Ministry of Foreign Affairs

Research Paper
Pedaling Progress A Dutch Solution for Bicycle Parking

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Research Paper

Pedaling Progress
A Dutch Solution for Bicycle Parking

July 2024

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Management Summary

The first part of this paper explores the increasing trend of cycling in Paris, accelerated by the COVID-19 pandemic, and the city's commitment to sustainable urban mobility, particularly evident in the surge of bicycle usage and ambitious plans for expanding bicycle parking facilities. Against the backdrop of the European Union's Declaration on Cycling and Paris's preparation for the 2024 Olympic Games, the study aims at a comprehensive market assessment to identify opportunities for private-public partnerships, focusing on a selection of Dutch expertise in bicycle parking solutions.

The primary objective is to answer the research question: "Which solutions can a Dutch consortium propose to meet the French demand for bicycle parking garages, considering the increasing demand for cycling, space optimization, sustainability, theft prevention, and the need for secure facilities?" The 'Dutch solution' encompasses a holistic approach to cycling infrastructure, serving as a benchmark globally. The paper assesses challenges faced by Paris, leverages Dutch expertise, and analyzes selected components necessary for bicycle parking.

The research question can be answered by first analyzing the positive societal, environmental and political impact of cycling, which proves that more accessible bicycle parking results in wider usage of bicycles, that would result in less traffic congestion, lesser pollution and an overall higher quality of life. When looking at the specific situation in Paris, we conclude that while Paris offers an estimated 60,000 bicycle parking spaces across the city, representing only 0.05% of the commuting populace, limitations in availability are evident, especially at major transport hubs.

When analyzing why Dutch bicycle parkings are renowned for their advanced and efficient reputation, we conclude that the main elements contributing to this are the Dutch companies able to calculate a precise cost-benefit analysis of the construction and usage of the parking on top of the advanced features such as space efficiency, customization for the urban landscape, technological integration and intermodal connectivity.

When looking at the existing trade dynamics and knowledge exchange between the Netherlands and France regarding bicycle infrastructure, it highlights collaborative initiatives and partnerships aimed at sharing best practices and expertise in cycling infrastructure, but it also shows that if there already is a French solution available, France is more likely to opt for its own solution, instead of looking abroad;

Therefore, the paper proposes the formation of a consortium involving Dutch and French entities from both public and private sectors to implement bicycle parking solutions in Paris, leveraging the expertise of Dutch consultancy firms such Decisio and Arcadis. Additionally, it outlines the potential contributions of Dutch companies in providing specialized technical solutions for optimizing bicycle parking facilities, such as LumiGuide, VelopA, AbelSensors and TKH Security.

Important to keep in mind is that the consortium is a collaborative effort between French and Dutch parties. The Dutch parties aim at supplementing the French efforts in creating an advanced bicycle parking, focusing on the aforementioned key areas where the Netherlands show specific expertise.

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1. Introduction

Paris, a city accommodating around 12 million commuters on a daily basis, has recently witnessed a remarkable surge in the promotion of cycling as a means of transport, catalyzed in part by the impact of COVID-19 lockdown measures. In 2020, amidst the pandemic, bicycle usage in Paris soared by an astonishing 35% compared to 2019. This trend continued to grow, with a recorded 42.1 million bicycle rentals in 2022, marking a 13% increase from the previous year. Notably, the share of Vélib' bicycles (a system of shared bicycles in Paris) accounted for 25% of the total counted bicycles, while self-service bicycles reached a record high of 4.6%. To accommodate this growth in bicycle use, mobility administrator Île-de-France Mobilités has released an ambitious plan to grow the bicycle parking spots at train stations from 20.000 to 100.000 by 2030.

These developments happen to align with the *European Union's Declaration on Cycling*, released on October 4th, 2023, stressing the significance of sustainable mobility. As Paris prepares for the 2024 Olympic Games while also trying to achieve broader Sustainable Development Goals (SDG), of which sustainable mobility is part as well (SDG 3, 9, 11 and 13). Thus, a comprehensive market assessment becomes imperative to explore the potential for private-public partnerships within this growing cycling ecosystem, specifically focusing on
bicycle parking solutions, as this is one of the fields Dutch expertise excels in (which this paper will highlight later on, starting on page 12).

In this proposal, our primary objective is to conduct a market assessment aimed at identifying opportunities for implementing a 'Dutch solution' through private-public partnerships within the cycling industry, particularly addressing the question:

"*Which solutions can a Dutch consortium propose to meet the French demand for bicycle parking garages, considering the increasing demand for cycling, space optimization, sustainability, theft prevention, and the need for secure facilities?*"

The 'Dutch solution' refers to the comprehensive approach embraced by the Netherlands to promote and facilitate cycling as a primary mode of transportation. It encompasses a cycling culture and infrastructure revered globally, often considered a benchmark for countries seeking to know-how on sustainable and healthy urban mobility. Key components of this approach include cycling infrastructure integrated into urban planning, efficient bicycle parking solutions, maintenance facilities, educational initiatives for cyclists and road users, seamless integration with public transportation, bicycle-sharing programs and the societal acceptance of cycling. The

big bicycle parkings installed at for example Dutch train stations, demonstrate the expertise and capacity of the Netherlands on the topic of cycling.

Throughout this proposal, we will delve into the challenges faced by Paris, as to why such a solution should be implemented. Furthermore, our focus extends to leveraging Dutch expertise, analyzing bicycle parking requirements, adapting proven Dutch solutions to Paris's unique urban setting, and identifying potential collaboration areas. This comprehensive investigation aims to not only highlight the benefits but also underscore the essential role of sustainable urban transport solutions in enhancing the livability and environmental well-being of Paris.

The paper is structured in the following manner: Firstly, it maps the stakeholders involved in bicycle parking facilities. Secondly, it delves into the current parking issues in France and identifies the essential components necessary for creating a parking space. Following this, it will analyze which components could benefit from a Dutch solution and determine potential providers for these solutions. The final chapter proposes a consortium comprising mostly Dutch, but also French parties to aid in constructing and managing the bicycle parking. This section will outline the public or private partner responsible for funding and assigning the project, the integral actors overseeing the process, and the specific solution providers involved. Finally, a conclusion will circle back to the research question, providing a clear answer on which solutions a Dutch consortium could propose and who should be part of it.

2. Societal, Environmental and Political Challenges & Needs

In order to highlight the relevance of the topic of bicycle parking, it is important to map the current environmental, societal and political challenges that contribute to the need for more parking infrastructure and that also could be solved by using a Dutch solution.

