



# The future of the bicycle industry 2042

The role of the bicycle industry in the transformation of transport and employment

Scenario study  
by White Octopus and freifahrt





# Imprint

**Study: The future of the bicycle industry 2042**

The role of the bicycle industry in the transformation of transport and employment

**July 2022**

**Publisher**

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**ISBN 978-3-00-072969-0**

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# About this study



# About this study

Cycling is experiencing a boom. For example, 41% of people between the ages of 14 and 69 in Germany say they want to cycle more in the future.<sup>1</sup> Cycling is good. It is beneficial for your health, it protects the climate and saves valuable resources. And, together with walking and public transport, it plays an important role in the transport transformation combatting climate change.

These benefits mean that cycling is now playing an important role in the debate concerning the transformation of transport and employment. The range of topics under discussion is extensive. It covers issues such as the construction and expansion of safe cycle paths in urban centres and rural areas, and also new models of usage such as bike leasing for employees. The debate concerns social acceptance, the use of new e-bikes and cargo bikes and new technological features. The reporting of these issues in the media is correspondingly wide-ranging.

Yet the bicycle industry itself is hardly ever discussed in this socio-political discourse – which makes it all the more interesting to examine.

We are bicycle industry stakeholders and supporters. We develop bicycle products and services – and we help design bicycle infrastructure.

But we also work together with players from other industries in the mobility sector. We see that they are increasingly focusing on their economic and social role. So we asked ourselves:

*What role will the bicycle industry play in the next few years if we are to become serious about the transport transformation? What products, positions and standpoints are important for the industry? And where does the industry see itself in the future?*

We, the teams from **White Octopus** and **freifahrt**, have, therefore, conducted a scenario study and looked 20 years into the future.

Our initial hypothesis was:

*The bicycle industry will have to undergo major changes in order to become a strong player in the transport transformation. It needs to become a player whose word carries weight in industrial policy, who confidently formulates visions and makes clear political demands.*

In our view, the bicycle industry in Germany is still far from actually achieving this – and, therefore, there is a long way to go before the industry can play a stronger role in the transport transformation.

To better understand who or what the bicycle industry will be in the future, we involved industry experts in the scenario process. In two iterations, we have jointly examined areas in need of action in the bicycle industry, identified the most important key factors and developed projections for the future.

This scenario study has enabled us to arrive at a `self-evaluation` of the industry. The experts, working together with us, have drawn up a desirable and a realistic view of the bicycle industry in 2042. In this study we demonstrate this self-evaluation – we reflect on it and we show ways to achieve a strong bicycle industry.

We would like to thank the experts who supported this study and made it possible.

For the **White Octopus** team  
Ingo Kucz

For **freifahrt**  
Sebastian Hofer

<sup>1</sup> vgl. BMVI (2021)



# 1. Summary



# 1. Summary

This study, based on the views of experts from the wider bicycle industry, compares possible developments in the bicycle industry up to the year 2042.

- In a desirable scenario for 2042, the experts outline the essential elements of a successful transport transformation and a strong bicycle industry.
- In a realistic scenario for 2042, the experts demonstrate which development they consider achievable.

## The main findings of this study are:

Many factors of similar importance play a significant role in the future of the bicycle industry. Unlike in other industries, where there are just a few decisive factors, in the bicycle industry there is an interplay between a large number of factors. Thus, the success of the industry depends on addressing all these important factors at the same time (see chapter 3).

- According to our experts, the nine most important factors influencing the future of the bicycle industry are (see chapter 4):

- *Social acceptance of cycling*
- *The role of civil society in urban development*
- *Level of state funding for cycling infrastructure*
- *Expansion of cycling infrastructure in the city and surrounding areas*
- *Competition for skilled workers*
- *Relocation of production*
- *Worker mobility*
- *The user experience*
- *Further development of the core business and the opening up of new user groups*

- There is a large discrepancy between the desirable and the realistic scenarios in 2042. The experts interviewed do not consider it realistic that the bicycle industry will be able to play a decisive role in transport transformation in the next 20 years. And they consider it unrealistic that bicycle-centred transport and the necessary infrastructure for cycling will emerge in the next 20 years. Nevertheless, they consider these developments desirable in order to achieve the transport transformation and to strengthen the bicycle industry (see chapter 5).

- The experts have a largely unanimous view of the desirable scenario for 2042, in which a bicycle-centred mobility model has been established in Germany and good and extensive cycling infrastructure has been created. The bicycle industry is innovative and can compete with other industries as an attractive employer (see chapter 5.2).
- However, the experts do not agree on the realistic scenario for 2042. There is a wide palette of factors for change that are perceived to be realistic. These involve factors over which the bicycle industry has limited influence as well as developments that it can actively influence (see chapter 5.3).
- The comparison of the two scenarios shows a need to take action to transform a realistic scenario into a desirable scenario. An industry that does not believe in a desirable vision will have difficulty in achieving its aims (see chapters 5.4–5.9).



## 2. **The scenario process**





## 2. The scenario process

Our scenario process consists of the following steps. <sup>2</sup>

1. In a longlist, we have collated the 39 most important factors influencing the bicycle industry in 2042 (see chapter 3).
2. The experts assessed these 39 influencing factors by answering the following questions:

- **Importance of the influencing factor:** *How relevant is the factor for a successful transport and employment transformation from the perspective of the bicycle industry?*

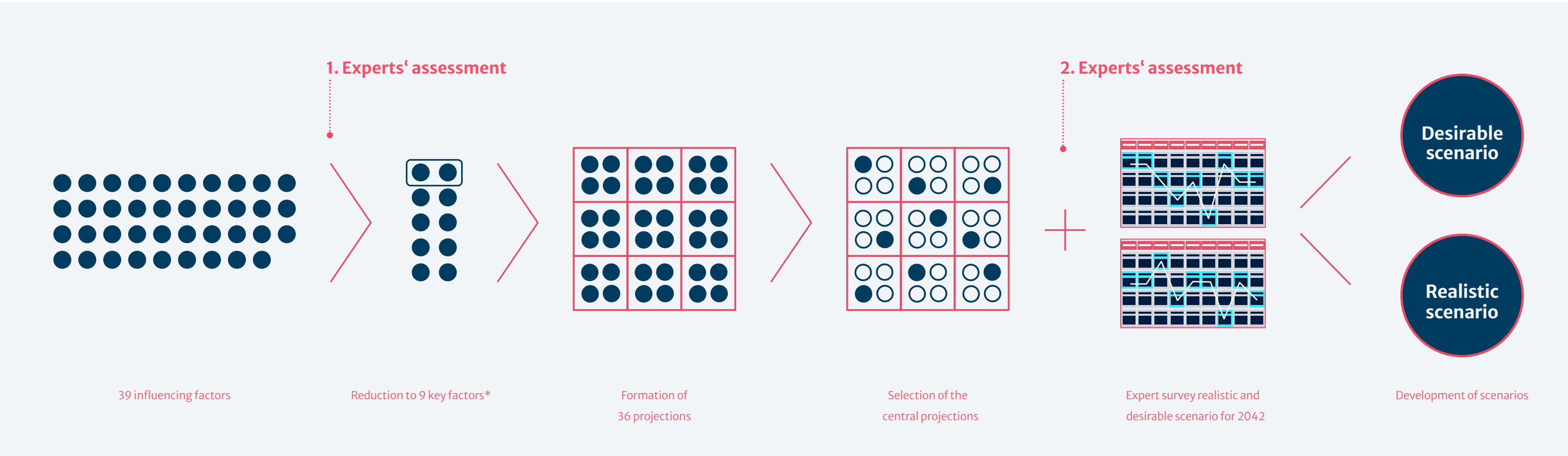
- **Need to act:** *How much action does the bicycle industry need to take?*

3. The nine most important influencing factors in this survey form the framework of the scenarios. We have described these and developed four projections for each influencing factor (see chapter 4).
4. The experts formed two scenarios from the projections (see chapter 5).

