation, SPARC should hire an external administrator. This role would be cost-effective and straightforward to onboard, focusing on maintaining high data quality during the initial stages. Prioritizing data accuracy and consistency is essential before proceeding with any API integration or automation efforts.

In the long term, SPARC should strengthen data governance by defining roles such as Data Owners and Data Stewards to ensure accuracy and accountability.

Blueriq's is outstanding tools to provide precise features for organizing and managing every stage of a business process. Because of its methodology, users may specify requirements, actions, and workflows, enabling detailed process customization. Blueriq aligns well with SPARC's workflow customization, integration, and security needs.

However, Blueriq's usability is more suited to technical users. Blueriq require expertise to leverage its full potential. It also lacks project tracking and feedback mechanisms, relying on external integrations or custom development to fill these gaps. Additionally, leveraging Blueriq effectively requires training, which may not align with the team's current experience level or project timeline. This issues which may impact in time constrain and cost-effectiveness.

User-friendly tools like Monday.com or Airtable offer quicker setup with cheaper price. By creating a user-friendly tool to develop and customize for next project, SPARC's can improve their process effectively without being constrained by complicated settings or high learning curves. For future development, it would be easier for SPARC to make a change without needing to hire expertise and spend more cost because how user friendly the tools are.

6 Appendix

6.1 Feedback Workshop

This section will explain the feedback that we received from the stakeholders in details to finalize draft version of the current process.

BPMN Feedback

Member Registration

1. **Partner Coordinator Role**
 - The Partner Coordinator (Fontys) operates separately from SPARC.
 - They manage the process and are not a "black box" as they are knowledgeable about internal details.
2. **Chairman and Treasurer**
 - After the Chairman signs the legal agreement, it is sent back to the Treasurer, who archives it.
3. **Draft Legal Agreement (LA)**
 - If a company wants to become a partner, the Partner Coordinator sends a draft version of the LA.
4. **Legal Agreements**
 - The NDA and Legal Agreement are sent together.
 - The NDA is signed between the member, SPARC, and Fontys (not the Partner Coordinator).

Co-fundings

There is no feedback for this BPMN, means all the process flow are clear.

Invoicing

There is no feedback for this BPMN, means all the process flow are clear.

Semester Projects

1. **Project Gateway**
 - Add a gateway asking, "Is there any project?"
 - If no project exists, the Semester Coordinator arranges one.
2. **Decision Paths**
 - One gateway should ensure that when both conditions (research and partner proposal) are false, the Semester Coordinator takes action to arrange a project.
3. **Partner Communication**
 - If a company is not interested in a semester project:
 - The Partner Coordinator contacts the company to understand their reasons.
4. **Unfit Projects**
 - If a project does not align with the semester requirements, the Partner Coordinator negotiates with the client to adjust the project or fit it into a different semester.

Project Reporting

1. Feedback on Interest

- If a company is not interested, the Partner Coordinator should request feedback to improve future semesters.

2. Project Clarity

- Add a loop where the PLOU (Program Line Owner) requests more information, potentially requiring multiple meetings to finalize the project outline.

3. Unfit Projects

- If a project doesn't fit the semester, the Partner Coordinator contacts the company to resolve the issue or explore alternative options.

Process Documentation Feedback

1. Inconsistencies in the document

- Each process has the same content but a different formatting leading to inconsistencies

1. Unclear BPMN Pictures

- Some of the descriptions on the BPMN picture are too small and require zooming in more to be able to see clearly

1. Work with number and titles

- Need to add numbering for each title to give clarity to the reader

Business Advice



Introduction

This document focuses on the critical data ownership issue between SPARC and Fontys, focusing on the governance challenges that this brings up. Data ownership specifically, refers to who has control over specific datasets, including the right to modify, share and delete those data.

SPARC and Fontys work closely together, sharing specific datasets: this requires clear demarcation of access rights, usage policies and governance procedures. This document will explore the current situation, the data governance challenges and potential solutions, and finally provide a practical advice on a possible solution that aim to solve this ownership challenge.

1 Context

It is important to explain on a high level this collaboration between Fontys and SPARC. Fontys deals with acquiring new partners both in education and innovation, if the partner is in innovation SPARC needs to have the data to be able to send invoices to these partners in Innovation. In fact, partners in Innovation to be part of this network and benefit from the exchange of knowledge in different projects must pay a membership to SPARC. This is where the challenge of data ownership arises, because Fontys needs the data of both partners in innovation and partners in education, but they do not need the invoicing data of partners in innovation because it is only SPARC that send invoice to Partner in Innovation and therefore is interested in these invoice data, but clearly in the data of the members that Fontys has there are already partial information that is part of the data that will be used in the Invoices data as well.

1.2 Current Situation

At SPARC, data management is currently fragmented and inefficiently organized, which poses significant challenges. The use of three separate systems - Excel, Fontys CMS, and Exact Online - creates duplication of data and increases the risk of errors. In this, there is no standardised format of how data arrives. The Partner Coordinator manages prospect information manually in Excel, after which the same data must be re-entered in Fontys CMS as soon as a prospect becomes a member. Then the Treasurer manually adds the member information to Exact Online for financial administration. These separate workflows lead to inconsistent data and a lack of central control.

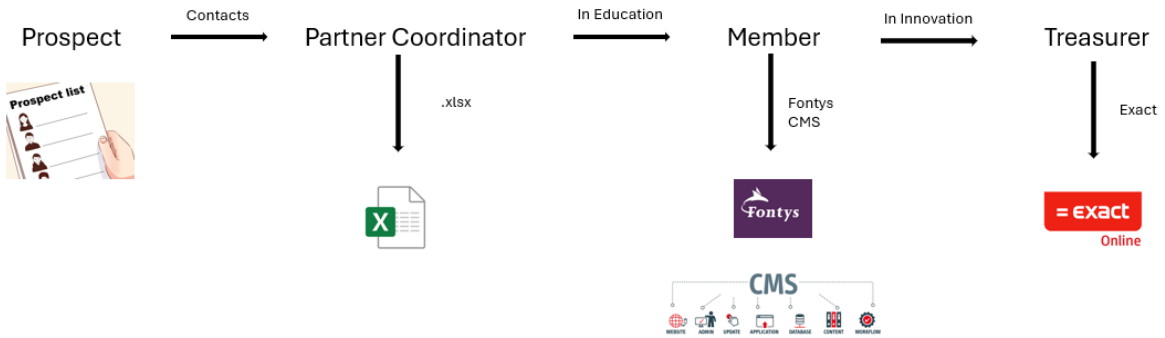


Figure 1 – Current Situation

Specifically, in the current situation, when a partner coordinator from Fontys has a first contact with a potential member (prospect), it populates an excel file, with as much information as possible, then if this prospect became a member, it will be added in the CMS, and the data are retrieved from the excel file. At this point, if the member is partner in innovation, SPARC treasurer needs the invoice information to populate them in exact, this data is stored in another excel where all the information of new partner in Innovation is stored.