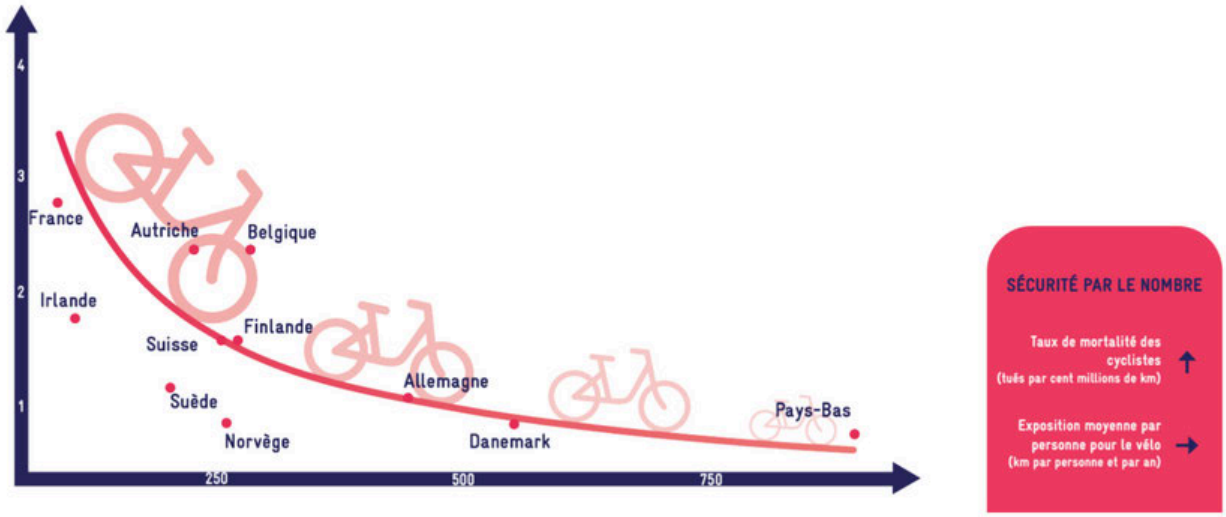
Societal

Traffic congestion and safety concerns

Paris suffers severe traffic congestion, stemming from increased vehicular activity that is not catered towards the current infrastructure. Safety concerns for cyclists navigating the crowded streets serve as a deterrent to widespread bicycle usage, enhanced by the lack of comprehension among drivers to share the road with cyclists, resulting in grave accidents. Despite this, as highlighted in the paper's introduction, biking has experienced a surge in popularity in recent years, partly accelerated through COVID-19. This increase indicates that society is in the midst of a shift toward more sustainable transportation options.

Cycling lessons, the inclusion of bicycler-awareness in driving lessons, and an overall shift in societal perception toward viewing cycling as a legitimate and respected mode of transportation are crucial aspects. Additionally, fostering a cycling-friendly culture involves urban planning that prioritizes the creation of safe, interconnected bicycle lanes and paths, well-designed intersections, and dedicated bicycle parking facilities. Encouraging public events, campaigns, and community engagement programs to promote the benefits of cycling, along with emphasizing safety measures, can further facilitate this cultural transition. As NextMove mentioned in an interview, safety of cyclists on the road currently remains one of the biggest concerns in France. Decisio, an economic research firm, affirmed this through their investigation, revealing that among Western-European nations transitioning towards a more bicycle-oriented culture, France continues to have the highest recorded rates of cyclist fatalities, as pictured in the graph on the next page.

Death rates of bicycle users by Decisio (2023)



According to MobilityLab, an American R&D Center, reliable bicycle parking has a pivotal role in encouraging new riders and promoting cycling as a practical transportation option. Convenient and secure bicycle parking emerges as a crucial factor in fostering cycling culture. Offering bicycle parking at various destinations promotes cycling as a preferred option, normalizes bicycle culture across diverse demographics, addresses fears of theft through proper security measures, and enhances the overall pleasurable experience of cycling. By making cycling convenient, safe, and enjoyable, well-designed bicycle parking plays a vital role in promoting active transportation and engaging individuals with their local communities.

As of now, Paris does not offer sufficient (secure) bicycle parking options, thus discouraging cyclists to take their bicycle to certain locations or to the city at all. This issue could be addressed through a public-private partnership where Dutch expertise on this topic is shared.

Environmental

Traffic congestion and pollution

Paris faces significant environmental challenges associated with increased vehicular traffic, resulting in air pollution that poses health risks and degrades air quality. The city's reliance on cars as the primary mode of transportation contributes significantly to this issue, with exhaust emissions releasing harmful pollutants into the atmosphere. To combat this problem, the city has implemented measures such as 30-kilometer zones and additional taxes on vehicles. However, these solutions have shown limited effectiveness in curbing pollution levels. In this scenario, promoting the use of bicycles emerges as an accessible and viable solution to alleviate the pollution caused by cars

Encouraging more individuals to cycle, particularly for short to moderate distances, can significantly reduce traffic congestion, mitigate emissions, and contribute to cleaner air in Paris. Cycling not only offers a sustainable alternative but also plays a crucial role in minimizing the environmental impact associated with vehicular traffic. Sufficient bicycle parking at transport hubs is crucial to make cycling and transferring to public transport more appealing. Well-maintained and secure bicycle parking areas encourage cyclists to combine biking with buses, trains, or subways seamlessly, thus catering to the many commuters in the Ile-de-France region, where on average 11 million people commute every day. This provision promotes eco-friendly travel choices and ensures a smooth transition between cycling and public transit, enhancing overall commuting efficiency and encouraging sustainable transportation options.

Political

Government policies and collaboration

Regulatory hurdles, zoning restrictions, and a lack of coherent government policies may obstruct the implementation of large-scale bicycle parking projects. Engaging in collaborative efforts between government bodies, urban planners, private entities, and community stakeholders is crucial. Establishing clear policies, streamlined regulatory processes, and incentivizing private investment through tax breaks or grants can facilitate smoother project execution. On top of this, the car industry in France functions as an anti-cycling lobbyist, creating fear about potential job losses resulting from the shift from car-centric to bicycle-focused policies. The car lobby is also greatly involved in promoting helmets for cyclists, to avoid having to deal with the real problem: that the danger for cyclists comes from cars, not from other bicycles or terrain.

However, bicycle parking can also contribute to solving political challenges. Enhancing bicycle parking in Paris embodies a commitment to social equity by providing a practical, cost-effective transportation option accessible to all residents. By prioritizing cycling infrastructure, regardless of income or social status, the city promotes inclusivity and reduces transportation barriers. This initiative offers an affordable, healthy, and environmentally friendly mode of transit, ensuring that diverse communities can benefit equitably while addressing concerns of mobility and access for all. Additionally, more and more people are leaving the city of Paris, claiming one of the reasons to be the lack of green spaces and the pollution; something that the adoption of cycling could change. On top of that, implementing extensive bicycle parking in Paris not only demonstrates proactive urban planning but also serves as a visible testament to a government's dedication to sustainable, innovative solutions. Such forward-thinking initiatives have the potential to resonate positively with the public, garnering support. Embracing modern, eco-friendly transportation options can showcase leadership and vision, capturing public imagination and fostering a sense of pride and confidence in the government's ability to address pressing challenges while enhancing the city's appeal and livability.

3. Mapping the Stakeholders

The ecosystem of bicycle parking solutions in Paris involves various stakeholders, each playing a crucial role in shaping the development and implementation of these facilities. To understand the intricacies and collaborations within this system, this chapter will outline some of the most relevant actors involved, when it comes to providing bicycle parking solutions.

Public Authorities
Similar to any urban infrastructure project, municipal authorities hold a pivotal role in decision-making, regulation, and investment for bicycle parking solutions. These entities encompass city planners, transportation departments, and local government officials responsible for aligning city development with sustainable transportation initiatives, including the integration of bicycle parking infrastructure. According to NextMove, an interest group for sustainable mobility, and Arcadis, a global design and consultancy firm, municipal authorities are often the client that orders cost-benefit analyses and the execution of large-scale bicycle infrastructure projects, such as parking. In the case of Paris, based on previous initiatives, and existing infrastructure projects, these authorities would be the Municipality of Paris (Mairie de Paris) and the department of Île-deFrance (Région Île-de-France).

