THE DEVELOPMENT OF A SMART DESIGN STRATEGY ROADMAP

Getting Vanderlande aligned with the long now

A master thesis
By Jarmo Ruiter

Colofon

Master thesis Strategic Product Design
Faculty of Industrial Design Engineering
Delft University of Technology
1st of September 2021 - 30th of March 2022

Author
Jarmo L. Ruiter
4482883
Strategic Product Design (MSc)

Supervisory team
Chair
Dr. Ir. L.W.L. Simonse
Faculty of Industrial Design Engineering
Department of Design, Organisation
& Strategy (DOS)
Section Methodology and Organisation of Design
(MOD)

Mentor
MSc. S.R. Dehli
Faculty of Industrial Design Engineering
Department of Design, Organisation
& Strategy (DOS)
Section Marketing and Consumer Research
(MCR)

Company mentor
O. Lenior
Vanderlande Industries
Senior Design Strategist

Company
Vanderlande Industries
Vanderlandelaan 2
5466 RB Veghel
The Netherlands
https://www.vanderlande.com/

Preface

At the beginning of my master I got introduced into design roadmapping by dr. Lianne Simonse. This is where I started learning about methods that helped me to develop a design strategy roadmap complimented with a tactical roadmap. After this course I always felt there was more to this topic and that the design roadmap could be taken to another level. Looking for a graduation project in this direction, Vanderlande Industries (a global leader in providing systems for the logistic process) came into sight. Vanderlande had been performing a set of workshops called the Long Now with graduate Celine. The workshops resulted into a set of innovative insights and coherent future vision that were plotted on a design roadmap. At this point Vanderlande started thinking on what they could do with this initial roadmap within their company. This master thesis is a final representation of my findings on the development of a smart design roadmap. Which for this project specifically gets Vanderlande in line with The Long Now vision, but uses a list of strategic steps other companies can use as well to develop their own smart design roadmap.

Therefore I am grateful for Vanderlande Industries as they gave me this opportunity to develop a strategy which results in a smart design roadmap and provided me with all the help I needed.

Besides Vanderlande I want to thank some other people who really helped making this graduation project possible.
Starting with my coaching team. I want to thank my mentor SIlje Dehli for the constructive feedback and different perspective on the project supporting both the project and me personally. Thank you, my chair, Lianne Simonse for your expertise on the project and linking me to Vanderlande and other people. And I want to thank my company mentor Odeke Lenior for being open to new suggestions and trusting my project. I really appreciated the weekly feedback and advice.

I want to thank the Long Now team within Vanderlande consisting of Odeke Lenior, Bart Bluemink and Christianne Francovich and Celine Tesselaar for all your feedback and support towards my project. I appreciated all your availability for questions and provision of information week in week out.

Finally I want to thank all my friends and family who supported me during the project and gave me new insights during the conversations about my project development.

Abstract

Vanderlande Industries is global market leader in logistic process automation at airports, the parcel industry and warehousing market. However in order for them to stay a global leader Vanderlande and keep the innovation standard high, they started developing a set of design roadmapping workshops called The Long Now (TLN) project The TLN is a project that developed a set of design roadmapping workshops, which resulted in a future vision together with a set of new product service concepts for the airports platform. Having the results, the team working on TLN was looking for a way to present them to the board of Vanderlande. But therefore the results of these roadmapping workshops had to be made more tangible. And this graduation project aims to develop a smart design strategy roadmap, which has the ability to internally align Vanderlande Industries with the long now (TLN) project.

In order to come to the right design strategy method I first performed research in three directions: Research on Vanderlande and the way operating within the company, research on design roadmapping and finally research on smart roadmapping.

Having performed this research I came to the conclusion that there had to be made an interactive platform which displays the results and needs to be adjustable, accessible and connectable. Knowing this I developed a design strategy method based on website design and user experience containing six steps.

The six steps went as followed: first user classification in which you determine the end-user. Second, user class description in which you find the user needs. Thirdly comes the object modelling of the scope, looking at the content and functional requirements of the smart design roadmap. The fourth step includes the object modelling of the structure. Fifth is navigational design, aiming at the way you can walkthrough the roadmap and finally was implementation design. This is where you created the actual look and feel of the smart design roadmap.

After performing these 5 steps it was still an iterative proces in which I co-designed the smart design roadmap with multiple people before I came to my final design.

But when I came to my final design, I was able to conclude that when performing the six steps of the design strategy I was able to develop a smart design roadmap that internally aligned Vanderlande with TLN and it became a lot more tangible due to supportive technologies, new partnerships and well visualised solution development.

I do still recommend however to validate both the results from the TLN workshops as well as the smart design roadmap with more people within Vanderlande as this currently only has been done by the team working on TLN.

Table of content

1 Project introduction

This introduction will consist of a short acquaintance with Vanderlande industries. Showing their vision, mission, management structure and challenges they face. These challenges are transformed into main research questions, which will be used to define my project scope and goal. Finally I will describe my approach on reaching my project goal including boundaries of my thesis.

Vanderlande industries

Vanderlande industries is a company established in Veghel with a focus on the development of systems and solutions in future-proof logistic process automation. Vanderlande is a global leader in terms of future-proof logistic systems for 4 specific markets; warehousing, parcel, amazon and airports (see figure 1). The continuous development of new technological process automation solutions together with a good client connection has made Vanderlande one of the best in their industry. The developed systems spread world wide currently move over 4 billion pieces of baggage a year, are active in over 600 airports and sort 52 million parcels every day (Vanderlande Industries B.V., 2021). This has lead to multiple statistical increments for the company this past year. +27% order intake, +14% revenue, +30% order book and +7% employees (Vanderlande Industries holding B.V., 2021). However Vanderlande is looking to become even more future proof as their technological and business driven mindset can only get them so far when facing internal and external threats. They figured this due to a threat in the form of Covid-19, which during the past year reduced air traffic drastically and thus also the question for new airport systems at airports.

Figure 1,
the 4 business units
Vanderlande is active in

The reduction in numbers of Vanderlandes important airport industry made them look for new innovative opportunities. This is why Vanderlande has performed design roadmapping workshops with a group of non-designer employees directed by a strategic product design graduate (Celine Tesselaar) from the TU Delft. The aim of these workshops was to create a future frame of concepts with a direct link to their end-user/traveller (human-centered design) called “The Long Now” (TLN). So although Vanderlande has a Business 2 Business mindset which is aiming for airports (current clients) they look to facilitate the end-user as well as possible in the end, which leads to new clients expanding their ecosystem outside airports.

This expansion of their automated material handling solutions to other platforms than just the airport is exactly what they want, especially when you take a closer look at the mission statement of Vanderlande and thus also their vision statement (See figure 2).

Figure 2,
Vanderlande mission &
vision statement

Challenges & Strategic design questions

The initial challenge for Vanderlande of gaining a new future frame and concepts for the airport market has been tackled by former graduate Celine Tesselaar, performing design roadmapping workshops. This outcome called the Long Now has the ability to make Vanderlande future-proof when it comes to viability, feasibility, desireability and also sustainability. However now that they have performed this they gained new challenges in terms of implementing the strategic design roadmap in the organisation and making it a more tangible for the board of Vanderlande.

Connecting TLN with VI
The first challenge that has to be tackled is connecting and adjusting the Long Now with Vanderlande their current way of operating. The outcome of the workshops resulted in a static image of a roadmap (see appendix A) only displaying key words over three horizons, but to make it more useful for Vanderlande it requires more detail and explanation. This raised the first strategy design sub-questions that need solving:

How does Vanderlande expand their ecosystem and technological developments over the three horizons?

What transition do the current VI systems and solutions make over the three horizons?

Internal company communication
Secondly, Vanderlande is a big company with a lot of employees which still expands and contains many different departments. Innovative new concepts will have to go through all these departments in order to realise these concepts. However all departments have their own list of requirements when it comes to concepts. So the internal communication and clarity especially with a new project like the TLN has to be up to date. Raising the following questions:

What information has to be available for each department?

How can the roadmap form a clear guideline for all departments?

Which functions must the roadmap be able to perform to add value to all departments?

Roadmap adjustability to radical threats
Thirdly, travellers' desireability changes over time. Whether this goes gradually or radically due to factors such as epidemics (COVID-19) or natural disasters it can change. So the human-centered developed roadmap is definitely able to add value but has to be adjustable to changes and needs to show focus points when such radical threats occur. Leading to the design sub-questions:

What are the focus points for Vanderlande when facing radical threats?

How adjustable does the roadmap have to be?

Stakeholder value emphasis
And the final challenge is still to put emphasis on the added value this strategic design roadmap has for all included stakeholders. Internally for Vanderlande and externally for travellers, clients and other external parties. So the following question has to be answered in the to be developed strategic design roadmap:

What is the value for all included stakeholders?

Main strategic design question
All previous sub-questions led to one main strategic design question that cover all challenges.

"How to create a smart platform showcasing a design strategy roadmap which has the ability to internally align a company?"

Project goal

The goal of this graduation thesis is to answer the main research question which includes the creation of a smart strategic design roadmap in the form of a digital platform for employees within the airport department of Vanderlande. They can use this to adjust and overview their future plans, projects and developments. Aligning the company with the newly developed Long Now design concepts and also align Vanderlande internally in terms of employees and their work.

In addition to the creation of this smart strategic design roadmap platform is to substract guidelines. This so a similar process and method can be used to create such a smart platform for other organisation and companies who are in need of one when having performed design roadmapping.
The way I see this is to develop two extra steps to the initially created design roadmapping method by Lianne Simonse.

Design roadmapping is a process consisting of multiple stages which enables organisations to form a respons to future strategic challenges (Simonse, 2018). There are 3 stages with 2 coherent methods in each stage of this process. Starting with value mapping, including the methods creative trend research and future visioning. Then idea mapping, consisting of technology scouting and time pacing. And finally pathway mapping, which consists of linking activities and ending with tuning constraints. In addition to these 3 stages, my goal is to form a fourth stage consisting of 2 extra activities with a focus on visual communciation and establishing a connection with the company. Making the design roadmap more tangible and more lively. See figure 3.

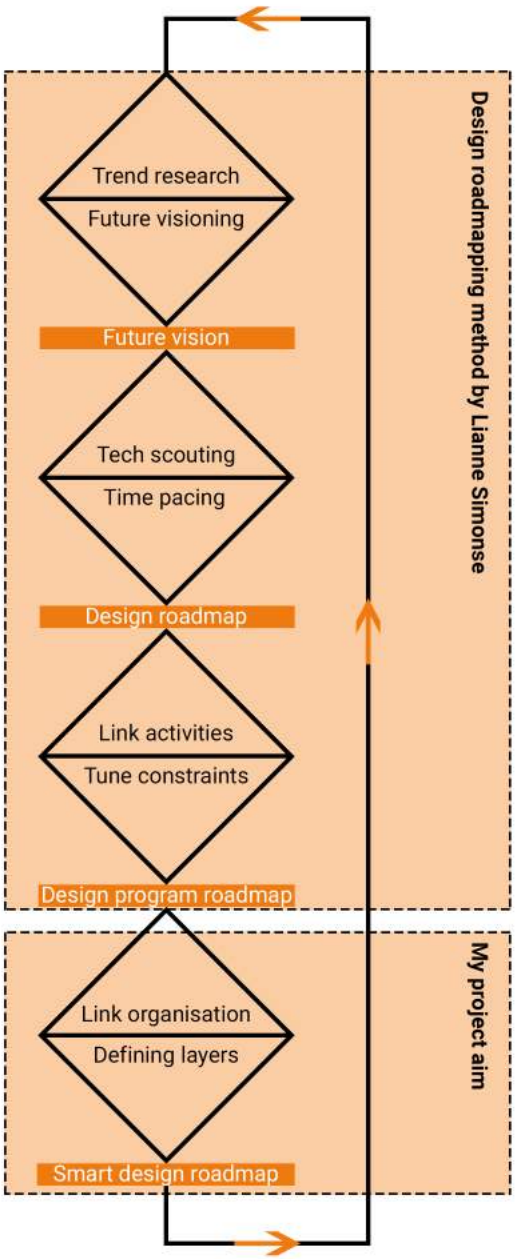


Figure 3,
My project aim in combination with Design roadmapping

Project scope

Vanderlande is, as said, a big company active in 4 different markets. The focus for this project lies within the airport department of the company and thus aims to be primarily valuable for the employees of this department. Getting even more specific the platform is aimed at airports within Europe (EMEA). Currently TLN team at Vanderlande is working on the creation and performance of another set of design roadmapping workshops with non-designers employees situated at airport branches in North America (NA) and Pacific Asia (APAC) again led by the former graduate Celine Tesselaar. So eventually the smart platform should also include the design roadmapping outcome of this second set of workshops with airports NA and APAC as well as future workshops performed in the warehousing, parcel and amazon market. But for now the project will be executed with the information I received, which is the design roadmapping outcome of workshops in the EMEA airport department of Vanderlande.

Project approach

For this project I decided to use my own created approach, which is based on methods I have learned over the past couple of years performing courses in my bachelor Industrial Design Engineering and master Strategic Product Design at the TU Delft. This approach consists of a combination between the double diamond process (British Design Council, 2015) and a standard iterative design process with a close relation to lean thinking. See figure 4 below for a visual representation. It includes three phases; discover, define and develop. The first diamond and thus half of my project consists of the discover and define phase. It starts with **discovering** all information there is already on different parts of this project. Looking at the context of Vanderlande, information on design roadmapping and any knowledge on smart roadmaps. The second part of the first diamond process is all about **defining** the design strategy for creating the smart design strategy roadmap. Design thinking about the visual communication style and platform the smart roadmap should be created on. The second dimanond and half of the approach is also the final phase of this process. It consists of an iterative design process of the to be **developed** smart strategic design roadmap platform. This will be done in a lean manner by directly working on a final design and then translated back to the primary steps. The design will often be discussed and somewhat co-designed with a team at Vanderlande working on the Long Now project, former students who performed the course design roadmapping, non-designers and my coaches for this project. Some groups will have more influence on the content of the smart roadmap where others have more to suggest about the functionality and clarity. And after these three phases I will deliver a final design for a smart design strategy roadmap for Vanderlande.

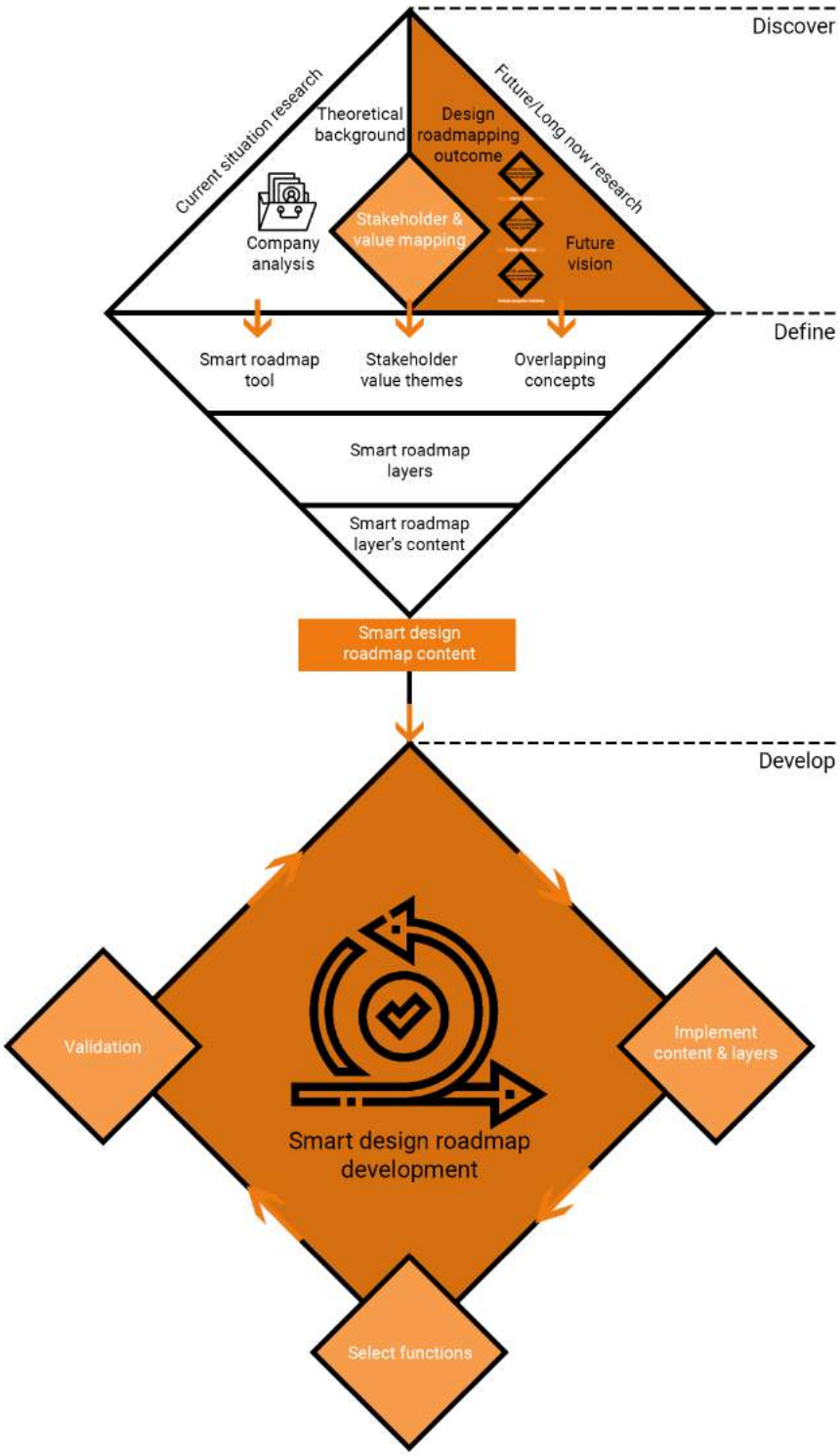


Figure 4,
The project approach for this specific thesis

Discover
The discover phase is all about collecting available data. It can be divided in three sub research categories.

Firstly, research on Vanderlande their current scope, operating management and most importantly their products/systems they sell to their clients.

Secondly, research on the TLN created design roadmap as an outcome of the performed workshops. I will be checking whether parts need additional work and detailing before its content can be put in the smart design roadmap.

Finally, I will conduct research on what is already known about smart design roadmaps and what are the key takeaways for creating such a roadmap.

Define
The define phase is the first step in creating a design strategy for the creation of the smart design strategy roadmap. This process will look at the literature background on visual communication of a software platform and also starts putting into frame what bridge there actually has to be formed in order to get Vanderlande from this point to the new future vision, which is aligning with the Long Now.

Develop
During the development of the smart strategic design roadmap platform, I will start with the first version and keep testing and reiterate the platform. This will be done with mulitple different people, containing different backgrounds. Some within Vanderlande as well as non-employees to check ease of use and other characteristics which aren't specifically end-user bound, but look more at surface bound functionality.

After the development phase the aim is to have and deliver a final design of a smart design strategy roadmap.

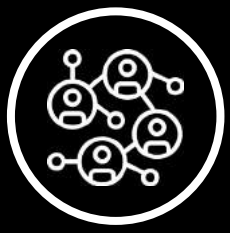
Any other project brief information can be found in appendix B, which includes the handed-in project brief primary to the project.

Key insights

The goal of this project is to create a smart strategic design roadmap platform for Vanderlande in combination with the development of a set of guidelines that adds a phase to the existing design roadmapping process of Lianne Simonse (2017). In order to make this process applicable for other organisations as well.

In order to succesfully reach this goal the following challenges have to be tackled:

Connecting VI with TLN



Internal company communication

Stakeholder value emphasis

Roadmap adjustability to radical threats

The approach for tackling the the challenges is a combination of the double diamond process and iterative design. Within this combination of methods, there are three main steps: discover, define and develop. From performing this approach , the results are showcased in this thesis.

2 Context

This chapter consists of research on three main project context parts. Firstly, research on the context of Vanderlande. Aiming at the way of operating within Vanderlande and checking their values. Secondly, a short description on the design roadmapping method. Closely followed by the final research on knowledge about smart roadmapping.

Vanderlande context

Values
The initial aim of the company is to optimise the competitive position of their clients by providing innovative and reliable solutions. This mission or aim is directly in line with the branding goal of Vanderlande. The five **brand values** (see figure 5) of Vanderlande on how they want to be seen by the outside world and potential new clients are; reliable, connected, innovative, sustainable and lastly customer-centric.

Reliability, in which the goal is to maintain certainty and trust with clients. And customer-centricity, in which the goal is to collect as much data from the clients to create the optimal customized logistic solution in their specific client context. Both reliability and customer-centricity can be translated to building a reputation with customers, and this statement is the base of the internal **core values** of Vanderlande. The core values are: drive to win, every day better, we care, safe base, team play and ownership. These 6 core values (see figure 6) create a certain culture that will form the internal identity, employees of Vanderlande will closely follow in order to contribute to their future success.

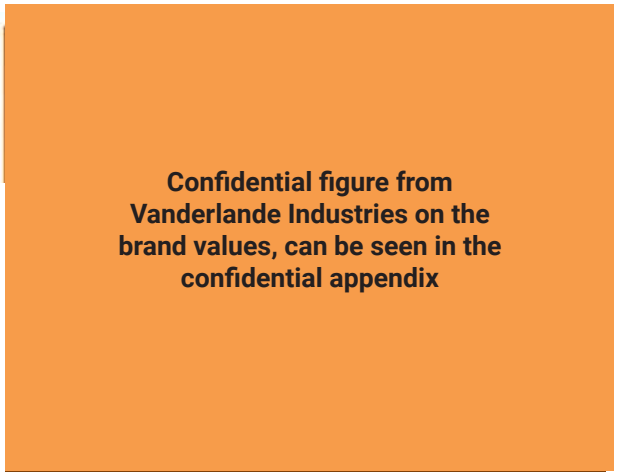


Figure 5,
Vanderlande their brand values

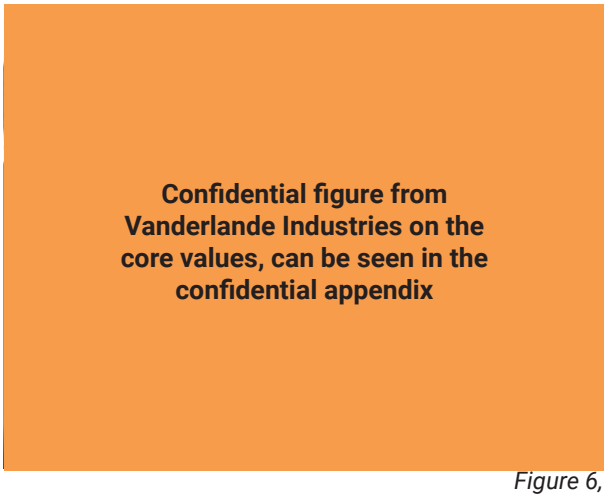


Figure 6,
Vanderlande their core values

Company Structure
Vanderlande has like every other company a CEO and company president at the head of the table. The further structure underneath consists of 6 main departments. A Chief Financial Officer (CFO), a Chief Privacy Officer (CPO), the suppliers business unit, the technological business unit (CTO), the Airport and parcel business unit (APS) and the warehousing business unit (WS). Like described in the introduction Vanderlande is active in warehousing, parcel and airport logistic markets. As for this thesis the aim lies with airports, the most important parts of the company structure are the APS and CTO business units.
The CTO business units is focussing on the innovative solutions in terms of software and hardware as well as emerging technological developments. In figure 7, you can see a small part of the structure of the CTO business unit and in appendix C.1 a complete overview of the CTO is shown.
The APS business unit is focussing on the relationship of Vanderlande with its airport and parcel clients. Maintaining the reliable brand value in combination with enabling salse. A part of this business unit is shown in figure 8, where the complete structure is visible in appendix C.2.

Company structure- BU Technology

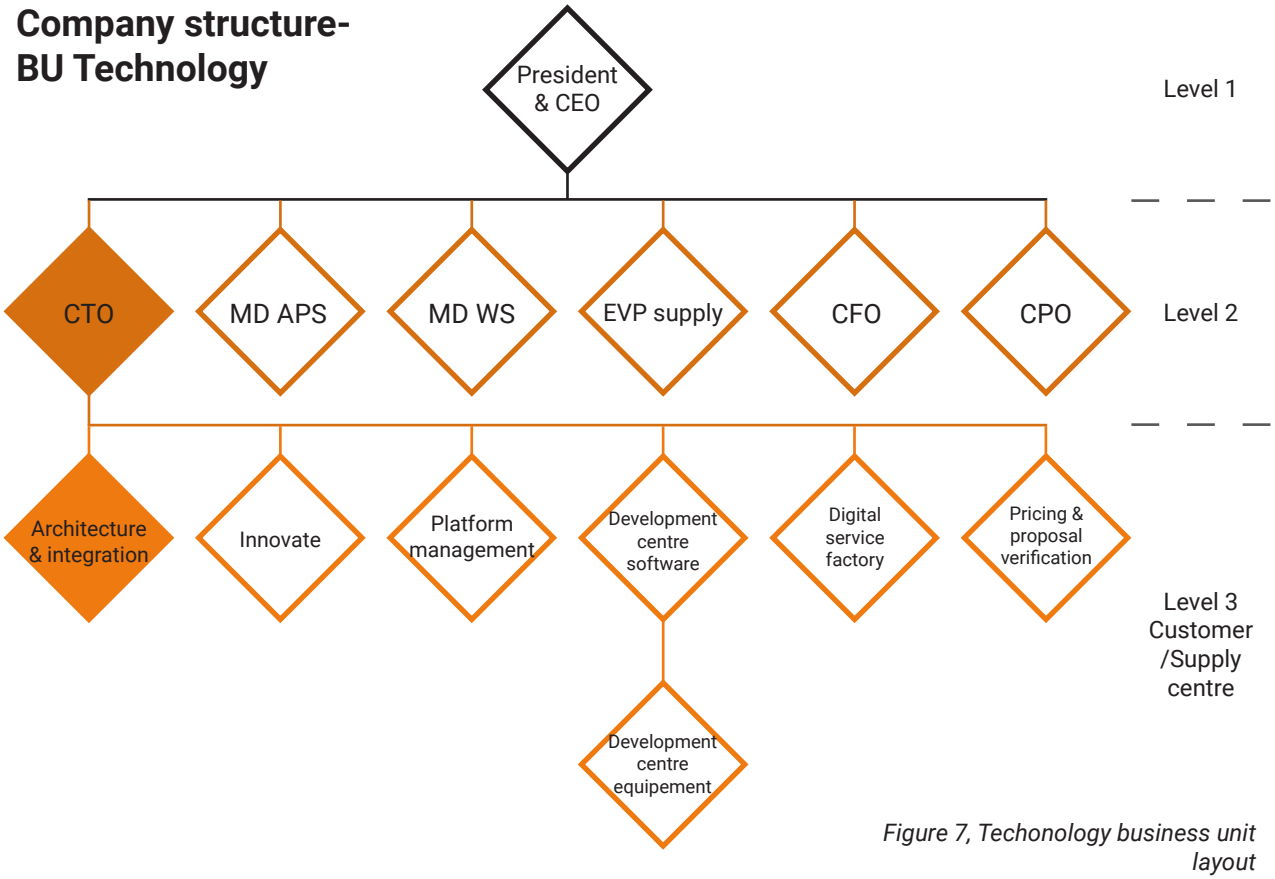


Figure 7, Techonology business unit layout

Company structure- BU Airport & Parcel solutions (APS)

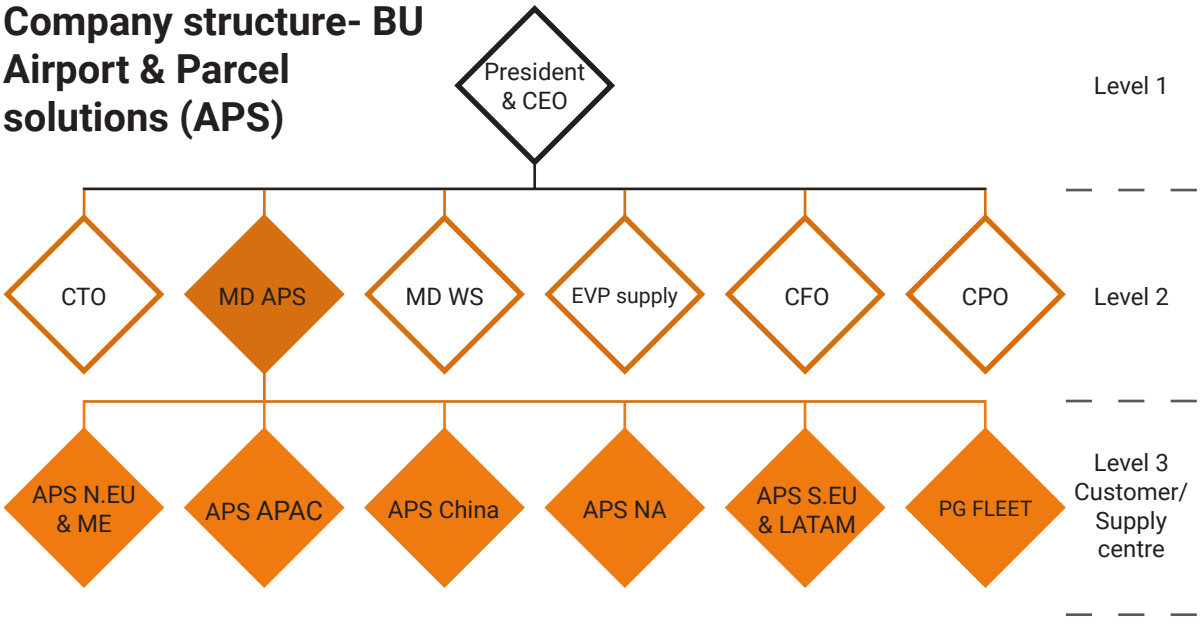


Figure 8, Airport & Parcel solutions business unit layout

Solutions portfolio
The portfolio of Vanderlande contains of multiple integrated solutions which can be divided in three categories; innovative systems, intelligent software and life-cycle services.

Innovative systems
The logistic systems spread over all three markets (airport, parcel and warehousing) can be seen in appendix D. This visual layout shows, besides the names of all systems, some overlapping systems which you can see back in more than one market. Shifting the focus of a system from parcel distribution to luggage distribution for example.

Intelligent software
To strengthen the hardware systems, Vanderlande has started to focus more on software programs on which the hardware systems can be monitored and controlled. Examples for this are VIBES, PAX monitoring and VISION. All three solutions are software programs that give clients the control over the by Vanderlande provided hardware solutions. Making the solutions customer-centered and building a stronger bond with the customers.

Life-cycle services
In order to create more value for customers, Vanderlande has decided to provide life cycle services for their customers. They divided the servitization into three types, see figure 9.
Firstly Asset services, these aim at supporting and maintaining the software and hardware systems Vanderlande provides their customers with, assuring the systems will keep its full usability and functionality throughout its life span.
Secondly are the logistic services, in which Vanderlande will take full responsability of the system operations. So they optimise and run the operations of the solutions they provide.
Finally the business services, this form of servitization aims to form a relationship on a business level.
Consulting and participating in business decisions costumers make.

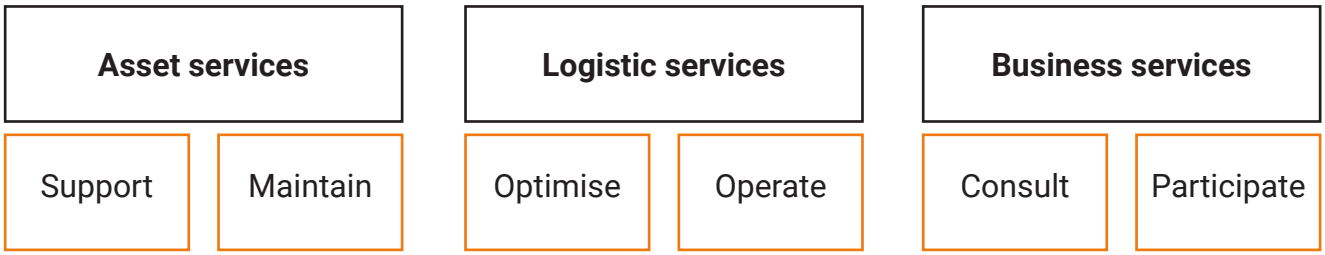


Figure 9,
the life-cycle services of Vanderlande

Airport values

Vanderlande has defined 5 themes when it comes to defining the airport value and needs. These are: Passenger experience, connectivity, profitable growth, opertaional excellence and corporate responsiblity. Each theme has their own value drivers which are shown in figure 10. This figure will also show additional technologies and innovations that when integrated will most definitely add value. The newly created innovative solutions and concepts for the airport business will be tested on fulfilment on each of the values and needs themes and its value drivers to check whether it will actually add enough value to the customer in the end.

Confidential figure from Vanderlande Industries showcasing the value drivers behind their airpot industry, this can be seen in the confidential appndix

Confidential figure from Vanderlande Industries showcasing the value drivers behind their airpot industry, this can be seen in the confidential appndix

Figure 10,
Airport value & needs per theme including their value drivers and coherent technological developments and innovations

Airport stakeholders

There are multiple stakeholders that are closely involved within Vanderlande their airport business. However according to Vanderlande their Vikipedia (2021) page there are 6 main stakeholders in the airport business that can be seen in figure 11. These six stakeholders are in direct contact with the solutions Vanderlande provides. Other stakeholders for Vanderlande in general, such as local governments airports are situated in as well as suppliers and investors will be considered at all times. But for now the main focus lies with the six stakeholders that are in close contact with the solutions.

Airport

The airports can be seen as the direct clients of Vanderlande and they are the main organisations that purchase the logistic systems, software and life-cycle services. Airports purchase these so they can optimise their internal infrastructure. Both large airports such as schiphol and heathrow as well as smaller local airports with national and international flights are clients.

Airlines

Airlines are the transportation organisations that get passengers from one airport to the other airports. They are in close contact with both passengers and baggage and are for this reason part of creating optimal passenger and bag flow and thus the travel experience of passengers.

Passenger

The passengers are in a way the end-user of all logistic systems. As in the end all systems aim to optimise passenger and bag flow and aim to create the optimal travel experience of the passengers. This applies to all types of passengers, such as working travellers and holiday travellers for example.

Security

The security is focussing on the safety of the passenger. Checking baggage and passengers on possible illegal substances and other products, by making use of security screening systems. So Vanderlnade has to make their security systems easy to use for mainly these stakeholders.

O&M team

The Operations and Maintenance team (O&M) is the team that makes sure everything goes according to plan in the airport infrastructure. They are responsible and have the control of all systems to function optimally. The intelligent software solutions and life-cycle services help the team to control.

Handlers

The handlers are the actual employees of airports, airlines and security that you can see on the work floor. Helping both passengers as well as baggage in getting from point A to point B at the airports. They use systems and load and unload baggage on the planes for example

Figure 11,
Vanderlande their stakeholders in the airport business unit

Airport journey maps

When you travel through the airport both you and your baggage go through different areas and segments with Vanderlande solutions. Therefore Vanderlande divided the airport into nine segments in which their current solutions are developed. The segments are: check-in, security screening, transportation, storage, sortation, make-up, unloading, reclaim and finally control.

To gain an overview on what airport solutions there are developed in which airport segment there have been created two journey maps. One map showing the travellers journey through the airport in correlation with the touchpoints with the solutions (see figure 12). And one hold baggage journey and its touchpoints with Vanderlande airport solutions (see figure 13). These journey maps create an overview on all the active current solutions and with what stakeholders they are in contact with.