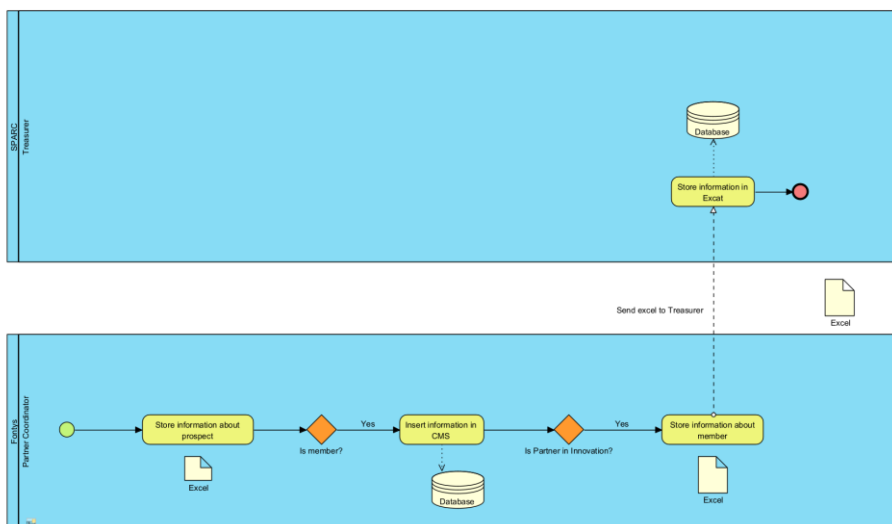


Figure 2 – BPMN of the current data processing.

1.3 Challenges

Redundancy and Duplication: The same data are insert across different systems: first into an Excel file, then into the CMS, then again (data about partner in innovation) into another Excel, and finally into Exact Online. This duplication takes away important time and increases the risk of errors.

Risk of Human Error: With each manual transfer of data, there is a possibility of mistakes, for example typos, omissions or inaccuracies. This is harmful to the overall data quality.

Systems not Integrated: The lack of integration between the CMS, Excel files, and Exact Online means that each update or changes made in one system, must be replicated manually in the others. This delays data synchronization.

Scalability Issues: As the number of members grows, managing this data manually will become even more time consuming, and consequently increase the possibility of errors. The current setup is not scalable for future growth.

Data Segmentation Challenges: Even if SPARC only needs data related to partner in innovation, the manual filtering and extraction process from the CMS to the Excel takes time and effort and creates inefficiencies.

1.4 Current Ownership of Data

A major bottleneck within the current situation at SPARC is the lack of clearly defined data ownership. There are no formal agreements on who is responsible for the accuracy, consistency and security of data across systems. This lack of structure poses significant risks:

1. Fragmented ownership:
 - a. Data is currently managed by multiple stakeholders, such as the Partner Coordinator and the Treasurer, without a formal allocation of responsibilities. This creates overlapping tasks, causing confusion when errors or inconsistencies are identified.
2. Lack of responsibility:
 - a. The current situation lacks a designated person or role responsible for data quality. This leads to a lack of control and difficulties in correcting errors or improving data processes.
3. Risk of regulatory non-compliance:
 - a. The lack of a Data Owner complicates compliance with regulations such as the General Data Protection Regulation (GDPR). Without a clear owner, it remains unclear who is responsible for the security and processing of personal data. This can result in legal and financial risks, such as fines, reputational damage and loss of stakeholder trust.
 - b. Lack of responsibility for managing access rights, which increases the risk of data breaches.
 - c. Not being able to track who accessed data or made changes, which is essential in audits or incident investigations.

This situation makes it difficult for SPARC to effectively manage and strategically deploy data. Solving this requires a structured approach where roles and responsibilities are clearly defined. By introducing the concept of Data Owners and Data Stewards, SPARC can strengthen control over its data and minimise risks.

2 Governance

In the desired situation, SPARC implements a standardised workflow that ensures uniformity in data collection, capture and management. The starting point is to create a single source of truth, a centrally managed dataset in which all relevant information is stored consistently and reliably. This forms the basis for further automating processes and eliminating current inefficiencies.

Clear Data Ownership Policies

Establish a formal agreement that defines ownership of specific datasets, clarifying the rights of access and responsibilities of SPARC and Fontys regarding data collection, management and usage. This formal agreement should specify:

- Who is responsible for updating and maintaining specific datasets.
- Who has the authority to modify, share or delete the data.
- Accountability measures for make sure good data accuracy and compliance.

Data Sharing Agreements

Having an agreement on data-sharing that outlines the terms and conditions for data exchange between Fontys and SPARC. This agreement should specify:

- Which datasets are shared between the two organizations
- The purpose of data sharing (reporting, invoicing etc.)
- The system used to share data (API, manual transfer or integrated system)

Automation of Data Flow

Reduce the need of manual processes by automating data flow between systems. This could involve:

- o Implementation of API to connect Fontys' CMS and SPARC's Exact Online.
- o Move Excel-based data processes into a centralized system solution.

Automation increase data accuracy, minimizes duplication, and simplifies workflows.

2.1 Roles and Responsibilities

An effective data governance structure requires clear assignment of roles and responsibilities. In the desired situation at SPARC, three primary roles have been identified that contribute to the consistency, security and efficiency of data processing.

1. Data Owners

- a. **Description:** Data Owners are responsible for a specific data domain, such as prospect information, member data or financial data. They determine how data should be used, maintained and protected.
- b. **Tasks:**
 - i. Oversee the quality and security of data in their domain.
 - ii. Make decisions on who gets access to specific datasets.
 - iii. Ensure compliance with regulations such as the AVG.

2. Data Stewards

- a. **Description:** Data Stewards are operationally responsible for the execution of data processes. They ensure that data is entered and maintained accurately, completely and consistently.
- b. **Tasks:**
 - i. Daily monitoring of data quality and consistency.
 - ii. Validating data entered through workflow.
 - iii. Identify and correct errors or discrepancies.
 - iv. Support the Data Owners by providing operational insights.

3. Data Governance Board

- a. **Description:** The Data Governance Board functions as an overarching team that oversees all data governance activities within SPARC.
- b. **Tasks:**
 - i. Develop and update policy guidelines for data governance.
 - ii. Evaluate the effectiveness of processes and roles.
 - iii. Periodic reports on data status and governance performance.

- iv. Monitor compliance with laws and regulations.

2.2 Data Quality

Fontys and SPARC are two organizations with separate and distinct roles, but they work closely together. Fontys is a higher education institution in the Netherlands with a strong emphasis on applied sciences. It plays a crucial role in connecting education and the professional field. Fontys collaborates with different partners such as companies, municipalities and other organizations with the aim of realizing innovative projects and providing practical education for students.