Urban Planners and Architects
Professionals specializing in urban planning and architecture are instrumental in designing and executing the layouts and structures of bicycle parking facilities. Their expertise ensures optimized space utilization, accessibility, and integration of these solutions into the existing urban landscape while adhering to safety and regulatory standards. According to several of the parties we have interviewed, including NextMove, L'Institut Paris Region is the main party in assisting local governments in adapting to a more bicycle friendly infrastructure. L'Institut Paris Region, recognized as Europe's largest urban planning and environmental agency, employs 200 experts to comprehensively explore regional and metropolitan dimensions. Their role involves supporting local decision-makers in enhancing quality of life and fostering future-oriented planning strategies for the Paris Region and other cities, considering the dynamic changes occurring in today's world. Additionally, Dutch company Arcadis specializes in sustainable urban planning and infrastructure solutions and has many years of experience in projects in both France and the Netherlands. Regarding bicycle parking, Arcadis has expertise in designing and implementing innovative facilities, integrating them into urban landscapes to promote cycling as a convenient and secure mode of transportation, aligning with sustainable city development goals. Arcadis in France already has experience with helping local governments implement cycling infrastructure.

Transportation Agencies

Parties invested in enhancing public transportation services and mitigating environmental impact contribute valuable expertise and backing for bicycle parking solutions. Acknowledging cycling as a way of transportation to alleviate traffic congestion and reduce emissions, these entities champion improved infrastructure that aligns with broader environmental sustainability objectives. Among these stakeholders, railway companies operating in Paris play a pivotal role in furnishing bicycle parking facilities at stations. Their involvement is essential in providing secure and convenient bicycle parking options, advocating for intermodal transportation, and addressing the parking needs of cyclists utilizing rail services. In the city of Paris, these significant contributors encompass RATP, the principal operator managing the city's extensive public transportation network, SNCF, the national railway company offering various train services, Smovengo, overseeing the Vélib' bicycle-sharing system which could be using these parking places as well, and Île-de-France Mobilités, responsible for orchestrating public transport services across the region, including Paris and its suburbs.

Property Developers and Car Parking Companies

Real estate developers and property owners are keen on integrating bicycle parking into their properties, be it residential or commercial. Their participation guarantees the inclusion of sufficient and safe bicycle parking areas in new construction or renovation ventures. This approach can attract clients who utilize cycling as a primary mode of transportation, adding to the project's sustainability. Officially, France has put in place regulations that require new built spaces such as private apartments, schools and elderly homes to have a certain area dedicated to bicycle parking. This aligns with the view of the property developer we have spoken to. He stressed the recent trend of cycling in France, however he admitted that in his previous parking projects, he did not think about incorporating special parking spaces dedicated to bicycles. Despite this interest, Arcadis notes that property developers constitute a minor portion of bicycle-parking facility clients, with municipal authorities comprising the majority.

Bicycle users and Residents

Businesses and residents stand as significant stakeholders benefiting from the introduction of bicycle parking solutions. Businesses find value in providing accessible parking options, contributing to a bicycle-friendly atmosphere, while residents experience enhanced convenience and security with reliable parking facilities. The bicycle's role in French culture has historically been centered around leisure and sport; however, Paris's mayor, Anne Hidalgo, initiated "Plan Vélo" to develop the city's cycle lanes, prompting a surge in cycling as a commuting activity. Initially pledging to double the existing 700 km of lanes to 1,400 km by March 2020, Hidalgo later revised the plan to a total of 1,000 km of bicycle lanes, with nearly 40% completed by the end of 2019. As of 2021, the municipality invested another 250 million euros in optimizing Paris' bicycle lanes and parking spots.

In conclusion, you will find a table representing the stakeholders and their (potential) interest in the project below (continuing on the next page):

Stakeholder	Category	Role	Contacted	Interested
Île-de-France	Public authority	Client	No	To check
Mairie de Paris	Public authority	Client	No	To check
NextMove	Advocacy Group	Advisor	Yes	Yes
L'Institut Paris Region	Public authority/urban planner	Advisor	No	To check
Arcadis	Urban planner	Advisor	Yes	Yes
Fifteen	Advocacy Group	Advisor	No	To check
Dutch Cycling Embassy	Advocacy Group	Advisor	Yes	Yes
RATP	Transportation agency	Client	No	To check

Stakeholder	Category	Role	Contacted	Interested
SNCF	Transportation agency	Client	No	To check
Smovengo	Transportation agency	Client	No	To check
Île-de-France Mobilités	Transportation agency	Client	No	To check
Property Developers	Private sector	Client	Yes	Yes

4. Breaking Down the Bicycle Parking

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Bicycle Parking at Gare de l'Est, Paris

However, considering that almost 12 million individuals commute on a daily basis in Paris, access to these bicycle parking spaces is limited, currently reaching a mere 0.05% of the commuting populace. Moreover, the 198 parking spaces at Gare de Lyon must accommodate the annual traffic of 36.6 million users of the train station, which already puts a limit on the available parking space for cyclists. In comparison, Amsterdam Central Station (71.2 million travelers per year) boasts four bicycle parking spaces, of which one of them already hosts 7000 parking spots.

Insufficient parking spots are not only a concern at Gare de Lyon, but also prevalent at other important transport hubs like Gare du Nord, Gare de l'Est and Gare Montparnasse. Furthermore, the issue extends beyond transportation hubs to major event venues such as the Accor Arena, where bicycle parking is notably absent from the website's accessibility section. Similarly, the inadequacy of available bicycle parking seems to be an issue in shopping areas, universities, and several other prominent locations throughout Paris. While there is a map indicating shared Vélib bicycles and their respective charging stations, there appears to be a lack of guidance or suggestions for privately owned bicycle parking facilities in these areas. Again, in comparison, the University of Amsterdam dedicated a full section on their website to designated parking spots per location.

Efforts like 12.5 (DouzePointCinq, a company that has developed an application in order to find parking spots near you, based on a subscription model) aim to meet this demand by reserving sections of car parks near major train stations for (motor)cyclists. However, the use of car parking spaces affects the accessibility for cyclists. Additionally, these offerings operate on a subscription basis, restricting usage. In contrast, bicycle parking facilities in the Netherlands are usually free for the first 24 hours, promoting regular and daily utilization.

Dutch-French bicycle tour operator and seller Holland Bikes confirmed Paris' need for more bicycle options. They stressed that if a tender is written out to design (car) parking spaces, taking into account bicycle parking might help the company win the tender, due to the municipality's focus on promoting sustainable mobility. Hence, bicycle parking can be used to leverage interest in the construction and access to subsidies to create new parking spaces. However, Holland Bikes mentioned as well that bicycle parking is often not considered by prominent parking companies such as Indigo Parking, because of their car-centric focus. Therefore, Holland Bikes often plays the role of client, consultant and lobbyist when it comes to integrating bicycle parking spots into new or existing parking spaces. In this next section, we will dive into what would be needed to create such a parking space, as the Netherlands has done, in order to see which components can possibly be used for a Dutch solution.

Bicycle Parking Requirements

As mentioned before, the Netherlands is renowned for its extensive bicycle parking facilities, representing a pinnacle in bicycle infrastructure worldwide. This part aims to analyze the crucial components required for the construction and efficient utilization of such bicycle parking spaces, in order to later on identify where a Dutch solution could provide assistance and which parts could be executed by the French.

Example of space optimization

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Cost-Benefit Analysis

The initial phase involves a comprehensive evaluation of the investment costs against operational expenditures.