The questions here were:

- What is the **realistic scenario by 2042?**
- What is the **desirable scenario by 2042?**

5. In the last step, we analysed and compared the experts' assessments and derived recommendations for action.



\* Based on the experts' assessment, we have merged two influencing factors for the scenario construction (see chapter 3.1)

<sup>2</sup> Based on Kosow/Gaßner (2008)



# 3.

## Selection of key factors



## 3. 1. Selection of key factors for the 2042 scenario

The selection of the most relevant key factors was not easy. Some decisive key factors were indeed quickly identified on the basis of the experts' assessment (e.g. competition for skilled workers or the level of state infrastructure investment), but the evaluation of those influencing factors available for selection was, in general, close (see Fig. 2). It is worthy of note that such a dense cluster in the upper right quadrant was only rarely found in the scenario projects that we have carried out in various other sectors. Usually a few very important key factors prevail. Other less important factors follow – often with a large gap between the important and the less important factors.

In this case it is different: we see that almost all of the 39 factors offered for selection are grouped together in the quadrant at the top right. This means that all factors are similarly significant. This is at least remarkable and allows us to draw the following initial conclusions:

- The bicycle industry should address all factors to achieve a successful transformation of transport and employment. Prioritisation of factors is possible, but difficult – especially since some of the factors are interconnected, i.e. they influence each other.
- Some of the factors considered to be very important describe the fundamentals necessary for a successful bicycle industry that have, so far, not been under the industry's control, or only to a limited extent. These include, for example, the expansion of cycling infrastructure, the level of infrastructure financing, the social mobility model or the role of civil society in urban development. Unlike more mature industries in the mobility sector, important fundamentals for a strong bicycle industry are therefore lacking or only partially present.

### Our first questions for the bicycle industry:

- How does the bicycle industry manage to address all factors simultaneously?
- How does the bicycle industry cope with the fact that some very important factors are outside its direct influence?





# 3.1 Result of the first panel of experts

Result of the experts' assessment:\*

\*The experts had the opportunity to rate the importance of the influencing factors and the need to act on these factors on a scale from 1 to 4.

- 1 = low relevance/low need to act,
- 2 = moderate relevance/moderate need to act,
- 3 = high relevance / high need to act,
- 4 = very high relevance/very high need to act.

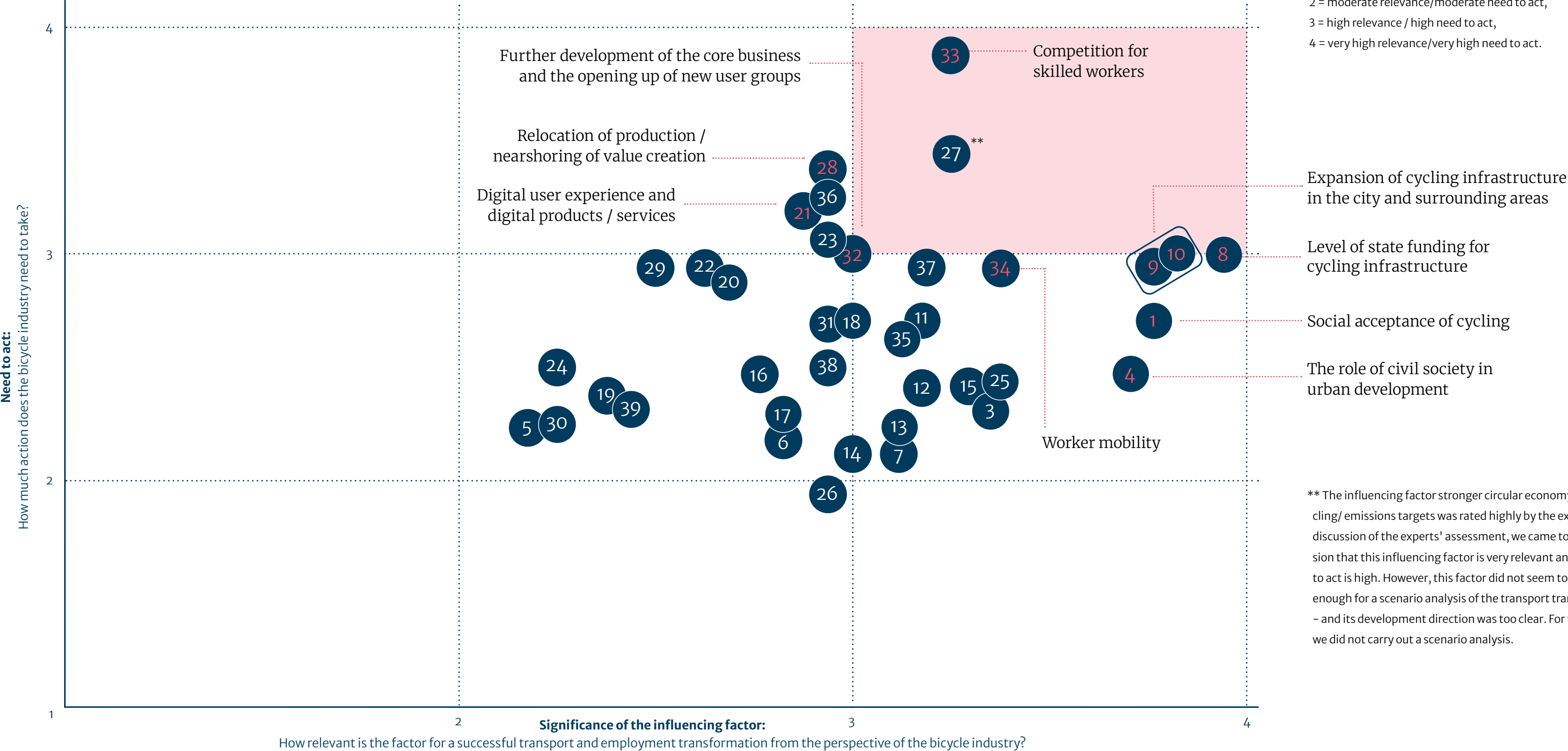


Fig. 2: Selection and evaluation matrix of key factors



## 3.2 Key factors and future projections

Experts identified the most important key factors for scenario construction. To this end, they assessed the importance of these factors and the need for action by the bicycle industry (see Fig. 3).

### Society

#### 1. Social acceptance of cycling

(e.g. perception of the bicycle as a serious means of transport).

2. The bicycle as a status/lifestyle product  
(e.g. role models such as celebrities or politicians)

3. Importance of road safety education in schools  
(e.g. at school / cycling to school)

#### 4. The role of civil society in urban development

(e.g. through bicycle referendums, district/ neighbourhood initiatives)

5. Change in shopping behaviour (online/stationary)  
(e.g. shift to buying food online)

6. New forms of work / New work  
(e.g. flexible work, cloud work, new gig jobs, etc.)

7. Role models and life models  
(e.g. societal/family roles, family structures, changes in living arrangements)

### Politics

#### 8. Level of state funding for cycling infrastructure

(e.g. Federal Transport Infrastructure Plan, Climate Protection Programme 2030)

9. Expansion of cycle highways from the city to the surrounding areas  
(incl. commuter transit mobility hubs)

#### 10. Expansion of urban cycling infrastructure

(e.g. rededication of traffic routes, expansion of public bicycle parking, battery charging infrastructure)

11. Financial support for private/commercial cycling mobility  
(e.g. purchase incentives, company bikes, taxation dependant on distance and mode of transport, mobility budgets)

12. Implementation of 15-minute city /  
traffic calming of neighbourhoods and cities  
(e.g. superblocs, local blocks, car-free inner cities, creation of social infrastructure in the immediate living environment)

13. Development of motorised private transport subsidies  
(e.g. commuter allowance, company car, parking fees)

14. Implementation of municipal modal split targets  
(e.g. implementation of targets in urban/mobility development plans)

15. Development of public transport and transfer points  
(e.g. public transport provision and network incl. mobility hubs)

16. Implementation of Vision Zero (=zero traffic fatalities)  
(e.g. dealing with danger points in roads, 30 km/h speed limit, protected bike lanes)

17. Land fairness as a political goal  
(e.g. rededication of traffic areas and public spaces)

18. Availability of mobility data  
(e.g. identification & use of mobility data, data-based forecasts of behaviour, demand and traffic).