These partnerships are categorized into two types:

- Educational Partners
- Innovation Partners

Fontys is responsible for maintaining and managing the data of all partners. This data is essential for effective coordination and reporting, but also presents challenges when Fontys collaborates with external partners such as SPARC. SPARC is an organization that focuses on fostering innovation. Its primary mission is to connect innovation partners with opportunities and resources and create a network that can accelerate growth and guide impactful projects.

Together, they collaborate on a tight contact, and they share data, that is why the need of defining clear ownership.

Data quality is a core aspect to ensure the successfulness of the proposed solutions and the smooth collaboration between SPARC and Fontys. Having poor data input can lead to unreliable outputs, which can cause inefficiencies and errors. For this reason, having high data quality is a critical area to focus on.

2.3 Key aspects of Data Quality in the Current Context

This section shows the critical data quality challenges in the current situation:

Accuracy of Input Data:

Date entered the system (Excel or CMS) must be correct and consistent. For example, when a Fontys partner coordinator records a new prospect's details, wrong or incomplete data could result in errors in membership invoicing or reporting. Furthermore, specific invoicing data such as payment terms, must be precise to avoid delays or mistakes with payments.

Consistency Across Systems:

Because multiple systems are used (Excel, CMS, Exact Online), inconsistencies between data can arise, mainly if data is manually transferred. For example, if a member's status is updated in CMS but not in Excel (and vice versa) it could lead to duplicate invoices or outdated reports.

Timing of Updates:

Data must be updated immediately to ensure accuracy. For example, delays in updating member details or payment statutes can negatively impact operational workflows.

Input Validation:

Implementation of validation rules during data entry (mandatory fields, predefined formats, duplicate detection) can prevent errors.

Data Cleaning and Maintenance:

Regular data checks should identify and resolve inconsistencies, duplicates, or outdated information.

2.4 Improvement of the Architecture

Data processing within SPARC currently has problems such as data duplication, inefficient input, and the use of multiple systems without integration. These bottlenecks limit the consistency, reliability, and accessibility of data, leading to suboptimal decision-making and operational inefficiencies.

To solve these problems, a standardised and automated workflow is essential. In the desired situation, a single source of truth is created, in which data is uniformly collected, validated, and centrally stored. This approach eliminates duplication, improves data quality, and ensures compliance with regulations such as the AVG. The revamped process builds on a clear division of roles and uses advanced tools and automation. By integrating a central data source with streamlined workflow, SPARC can effectively manage data, deploy it strategically and collaborate more efficiently across departments. This approach not only contributes to consistency and reliability but also reinforces the strategic value of data to the organisation.

1. Collection of Data

- a. Data processing starts with the uniform collection of data through a digital form in Microsoft Forms. This was conceived with the idea of using a tool that can be connected in almost any organisation. This form is easy to use and edit, so there is almost no learning curve to it. Besides, most organisations, including SPARC already have a running Microsoft 365 package, which Microsoft Forms also falls within.
- **Input:**
 - Users, such as the Partner Coordinator or prospects themselves, fill in the form. ○ The form is designed to accept only correct and complete data thanks to built-in validation rules (e.g. mandatory fields and format checks).
 - **Validation on entry:**
 - Immediately upon entry, the form checks for basic errors, such as missing mandatory information or incorrectly formatted fields (e.g. e-mail and phone numbers).

2. Validation and Verification

- After submitting the form, Power Automate activates a workflow that validates and further processes the data. To stay within Microsoft's package, Power Automate was chosen. This is because this has good cooperation between the various Microsoft apps, making integration easy.
- **Automatic validation:**
 - Power Automate checks the data for duplication and completeness by comparing with existing datasets in the central data source (CMS Database or SQL Database)
 - If discrepancies or duplicates are found, an alert is sent to the Data Steward.
- **Manual check by the Data Steward:**
 - If necessary, the Data Steward receives an approval request to check and approve the entered data.
 - The Data Steward corrects any errors before final storage of the data.

3. Storage and Synchronisation

- Validated data is stored in a central system that acts as the source of truth. This system ensures consistency and integration with other platforms.
- Central storage:
 - All data is stored in a SharePoint list, which acts as SPARC's primary data archive. ○ This list is structured according to standardised fields, such as name, e-mail address, membership status and company information.
- Integration with other systems:
 - Power Automate automatically synchronises data with:
 - i. Fontys CMS: For membership management.
 - ii. Exact Online: For financial administration.

4. Access management

- a. Access management is an essential part of data processing to ensure both security and efficiency.

- **Roles and access rights:**
 - Only authorised users, such as the Partner Coordinator, Data Stewards and Treasurers, have access to specific datasets.
 - Access rights are centrally managed and adjusted by the Data Owner depending on users' needs.
- **Audit trails:**
 - The central system automatically logs changes to data, including who made these changes and when. This provides transparency and traceability.

In the desired situation, data processing within SPARC is streamlined, with a digital workflow via Microsoft Forms and Power Automate ensuring central data collection and validation. Validated data is stored in a central source of truth (SharePoint) and synchronised with systems such as Fontys CMS and Exact Online. The process is supported by access rules and controls that ensure compliance, efficiency, and clarity.