This includes assessing technology integration, infrastructure development, and ongoing maintenance and personnel expenses. It explores potential economic benefits such as increased bicycle usage, health advantages, and positive environmental impacts like reduced traffic congestion and lower CO2 emissions. The utilization of consultancy expertise aids in predicting financial impacts through scenario analyses and Return on Investment (ROI) models. Stakeholders' feasibility and ROI determinations are essential, ensuring optimal outcomes for stakeholders based on analytical insights, cost-saving measures, and design enhancements to improve economic efficiency.

Automated Bicycle Storage
The Netherlands' renowned bicycle parking facilities, notably at train stations, emphasize automated systems utilizing innovative technologies like mechanical bicycle parking solutions. These systems optimize space utilization while ensuring secure and convenient storage for bicycles.

Safety and Security Measures
Effective security measures, including surveillance cameras, access control, and adequate lighting, contribute significantly to a secure environment for bicycles, effectively combating theft and vandalism.

Safe and accessible entrances in Amsterdam, North-Holland

Convenience and Accessibility
Emphasizing user convenience and accessibility, these parking solutions are easily accessible, with clear markings and sufficient amenities like bicycle pumps, repair stations, and electric bicycle charging points.

Sustainability and Environmental Considerations
Highlighting the sustainability aspect, these bicycle parking structures prioritize eco-friendly designs and materials, aligning with environmental consciousness and contributing to a greener urban environment.

In summary, integrating these key elements are essential in developing bicycle parking facilities that are economically viable, technologically advanced, safe, space-efficient, user-friendly, and environmentally sustainable.

5. A Dutch Solution Where Needed

As we have explored the necessary components for bicycle parking facilities in France and the Netherlands, we now identify which aspects of the Dutch approach could be implemented in Paris. We will also assess the already existing solutions in France to bridge the gap between the two systems. The goal is to integrate effective elements of the Dutch approach into Paris's infrastructure, potentially optimizing bicycle parking in the city.

This section will draw insights from Dutch solutions, identifying aspects not fully realized in France. It also aims at identifying the Dutch parties that provide these solutions that could form a public-private partnership consortium in order to realize the construction and exploitation of the bicycle parking facilities.

A clear cost-benefit analysis based on experience
The first stage of developing the parking plan is the cost-benefit analysis. As mentioned before, the cost benefit analysis is made to determine how, why and where a parking facility could be constructed. It serves as an initial stage to evaluate the feasibility and potential benefits of constructing bicycle parking facilities. Comparatively to the French, Dutch companies often excel in delivering innovative and cost-effective solutions for urban infrastructure projects, especially when it comes to biking. Decisio, a Netherlands-based economic research firm, specializes in conducting comprehensive cost-benefit analyses, assessing the economic viability and potential advantages of infrastructural developments. On top of that, they already have experience with similar bicycle parking projects, in the Netherlands and abroad.

Arcadis, another Dutch consultancy renowned for its expertise in urban planning and sustainability, offers comprehensive solutions aligned with environmental consciousness. These Dutch companies have a proven track record in implementing similar projects, utilizing advanced methodologies to optimize space, maximize functionality, and ensure economic feasibility, factors crucial for executing bicycle parking in Paris. While France could use its expertise regarding the actual construction of the parking, leveraging Dutch companies' proficiency in designing such infrastructural projects could offer a pragmatic advantage due to their specialization and successful track record in similar ventures. Their experience and innovative approaches position them as key contributors to the success of implementing bicycle parking facilities in Paris.

Innovative Technological Integration

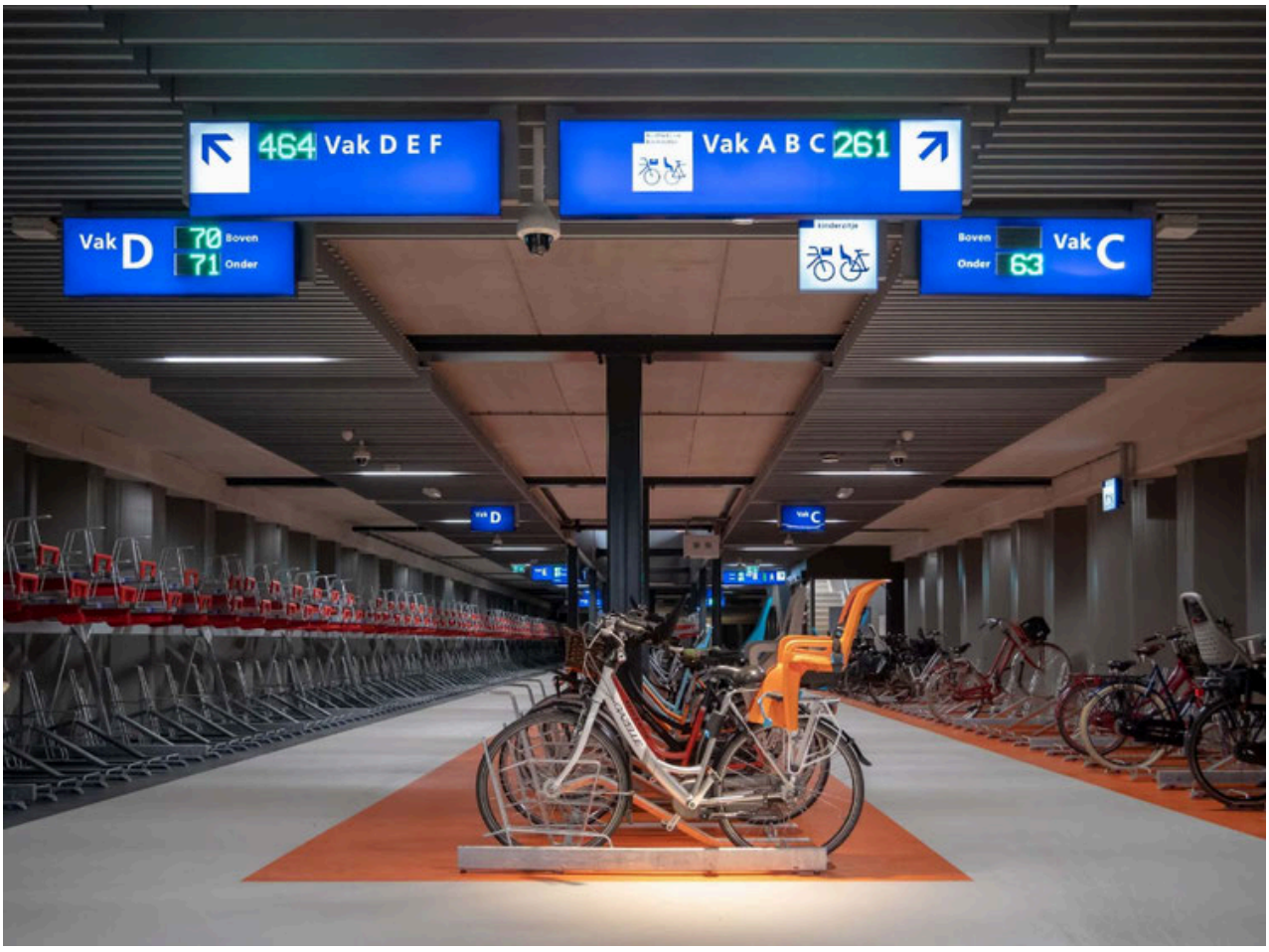
Dutch bicycle parking systems, notably in cities like Amsterdam and Utrecht, boast highly automated and technological storage solutions. These systems, driven by advanced machinery and technology, optimize space utilization while ensuring secure and convenient storage for bicycles, an example of this is the lights that indicate whether there are available parking spots, similar to car parkings. Even above the ground, street signs already indicate the number of available parking spots. This level of technological innovation is yet to be fully replicated in the current French bicycle parking setups, where for now only the Vélib bicycles have a designated parking space indicator.

