D5.5

Exploitation and Innovation Plan

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1 Introduction

1.1 Objective

The purpose of the Exploitation and Innovation Plan is to describe actions to ensure that new knowledge, key outputs, and innovation generated from the project is well managed and strategically exploited, while concurrently safeguarding intellectual property rights (IPR) as stated in the consortium agreement.

This document will describe the project's main scientific and technical outcomes, its key exploitable results, and the dissemination channels implemented during the course of the project to support the exploitation of results. Furthermore, it will define strategies to maximise their take up and effective market penetration, based on the needs identified through the stakeholder consultation process and on an analysis of the key market challenges and opportunities. Finally, it will include specific roadmaps for each partner's exploitation efforts and general conclusions on CoEXist's findings, their impact and key factors towards successful take-up. CoEXist's Exploitation and Innovation Plan aims to subsequently ensure an extended impact in the European and Global context, which would support the successful transition to autonomous transport and the coexistence with conventional vehicles within a wider city environment.

1.2 CoExist Project

To ensure a positive roll out of CAVs and its alignment with local policy goals, authorities will have to play a key role and should take the lead with proactive planning approaches. This begins with planning, as early as possible, how the introduction of CAVs should unfold, to minimise the potential negative impacts and more importantly make the most of the opportunity to influence the paradigm shift into a more sustainable urban mobility vision.

CoEXist understands that automation-ready transport and infrastructure planning in cities are a key precondition for fulfilling the promises of connected and automated vehicles (CAVs) and effectively handling related risks. This need for considering CAVs in local policy discussions and planning processes (e.g. SUMP), should not however be misunderstood as endorsing the disruptive technologies surrounding CCAM and their impacts, but rather empowering the local authorities to critically review the anticipated technological changes and shape the future according to their expectations.

Consequently, the project's strategic aim was defined as: "to bridge the gap between automated vehicles (AVs) technology and transportation and infrastructure planning, by strengthening the capacities of urban road authorities and cities to plan for the effective deployment of AVs". This is defined in the CoEXist project as achieving 'automation-readiness', i.e. the capability of making structured and informed decisions about the comprehensive deployment of CAVs in a mixed road environment

To ensure the effective accomplishment of its strategic objective, CoEXist addressed three key steps in transport and infrastructure planning:

- **Automation-Ready Transport Modelling:** developed and validated extensions of existing microscopic traffic flow simulation and macroscopic transport modelling tools to include different types of CAVs (passenger cars/light-freight vehicles with different automation levels).

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- **Automation-Ready Road Infrastructure:** developed and implemented tools to assess the impact of automated vehicles on traffic efficiency, space demand and safety, and provide guidance on infrastructure development, to suit both conventional and automated vehicles.
- **Automation-Ready Road Authorities:** elaborated eight strategically-selected use cases in four local authorities (Gothenburg, Helmond, Milton Keynes and Stuttgart), used to evaluate – with the CoEXist tools – the impacts of automated vehicles on traffic efficiency, road space requirements and safety, to guide local policy discussion and identify strategies to improve automation-readiness.

CoEXist has developed an 'Automation-ready Framework' to support local authorities in reducing uncertainties and building up their capacity to make structured and informed decisions about CAV deployment in a mixed road environment. The project has developed functionalities for microscopic and macroscopic automation-ready modelling tools, enabling them to consider different types of CAVs. Through their application in eight strategically selected use cases in Helmond (NL), Milton Keynes (UK), Gothenburg (SE) and Stuttgart (DE), CoEXist has assessed to what extent road infrastructure is automation-ready and whether the introduction of CAVs improves traffic performance, space efficiency, and safety. This has allowed the project to derive general conclusions on CCAM's impact on urban transport and identify adaptation and design recommendations for road infrastructure, towards an optimal exploitation of the potential benefits of CAD in urban mobility.

Moreover, it is the ambition of CoEXist that the research results and analysis achieved throughout the project, including the practical application of CoEXist tools on the selected use cases, should influence the transport and infrastructure planning in road authorities and steer their progress towards automation-readiness. Therefore, each CoEXist road authority has developed a concrete 'Automation-ready Action Plan', providing detailed guidance on their specific processes and steps that should be taken to conduct automation-ready transport and infrastructure planning.

