

A dark blue vertical bar runs down the left side of the page. A blue arrow points to the right from this bar, containing the date.

4/4/2024

# Research Plan

Individual Project: Research Topic

Several thin, curved lines in shades of blue and grey sweep upwards from the bottom left corner of the page.

Name: Lucas Jacobs

Class: S-A-RB06

PCN: 490692

Student number: 4607368

Technical teachers: Felipe Ebert, Bartosz Paszkowski

Semester coach: Gerard Elbers

## Table of Contents

Problem .....	1
Research Questions .....	2
Research Methods .....	4
Deliverables .....	7
Estimation of Required Time .....	7

## Problem

The main problem is that the festival industry doesn't have a digital platform that can effectively connect the festival goers and provide organizations with easy access to feedback and interaction with festival attendees. Therefore, there will be missed opportunities to make a great community and a limited reach to discover new events.

## Research Questions

FestivalConnect aims to have a digital platform for festival-goers and organizers to connect and improve the festival experience. However, without proper consideration for maintainability while also keeping in mind the performance, scalability, security, and privacy. The platform can become difficult to update and maintain over time, hindering the ability for FestivalConnect to adapt to the evolving festival industry.

### Main research question:

“How can FestivalConnect be developed and maintained to optimize the privacy, performance, security, and scalability throughout its lifecycle?”

### Sub-questions:

1. What are the key features and functionalities that should be included in FestivalConnect to improve the festival experience for users?
2. What kind of behaviors need to be taken into account, regarding what the users expect from the FestivalConnect application?
3. Which technologies and architectural frameworks are most suitable for developing FestivalConnect, while having an eye on scalability, security, and maintainability?
  - a. What front- and back-end technologies are best fit for handling FestivalConnect, to handle large volumes of user data and make sure of scalability?
  - b. Can a certain architecture improve the scalability and maintainability of FestivalConnect?
  - c. What database technologies can offer secure and efficient data handling for storing user information and event data?
  - d. What is a good framework to make sure that internalization can be used and people from all over the world can use the system?
4. How can user feedback and community engagement be implemented into FestivalConnect to better the sense of belonging to the festival and improve interaction between the festival-goers and organizers?
  - a. How can we properly implement the features in a user-friendly way?
5. What strategies and technologies can be implemented to make just that the law, regulations, and industry standards are guaranteed, keeping in mind data privacy and security?
  - a. What are the needed strategies to make sure that it complies with data protection laws, such as GDPR?
  - b. What legal regulations and industry standards are set for collecting, storing, and use of user data in the festival industry?
  - c. How can we assess that these security standards are met and solve potential vulnerabilities or risks?
6. What are the most effective methods for testing and validating FestivalConnect to make sure that it will meet the specified quality standards and requirements?
  - a. What is the most suitable testing to use, to verify the functionality and quality of FestivalConnect?
  - b. Can automated testing tools and frameworks streamline the testing process and improve the consistent and reliable results?

- c. What metrics can be used to evaluate the effectiveness of testing with effect on the quality?
- 7. How can cloud-native principles and technologies be used to improve the scalability of FestivalConnect, with a particular look at handling peak festival periods that lead to increasing user demand?
  - a. What cloud services can be used by FestivalConnect and offer the necessary infrastructure and tools for deploying and managing the environment?
  - b. What are the best architectures to use inside cloud services to improve scalability and is cost-efficient?
  - c. Can there be different strategies implemented to minimize latency for users accessing FestivalConnect from different geographic locations?
- 8. What measures should be taken into account to minimize the security risks and that FestivalConnect is designed with proper security, considering the trade-offs between performance?
  - a. What security threats and vulnerabilities are most relevant to FestivalConnect, and how can we overcome those weaknesses?
  - b. How can secure coding practices, such as input validation or error handling play a role in integrating secure code?
  - c. What authentication and authorization technologies are needed to protect user accounts and protect them from sensitive data from unauthorized access?
- 9. How can FestivalConnect be designed and implemented to support continuous software development and deployment?
  - a. What DevOps practices and tools can be used to support continuous integration and deployment for FestivalConnect?
  - b. How can version control systems and branching strategies give an improved environment to develop in?

## Research Methods

During this project, I will do research to get to know what the best technologies and practices are for FestivalConnect. The Development Oriented Triangulation Framework (DOT-Framework) will be used. This framework has several strategies such as library, lab, showroom, and workshop, see the following picture.