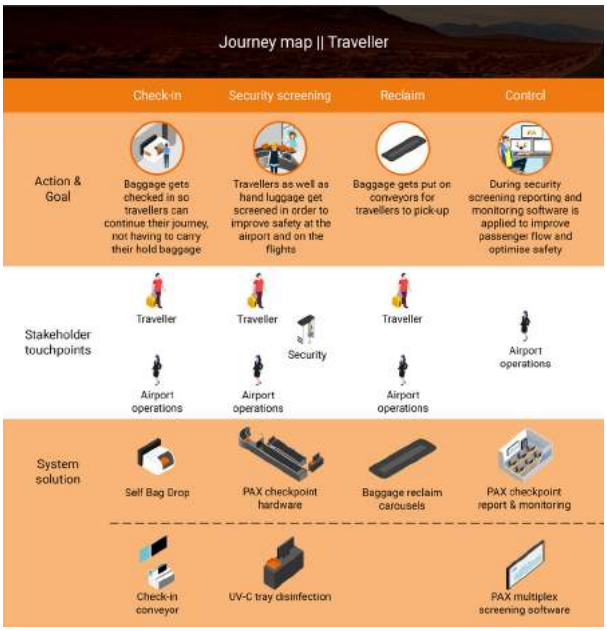


Figure 12,
Journey map of a passenger, including the stakeholders and solutions

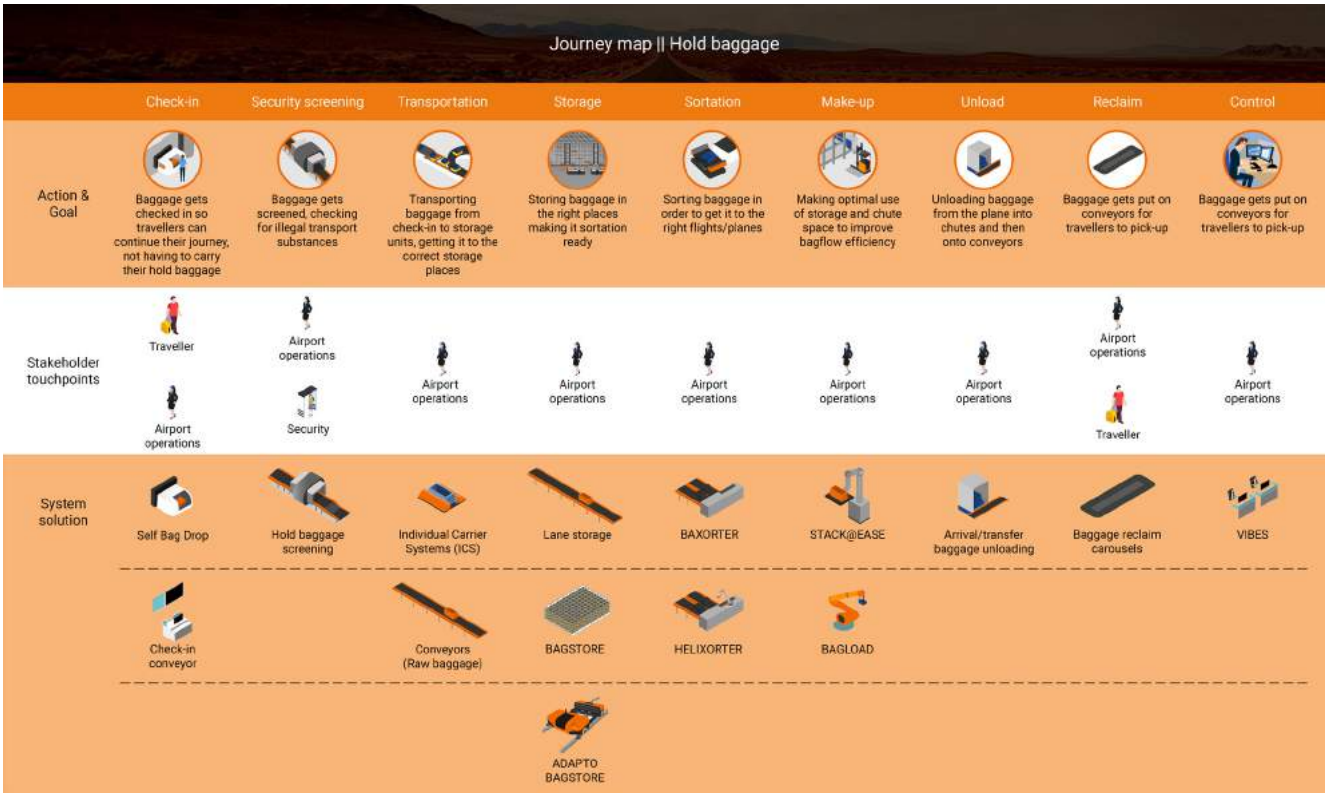


Figure 13,
Journey map of a piece of hold baggage, including the stakeholders and solutions

Airport solutions portfolio
Now that you know what solutions there are and in which segment, there now will be taken a look at the types of solutions. In the general solutions portfolio there has been talked about three categories for the integrated solutions Vanderlande develops: innovative systems, intelligent software and life-cycle services. When it comes to these categories the solutions for specifically the airport business are then divided in three sub-categoires:

Baggage handling solutions (BHS)
Passenger handling solutions (PHS)
Software solutions (SS)

The software solutions are included in both the baggage and passenger focussed solutions as their developed software enables and optimises both bagflow or/and passenger flow, which is the ultimate goal. In the sub-paragraphs below, the current airport solutions will be listed and described into baggage, passenger focussed and software solutions. In addition it also shows the location the solutions can be found within the airport (See figure 14).

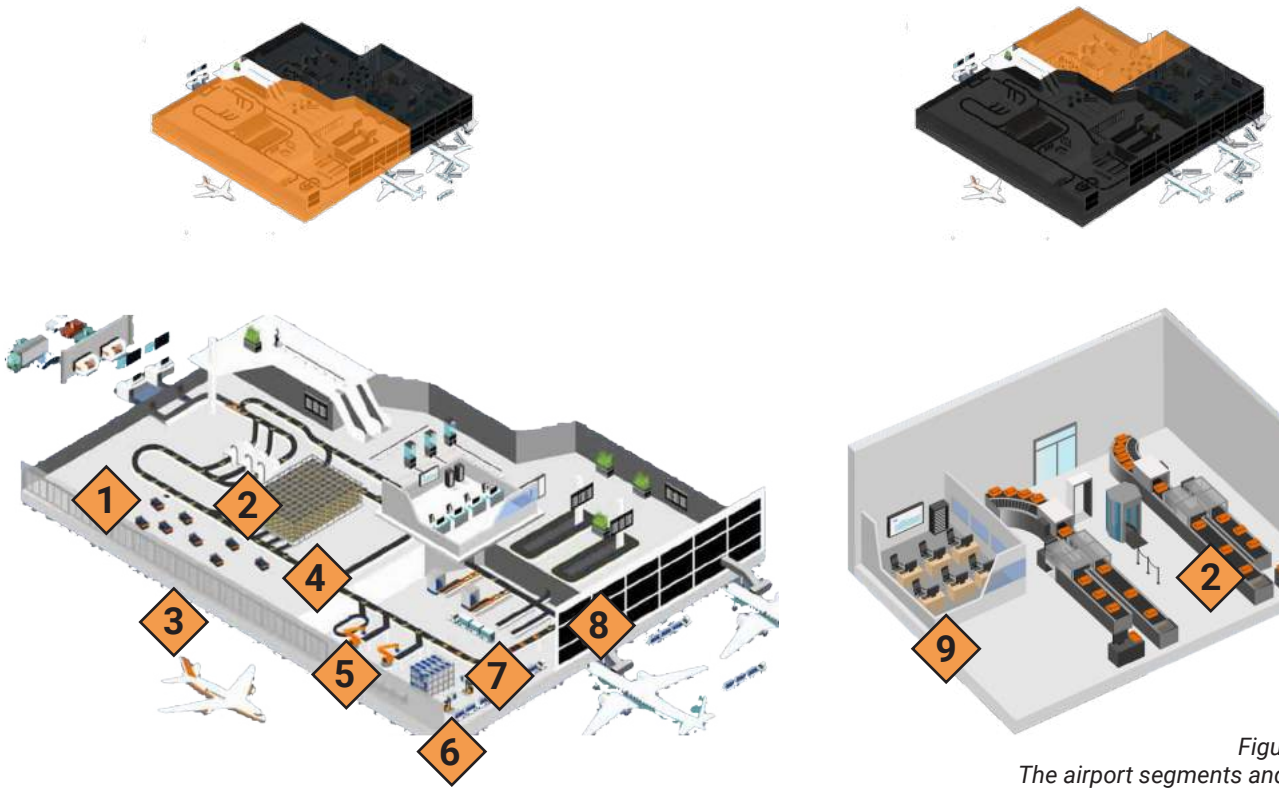
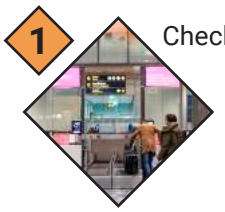


Figure 14,
The airport segments and their exact location within the airport

Baggage handling solutions



Systems/innovations
Self bag drop
Check-in conveyor

Function
Systems to check-in your baggage as easy as possible as well as making sure it goes to the right places. Within the airport as well as to the final destination.

User/Traveller connection
Improving ease of use for end-user

Systems/innovations
Hold baggage screening

Function
Increase efficiency and effectivity in screening lanes for baggage and safety. Optimising space usage, controlling and flow

User/Traveller connection
Increase security check pace & comprehensibility

Systems/innovations
Raw conveyors
ICS (individual carrier system)

Function
Future proof end-to-end baggage logistics making it transport a more seamless process. Getting baggage from A to B in the airport. Part of FLEET and Bagflow

User/Traveller connection
Baggage control & increased flight efficiency

Systems/innovations
ADAPTO BAGSTORE
Lane storage
BAGSTORE

Function
Future proof end-to-end baggage logistics making storing easier and clear. Making it available for sortation. Part of Bagflow evolution

User/Traveller connection
Baggage control & increased flight efficiency

Systems/innovations
HELIXORTER
BAXORTER

Function
Future proof end-to-end baggage logistics making sorting a more seamless process. Sorting all baggage for each filght. Part of Bagflow evolution

User/Traveller connection
Baggage control & increased flight efficiency

Systems/innovations
STACK@EASE
BAGLOAD

Function
Future proof end-to-end baggage logistics making up the tray with baggage that have to go to planes. Making it faster to load and unload. Part of Bagflow evolution

User/Traveller connection
Baggage control & increased flight efficiency

Systems/innovations
Arrival/transfer
baggage unloading

Function
Future proof end-to-end baggage logistics unloading the baggage on and from planes. Easing the process for the handlers. Part of Bagflow and FLEET evolution

User/Traveller connection
Baggage control &
increased flight efficiency

Systems/innovations
Baggage reclaim carousels

Function
Making baggage reachable to its rightful owner. As well as forming a hassle free experience for airport employees putting baggage on the carousel.

User/Traveller connection
Hassle free baggage claim

Systems/innovations
FLEET bag, batch & apron

Function
Automating the baggage flow within the airport with autonomous vehicle types. Making it less of a hassle for airport employees, improving sorting, picking and storing all types of baggage in a sustainable manner. Improving end-to-end logistics.

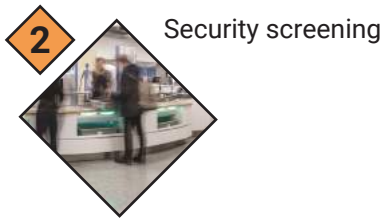
User/Traveller connection
Baggage control, decreasing the chance of baggage irregularities

Passenger handling solutions

Systems/innovations
Self bag drop
Check-in conveyor

Function
Systems to check-in your baggage as easy as possible as well as making sure it goes to the right places. Within the airport as well as to the final destination.

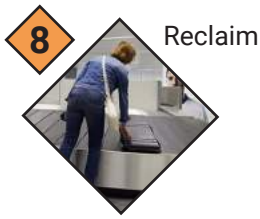
User/Traveller connection
Improving ease of use for end-user



Systems/innovations
PAX Advanced automated screening lane
PAX MX2
PAX Compact
PAX Divest Assistant

Function
Increase efficiency and effectivity in screening lanes for passengers and safety. Optimising space usage, controlling tray usage and passenger assitance

User/Traveller connection
Increase security check pace & comprehensibility



Systems/innovations
Baggage reclaim carousels

Function
Making baggage reachable to its rightful owner. As well as forming a hassle free experience for airport employees putting baggage on the carousel.

User/Traveller connection
Hassle free baggage claim

Software solutions

Systems/innovations
PAX Multiplex screening software
PAX CHECKPOINT reporting and monitoring tools

Function
Software and hardware solutions to improve efficiency and effectivity of security checkpoints. Using real-time and historical data in combination with the newest screening tech (CT, X-rays, etc.)

User/Traveller connection
Increase security check pace

Systems/innovations
VIBES

Function
Software solutions to improve efficiency and effectivity of bagflow. Using real-time and historical data in combination with the newest solutions monitoring all systems and their process.

User/Traveller connection
Improve monitoring of systems, easing maintenance and operations

Key insights

First there has been looked at the core and brand values of Vanderlande, in order to make sure I follow their guidelines when it comes to developing the smart design roadmap. But most importantly the airport platform of Vanderlande Industries has been researched on the following 5 aspects:

- Airport values
- Airport stakeholders
- Aiport platform company structure
- Airport journey maps
- Product portfolio

Research on this VI platform is the most important as of now, TLN workshops have only been performed for this platform. So later on in the project when it comes to developing the smart design roadmap content. The bridge can be made between the results from TLN and these current types of operating within the airport platform of Vanderlande. The bridges that can be formed to connect TLN with VI are the following:

- Looking at what products from VI current portfolio can be transformed and used for TLN product service concepts.

- Checking whether the TLN value drivers for both Vanderlande and the travellers are coherent to the current airport values.

Finally looking at the company structure of the airport platform the ability is there to link the departments to specific roadmap aspects of TLN smart design roadmap.

Design roadmapping

Roadmapping is a form of supporting innovation with strategic long-term planning (Phaal et al., 2004 & Oliveira et al. 2020). Phaal et Al. (2007) states that the strategic long-term planning of a roadmap in general should answer these three questions: “Where are we going? Where are we now? and how can we get there?”

A design roadmap is a visual display of a new concept or service including the coherent technological developments, market opportunities, business models and trends planned out over a longer period of time (Simonse, 2018). This design roadmap gets based on a future vision, which yet again is based on stakeholder values.

According to Simonse (2018) design roadmapping consists of 3 parts; value mapping, idea mapping and finally pathway mapping. Value mapping is divided into trend research and future visioning, which forms the base of the design roadmap. Idea mapping includes tech scouting and time pacing, which aims to create more volume to the developed future vision and thus concept. Linking technologies, partners and business model to the roadmap. Finally, pathway mapping aims to synchronize and finetune all aspects together including both time and financial management. After performing all three parts, a usable design roadmap has been created.

Now as said in the introduction this design roadmap has the ability to help Vanderlande looking at future scenarios, but as strategy design is something completely new at Vanderlande they were looking for tangiblity and usability. This is were we start taking a look at smart design roadmapping.

Smart design roadmapping

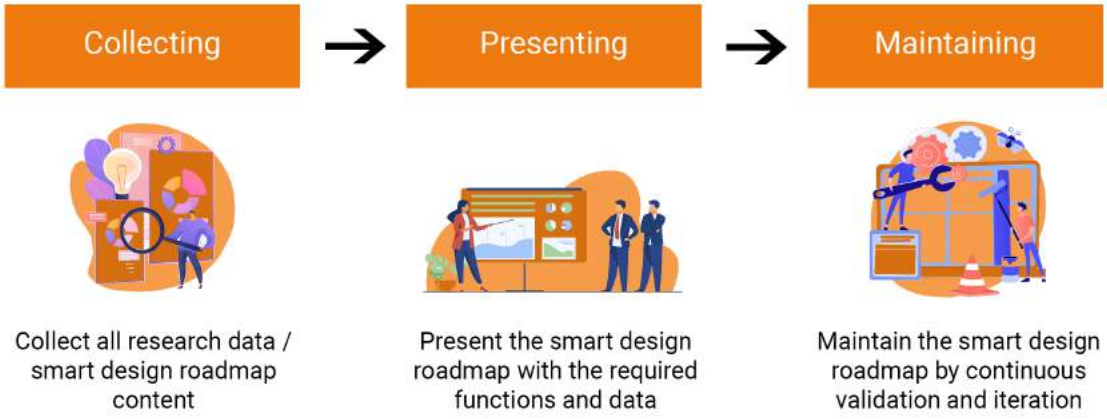
The next step after creating a design roadmap is creating a smart design roadmap. However, before finding the right design strategy for creating the smart design strategy roadmap there must be taken a look at smart roadmapping. That’s why there has been taken a look at answering the following questions:

1. Why create a smart design roadmap?
2. How to create a smart design roadmap?
3. What are the key features of creating a smart design roadmap?

Why create a smart design roadmap?
A smart roadmap is a way to create value for mainly the company or organisation you create it for, in this case Vanderlande. As the tool has the ability to align a company internally (employees and the company’s current approach) with a new created strategy/future vision. But it also creates value for all connecting stakeholders, as the smart design roadmap shows a direction with opportunities and focuspoints in a general perspective.

How to create a smart design roadmap?
According to Erlich (2021), creating a smart or dynamic roadmap takes 3 steps. Firstly you collect, then you present and then you maintain. In figure 15 you can see this process with an additional short explaination per step.

Figure 15,
The three steps in order to create a smart design roadmap according to Erlich (2021)



What are the key features of creating a smart design roadmap?
When we look at the key features of a smart design roadmap, the main aspects are: accessibility, connectivity and longevity (Erlich, 2021) (See figure 16). In my opinion longevity can be replaced by adjustability, because the ability to adjust the roadmap will lead to a longer life span of the roadmap. That's why in figure 17 below adjustability gets explained besides the other two, in terms of functionality in the smart roadmap. These features are now included in the list of requirements to select the right platform to fulfill these features. This selection process and list of requirements can be seen in the implementation paragraph of the smart design roadmap chapter.

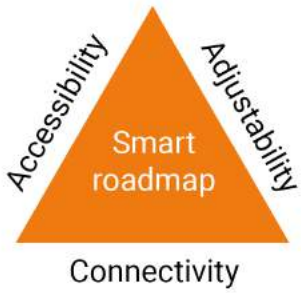
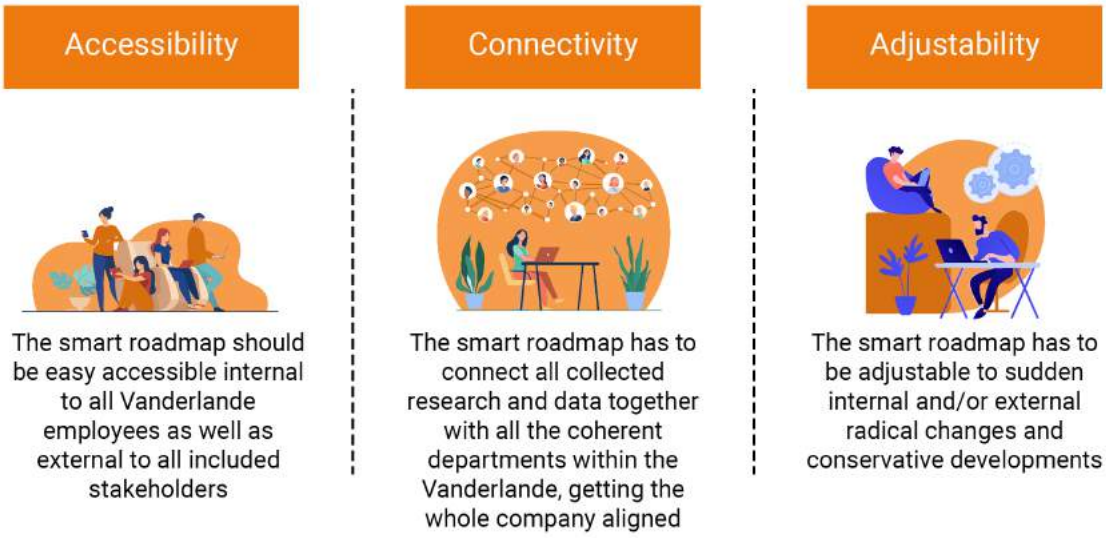


Figure 16,
The three key features of a smart design roadmap (Erlich, 2021)

Figure 17,
A short description of the three key features when it comes to a smart design roadmap



Key insights

According to Lianne Simonse (2018) design roadmapping consists of the following three steps:

- Value mapping
- Idea mapping
- Pathway mapping

The aim of this project is adding another step that makes the design roadmap more tangible for organisations/companies. Which make it a smart design roadmap.

The three key features that form a smart design roadmap are:

- Accesibility
- Connectivity
- Adjustability

So when creating the smart design roadmap there have to be chosen a platform that can complete or fulfill all three of these features. That is why in the 'implementation design' of my strategy you will see these features back.

3

Smart roadmap design strategy

Before the development of the smart design roadmap, the design strategy will be determined to visually communicate and tackle the challenges that have been discussed at the introduction of the project. The chapter includes the design strategy for the development of a user interface platform, which combines user experience and wedsite design. This strategy will show the steps to take in order to create the optimal design.

Design strategy

A very important aspect in this thesis is the visual communication of the smart design strategy roadmap platform. As the roadmap will be presented on a smart platform, there will be spoken of the creation of a software interface in the form of something similar in style to a website. It has a similar effect as an integrated form of Human Computer Interaction (HCI) in correlation with websites.

User experience
When it comes to the creation of a website, the consideration of the user and his/her experience with the it is key. As Jonathan Lazar (2006) states: "'a web site design that does not consider its user is a web site that is disappointing experience for the user". For this reason the platform I create will be structured based on the aim for optimal user experience.

Design method
With user experience in mind, for the design of a smart design strategy roadmap platform I will use a combination of the user-centered website design method (WSDM) (Troyer & Leune, 1998)(See figure 18) and the elements of user experience model (Garrett, 2002)(See figure 19). Both methods contain overlapping parts with eachother. As you look closely at figure 21 you can see that the five elements of user experience method a more detailed description is of the conceptual design, user modelling and implementation design part of the WSDM. There will be given a short explanation in the following sub paragraphs of every step during the creation of a website interface. Getting the website of from an abstract idea to an actual implemented end result. The combination of the two methods into my strategy can be seen in figure XX.

User classification
User classification is all about getting a clear image of the end-user who is going to use the created platform design. This can be more than 1 specific person of group of people. However more and different end-users will lead to increasing set of user needs, a bigger scope and so on.

User class description - Strategy
This step of the method talks all about what the specific needs are of the end-user as well as what

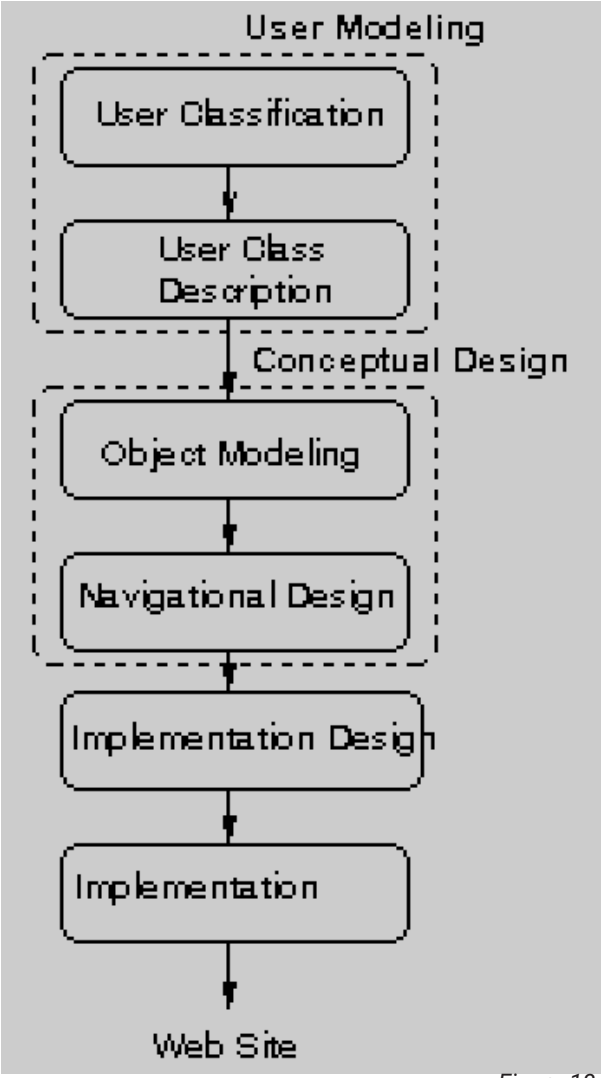


Figure 18,
The WSDM (Troyer & Leune, 1998)

they need the platform to be able to perform. It can also be seen as the goal of the platform, what should it show and be able to do. In terms of a smart design strategy roadmap it will most definitely has to show the actual roadmap but what other maybe less direct needs does it have to fulfil. As stated by Garrett (2002), deriving these needs and objectives can be done by multiple research methods such as user research and ethnography.

For specifically this project the end-user is going to be everyone within Vanderlande as was described in the introduction chapter. The aim is to make Vanderlande use this platform to introduce them to TLN, improve the internal communication, show

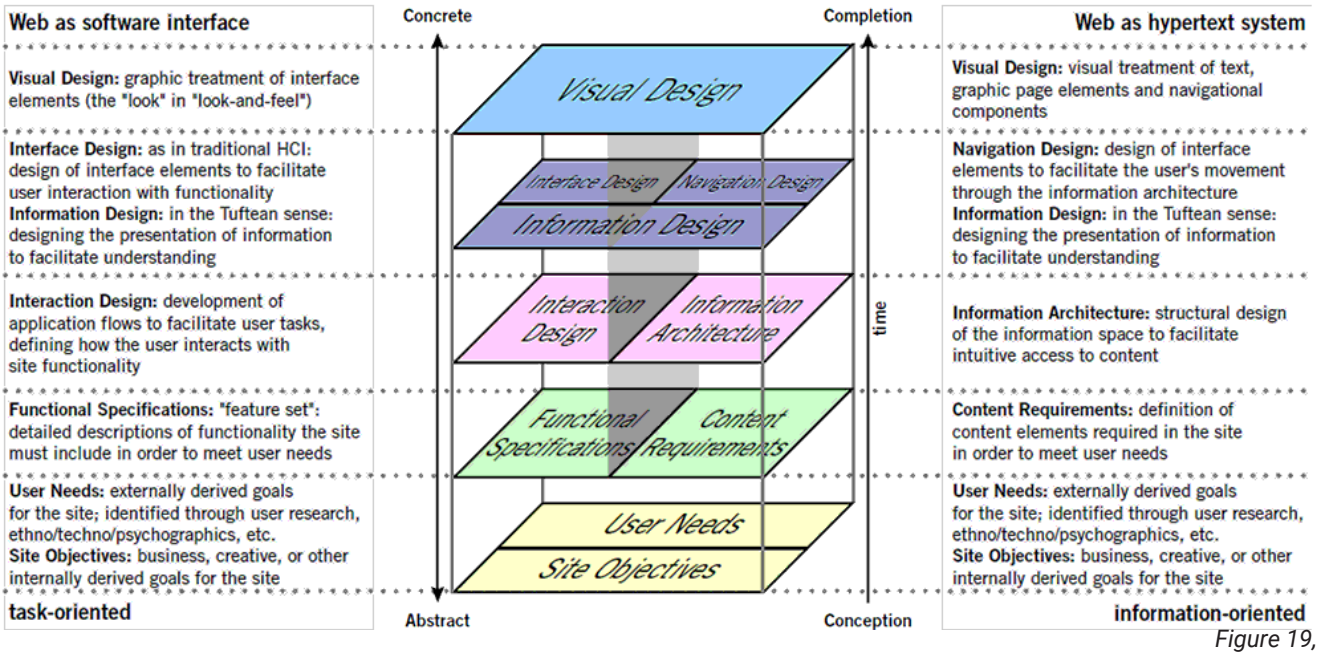


Figure 19,
The 5 elements of the UX model
(Garrett, 2002)

the value of new partner/stakeholders and make their innovations adjustable to future changes. Due to the classification and user class description being described in the introduction and it being the challenge of this project they won't be described further more in the next chapter of smart design roadmap creation, but we will move on with object modelling.

Object modelling - Scope

The definition of the scope is a more detailed description of the strategy. In the scope there are two sides. On one hand what content do end-users want to see. As found in the company structure research of Vanderlande some users have priorities in terms of content. The technology department within Vanderlande is in favour of showing technology rather than the external ecosystem for example. So for each department in the company structure of Vanderlande, they have to be able to see what is of importance for them.
On the other is the functionality of the platform. What are the users able to do with the platform in terms of zooming in and out of the roadmap when you want to see either more or less information for example. Therefor I made a list of requirements when it comes to functions of the smart design roadmap for Vanderlande. So users can perform and see what is important to them.

Object modelling - Structure

After gaining a list of requirements in terms of functionality and developing all content, this step will create the structure or base of the platform. The structure mainly focusses on the layers end-users can eventually navigate through and what is there to be seen on each layer. The main layer of the platform will be the complete roadmap but how will this roadmap be structured and which layers are there present in the rest of the platform is what will be looked at in this step. When it comes to the right visual design roadmap structure as well as looking for the purpose the guidelines/decision trees of roadmapping are followed (see appendix E). The decision trees have been formed by research of Blackwell et al. (2008) who was testing on what type of roadmap diagrams are preferred. When I execute both decision trees which can be seen in appendix E, I end up with the structure as seen in figure 20 below. This is the structure I use for the intial smart design roadmap layer including all aspects.

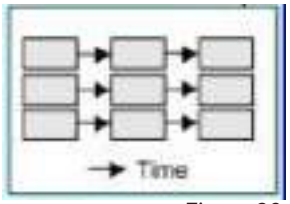


Figure 20,
The optimal roadmap structure
(Blackwell et al., 2008)

Navigational design - Skeleton
Within information design the aim lies in making the layout of all the layers comprehensible, creating a clear navigation path through the platform. This is also where you create filter selections and show buttons/options end-users can navigate through. For this the handbook of HCI (Gross, 2014) will be followed. This handbook shows which buttons are smart to use on which type of pages. Making it clear where you can click to navigate through the platform. Next to clear navigation the interface design is looking at the basic principles of creating a layout and keeping this in mind. Bhaskar et al. (2011) has created a list of 16 general principles on which they tested different types of websites and how present the principle was. Think about the importance of symmetry, balance, unity, etc. These are some principles that will be reconsidered and iterated on throughout the creation of the smart design roadmap. Iterative steps will finally show what the right navigational design is going to be.

Implementation design - Surface
Now the final step is creating the actual 'look and feel' of a website. First you have to select the right platform to make the visual design on. This selection process makes use of a list of requirements of the smart design roadmap and a couple of requirements that are important to the company. And finally to make the platform come alive there will be made use of the principles of beautiful web design (Beaird & George, 2014). This set of principles partially overlaps with the principles of Bhaskar et al. (2011), however now colour, texture, typography and imagery are also coming into play. To find the right look and feel an iterative process will end up in a final design.

Key insights

The design strategy for the creation of a smart design roadmap platform is a combination of the user-centered website design method (WSDM) (Troyer & Leune, 1998) and the elements of user experience model (Garrett, 2002) you can see this combination in figure XX. The strategy consists of the following 6 steps:

• User classification
Aiming at getting a clear look at the end-user of your smart design roadmap platform

• User class description
Aiming at the value needs of the end-user in terms of what the smart design roadmap is meant to establish within the company

• Object modelling - scope
Aiming at both the content and the function aspects of the roadmap. This requires a list of content that has to be included as well as a list of functions that the smart design roadmap must be able to perform.

• Object modelling - structure
Aiming at the structure of both the complete smart design roadmap platform in terms of layers as well as the structure of the actual roadmap itself.

• Navigation design
Aiming at the right form of walking through the smart design platform. Create clarity on how to navigate through all the layers, implementing interactive buttons.

• Implementation design
Aiming at the complete look and feel of the smart design roadmap platform. Making sure the platform that is selected can fulfill all the requirements that are established by both my research and specific company needs.

In the next chapter you will directly dive into object modelling as the user classifcation and description are the complete challenge and aim of this project as described in the introduction. Its end-user being Vanderlande, aiming for the smart design roadmap platform to function as the connection between TLN and VI, improve internal communication, emphasize importance of new partners/stakeholders and being adjustable to changes.

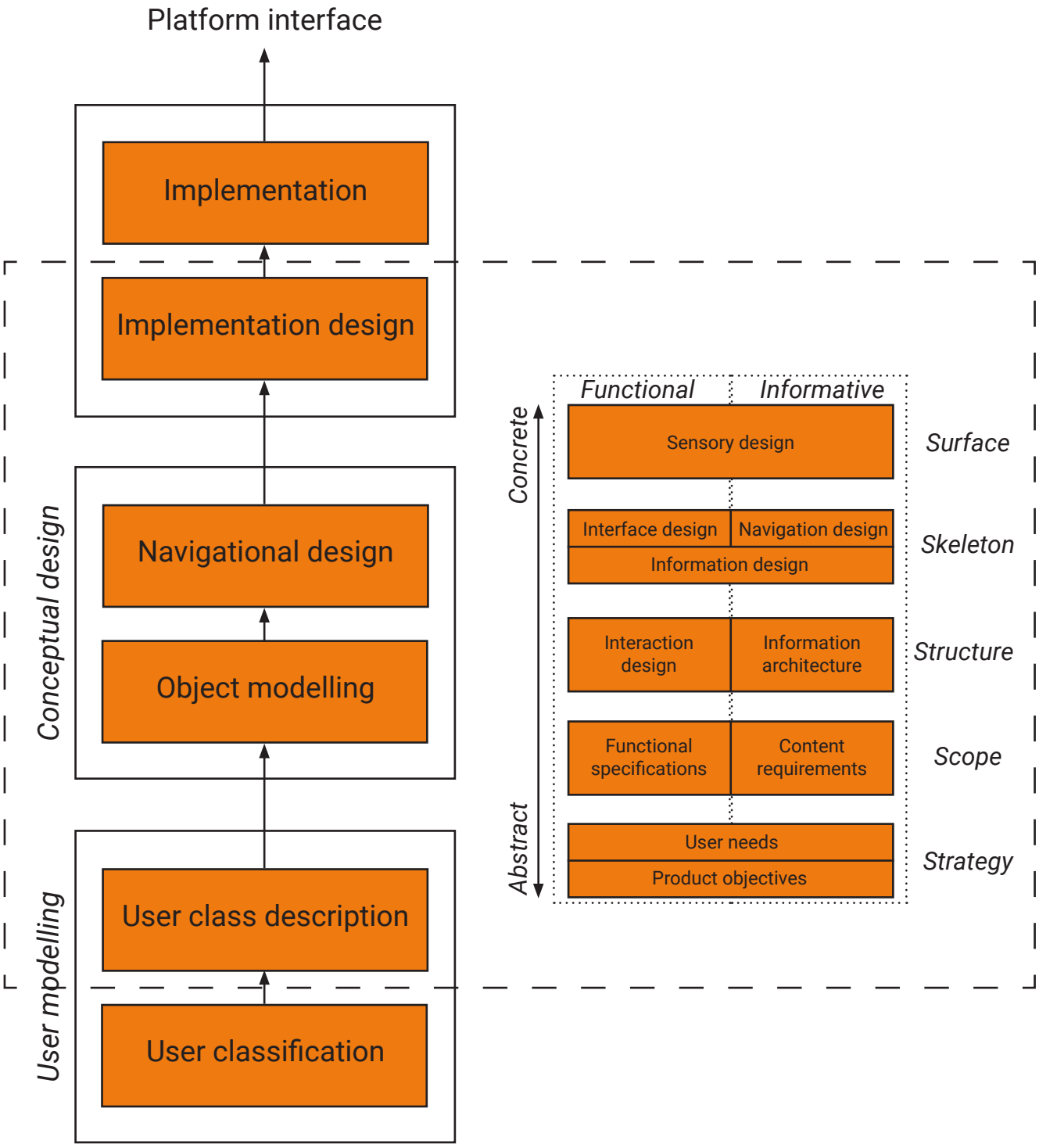


Figure 21,
The design strategy for creating the smart design roadmap

4

Smart design roadmap creation

Smart design roadmapping is about the development of the actual smart design platform. This chapter will walk through the design strategy steps in order to come to a final design of the smart design roadmap platform. The user modelling steps are the goal and challenge of this project as described in the introduction chapter. That's why we directlly drop in the conceptual design with object modelling and after that implementation design.