These Automation-ready Action Plans include an analysis of the local legal framework and policy context for each city, as well as a description of the strategy definition, vision and objectives for CCAM deployment, considering the risks identified and expected impacts. To develop its action plan, each city has reflected on the results from their Automation-ready Forum – participative instances for discussion and engagement with citizens and key local stakeholders – and the conclusions from the use cases' impact assessment. Building upon this basis, CoEXist road authorities have performed a self-assessment of their current level of automation-readiness, analysing their progress and challenges for each aspect of mobility and for each phase of the automation-ready framework, and defined a set of measures and activities going forward. CoEXist's 'Guidelines: How to become an automation-ready road authority?' provide a full description on how to implement the tools and methodologies developed by the project, and summarises the key conclusions and lessons learnt from the project's use case implementation and analysis.

1.3 CoExist Partnership

CoEXist has been implemented by a multidisciplinary consortium of 15 partners from 7 countries with balanced coverage of all required competences, including EU-wide dissemination and exploitation capabilities.

The distinguishing and innovative aspect of this consortium has been the combination of the transport and infrastructure planning sectors (PTV, FEHRL, VTI, USTUTT) with the AV sector (Vedecom, TASS, UNIFI,

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iD4Car and Renault – who only participated in the first half of the project), and positioning it in an urban transport policy (Polis, Rupprecht) context with the national champion road authorities for automation (Gothenburg, Helmond, and Milton Keynes) and for transport modelling (Stuttgart). These organisations are leaders in their fields and worked together for the first time in CoEXist, successfully advancing automation-ready transport and infrastructure planning in European urban road authorities.

Figure 1: CoEXist consortium partners

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2 Framework for CoEXist's exploitation and innovation management

2.1 Approach

To maximise the uptake and impact of its results, CoEXist has followed a practice-oriented, systematic approach to develop exploitation strategies and steer innovation. In accordance to the research focus and outcomes from each work package at the different stages of the project, CoEXist identified the key target audiences and market requirements to guide exploitation efforts. As shown in Figure 1, the systematic approach builds upon on the tools developed and results generated from their demonstration in road authorities, to define target groups for the roll-out and exploitation of project outputs, implementation actions and expected impacts.

For instance, the guidance on automation-ready planning developed in WP1 (*Automation-ready Framework* and *Practitioner Briefing on Road Vehicle Automation in SUMP*), as well as the strategic definition of use case scenarios demonstrated through the application of automation-ready traffic flow simulation and transport demand modelling tools (WP2), can be exploited by transport planners, modellers and academics, supporting their capacity to address CCAM in their planning efforts and research. These tools and knowledge products have been demonstrated in CoEXist cities and lead to the development of concrete Action Plans, guiding further exploitation actions to be implemented beyond the project.

