**Project plan**

***NXTGen BIC Bike***

*TUe*

***Eindhoven***

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| **Date:**  **16-04-202523/04/2025** |
| **Version:** **1.9** |
| **Status** **:** **Ongoing** |
| **Authors:** **Maria, Rick, Adan, Lotte** |

#### Version

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Version** | **Date** | **Author(s)** | **Amendments** | **Status** |
| 1.0 | 12-03-2025 | Lotte | Made Document | Started |
| 1.1 | 14-03-2025 | Lotte | 2.1 & 2.2 | Ongoing |
| 1.2 | 14-03-2025 | Maria | 3.1 & 3.2 | Ongoing |
| 1.3 | 14-03-2025 | Rick | 4.1 & 4.2 | Ongoing |
| 1.4 | 17-03-2025 | Abdikani  | Chapter 1 | Ongoing |
| 1.5 | 26-03-2025 | Lotte, Rick, Maria | Made changes regarding to feedback | Ongoing |
| 1.6 | 11-04-2025 | Lotte | Improved 1.1, 1.6, 2.2 | Ongoing |
| 1.7 | 11-04-2025 | Rick | Improved 1.2 | Ongoing |
| 1.8 | 11-04-2025 | Lotte | Improved 1.3 | Ongoing |
| 1.9 | 23-04-2025 | Maria | Made changes regarding feedback | Ongoing |

**Communication**

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| --- | --- | --- |
| **Version** | **Date** | **To** |
| 1.4 | 21-03-2025 | Joris vd Straten, Bart van Gennip |
| 1.5 | 28-03-2025 | Bart van Gennip |
| 1.5 | 09-04-2025 | Pim Veroude |
| 1.8 | 16-04-2025 | Pim Veroude, Joris vd Straten, Bart van Gennip, Eric Bakker, Remco Dijkman |

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# Project Assignment

## Context

This project is part of the NXTGEN Smart Industry 06 - Smart Supply Networks initiative, in collaboration with TU/e and SupplyDrive.

NXTGEN is a company which purpose is to get the Netherlands back on top. They want to achieve this by not only focusing on ultraprecise high-tech-equipment. But also, on ensure sustainable economic earning capacity for future generations and to contribute to solutions for major societal challenges.

The TU/e is a young university that was founded in 1956 by industry, local government and academia. They foster student education and drive scientific and technological advancements for the betterment of society. By intertwining education with cutting-edge research, they empower their students and researchers to pioneer innovations and accomplish the extraordinary. At the heart of TU/e, they embody their core values: Curiosity, Openness, Respect, and Responsibility.

SupplyDrive is an IT company, which helps other businesses by integrating systems and automating repetitive tasks. This helps improve efficiency and quality. The solutions help supply chain companies transform from manual to automated processes, which enable faster and more accurate workflows.

## Goal of the project

The goal of the project is to optimize the supply chain by understanding and analysing the buffer times between key stages. These buffer times should be clear and transparent throughout the process across all levels of the supply chain, including first-tier, second tier, and third-tier suppliers.

By making these buffer times visible, it will be possible to test different timing strategies and find the most effective way to improve the supply chain. By including this buffer time in the synthetic data used to train the TU/e SCM model these different timings can be tested and simulated. The main goal is to optimize the supply chain with the model by training it on synthetic data.

## The assignment

The task of the team is to develop one script that generates synthetic data, using a database. This involves describing a fictional eBike (the BIC Bike) and looking into how an eBike supply chain is going, look into how the TU/e model is created and working, and include suppliers, materials and logistics. Using this model, the synthetic data can be structured to match with the supply chain’s dynamics.

We will also ensure that the model can be adjusted so that it can generate multiple scenarios. This project will using Agile Scrum methodology, with five development sprints focusing on data modelling, analysis, and refinement.

## Scope

The project will focus on the development and integration of synthetic data for supply chain simulation. This includes defining key data elements, generating structured datasets, and ensuring compatibility with the TU/e model.

The project will not include physical prototype, or full-scale supply chain management beyond the simulation framework. Our efforts will be concentrated on creating a simplified and functional data script that will demonstrate the impact of data on supply chain efficiency.