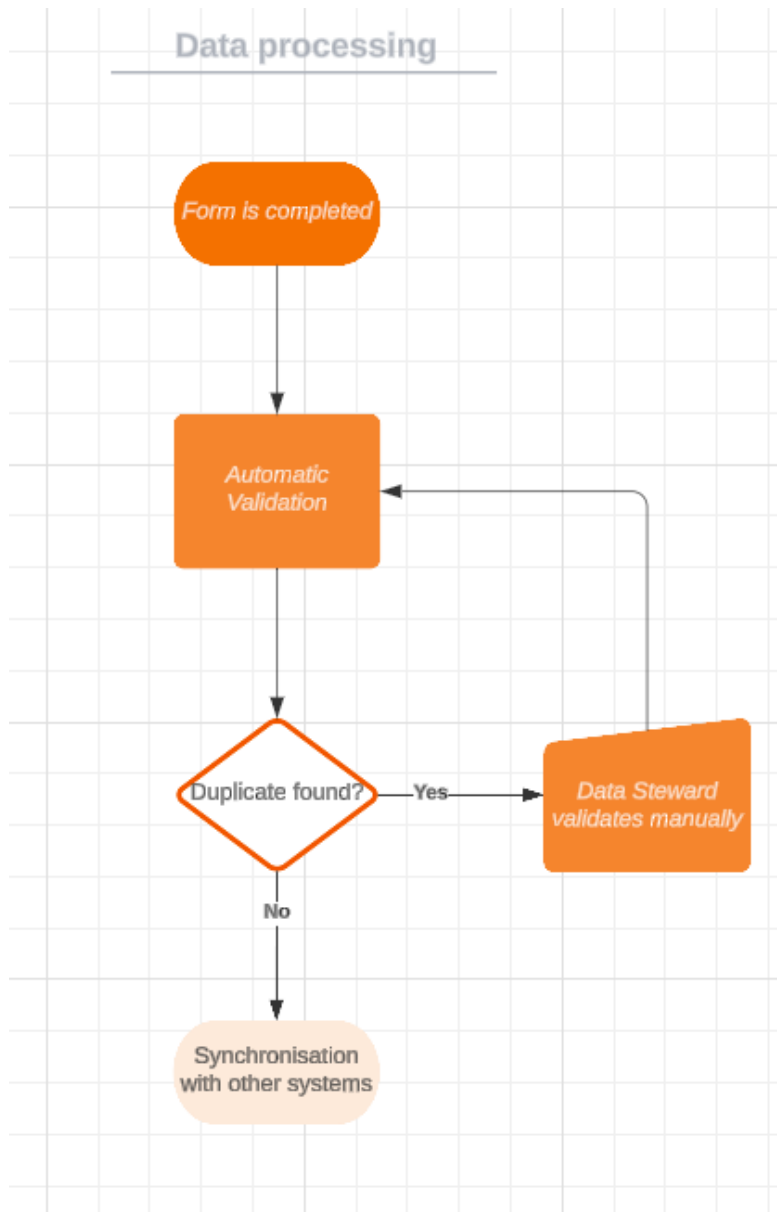


Figure 3 – Workflow of the Desired Situation

2.5 Benefits of the Proposed Improvements

The proposed improvements have several benefits:

Efficiency: Automating workflows and having systems that are integrated reduces manual effort, giving space to resources for more significant tasks.

Scalability: A centralized and automated system can manage the growing number of members.

Data Accuracy: Setting validation rules and having systems that are synchronized ensure consistency and correctness of data across all platforms.

Security: Role-based access control protect sensitive data, ensuring SPARC and Fontys only access the information relevant to them.

Collaboration: A streamlined architecture improve collaboration between SPARC and Fontys by removing inefficiencies and data silos.

Operational Efficiency: this is because simplify and well-defined data processes reduce the time spent fixing errors and resolving discrepancies.

Accurate Reporting and Invoicing: due to the quality of the data input reports and invoices generated are reliable.

Reduce risks: good data quality reduces compliance risks associated with data inaccuracies, particularly in relation to GDPR.

In conclusion, managing and focus on data quality matters, will enhance the effectiveness of any proposed solution. It will make sure that the data flow between SPARC and Fontys is accurate and consistent. These improvements will eliminate inefficiencies, reduce errors, and help SPARC and Fontys for more effective and secure collaboration in the future.

3 Solution Selection Criteria

When deciding on the best solution to address the challenges discussed, it is important to evaluate each option systematically. Solution selection criteria provide a structured approach to assess the proposed solutions. These criteria ensure that the chosen solution aligns with the strategic goals of the organisation, takes care of the identified challenges, and give the greatest value in terms of functionality, scalability, and cost-effectiveness. By giving weight to each criterion, it is possible to compare objectively the proposed alternatives and select the appropriate solution.

3.1 Explanation of Criteria and Their Relevance

To ensure an all-around evaluation, the following criteria have been defined as important to the selection of the right solution. Each criterion reflects an aspect of the solution's impact on performance, user experience, and long-term sustainability:

Cost (Weight 15%):

The financial investment required to implement and maintain the solution is a key factor. This includes development or integration costs, licensing fees, and ongoing maintenance expenses. For the selection of the solution, affordability is core since a balance between budget and the proper solution is required.

Implementation Time (Weight 12%):

The time needed to deploy the solution affects how fast SPARC and Fontys can address the existing challenges. A solution with a shorter implementation time might be prefer.

Maintenance (Weight 10%):

The simplicity and cost of maintaining the solution after implementation play a central role in sustainability. Having systems that required frequent updates, or specialized expertise can take time and resource.

Ease of Use (Weight 12%):

Simplicity of system determines how efficiently, and fast users can adapt to the system. Choosing a solution that ensure that stakeholders can learn how to use the new solution without extensive training is crucial.

Automation (Weight 12%):

Automation reduces the need for repetitive manual tasks, reserving time for more meaningful activities, and it minimise human error. In this context, the goal is to eliminate or reduce manual data transfers between systems (from Excel to CMS or Exact Online).

Scalability (Weight 10%):

The ability to handle increased data as partnership grows is fundamental in the decision of the solution. A scalable solution ensures that the system will remain functional and efficient in the future.

Error Risk (Weight 10%):

Solutions that minimize the possibility for human error or system crashes are ideal. Errors in data entry or data transfer can lead to miscommunication, financial mistakes, and wasted time.

Customization (Weight 6%):

The flexibility of a solution that adapts to specific needs adds value. Customization make sure that a solution is fully adaptable to specific and unique workflows.

Functionality (Weight 8%):

The features of the solution are important for supporting all required tasks. A proper solution should address all critical workflows and core needs.

Data Storage (Weight 5%):

The choice of where the data will be stored (in the cloud or locally) impact security and scalability.

3.2 Criteria Weighting

The following table summarizes the weights assigned to each criterion:

Criterion	Weight (%)	Reason for Weight
Cost	15%	Financial viability is a core factor in choosing a solution.
Implementation Time	12%	Faster solution implementation allows to address the inefficiencies and challenges quickly.
Maintenance	10%	Lower maintenance reduces long-term costs and efforts.
Ease of Use	12%	Ensuring stakeholders can efficiently use the solution without a high learning curve is fundamental.
Automation	12%	Reducing manual effort and human error is a core goal of the project.
Scalability	10%	The solution must consider future growth.
Error Risk	10%	A reliable system that minimizes data entry and transfer errors is essential.
Customization	6%	Tailoring the solution to specific needs ensures efficiency.
Functionality	8%	A system with sufficient features supports all the required tasks need to be performed.
Data Storage	5%	Proper storage choice ensures better security and scalability.

Possible solutions

This chapter assess and discuss in detail the four possible solutions to address SPARC's challenges mentioned previously. The four possible solutions are the following:

- Build a Standalone Web Application
- Integration Between CMS and Exact via API
- Treasurer Direct Access to CMS
- Hire an External Administrator

3.3 Build a Standalone Web Application

(In appendices details and demo of this solution)

Building a custom web application with its own SQL database to manage prospects and confirmed members. This system would serve as a central source for member data and automate data sharing with CMS and Exact.

Core features

- Centralized system for prospect and member management.
- Automates data sharing via APIs to CMS and Exact.
- Tracking of potential member with status updated.

Pros and Cons:

Pros	Cons
Fully customized.	High development and maintenance cost.
Reduce manual input errors through automation.	Introduction of new system, in the existing landscape.
Provide real-time insights on prospect and members.	Resources need to include a use a new system in their workflow.
Provide strict data ownership with user roles and permission.	
Improved data quality due to validation rule customization tailored and built on the system.	