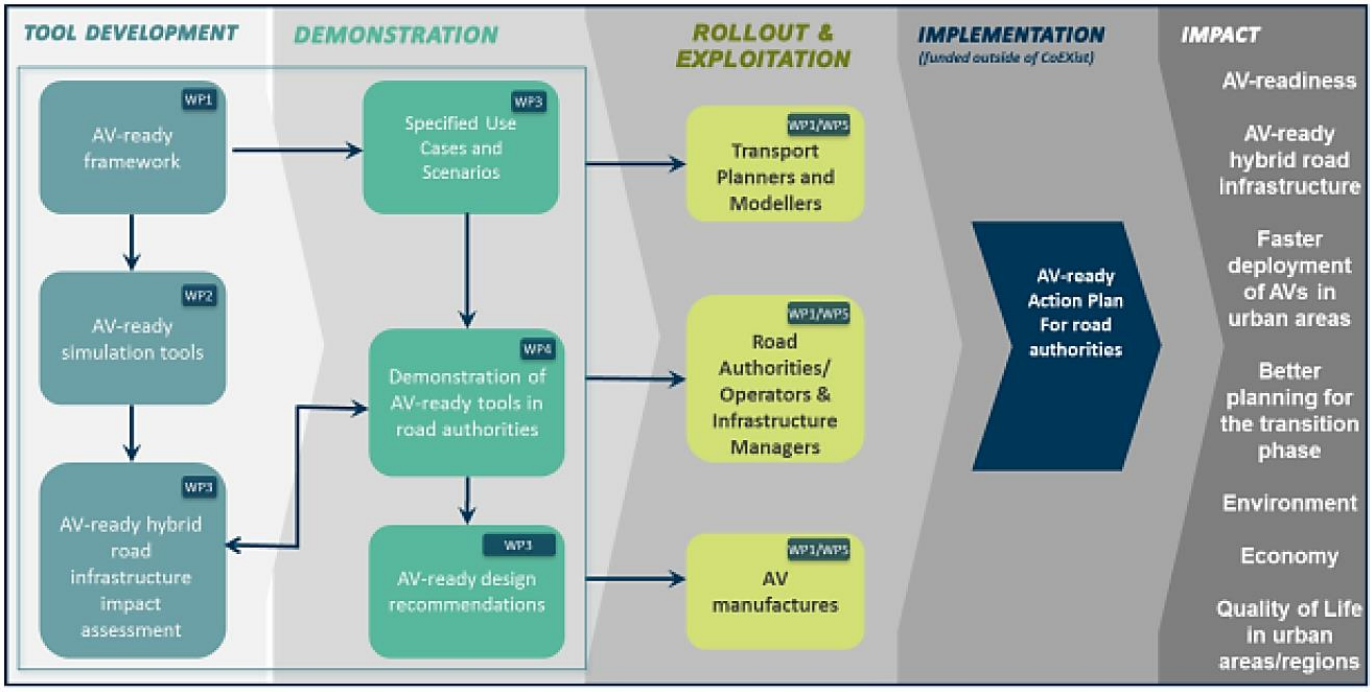

Figure 2: CoEXist systematic approach for exploitation of results

Similarly, the assessment of the impacts of CAVs on road infrastructure (WP3) based on the use case implementation results (WP4), provide valuable guidance and tools for road authorities ad infrastructure managers, strengthening their capacity to understand the potential impacts of CCAM and prepare

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accordingly. The results from the impact assessment efforts, and the derived general impacts and design recommendations also constitute useful knowledge for AV-manufacturers, enabling to address identified challenges and real needs from cities and users.

CoExist continuous efforts to engage with different types of stakeholder and consider their needs and perspectives (for example, through CoEXist's Online Automation-ready Survey), allowed the project to align its products and outputs with such requirements, and constitutes also a key factor for the successful take up and exploitation of the project's results. In this way, CoEXist has been able to manage exploitation and innovation by integrating, product and process innovations, and scientific/technical outputs, considering the respective application areas and types stakeholders.

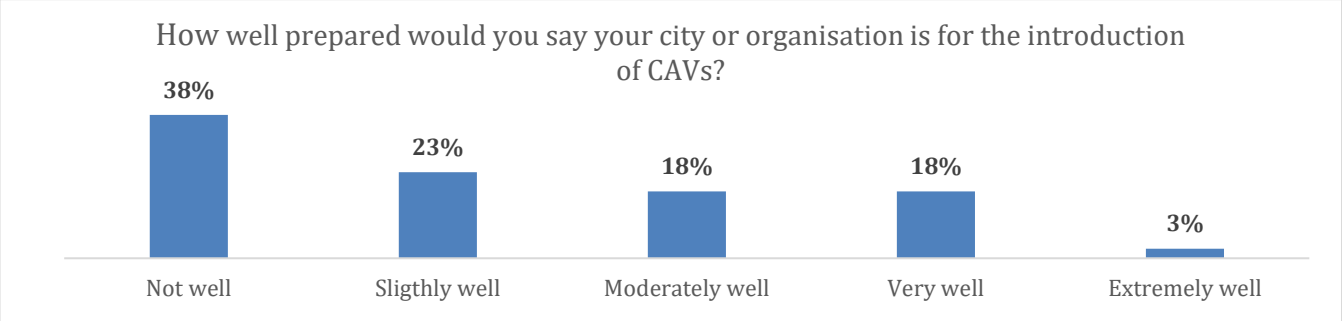

Figure 3: Need for guidance - CoEXist Online Automation-Ready Survey (CoEXist, 2019)