Dutch companies have demonstrated advancements in this realm, particularly in urban infrastructure projects involving bicycle parking systems. One such example is the integration of highly automated and technologically advanced storage solutions. Dutch company TKH Security specializes in developing automated systems tailored for bicycle parking, utilizing advanced machinery and technology to optimize space utilization while ensuring secure and convenient storage for bicycles. Furthermore, TKH Security's expertise extends to creating the aforementioned indicators that display available parking spots, streamlining access and enhancing user convenience. This technological innovation has yet to be fully replicated in the current French bicycle parking setups, making the expertise of such Dutch firms valuable in implementing technologically advanced solutions in Paris. Leveraging the proficiency of Dutch companies like TKH Security could significantly enhance the technological integration aspects of bicycle parking facilities in Paris.

Both Abel Sensors and LUMIGUIDE are similar companies that could assist in the integration of technical features in bicycle parking. Abel Sensors is a company with similar expertise that can offer real time data with smart sensor solutions, even offering an app where users can see where parking spots are available, while LUMIGUIDE, in their own words, has developed the first-ever bicycle detection system using artificial intelligence. They have developed technologies in smart bicycle and car parking management that helps commuters to find available parking spaces and the municipalities to monitor their parking facilities.

Another potential candidate for this specific aspect could be Philips, a renowned Dutch multinational specializing in health technology and smart city solutions. While primarily known for healthcare and consumer electronics, Philips also operates in the realm of urban innovation, offering intelligent lighting, surveillance, and smart city infrastructure solutions. Leveraging their expertise in connected systems, they might provide solutions for energy-efficient lighting, smart sensors, or integrated technology systems suitable for bicycle parking facilities.

Innovative technical integration in Utrecht, Utrecht



Space Optimization Strategies

Paris, known for its dense urban environment, faces spatial limitations, necessitating innovative approaches to maximize available space for bicycle parking. Adapting Dutch space-efficient methodologies to fit within the constrained areas of the city without compromising accessibility or safety is a critical aspect of customization. The Dutch systems emphasize space efficiency through compact storage methodologies, such as multi-tiered bicycle racks, allowing for a greater number of bicycles to be accommodated within a limited footprint. While some aspects of this space-saving approach have been adopted in certain French bicycle parking setups, the full utilization of these strategies remains largely unexplored.

The Dutch government, with a history of promoting cycling-friendly policies, has gained considerable experience and developed innovative solutions in response to the dense urban landscapes prevalent in Dutch cities. This experience in optimizing space for bicycle-related infrastructure could greatly benefit France, particularly in cities like Paris, which also face similar challenges due to high population density.

Although France has made strides in urban planning, leveraging Dutch expertise, especially in space optimization strategies, could significantly enhance the development of bicycle parking facilities in French urban areas. Dutch companies like Falco BV, VelopA and KlaverFietsparkeren, who already have worked on similar projects, showcase proficiency in addressing space constraints by deploying multi-tiered racks and modular storage systems, proving valuable in shaping innovative solutions suitable for densely populated urban environments like Paris.

Customizing for Parisian Urban Historical Landscape

Paris, celebrated for its rich historical and architectural legacy, frequently confronts hurdles when introducing contemporary infrastructure. Adapting bicycle parking solutions to harmonize seamlessly with the city's architectural heritage is pivotal. It is essential to highlight the aesthetic integration while safeguarding the city's cultural essence during the adaptation phase. A prime example of effectively addressing this aspect from Dutch practices was seen in the construction of a bicycle parking facility in Maastricht. Situated within a protected urban heritage area renowned for its architectural significance, the city achieved a parking space accommodating over 3000 bicycles without altering the established street layout.

Engaging a Dutch company for designing bicycle parking solutions in Parisian urban landscapes would offer the French significant advantages, as they have experience integrating cultural heritage with bicycle infrastructure. As mentioned before, Dutch firms also excel in optimizing space in densely populated cities, which aligns perfectly with Paris's spatial challenges. Collaborating with Dutch companies provides access to their specialized knowledge in historical preservation, architectural integration, and space-efficient design. This ensures that the new bicycle parking infrastructure harmoniously integrates with Paris's rich cultural and architectural heritage. Architectural firms like MVRDV and MTDLS, who have experience with these projects, such as the bicycle parking in Maastricht mentioned above, could assist the French. On top of that, Arcadis could offer its guidance regarding heritage preservation, sustainability and urban design, as they have international experience in consulting similar projects.

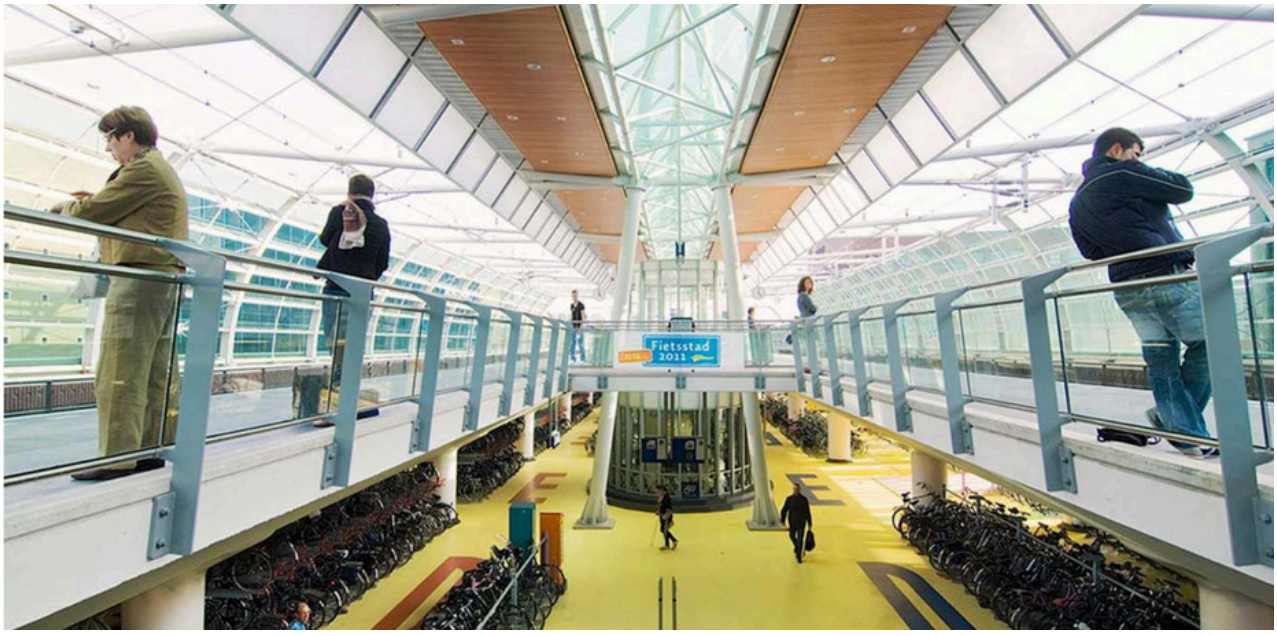
Parking entrance customized to the urban landscape in Maastricht, Limburg

Intermodal Connectivity

Integrating bicycle parking facilities effectively with existing public transportation hubs and intermodal transit networks in Paris is essential. Enhancing seamless connectivity between cycling and other modes of transportation contributes significantly to encouraging bicycle usage and reducing dependency on motor vehicles. A Dutch example of solving this issue is the bicycle parking in the train station of Houten, where the bicycle parking offers direct access to the train platforms.