Estimated Costs:

Category	Cost	Details
Development Costs	High	Requires a development team for design, coding, and testing.
Maintenance Costs	High	Ongoing updates, bug fixes, and scaling.
Infrastructure Costs	Moderate	Hosting and secure data storage.

How It Modifies the Current Process

- **Automation:** Automates the manual transfer of data between systems, reducing human error and increasing efficiency.
- **Centralization:** Consolidates data in one platform, eliminating silos and ensuring smooth integration with Exact and CMS.
- **Data Ownership:** Strengthens data ownership by enforcing access controls based on roles.
- **Scalability:** Supports long-term scalability and aligns with SPARC’s goal to double its membership.

When It’s a Good Fit

This solution is ideal for long-term scalability and organizations looking for full control over their system. It works well if resources for development and maintenance are available.

3.4 Integration between CMS and Exact via API

Linking the CMS to Exact using APIs to automate the data flow. This solution uses existing systems to simplify the transfer of data.

Core features

- Automates the transfer of member data (partner in innovation) from CMS to Exact
- CMS tracks all member data, including potential partners
- Real-time updates to Exact for the treasurer’s use

Pros and Cons:

Pros	Cons
Uses existing systems, minimizing infrastructure changes.	Requires implement and integrate API.
Reduces manual intervention and related errors.	Limited flexibility compared to a custom-built solution.
	Relies on the quality of input data in the CMS. Errors in the CMS can propagate through the API.

Estimated Costs:

Category	Cost	Details
Development Costs	Moderate	Includes API design, development, and testing.
Maintenance Costs	Moderate	Monitoring and periodic updates to ensure API functionality.
Infrastructure Costs	Low	No need for new systems, relies on CMS and Exact’s existing infrastructure.

How It Modifies the Current Process

- Automation: Automates data sharing between CMS and Exact, reducing manual intervention and errors.
- Improved Visibility: Provides up-to-date data for the treasurer and insights into potential partners in innovation, supporting strategic planning.
- Flexibility: Balances automation and cost-effectiveness without drastically change the current IT infrastructure.

When It’s a Good Fit

This solution works well when a cost-effective with a moderate automated approach is needed. It avoids major IT infrastructure changes while improving efficiency.

3.5 Treasurer direct access the CMS

The treasurer gains direct access to the CMS to manually retrieve and manage member data. Updates to Exact are done manually by the treasurer.

Core features

- Treasurer can track and manage member information (partner in innovation) directly in the CMS.

- Manual updates to Exact for invoicing purposes.

Pros and Cons:

Pros	Cons
No development costs or new tools required.	Manual processes increase the risk of errors.
Can be implemented immediately.	Not scalable for SPARC’s goal of doubling membership.
	Lacks real-time tracking and automation.

Estimated Costs:

Category	Cost	Details
Development Costs	None	No need for software development or integration.
Maintenance Costs	None	No technical maintenance required.
Infrastructure Costs	None	Utilizes existing systems without modification.

How It Modifies the Current Process

- Manual Updates: Keeps the process manual, with the treasurer managing and transferring data.
- Error Risk: Same risk of human errors due to the repetitive manual nature of the process.
- Scalability: Not suitable for scaling, because rely on manual intervention.

When It’s a Good Fit

This option is suitable as a short-term, low-cost solution or a quick fix. It’s ideal when minimizing costs and immediate implementation are priorities.

3.6 Hire an External Administrator

Hiring an external administrator to manage the processes with a mix of manual interventions and existing automated tools.

Core features

- A dedicated employee to manage member data.
- Combines manual updates and limited automation where available.

Pros and Cons:

Pros	Cons
Reduces workload for existing employees.	High continuing salary costs.
No additional tools or development required.	Keeps a manual process, limiting efficiency and scalability.
Can provide better managing of member data if trained properly.	Error risk due human intervention.

Estimated Costs:

Category	Cost	Details
Salary Costs	Moderate	Regular expenses for a part-time or full-time administrator.
Training Costs	Low	Training on members, CMS and Exact processes.
Infrastructure Costs	None	No changes to the existing systems.

How It Modifies the Current Process

- **Workload Distribution:** Make it easy on SPARC and Fontys employees by delegating tasks to a dedicated administrator.
- **Manual Processes:** Continues manual updates, with some improvement in efficiency due to specialization.
- **Error Risk:** Risk of errors remain, as manual intervention is still required.
- **Scalability:** Limited scalability, as it relies on a single individual to handle (potential growing) member data.

When It's a Good Fit

This solution works when additional helps due to workload is required, but the organization cannot invest in automation or IT system development. It's an approach for managing workloads in the short to medium term.

Conclusion

These proposed solutions provide an overview of possibilities for overcoming the challenges explained. The detailed analysis of features, costs and process impacts forms the foundation for selecting the most suitable approach.

3.7 Comparative Table of Possible Solutions

Below is a table that compares each possible solution based on the criteria.

Criteria	New Database/System	API for Integration	CMS Access for Johan	Hire Administrative worker
Cost	High (development, hosting, maintenance)	Medium (API development and hosting)	Low (no additional infrastructure needed)	Medium (ongoing salary)
Implementation Time	Long (custom development and migration)	Medium (depends on CMS and API compatibility)	Immediate (no technical setup required)	Immediate (after the hiring process)
Maintenance	Complex (requires RBAC and system updates)	Moderate (requires monitoring and updates)	Minimal (no maintenance beyond CMS updates)	Moderate (requires oversight for consistency)
Ease of Use	Moderate (training required for staff)	High (automates processes for users)	Moderate (Johan uses CMS manually)	Moderate (requires oversight for consistency)
Automation	Full (supports advanced workflows)	Partial (syncs data but retains CMS reliance)	None (manual data handling by Johan)	None (entirely manual processes)
Scalability	High (scales with SPARC's growth and needs)	High (scales with SPARC's growth and needs)	Low (manual processes won't scale well)	Low (limited to human capacity)
Error Risk	Low (automated processes minimize errors)	Moderate (requires robust authentication)	High (risk of human error in manual work)	High (human error risk in manual tasks)
Customization	High (fully customizable for SPARC's needs)	Medium (flexible but relies on CMS features)	Low (limited to existing CMS features)	Medium (worker can adapt tasks as needed)
Functionality	Comprehensive (supports granular roles)	Good (role-based endpoints for access control)	Minimal (basic roles in CMS)	Good (worker handles tasks manually)
Data Storage	High (centralized database with scalability)	Good (improves current workflow efficiency)	Limited (manual processes hinder growth)	Limited (human-dependent scalability)

3.8 Weighted Scores

Each solution is assigned a score from 1 (least desirable option for that specific criterion) to 5 (most desirable option for that specific criterion) based on how well it meets each criterion, with the scores multiplied by the weight for that criterion.