4.1. Object modelling - scope

The design strategy states that the scope wthin the object modelling step is divided into two parts. On one side there will be taken a look at the content requirements of the smart design roadmap and on the other side the focus lies on the functionality of the smart design roadmap. Both content and functionality will be discussed in this paragraph.

4.1.1. Content requirements

The content of the smart design roadmap closely follows the already created design roadmap formed by the TLN workshops, however there has been taken a critical look at. And now it has been transformed into a more detailed and adjusted set of innovative information, that is also related to the current solutions VI has developed. Bridging the gap between TLN and VI. An example of bridging this gap can be seen in appendix F. The result has strengthened the smart design roadmap. The content that is required to create the smart design roadmap can be divided into the following categories:

- The product service solutions
- Trends
- Future vision
- Value drivers & target group
- Technological developments
- Current VI solution development
- Ecosystem
- Relation models

All 8 of these categories will be researched, adjusted where needed and information will be added to put more detail in the smart roadmap making it more tangible.

4.1.1a. The product service solutions

The performed workshops with Vanderlande employees (done by TU Delft graduate Celine Tesselaar) resulted in a tactical roadmap with a couple of future product service solutions. This sub-paragraph consists of research on the outcome of these design roadmapping concepts.

For the development of the product service solutions they have developed one solution for each solution category described in the “airport solutions portfolio” paragraph. So one future solution for baggage handling, one for passenger handling and one software system.

VI Travel buddy

The VI travel buddy is the passenger handling product service concept, which is one of the three new strategic directions for Vanderlande, where the complete roadmap is based on and forms the core of the roadmap. To see the description of this concept next to the visual shown in figure 22, you will need to request the confidential appendix.

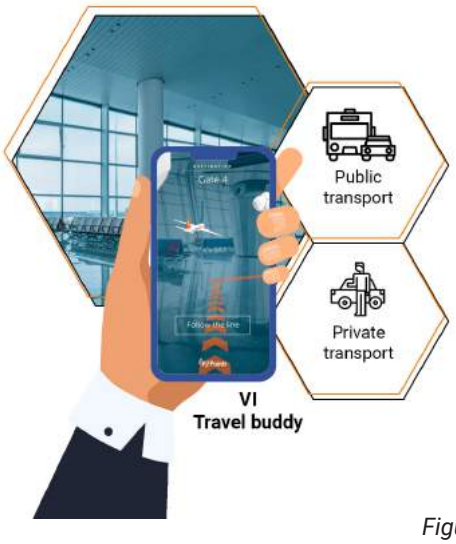


Figure 22,
A representation of the product service proposition: VI Travel Buddy

VI WeBringIt

The VI WeBringIt is the baggage handling product service concept, which is the second of the three new strategic directions for Vanderlande, where the complete roadmap is based on and forms the core of the roadmap. To see the description of this concept next to the visual shown in figure 23, you will need to request the confidential appendix.

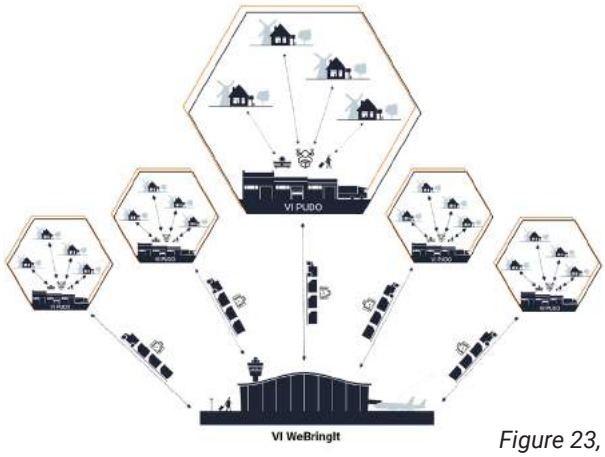


Figure 23,
A representation of the product service proposition: VI WeBringIt

VI SLIM

The VI SLIM is the new software product service concept, which is the last of the three new strategic directions for Vanderlande, where the complete roadmap is based on and forms the core of the roadmap. To see the description of this concept next to the visual shown in figure 24, you will need to request the confidential appendix.

Figure 24,
A representation of the product service proposition: VI SLIM

is transparent and forms a way of communication, where both consumers and providers can see the planning, follow track&trace and have the ability to keep each other up to date.

4.1.1b. Trends

In the workshops the employees of Vanderlande worked on clustering the most important trends together into a couple of categories. In total there have been created 13 categories (see figure 25). After getting these categories they have ranked in the most desireable and best possible trends to actually be realised. Resulting in the following trendclusters to be seen as leading factors in the design roadmapping process:

the six trendclusters are part of the future strategy of Vanderlande, which gets included in their roadmap. From these six trendclusters the concepts have been developed and therefore the complete roadmap. This smart design roadmap content makes it confidential and therefore can only be seen in the confidential appendix.

Now that these trendclusters have been taken as the core trends of the roadmap. I decided to map all trends again in two different ways. One map showing the trends over time, when do we expect the trends to come to live (see figure 26). And the other map where all trends(clusters) are mapped into the DEPEST method, in order to see whether all environmental factors are considered (see figure XX).

The reason this has been done is to reconsider all trends in the smart roadmap. The trendclusters where this roadmap has been based on are the by the employees rated clusters in terms of impact on the industry. Whereas in the real world radical developments such as cyber attacks and epidemics may also appear and influence the business. For this reason I wanted these types of developments to be considered as well, so Vanderlande also knows what has to be done when another radical changes appear, like COVID-19 for example. What are the focuspoints when something like this happens again and closes the complete airport business. So I recommend Vanderlande to also take a closer look at their future plans when these happenings occur. For now I only implemented some focus points within the strategy roadmap on parts that can still be worked on regardless of any changes.

Figure 25,
Trends per cluster per horizon

Figure 26,
Trends per cluster per DEPEST factor

4.1.1c. Future vision

From the most important trendclusters as seen in the previous paragraph the main vision themes have been collected. After a lot of iterative steps there are created four main vision themes named: Orchestrate, smart, seamless and personalised. These four key themes needed to lead to the best fitting future vision statement. In a cocreative process together with the TLN team we came up with this future vision statement for TLN:

The complete future vision and its vision themes are next to the three concepts the core of the strategy of Vanderlande and therefore condemned confidential. So in order to see the future vision and its themes described on what it means, you will have to see the confidential appendix.

4.1.1d. Value drivers

The value drivers are split into two parts. The value drivers for Vanderlande and the value drivers for the travellers. You can already see the value drivers back in the future vision. For the travellers its all about the creation of an experience when it comes to travelling. So besides making the journey unique , the aim is also to make the traveller to enjoy their journey as much as possible. The believe is that this is done by making the journey:

Reduced waiting time by both passenger and baggage flow optimisation
Hassle free
Transparent
End-to-end
Give the feeling of being in control

Whereas for Vanderlande you want to stay the global leader in logistic solutions and optimise their products. That's why for Vanderlande the value drivers to maintain a competitive and innovative advantage are:

The value drivers of Vanderlande are coherent to their already established airport value drivers described at the start of the thesis. As they show the direction and focus points of Vanderlande this has been condemned confidential and can only be seen in the confidential appendix.

And additionally also the value drivers for clients of Vanderlande, still has to be written and checked

Target group

The target group will expand over the years when TLN is in progress. To assure Vanderlande their stability even in case of radical environmental challenges. Vanderlande will not only have airports as their clients anymore in their airport business, but they will also expand directly to the passenger/ travellers who travel by plane and eventually travellers in general. Another target group will become the different logistic and travel modalities as they will be part of the connection network of VI SLIM, WeBringIt and Travel buddy. By adding these target groups, Vanderlande will also have focus points when the airports will have to close down for example, so they stabilise the income and relevancy in the travelling business instead of growing only towards the parcel and warehousing business units. Which besides will be connected more to the travel business as baggage seems to become another form of goods, consumers like to be transported.

4.1.1e. Technological developments

In order to reach the product service solutions the strength of Vanderlande will help them get there, which is technology. In figure 27 you can see the technological requirements that are needed per horizon in order for the three TLN solutions to be able to realise.

I've looked a step further than these requirements and linked actual technological developments to these requirements so the CTO business department has actual developments to look at and improve on. These developments can be seen in figure 28.

The specific technological requirements to each concept mapped out over the three horizons displays to much of the strategy of Vanderlande and therefore is condemned confidential and can be seen in the confidential appendix.

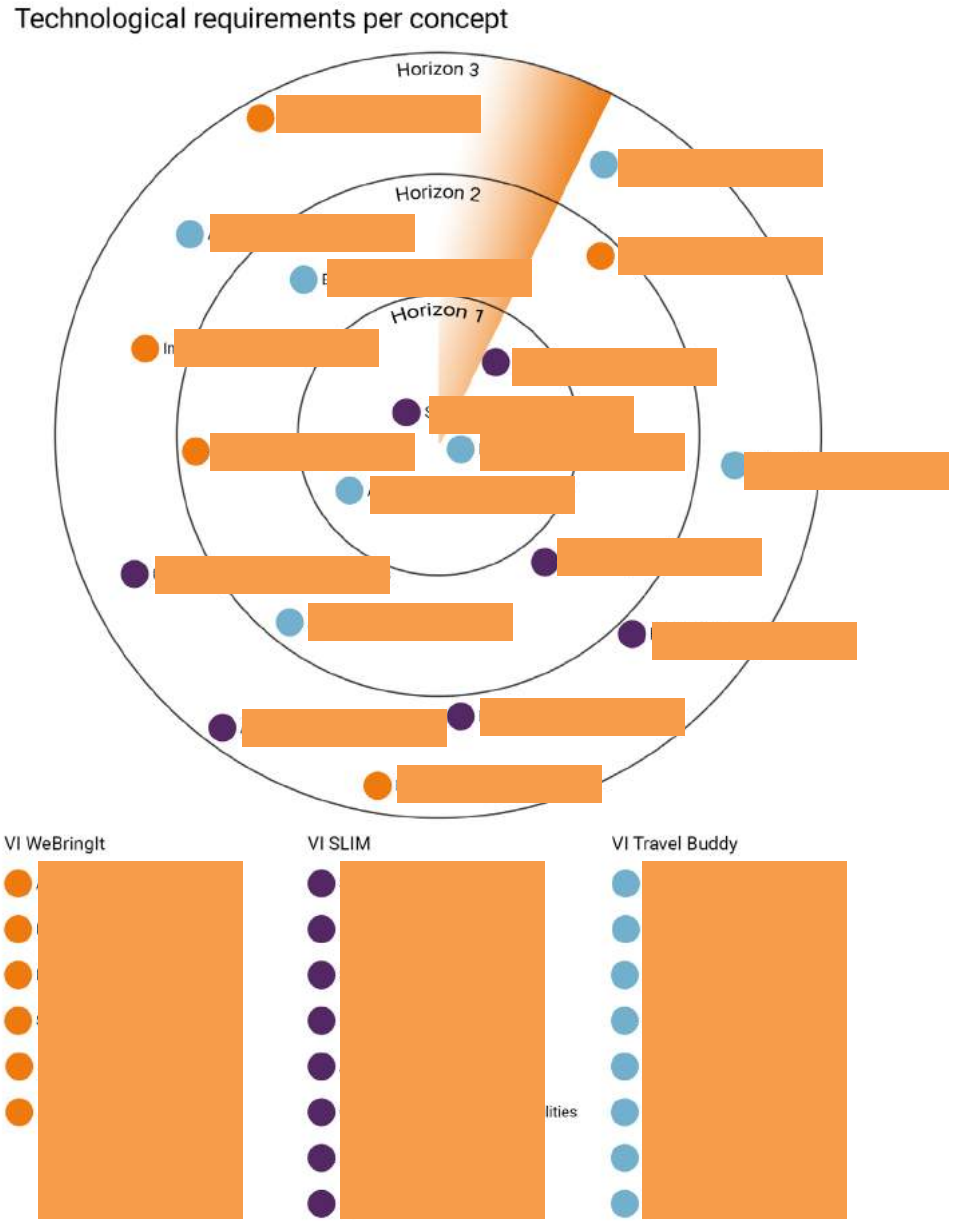


Figure 27, Technological requirements per concept per horizon

For the technological parts of the three concepts that have been included in the roadmap, there has been taken a look at more tangible and actual trending technological developments that can help Vanderlande realise the three concepts. The additionally researched technological developments per concept are described in figure XX. The technological research for the concepts has been mapped into 6 categories. The 6 categories are: Artificial Intelligence, scoring and recognition, robotics, privacy and security, logistics and transport and last but not least other technological research.

Each of the researched technological developments are based on three sources, to check the feasibility. The main resource that has been used is the tech trend report by the Future Today Institute (2021). The other two information sources are a report on tech trends that will dominate industry in 2022 (Forbes, 2021) and a guide on the top strategic technology trends for 2022 (Gartner, 2021). From these three sources a short detailed description of the technological developments is created to add more value to the strategic concepts. The short descriptions that will be included in the smart roadmap can be seen in the following pages.

Figure 28,
Technological developments linked to the concepts and it requirements

AI in the cloud

AI in the cloud is a combination of Artificial Intelligence and cloud computing. There are multiple AI clouds lead by a corporate leader. All individual clouds serve a specific type of shared infrastructure for AI use cases. For Vanderlande the aim is becoming an important partner in the AI cloud for transport logistics. In general AI in the cloud is growing rapidly and multiple big companies try to become the leader in this market.

Robotic process automation

Robotic process automation (RPA) is a technique where simple specific office processes and objectives are automated. This way employees have more time for high value purposes within the company. Vanderlande already works on solutions taking over simple baggage handling mechanics, easing the work for employees. Future Today Institute confirms automation is the way to go.

AI on the edge

Opposite to AI in the cloud is AI on the edge. Edge AI makes use of Artificial Intelligence on a local level. Using hardware devices to directly process data and make real time decisions. Many IT companies provide software solutions which moves AI decision making from the cloud to the edge. This development gives Vanderlande the opportunity to make their newest technological solutions collect data as well as directly process data.

Ubiquitous digital assistants

The use of digital assistants (DA's) in consumers their home becomes more popular by the day while at the same time people are getting more familiar and used to it. That's why Vanderlande should look into creating their own digital assistant for travellers during their journey. The DA should initially help travellers navigate within airports and at the PAX checkpoints. And in the further future assist with the entire journey.

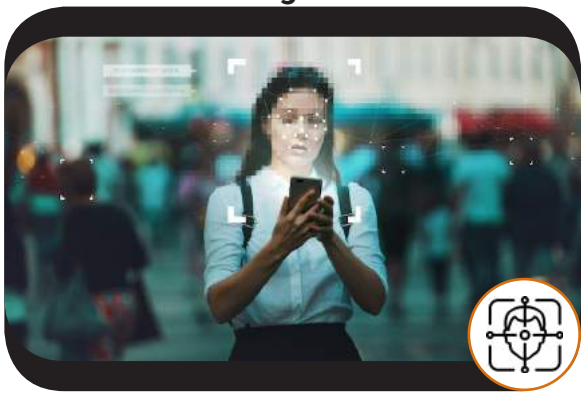
Machine reading comprehension

A very challenging, yet important AI development is Machine Reading Comprehension (MRC). MRC gives solutions/systems the ability to read large sets of data in order to directly respond to consumers their questions. This development gives Vanderlande the possibility to improve automated PAX checkpoints by inlcuding an MRC assisted AI which answers all travellers real time questions at the security check.

Two factor biometric authentication

In order to improve security measures for travelling by plane or by any other modality in the future biometric authentication becomes undeniable. Implementing the two factor biometric authentication in Vanderlande their PAX checkpoint will strengthen safety. Two factor biometric authentication is a tool that initially looks at skeleton topologies and secondly at patterns in people their veins and fingers.

Biometric scoring



Increasing the biometric data collection and analysis serves the opportunity to learn more about people their thinking and performing patterns. Especially behavioural biometric tools help companies find and fulfil consumer needs. The more tools being used, the better your behaviour can be mapped out and scored. With the scoring of behaviour, Vanderlande has the ability to optimise the passenger flow throughout their journey.

Robots as a service (RaaS)

RaaS gives a company the benefit of robotic process automation by dealing in service subscriptions for them leasing robotic hardware. Vanderlande is already somewhat present in this market, when it comes to logistics. But taking it a step further is the way to go. Vanderlande their latest FLEET evolution is a robotic hardware device they can lease to multiple organisations, in case of WeBringIt even to delivery modalities.

Robots as essential workers

During the past years with COVID-19 spreading globally, robots became essential workers. As long as there comes a registry in which all robots get noted and people can see the owner and purpose of roaming robots, the idea of robots becoming essential is close. Vanderlande their FLEET evolution as a F&LM delivery service as well as robot assistants at the PAX security checkpoints can become essential in the travel of the future.

Automating supply chain

Vanderlande their supply chain is already performing on a high level, however in order to optimise effeciency and effectiveness the next step is to digitise process operations. The FLEET evolution is a perfect example of automating the supply chain of baggage logistics within airports. By making specific handling tasks such as transporting baggage digital, the logistics are bound to be more streamlined.

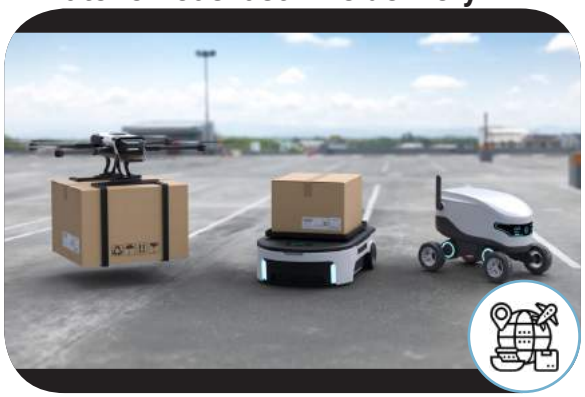
Cobots

Cobots better known as Collaborative robots are robots that work alongside either employees or other machines. These robots can be given a certain set of tasks they are supposed to perform at any given place and time. A lot of Vanderlande their baggage handling solutions within the airport still get managed by handlers and gain more potential when becoming cobots. Keeping the end-user of specific solutions in mind.

Drone fleets

One of the latest steps in delivery logistics is the use of drone fleets. Although this concept is only viable in the far future, the use of these air carriers is something the people can already see happening for first and last mile delivery. And as this is meant for delivery, the use in F&LM of baggage handling, delivering your baggage to your doorstep is something to look at.

Autonomous last mile delivery



Something to watch closely is autonomous last mile delivery. Where drone fleets are a specific type of last mile delivery, in general there are multiple types of autonomous last delivery. Vanderlande has some opportunities in this market. They have the option to further develop the FLEET evolution into an autonomous last mile delivery solution that can be spotted on the street or they can partner up with start-ups like Nuro who develop these vehicles.

Transportation as a service (TaaS)

A recently developed sustainable solution for transportation is the upcoming development of transportation as a service. Within big cities you can see shared bicycles or scooters as well as Uber rides more often for human transportation. There lies an opportunity for Vanderlande within parcel and baggage transportation as a service. Making the end-to-end delivery more sustainable and efficient at the same time.

Follow-me autonomously

Follow-me autonomously is literaly what it says. A specifc technological hardware device that has the ability to follow you around wherever you go. Within the airport industry it could be a device that carries your baggage from A to B. Improving the travellers experience and making the entire journey hassle free. It basically becomes a personal assitant amongst your travel journey.

Emphasizing data ethics

Besides collecting all sorts of different data being very useful, a lot of people are aware of this happening and it raises a lot of questions. The privacy concerns around data collecting and analysing is a very hot topic. And if Vanderlande wants to continue with the collection of data sets, they need to have answers and be transparent about their data ethics. Making sure people feel secure, trusted and heard.

Trackers

More specific than data ethics, the use of trackers is a specific type of data that gets collected and requires transparency. The trackers can be found throughout all types of websites and applications and have the ability to not only gain your name and location, but will also find somewhat of a behavioural pattern. The use of these trackers keep things like the internet free, but still requires transparency and consent
.

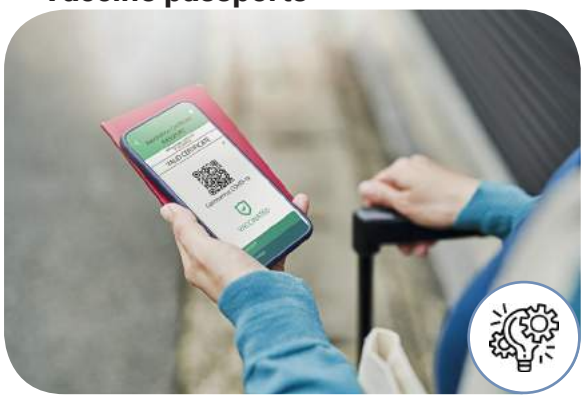
Smart eyewear & HMDs

The position of smart eyewear and head mounted displays (HMDs) is looking very strong and the first contender to overtake smartphones as the primary personal device. So where VI travel buddy should initially be a phone application, Vanderlande can already take a look at how the concept might work on HMDs and eyewear. They can do this by collaborating with Amazon echo frames for example.

Biometric malware

Where the use of biometric data and biometric behavioural data should improve security and the safety of people, the enormous databank also directly forms a big danger. Malware attacks on biometric data have the ability to gain and manipulate personal information. Therefor Vanderlande has to invest into the security of these biometric databanks in order to provide trust.

Vaccine passports



The recent development of pandemics with COVID-19 as the leader has resulted in a new way of living. In this new way of living, being vaccinated is a requirement. Therefore the development of vaccine passports might be closer than you think. As the use of these passports is important whilst travelling, Vanderlande can look for opportunities in digitising these vaccine passports in their smart platforms like VI travel buddy.

Blockchain travel industry

The importance of blockchain transactions in every aspect is becoming undeniable, not excluding it within the travel industry. The use of blockchain in the travel industry will not only simplify but also secure payments. Connecting all instances together, making sure the transactions will never get lost and be secure. Especially in VI SLIM this is the way forward when planning your baggage journey amongst multiple modalities.

4.1.1f. Systems & Solutions

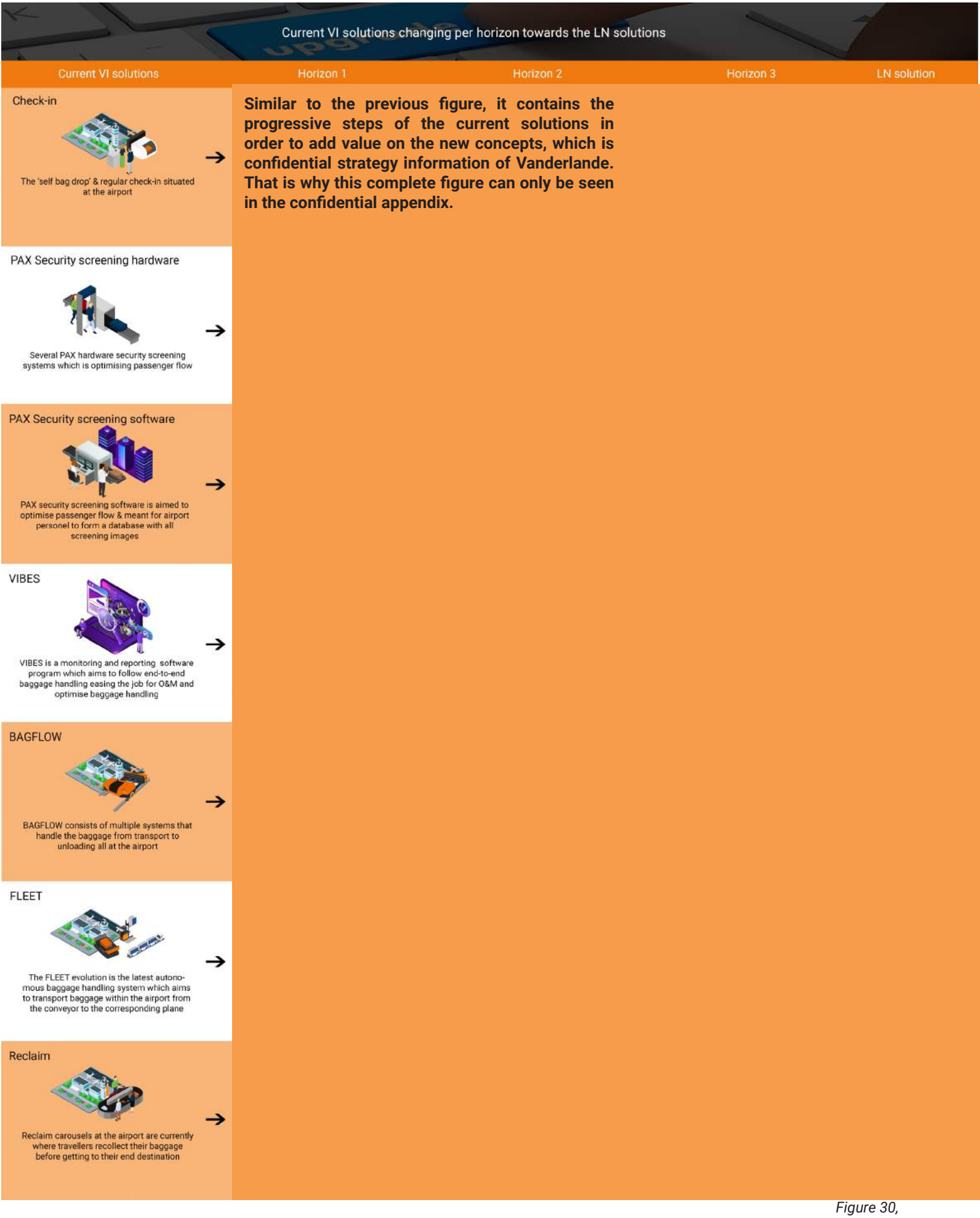
For the systems and solutions, there initially has been taken a look at what type of solutions Vanderlande is currently providing and how these solutions are supposed to be used and/or look in 2050 (as seen in figure 29 on the right).

After creating the start and end situation of the solutions, the steps in the horizons in between have been created to form a bridge and show Vanderlande the steps they have to take to get to the end result. The entire 4 horizons process per solution has been mapped out on the next page (See figure 30).

In appendix F there is also a visual that primarily looks at overlapping aspects of the three concepts with the current solutions of Vanderlande and the coherent plans of Vanderlande.

This figure contains the progress of Vanderlande their current solutions such as FLEET, BAGFLOW, etc. and how they have the ability to add value to the three new concepts. However the way current systems help to add value to the new concepts contains the strategy of Vanderlande. For the other half of this image you will have to see the confidential appendix.

Figure 29,
All VI solutions transforming towards parts of the TLN solutions



Similar to the previous figure, it contains the progressive steps of the current solutions in order to add value on the new concepts, which is confidential strategy information of Vanderlande. That is why this complete figure can only be seen in the confidential appendix.

Figure 30,
All VI solutions transforming towards parts of the TLN solutions per horizon.

4.1.1g. Ecosystem

The ecosystem has been divided into an internal ecosystem and an external ecosystem. The internal system looks at team that have to be included in TLN in order to realise the solutions. The external ecosystem looks at partners Vanderlande should create.

Internal ecosystem

Vanderlande will need three teams internally, which are; the HUB team, the smart platform team and the software development team. The hub/pudo team, that works on creating the PUDOs and link its partners getting in contact. The smart platform team works in close contact with the software developments team in order to create the platform that enables the travellers to be in control on their own journey with the travel buddy as well as their baggage its journey with VI SLIM. All three teams are integrated in the Vanderlande airports platform when it comes to the external ecosystem figure.

The external ecosystem consists of possible partnerships Vanderlande has to form in order to realise the newly developed concepts. These partnerships have been placed into a layered visual, in which the you see which partner comes in each horizon. This visual can be seen in figure 31 below

The figure below in combination with the description underneath the orange block describes new partnerships Vanderlande has to establish to realise the concepts and thus the TLN strategy. As this displays the strategy of Vanderlande this description and the complete figure 31 can only be seen in the confidential appendix.

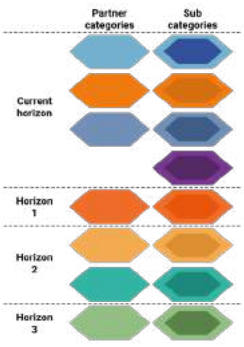


Figure 31,
The external ecosystem presented in a visual graph. From left to right you see which partners are added per horizon

4.1.1h. Relation models

Currently Vanderlande is a business to business (B2B) operating company. Vanderlande provides airports all over the world with both hardware and software systems and services as their main source of income. With the new Long Now concepts they expand their ecosystem and the business model shifts to partially business to consumer (B2C) and new B2B connections. The following three figures 32, 33 and 34 display a quick description on the new ways of operating. It contains values, solutions and services that get exchanged.

When it comes to **VI Travel buddy**, there are three important new stakeholders that get involved in the travel ecosystem of Vanderlande. These bridges have to be established in order to bring the future vision around this concept to realisation. The

The following information underneath contains the relation model of Vanderlande and the VI Travel buddy concept with their new partners that are of importance for their strategy. It shows information and data and capitalistic exchanges between stakeholders. However both the image and coherent description are only visible in the confidential appendix.

Figure 32,
The business model connected to the VI travelbuddy concept

When it comes to **VI WeBringIt**, there are two important new stakeholders that get involved in the travel ecosystem of Vanderlande. These bridges have to be established in order to bring the future vision around this concept to

The following information underneath contains the relation model of Vanderlande and the VI WeBringIt concept with their new partners that are of importance for their strategy. It shows information and data and capitalistic exchanges between stakeholders. However both the image and coherent description are only visible in the confidential appendix.

Figure 33,
The business model connected to the VI WeBringIt concept

When it comes to VI SLIM, there are three important new stakeholders that get involved in the travel ecosystem of Vanderlande. These bridges have to be established in order to bring the future vision around this concept to realisation. The

The following information underneath contains the relation model of Vanderlande and the VI SLIM concept with their new partners that are of importance for their strategy. It shows information and data and capitalistic exchanges between stakeholders. However both the image and coherent description are only visible in the confidential appendix.

Figure 34,
The business model connected to the VI SLIM concept

4.1.2. Functional requirements

After developing the content of the smart design roadmap based on the static roadmap, it is then time to define the functionality of the smart design roadmap. The aim of this creation is to offer a platform on which the roadmap is able to be continuously updated and has the ability to give more context, detail and plan on that specific part in case it is needed. The smart design roadmap will consist of all the content requirements aspects.

As described in the paragraph design roadmapping by Simonse (2018), normally the roadmap is split into two parts; the tactical roadmap and the strategic roadmap. Although the two roadmaps go hand in hand with eachother there is a distinctive difference. The strategic roadmap aims to communicate the product or service to the external world, showing mainly its proposition and values it brings. Whereas the tactical roadmap is there to backup the strategic roadmap giving a more detailed description of the product including trends to watch closely, technologies that have to be developed and partnerships that have to be made in order to achieve the development of the product or service. The tactical roadmap is therefor aimed at the internal communication of the product service development. Especially for the internal communication there have to be established a couple of basic functionalities that are important in order for it to become a smart design strategy roadmap. Underneath is a list of required functionalities:

• The ability to directly see how far each platform (Airport, Warehousing, Parcel or other) is with the TLN project.

• The ability to filter what platform you want to see or see all platforms together in one roadmap.

• The ability to see focuspoints in the new concept solution strategies. This way Vanderlande can see crucial directions in case of both radical and incremental developments.

• The ability to filter what you want to see from the smart design roadmap. The aim is to easily divide aspects from all three concepts from eachother. Zooming in and out on specific roadmap features.

• A suggestion/discussion board, where employees can speak their mind on new opportunities and threats. Roadmap aspects that have to be added or maybe even deducted. When performing the design roadmapping workshops each every two years certain aspects or even entire concepts might change. And instead of everyone having the ability to add or remove aspects, they can only suggest certain things. Where the smart design roadmap manager is the only person with the authority to change aspects.

• Allocate people to specific aspects of the smart design roadmap.

• Adding a form of time management to the specific aspects employees are working on or a link to a different software that manages time such as Itonics.

These are the main functionalities that make the design roadmap “smart” and give design roadmapping in general the extra layer that is important for making product service solutions more tangible and understandable for everyone.

4.2. Object modelling - structure

To determine the structure of the interface, which takes part in the object modelling step, there will be taken a look at the layers that should be implemented in the smart design roadmap. Both the structure of the entire platform will be shown by showing all layers as well as the structure of a single layer.
First we'll show you the entire platform structure by going through all the layers of the smart design roadmap. It is a combination of the architecture of the smart design roadmap and the interaction, which are the options you have each layer. In the layer cards below, the layers are visible. Starting from the first layer working towards the inner layer.

Layer 1 - Vanderlande The Long Now smart design roadmap
The title screen displaying the logo of Vanderlande in combination with the Long Now.

Layer 2 - Log in
The log in screen where employees can either log in or register. This way each employee has its own account in the smart design roadmap, where he can write suggestions from and select preferences, slowly personalising the roadmap to the employees behaviour on the platform.

Layer 3 - Smart design roadmap navigation explanation
This screen introduces the user to the the smart design roadmap and the Long Now. It quickly introduces to the idea behind both and shows how you can navigate through the smart design roadmap.

Layer 4 - Platform selection
Showcases the different platforms the TLN workshops are going to be held in (warehousing, parcel and airports) and what the current status is for each platform. From this point you can already choose your first filter of the smart design roadmap by selecting the platform

Layer 5 - Context airport platform smart design roadmap
A short introduction to the TLN airport platform. Showcasing the three new concept solutions the smart design roadmap revolves around.

Layer 6 - The smart design roadmap
This is the screen where the complete smart design roadmap is placed on which can also be seen as the home screen. This screen showcases all aspects and filters you want to see.

Layer 7 - Discussion/suggestion board
A board or forum, where employees can air their ideas and opinions in the hope for feedback on their topic.

Layer 8 - Trends
A detailed overview and description of the trends

Layer 9 - Value drivers
A detailed overview and description of the value drivers

Layer 10 - Solution development
A detailed overview of the solution development from current VI solutions to TLN concepts

Layer 11 - Technology
A detailed overview and description of the technological developments

Layer 12 - External ecosystem
A detailed overview of the external ecosystem and its coherent relation models

Secondly, the layers cards below showcase the layer structure of a single layer. I've taken layer 6 'the smart design roadmap' (figure 35) and layer 8 'the trends' (figure 36) to visualise the structure as simple as possible.