Goudappel and Mobycon, prominent Dutch firms specializing in mobility solutions, excel in designing mobility hubs that seamlessly connect bicycle sheds with other means of public transportation, like buses and trains. Their track record in creating cyclist-friendly access to (train) stations may surpass many French companies, making them ideal choices to enhance intermodal connectivity in France. With proven success in executing similar projects, they employ innovative designs to facilitate easy navigation for cyclists, encouraging increased bicycle usage and reducing reliance on cars.

Intermodal connectivity at the train station in Houten, Utrecht

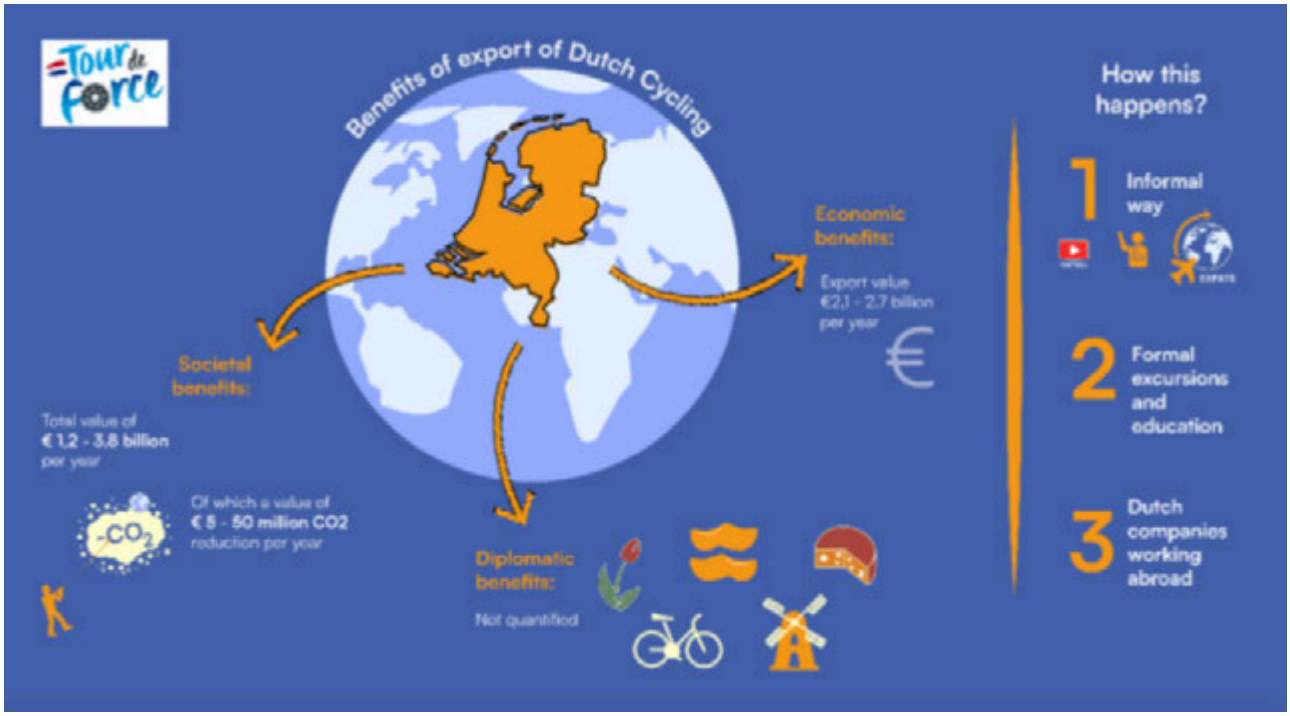


6. Creating a blueprint for a Public-Private Partnership

Understanding Existing Connections

The existing trade relationship and knowledge exchange between the Netherlands and France in the field of sustainable mobility predominantly revolves around the import and export of the bicycles itself and their components. Decisio's research highlighted the significant export value of bicycles from the Netherlands, estimating this to fall between 1.2 to 3.8 billion euros annually (pictured below). Furthermore, the introduction of services like Swapfiets in France has been instrumental in bringing Dutch bicycle-sharing services to the French market, expanding the options for French consumers.

Overview of the bicycle trade by Decisio



In terms of knowledge exchange, notable collaborations and information sharing occur through initiatives involving NextMove, the Dutch Cycling Embassy, de Rijksdienst voor Ondernemend Nederland (RVO) and the Embassy of the Kingdom of the Netherlands in France. These collaborations often entail organized field trips for French partners and interest groups, enabling them to witness the best practices and cycling infrastructure established in the Netherlands first hand. The main purpose is to connect the right parties with each other and to show examples of Dutch cycling knowledge to foreign parties. After having spoken with the Dutch Cycling Embassy, they expressed their interest in sharing this research proposal with their network, in order to get more parties involved if needed.

Another Franco-Dutch party that has been actively involved both lobbying for more bicycle storage as a stakeholder and focusing collaboration with the right parties, is Holland Bikes. As mentioned in the previous chapter, Holland Bikes is a French-Dutch company founded in 2002, who grew to be one of the biggest bicycle-tour operators and Dutch bicycle selling point in Ile-de-France. They meet up with parking facilitators like Indigo Parking, to lobby for more bicycle space in existing car parking spaces, as they are already storing 5000 bicycles in car parkings nowadays.

Creating a Consortium

To create a parking space for bicycles using Dutch expertise, a collaborative consortium can be created, integrating a diverse array of Dutch and French entities from both public and private sectors. This collective effort aims at establishing an ecosystem that harmonizes technological innovation, public infrastructure, and private investments, fostering sustainable and integrated solutions for modern urban challenges. Therefore, this section will aim at identifying the right parties that could take part in such a consortium, consisting of Dutch, French, public and private partners. It will be divided into three different types of partners:

1. Possible investors and clients that would give the assignment or provide funding to carry out the project;
2. Actors providing specific solutions for the realization of the parking;
3. Integrative actors, who oversee the process from start to finish.

Possible investors or clients

After having spoken with Decisio and Arcadis, who both have had experience in carrying out and overseeing the implementation and usage of bicycle parking spaces, we concluded that the demand for such a parking solution more often than not comes from the public sector. Most of the time, municipalities, local and national governments initiate and fund the idea of creating bicycle parking. In Paris, these clients would most likely be the Municipality of Paris and the local government of Ile-de-France.

In some cases, albeit both Arcadis and Decisio made clear this is not very often, demand could also come from private project developers, who would like to create a parking lot for their building. The project developers we have spoken to expressed interest in Dutch expertise, for as long as it is the most (cost)efficient way to include bicycle parking. They mentioned that in the private sector, there is no specific need for a company of French origin to win a tender and they welcome the most pragmatic solution. However, since this paper aims at public private partnerships and the French public sector has already expressed interest in creating more bicycle parking availability, we would prioritize demand coming from the public sector.