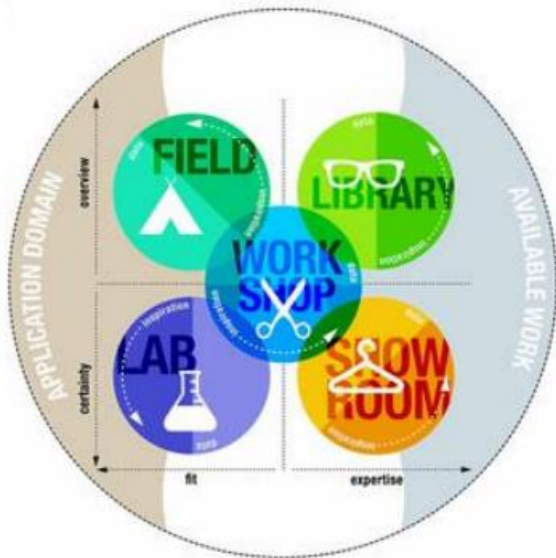


Figure 1: DOT-Framework

To answer the research questions, we need to have a mix of methods to answer these research questions.

See the following strategies:

- **Library:** Getting to know what is already been done, guiding to the best information to help me further design my FestivalConnect.
- **Field:** Understand the context. Getting to know the end user's needs, desires, and limitations.
- **Lab:** Test parts and concepts of the product. Test things to validate if it works as intended.
- **Showroom:** Test the ideas that you have for existing work. Testing your product to general guidelines or show prototypes to your stakeholders.
- **Workshop:** Use this strategy to explore new opportunities.

(The DOT Framework, n.d.)

Let's now list all the research questions with certain research methods to answer them. Note that this is just a guideline, and there can always be used another strategy.

1. What are the key features and functionalities that should be included in FestivalConnect to improve the festival experience for users?
  - a. **Literature Study:** Getting to know who my audience is going to be. Based on this adjust my functionalities, keeping in mind and prioritizing what is most important to them.
  - b. **Community research:** What are the existing communities like in the festival industry? Are they diverse? Do they have special needs?
  - c. **Stakeholder analysis:** Look at what my stakeholders have to say during the talks with them. What are we discussing and prioritizing to have the most suitable functionalities for FestivalConnect?

2. What kind of behaviors need to be taken into account, on what the users expect from the FestivalConnect application?
  - a. **Literature Study:** getting to know what the important behaviors for FestivalConnect application needs to be. Also looking at data to get to know what a performance measurements to aim for, what is the expected user base?
  - b. **Community research:** Looking at what people have to say about the importance of how an application should behave. What is important for the user, in the context of festivals?
  
3. Which technologies and architectural frameworks and methods are most suitable for developing FestivalConnect, while having an eye on scalability, security, and maintainability?
  - a. **Literature study:** Looking at what frameworks work best in the context of FestivalConnect.
  - b. **Community research:** What do trustworthy communities have to say about certain frameworks, and does the information relate to my case?
  - c. **SWOT analysis:** what are the strengths, weaknesses, opportunities, and threats when it comes to certain frameworks?
  - d. **Design pattern research:** Can apply certain design patterns to the design of the database setup, architecture, etc.
  - e. **Pitch:** Justifying to my stakeholders why I have chosen certain technologies.
  - f. **Evaluation matrix:** Final conclusion matrix on how good the technology fit the application.
  
4. How can user feedback and community engagement be implemented into FestivalConnect to better the sense of belonging to the festival and improve interaction between the festival-goers and organizers?
  - a. **Community research:** Look for what the special needs are for this sector.
  - b. **Design pattern research:** are there needed patterns that can improve the quality and structure of the code when implementing these features?
  - c. **Task analysis:** what is the precise flow of these functions, how do these work, and can this be explained with a certain flow diagram on both high-level as well as in-depth details?
  - d. **Prototyping:** Giving a visual look at how the system can look and function.
  