Figure 35,
Layer 6 - The smart design roadmap structure

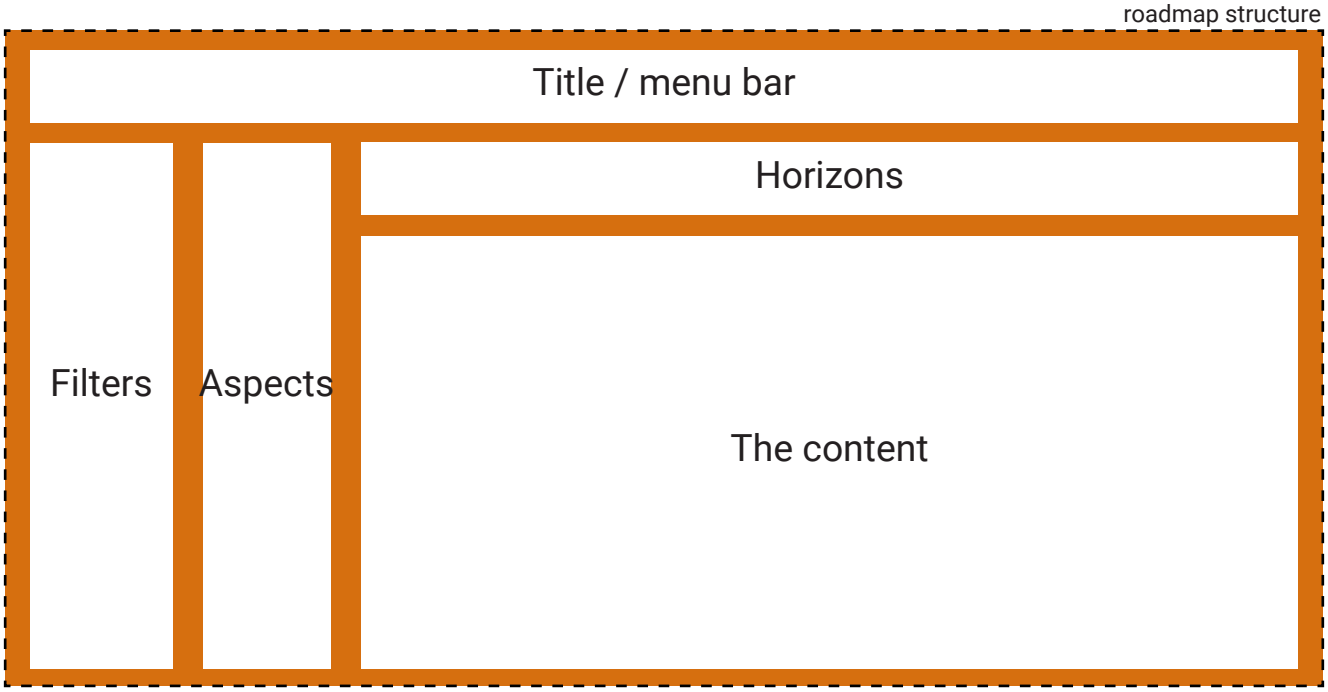
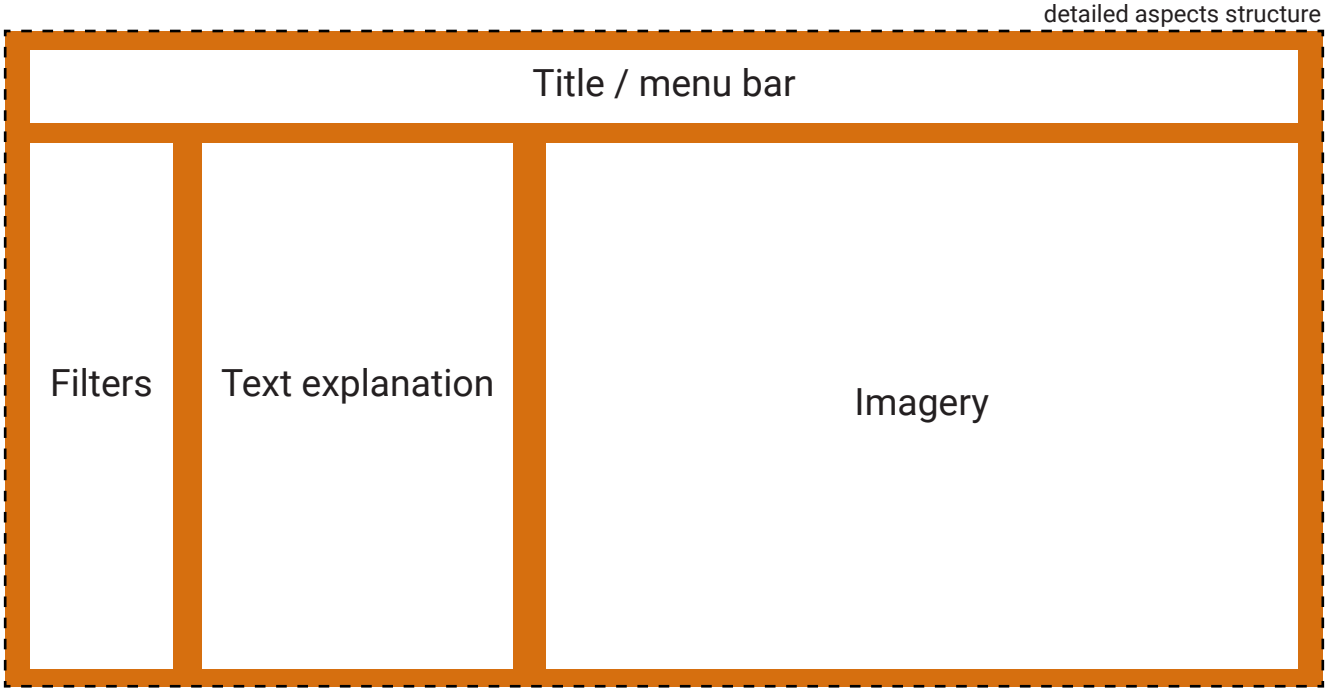


Figure 36
Layer 8 - Trends and other detailed aspects structure



4.3. Navigational design - skeleton

To see what the best way is to navigate through the smart design roadmap layers I developed a flowchart that guides you through the complete platform and all its layers. See figure 37.

Figure 37,
The navigational structure of the smart design roadmap

4.4. Implementation design - surface

For thesurface selection there needs to be made a list of possible online platforms that have the ability to create and/or show the smart design roadmap in combination with a list of requirements/key feautres the platform must be able to fulfill and/or contain.

As described in one of the previous chapters, the paragraph Smart design roadmapping, there already have been defined three features a smart design roadmap has to fulfill. These are accessibility, connectivity and adjustability. Besides the three main features, there has been added three extra features. These three extra features are the Visual capability, Interactivity and planning/time functionality. I've derived these three extra features from conversations with the TLN team at Vanderlande. So basically it were three requirements formed by Vanderlande on what they would like to see in an smart design roadmap.

Visual capability
Visual capability aims at the smart platform being able to show visuals of concepts, processes creating a better feeling with the future frame and vision.

Interactivity
Interactivity is aiming towards the addition of interactive platform functions such as selecting and scrolling on what you would like to see in detail or more abstract level. A level of layers must be

Figure 38,
A platform selection matrix based on key features

available for users to select, leading to the abillty highlight certain activities.

Planning
The ability to see time related activities within the smart design roadmap. For example showing when to start looking at certain technological developements and trends and when it has to be integrated within the product or company. Giving users an overview of when a specific internal company department is working on certain part of the process.

After deriving the 6 key features that are important in the development of a smart design roadmap together with company requirements there has been looked at possible online platforms on which the smart design roadmap could be created on. This led to 5 possibilities for platforms; Itonics, Hype, Figma, Miro and Adobe illustrator. All 5 platforms have their correlated strenghts and weaknesses regarding the 6 key features. That's why a matrix has been created (see figure 38) in which all 5 platforms are rated on each key feature. The rating varies between: 2 checkmarks = good, 1 checkmark = average, 1 cross = below average.
From this matrix it became clear that for Vanderlande the optimal platform to create a smart design roadmap on would be Figma.

Key insights

During the development of the smart design roadmap by using the strategic steps it quickly came to my notice that the content coming from the TLN workshops was based on optimal circumstances without using any influence from the outside in terms of participants. All participants were employees of Vanderlande, therefore it is of importance that Vanderlande validates the outcome with other stakeholders to see if their result is not biased and also gains interest from the outside.

Furthermore, I will list the key points of the 4 steps that have been taken to develop the smart design roadmap.

• Object modelling - scope
The scope within object modelling consists of a list of content requirements and a list of functional requirements. The content requirements of a design roadmap are: trends, value drivers, future vision, product service solution, technology, solution development, external ecosystem and the relation model.
The functional requirements can differ per organisation, but there should always be a filter ability in which you can select how much you see of the roadmap and be able to see aspects in more detail.

• Object modelling - structure
The strucutre within object modelling consists of two different structures. Firstly, the structure of the entire smart design roadmap platform containing all its layers. And secondly, the structure of specific layers. Showcasing the spacing of layer.

• Navigational design
Navigational design speaks for itself it showcases the way users can navigate through the layers of the complete smart design roadmap platform.

• Implementation design
By forming a list of features and capabilities the smart design roadmap must include, you can put specific platforms in a matrix to see which platform is most compatible to put all the necessary features to its right. For this instance Figma seems to be a good platform to showcase a design on.

5 Iterative process

Along the way multiple iterations have been made on the smart design roadmap, due to the lean manner of development. This chapter describes and displays the iterations that have been made, in combination with feedback people gave on the roadmap.

Co-design process

The development of the final design of the smart design roadmap was not performed by just myself, neither was it accomplished in one go. I have had multiple discussions around the design with a variety of people and expertise. And I've gone through multiple iterations of the smart design roadmap, before my final result. By working in a very lean method I often skipped the first few steps of my design strategy and directly went in on the implementation design. By doing so, I was able to continuously show my progress weekly and get a continuous loop of feedback from different people. Therefore I would say that the final design of the smart design roadmap is a co-designed result, really implementing the strength of the design background.

Who?
The people I've co-designed the smart design roadmap with can be divided into 4 groups:

• Group 1 is the TLN team within Vanderlande consisting of 4 people besides me. I've worked with this team throughout the project and had weekly stand-ups where I could showcase some aspects I worked on that week. This was my main source of feedback as they were also working on this project and had the most amount of knowledge on it out of everyone. Therefore they were the start of the iteration steps.

• Group 2 are my chair and mentor of this project. Both familliar with strategic design and experts on their own levels in terms of this. My chair being an expert on the design roadmapping area, which really helped me iterating content requirement wise. Whereas my mentor gave a completely different perspective on the smart design roadmap and helped me more thinking about the functionality of the smart design roadmap. And looking whether it fulfills the challenges mentioned at the start.

•Group 3 consists of 2 non-designers. I used these two people to see whether the smart design roadmap was easy understandable and easy to navigate through as a complete outsider. Making me iterate on mostly details such as clarity of use.

• Group 4 consists of 3 strategic and implementing designers. This group of students had the ability to stand in my shoes and gave different perspectives on all aspects and helped me iterate on the roadmap in general. Not specifically the content, functionality or clarity, but like I said everything in general.

How?
The way I performed the sessions with my groups was simply walking through the platform and then during the walkthrough pinpoint flaws by writing them down on either post-its or just a notebook. And then these pinpoints were getting discussed to find new solutions for that subject or aspect.

The last workshop with the TLN team of Vanderlande to make my final iterations went as followed: I brought along my platform layers printed together with a set of post-its. Then while I presented the smart design roadmap on the platform, the team could write down some final iteration steps and stick them to the right layer. After I was done presenting the smart design roadmap draft, we discussed our findings and I was able to create a list of things to change. To see the end result of this session see the pictures in figure 39 on the next page.

What?
From the co-designing sessions I started translating the feedback to new smart design roadmap drafts and eventually the final design. Some of these iterative changes can be seen on the following pages and old versions of the smart design roadmap in appendix G.

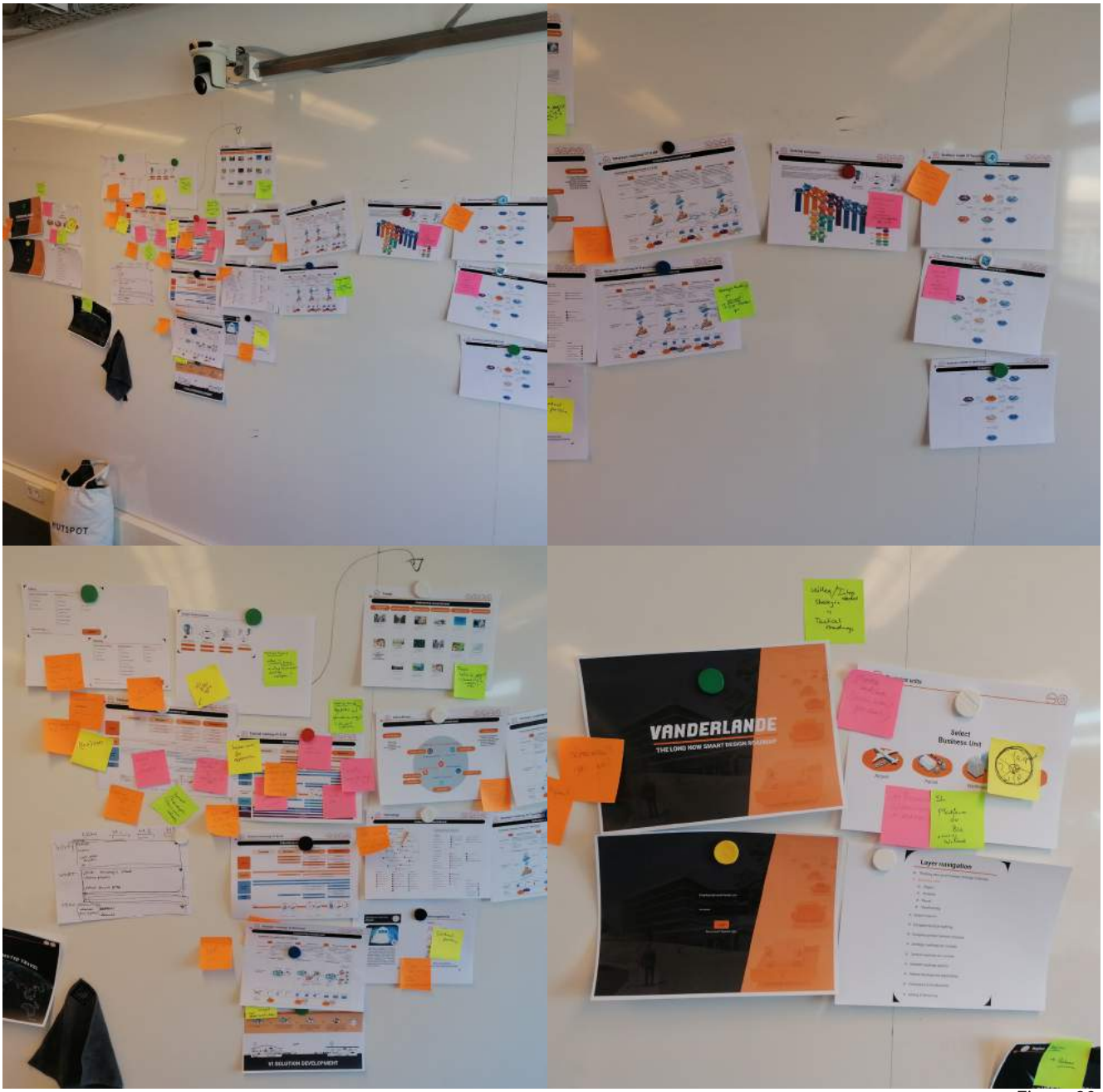


Figure 39,
End result pictues of the final iteraintg workshop

Iterations

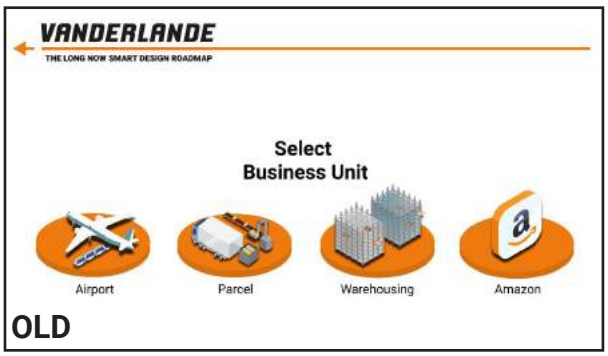
The first iteration consists the visualisation of the new product service concepts and its development over the 3 horizons. Initially I combined all three new concepts into one visual, however Vanderlande wanted the clear division between the three concepts as well were the visuals not clear and understandable. See the transition from old to new in figure 40.

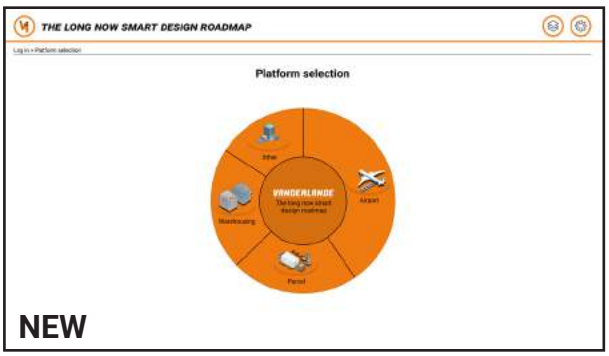
Figure 40,
The iterative step of the new product service conept visuals

The new iteration is a visual of the strategy of Vanderlande and is for that exact reason confidential and can only be seen in the confidential appendix.

The following iteration shows how the platform selection layer changed from seperate parts to a pie chart, which shows the size and status of the project in that platform. That way you have an idea of the size of the project in one glance. See figure 41.

Figure 41,
The iteration of the platform selection layer





One of the most important iterations is combining the tactical roadmap and strategic roadmap of all concepts together into one smart design roadmap, having the ability to see them seperately by using the filter function. But keeping the importance in being able to see everything together on one screen as well. See figure 42.

This specific iteration shows how the two roadmaps, which were the strategic one and tactical one got combined and improved to ony smart design roadmap. These roadmaps however show all strategic information of the future of Vanderlande. This is why the figures on the iterative changes can only be seen in the confidential appendix.

Figure 42,
The iterative step of combining the strategic and tactical roadmap together in one smart design roadmap

NEW

6 Final design

After performing the design strategy and making all the iterations I have ended up with a final design of the smart design roadmap. This final design is an in figma created platform on which the smart design roadmap comes into its own. In this chapter there will be gone through all the layers with a short description on what it contains in terms of content and functions.

Implementation

Before showcasing the final design which has to be implemented in the company, there will be a explanation on the way this final design draft is gonna be used for now and where it is supposed to go.

For now there has to be put emphasis on the fact that this is a 'first design' of the smart design roadmap. The use of the figma prototype is there to introduce employees of Vanderlande with the long now project and show what it is all about. It also functions as a conversation starter, blowing life into the entire project.

Once the attention is there, a software developer has to be acquired to actually realise the final smart design roadmap. This way all the functions and content suggestions get realised. If the smart design roadmap becomes fully active somebody has to be in control of the smart design roadmap at all times. Being able to adjust it when needed for the new data that gets collected from the workshops and translate it into the roadmap.

Besides keeping the smart design roadmap up to date from this points on, the innovation teams have to get to work with the new product service concepts that come out of it. Think in terms of technological developments and the actual acquiring of new partners and stakeholder, expanding the logistic travel ecosystem.

On the next couple of pages you'll see the final design of the smart design roadmap in combination with all its functions and content.

Context

This smart design strategy roadmap will consist of three product service concepts. These are; VI WeBringIt, VI SLIM and VI TravelBuddy (see figure 43, 44 and 45). Each of the three is discussed per horizon this chapter and gets explained on what aspects in the roadmap are applicable to that specific product service.

The description of the 3 horizons in the final design of the smart design roadmap and the final design of the smart design roadmap specifically created for Vanderlande is confidential for the largest part. Therefore the description underneath talking about steps that will be made by Vanderlande is condemned confidential as it shows the strategy of Vanderlande. That is why the final design layers for Vanderlande showing and the horizons descriptions under this orange block can only be seen in the confidential appendix.

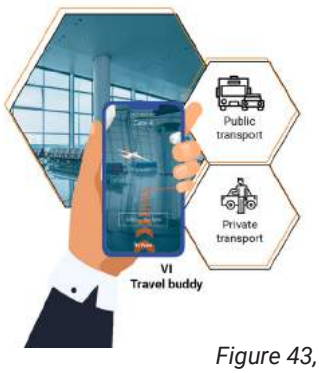


Figure 43,
A representation of the product service proposition: VI Travel Buddy

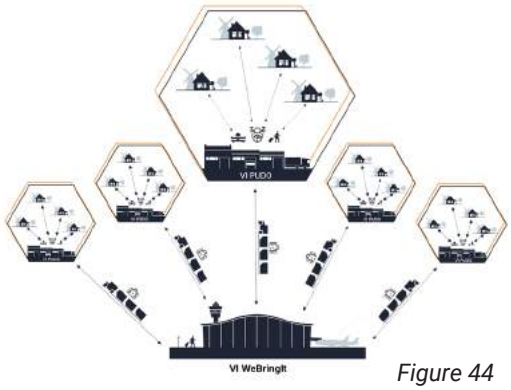
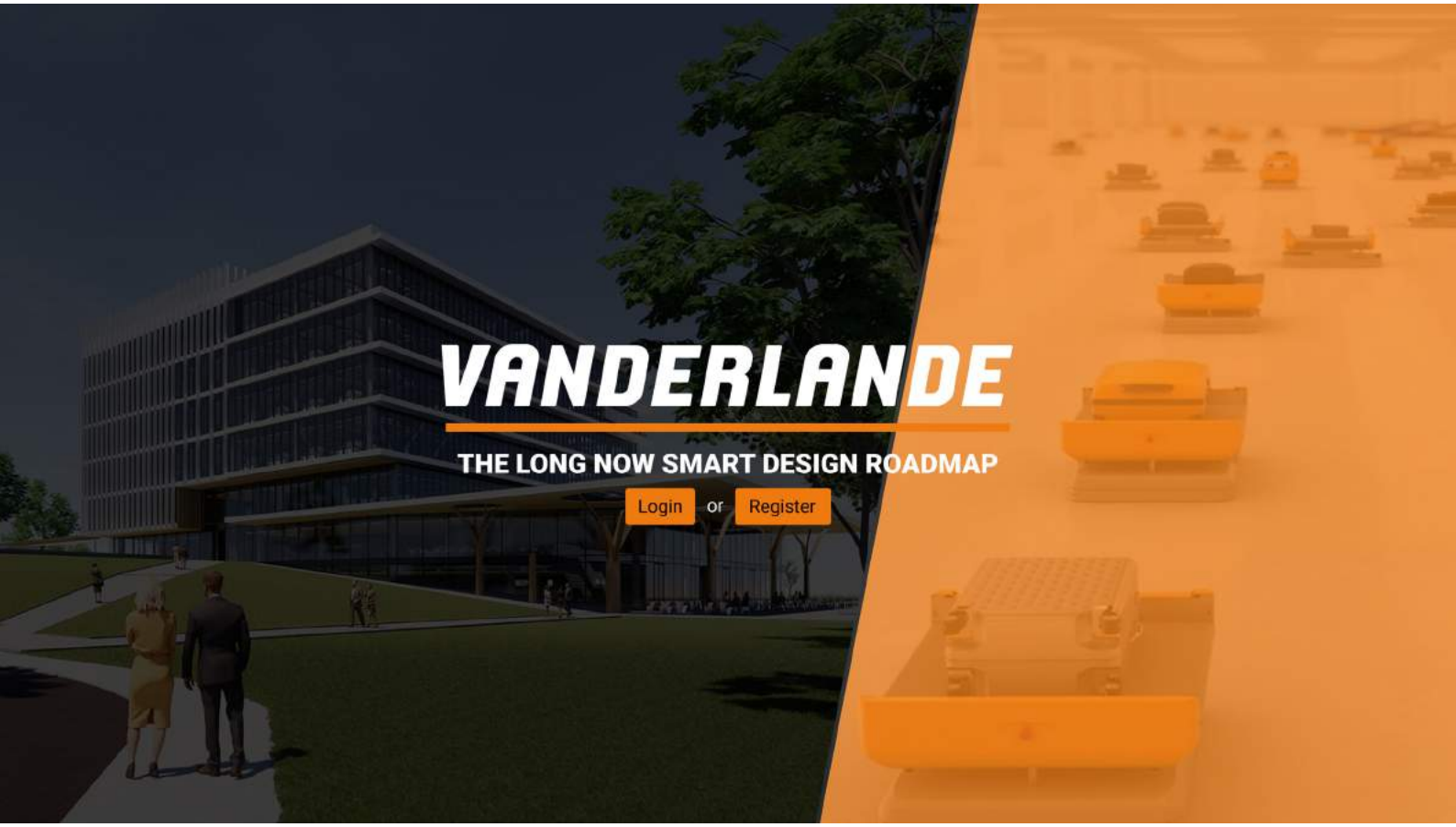


Figure 44
A representation of the product service proposition: VI WeBringIt

Figure 45,
A representation of the product service proposition: VI SLIM

Layer 1 - The long now smart design roadmap

Figure 46,
The welcome screen of the smart design roadmap

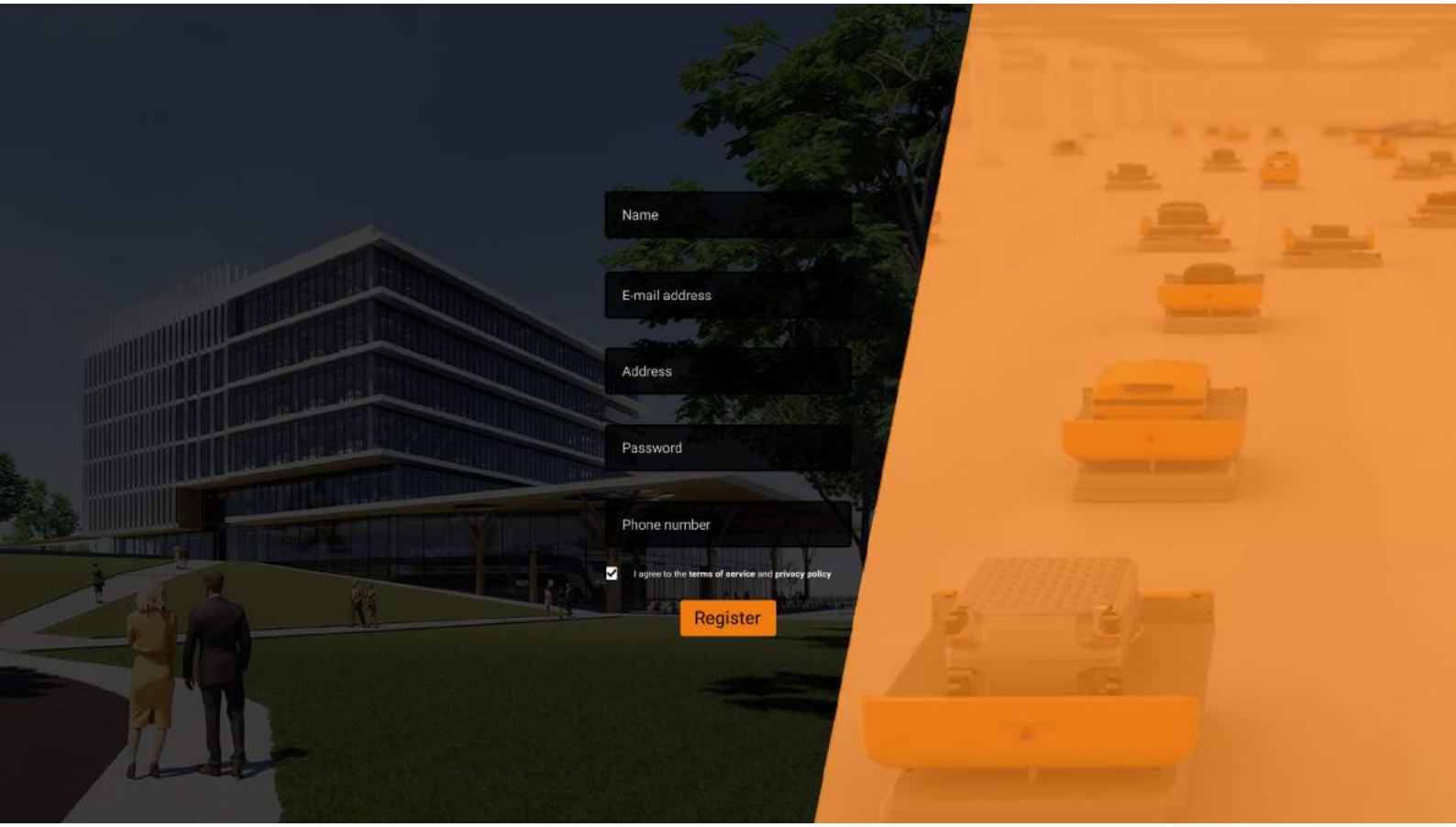


The screen as seen in figure 46 above functions as the welcome screen. The aim with this screen is to invite users to take a look at the lonw now smart desgin roadmap.

On top of this the user gets the option whether they already have an account and can simply log in or if they have to still register.

Layer 2 - Log in

Figure 47,
The log in screen of the smart design roadmap

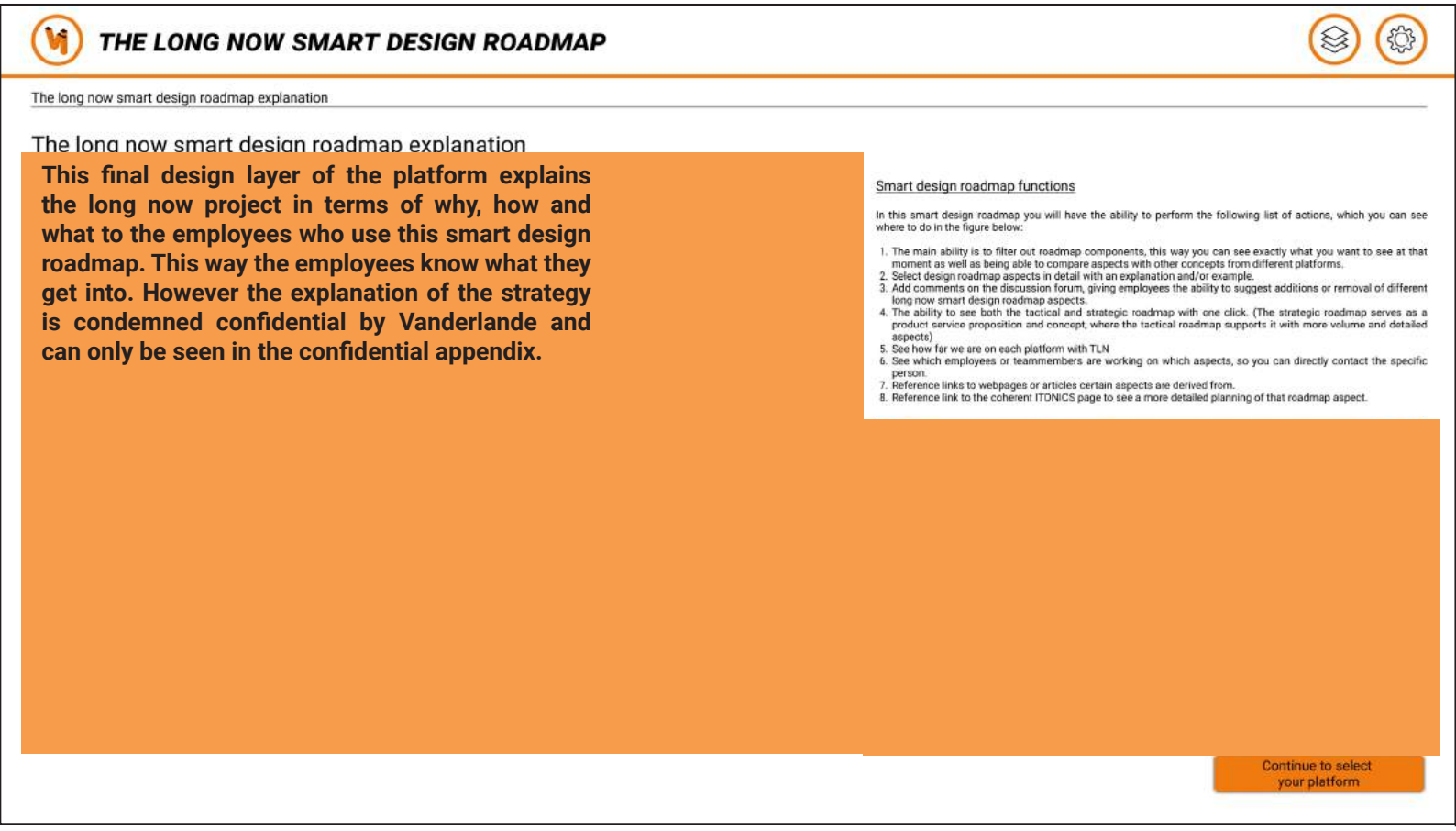


To make the smart design roadmap more exclusive and secure it doesn't function as an open platform. Just like other software programs you are in need of an account which in this instance will be linked to the users Vanderlande account, so you're permitted to log in (see figure 47).

An option for it to be turned into an open document is placing it on the Vikipedia of Vanderlande, which is an exclusive platform for employees already.

Layer 3 - Smart design roadmap navigation explanation

Figure 48,
Entry screen which explains
TLN and smart design roadmap



In figure 48 above you can see an explanation screen of the long now project in general as well as the goal and function of the smart design roadmap displaying the outcome of the TLN workshops.

This layer is especially necessary for users who enter the smart design roadmap for the first time as you get an estimation of what you're getting into. My findings where that without the explanation screen users have no clue what to exactly do with the platform neither know what are the possibilities.

On the far left there is an explanation on why the long now gets performed and what exactly the outcome is when doing the project. One of which is the strategic smart design roadmap, what gets described in the paragraph next to it.

The middle paragraph describes the challenges I'm trying to conquer when developing the smart design roadmap. These challenges form the goal of the development of a smart design roadmap in order to get Vanderlande aligned with TLN.

And finally on the far right a list of functions is displayed, so users know what they can do and gain from this platform.