Integrative Dutch actors

Regarding the integrative actors, Dutch consultancy firms Decisio and Arcadis, experienced in analyzing costs and benefits as well as in landscape architecture, play fundamental roles in these projects. They offer expertise necessary for developing bicycle parking spaces. At Arcadis, their team ranges from advisors and consultants to the actual mechanics. Their insights into financial feasibility and their involvement in designing, planning, and executing these projects are essential. Moreover, they can set up and manage consortia involving various stakeholders, showcasing their ability to coordinate collaborative efforts effectively and to evaluate the user experience. The Dutch branch of Arcadis mentioned specifically that they have specialized expertise in analyzing the user friendliness for all types of cyclists, ranging from children to elders and from sportsmen to commuters. They are also experienced in developing a 'master plan', this refers to a plan that not only describes the practical execution of the project but also incorporates the right location and anticipates the future users of the parking.

Decisio and Arcadis serve as key players capable of facilitating the development of sustainable and accessible bicycle parking solutions in collaboration with public and private entities. Additionally, Decisio has expressed interest in expanding on the French market, already having done a bicycle infrastructure project in Bordeaux. Arcadis has an office in Paris with French speaking mobility experts, which puts them in an excellent position to handle the bilateral communication between French and Dutch parties. In the Paris region, Holland Bikes could serve as a consultant and connector, since they already established connections with relevant stakeholders and have acquired lots of expertise over the last 20 years. Potentially, this player could lead the consortium as well, in order to facilitate clear communication between both French and Dutch, public and private parties.

Actors providing specific Dutch solutions

As mentioned in the previous chapter, the Netherlands offers several types of expertise and technical tools that French bicycle parkings currently have limited access to.

The overall construction of the parking lot would most likely be done by a French contractor, as the use of local parties is preferred, however some of the more technically advanced bicycle elements could be carried out by a Dutch company. Goudappel and Mobycon could provide expertise on creating a smooth transition from the parking to the train or bus platforms (intermodal connectivity), while companies like Philips, TKH Security, Abel Sensors and LUMIGUIDE could assist in providing the technology needed to put bicycles in the right spatial order and the implementation of the light system that indicates the pathways and the available parking spots. These parties can even provide AI software connected to special apps for both the parking owners and the users to monitor the parking in order to stay updated on the capacity and the appropriate signage.

Falco BV, VelopA and KlaverFietsparkeren offer the specific parking structures in order to stack the bicycles in the most space efficient way. Their structures also take into account the different range of bicycles that can be parked in such a parking lot, ranging from cargo-bicycles to tandems and from bicycles with children's seats to electric bicycles.

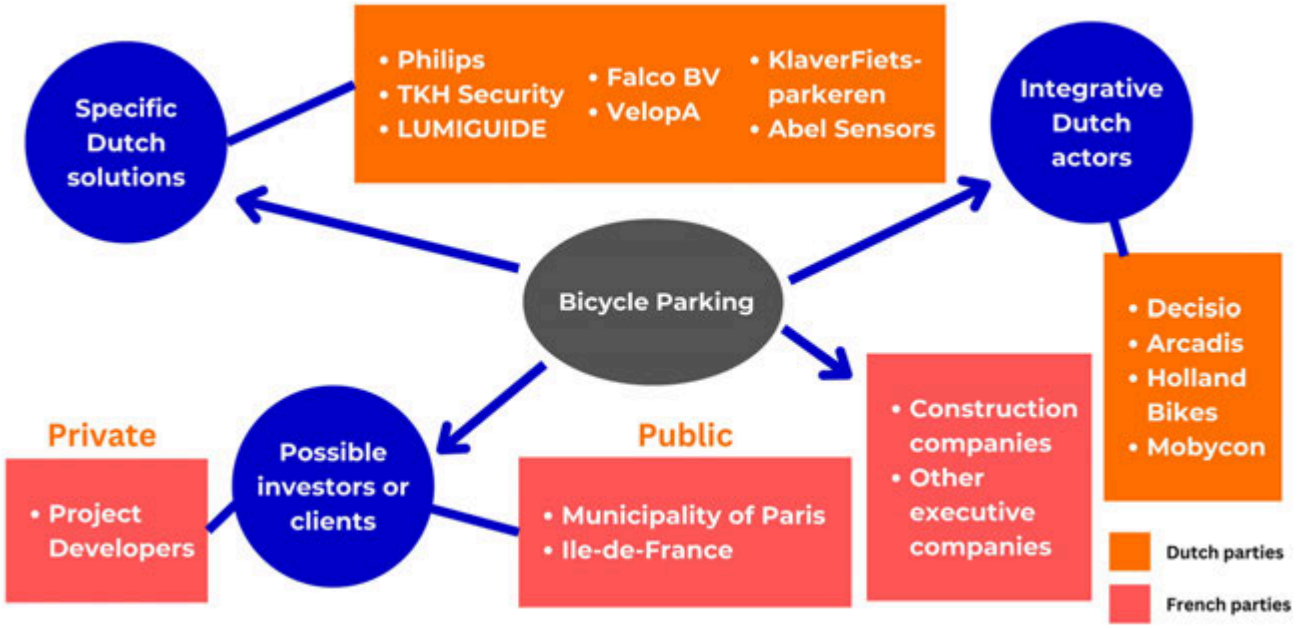
As for the exploitation of the parking, if the Dutch example would be followed, it would mean that most of the parkings would be manned 24/7. It would be up to a French company or the public partner to provide personnel to occupy the parking, as the staff would need to be local due to language and availability.

Lastly, architectural firms such as MVRDV (who also have a French office located in Paris) and MTLDS could provide support in creating the overall design of the parking space, in order to integrate it into the already existing landscape.

An overview of the consortium

The project is anticipated to involve a French public entity as the primary issuer of the assignment, with a possibility of involvement from a private project developer. A Dutch consultancy firm would spearhead the project's execution, taking charge of overseeing its implementation and crafting a cost-benefit analysis based on their previous experience in the Netherlands. The construction and implementation phase would enlist a collaboration between Dutch and French companies, primarily leveraging the specialized expertise and tools related to bicycles provided by Dutch companies, thereby integrating their proven 'Dutch solution' into the project. Outlined below is the composition of the consortium and a table indicating the different parties with their corresponding level of interest.

Overview of the structure of the consortium



Overview of the Dutch parties involved (conversations have been initiated and are ongoing to verify interest and participation in such a project)

Party	Specialization	Can manage projects independently if only related to bicycle parking?
Philips	Intelligent lighting, surveillance, and smart city infrastructure solutions	Yes, specialized in one compoment of the parking
TKH Security	Automated systems tailored for bike parking	Yes, specialized in one compoment of the parking
Lumiguide	Bicycle detection system using artificial intelligence	Yes, specialized in one compoment of the parking

Party	Specialization	Can manage projects independently if only related to bicycle parking?
Abel Sensors	Real time data with smart sensor solution	Yes, specialized in one compoment of the parking
Falco BV	Multi-tiered racks and modular storage system	Yes, specialized in one compoment of the parking
Velop A	Multi-tiered racks and modular storage system	Yes, specialized in one compoment of the parking
Klaver Fietsparkeren	Multi-tiered racks and modular storage system	Yes, specialized in one compoment of the parking
Mobycon	Designing intermodally connected mobility hubs	In need of a French partner
Arcadis	Planning, designing and building the parking	Can manage projects independently
Decisio	Cost-benefit analyses, assessing the economic viability and advantages of infrastructural developments	Can manage projects independently
Holland Bikes	Bike rental and lobbyist	Can manage projects independently

7. Conclusion

In conclusion, the surge in cycling as a primary transportation mode in Paris, accelerated by the COVID-19 pandemic and in line with worldwide sustainability efforts, offers a chance to integrate inventive bicycle parking solutions. The public sector's demand, typified by Île-de-France Mobilités' aspiration to broaden bicycle parking facilities, signifies the city's commitment to sustainable urban mobility.