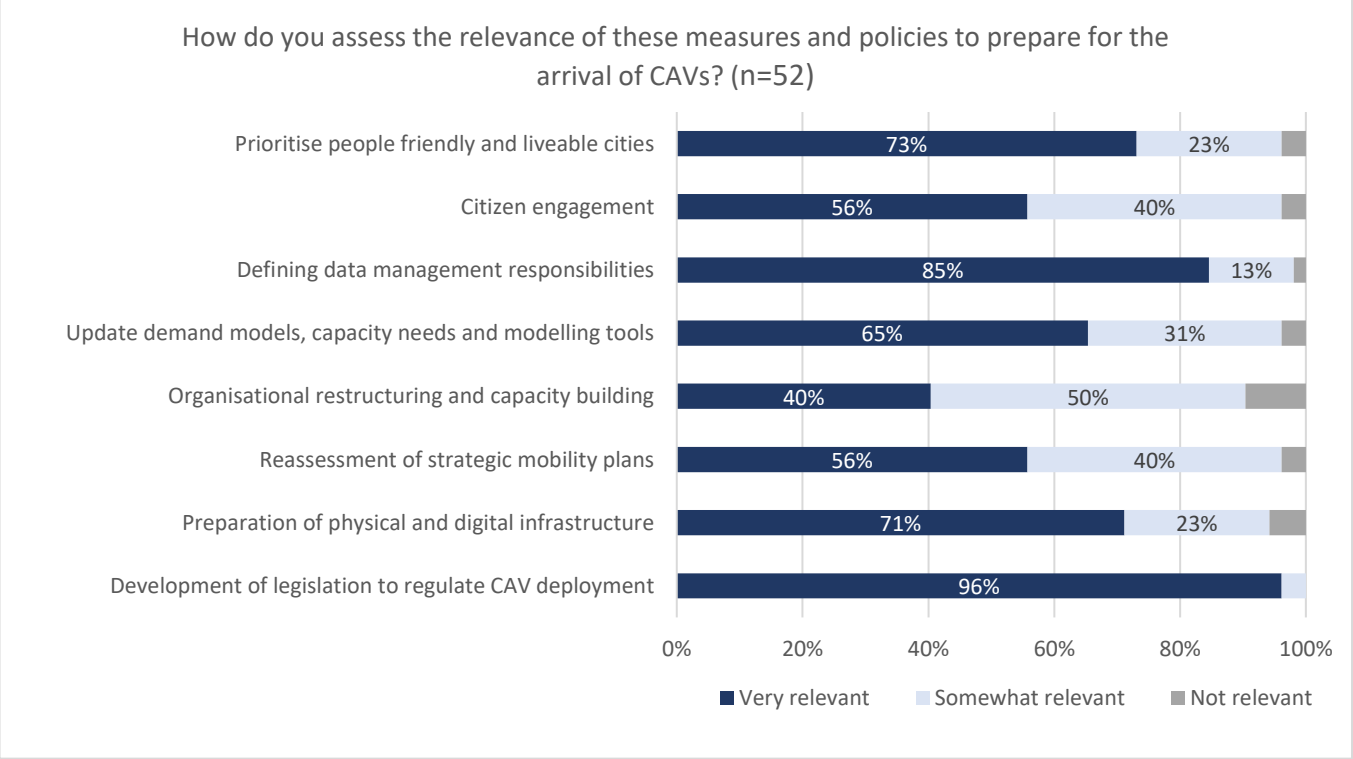

Figure 4: Key measures and policies - CoEXist Online Automation-Ready Survey (CoEXist, 2019)

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2.2 Exploitable Results and Outcomes

Automation-ready framework

The automation-ready framework aims to support local authorities in reducing uncertainties and building up the capability to make structured and informed decisions about the comprehensive deployment of Cooperative Connected and Automated Mobility (CCAM).

It is organised in three phases, which represent strategic focus areas for urban mobility planning processes. Still, the different stages do not correspond to a time period as different cities may be in a different phase depending on local circumstances. They can be overlapping, parallel and interlinked. The automation-ready framework aims to reduce uncertainty as cities go through each of the phases.

For each phase, a set of measures are recommended to facilitate the reduction of uncertainties and to ensure a smooth transition into the sustainable deployment of CAVs in cities. Also, the technological scope of the framework aims to provide recommendations that are applicable to different European cities, which will experience a wide range of CAV deployment due to unique local circumstances regarding the mode share between privately, shared or collective CAVs.

SUMP Practitioner Briefing: Road-Vehicle Automation in Sustainable Urban Mobility Planning

As part of the SUMP EU Guidelines update process, CoEXist has led the development of a Practitioner Briefing on planning for road vehicle automation, which provided an initial basis of support for authorities to undertake the challenge of addressing CCAM in SUMP processes.

The document provides guidance on key tasks and factors to be considered within the SUMP methodology, mapping for the main uncertainties and discussion guiding principles on how to mitigate them. Furthermore, it delivers recommendations on how the eight SUMP principles can be applied in the context of CCAM and shares useful tools and good practice examples.