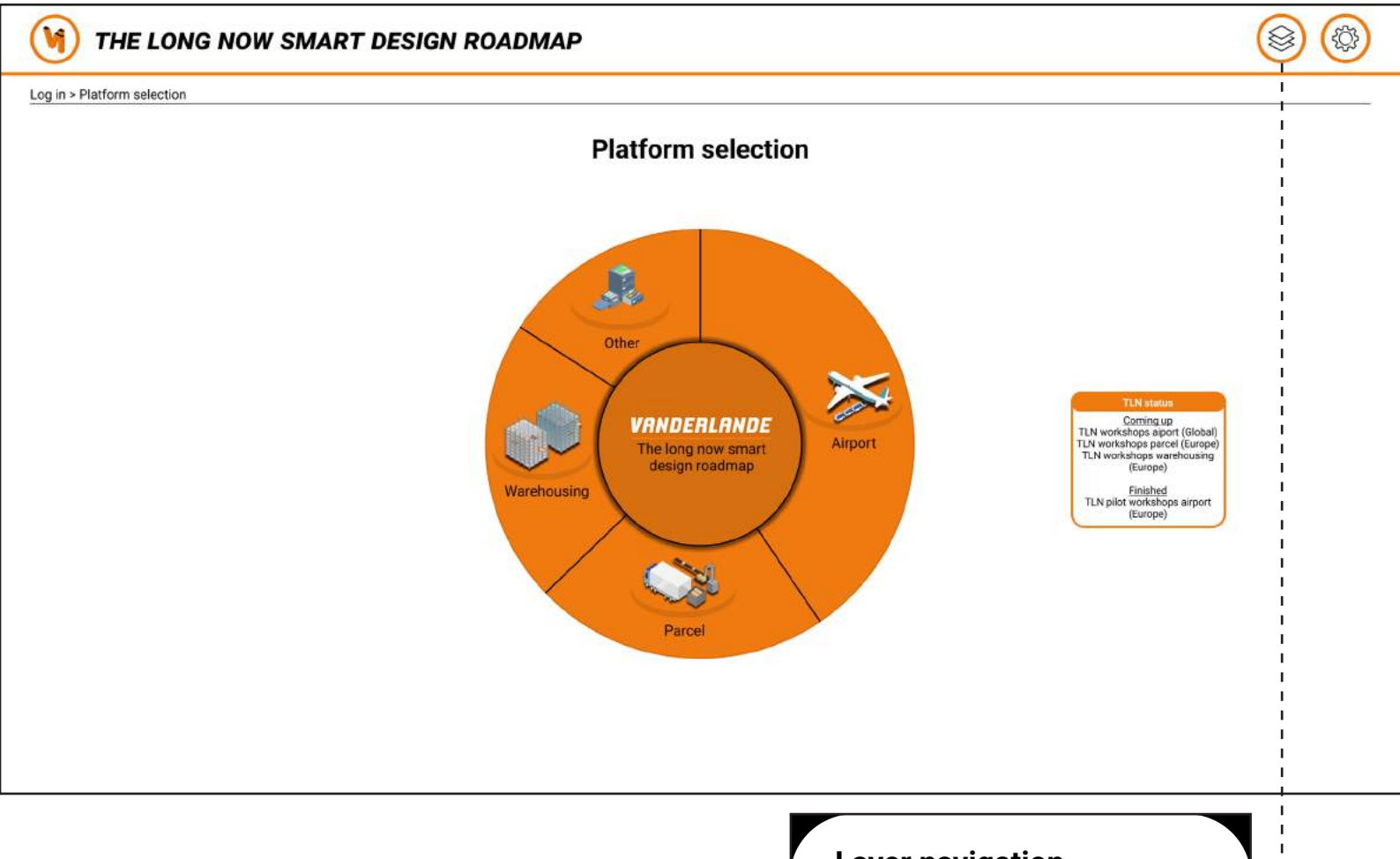
This layer mainly focuses on the challenge of connecting VI with TLN as it explains what de goal of the project is.

Layer focus on this project challenge:

Connecting VI with the LN

Layer 4 - Platform selection

Figure 49,
Platform selection screen included with status update



The platform selection layer in fgure 49, is the first form of a filter in which the user can select the platform they want to explore more of. When hovering over the 5 options the user will see a status update on where they are with TLN project. The reason behind the pie chart like visual is so users can see in one glance how big and thus how far the project is in comparison to the other platforms. For that reason, the airport platform is currently the furthest with the project.

Besides the breadcrums being visual at the top underneath the titel, the pop-up screen in figure 50 will show for a quicker navigation to what you want to see.

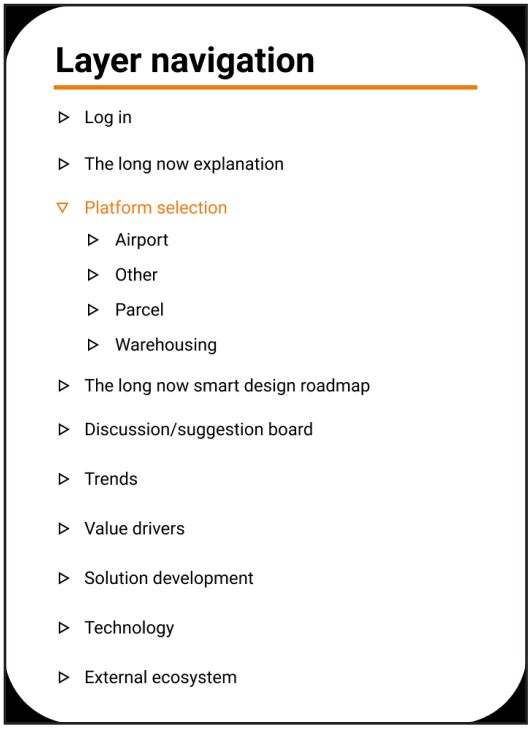
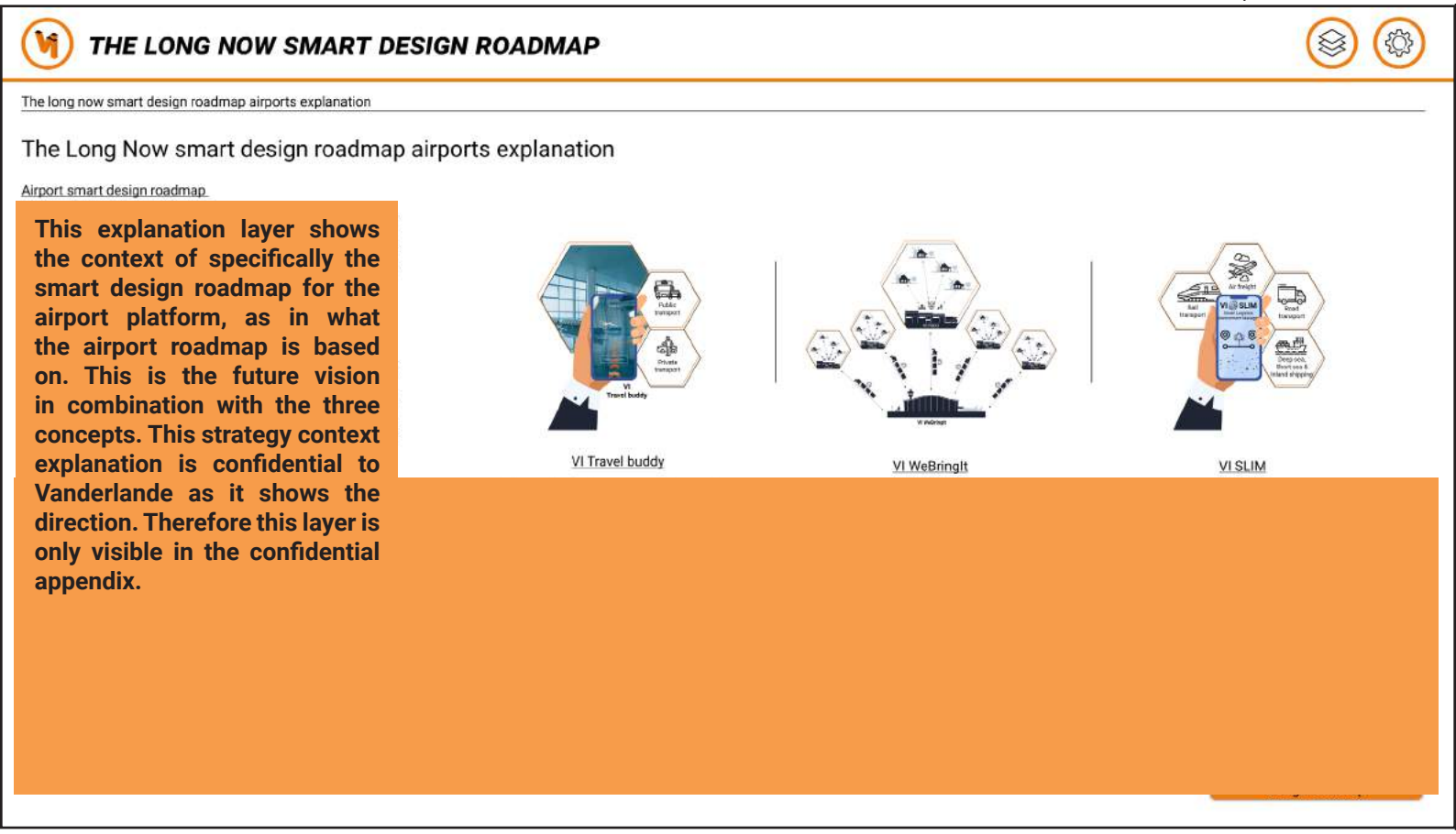


Figure 50,
Pop-up screen where you can quickly navigate to a location

Layer 5 - Context airoprt platform smart design roadmap

Figure 51, TLN airport platform context explanation



The following explanation screen in figure 51 shows the context behind the airport platform smart design roadmap. It mentions the future vision Vanderlande is aiming for in combination with the three concepts on which the entire smart design roadmap is furhter build on.

VI SLIM, VI Travel buddy and VI WeBringIt are the core of the smart design roadmap and state why new innovations, technological developments and partnerships must be formed.

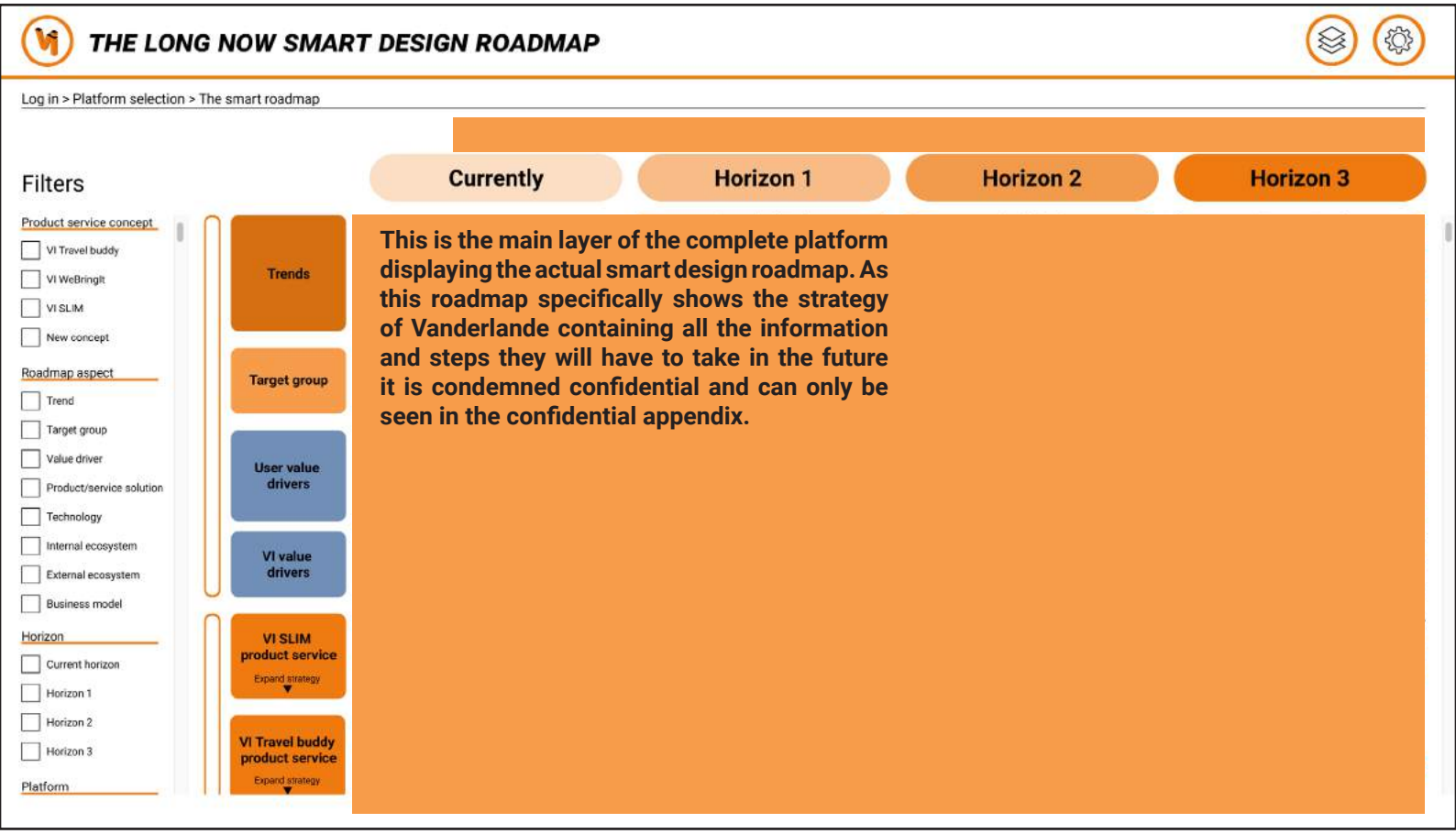
This layer funtions as the final layer of information before you can understand and go through the smart design roadmap.

Layer focus on this challenge

Connecting VI with the LN

Layer 6 - Smart design roadmap

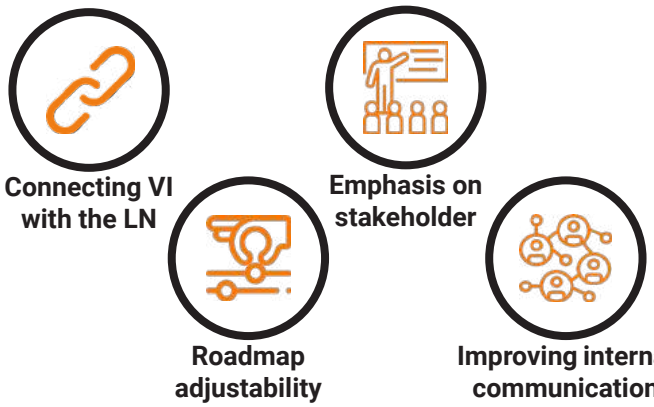
Figure 52,
The smart design roadmap inclusing all aspects. Also known as the home screen



This is the core of the platform and is the screen including the smart design roadmap. This layer of the roadmap consists of all aspects both the strategic and tactical roadmap are merged into one.

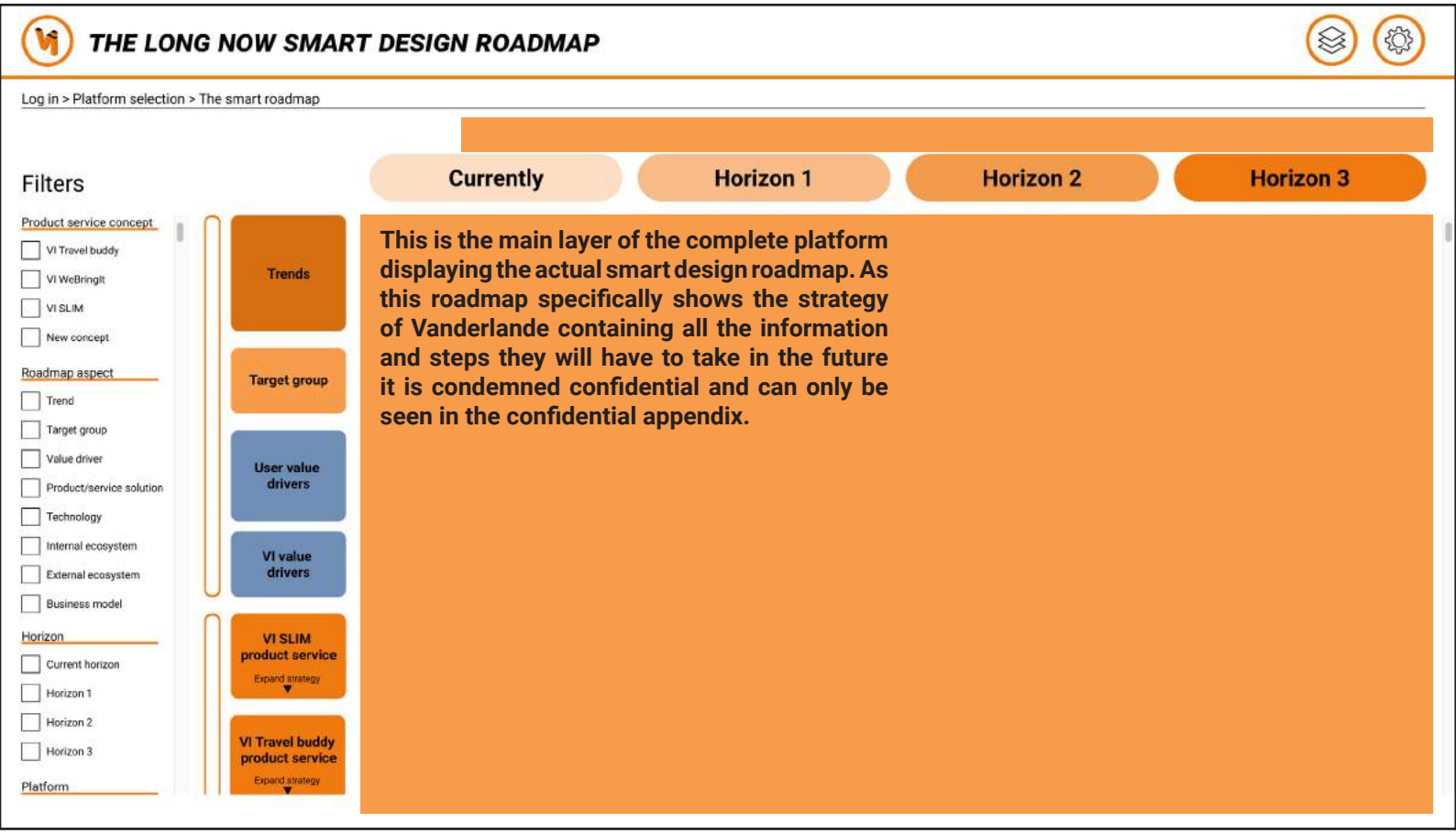
From this screen you can filter out the aspects you would like to see as shown in figure 52 on the far left. On the following pages there will be zoomed into filtered roadmap aspects. Showing what this layer is able to do. The filter options consist of the product service concept, roadmap aspect, horizon and platform. When the workshops will be performed for the other platforms the platforms can be compared to see overlapping technologies and partners for example. Improving the communication within the company.

From this page you will have the ability to select a lot of different layers and smaller applications. You are able to select the roadmap aspects to see more detail, you can select actual parts of the roadmap so you can see who is working on it. And you can expand the strategic roadmaps. So you can see and compare them together but also at the same time only look at the tactical parts when you collapse them. As this being the smart design roadmap it focuses on all four of the challenges:



Layer 6 - Smart design roadmap - focus point

Figure 53,
The smart design roadmap inclusing all aspects. Also known as the home screen

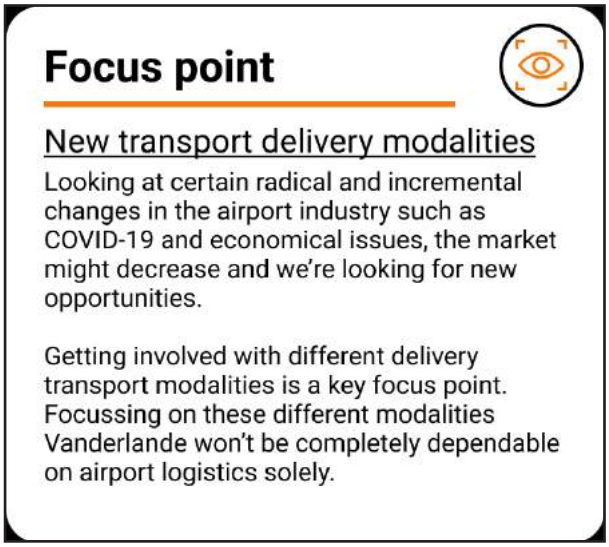


In the strategy of the roadmap icons as seen in figure 54 have been placed showing focuspoints when it comes to radical or incremental changes that differ the market. The focuspoints aim at opportunities when the airport platform market will be reduce again just like with Covid-19.

The focuspoints help tackling the the adjustability to radical changes:

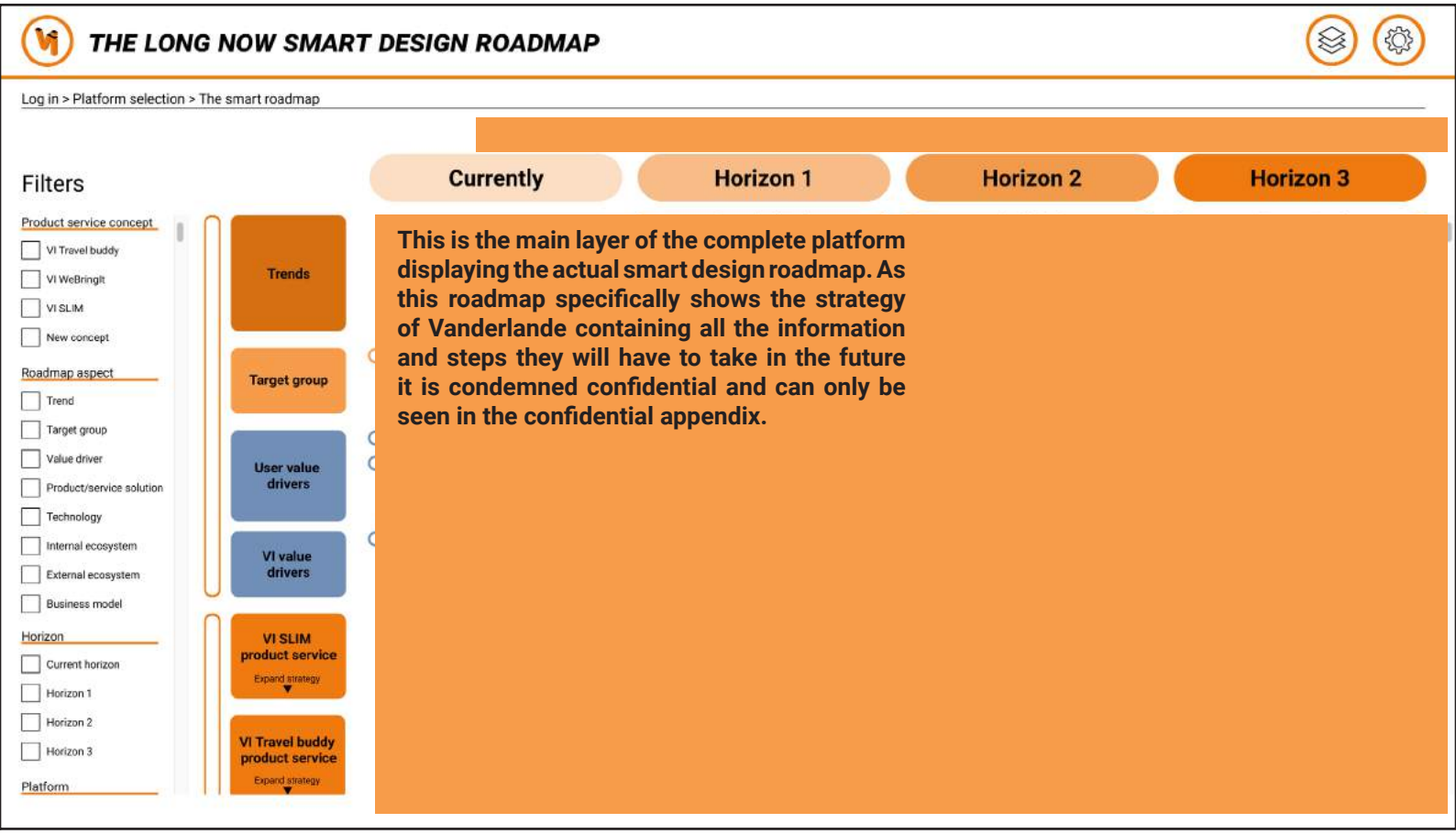
Roadmap adjustability

Figure 54,
Pop -up screen showing focuspoints when radical changes occur



Layer 6 - Smart design roadmap - settings & contact

Figure 55,
The smart design roadmap inclusing all aspects. Also known as the home screen



Other specifications of layer 6 are shown in figure 56. You have a settings list where you can personalise your account in and make suggestions on the next layer.

Roadmap parts can be clicked and will then show the coherent team to that aspect. This way you can easily get in contact with the employees working on that specific part.

These specifications focus on the challenge:

Improving internal communication

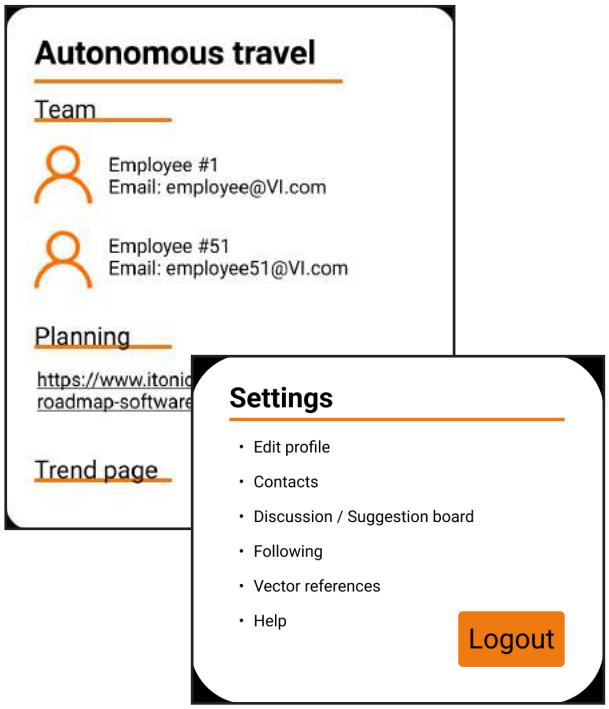
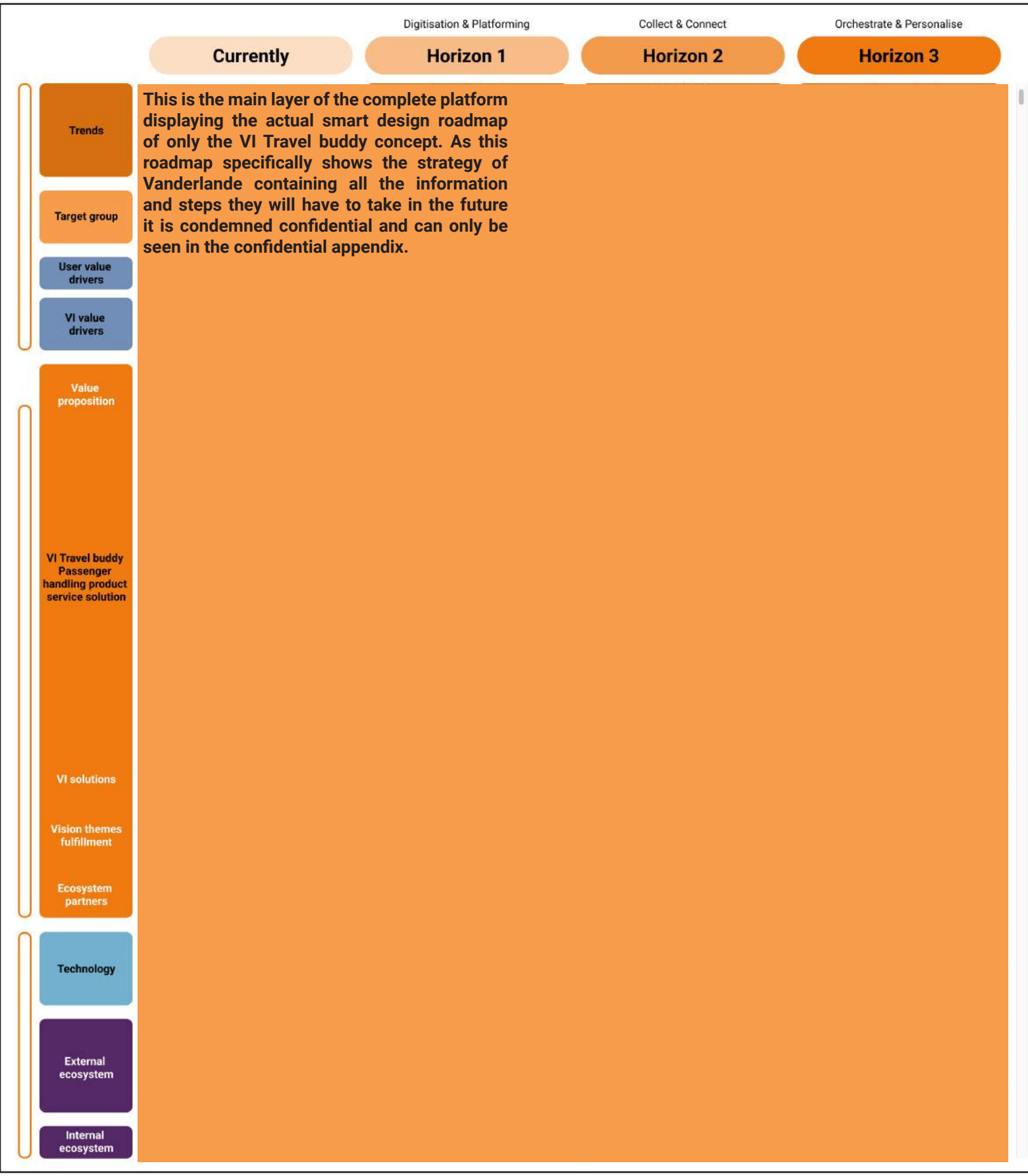


Figure 56,
Two pop up screens, top left showing the contact person and planning link. Bottom right showing the settnings

Layer 6 - Smart design roadmap - VI Travel buddy

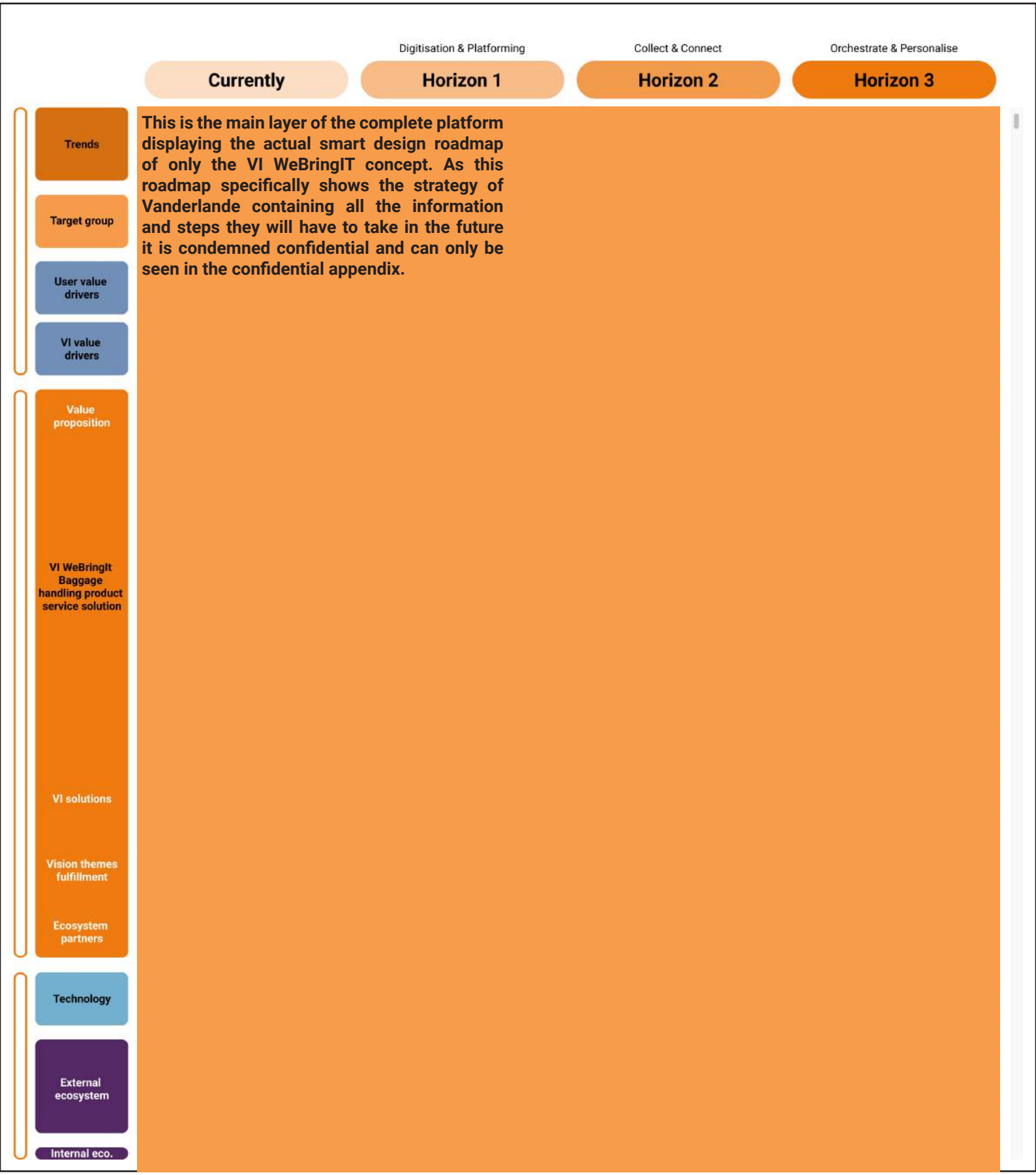
Figure 57,
The smart design roadmap filtered on the VI Travel buddy



This orange block describes the smart design roadmap steps for VI travel buddy that is visually displayed in figure 57. It pinpoints some important aspects as well as the three horizon steps, showing what the concept goes through each horizon. This being the strategy of Vanderlande it is condemned confidential and can only be seen in the confidential appendix.

Layer 6 - Smart design roadmap - VI WeBringIt

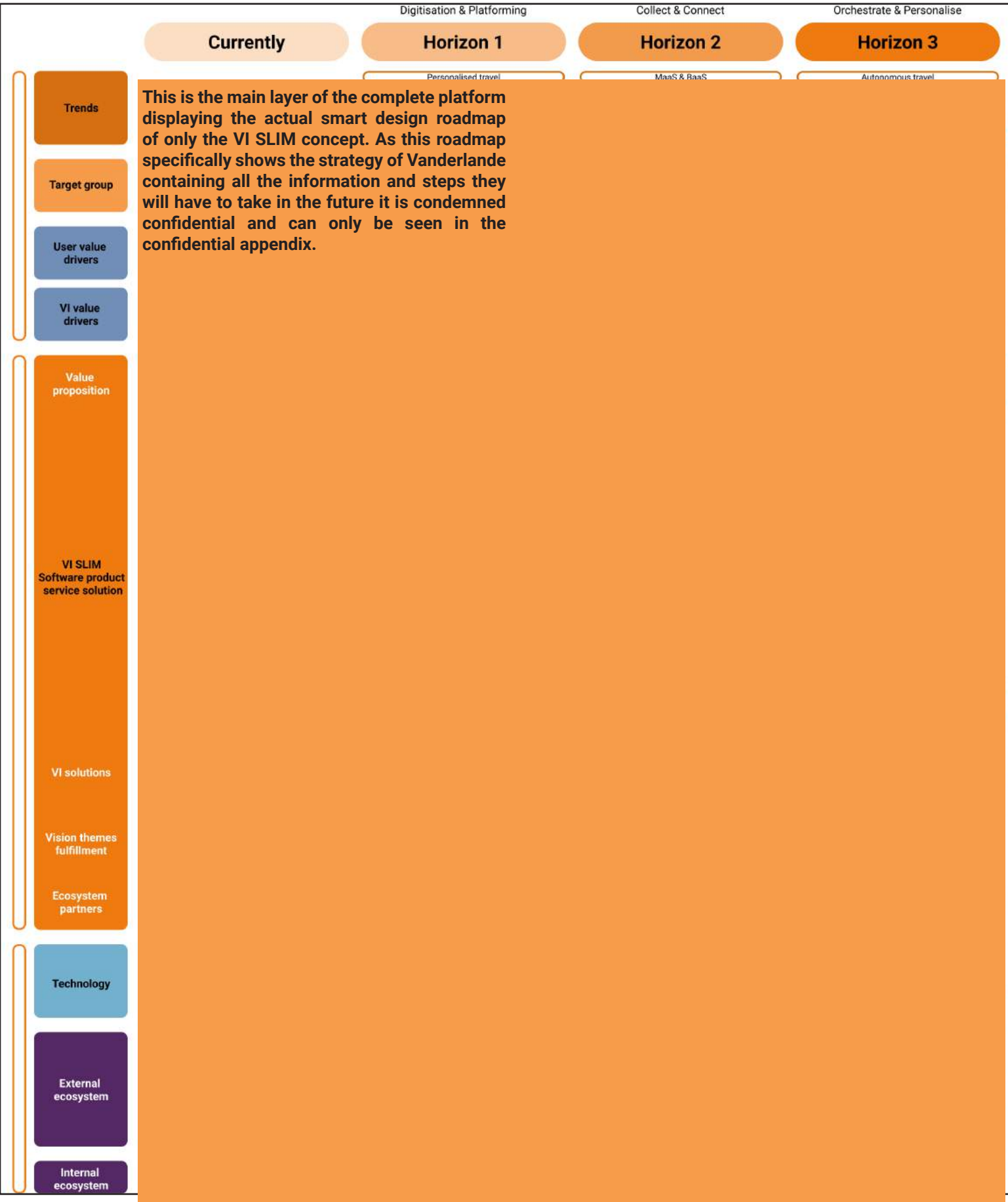
Figure 58,
The smart design roadmap filtered on the VI WeBringIt



This orange block describes the smart design roadmap steps for VI WeBringIt that is visually displayed in figure 58. It pinpoints some important aspects as well as the three horizon steps, showing what the concept goes through each horizon. This being the strategy of Vanderlande it is condemned confidential and can only be seen in the confidential appendix.