### Technology

19. Potential for automation in production  
(e.g. AI, robotics, autonomous logistics)

20. Potential for material and production innovations  
(e.g. smart textiles, local manufacturing, C2C potential)

#### 21. Digital user experience and digital products/services

(e.g. smart bikes, app interfaces, digital locks for B2B, B2C rental systems)

22. Importance of new product segments  
(e.g. Canyon Future Mobility Concept, PodBikes, etc.)

23. Further development of safety features  
(e.g. airbags, turn assist, V2X communication, cameras and sensors in the environment and products)

24. Development of integrated design as a desirability factor  
(e.g. Canyon Bikes, Cowboy, Vanmoof)

### Ecology

25. Dynamics of climate and environmental regulation  
(e.g. emissions trading in the mobility sector, particulate pollution)

26. Success of local adaptation and resilience strategies  
(e.g. shading of public squares and cycle paths, greening of urban spaces).

27. Stronger circular economy / recycling / emissions targets  
(e.g. recycling of batteries and, if necessary, entire bicycles, objective of industry networks such as the WFSGI, Shift Cycling Culture, CIE)

### Economy

#### 28. Relocation of production / nearshoring of value creation

(e.g. closer to metropolitan areas, within the EU)

29. Automation of R&D / production steps  
(e.g. through the use of robotics, collaborative tools)

30. Change in the number and size of bicycle companies  
(e.g. consolidation through M&A activities)

31. Entry of new (innovative) bicycle companies, companies from outside the sector and parts manufacturers  
(e.g. Fazua, Vanmoof, Cowboy, companies from other sectors becoming bike OEMs, for example entry of the car industry)

#### 32. Further development of the core business and the opening up of new user groups

(e.g. in the direction of micro mobility, subscription models (Dance, Swapfi-ets), B2B growth paths with large fleet operators, vehicle and equipment rental offers).

#### 33. Competition for skilled workers

(e.g. mechatronics technicians, digital development incl. development of wage levels in the sector compared to competing sectors)

#### 34. Worker mobility

(e.g. mobility budgets, bike/fitness bonus, bike fleet, provision of showers for workers, company bikes)

35. Shifting delivery & commercial transport to micro logistics vehicles  
(Rollout city logistics, shift to micro logistics)

36. Professionalisation in production and logistics  
(e.g. batteries & chargers, displays, storage standards, just-in-time forecasting)

37. Professionalisation of the retail trade  
(e.g. repair times and availability of online booking, improved shopping experience, online services, ability to repair third-party brands)

38. Development of the used bike market  
(especially for high-quality bikes and / or leasing returns)

39. Growth and differentiation of the accessories range  
(e.g. commuter clothing, bike fashions that are compatible with everyday life, affordable bike fashion, digital assistants)



# 4. **Key factors and projections**





# 4.1 Social acceptance of cycling

## Status quo 2022

Climate change and the desire for innovations and liveable cities make the bicycle a means of transport that is taken seriously. For example, e-bikes which reach new user groups, inspire riders with a qualitatively different experience and enable further distances to be covered. The number of e-bikes increased by 20% from 2020 to 2021. The reputation and acceptance of cycling is increasing due to its presence in the media and the efforts of local initiatives and public debates regarding the transport transformation. Cycling is also becoming more popular – the number of cyclists increased due to the pandemic.

The climate crisis increases the desire for sustainable mobility and is changing social discourse. The automobile mobility model which was previously predominant is losing support, and a bicycle-oriented mobility model is becoming more important. According to the Fahrradmonitor 2021 (an online survey in Germany), 41% of people between the ages of 14 and 69 want to cycle more often. The desire for more



Fig. 4: Unsplash, Nuno Ricardo

frequent bicycle/e-bike use is strongest among younger people (14 to 29 years) at 49%. The greatest willingness to increase the use of low-emission or zero-emission modes of transport is to be found in large cities.

## Projections 2042

1.

**Mobility model “bike-centred”**

The bicycle is gaining considerable importance in society.
2.

**Urban bicycle oases**

Urban “bicycle oases” are emerging; in rural areas the bicycle remains unimportant.
3.

**Rural areas as innovation driver**

Cycling is becoming more popular in rural areas, while acceptance is stagnating in the city.
4.

**Mobility model “car-centred”**

The bicycle cannot challenge the private car as a means of mobility.

<sup>3</sup> see Federal Ministry for Digital and Transport – BMDV (n.d.)



# 4.2 The role of civil society in urban development

## Status quo 2022

The concept of what constitutes good city life is shifting. The model of the car-friendly city is losing support and is being replaced by the model of a liveable, people-centred city. The desire for good accessibility without a car is increasing. Political goals such as the 15 minute city reinforce this trend.

Civil society initiatives are campaigning for car-free zones and liveable urban spaces, especially in the cities. These catalysts can radiate locally, but also supra-regionally. Local cycling movements and real life laboratories are of particular importance.

Changing Cities now counts 53 ongoing and completed bicycle referendums and citizens' initiatives across Germany. These call for "priority for walking, cycling and public transport", "seamless cycling networks" and the "promotion and legislation in favour of sustainable mobility".<sup>4</sup> Various bicycle referendums have already been successful and have led to politically binding action. For example, the



Abb. 5: QIMBY, Philipp Kosok

bicycle referendum in Berlin led to the first Berlin Mobility Law.<sup>5</sup> Demands made by other local bicycle referendums were implemented by politicians.

The demands of these bicycle referendums are becoming more ambitious, as the planned Berlin Car Free referendum shows. According to the initiators, Berlin should become a continuous largely car-free area.<sup>6</sup>

## Projections 2042

### 1. Traffic calming supported by civil society and politics

Politics and civil society create traffic-calmed cities.

### 2. Politics drives traffic calming

Politics implements concepts for traffic-calmed cities.

### 3. Grassroots movements prevail

Local initiatives contribute to transport transformation without political majorities.

### 4. No traffic calming

There is no political and social consensus for traffic-calmed cities.

<sup>4</sup> see Changing Cities (n.d.)  
<sup>5</sup> see Bicycle referendum (n.d.)  
<sup>6</sup> see on the current status of this project Der Tagesspiegel (2022)





# 4.3 Level of state funding for cycling infrastructure

## Status quo 2022

The *National Cycling Plan 3.0* defines various mission goals under the banner “*Cycling in Germany 2030*”. The most important goal is “*seamless cycling infrastructure in Germany*”<sup>7</sup>

The funding for seamless cycling infrastructure to be achieved by 2030 comes largely from the German federal budget. In addition to previous funding and financing amounting to approx. 560 million euros, approx. 900 million euros will now be made available from the Climate Protection Programme 2030. This means that approx. 1.46 billion euros will be available for the promotion of cycling by 2030. Further funding is being offered by the German Ministry for the Environment for the expansion of cycling infrastructure as part of the National Climate Initiative. Funding will especially focus on less well-off municipalities.<sup>8</sup>

At the European level, the Green Deal has the goal of doubling the amount of cycling infrastructure available in the EU.<sup>9</sup>

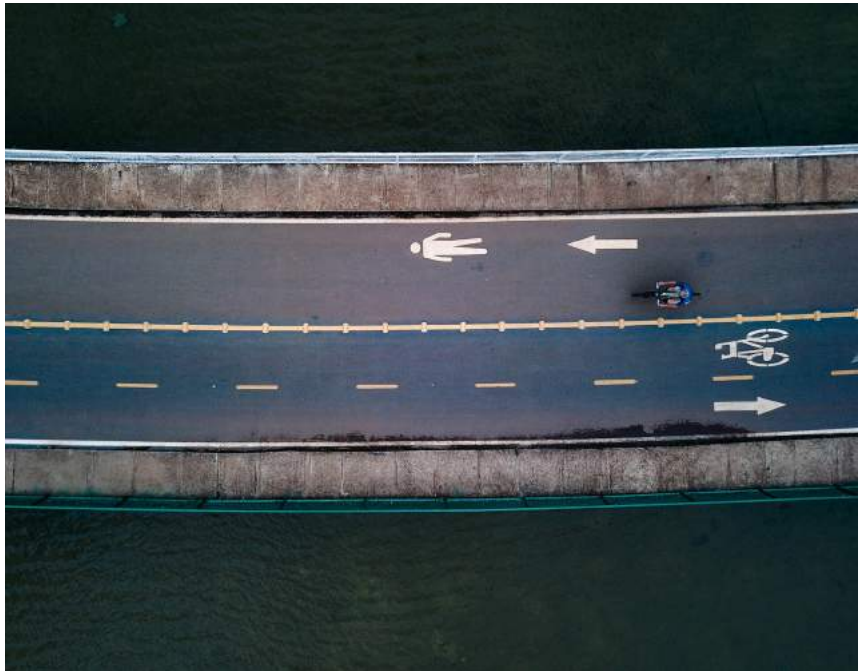


Fig. 6: Unsplash, Cande Bonfim

## Projections 2042

1.