This proposal seeks to leverage a consortium of Dutch companies offering a 'Dutch Solution,' characterized by the Netherlands' expertise in cycling infrastructure and bicycle parking facilities, as a means to address Paris's increasing demand for secure, space-efficient, and sustainable bicycle parking, in order to answer the research question: "*Which solutions can a Dutch consortium propose to meet the French demand for bicycle parking garages, considering the increasing demand for cycling, space optimization, sustainability, theft prevention, and the need for secure facilities?*"

The research outlines the critical challenges and opportunities faced by Paris in transforming its bicycle parking infrastructure to accommodate the rising demand for cycling as a sustainable mode of transportation. Paris has showcased commitment and progress in fostering a bicycle-friendly city, but challenges persist in accessibility, safety, and space efficiency for bicycle parking facilities. This was exemplified by the bicycle parking situation at Gare de Lyon and other major transportation hubs.

This paper has listed the components integral to a high tech bicycle parking. It identified specific areas in which Dutch expertise and innovation could significantly contribute to optimizing bicycle parking in Paris. These crucial elements encompass a clear cost-benefit analysis, leveraging extensive experience, innovative technological integration, strategies for space optimization, customization tailored to Paris's urban historical landscape, and the enhancement of intermodal connectivity and has matched them with the right Dutch companies that could provide such knowledge.

Based on this information, the proposed consortium embodies collaborative efforts involving French public entities driving project initiation, Dutch consultancies leading project execution, and a combined endeavor integrating established 'Dutch solutions' into the bicycle parkings. This strategic partnership leverages Dutch expertise to address challenges within Paris's urban landscape, thereby transforming and enhancing its cycling infrastructure. Identified public investors, predominantly the Municipality of Paris and the Ile-de-France local government, play key roles in the consortium.

Dutch consultancy firms, notably Decisio and Arcadis, with proficiency in cost-benefit analyses and landscape architecture, facilitate seamless project coordination.

Additionally, specialized Dutch solution providers like Goudappel, Mobycon, Philips, TKH Security, Falco BV, VelopA, and KlaverFietsparkeren contribute advanced technological and structural innovations tailored for efficient bicycle parking, ensuring the integration of Dutch ingenuity while considering local intricacies and preferences. This collaborative effort aims to reshape and optimize Parisian bicycle infrastructure through the fusion of Dutch expertise and Paris's urban fabric.

In summary, the integration of Dutch expertise into Parisian bicycle parking infrastructure presents a comprehensive solution, aligning with the city's commitment to sustainable urban mobility. Encouraging continued dialogue, networking, and concerted efforts among stakeholders will be pivotal to realizing the shared vision of enhancing urban mobility through collaborative initiatives. This proposal aims to offer transformative Dutch solutions while allowing room for French public and private actors to participate. The goal is to merge expertise from both nations, creating a more cyclist-friendly and efficient urban landscape in Paris, and potentially extending these improvements to other cities across France.

8. Bibliography

Websites

Bezema, M. (n.d.). Bicycle parking in the Netherlands. European Cyclists' Federation. Retrieved from https://ecf.com/sites/ecf.com/files/Bezema.M_Bicycle_parking_in_the_Netherlands.pdf

European Cyclists' Federation. (n.d.). Ambitious plan will make Paris 100% cycling city by 2026. Retrieved from https://ecf.com/news-and-events/news/ambitious-plan-will-make-paris-100-cycling-city-2026

Falco. (n.d.). Retrieved from https://www.falco.nl/?gclid=Cj0KCQiA1rSsBhDHARIsANB4EJZzHDJAPSVa4HESU2l0HHeksFuwL3dyeYXSa4hUwdI_36fsaRb59TUaAiBlEALw_wcB

Femina. (n.d.). Classement gares les plus frequentees en France. Retrieved from https://www.femina.fr/article/classement-gares-les-plus-frequentees-en-france

Fietsberaad. (n.d.). Exportwaarde Nederlandse fietsensector. Retrieved from https://www.fietsberaad.nl/Kennisbank/Exportwaarde-Nederlandse-fietsensector-(1)

France24. (2018, October 19). France congestion charge: Paris to reduce traffic jams and cars. Retrieved from https://www.france24.com/en/20181019-france-congestion-charge-paris-reduce-traffic-jams-cars-transport

Maastricht Beleid. (2020). Actieplan Fietsparkeren in Maastricht. Retrieved from https://www.maastrichtbeleid.nl/beleidsinformatie/Beleidsinformatie/2020/Actieplan%20Fietsparkeren%20in%20Maastricht/Actieplan%20Fietsparkeren%20in%20Maastricht.pdf

Mobility Lab. (n.d.). Four ways that reliable bicycle parking encourages new riders. Retrieved from https://mobilitylab.org/research/bicycle/four-ways-that-reliable-bicycle-parking-encourages-new-riders/

Paris.fr. (n.d.). Test: Stationner son vélo. Retrieved from https://www.paris.fr/pages/test-stationner-son-velo-7525

Paris je t'aime. (n.d.). Paris by bicycle: Practical information. Retrieved from https://parisjetaime.com/eng/article/paris-by-bicycle-practical-information-a859

ProRail. (n.d.). Ondergrondse fietsenstalling Maastricht geopend. Retrieved from https://www.prorail.nl/nieuws/ondergrondse-fietsenstalling-maastricht-geopend

Rijksdienst voor Ondernemend Nederland (RVO). (2023, July). International earning potential of the Dutch bicycle sector. Retrieved from https://www.rvo.nl/sites/default/files/2023-07/International-earning-potential-Dutch-bicycle-sector.pdf

SDSV. (2020). Retrieved from https://www.iledefrance-mobilites.fr/medias/portail-idfm/c8cffdfa-b77e-4a82-b6ed-dcdc4e57a4ae_SDSV_2020_Web.pdf

UITP. (n.d.). Average daily ridership during a work day in Paris. Retrieved from https://citytransit.uitp.org/paris/average-daily-ridership-during-a-work-day

Van Oosteren, S. (2013, July 17). Quand le lobby automobile veut imposer le casque aux cyclistes. Le Monde. Retrieved from https://www.lemonde.fr/blog/transports/2013/07/17/quand-le-lobby-automobile-veut-imposer-le-casque-aux-cyclistes/

Reports

Arcadis France. (n.d.).

Arcadis The Netherlands. (n.d.).

Decisio. (n.d.).

Dutch Cycling Embassy. (n.d.).

Embassy to the Kingdom of the Netherlands in France. (n.d.).
Mobycon. (n.d.).

MVRDV. (n.d.).

NextMove. (n.d.).

Interviews

AbelSensors. (n.d.).

Douze Point Cinq. (n.d.).

Stein van Oosteren. (n.d.).

This is a publication of
Netherlands Enterprise Agency
Prinses Beatrixlaan 2
PO Box 93144 | 2509 AC The Hague
T +31 (0) 88 042 42 42
Contact
www.rvo.nl

Publication number: RVO-141-2024/RP-INT

NL Enterprise Agency is a department of the Dutch ministry of Economic Affairs and Climate Policy that implements government policy for Agricultural, sustainability, innovation, and international business and cooperation. NL Enterprise Agency is the contact point for businesses, educational institutions and government bodies for information and advice, financing, networking and regulatory matters.

Netherlands Enterprise Agency is part of the ministry of Economic Affairs and Climate Policy.