Criteria	Weight (%)	New System (Web App)	API Integration (CMS & Exact)	Direct Treasurer Access to CMS	Hire External Administrator
Cost	15%	2 (30)	3 (45)	5 (75)	3 (45)
Implementation Time	12%	1 (12)	3 (36)	5 (60)	4 (48)
Maintenance	10%	2 (20)	3 (30)	5 (50)	4 (40)
Ease of Use	12%	3 (36)	3 (36)	5 (60)	5 (60)
Automation	12%	5 (60)	4 (48)	1 (12)	3 (36)
Scalability	10%	5 (50)	4 (40)	1 (10)	2 (20)
Error Risk	10%	5 (50)	5 (50)	2 (20)	3 (30)
Customization	6%	5 (30)	3 (18)	1 (6)	1 (6)
Functionality	8%	5 (40)	4 (32)	2 (16)	3 (24)
Data Storage	5%	5 (25)	3 (15)	1 (5)	1 (5)

Total Weighted Scores:

- New System (Web App): 353
- API Integration (CMS & Exact): 350
- Direct Treasurer Access to CMS: 314
- Hire External Administrator: 314

3.9 Summary of Findings

New System (Web App) and API Integration (CMS & Exact) received the highest scores:

- Web App is the most scalable, customizable, and supports long-term goals but has high costs and a long implementation time.
- API Integration balances cost and automation, making it a cost-effective mid-term/long term solution while requiring moderate development time.

Direct Treasurer Access to CMS and Hire External Administrator have similar scores:

- Both solutions work as short-term fixes, but they lack scalability, rely on manual processes, and do not address long-term growth.

3.10 Justification

The integration between CMS and Exact via API is the most suitable solution for the following reasons:

- **Balanced Cost and Automation:** API integration is more affordable than building a new system, and it still significantly automate processes, reducing manual data entry and errors.
- **Moderate Scalability:** While not as scalable as a standalone system, API integration provides a reasonable level of growth support without changing the IT infrastructure drastically.
- **Shorter Implementation Time:** Compared to building a new system, integrating CMS and Exact APIs can be implemented more quickly, making it an effective mid-term/long term solution.
- **Data Ownership and Accuracy:** By integrating the CMS and Exact, SPARC can keep data ownership within its existing tools while ensuring up-to-date information for the treasurer.

4 Alternative Tools Criteria

The purpose of this document is to evaluate workflow tools that meet SPARC co-funding process requirement. These tools will be compared to give a recommendation for SPARC future development. The tools that are mentioned in this document are believed to be able to map out SPARC processes especially for co-funding process.

4.1 Requirement Overview

This section provides a summary of the requirements that will guide the evaluation and selection of workflow tools suitable for SPARC’s co-funding process. The requirements are categorized into business, user, and functional needs to ensure the chosen tool aligns with SPARC’s objectives.

1. Business Requirements

- Tools that enhance project tracking.
- Tools that improve communication.
- Tools that support centralized information management.

2. User Requirements

- Role-based access control (e.g., different permissions for members, SPARC, and Fontys).
- Customizable workflows to adapt to specific project needs.
- Feedback mechanisms for users to provide input or report issues.

3. Functional Requirements

- Compatibility with specific functionalities (Co-Funding Process):
- Proposal submission workflows.
- Detailed project tracking capabilities.
- Integration with other systems, including:
- Excel for data manipulation and reporting.
- Exact for financial and operational data management.

4.2 Tools Selection Criteria

The following table represents the criteria on which the tools will be compared. It includes three columns – Criteria, Description, Weight. The weight is distributed in percentages across the criteria.

Criteria	Description	Weight (%)
Scalability	Ability to handle growing number of users, data, and increasing process complexity	15%
Usability	User-friendly interface for all stakeholders, including professors, managers, and board members.	10%

Customization	Ability to tailor workflows, and notifications to align with SPARC’s processes.	20%
Integration	Seamless compatibility with external systems such as Excel, Exact, PIM.	15%
Project Tracking	Features for real-time status updates, centralized information, and tracking mechanisms.	20%
Feedback Mechanism	Automated feedback and notifications for proposal approvals and rejections.	5%
Cost	Affordable pricing that aligns with SPARC’s budget constraints.	5%
Security	Role-based access control and data protection measures.	10%

These criteria are going to be measure for further analysis comparison between Blueriq and alternative workflow tools.

4.3 Workflow Tools

SPARC's main problems include a lack of streamlined workflows, difficulty in clearly visualizing and communicating processes to team members. SPARC’s also have a problem with having separate information stored. Based on these issues, we come to a solution for SPARC to implement project management or workflow tools.

Project management and workflow tools provide clear visualizations of processes, making them easier to understand and follow. They enhance transparency, streamline task assignments, and ensure team members can track progress in real time. By centralizing process details, these tools improve communication and help explain workflows effectively to all stakeholders.

The project group found two potential tools that will be good alternatives for Blueriq, which is Monday.com and Airtable. These tools were chosen based on their popularity, ease of use, and advanced project management features that better align with SPARC needs.

Here is the explanation for each tool:

Blueriq



Blueriq is a decision-driven platform designed to simplify complex processes. Its architecture is easy to comprehend and work with since it follows a simple flow: analyse, model, execute, and display. By employing decision models to create applications that swiftly adjust to changes in policy and enhance the user experience, Blueriq allows us to concentrate on the important things.

Key Features

- Separate logic and presentation
- Well customized to complex process
- Rule based workflows and automation

Criteria Based Analysis

Scalability (15%)

Pros:

- It is efficient at handling large amounts of data and users.
- Dozens of modular designs allow Blueriq to grow with changing processes.

Cons:

- Blueriq scales. As the organization may need more users, workflows, or modules to be implemented, the pricing model may increase.
- Needs sophisticated infrastructure management to prevent performance degradation.

Usability (10%)

Pros:

- Offers a uniform and comprehensible interface for developers and process designers.
- Allows dynamic workflows, decreasing complexity on the end-user side.

Cons:

- The Blueriq interface and tools are primarily for technical users who create workflows, decision tables, and business rules.

Customization (20%)

Pros:

- Advanced forms, rules, and workflows are very well customized to complex processes such as SPARC's co-funding.
- Decision tables and business rules provide a detailed level of customization in accordance with custom needs.

Cons:

- Customization may take a long time and requires more technical expertise, resulting in a steeper learning curve.

Integration (15%)

Pros:

- Sustains interfacing with outer systems such as databases, APIs, and other platforms.
- Pulls and pushes data dynamically and is compatible with Excel, Exact, and similar tools.

Cons:

- May need bespoke development for certain tools such as Excel, Exact, or PIM, adding complexity and cost to setup.

Project Tracking (20%)

Pros:

- Defined states and transitions in workflows allow you to keep track of the progress of the workflow.

Cons:

- No built-in project tracking features such as dashboards or timeline views. Could benefit from customization.
- Needs integration with third-party tools for holistic tracking.