Automation-ready Traffic Flow Simulation Tools

The microscopic traffic flow simulator PTV Vissim was further developed to enable the simulation of CAV-behaviour, considering the differences in car-following distances, simple communication aspects (V2V and V2I), acceleration behaviour, and platooning, among other aspects.

Empirical data collected from real AV's on DICTM test track in Helmond (NL) and co-simulations integrating CAV driving logics (VEDECOM), vehicle dynamics (PreScan) and traffic simulator (PTV Vissim), were used to derive, calibrate and validate behavioural parameters of CAVs.

The features developed are fully described in *D2.10 "Vissim extension new features and improvement - final"*. Also, a manual on how to use the feature is available: *"D2.11 Guide for the simulation of AVs with microscopic modelling tool"*, which can be found in the manual document that is provided when installing the software but also online in the online help. Besides, D2.3 presents the derived sets of behavioural parameters.

Several webinars are also available online on the CoEXist's and PTV's YouTube channels, providing practical guidance, useful information and examples on how to use the tools.

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Automation-ready Transport Demand Modelling Tools

CoEXist developed functionalities for automation-ready microscopic traffic flow modelling, which enabled the project to create assumptions for the supply-side of macroscopic travel demand models. Volume-Delay functions were adapted to replicate the impacts of CAV on capacity, which depend on vehicle class, on road type and on the share of CAV. In addition, existing travel demand models were extended to include changes in the perception of car travel time, as drivers may use some of this time for non-driving activities.

CoEXist's automation-ready macroscopic modelling tools provide extensions to PTV Visum by adding functionalities to the software in form of Visum compatible scripts (also available for adaptation to other modelling software), Visum procedure files and Visum Add-Ins. The tools can be integrated into the software to replicate the impacts of CAVs on capacity and demand. They allow the model developer or model user to test various assumptions, extending the capabilities of Visum to enable the consideration of CAVs in travel demand simulations.

The features developed are described in deliverables *D2.7 'AV-ready macroscopic modelling tool'* and *D2.9 'Built-in AV-ready macroscopic tool'*. Also, *D2.8 'Guide for the simulation with AVs with macroscopic modelling tool'* provides detailed guidance on how to use the functionalities.

Several webinars are also available online on the CoEXist's and PTV's YouTube channels, providing practical guidance, useful information and examples on how to use the tools.

Automation-ready Road Infrastructure Impact Assessment Tools

CoExist developed an impact assessment approach that in a structured and sound way can be used by road authorities to evaluate the traffic impact of automation on a given road design, traffic controllers, regulations, etc.

The assessment approach utilizes outputs from automation-ready transport modelling tools as input. The traffic models are applied to a set of consistent experiments with respect to penetration rates and different mixes of AV classes, as described in deliverable *D3.1 'Completed experimental design templates for eight use cases and AV-ready alternative design'*.

Since there are many uncertainties about how future CAVs will behave, CoEXist general modelling and assessment approach aims at describing a range of possible behaviours of these vehicles. The behaviours of the automated vehicles are specified by CoEXist' Driving Logics which are functionally defined, that is, in terms of how and where they can operate safely, disregarding which technologies make this possible. As CAVs will likely behave differently in different environments, the driving logics are combined to AV-classes (basic, intermediate or advanced) by determining which driving logic each vehicle should follow, in different road environments.

Relevant performance metrics, presented in deliverable *D3.2 'Definition of performance metrics and qualitative indicators'*, are calculated from the model outputs and used to assess the traffic impact of automation in terms of traffic performance for different infrastructure designs. Also, a qualitative safety assessment tool is developed which assess potential safety effects in relation to the accident types and automation functions that are relevant for an infrastructure design. An essential functionality of the assessment approach is to consider and visualize effects of the large uncertainties with respect to how different types of AVs might behave and which mixes of different types of AVs that are likely to CoEXist at

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different stages of the transition period towards full automation. Besides, an inspection-based safety assessment approached was developed and implemented on selected use cases.

CoEXist's automation-ready road infrastructure assessment tools consists of a set of scripts and spreadsheet-based tools for the calculation of the above specified metrics and the use case specific impacts on traffic performance and space efficiency based on the micro- and macroscopic simulation outputs, as well as a qualitative estimation of traffic safety effects of different AV-functions for a specific use-case.