**State funding is utilised to the full**

Cycling infrastructure is strongly supported by the state and is being expanded rapidly.
2.

**High level of funding not fully utilised**

Funding is available but not fully utilised.
3.

**Low level of funding is utilised to the full**

Little funding is made available, but this is fully utilised.
4.

**Low level of funding remains unused**

Funding is hardly used.

<sup>7</sup> see Federal Ministry for Digital and Transport – BMVI (2019)

<sup>8</sup> see General German Bicycle Club – ADFC (n.d.)

<sup>9</sup> see National Cycling Plan – NRVP (n.d.)





# 4.4 Expansion of cycling infrastructure in the city and surrounding areas

## Status quo 2022

According to the General German Bicycle Club (ADFC) guidelines for cycling infrastructure, cycling needs space, protection and infrastructure.<sup>10</sup> However, at present none of Germany's six largest cities invests more than five euros per capita per year in cycling.<sup>11</sup> The Corona pandemic and the worsening climate crisis are now causing a rethink. According to the National Cycling Plan 3.0, in future 30 euros per capita per year are to be invested in the expansion of German cycling infrastructure. But also outside the urban centres there is a lack of up-to-date cycling infrastructure, as only a quarter of Germans live in the 30 largest cities.<sup>12</sup>

Cycle highways make urban-rural connections more attractive, safer and faster. This can motivate commuters to switch to environmentally friendly cycling.<sup>13</sup>

In Germany, the majority of cycle highway projects are in the planning phase, and only a few have been completed so far.<sup>14</sup>



Fig. 7: Kieler Veloroute 10

An example of such a project is the "Ruhr RS1 cycle highway", which will be 101 kilometres long when completed and is expected to relieve the roads of 50,000 car journeys every day and thus save 16,000 tonnes of CO2 emissions per year.<sup>15</sup>

Projects in other European countries, especially in the Netherlands, are also having an impact. The standard model involves a largely car-free route with a width of about 3 metres, with two lanes, a uniform design and continuous signposting as well as a minimum length of 5 kilometres.<sup>16</sup>

## Projections 2042

- 1. Integrated and good infrastructure**  
Cycling infrastructure is expanded holistically and creates optimal connections between the city and the surrounding areas.
- 2. Integrated but poor infrastructure**  
Cycling infrastructure is developed holistically, but is of poor quality.
- 3. Good infrastructure in certain areas**  
The cycling network has only been developed in certain areas. However, the routes are of good quality.
- 4. Patchwork of cycle paths**  
The cycling network is only developed in certain areas and is of poor quality.

<sup>10</sup> see ADFC II (o. J.)  
<sup>11</sup> See Greenpeace (2018)  
<sup>12</sup> See Greenpeace (2020)  
<sup>13</sup> See German Institute of Urban Affairs – difu (2020)

<sup>14</sup> see NRVP II (o. J.)  
<sup>15</sup> see Regionalverband Ruhr (2021)  
<sup>16</sup> see NRVP II (o. J.)



# 4.5 Competition for skilled workers

## Status quo 2022

Employment in the bicycle industry has grown strongly in recent years. This growth averaged 20%. The number of employees in the core areas of the German bicycle industry increased to almost 21,000 between 2014 and 2019.<sup>17</sup>

Reasons for the positive development of the bicycle market include a boom in bicycle tourism, the introduction of the 1% rule for bike leasing to employees in 2012 and a general increase in value due to e-bikes and other innovations.

In addition, new employment is being created due to the increased relocation of production from Asia to Europe.<sup>18</sup>

The growth of the bicycle industry leads to an increased demand for skilled workers and correspondingly stronger competition to attract staff. In addition, there is an ongoing debate on quality and skilled repair services.<sup>19</sup> The long-term contribution of the bicycle industry to transport transformation, therefore, also depends on whether it can develop and/or recruit these skilled workers. Increasing



Fig. 7: Unsplash, Taylor Smith

digitalisation and electrification will also require additional skilled workers who are new to the sector.

## Projections 2042

- 1. Attractive employer**  
The bicycle industry succeeds in offering attractive working conditions and rising wages.
- 2. A sense of purpose is more important than wage levels**  
The bicycle industry scores with meaningful work and good working conditions.
- 3. Wage level as a driving factor**  
The bicycle industry prioritises high wages and neglects working conditions.
- 4. Industry not competitive as a whole**  
The bicycle industry is not competitive in the race for the best brains.

<sup>17</sup> see IAT & Wuppertal Institut (2020)

<sup>18</sup> see Bianchi (o. J.)

<sup>19</sup> see Spiegel.de (o. J.)



# 4.6 Relocation of production

## Status quo 2022

„All bicycles come from Asia“. The way the sector looks at itself has been changing for some years. The main reasons are the introduction of anti-dumping tariffs and, most recently, the enormous impact of the Corona pandemic on global supply chains.<sup>20</sup> Bicycle manufacturers are questioning production in Asia and are assessing the risks involved. As a result, production will shift to Germany and Europe.

Other reasons for relocating production are better lead times, a better environmental balance due to more sustainable production conditions and shorter transport routes.

There are also strategic reasons that make production in European countries increasingly attractive. Countries such as Bulgaria, Lithuania, Poland, Romania, Belgium and Turkey are investing in the development of new manufacturing sites and thus in the creation of new jobs.<sup>21</sup> Portugal, with its investment in `bike valley` is a pioneer in this regard. According to the president of the European Bicycle Manufacturers Association, Moreno Fioravanti, there is potential in the

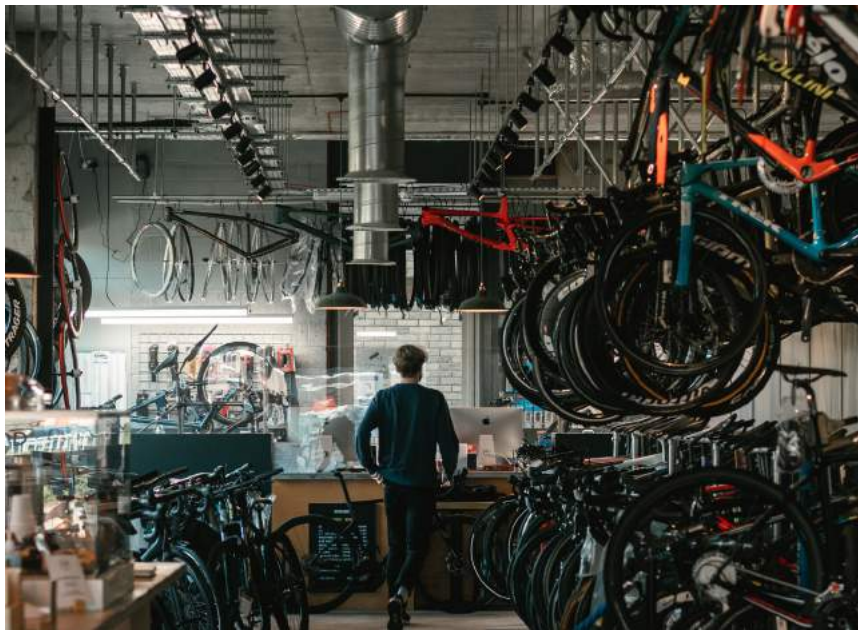


Fig. 8: Bicycle manufacturer/Unsplash, Tom Austin

EU for a production volume of up to eight million e-bikes, involving the creation of 50% to 60% more jobs, which would correspond with up to 170,000 employees.<sup>22</sup>

## Projections 2042

- 1. Production strategy**  
Small regional bicycle manufacturers are increasingly emerging in the EU and in Germany.
- 2. Regional production**  
Highly standardised components and bicycles are manufactured in the EU and Germany
- 3. Relocation of production of essential components**  
Strategic production shift of essential components to the EU and Germany.
- 4. More efficient production**  
Efficiency-driven relocation of production of standard components to the EU and Germany.

<sup>20</sup> see Bike-EU (o. J.)  
<sup>21</sup> see Bike-EU (o. J.)  
<sup>22</sup> see Radmarkt (o. J.)