Feedback Mechanism (5%)

Pros:

- Proposals can be approved or rejected using automated notifications and decision tables.
- The rules-based mechanisms provide stability and predictability.

Cons:

- Not many pre-built templates to customize for feedback or notifications.
- Needs more configuration, which would be useful to customize the feedback mechanism.

Cost (5%)

Pros:

- Economical for organizations needing solid rule-based workflows and automation.

Cons:

- There is no fixed price. Pricing varies based on specified requirements.

Security (10%)

Pros:

- Space Customizable Host co-modifications permit you to control whom you share the workspace with and if they handle creating material.

Cons:

- Technical skills may be required to implement and maintain security settings.

Overall Assessment

Blueriq delivers strong technology for specific modeling, featuring capabilities that are capable of modeling all levels of a business process end to end. Users can provide very specific requirements, actions, and workflows, thanks to its regulated methodology that gives you complete process customization. Blueriq is a good fit for SPARC's workflow customization, integration, and security requirements. Nonetheless, it is more favorable to technical users, who could take advantage of its full capabilities. Two of the biggest downsides are no built-in feature for project tracking or feedback (you must customize it on your own). However, its pricing can increase with usage, which might affect cost-effectiveness for larger teams or deeper workflows.

Airtable



Airtable has a user-friendly interface that merges a spreadsheet with database functionality, making it easy for non-technical stakeholders to manage and track workflows. It's customizable, with features such as Kanban boards and automation that help cut down the amount of time spent on SPARC's co-funding process. It is a cost-effective option with a free plan and scalable pricing.

Key Features

- Custom views
- Record management
- Team collaboration
- Integration with other tools

Criteria Based Analysis

Scalability (15%)

Pros:

- It is scalable and can manage large volumes of data and users efficiently.
- Blueriq is modular in design, enabling adaptation as processes grow and develop.

Cons:

- Inconsistency & slow at larger data quantities.

Usability (10%)

Pros:

- With a user-friendly interface that offers the ease of use of a spreadsheet with the usability of a database, Airtable is accessible to both non-technical users and technical teams.
- Ready-made templates for different purposes — project management, marketing, and team collaboration.
- Provides a visual workflow building and customization interface using drag-and-drop, no coding required.

Cons:

- Users may need to get used to Airtable's relational database model for complex workflows, which can be a little difficult for non-technical users.

Customization (20%)

Pros:

- An extremely versatile set of forms, workflows, and databases that can be adjusted to meet the needs of complex processes.
- Views such as grid, calendar, Kanban, Gantt for different use cases, and automations that can be implemented without writing a single line of code.

Cons:

- Might restrict customization – which seems limited to companies with special needs.

Integration (15%)

Pros:

- Integrates with Google Workspace, Slack, and third-party apps via Zapier effortlessly.
- API for Custom Integrations — This feature allows Airtable to connect with external systems (ERP/CRM tools).

Cons:

- As part of the plan, the platform applies rate limits on its API, which may slow down some applications that deal with a lot of data or require complex interfaces.

Project Tracking (20%)

Pros:

- Bug tracking tool with custom views like Kanban, Gantt, and calendar, for real-time updates on project development.
- Pushes real-time notifications when tasks need to be completed or certain events occur.

Cons:

- Does not have end-to-end tracking; having to utilize external tools in combination.

Feedback Mechanism (5%)

Pros:

- Automated email alerts for changes or updates to records, activities, or approvals.

Cons:

- Pre-built feedback templates are minimal; manual customization needed to build notifications for specific workflows.

Cost (5%)

Pros:

- Provide free sandbox options or getting started templates/free options for all bundles.

Cons:

- The per-user cost, and when the team grows, it could increase rapidly.

Security (10%)

Pros:

- Custom controls for collaboration permissions for your workspace allow you to decide what you share, with whom, and whether they can edit content.
- Restrict who has access to Airtable views via share links that require a password or use of a particular email domain.

Cons:

- Airtable should not be used to store sensitive information that you do not want some collaborators to see.

Overall Assessment

With a combination of a user-friendly interface, rich customization capability, and a low-cost pricing structure, Airtable has proven to be a great solution for SPARC's co-funding process. On the other hand, Airtable may not be suitable for complex workflows and large-scale integration use cases since its relational database model can be difficult for non-technical users and its API rate limitations can hinder performance for those with high data volume needs. Moderate security, with some access control features, may not be suitable for sensitive or private data.

Monday.com



Monday.com has built-in elements like Gantt charts, real-time updates, and more for project monitoring that Blueriq does not have. Its visual layout and customizable dashboards keep all stakeholders on the same page. It also comes with strong automation features and integrates with external systems, helping to centralize information.

Key Features

- Resource and workload management
- Templates for easy setup
- Collaboration tools
- Visual project tracking with dashboard
- Advance reporting and analysis

Criteria Based Analysis

Scalability (15%)

Pros:

- Provides higher-volume plans with greater storage, automation, and integration limit as teams scale.

Cons:

- If you are working with large datasets or complex workflows on Monday.com, it can be slower.

Usability (10%)

Pros:

- Very visual interface, easy to navigate, customizable dashboards/various view modes (e.g., Kanban, Gantt charts, Timeline view).
- Low entry barriers for non-technical users, with drag-and-drop functionalities and pre-built templates that make it easy to create and manage flows.

Cons:

- With more advanced features (like custom automation or advanced reporting), users may need to learn functionality a bit.

Customization (20%)

Pros:

- Variable workflows, reminders, and automation guidelines.

- Workflows can be customized to the users, who can build personalized dashboards and reports.

Cons:

- Requires some technical expertise/additional setup time for advanced customization (e.g., custom automations or specific integrations).\

Integration (15%)

Pros:

- Provides built-in integrations with numerous popular tools, which eases the process of centralizing data.

Cons:

- Setup and integration complexity may increase for more proprietary or custom systems, and technical support may be needed in some cases.

Project Tracking (20%)

Pros:

- Provides a comprehensive set of features for project tracking, with task dependencies, Gantt charts, timelines, automated notifications, and real-time updates.
- Personalized dashboards and project views for team leads and managers to track overall progress.

Cons:

- Tracking features are more advanced (dashboards for high-level users) and can become cluttered if not configured correctly, especially in large teams and complex projects.

Feedback Mechanism (5%)

Pros:

- Automated feedback loops, with notifications and status changes that can be finely tuned.
- Pre-built templates for frequently encountered approvals and feedbacks.

Cons:

- Providing tailored notifications may necessitate greater configurability for true workflows.

Cost (5%)

Pros:

- Pay-per-use pricing based on features, team size, and volumes with a free trial, and competitively priced starter levels for small businesses or teams.

Cons:

- Less cost-effective for larger teams or advanced features. Enterprise Pricing – Pricing is not transparent and flexible according to the organization's needs.