Layer 6 - Smart design roadmap - VI SLIM

Figure 59,
The smart design roadmap filtered on the VI SLIM

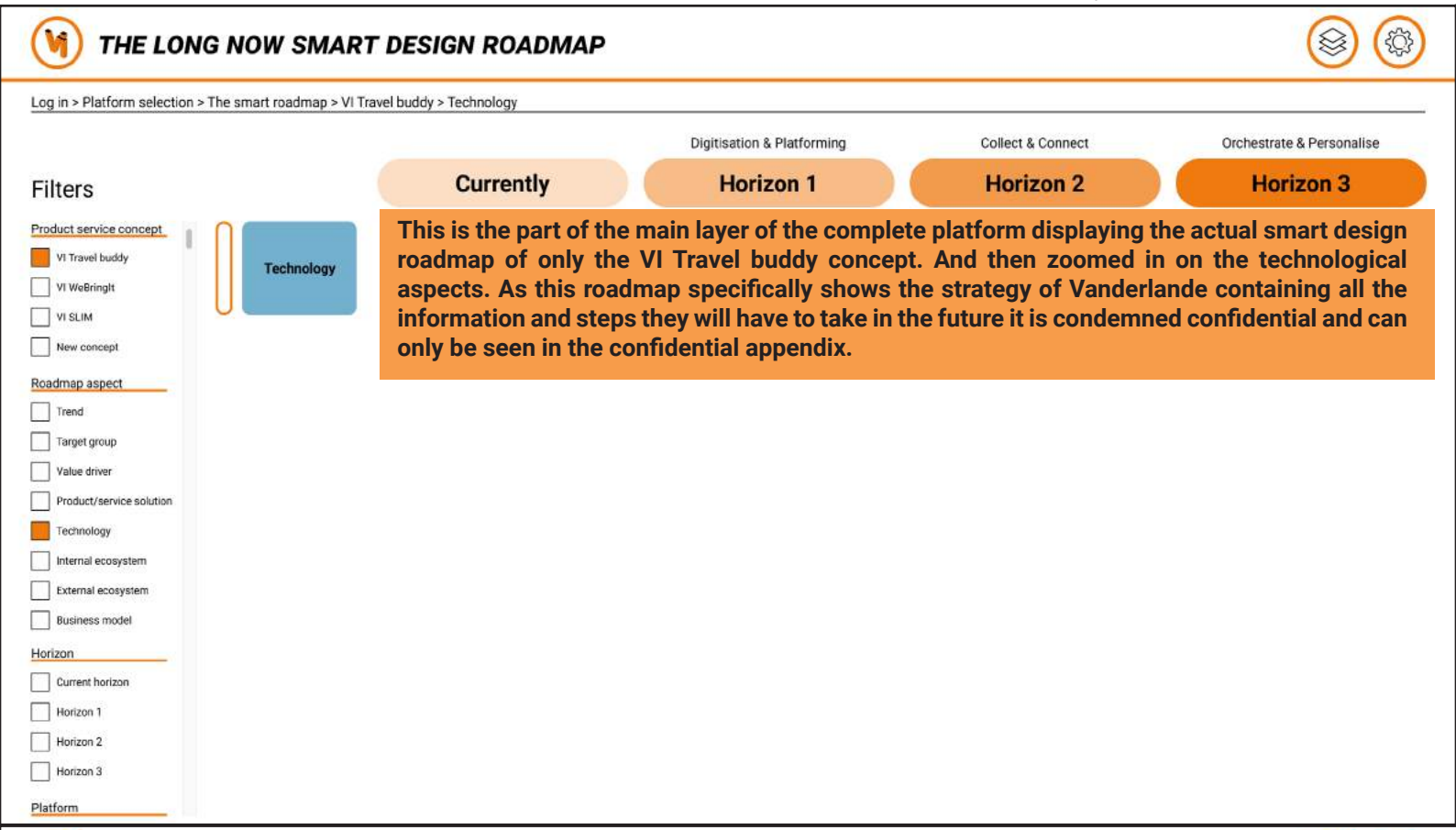


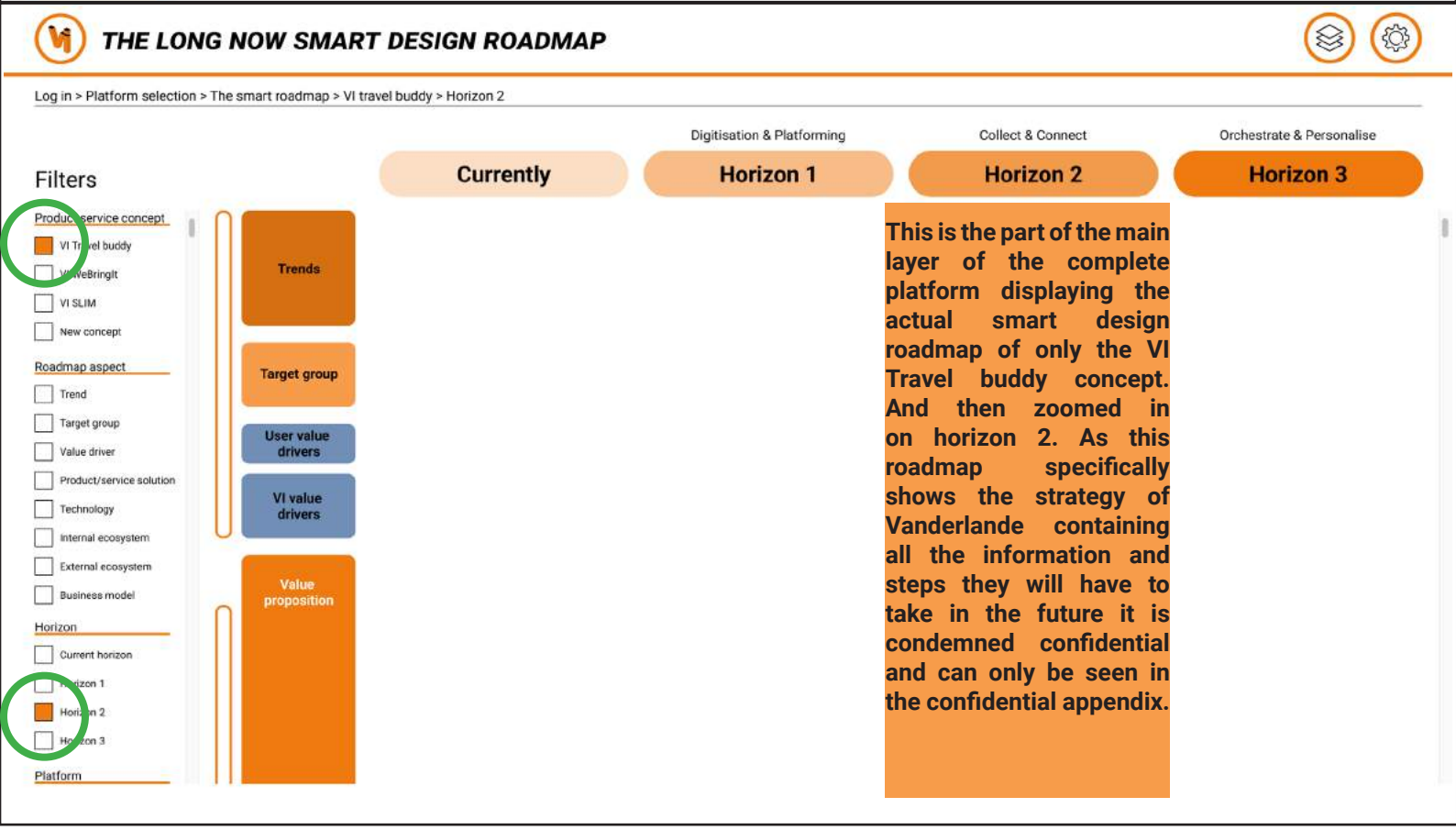
This is the main layer of the complete platform displaying the actual smart design roadmap of only the VI SLIM concept. As this roadmap specifically shows the strategy of Vanderlande containing all the information and steps they will have to take in the future it is condemned confidential and can only be seen in the confidential appendix.

This orange block describes the smart design roadmap steps for VI SLIM that is visually displayed in figure 59. It pinpoints some important aspects as well as the three horizon steps, showing what the concept goes through each horizon. This being the strategy of Vanderlande it is condemned confidential and can only be seen in the confidential appendix.

Layer 6 - Smart design roadmap - technology & horizon 2

Figure 60,
The smart design roadmap. The top filtered on the technology. The bottom on horizon





Layer 7 - Discussion/suggestion board

Figure 61,
The discussion board for employees

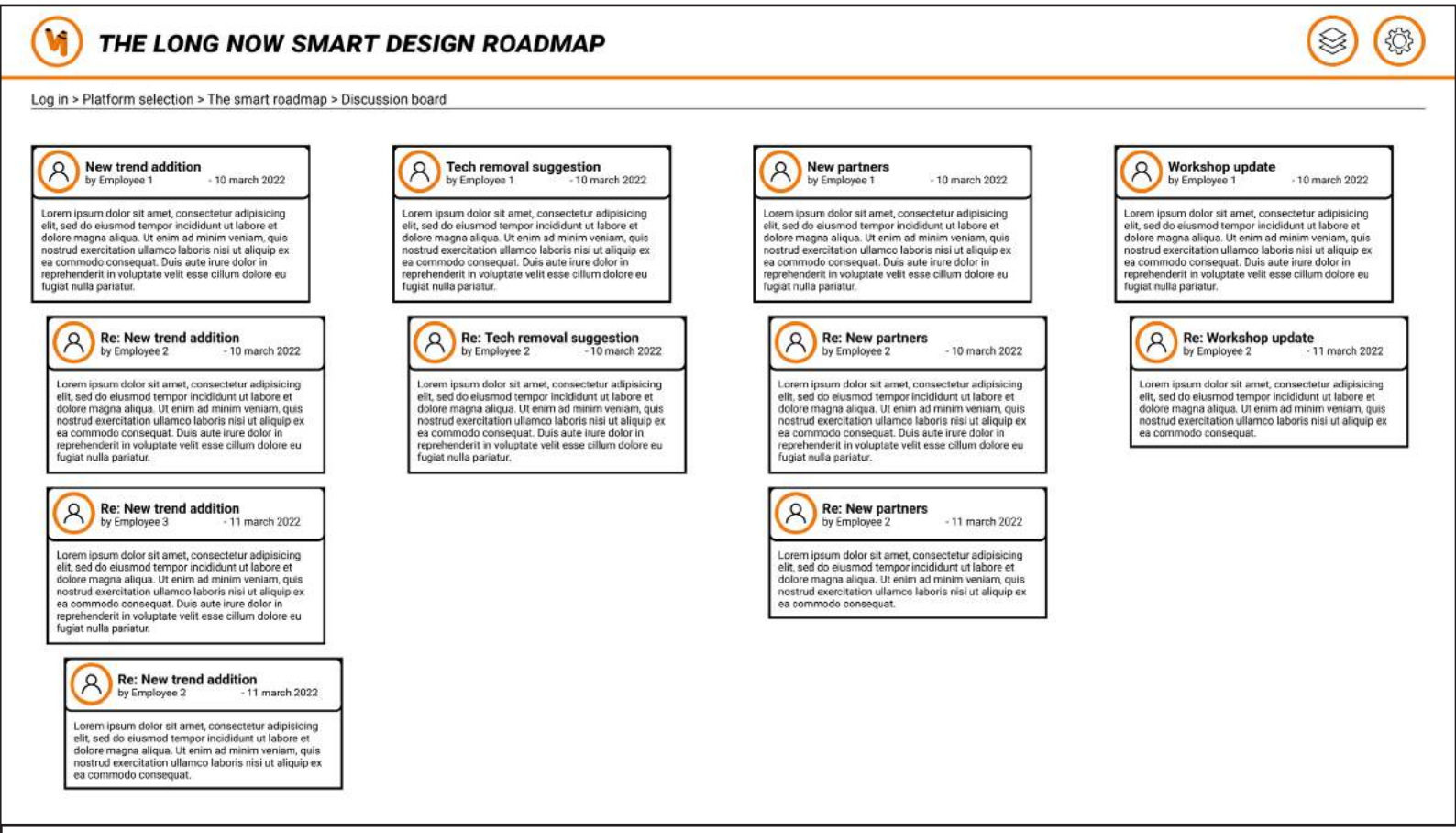


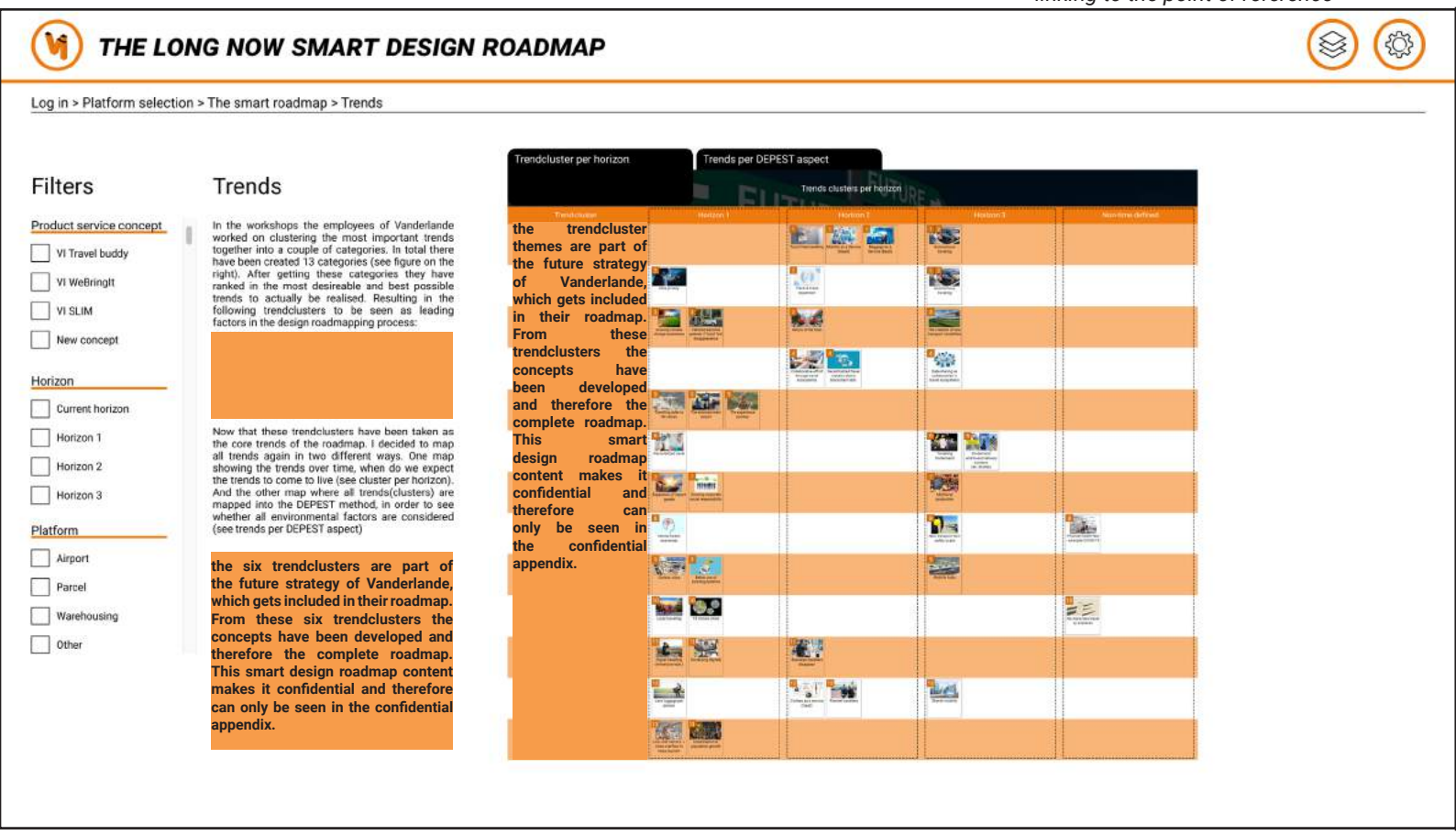
Figure 61 shows a suggestion/discussion board to activate employees their brains about the roadmap rather than just following it. Actually being able to adjust the roadmap and add or remove certain aspects is too much of a risk for mistakes and removing the entire platform for example. That is why I decided to create a board where people are able to suggest new opportunities and threats, which come out of their research. Which later on can be realised into the smart design roadmap by the manager of the platform.

The challenges focus with the discussion board lies with the imporvement of communication:

Improving internal communication

Layer 8 - Trends

Figure 62,
The trends inclusive with a trendcard, linking to the point of reference



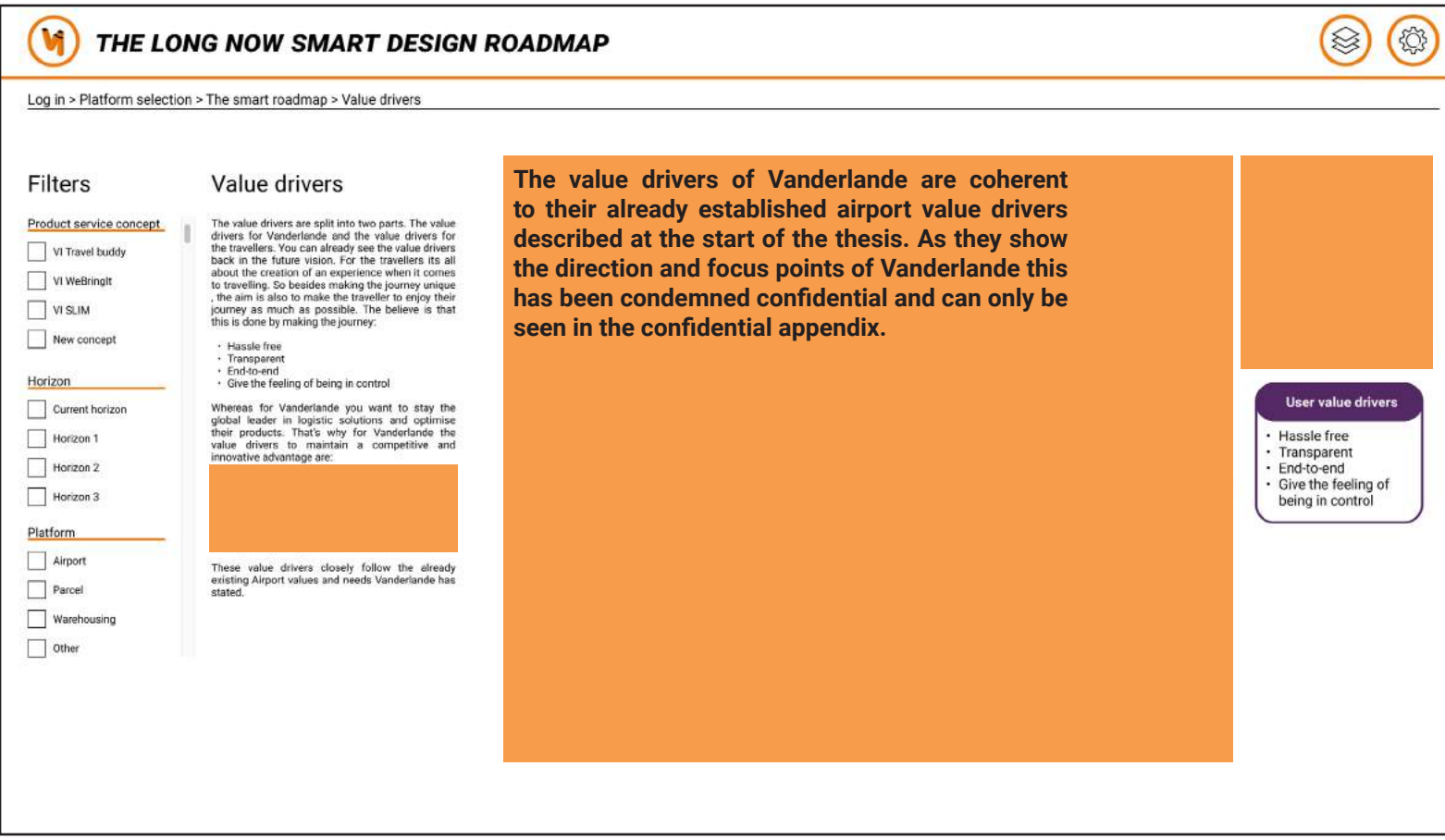
The trend layer as shown in figure 62 gives more detail. and showcases the trendclusters. that are formed around the product service concepts.

As an additional feature you can select a trendcard and click the reference link, which will take you to the source of the trend. This way people can check where it comes from.See figure 63.

Figure 63,
Detailed description of a trend card

Layer 9 - Value drivers

Figure 64,
The value drivers reflected back on airport value by VI



The value drivers that were represented in the smart design roadmap layer have been reflected back to the airport values that were already stated by Vanderlande. In figure 64 you can see how the value drivers of the TLN concepts closely follow the already existing value drivers.

This layer focus lies on emphasizing the stakeholders and their values.

Emphasis on stakeholder

Layer 10 - Solution development

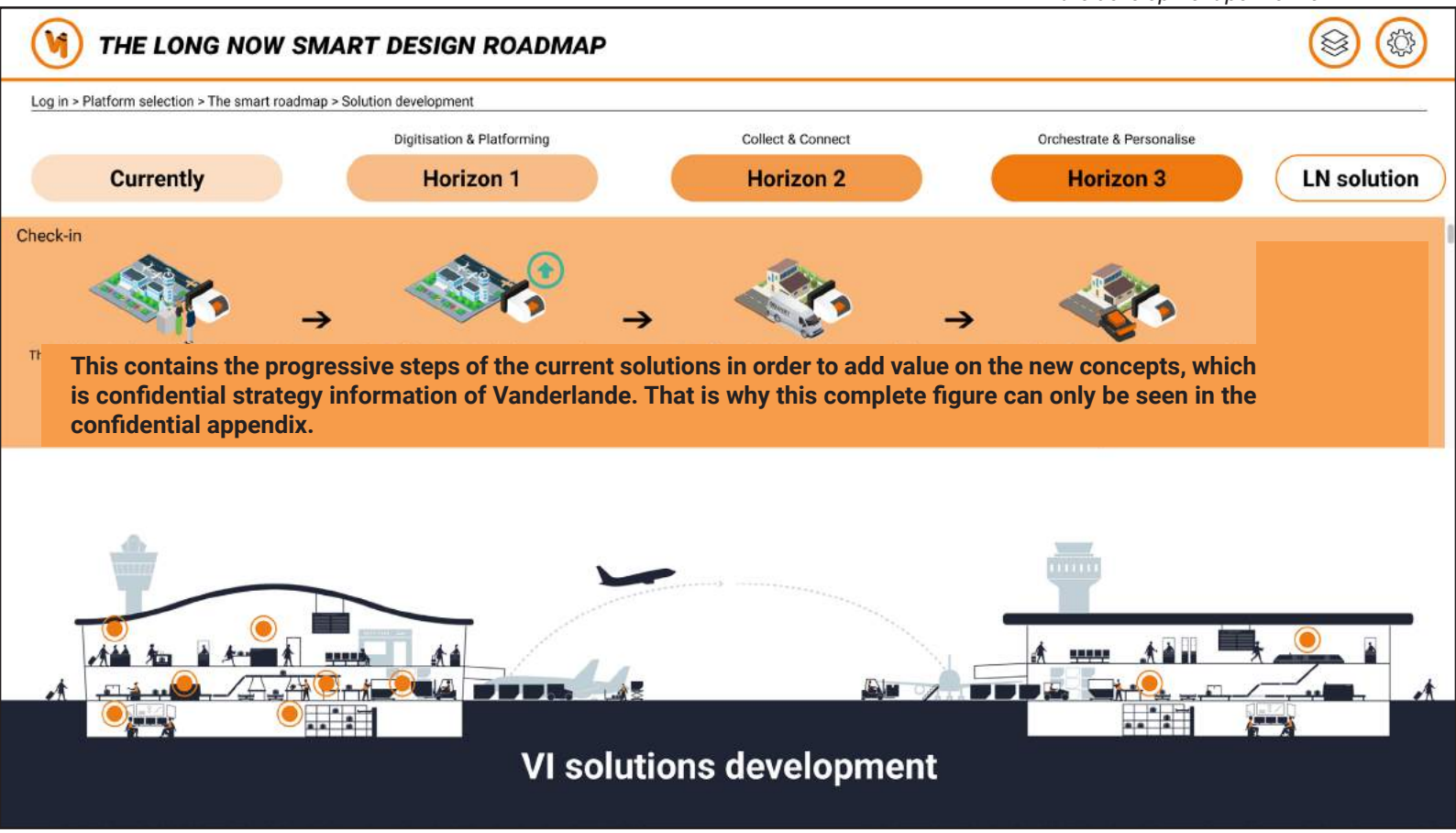


Figure 65,
The solution development screen, showing the development per horizon

This layer contains a detailed description of the solution development of the existing solutions and how they can transform to the new TLN product service concepts. Every single product from the portfolio and the coherent module are also described in case you want to have a quick check.

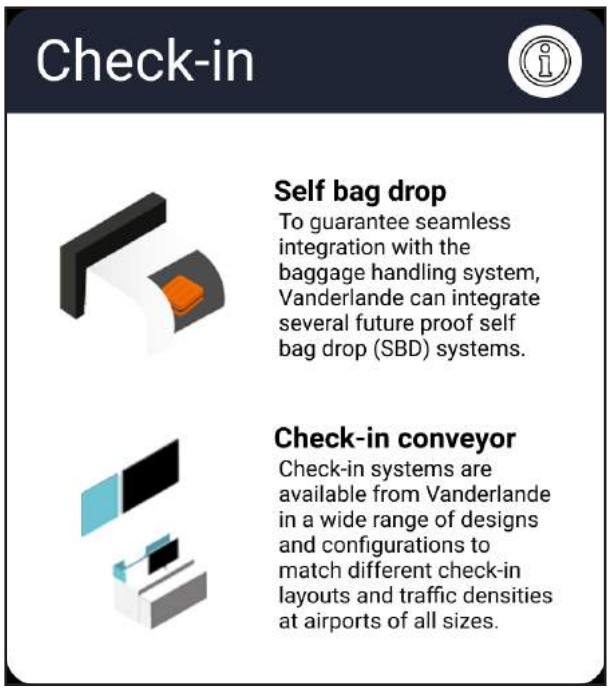
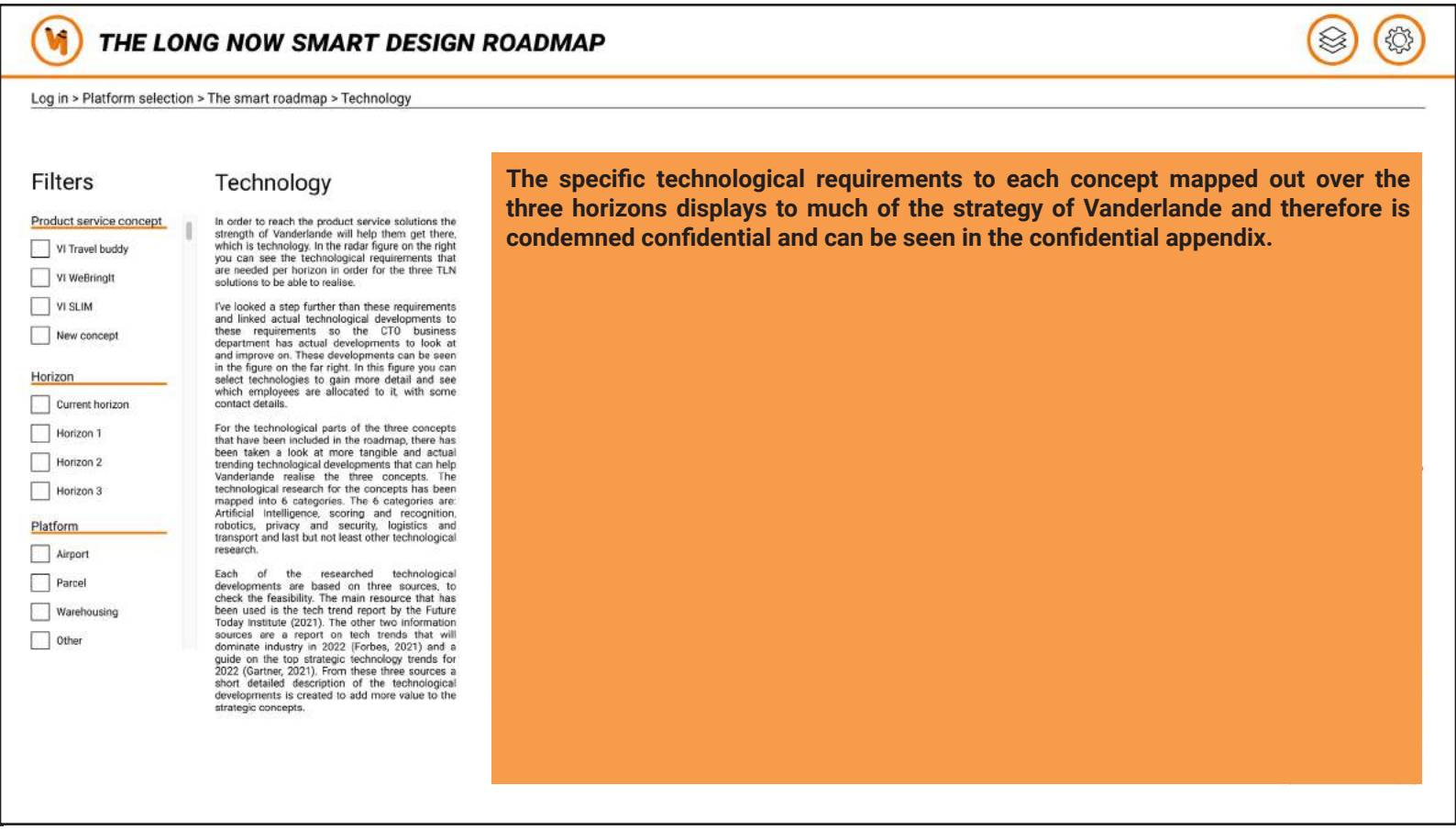


Figure 66,
The solution development, showing the specific solutions.

Layer 11 - Technology

Figure 67,
Technological development screen showing both detail and contact persons



What technologies are in the roadmap has already been described in the chapter smart design roadmap creation in paragraph object modelling - scope. The extra feature however is the ability to see who is allocate to each individual technology as can be seen in figure 68.

Layer focus on challenge:

Improving internal communication

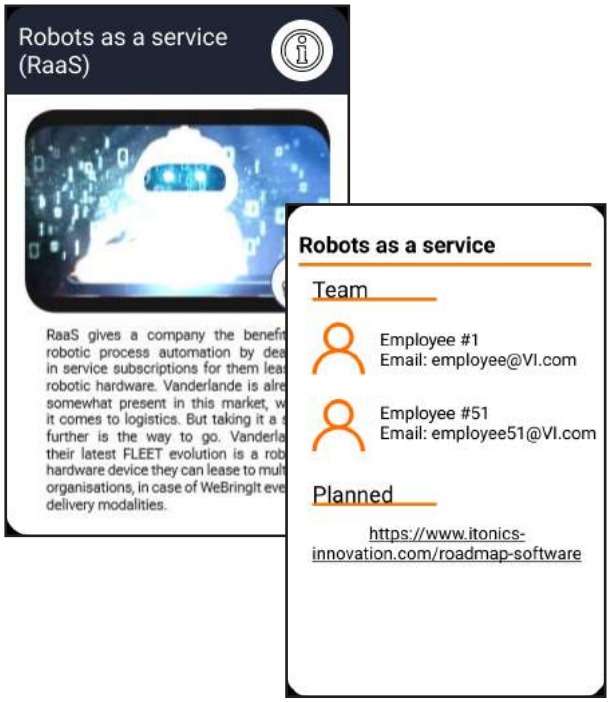
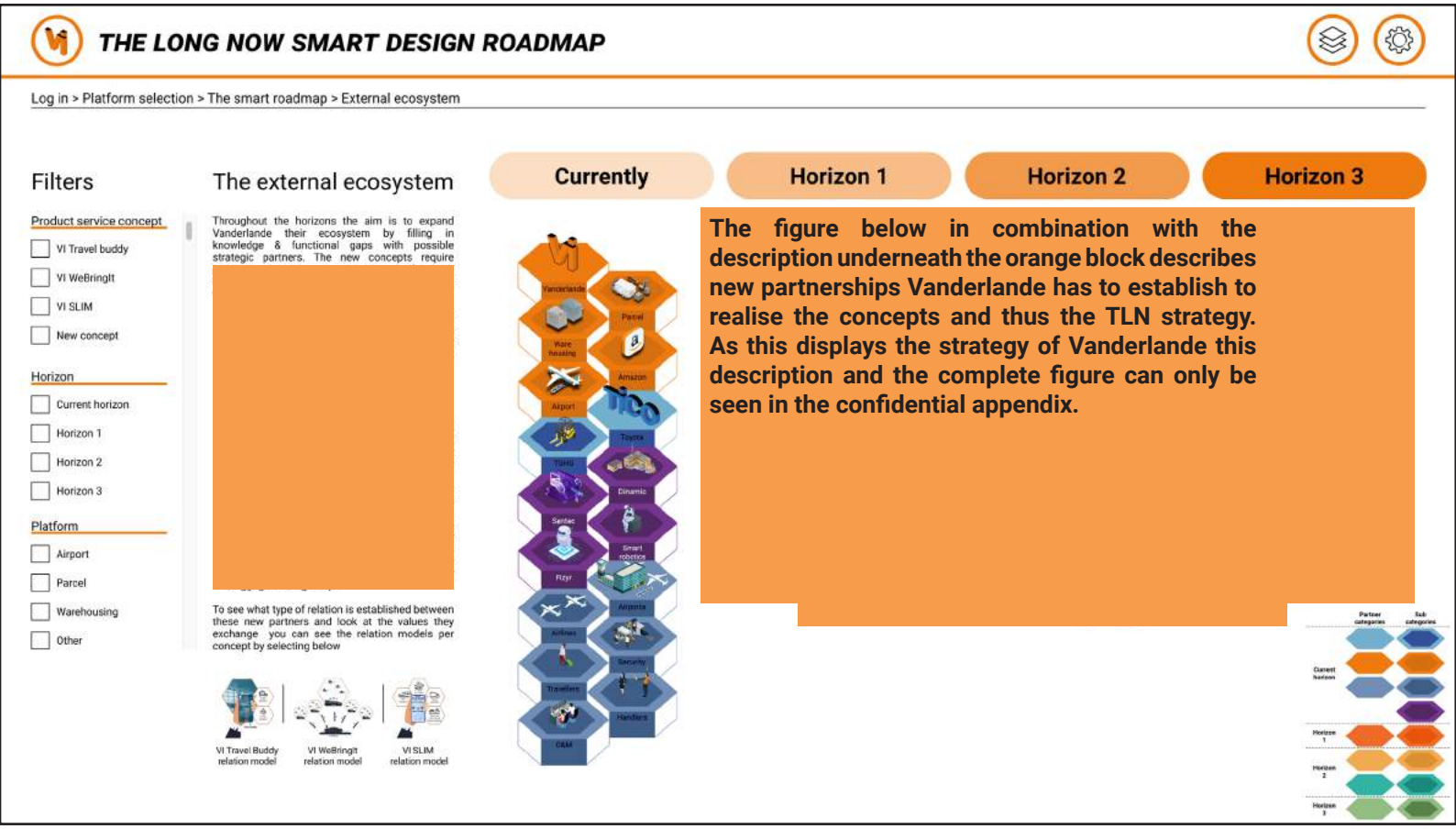


Figure 68,
Pop-up screen for technology contacts and detail.