For a detailed explanation of the tool's functionalities and guidance for its usage, please *see D3.3 Tools for assessing the traffic impacts of automated vehicles*.

The scripts and the spreadsheet-based tools are also available for download at www.h2020-coexist.eu

General Impacts and Design Recommendations

This deliverable (D3.4) reports on the results of CoEXist's use case implementation, and the assessment of CCAM's impact on road infrastructure, concerning traffic performance, space-efficiency and safety of AVs and its interaction with the environment. The report provides a clear and understandable account of the key findings in each use case and executes an analysis to derive generalised conclusions and design recommendations for urban road infrastructure. In this way, the document constitutes a valuable input for policy and action planning towards automation-readiness.

Guidelines: How to become an automation-ready road authority? (Final Results Brochure)

D4.7 Guidelines on how become an Automation-ready road authority provides a full overview into CoEXist's research, outputs and conclusions. It summarises, in non-technical and understandable manner, each step of the CoEXist approach to strengthen capacities of road authorities to make informed decisions about the deployment of CCAM.

This document aims to provide guidance and best practice examples to road authorities in Europe and beyond on how to become 'automation-ready'. To do so, it presents a comprehensive overview of CoEXist's research and key results, including:

- a brief description of the current state of automation-readiness in European cities, evidencing the need for guidance and knowledge exchange regarding CCAM, based on the results of CoEXist's stakeholder consultation activities;
- the developed automation-ready modelling tools and road infrastructure impact assessment methodology, respectively, setting a technical framework to investigate CCAM scenarios and evaluate expected effects on urban mobility;
- the demonstration of CoEXist's tools in partner road authorities, with the results and conclusions from each of the eight strategically selected use cases, which are presented and analysed.
- the automation-ready planning framework and SUMP guidance, as well as its application in CoEXist cities for the development of concrete Action Plans, outlining key measures, the followed strategies and lessons learnt.

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In this way, this report delivers concrete guidance, tools and methodologies to enable cooperative action and informed decision-making about the deployment of Cooperative Connected and Automated Mobility (CCAM), supporting road authorities in their way towards automation-readiness.

Reports on CoEXist's Cities' Automation-ready Fora and Action Plans (D4.4 and D4.6)

CoEXist's cities have hosted 'Automation-ready Fora' to engage with local stakeholders, citizens and institutions, based on the 'Automation-ready framework'. Aiming to facilitate a more informed discussion about the city's vision for automated mobility, each CoEXist city has strategically chosen the scope and target audience of its forum to adjust to its local activities and priorities. These experiences are described in detail in *D4.4 Report on four 'Automation-ready Fora'* and constitute a valuable good practice example for cities and regions in their efforts to engage citizens and stakeholders to discuss highly complex and innovative mobility issues.

In the same way, the developed *'Automation-ready Action Plans (D4.6)'*, with their analysis of current contexts (legal, institutional, etc.), assessment of local automation-readiness and proposed strategies, are useful experiences which can guide other cities and regions in their efforts towards automation-readiness.

2.3 CoEXist's main dissemination channels for exploitation

Since the project's initiation, CoEXist has followed a clear communication and dissemination strategy, with activities and tools designed to ensure that CoEXist outcomes and outputs reach the identified target groups. As described above, the exploitation approach included the continuous identification of relevant technical results and outputs and key applicable target groups, to guide dissemination and outreach efforts via relevant communication channels (online, printed materials, meetings, etc.).

Through communication and dissemination, CoEXist also aimed at raising awareness in the general public about the introduction of AVs in urban areas, their coexistence with CVs during a certain period of time and the necessary preparation of the cities' policies and road infrastructure towards a positive deployment and operation of AVs.

To this goal, the project employed a comprehensive set of supporting communication tools and products, including a recognisable and attractive project identity (project logo, graphic charter, templates), and printed material, such as leaflet, brochures and roll-up posters to disseminate the project's activities and results. Online media played a major role in reaching out to CoEXist's external audience, with an interactive website serving as the project's main gateway to the outside world. Besides providing all information on project objectives, partners, intermediate and final results, publications, events, bi-annual e-newsletters etc., it also included a number of special features that supported the project's activities (e.g. WP1 stakeholder engagement survey, event registration, etc.). The website was also linked to social media platforms (e.g., LinkedIn Group, Twitter account), which further enhanced dissemination outreach and allowed the project to build a broad list of subscribers.