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| The project includes: | The project does not include: |
| Structuring data to reflect realistic supply chain dynamics | Making a Physical Prototype for the BIC Bike |
| Ensuring compatibility of synthetic data with the TU/e model | Full-scale supply chain management |
| Analysing the impact of synthetic data on supply chain optimization | Manufacturing or logistics operations |

## Conditions

The project must align with the research objectives set by TU/e and SupplyDrive while remaining feasible within the time constraint of 18 weeks. The synthetic data must be well-structured, adaptable, and compatible with the supply chain simulation model.

Furthermore, our development process must be guided by Agile principles to ensure iterative improvements and effective team collaboration. We will be using platforms like Microsoft Teams, Git, and Trello to manage communication, documentation, and version control.

## Research questions

Main questions: How can synthetic data be generated to help the model to simulate to optimize the supply chain within the Smart Supply Networks project?

Sub-questions:

1. What is MKG (ERP-system) and how does it support supply chain management?
2. How is the supply chain model structured?
3. What are the different types of synthetic data?
4. What kind of synthetic data is required for the supply chain simulation model?
5. How can the required data be generated?

## Approach

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| --- | --- | --- | --- |
| ***Sub-question*** | ***Research Strategies*** | ***How are the Strategies applied?*** | ***Stepping Stones*** |
| *What is MKG (ERP-system) and how does it support supply chain management?* | *Literature Study (Library)**Interview (Field)**System Test (Lab)* | *Literature Study: Through multiple reliable resources we will research the key concepts of the ERP system and its functionalities.**Interview: Within the first weeks of the project, we will meet a stakeholder who specializes in using this ERP system who will be interviewed by us.**System Test:**To understand the ERP system better we will experience its functionalities by working with it during the meeting.* | *Research Document* |
| *How is the supply chain structured?* | *Expert Interview (Library), Observation (Field), Data Analytics (Lab)*  | *Expert Interview: Interview one of our stakeholders with how the model is made.**Observation: Observe the supply chain and look at what data we can get from it.**Data Analytics: With Data Analytics we can investigate what can cause delays or what are points that are difficult to work with.* | *Research Document* |
| *What are the different types of synthetic data?* | *Design Pattern Research (Library), Literature Study (Library)**Observation (Field),**Computer Simulation (Lab)* | *These strategies can be applied by analyzing existing synthetic data solutions, using filed observations to ensure accuracy, testing different datasets in simulations to optimize supply chain performance.* | *Research Document* |
| *What kind of synthetic data is required for the supply chain simulation model?* | *Expert Interview (Library), Explore User Requirements (Field), Requirements Prioritization (Workshop)* | *These strategies are applied by discussing with the client what is needed for the model and setting up requirements for this.* | *Research Document, Requirements* |
| *How can the required data be generated?* | *Literature Study (Library), Computer Simulation (Lab), Code Review (Workshop)* | *These strategies are applied by simulating realistic supply chain scenarios in a lab environment to generate dynamic datasets and evaluating Python scripts in collaborative sessions to ensure quality, accuracy, and reusability.* | *Research Document, Data Script* |

## Finished products

The project will deliver a structured synthetic data script designed for supply chain simulation, an in-depth Research Report, and a final presentation showcasing the scripts functionality. The dataset will be generated based on key supply chain parameters, ensuring realistic simulation and compatibility with the TU/e model.

To enhance collaboration and transparency, a Git repository will be used for version control and tracking project progress. This repository will contain all relevant project files, including datasets, documentation, and updates.

The project’s deliverables will be organized using a **Product Breakdown Structure (PBS)** to outline the intermediate and final products. The PBS consists of:

* **Synthetic Data Script** – A structured dataset that simulates realistic supply chain data.
* **Research Report** – A document where we can write down the research we did and what came out of it.
* **Test Reports Documentation** – Supporting documents outlining test results.

# Approach and Planning

## Approach

We will be using the following method, Agile Scrum. With Scrum we will work with in sprints that are 3 weeks long each. In total we will have 5 sprints where we need to know about the Supply Chain, we need to know what kind of data is needed and how we are going to make the data.

We will let each other know what we are working on and how something is coming along.