Layer 12 - External ecosystem

Figure 69,
The external ecosystem, which shows the acquirements per horizon



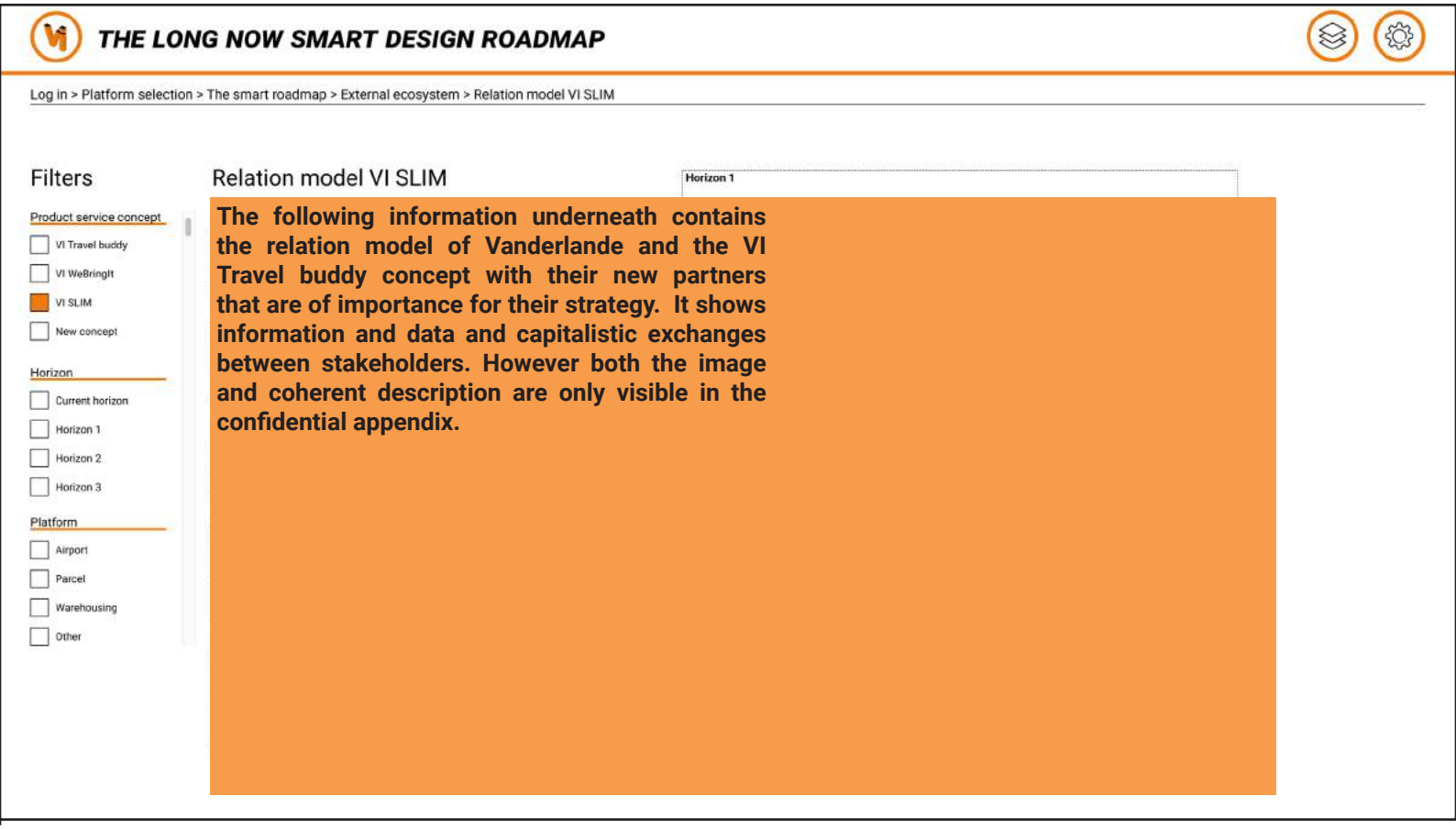
The external ecosystem layer as seen in fgure 69 does not have any special features other than giving a detailed description and being able to filter which partners are important for which new product service concept.

Layer focus on challenge:

Emphasis on stakeholder

Layer 12 - External ecosystem - relation model

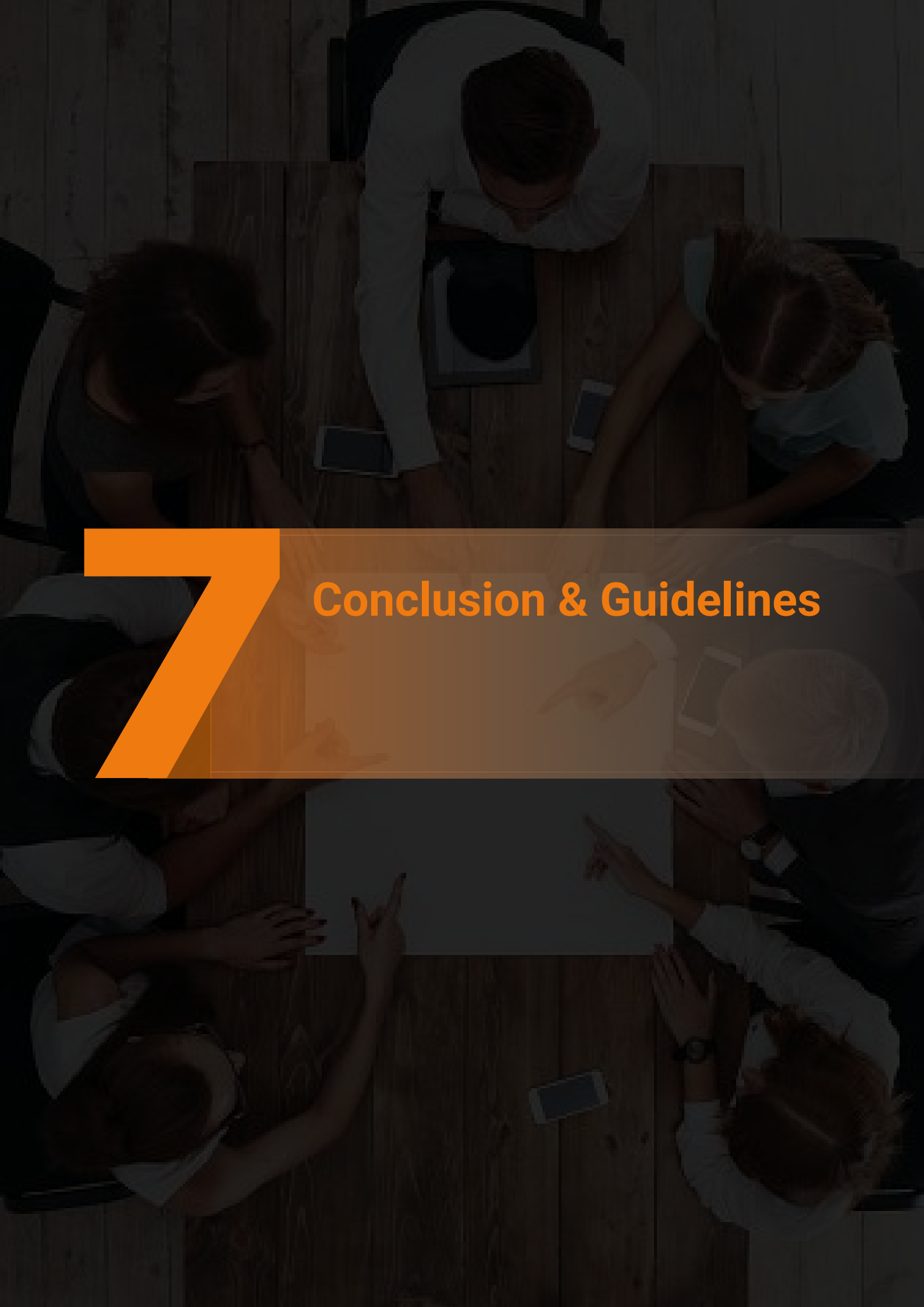
Figure 70,
The relation model for a specific product solution concept, in this case VI SLIM



The relation models of all new product service concepts put a lot of emphasis on the importance of expanding the travel logistic ecosystem Vanderlande is currently in.

Layer focus on challenge:

Emphasis on stakeholder



7 Conclusion & Guidelines

Conclusion

The main research question of this master thesis was: “How to create a smart platform showcasing a design strategy roadmap which has the ability to internally align a company?”. After performing research on finding a suitable design strategy to answer this question and testing this design strategy on TLN project of Vanderlande. I can conclude that a combination of the user-centered website design method (WSDM) (Troyer & Leune, 1998) and the elements of user experience model (Garrett, 2002) make it able to create a set of 6 steps that make it able to develop a smart design roadmap, which can internally align a company.

When performing the set of 6 steps to get from your standard design roadmap to a smart design roadmap, all four challenges that were stated will be tackled.

The first challenge that has been tackled was connecting TLN with Vanderlande Industries. By visualising clear detailed steps in terms of the development of the new product service solutions over the horizons, partnerships they have to establish and technologies they have to develop. Creating all three of these detailed bridges a connection has been established which made the new product service solutions way more tangible and less far away.

Secondly, the smart design roadmap improved the internal company communication by creating layers such as a suggestion board as well as linking employees to specific roadmap parts and aspects. Sharing their contact information with one click, everyone is easily able to contact eachother.

By making the smart design roadmap in an software platform that can at all times be changed. The adjustability of the smart design roadmap has been taken care of as well. Within the platform a manager of the smart design roadmap can change the aspects and parts of the roadmap at all time. I even highlighted some specific parts which in my eye are focuspoints as they will not be dependable on radical changes.

The final challenge that has been tackled by performing the six steps to creating a smart design roadmap is emphasizing new stakeholder values. For the new product service solutions of the TLN a couple of new partnerships have to be formed. By creating a relation model for each individual concept, there will be showcased on what benefits each stakeholders has on the new partnership. Expanding the logistic travel ecosystem.

So with this design strategy, consisting of six steps combining web design and user experience, a smart design roadmap can be developed which creates an optimistic future vision for the company and has the ability to internally align the company at the same time.

Set of guidelines

The conclusion shows that the design strategy, which consists of a set of six steps has the ability to develop a smart design roadmap from a standard design roadmap. I've translated the six design strategy steps from Troyer & Leune (1998) and Garrett (2002) into a set of guidelines that have to be performed to create the smart design roadmap.

Step 1 - User classification
Starting with user classification, in which you look for the end-user of your smart design roadmap. This can be a group of people or a single person depending on your project.

Step 2 - User class description
This step is taking a look at the specific user needs and product objectives. The objectives already include the challenges that come with the development of a smart design roadmap. The challenges being: connecting the new product service solutions to the company, improving internal company communication, emphasize stakeholder values and making the roadmap adjustable. These challenges can function somewhat as a measurement tool. If the smart design roadmap doesn't tackle the challenges it will have to adjusted.

Step 3 - Object modelling - scope
Object modelling of the scope consists of two parts. First creating a list of functional requirements, which the smart design roadmap must be able to perform. Secondly you look at what content must be integrated in the smart design roadmap. Due to the methods of Lianne Simonse (2018). The smart design roadmap should at least contain the following eight aspects:
• trends
• value drivers
• future vision
• product service solution
• technology
• solution development
• external ecosystem
• the relation model

Step 4 - Object modelling - structure
To model the structure of the roadmap you'll have to model the complete platform containing all its layers and you have to model the structure of all layers seperately. So there are two types of structure you must determine.

For the structure of the complete platform of the smart design roadmap, you'll have to make all layers being returnable to the actual smart design roadmap layer.
And for the smart design roadmap layer you want to make sure it contains a filter, aspect, horizon and title section.

Step 5 - Navigational design
Navigational design aims at the flow through the layer. How are you moving from one layer to the other. What buttons can you press. This is best to be done with a flowchart on how you want to move through the layers.

Step 6 - Implementation design
The final step of the guideline is giving the look and feel to the smart design roadmap. What platform fits best with the company you're creating the smart design roadmap for.You can look for the right platform by filling in a matrix. And according to research the platform matrix should at least contain the following three features: adjustability, connectivity and accesibility.

Now that you have performed the six steps it becomes an iterative process on checking whether your developed smart design roadmap actually fulfills all needs and gains the right attention.

8 Recommendations

Recommendations

The following recommendations are aimed towards the TLN team at Vanderlande as they will keep going with this project and keep pushing the implementation of strategic design withinthe company forward. Knowing Vanderlande as a company is still to be convinced in accepting design within their company I still think the recommendations can be of use. The recommendations are divided into the validation of the TLN airport result, the validation of the smart design roadmap, integrating the internal ecosystem and finally team expansion.

Validation of the TLN airport workshop results
Before my arrival at Vanderlande the set of workshops had been conducted. What is quite noticable is that the workshops have been performed completely within Vanderlande. And although they used employees from different departments a validation workshop with stakeholders outside Vanderlande can be usefull to make sure the results aren't biased. Especially as Vanderlande is a B2B providing company, checking with airports whether they see potential in the future vision and its coherent concepts can only strengthen your point.

Validation of the smart design roadmap
I've eventually only been able to conduct a final iterative workshop, but my final design has never been completely validated. Therefore I recommend taking a final look at where the smart design roadmap is now, before the team continues with performing the TLN workshops for airport global and warehousing platform.

Integrating the internal ecosystem
Although we are only at the start of this project, starting to take a look at what teams there have to be formed to realise the future vision and its new concepts is important. As right now this part of the smart design roadmap is almost missing. I think by creating teams you get more of a feel on who is doing what for the realisation of the concepts. And you can strengthen the project to the board even more. From this points you can also start looking at costs and possible outcomes.

Team expansion
The team of TLN consists of some amazing people with a real drive for the project, however it is only 4 people as of now. And from these four nobody is working full time on this specific project, but everyone is having other projects on the side. In my opinion to make sure this project gets continued I would grow the team with some more people so you know that there will be worked on the project every day.

9 References

References

Beaird, J. & George, J. (2014). THE PRINCIPLES OF BEAUTIFUL WEB DESIGN

Bhaskar, Uday & Naidu, P. & Babu, S.R. & P.Govindarajulu,. (2011). Principles of Good Screen Design in Websites. International Journal of Human Computer Interaction. 2. 48-57.

Blackwell, Alan & Phaal, Robert & Eppler, Martin & Crilly, Nathan. (2008). Strategy Roadmaps: New Forms, New Practices. 5223. 127-140. 10.1007/978-3-540-87730-1_14.

British design council (2022). What is the framework for innovation? Design Council's evolved Double Diamond. https://www.designcouncil.org.uk/news-opinion/what-framework-innovation-design-councils-evolved-double-diamond

Erlich, N. (2021). Why the dynamic product roadmap is changing the game. https://craft.io/templates/dynamic-product-roadmap-changing-the-game.html

Forbes council member. (2021). 16 Experts Predict The Tech Trends That Will Dominate Industry In 2022. https://www.forbes.com/sites/forbestechcouncil/2021/10/15/16-experts-predict-the-tech-trends-that-will-dominate-industry-in-2022/?sh=4c07b5c64806

Future todat institute. (2022). 2022 Tech trends report https://futuretodayinstitute.com/

Garrett, J.J. (2002). The Elements of User Experience: User-Centered Design for the Web.

Gartner. (2022). Gartner Top Strategic Technology Trends for 2022. https://www.gartner.com/en/information-technology/insights/top-technology-trends

Gross, T. (2014). Human-Computer Interaction Education and Diversity. In: Kurosu, M. (eds) Human-Computer Interaction. Theories, Methods, and Tools. HCI 2014. Lecture Notes in Computer Science, vol 8510. Springer, Cham. https://doi.org/10.1007/978-3-319-07233-3_18

Lazar, J. (2006) Web usability: a user-centered design approach by Jonathan Lazar (2006). Universal Access in the Information Society 6(1):115-115. DOI: 10.1007/s10209-007-0073-0

Phaal, R., Farrukh, C. J., & Probert, D. R. (2004). Technology roadmapping—a planning framework for evolution and revolution. Technological forecasting and social change, 71(1-2), 5-26.

Phaal, R., Farrukh, C. J. P., & Probert, D. R. (2007). Strategic Roadmapping: A Workshop-based Approach for Identifying and Exploring Strategic Issues and Opportunities. Engineering Management Journal, 19(1), 3–12. doi:10.1080/10429247.2007.11431716

Simonse, L.W.L. (2018). Design Roadmapping. BIS Publishers.

Troyer, O.M.F. & Leune, C.J. (1998).WSDM: a user centered design method for Web sites, Computer Networks and ISDN Systems, Volume 30, Issues 1–7,1998, Pages 85-94, ISSN 0169-7552, https://doi.org/10.1016/S0169-7552(98)00042-7.

Vanderlande Industries B.V. (2021). Company profile. https://www.vanderlande.com/about-vanderlande/company-profile/

Vanderlande Industries B.V. (2021, April 21). Partner in Airport solutions | Vanderlande industries. Vanderlande. https://www.vanderlande.com/airports/

Vanderlande Industries B.V. (2020). VANDERLANDE STRATEGY 2026. https://vikipedia.vanderlande.com/download/attachments/857840119/VANDERLANDE_STRATEGY%202026%20-%20VIKIPEDIA%20%281%29.pdf?api=v2

Vikipedia (2021). Market Home Airports . Vanderlande. https://vikipedia.vanderlande.com

Vector & Icon references

From current solutions to future solutions file

1. Inside airport vectors People vector created by macrovector - www.freepik.com
2. Airport Car vector created by macrovector - www.freepik.com
3. Home City vector created by macrovector - www.freepik.com
4. Airport monitoring Background vector created by macrovector - www.freepik.com
5. Software Technology vector created by upklyak - www.freepik.com
6. Software as a service Technology vector created by upklyak - www.freepik.com
7. Software monitoring People vector created by upklyak - www.freepik.com
8. Van -Car vector created by upklyak - www.freepik.com
9. Phone Technology vector created by pikisuperstar - www.freepik.com

Smart design roadmap creation file

10. Connectivity People vector created by pch.vector - www.freepik.com
11. Accessibility People vector created by pch.vector - www.freepik.com
12. Adjustability Computer vector created by vectorjuice - www.freepik.com
13. Creating value Business vector created by vectorjuice - www.freepik.com
14. Collecting Infographic vector created by vectorjuice - www.freepik.com
15. Presenting People vector created by pch.vector - www.freepik.com
16. Maintaining Cartoon vector created by vectorjuice - www.freepik.com

Smart design roadmap platform

17. Iso. Warehouse Business vector created by macrovector - www.freepik.com

Horizon roadmap image

18. Escalator Abstract vector created by macrovector - www.freepik.com
19. Airport Isometric Airport Vectors by Vecteezy
20. Phone Isometric City Vectors by Vecteezy
21. Public transport Train 3d Vectors by Vecteezy
22. Bus Isometric Bus Vectors by Vecteezy
23. Modality hub 3d Vectors by Vecteezy

Ecosystem document

24. AI Technology vector created by macrovector - www.freepik.com
25. Smart robotics Background vector created by macrovector - www.freepik.com
26. Dinamic Technology vector created by macrovector - www.freepik.com
27. O&M Travel vector created by macrovector - www.freepik.com
28. Travel agency Texture vector created by macrovector - www.freepik.com
29. AR Technology vector created by pikisuperstar - www.freepik.com
30. AR devices Background vector created by macrovector - www.freepik.com
31. Public transport Infographic vector created by macrovector - www.freepik.com
32. Transport Business vector created by macrovector - www.freepik.com
33. Delivery Car vector created by macrovector - www.freepik.com
34. LMD Cartoon Vectors by Vecteezy

Horizon roadmap main page images

35. Resources Woman vector created by upklyak - www.freepik.com
36. Context Technology vector created by macrovector - www.freepik.com

VI WEBRING IT figures + 2D

37. Warehouse Abstract vector created by macrovector - www.freepik.com
38. House Tree vector created by macrovector - www.freepik.com
39. Airport Car vector created by macrovector - www.freepik.com
40. Warehouse 2d Banner vector created by macrovector - www.freepik.com
41. Drone Icons made by Pixel perfect from www.flaticon.com

VI SLIM

42. Holding phone Technology vector created by pch.vector - www.freepik.com
43. End to end Icons made by -Kiranshastry from www.flaticon.com
44. Baggage Icons made by Good Ware from www.flaticon.com
45. Logistics Icons made by Nhor Phai from www.flaticon.com
46. Air transport Icons made by surang from www.flaticon.com
47. Road transport Icons made by monkik from www.flaticon.com
48. Rail transport Icons made by BZZRINCANTATION from www.flaticon.com
49. Water transport Icons made by Freepik from www.flaticon.com
50. Freight ship Business vector created by macrovector - www.freepik.com
51. Travel agencies Banner vector created by macrovector - www.freepik.com
52. Data transfer Icons made by Stockio from www.flaticon.com
53. Data transfer iso Web Vectors by Vecteezy

VI Travel Buddy

54. Holding phone Technology vector created by pch.vector - www.freepik.com
55. Private transport Icons made by mangsaabguru from www.flaticon.com
56. Public transport Icons made by xnimrodx from www.flaticon.com

Airport stakeholders

57. Airport Icons made by Freepik from www.flaticon.com
58. Airline Icons made by netscript from www.flaticon.com
59. Passenger Icons made by Freepik from www.flaticon.com
60. Security Icons made by Eucalyp from www.flaticon.com
61. Handlers Icons made by turkkub from www.flaticon.com
62. O&M team Icons made by juicy_fish from www.flaticon.com
63. Logistic modalities Icons made by geotatah from www.flaticon.com
64. Transport Icons made by xnimrodx from www.flaticon.com
65. Travel agencies Icons made by photo3idea_studio from www.flaticon.com
66. AR Icons made by ghost_icon from www.flaticon.com

Icons

67. AI icon Brain icons created by Freepik - Flaticon
68. Scoring & recognition Facial recognition icons created by juicy_fish - Flaticon
69. Robotics Robot icons created by Freepik - Flaticon
70. Logistics Logistics icons created by Eucalyp - Flaticon
71. Privacy Privacy icons created by Freepik - Flaticon
72. Other technology Project icons created by dDara - Flaticon
73. Layer selection Layers icons created by Konkapp - Flaticon
74. Add Add icons created by Freepik - Flaticon
75. Remove Remove icons created by Freepik - Flaticon

77. Long term thinking undefined Freepik from www.flaticon.com'
78. Development decision undefined Witdhawaty from www.flaticon.com'
79. Rocketship undefined Vitaly Gorbachev from www.flaticon.com'
80. Shared vision Icons made by manshagraphics from www.flaticon.com'
81. Roadmap undefined Icongeek26 from www.flaticon.com'
82. Connecting undefined Smashicons from www.flaticon.com'
83. Company communication undefined prettycons from www.flaticon.com'
84. Stakeholder value emphasis undefined geotatah from www.flaticon.com'
85. Adjustability undefined lutfix from www.flaticon.com'
86. Focuspoints undefined Freepik from www.flaticon.com'

10

Appendix

Appendix A - Initial roadmap

This figure displays the first roadmap that was created by Vanderlande in coopertaion with graduate Celine Tesselaar. As this is the strategy of Vanderlande again, it has been condemned confidential and can only be seen completely in the confidential appendix.

Figure XX,
The first roadmap for Vanderlande created by Celine Tesselaar (2021)

Appendix B- Project brief

DESIGN FOR our future

TU Delft

IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT
Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser.

STUDENT DATA & MASTER PROGRAMME
Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy".
Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 !

family name	Ruiter 5347
initials	J.L. given name Jarmo
student number	4482883
street & no.	
zipcode & city	
country	
phone	
email	

Your master programme (only select the options that apply to you):

IDE master(s): ( ) IPD ( ) DfI (★) SPD

2nd non-IDE master:

individual programme: - - (give date of approval)

honours programme: ( ) Honours Programme Master

specialisation / annotation: ( ) Medisign ( ) Tech. in Sustainable Design ( ) Entrepeneurship

SUPERVISORY TEAM **
Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair	Simonse, L.W.L.	dept. / section:	dept. DOS, sect. MOD
** mentor	Dehli, S.R.	dept. / section:	dept. DOS, sect. MCR
2nd mentor	-		
organisation:	Vanderlande		
city:	Veghel	country:	the Netherlands

Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..

Second mentor only applies in case the assignment is hosted by an external organisation.

comments (optional)

Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.

Procedural Checks - IDE Master Graduation

TU Delft

APPROVAL PROJECT BRIEF
To be filled in by the chair of the supervisory team.

chair Simonse, L.W.L. date - - signature lsimonse Digitally signed by lsimonse Date: 2021.10.19 13:22:16 +02'00'

CHECK STUDY PROGRESS
To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair.
The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: 27 EC

Of which, taking the conditional requirements into account, can be part of the exam programme 27 EC

List of electives obtained before the third semester without approval of the BoE

★ YES all 1st year master courses passed

NO missing 1st year master courses are:

name J. J. de Bruin date 26 - 10 - 2021 signature J. J. de Bruin, SPA Digitally signed by J. J. de Bruin, SPA Date: 2021.10.26 12:21:28 +02'00'

FORMAL APPROVAL GRADUATION PROJECT
To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **.
Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)?
- Is the level of the project challenging enough for a MSc IDE graduating student?
- Is the project expected to be doable within 100 working days/20 weeks ?
- Does the composition of the supervisory team comply with the regulations and fit the assignment ?

Content: ★ APPROVED NOT APPROVED

Procedure: ★ APPROVED NOT APPROVED

- a company mentor is missing, please add a company mentor

comments

name Monique von Morgen date - - signature

Personal Project Brief - IDE Master Graduation

TU Delft

Developing a smart design roadmap to internally align Vanderlande

project title

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

start date 01 - 09 - 2021 23 - 02 - 2022 end date

INTRODUCTION **

Please describe, the context of your project, and address the main stakeholders (interests) within this context in a concise yet complete manner. Who are involved, what do they value and how do they currently operate within the given context? What are the main opportunities and limitations you are currently aware of (cultural- and social norms, resources (time, money,...), technology, ...).

This project contains the development of a smart roadmap and will be mainly performed for Vanderlande, but includes multiple stakeholders such as the clients of Vanderlande and the end-user (see figure 1).

Vanderlande is a global leader in terms of future-proof logistic systems for warehousing, parcel and most importantly airports in my graduation project. The continuous development of new technological process automation solutions together with a good client connection has made Vanderlande one of the best in their industry. However Vanderlande is looking to become even more future proof as their technological and business driven mindset can only get them so far when facing internal and external threats They figured this due to a threat named Covid-19, which during the past year reduced air traffic drastically and thus also the question for new airport systems.

The reduction of Vanderlandes important airport industry made them look for new opportunities. This is why Vanderlande has started to look at roadmapping with a user-centered vision. As this creates a more future proof direct link to their end-user/traveller.
The value of the end-user for instance, continuously develops and is something they tend to focus on more. Mainly because airports focus on the travel experience of the consumer. So although Vanderlande has a Business 2 Business mindset which is aiming for airports (Vandelande clients) they look to facilitate the end-user as well as possible in the end. And a satisfied user leads to a satisfied airport and ultimately a trusted and happy Vanderlande.
Current research on travellers, is their appreciation of seamless and personalised travelling which has a future focus on more service related solutions rather than just a product.

An important point Vanderlande values for this project is getting the airport department of Vanderlande in line with the Long Now future vision, so they all know where their coherent goal/aim lies. A big company like Vanderlande has a lot of departments within. And all departments of such a big company have to know what to work on, in what time, what order, basically all activities that must be performed and who is involved. So eventually the aim is to get the entire company in line, however for this project I'm aiming for mainly the airport department. This initially values Vanderlande but if you make it available for their clients as well you create a more transparent communication which satisfies and creates more trust with the clients.

Finally from the course design roadmapping (given by Lianne Simonse (2017)) I've learned a method to create a strategic and tactical roadmap, which you can see on a simple piece of paper. So what I mean by 'smart' in this context is a more visual and dynamic roadmap. In which you're able to select layers, for more detail and make it adjustable to future changes, as companies change, new trends develop and you never know exactly what the future holds. What exactly the smart roadmap consists of in terms of what platform it is on, selectable layers are there and abilities does it include is something I want to find out and create so there is an added set of by me developed guidelines to the existing ones created by Lianne Simonse (see figure 2) . But eventually a smart roadmap has to become comprehensible and adjustable for an entire company.

Simonse, (2017). Design Roadmapping. BIS Publishers.

space available for images / figures on next page

introduction (continued): space for images

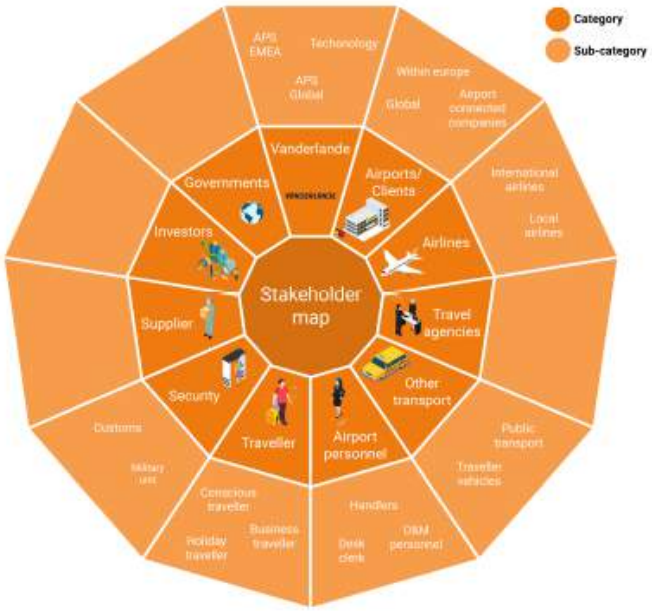


image / figure 1: Initial stakeholder map

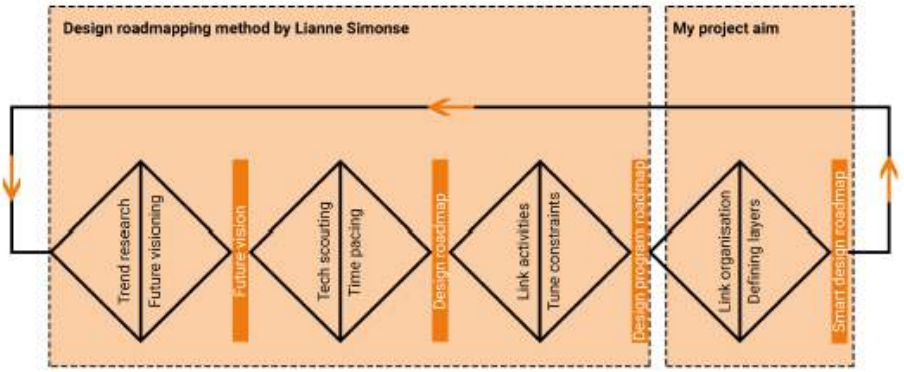


image / figure 2: The Design roadmapping method by Simonse (2017) together with my aim for guidelines

PROBLEM DEFINITION **

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

First of all, the smart design roadmap for Vanderlande primarily aims at the airport department within the company and afterwards can be a starting point to expand the roadmap to other departments. The roadmap is meant to facilitate/be used by team Vanderlande's airport department and then be presentable to their clients.

So when creating the smart roadmap, the main issues to tackle are the following:
Firstly, address end-user importance to Vanderlande to become future-proof. As this form of design thinking is the way for a better company development. And a point they are currently working on.

Secondly, making sure the complete Long Now project and concepts are in line with the technology driven resources and solutions Vanderlande currently possesses which make up their strength and a market leader in logistics.

Thirdly, connecting all activities and different sections within the airport department so the whole internal structure of the company is in line and knows who is involved in what. So the entire company has an overview on a tool/platform connecting all employees, managers, etc.. Because currently they aren't all aware of visions/plans of the future of Vanderlande.

Fourthly, the roadmap being adjustable to future changes in either an external or internal context. Making it a smart roadmap.

And finally, making sure it is also understandable for the clients of Vanderlande. So they have a transparent communication on what they have to offer and how they will operate.

ASSIGNMENT **

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, ... In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

My goal is to create a smart design roadmap in the form of a digital platform for employees within the airport department of Vanderlande, which they can use to adjust and overview their future plans, projects and developments. Aligning the company with the newly developed Long Now design concepts and also align Vanderlande internally in terms of employees and their work.

In order to create this digital platform consisting of the smart design roadmap, I will primarily perform some background research in three stadiums. Throughout all processes of my project I'll keep the innovation balance in mind in the form of checking desirability, feasibility and viablility in each stage, but mainly whether the roadmap is well balanced.

The past half-year a graduate has collected a lot of information by performing workshops per step of the roadmapping method (developed by Lianne Simonse) together with EU employees of Vanderlande. The outcome in the form of a static roadmap is what I'll firstly research and review. After this initial research I'll perform some of my own research in the form of a company analysis to adjust and/or finetune the visions, concepts and activities with Vanderlande's current beliefs, products and way of doing business.

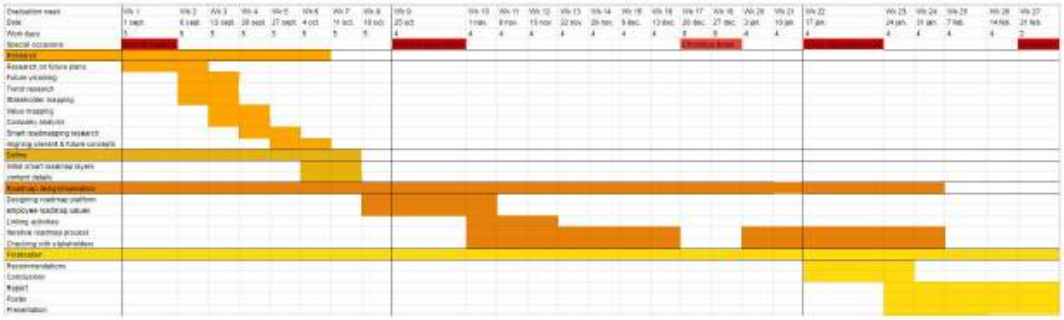
The last form of research will be on what should be included in the smart design roadmap as well as looking at what tools and platforms there currently are to create similar types of roadmaps.