In addition, two key publications presented the project's results to different target groups as "glossy", well-designed versions of deliverables (1) *D1.2 'Automation-ready framework'* and (2) of *D4.7 guidelines 'How to become an AV-ready road authority'* and *D3.4 'General conclusions and design recommendations'*, which were integrated into the project's Final Results Brochure: Enabling "Automation-Ready" Transport Planning - How to become an Automation-Ready road authority?

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Networking activities (WP5) also played a key role in spreading the word about automation-readiness. The network partners involved in this project (Polis, ID4Car, FEHRL) made effective use of their respective databases to promote the project among their members and contacts and reach out to broad audiences during dissemination events and conferences. CoEXist also liaised with related Horizon 2020 projects, especially from other ART or MG calls to create synergies, fed relevant European dissemination platforms such as Eltis, CIVITAS and EUCAD, with relevant information, and established links with related European networks and associations representing C-ITS sector, OEMs and research groups on AV/ART (e.g., COST WISE-ACT), and on an international level with its successful US-EU Twinning Partnership and participation at events such as TRB, AVS and ITS (EU and World Conferences). Deliverables *D5.4 Cooperation with ART projects and stakeholder engagement* and *D1.5 Report on CoEXist International Cooperation,* describe these activities in detail.

At the end of the project, CoEXist' final conference showcased the project's and cities' accomplishments and presented the results and tools of the project. The event was held virtually due to the COVID-19 pandemic and counted with a broad and diverse audience. To enhance exploitation of the CoEXist results, the conference included a training session on how to make proper use of the tools that have been developed.

The CoEXist project and results have also be widely promoted at relevant external events across Europe, including conferences (CIVITAS Forum SUMP Forum, POLIS Conference, among others), workshops, webinars and publications.

CoEXist partners will continue to utilise the described dissemination channels and materials to further exploit and maximise take up of the project's results and products. Such efforts have already endured after the project's finalisation, with presentations at AVS2020 conference, POLIS Conference 2020, Robomobile Life Future Workshop, among others. And with articles at publications like POLIS' Thinking Cities, and scientific journals (Paper 'An Approach for Handling Uncertainties Related to Behaviour and Vehicle Mixes in Traffic Simulation Experiments with Automated Vehicles' published in Journal of Advanced Transportation).

2.4 Exploitation of CoEXist results

2.4.1 Expected impacts on society, environment and competitiveness

Societal impacts

To ensure a positive roll out of CAVs and its alignment with local policy goals and societal needs, authorities will have to play a key role and should take the lead with proactive planning approaches. This begins with planning, as early as possible, how the introduction of CAVs should unfold, to minimise the potential negative impacts and more importantly make the most of the opportunity to influence the paradigm shift into a more sustainable urban mobility vision.

CoEXist understands that automation-ready transport and infrastructure planning in cities are a key precondition for fulfilling the promises of connected and automated vehicles (CAVs) and effectively handling related risks. This need for considering CAVs in local policy discussions and planning processes (e.g. SUMP), should not however be misunderstood as endorsing the disruptive technologies surrounding CCAM and their impacts, but rather empowering the local authorities to critically review the anticipated

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technological changes and shape the future according to their expectations, and so society in general can benefit from the technological developments AVs will provide, and not just AV manufactures or users of AVs.

The modelling and impact assessment tools provided by CoExist will play an important role in decision making on the deployment of CCAM, especially during the transition phase when more “pain than gain” are coming from AVs. CoEXist has made efforts to reduce “pain” and increase “gain” by providing automation-ready modelling and impact assessment tools. CoEXist’s modelling and impact assessments tools will be used to quantify the efficiency of an infrastructure change or a measure in an AV context, as the introduction of AVs could significantly impact the allocation of infrastructure funding/ investment decisions.

The debate about AVs is usually very technical and sometimes detached from large parts of the society. Important stakeholder groups such as emergency services, schools, cyclist groups or the mobility impaired need to be involved early in the planning processes in order to identify problems associated with CAV deployment. CoEXist road authorities have hosted ‘Automation-ready Fora’ to discuss such topics with their citizens and stakeholders, In this way the concerns from local stakeholders can be addressed earlier and aversions against AVs could be reduced. Besides, CoEXist broad stakeholder engagement and consultation efforts have ensured the consideration of perspectives from different key actors.