## Breakdown of the project

Sprint 1:

*Sprint Deliverables:*

1. *Project Plan*

Sprint 2:

*Sprint Deliverables:*

1. Bill Of Materials
2. Updated Project Plan
3. Interview SupplyDrive
4. Interview Professor at TUe
5. Supply Chain Workshop with Bart
6. IST Process of Supply Chain

Sprint 3:

*Sprint Deliverables:*

1. Research Document
2. Data Script
3. Interview with Professor

Sprint 4:

*Sprint Deliverables:*

1. Test Reports Document

Sprint 5:

*Sprint Deliverables:*

1. *Finished Products*
2. *Updated Documents*

# Project Organization

## Team members

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| --- | --- | --- | --- |
| **Name + e-mail** | **Abbr.** | **Role/tasks** | **Availability** |
| *Rick van Esch**532837@student.fontys.nl* | *Rick* | *Business analyst* | *Every Tuesday between 13:00 – 16:00**Every Wednesday and Friday between 09:00 – 16:00* |
| *Lotte de Haan**510426@student.fontys.nl* | *Lotte* | *Project Leader* | *Every Tuesday between 13:00 – 16:00**Every Wednesday and Friday between 09:00 – 16:00* |
| *Maria Tataru**500597@student.fontys.nl* | *Maria* | *Planner* | *Every Tuesday between 13:00 – 16:00**Every Wednesday and Friday between 09:00 – 16:00* |
| *Abdikani Adan**450267@student.fontys.nl* | *Abdikani* | *Developer* | *Every Tuesday between 13:00 – 16:00**Every Wednesday and Friday between 09:00 – 16:00* |
| *Bart van Gennip**b.vangennip@fontys.nl* | *Bart* | *Project Owner* |  |
| *Joris van der Straten**j.vanderstraten@fontys.nl* | *Joris* | *Project Owner* |  |
| *Pim Veroude**p.veroude@fontys.nl* | *Pim* | *Coach* |  |

## Communication

As a team, we created 2 Teams channels, one for the team members only, and one with the team and our stakeholders. In this way we keep all our work in the same place, and when one part is on final version, we share it with the stakeholders.

The communication between team members is done using WhatsApp.

## Configuration management

In order to share our final work with the clients, we are going to set up a GIT repository.

# Risks & Constraints

## Risks and fall-back activities

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| **Risk Description**  | **Risk Probability**  | **Risk Impact**  | **Prevention activities**  | **Mitigation activities**  |
| Change in Business Requirements or Strategic Direction | Low  | Very High  | Regularly communicate with stakeholders to align with business objectives.Develop the project plan with flexibility to address potential scope changes | Reevaluate the current approach and find areas where the existing work can be adjusted. |
| Scope Creep  | Medium  | High  | Define clear project scope and requirements  | Thoroughly review project scope  Engage with the stakeholders more frequently |
| Miscommunication with Stakeholders  | Medium  | High  | Adding an extra communication option for future communication needs  Align project goals with stakeholder expectations  | Facilitate conflict resolution sessions  Adjust project plans based on feedback |
| Inaccurate or Incomplete Data Feeding into the Model | Medium | High | Define the data fields required for the model and ensure the data matches the expected inputs.Test the data feeding process in stages, starting with small data sets to confirm correct integration with the mode. | Implement data validation checks for the script. |
| Organisational Changes (Key Team Members Leaving) | Low | Medium | Document work and assign backup roles for key tasks. | Reassign tasks and continue working with the documentation as a guide. |
| Team Communication Breakdown | Medium | Medium | Have regular communication through channels and stand-up meetings. | Realign the team through one-on-one meetings and document meeting notes. |
| Knowledge Skill Gaps | Medium | Medium | Conduct skills assessment to identify strong and weak suits of all members. | Shift certain tasks to team members with the right skill set, and provide monitoring to less experienced members. |

## Constraints

**Time Constraints:**

One of the most common constraints is time. Students often have other academic commitments and personal responsibilities. Meeting deadlines both personal and group ones can be challenging, especially if team members have conflicting schedules. To tackle this constraint, we should decide carefully to what extent we could develop the features of our final solution.

**Resource Constraints:**

Limited access to necessary resources, such as software, hardware, data, or equipment, can hinder the project development. Whether it is a budget, equipment, or manpower, we must work within the bounds of what is available.

**Technical Constraints:**

Technical constraints occur when one or more team members are not familiar with tools or technologies which are required for the project. This will impact the development and implementation of the solution. However, learning and implementing new technologies may take extra time and effort, and it will minimize the impact of the constraint.

**Communication Constraints:**

Effective communication is crucial for project success. Language barriers, differences in communication styles, or a lack of clear communication channels can impede collaboration and understanding among team members. We will use a Trello board for managing our tasks and to keep it organized to prevent the communication constraints.