Finally, I will quickly start with the actual creation of the platform so it is an iterative process on which I want a continuous loop of feedback on. This way I can keep adjusting/fine tuning the smart design roadmap until a certain point of satisfaction. As this is where I can really add a lot of value for the company.

PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

start date 1 - 9 - 2021 23 - 2 - 2022 end date



My project will consist of three parts: research, define and create.

Starting with research as I said in the assignment paragraph it will consist of three parts. First, researching the future vision and plans from the performed workshops called the Long Now. I will do this by reversing through the steps from Simonse's roadmapping method (seen in figure 2, introduction paragraph) Secondly, research on what is already there. What is it Vanderlande has currently envisioned, developed and how is their company structured. And finally, what is there known about the roadmapping topic and more specifically is there any literature on smart design roadmaps. Together with forming initial thoughts on layers and functions of the final smart design roadmap.

After this research I can define and finetune the strategic concepts, making the Long Now align with Vanderlande and form touchpoints. This way I can create more detailed content for the roadmap which is understandable for all stakeholders and is adjustable to future changes in terms of external and internal company behaviour, making it ready for integrating it in the smart design roadmap.

And finally the actual realisation of the roadmap, which will be an iterative process I aim to start with early on. This way I can gauge employees opinions and always integrate new content where needed, but mainly adjust features and functions within the platform. Making it as close to use ready for the company.

And then to top it off, is ofcourse the finalisation of my whole project in the final couple of weeks, although this is a continuous process.

Personal Project Brief - IDE Master Graduation

TU Delft

MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, ... Stick to no more than five ambitions.

Motivation
The past couple of years during my masters Strategic Product Design (SPD) at the university of technology in Delft I can see my future as a strategic designer with a specialisation in servitization and roadmapping especially in sustainable user-centered vision companies. During these study years I've created my own set of skills of servitization and roadmapping which are coherent to this graduation opportunity. That's why I would love to showcase my skills in practice in order to help Vanderlande as well as improving and perfecting my developed skills and expertise. Not to forget it being a great opportunity to see how such a big company operates.

I found my skills, that separate me from other designers, when I was performing my Bachelor end project and got told by my coach, as well as noticing myself, that I particularly fancied and did a good job in including all stakeholders in my overall strategic design process. From design research to conceptual thinking, I always checked the opinions and values of all stakeholders making sure everyone felt heard and thus created a positive impact/experience on the newly showcased opportunities and concepts.
Together with my skills in programs like Photoshop and InDesign, I have the ability to visually communicate newly performed research and possibilities with all stakeholders that have to be informed and need an overview on future projects around Vanderlande.

That's why I love to be a part of this user-centered roadmapping project at Vanderlande, as it would allow me to progressively improve my skill set and give me the opportunity to showcase the whole company of the importance of end user-centered future visions and possibilities.

And finally being able to develop my own type of tool to create a smart roadmap which might not only be usable by Vanderlande but other companies in the future as well.

Personal ambitions:
1. Improving my visual communication skills
2. Creating my own type of tool guidelines, so the smart design roadmap can also be created for other companies.
3. Improve my own skill-set on roadmapping, maybe even creating my own roadmapping method based on other existing methods.
4. Improving at project management, mainly in terms of planning and following it.

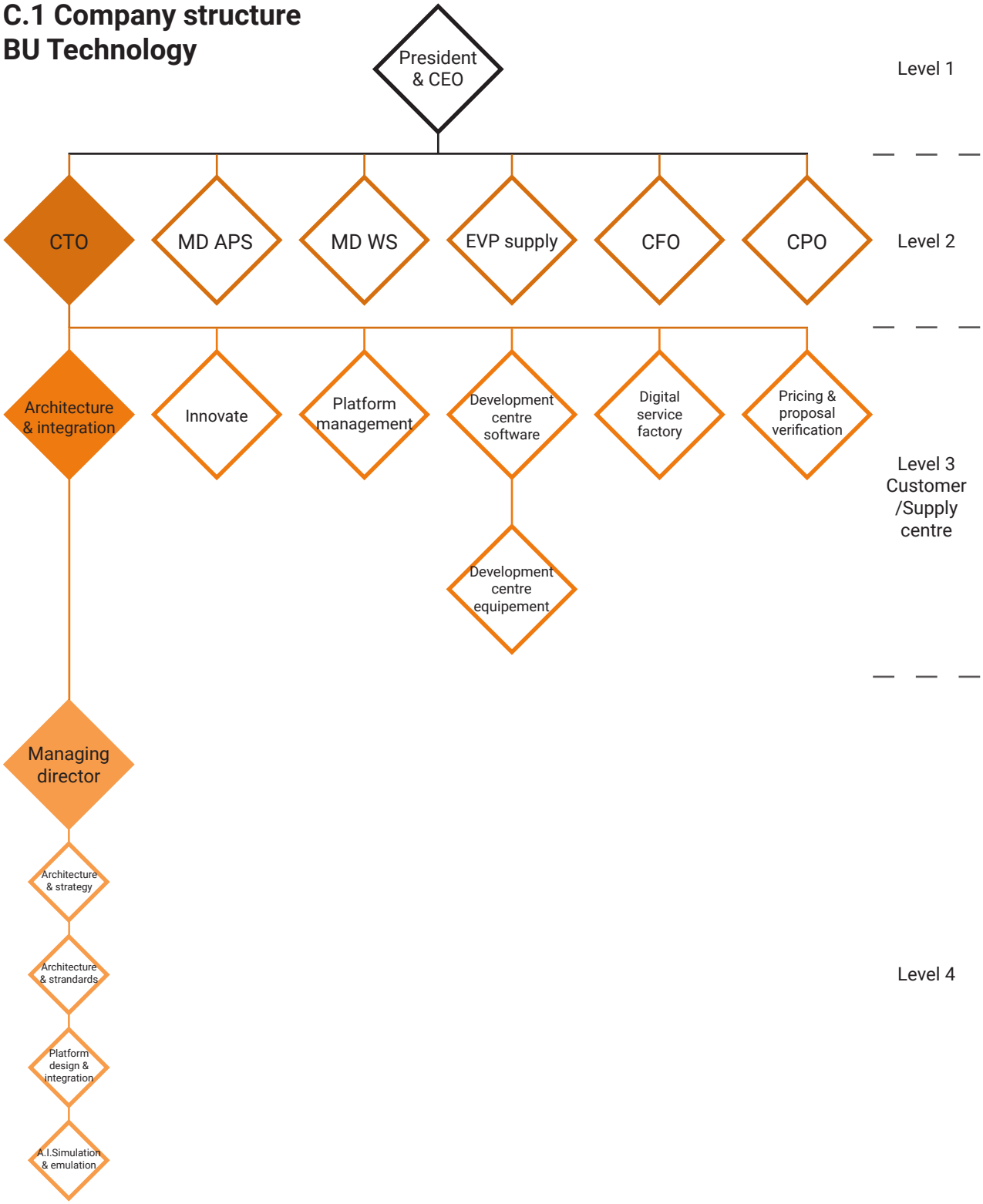
FINAL COMMENTS

In case your project brief needs final comments, please add any information you think is relevant.

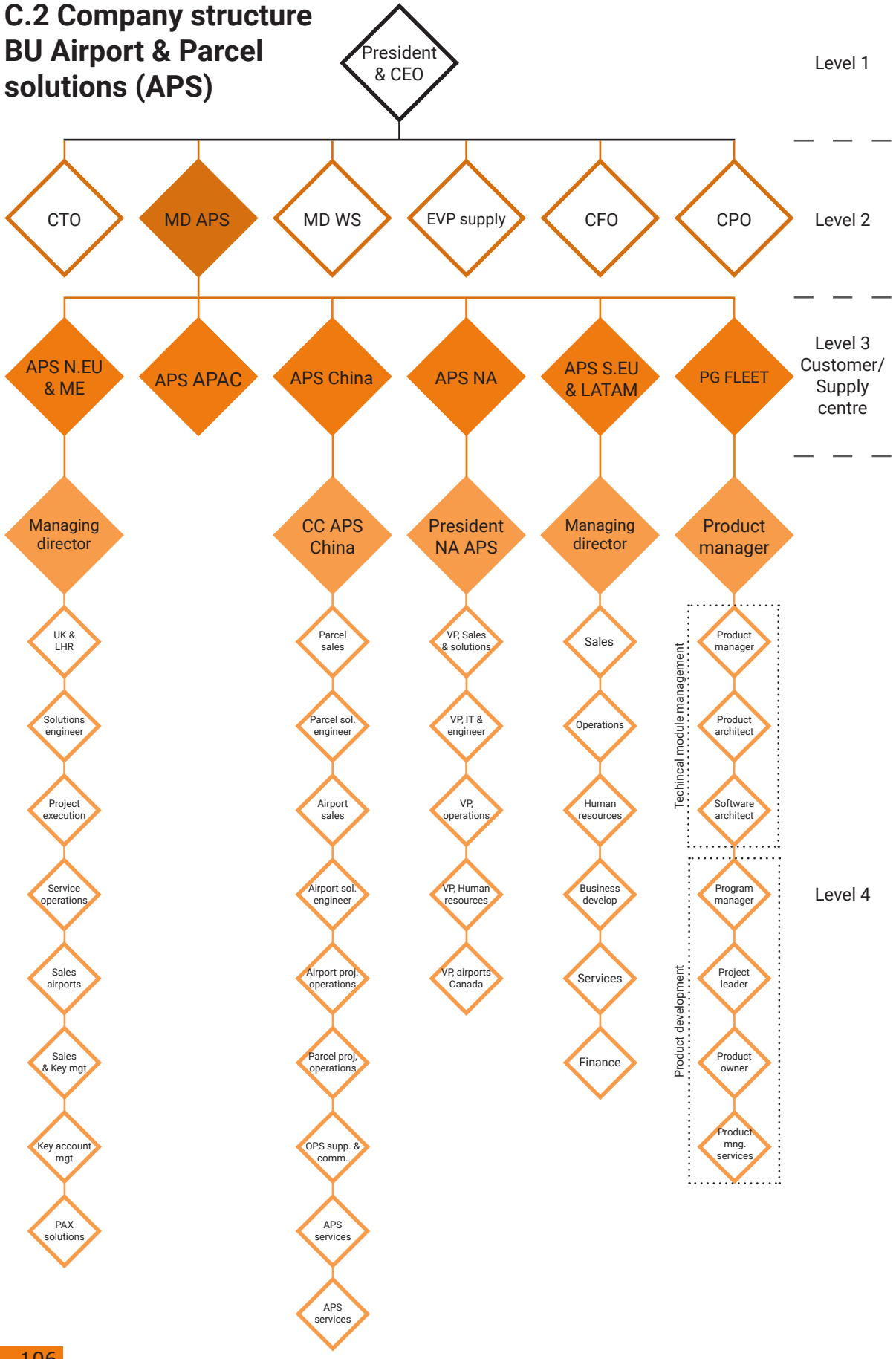
My final 3 EC points for my electives are from/for the course initiate to graduate, which includes handing in this approved project biref.

Appendix C - Company structure

C.1 Company structure BU Technology



C.2 Company structure BU Airport & Parcel solutions (APS)



Appendix D - Vanderlande current product portfolio

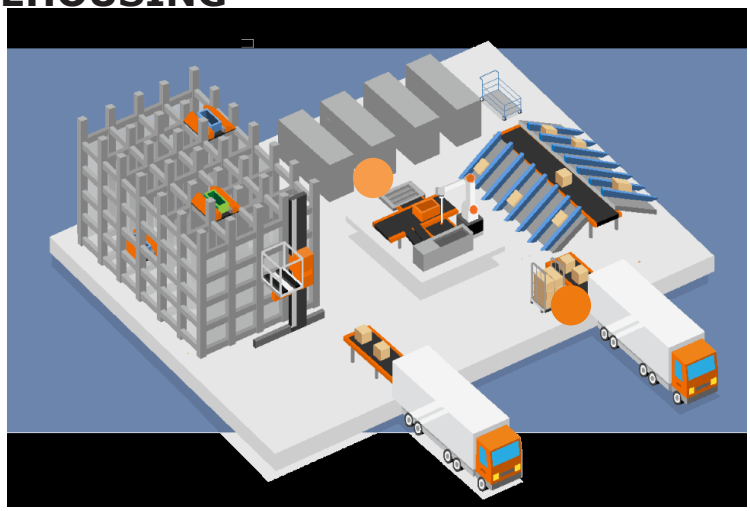
AIRPORT

Department

Systems & Innovations

Evolutions

WAREHOUSING

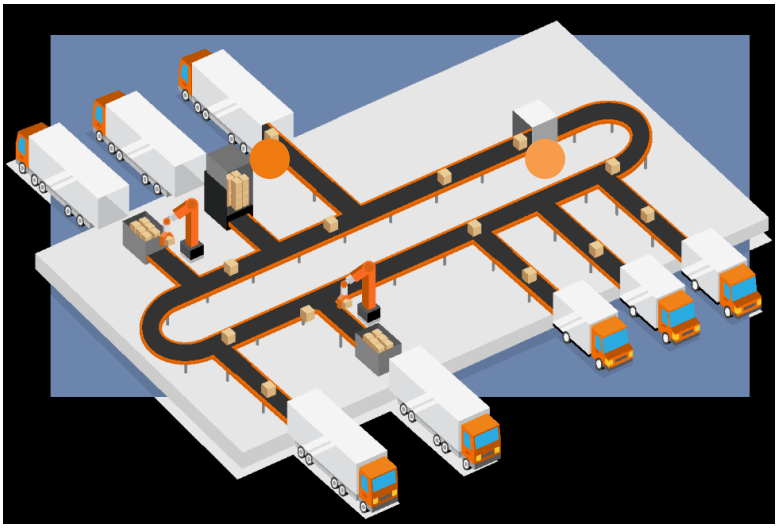


Department

Systems & Innovations

Evolutions

PARCEL



Department

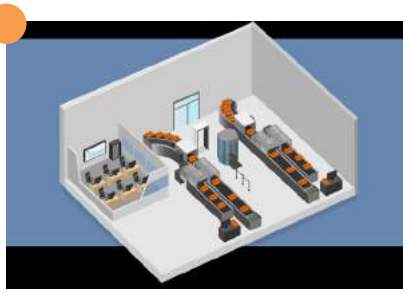
Systems & Innovations

Evolutions

ity

ng &
oring tool
e screening

divesting
k station
ted diverter
turn system



eckpoint

Baggage route

Remote check-in and reclaim
TUBTRAX (ICS)
ADAPTO Bagstore
BAGLOAD robot loading
VIBES control room
Reclaim
FLEET bag
FLEET batch
FLEET apron

BAGFLOW
FLEET

g, Picking & Storing

ore HDS
O
to picker workstation
tem robotics
X // AIRTRAX pocket
veyor range

ORTER
ORTER
ORTER
ted tote picking

FASTPICK
AIRPICK

Receiving & Shipping

Robotics
PACK@EASE
Telescopic belt conveyors
Palletising

STOREPICK
HOMEPICK

g & Screening

(regulars & irregulars)
ECART@EASE (regulars & irregulars)
ng machines
ORTER (regulars & irregulars)
ORTER
RTER
ORTER
ORTER (1200 to 1500)
XORTER

SORT

Loading & Unloading

Telescopic belt conveyors (load & unload)
Chutes
Unloading pallets and cages
Unloading ULDs

Appendix E - Roadmap structure decision trees

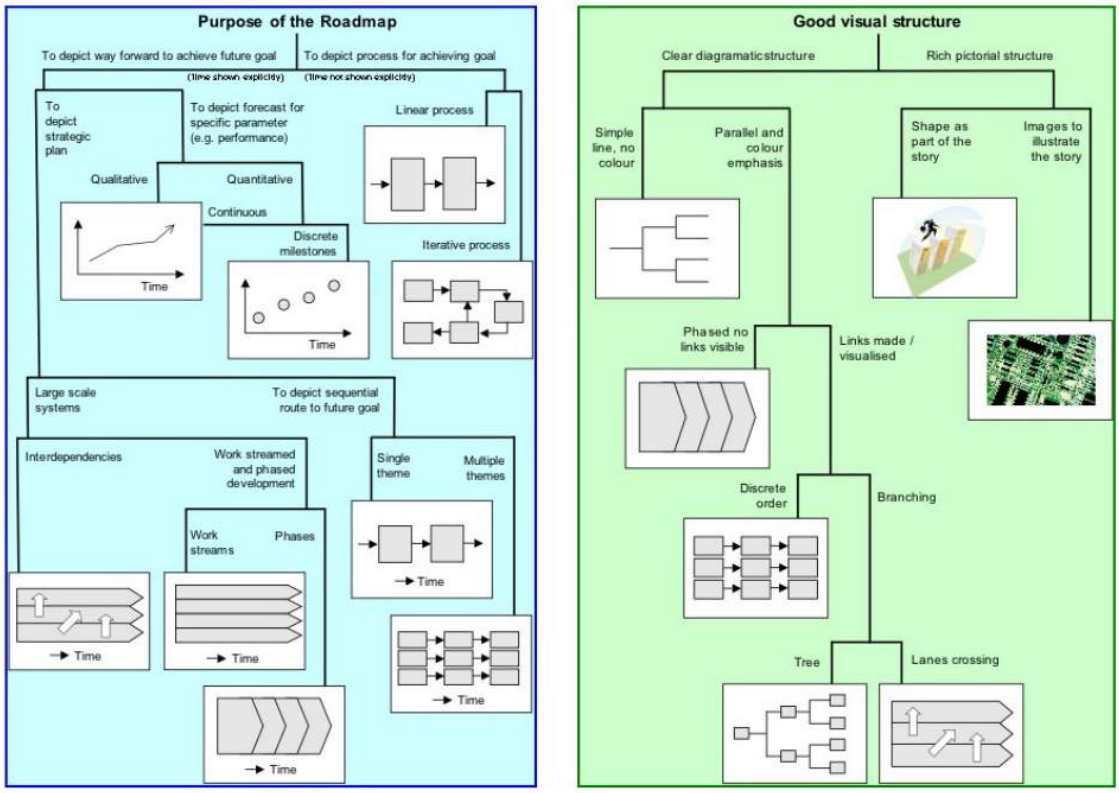


Fig. 8. Decision trees, based on Zurich workshop dendrograms, for use in a practitioner workshop. These illustrate decision trees for roadmap *purpose* and *visual structure*.

Figure 72,
Decision trees that determine the structure of the smart design roadmap

Appendix F - Bridging the gap between TLN and VI

Figure 73,
Overlapping current VI solutions with TLN new product service concepts

Appendix G - Old versions of the smart design roadmap

These are all figures of old versions of the smart design roadmap that have been iterated on untill the final design.

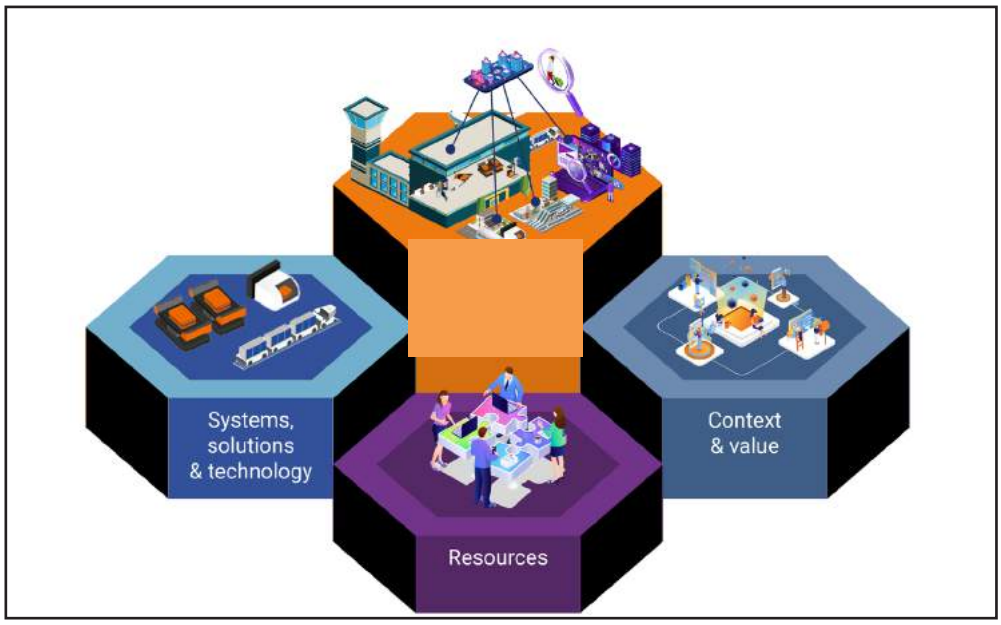


Figure 74,
The roadmap content requirement aspects visualised

Figure 75,
The solution development layer draft

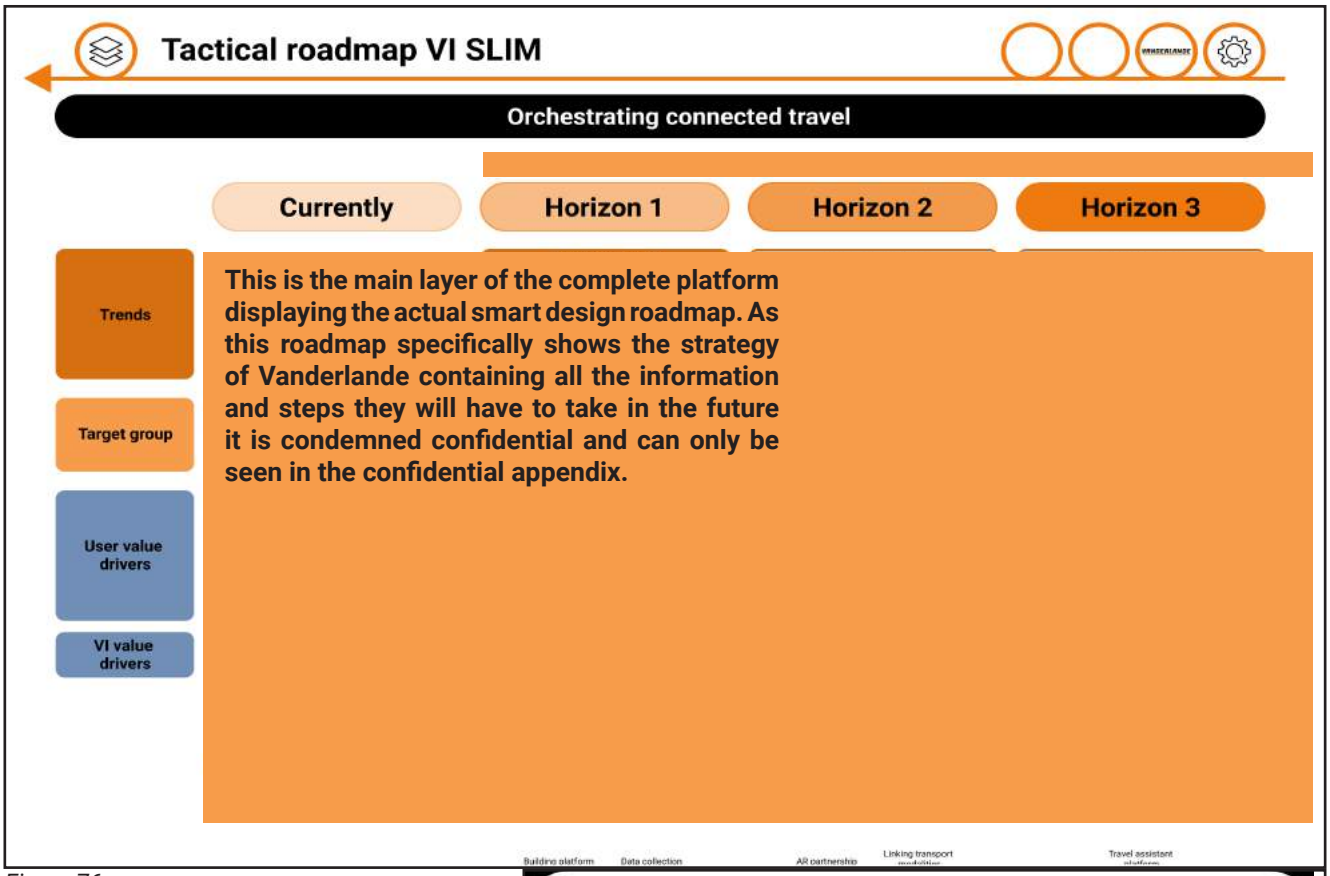


Figure 76,
A former draft of the smart design roadmap layer, highlighting the filter selection

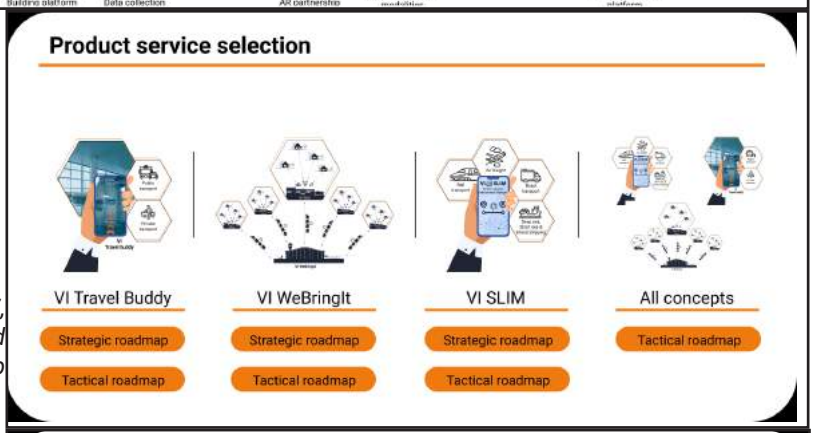


Figure 77,
A pop-up screen on which you could select the type of roadmap

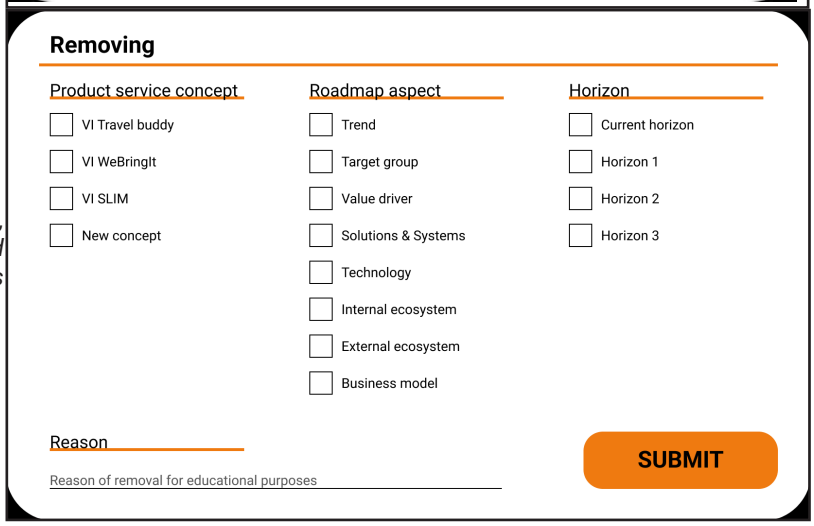


Figure 78,
A pop-up screen on which you could add and remove roadmap aspects

Figure 79,
Old tactical smart design roadmap

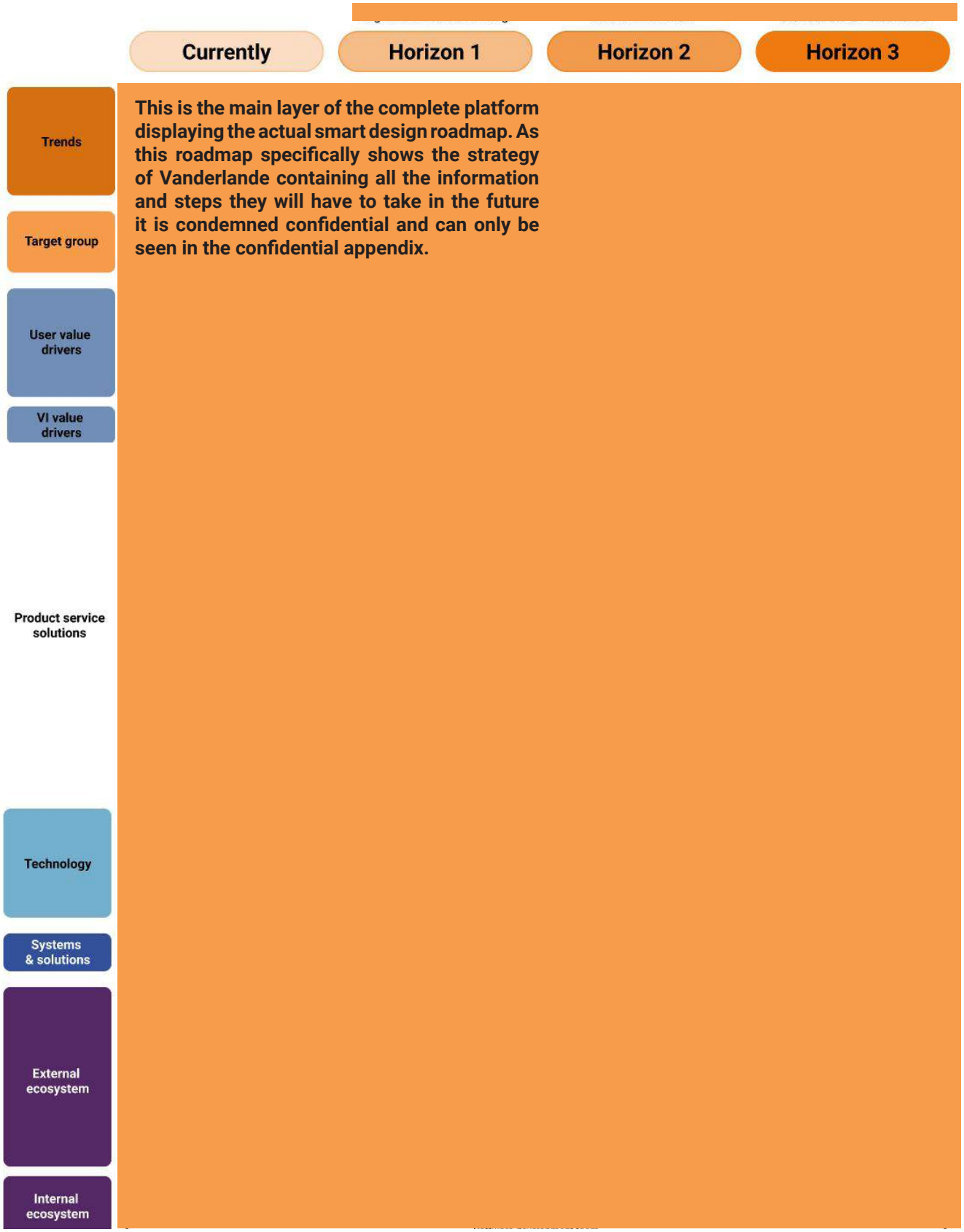
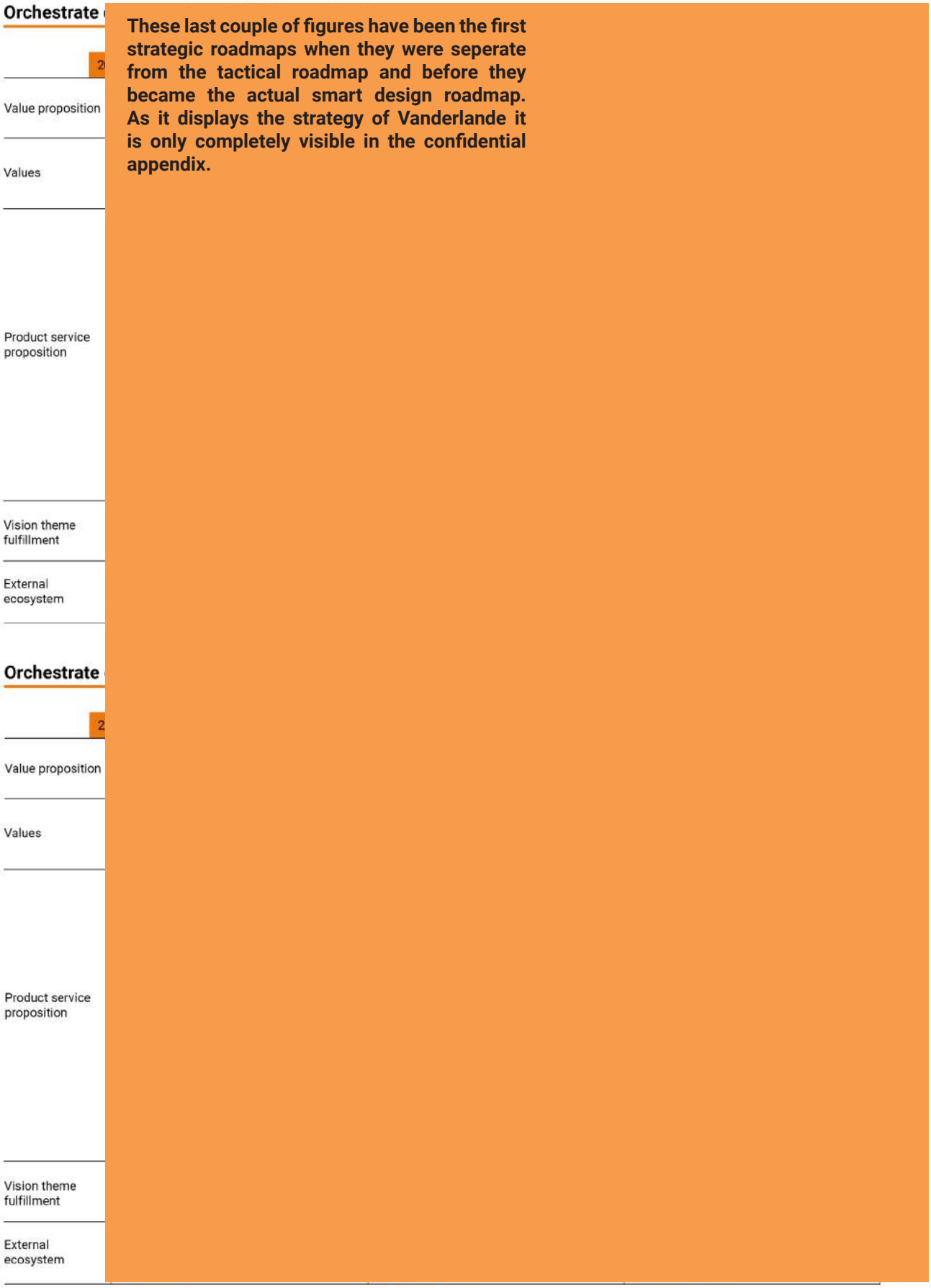


Figure 80,
Old seperate strategic smart design roadmaps



These last couple of figures have been the first strategic roadmaps when they were seperate from the tactical roadmap and before they became the actual smart design roadmap. As it displays the strategy of Vanderlande it is only completely visible in the confidential appendix.

These last couple of figures have been the first strategic roadmaps when they were seperate from the tactical roadmap and before they became the actual smart design roadmap. As it displays the strategy of Vanderlande it is only completely visible in the confidential appendix.