Security (10%)

Pros:

- Includes all role-based access control, data encryption, and two-factor authentication.
- Provides enterprise clients with sophisticated security capabilities.

Cons:

- May require more fine-tuning for sensitive data based on advanced security features offered.

Overall Assessment

Monday.com has a friendly interface with a lot of customizations and price scales that project management systems offer. Tools such as Gantt charts and real-time updates improve tracking of projects and collaboration. On the other hand, it might struggle with scalability with big datasets and complex workflows, potentially limiting efficiency. Additional advanced features can be complicated for non-technical users. And although it

has good security features, it might also need to be modified for sensitive data. Overall, Monday.com is a great fit for smaller to medium-sized teams, but larger organizations should evaluate their unique requirements closely.

4.4 Comparison

In the following table they are compared based on every criteria. The score is from 1 to 5 (5 being the best).

Criteria	Blueriq	Monday.com	Airtable
Scalability	4	4	3
Usability	3	5	4
Customization	5	4	5
Integration	3	5	5
Project Tracking	3	5	4
Feedback Mechanism	2	4	3
Cost	3	4	5
Security	5	4	4

Reasoning

1. Scalability

Blueriq (4): Built for large-scale enterprise solutions but require technical expertise for scaling.

Monday.com (4): scales well but has limitations for highly complex systems.

Airtable (3): Suited for smaller to medium-scale teams, making it less robust for enterprise.

2. Usability

Blueriq (3): Requires expertise from developers to navigate effectively.

Monday.com (5): Easy setup and interface for non-technical users.

Airtable (4): Combined spreadsheet and a database functionality, with a moderate learning curve.

3. Customization

Blueriq (5): Highly customizable.

Monday.com (4): Decent, but less flexible.

Airtable (5): Highly customizable.

4. Integration

Blueriq (3): Integrates well, but may require significant setup.

Monday.com (5): Seamless integration with numerous apps and tools.

Airtable (5): Extensive API support and native integrations.

5. Project Tracking

Blueriq (3): Focused on automation and workflow rather than project tracking.

Monday.com (5): Excellent project management features.

Airtable (4): Offers basic project tracking.

6. Feedback Mechanism

Blueriq (2): Limited built-in feedback tools.

Monday.com (4): Includes tools for collaboration but not specialized.

Airtable (3): Allows comments on records but not an advanced mechanism.

7. Cost

Blueriq (3): Tailored pricing for enterprises, potentially expensive.

Monday.com (4): Reasonable pricing for features offered; scalable plans available.

Airtable (5): Affordable, with a robust free tier.

8. Security

Blueriq (5): Great security.

Monday.com (4): Reliable security.

Airtable (4): Reliable security.

Summary of Findings

Every tool could be used for different scenarios, but to determine which tool is the best based on the criteria, their score needs to be examined by the weight of the criteria. The following formula is used to calculate it:

4.5 Conclusion

The evaluation of workflow tools for SPARC's co-funding process has yielded insights into the suitability of three options: Blueriq, Monday.com, and Airtable. These tools were analyzed based on criteria such as scalability, usability, customization, integration, project tracking, feedback mechanisms, cost, and security. The goal of this analysis was to identify a tool that aligns closely with SPARC's needs and facilitates streamlined processes for the co-funding workflow.

Weighted Scoring Analysis

The tools were evaluated based on a weighted scoring system, where each criterion was assigned a percentage weight reflecting its importance. The weighted scores were calculated as follows:

- **Blueriq:** Total score of **3.70**
- **Monday.com:** Total score of **4.45**
- **Airtable:** Total score of **4.20**

Recommendation

Based on the weighted scores, Monday.com is the recommended tool for SPARC's co-funding process. Its high overall score reflects its versatility and alignment with SPARC's requirements across multiple dimensions. It is particularly effective for enhancing project tracking, usability, and integration, which are critical for SPARC's objectives.

5 Advice

By implementing a central data source and standardised workflows, duplication and errors are eliminated, while data quality and efficiency are improved.

With clear roles, such as Data Owners and Data Stewards, responsibilities are clearly defined, ensuring better management and compliance with regulations such as the AVG. Automation with Microsoft Forms and Power Automate streamlines processes and ensures SPARC can rely on a single source of truth.

To address SPARC's data challenges and inefficiencies, the recommended solution is API Integration between the CMS and Exact Online. This approach offers an effective balance between cost, scalability, and automation, making it a practical mid- to long-term solution that aligns with SPARC's operational needs and growth goals. This approach is cost-effective, leverages existing systems, and automates data flows, reducing manual processes and errors while ensuring real-time updates. It supports SPARC's current and near-future needs with moderate scalability and can be implemented quickly compared to building a custom system.

For immediate relief during implementation, SPARC should hire an external administrator. This role would be cost-effective and straightforward to onboard, focusing on maintaining high data quality during the initial stages. Prioritizing data accuracy and consistency is essential before proceeding with any API integration or automation efforts.

In the long term, SPARC should strengthen data governance by defining roles such as Data Owners and Data Stewards to ensure accuracy and accountability.

Blueriq's is outstanding tools to provide precise features for organizing and managing every stage of a business process. Because of its methodology, users may specify requirements, actions, and workflows, enabling detailed process customization. Blueriq aligns well with SPARC's workflow customization, integration, and security needs.

However, Blueriq's usability is more suited to technical users. Blueriq require expertise to leverage its full potential. It also lacks project tracking and feedback mechanisms, relying on external integrations or custom development to fill these gaps. Additionally, leveraging Blueriq effectively requires training, which may not align with the team's current experience level or project timeline. This issues which may impact in time constrain and cost-effectiveness.

User-friendly tools like Monday.com or Airtable offer quicker setup with cheaper price. By creating a user-friendly tool to develop and customize for next project, SPARC's can improve their process effectively without being constrained by complicated settings or high learning curves. For future development, it would be easier for SPARC to make a change without needing to hire expertise and spend more cost because how user friendly the tools are.

6 Conclusion

In conclusion, based on the specific problems brought by SPARC regarding the process of prospect/potential members to actual members, the challenges and needs of this process have been fully identified and addressed. Because this issue is heavily influenced by IT Governance principles, the topic was approached in a structured manner starting from the IT Governance perspective, starting with a comprehensive analysis of IT governance and then the current IT architecture related to this process. With a clear understanding of the situation, it was possible to define and explore the possible solutions systematically. The criteria for evaluating these solutions were identified to ensure that they addressed the identified challenges, organizational needs, and long-term goals. This approach allowed to evaluate each potential solution not only in terms of feasibility but also based on how effectively it would improve the current process.

With the use of clear and practical criteria, each solution has been examined: this allowed to propose a valid and specific solutions that considered important factors like cost, scalability, automation, and data management. Finally, a solution was selected that best met the criteria and provided the best value to SPARC's operations.

In summary, this work reflects a structured approach, integrating both technical and strategic considerations to deliver the right solution for SPARC.

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