# 4.7 Worker mobility

## Status quo 2022

For 71% of employees, mobility plays an important role in additional benefits.<sup>23</sup> While a company car is often still considered to be a status symbol, preferences are increasingly changing. For many employees, being in the office is no longer an absolute necessity. As a result of the Corona pandemic, the amount of people working from home has increased significantly. Whereas before the pandemic only 4% of employees worked from home, in July 2021 15% of employees in Germany stated that they worked from home. At the height of the pandemic, this figure was as high as 24%.<sup>24</sup>

At the same time, the amount and quality of mobility provision, such as company bike leasing or mobility budgets, is increasing. When using mobility budgets, users prefer sustainable forms of mobility for commuting and business trips.

In smaller companies, however, this form of employee incentive is even less common than a company car.<sup>25</sup>



Fig. 9: Bikesharing Vienna/QIMBY, Philipp Böhme

Yet the majority of companies have an interest in making commuting and business travel sustainable and associate this with better employer branding.<sup>26</sup> Carbon accounting can also lead to the promotion of cycling as part of company mobility policy.

## Projections 2042

1.

**Comprehensive sustainable worker mobility**

Companies and employees focus on sustainable mobility.
2.

**Workers push for sustainable mobility**

Employees increase pressure on those employers who cling to old patterns.
3.

**Employers push for sustainable mobility**

Companies take a lead in transport transformation through sustainable worker mobility concepts.
4.

**Worker mobility hardly changes**

No comprehensive implementation of new concepts for worker mobility.

<sup>23</sup> see Fuhrpark.de (o. J.)  
<sup>24</sup> see Hans-Böckler-Stiftung (2021)  
<sup>25</sup> see Markt und Mittelstand (o. J.)

<sup>26</sup> see SAP Concur (2020)



# 4.8 The User Experience

## Status quo 2022

The experience of the bicycle as a product is continuously evolving on both the hardware and the software level. New, integrated digital products and services offer the greatest potential. They often play an integral role in bicycles, especially in the case of higher-priced e-bikes. Apps are the interface to the e-bike hardware, which can be used, for example, to track activities or change riding behaviour settings. Features such as locking or locating functions or individual settings are already common.<sup>27,28</sup> In some cases, additional products are integrated, such as cameras in the handlebars that can be controlled by a smartphone. Smart parking systems also increasingly play a role in bike parking management. In addition to these individual applications, the availability of micro-mobility data also plays a major role, for example, in the expansion of cycling infrastructure, service offers or product/service innovations. At present, however, such data is hardly available.



Fig. 10: <https://www.simplon.com/de/Explore/Experience-Center>

At the same time, the way bicycles are sold is changing, making it easier for customers to also buy bicycles online: the proportion of bicycles purchased online increased from 8% in 2011 to 23% in 2021.<sup>29</sup>

## Projections 2042

1.

**The bicycle industry puts UX at the centre**

Bicycle industry focuses on digital and analogue user experience in hardware and services.
2.

**The bicycle at the centre of innovation activity**

The industry focuses on hardware and neglects services and product-related services.
3.

**Services as a UX driver**

The bicycle industry focuses on innovation in services and product-related services.
4.

**No consistent UX strategy**

Innovation remains small-scale and disintegrated.

<sup>27</sup> See Bosch (o. J.)  
<sup>28</sup> See Vanmoof (o. J.)  
<sup>29</sup> See Statista (2022)



## 4.9 Further development of the core business and the opening up of new user groups

### Status quo 2022

The spread of e-bikes and new vehicle forms as well as additional digital products and services bring new sales and upsell opportunities. According to the Bicycle Monitor Germany 2021 (Fahrrad- Monitor Deutschland 2021) the number of people who want to use and buy a cargo bike, mountain bike or e-bike has increased in recent years, whereas the number of people who want to use or buy a conventional bike has decreased.<sup>30</sup> Originally, e-bikes were mainly attractive for people who found it too strenuous to ride a bike. In the meantime, this perception has changed, and electric bikes can be found in all categories.

Subscription models (see Swapfiets or Dance) or leasing models provided by the employer, such as Jobrad, enable people to use high-quality bicycles and e-bikes which they previously refused to buy. Additional service offers such as repair and theft insurance expand the portfolio.

Digital apps and services also expand the core business. As fleet operators are B2B customers, they have a particular



Fig. 11: Swapfiets, Amsterdam

need for high-quality user data and are interested in tracking and analysis data.

Beyond the evolution of the classic bicycle, we are witnessing a diversification of vehicle types<sup>31</sup> due to individual preferences and applications, not only in the B2C but also in the B2B sector. There is growth potential especially in the micro logistics and company fleets sector.<sup>32,33</sup>

### Projections 2042

#### 1. The bicycle industry as a mobility service provider

The bicycle industry increasingly sees itself as a mobility service provider and attracts new customers.

#### 2. A bicycle industry under pressure

Despite its new orientation, the bicycle industry is losing user groups.

#### 3. The bicycle industry succeeds in its core business

The bicycle industry constantly expands user groups with its classic portfolio.

#### 4. The bicycle industry falls behind

Other players succeed with better products.

<sup>30</sup> see BMVI (2021)

<sup>31</sup> see Have A Go (o. J.)

<sup>32</sup> Pedelec-Elektro-Fahrrad.de (o. J.)

<sup>33</sup> ONO Motion (o. J.)





# **5. Scenarios 2042**



# 5.1 Selection of the scenarios 2042

In contrast to other scenario projects, we decided in the context of this study to reflect the input of the experts as directly as possible (see Chapters 5.2 & 5.3).

In comparing a desirable and a realistic scenario for 2042, we discuss the differences in the experts' assessments (see 5.4).

As with the selection of the key factors, we involved the experts in the selection of the scenarios. For this purpose, we moved the future projections of the key factors into a morphological box (see Fig. 12).

On the basis of our questions (see below right), the experts combined the future projections that they thought were appropriate. All experts created a desirable and a realistic scenario.

Instead of a narrative condensation or summary, we presented the desirable and realistic scenario projections 2042 in the form of a heat map in which we superimpose the experts' assessments (see Figs. 13 and 14). The colour darkens depending on how many experts stated a future projection.

## We asked the experts to form two scenarios.

Social acceptance	The role of civil society	State funding	Expansion of cycling infrastructure	Relocation of production	The user experience	Further development of the core business	Worker mobility	Competition for skilled workers
<b>Mobility model "bike-centred"</b> The bicycle is gaining considerable importance	<b>Traffic calming supported by civil society and politics</b> Politics and civil society create traffic-calmed cities.	<b>State funding is utilised to the full</b> Cycling infrastructure is strongly supported by the state and is being expanded rapidly.	<b>Integrated and good infrastructure</b> Cycling infrastructure is expanded holistically and creates optimal connections between the city and the surrounding areas.	<b>Production strategy</b> Small regional bicycle manufacturers are increasingly emerging in the EU and in Germany.	<b>The bicycle industry puts UX at the centre</b> Bicycle industry focuses on digital and analogue user experience in hardware and services.	<b>The bicycle industry as a mobility service provider</b> The bicycle industry increasingly sees itself as a mobility service provider and attracts new customers.	<b>Comprehensive sustainable worker mobility</b> Companies and employees focus on sustainable mobility.	<b>Attractive employer</b> The bicycle industry succeeds in offering attractive working conditions and rising wages.
<b>Urban bicycle oases</b> Urban "bicycle oases" are emerging; in rural areas the bicycle remains unimportant.	<b>Politics drives traffic calming</b> Politics implements concepts for traffic-calmed cities.	<b>High level of funding not fully utilised</b> Funding is available but not fully utilized.	<b>Integrated but poor infrastructure</b> Cycling infrastructure is developed holistically, but is of poor quality.	<b>Regional production</b> Highly standardised components and bicycles are manufactured in the EU and Germany.	<b>The bicycle at the centre of innovation activity</b> The industry focuses on hardware and neglects services and product-related services.	<b>A bicycle industry under pressure</b> Despite its new orientation, the bicycle industry is losing user groups.	<b>Workers push for sustainable mobility</b> Employees increase pressure on those employers who cling to old patterns.	<b>A sense of purpose is more important than wage levels</b> The bicycle industry scores with meaningful work and good working conditions.
<b>Rural areas as innovation driver</b> Cycling is becoming more popular in rural areas, while acceptance is stagnating in the city.	<b>Grassroots movements prevail</b> Local initiatives contribute to transport transformation without political majorities.	<b>Low level of funding is utilised to the full</b> Little funding is made available, but this is fully utilised.	<b>Good infrastructure in certain areas</b> The cycling network has only been developed in certain areas. However, the routes are of good	<b>Relocation of production of essential components</b> Strategic production shift of essential components to the EU and Germany.	<b>Services as a UX driver</b> The bicycle industry focuses on innovation in services and product-related services.	<b>The bicycle industry succeeds in its core business</b> The bicycle industry constantly expands user groups with its classic portfolio.	<b>Employers push for sustainable mobility</b> Companies take a lead in transport transformation through sustainable worker mobility concepts.	<b>Wage level as a driving factor</b> The bicycle industry prioritises high wages and neglects working conditions.
<b>Mobility model "car-centred"</b> The bicycle cannot challenge the private car as a means of mobility.	<b>No traffic calming</b> There is no political and social consensus for traffic-calmed cities.	<b>Low level of funding remains unused</b> Funding is hardly used.	<b>Patchwork of cycle paths</b> The cycling network is only developed in certain areas and is of poor quality.	<b>More efficient production</b> Efficiency-driven relocation of production of standard components to the EU and Germany.	<b>No consistent UX strategy</b> Innovation remains small-scale and disintegrated.	<b>The bicycle industry falls behind</b> Other players succeed with better products.	<b>Worker mobility hardly changes</b> No comprehensive implementation of new concepts for worker mobility.	<b>Industry not competitive as a whole</b> The bicycle industry is not competitive in the race for the best brains.