5. What strategies and technologies can be implemented to make just that the law, regulations, and industry standards are guaranteed, keeping in mind data privacy and security?
  - a. **Problem analysis:** what are the problems that occur that can lead to weak privacy and security? Getting to know what the real problem is, before implementing and regulating some rules into the application?
  - b. **Literature study:** Are there industry standard regulations when it comes to collecting, storing, and use of user data in the festival industry? What can be the best practices and needed requirements to properly cherish the laws?
  - c. **Available product analysis:** Look for best practices when it comes to handling data in a software enterprise application.
  - d. **Best good and bad practices:** what should be done and don't to have secure data handling.
  
6. What are the most effective methods for testing and validating FestivalConnect to make sure that it will meet the specified quality standards and requirements?
  - a. **Literature study:** Look for certain patterns to properly test your application.
  - b. **Best good and bad practices:** when it comes to testing, what should we do and not?

- c. **System test:** Make test scenarios to properly test the user stories. Make a separate test plan for this.
  - d. **Unit test:** test the business logic and if this logic is correct.
  - e. **Component test:** testing the flow of the application.
  - f. **Benchmark testing:** Testing the system benchmarks and if it complies with the agreed metrics.
7. How can cloud-native principles and technologies be used to improve the scalability of FestivalConnect, with a particular look at handling peak festival periods that lead to increasing user demand?
- a. **Literature study:** Researching what the best practices are for the cloud. How to increase user traffic?
  - b. **Available product analysis:** what is currently already available on the market, that can be used and is proven to be efficient and good.
  - c. **Problem analysis:** Does the improved scalability of FestivalConnect only depend on cloud-native technologies or how can we make sure that the solution that we want to provide is helping?
8. What measures should be taken into account to minimize the security risks and that FestivalConnect is designed with proper security, considering the trad-offs between performance?
- a. **Code review:** Regularly check the code of the design security to check for faults.
  - b. **Unit test:** is the created code secure and is it logically correct?
  - c. **Literature study:** Looking at the most common vulnerabilities of a website. What can be possible outlooks for hackers to hack the system? The needed security for the product.
  - d. **Available product analysis:** what are the best practices on the market to make a secure website?
9. How can FestivalConnect be designed and implemented to support continuous software development and deployment?
- a. **Literature study:** Looking at the best software to support CI/CD.
  - b. **Available product analysis:** Getting to know what already exists on the market to ensure CI/CD.
  - c. **Pitch:** Showing to the stakeholders why FestivalConnect is designed to have CI/CD.
  - d. **Community research:** More knowledge of people there opinions if they recommend certain designs and software.

## Deliverables

- Process report (full report), with the research questions to answer with the applied research methods, a brief description of the applied research methods and results, and a conclusion. Also a timetable on when worked on what things, to keep track of the progress.
- Recommendations for future work.
- Professional products that relate to the research, and it brings value to answering the research questions.

## Estimation of Required Time

Phasing	Effort	Start	Ready
1 Pre-project phase – Work on the project proposal, initial ideas	2 weeks	19-02-2024	03-03-2024
2 Sprint 1 – Project Plan, User story, Testplan, Coding Guidelines, Architecture, Front- and Back-End Choice	3 weeks	04-03-2024	24-03-2024
3 Sprint 2 – Working on Backlog (user stories)	3 weeks	25-03-2024	14-04-2024
4 Sprint 3 – Working on Backlog (user stories)	3 weeks	15-04-2024	12-05-2024
5 Sprint 4 – Working on Backlog (user stories)	3 weeks	13-05-2024	02-06-2024
6 Sprint 5 – Working on Backlog (user stories)	3 weeks	03-06-2024	23-06-2024

To visualize it more, here is a Gantt chart of the documents that I want to cover, over the time of this project duration. Note, that this chart may not cover all the documents, with also having that some documents need initial research at the beginning and an update throughout the sprints (such as user stories document).

Task Name	Feb	Mar	Apr	May	Jun	July
Project Proposal (Pitch)						
Sprint 1: Sprint 1 – Project Plan, User story, Testplan, Coding Guidelines, Architecture, Front- and Back-End						
Sprint 2 – Working on Backlog (user stories)						
Sprint 3 – Working on Backlog (user stories)						
Sprint 4 – Working on Backlog (user stories)						
Sprint 5 – Working on Backlog (user stories)						

To further divide the research question on when these are expected to be finished the following division.

- Sprint 1-2: Sub questions 1, 2, 3, and 4.
- Sprint 2-3: Sub questions: 6, 8, and 9.
- Sprint 3-5: Sub questions: 5 and 7.