Fig. 12: Morphological box with future projections

### Our questions were:

How will the decisive factors for a strong role of the bicycle industry in the transport transformation realistically change by 2042?

How would the decisive factors for a strong role of the bicycle industry in the transport transformation (=desirable) have to change by 2042?



# 5.2 Desirable Scenario 2042



Fig. 13: Desirable scenario 2042, shown as a heat map







In the desirable scenario 2042, the majority of the experts describe the situation as follows (see Fig. 13):

- The previous car-centred mobility model has shifted towards a bicycle-centred mobility model. This applies to rural as well as urban areas.
- A modernisation of the cycling infrastructure has taken place. A comprehensive and high quality cycling network has been created with a significant level of funding. Urban areas are traffic-calmed.
- The self-image of the bicycle industry has changed. It sees itself as an innovative mobility service provider that focuses on user experience.
- The important factor of worker mobility no longer sees the company car as a status symbol and concentrates instead on sustainable mobility solutions.
- The bicycle industry is competitive in the search for the best brains. It has a strong manufacturing foothold in Germany and Europe.

In addition to the high level of agreement among the experts, the importance of factors that can only indirectly be influenced by the bicycle industry is notable. A new mobility model, political support and a high level of investment and the expansion of bicycle infrastructure are seen to be desirable.

The synergy effect is important in these central future projections: the more the mobility model shifts towards cycling, the more the financing and expansion of high quality infrastructure will follow.

Furthermore, the greater the prevalence of high quality and well-funded infrastructure, the more the mobility model shifts.

**Our interim questions for the bicycle industry:**

*What can the bicycle industry do to make these ambitious future projections come true? How should the industry position itself in the socio-political discourse in order to achieve the implementation of these future projections although they can only be influenced indirectly?*

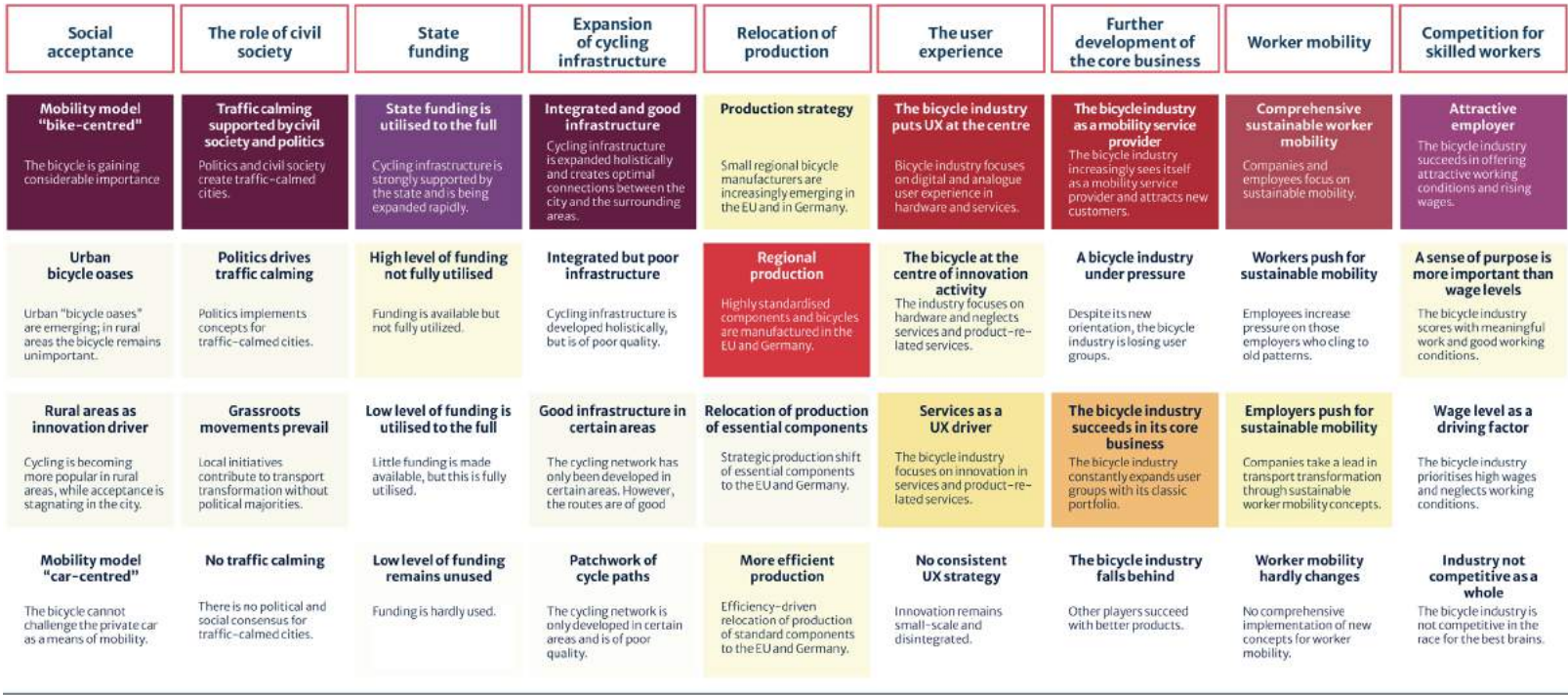


Fig. 13: Desirable scenario 2042, shown as a heat map



# 5.3 Realistic scenario 2042



Fig. 14: Realistic scenario 2042, shown as a heat map





A clear summary of a realistic scenario is not possible – the experts' opinions are too diverse (see Fig. 14).

We do not know the reasons for the experts' inconsistent assessment. We do not know why there is no uniform picture of what a realistic scenario can be.

The wide range of experts may be one reason for this. However, these experts gave a uniform picture of desirability. Maybe this divergence is more due to individual assessments rather than opinions which are related to the profession of the experts.



Fig. 14: Realistic scenario 2042, shown as a heat map

**Our questions for the bicycle industry are therefore:**

*What can the bicycle industry do to create a shared picture of what can be considered realistic? How exactly can the bicycle industry communicate what it sees as a realistic basis for a strong bicycle industry in the transport transformation?*





# 5.4 Comparison of the two scenarios for 2042

## A first comparison of the two scenarios shows:

– In the desirable scenario for 2042, there is high consensus among experts as to which future projections should come true. The consistently dark colour of the upper future projections illustrates this.



Fig. 13: Desirable scenario 2042, shown as a heat map

– In the realistic scenario for 2042, the picture is mixed. There is hardly any consensus among the experts as to which future projections are considered realistic. The colour distribution, which is predominantly even, demonstrates this.



Fig. 14: Realistic scenario 2042, shown as a heat map





### As a first interim conclusion, we can state:

*There is a large discrepancy between the two scenarios between what is assessed as desirable and what is considered realistic for the year 2042.*

Furthermore, consensus seems to depend on whether the factors are largely externally determined or can be influenced by the industry. In the case of external, socio-politically determined factors such as infrastructure, financial support and social acceptance, there tends to be a consensus among experts. The assessments differ when it comes to internal industry factors, i.e. technological and innovation factors such as user experience and the further development of the core business.

This delta is remarkable. The experts are saying that the desirable scenario for a strong bicycle industry in the transport transformation is not realistic.

*Why is this the case? Is the bicycle industry lacking in self-confidence? And if so, how can it become more assertive? Or at least have the belief that a desirable scenario is also realistic? How can it increase its belief in itself?*

Our experience in working with other industries in the mobility sector is different. There, the stakeholders formulate desirable scenarios in which they also believe. Self-confidence and belief in one's own visions are much stronger there.

### What does that mean for the bicycle industry?

When comparing the two scenarios for the year 2042, interesting effects stand out, each of which raises questions. We first focus on issues that the bicycle industry can change on its own (see chapters 5.5 – 5.7). Then we describe the areas in which the bicycle industry only has an indirect influence (see chapters 5.8 & 5.9).



# 5.5 The user experience

The user experience is one of the key factors that the bicycle industry can influence. The divergence between desirable and realistic future projections is, therefore, all the more surprising.

In the desirable scenario for 2042, the user experience is at the centre of the bicycle industry. However, the experts do not consider this strategically relevant decision to be realistic. Rather, the situation is unclear, and a relevant proportion of experts *do not even expect a consistent user experience strategy*.

## Our questions for the bicycle industry:

*How can this be? How is it that a good user experience is considered desirable but not realistic?*

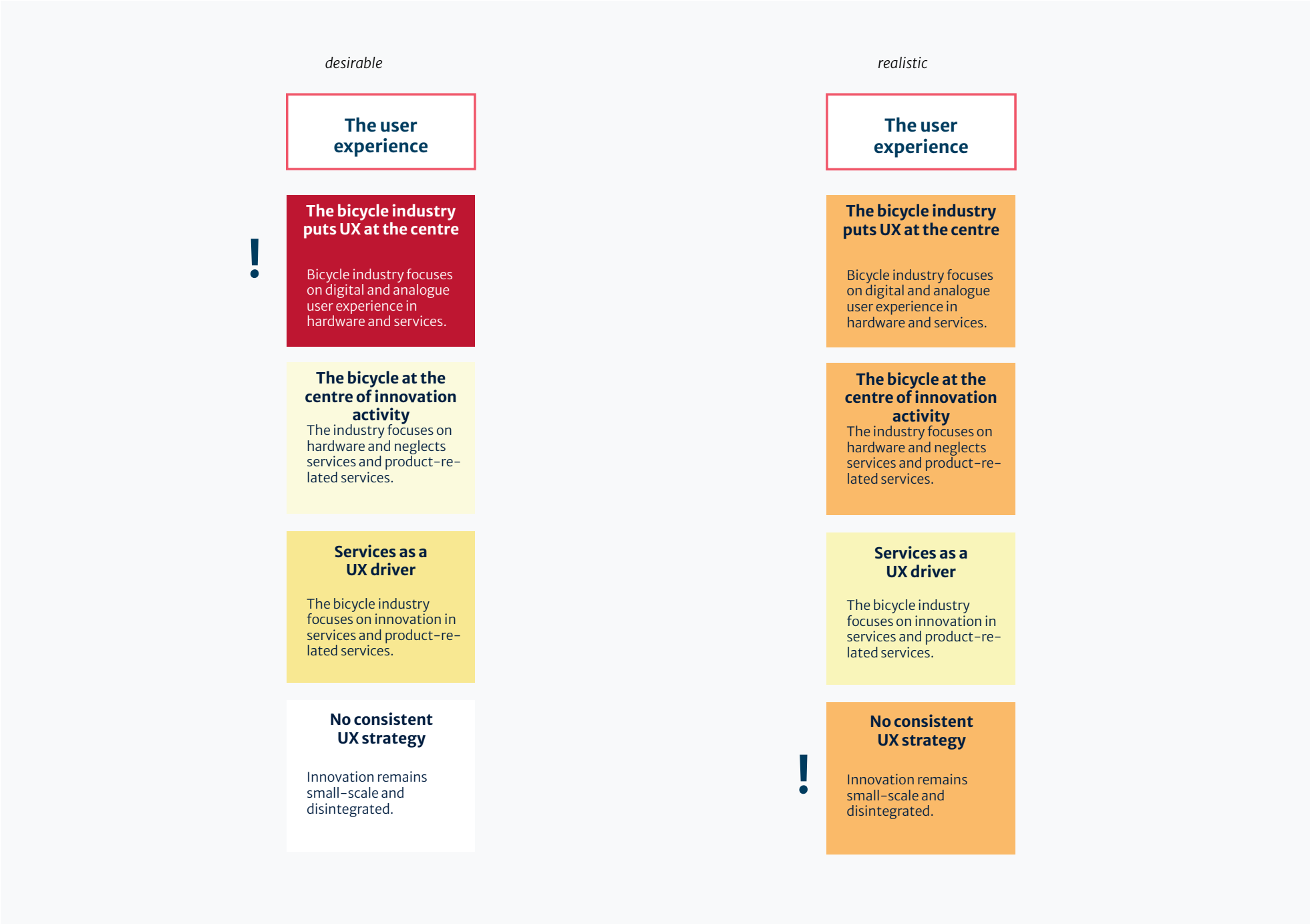


Fig. 15: Comparison of the key factor user experience.





# 5.6 Further development of the core business

Important stakeholders in the mobility industry recognise that they have to further develop their core business in order to be successful in the future. The experts also consider an expansion of the core business in the bicycle industry to be both sensible and desirable.

However, they don't believe that this will be achieved. On the contrary, they think it is realistic that in 20 years the bicycle industry will still concentrate on its (current) core business.

As with the user experience factor, the divergence of assessments is interesting, as the industry can actively influence this factor.

## Our questions for the bicycle industry:

*Have experts already written off the bicycle industry? Why is a transformation of the industry not realistic in the next 20 years? Can the bicycle industry not develop any innovative impulses internally?*



Fig. 16: Comparison of the key factor further development core business.



# 5.7 Competition for skilled workers

One of our initial hypotheses was that the transport transformation requires a strong bicycle industry. The key factor competition for skilled workers shows how strong the experts think the industry will be in 2042.

In the desirable scenario, the bicycle industry is an attractive employer.

However, the majority of experts do not consider it realistic that the bicycle industry will prevail in this competition. Some experts think it is realistic that the bicycle industry can prevail. However, about the same number of experts doubt this.

## Our questions for the bicycle industry:

*Is it possible that a sense of purpose is sufficient to survive in the competition for skilled workers? How can the bicycle industry develop a USP which enables it to survive the strong competition for skilled workers?*



Fig. 17: Comparison of the key factor competition for skilled workers.



# 5.8 Social acceptance and the role of civil society

The dominant future projections in the desirable scenario are a bicycle-centred mobility model in rural as well as in urban areas and traffic calming in the cities.

It is exciting that the experts consider this change to be realistic. The difference between the desirable and realistic scenario 2042 is the smallest concerning these decisive influencing factors. The experts see urban areas as the driving force of the transport transformation. However, some experts also consider a shift towards cycling in the mobility model in rural areas to be realistic.

## Our questions for the bicycle industry:

How can the bicycle industry better influence the social discourse? How can it more strongly promote the vision of a bicycle-centred transport transformation?

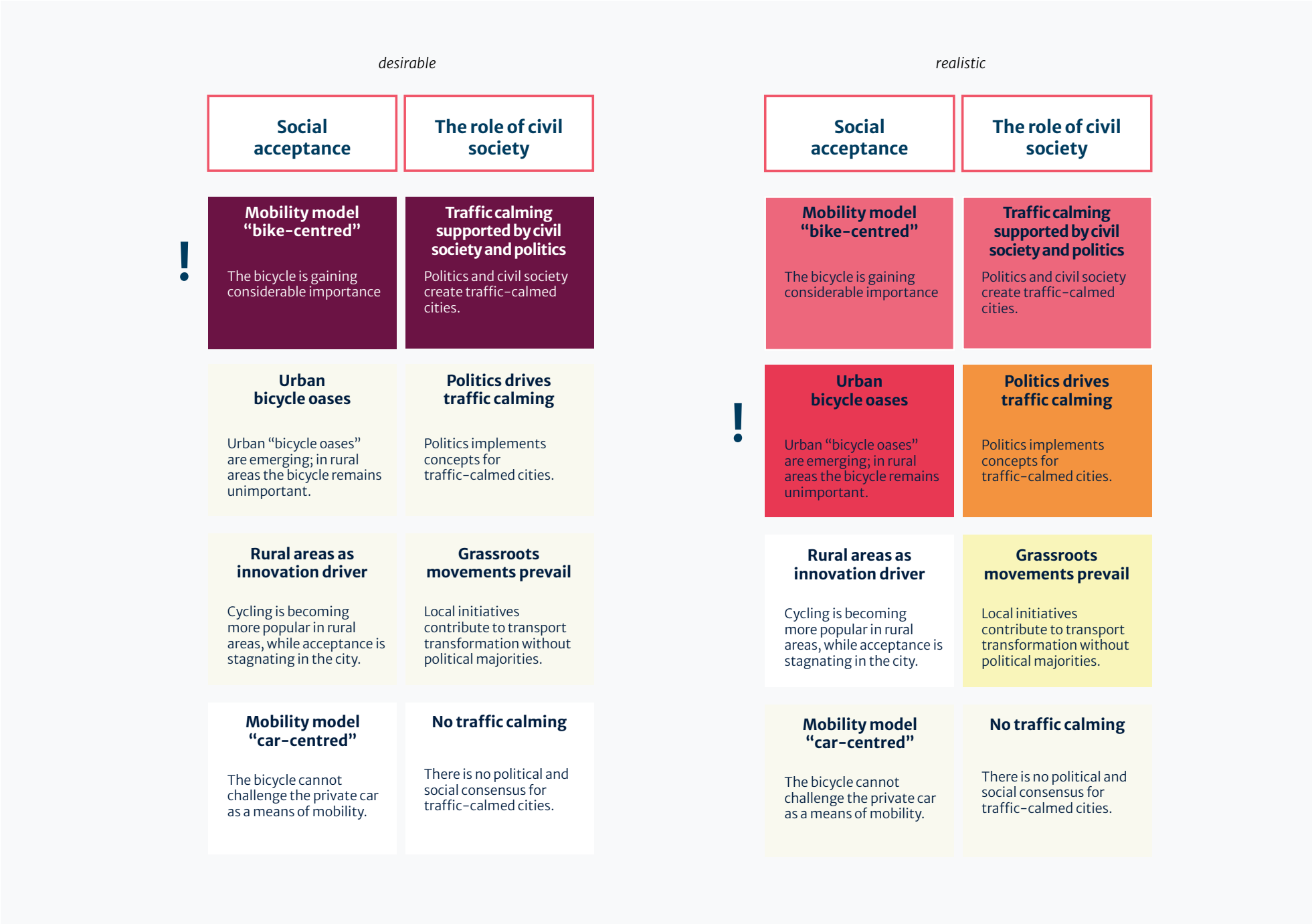


Fig. 18: Comparison of the key factors social acceptance and the role of civil-society





# 5.9 State funding and expansion of cycling infrastructure

State funding and the expansion of cycling infrastructure are closely linked. The experts consider strong funding and a vigorous expansion of cycling infrastructure to be necessary in a desirable scenario.

However, they consider neither the full utilisation of existing funds nor a strong expansion of the infrastructure to be realistic.

## Our questions for the bicycle industry:

*Do the experts expect a failure of the state to act or an unambitious state and weak municipalities? What can the bicycle industry do to promote this important expansion? How concretely can it influence these central factors? How can the bicycle industry intelligently bundle its forces to create the necessary conditions for a successful transport transformation and a strong bicycle industry?*

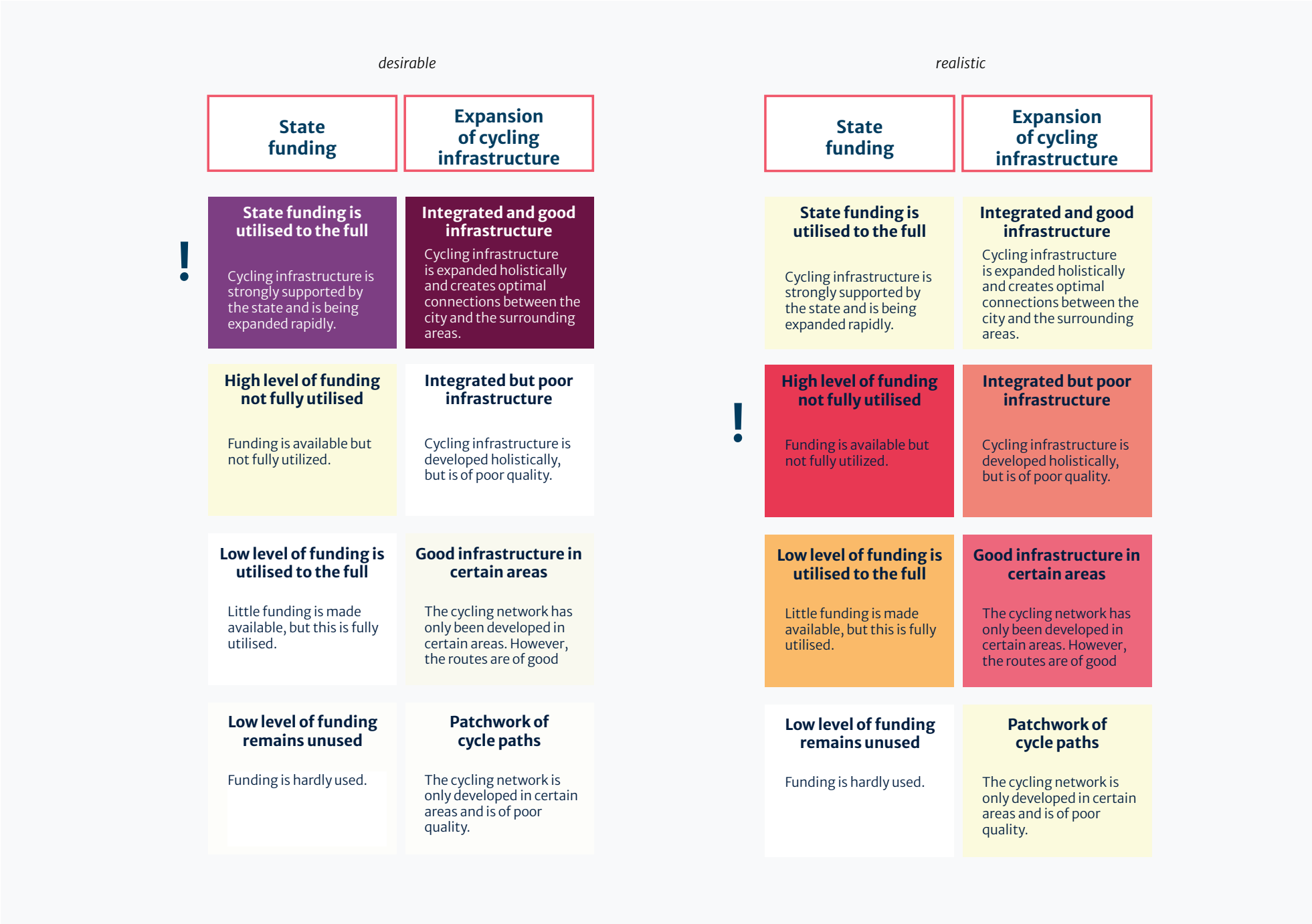


Fig. 19: Comparison of the key factors state funding and expansion of cycling infrastructure



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# Participation of the experts

## We thank the experts

*Our study is based on the assessment of experts. In the first round, the experts selected the key factors that they consider to be most important up to the year 2042. In the second round, we asked for a desirable and a realistic scenario. The experts consisted of representatives of the OEM, service providers/mobility providers and industry experts. We would like to thank the following experts for their time and commitment:*

**Carsten Pietruck**, Director Digital Solutions & Services at ABUS August Bremicker Söhne KG

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