Environment

It is generally anticipated that, in the long run, CAVs will reduce congestion and environmental impacts of transport through a combination of greater road capacity and efficient use of shared vehicles, although this is strongly dependent on the level of automation, penetration rates and types of services deployed. This and the ability of optimised accelerating and braking behaviour of AVs – which will be most likely electric vehicles in the mid-/ long-term – can lead to optimal energy use and reduced emissions in urban areas/regions. CoEXist has provided tools to assess these environmental benefits and to develop recommendations for automation-ready transport planning to maximise environmentally friendly impacts. Also, CoEXist has provided useful insights and conclusions about the levels of automation and penetration rates for which such benefits can materialise and provided recommendations to increase positive impacts.

Global competitiveness of European companies

Among CoEXist partners, leading European companies from different sectors cooperated together, creating a value chain and valuable synergies that result in increased competitiveness for them and other European companies.

Through the closed-loop connection between VEDECOM, PTV and TASS, AVs can be simulate which will reduce the time and costs for testing AVs in traffic conditions. With the wide dissemination of CoEXist results and the experiences they have gained, TASS and PTV will be able to position their software tools (PreScan and Vissim) as the leading tools that AV manufactures from around the world could use to simulate their AVs.

Furthermore, European transport consultants and professional who participated in CoEXist’s webinars and trainings, and through the publicly available guidance documentation, will gain an understanding of how the developed tools and knowledge (such as the AV behavioural default parameters) can be applied to make detailed predictions about the behaviour of AVs on the road network. This gives them a competitive

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advantage when they sell their transport modelling services to road authorities around the world who want to become automation-ready.

CoEXist will foster market take-up of AVs by making road/city authorities automation-ready and mainstreaming AV modelling and impact assessment across Europe. And indirectly, AV manufactures, after-market equipment manufactures as well as technology (e.g. sensor technologies - such as radar, camera, lidar and V2X communication) and AV infrastructure providers may use CoEXist findings to improve AVs and automation-ready infrastructure in future, to the benefit of global consumers.

The findings from analysing the modelled use cases and scenarios, and the fostered dialogue about impact assessment with road/city authorities and other stakeholders, has provided valuable data, user requirements and general recommendations for AV manufacturers and automation-ready infrastructure providers.

Through its analysis and derived conclusions and guidance, CoExist has contributed to develop an optimal framework for the successful deployment of efficient CCAM services, and to define/develop AV products, thus strengthening Europe's market position

2.4.2 Data management and Intellectual Property Rights

Data and knowledge management

CoEXist followed proven approaches in knowledge and data management. With the set up a joint knowledge management system based on MS SharePoint, all project documents and activity reports were continuously available to all project partners. Besides, CoEXist has published project outputs for public access, as well as regular news, videos and event reports, via its website. All reports and video recordings (webinars, trainings, etc.) have been made available free of charge after the project.

Data utility and availability (IPR)

The data gathered and generated from CoEXist will be useful for transport planners, city authorities, consultants, and researchers working in the field of transport sciences, among others, and thus, it is important that it is made available publicly to maximise the exploitation and take up potential of the project's results and outputs.

Intellectual Property Rights (IPR) procedures and any potential issues arising from commercial exploitation, have been clearly laid down in the consortium agreement which all partners were required to sign prior to project commencement.

In addition to all produced deliverables within the project, the consortium agreed that the following data will be made accessible/public: input data from road authorities/cities, output data - as results from modelling software – and the "default values (parameter sets of the modelling software Vissim).

CoEXist has developed Automation-ready modelling and Automation-ready infrastructure impact assessment tools as well as guidance documents for road/city authorities to become Automation-ready. The exploitation of these outputs varies from commercialized (software / modelling tools in terms of legitimate commercial interests) to open access (impact assessment tools, guidelines, reports).

One of the main key results of CoEXist are the "default values" for automation-ready transport modelling which have been be made accessible to transport planners to support automation-ready modelling beyond

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CoEXist's tools. Still, these default behavioural parameter-sets for AVs (D2.3) can only be used and implemented for users who have access and a licence for a transport modelling and simulation software (e.g. Vissim, SUMO, Aimsun, etc.). In CoEXist, the full versions of the PTV software Vissim and Visum are being used for development, but these are only commercially available products; nonetheless, student licences with limited capabilities are available for free and basic simulations are possible.

The table below provides an overview of the products and outputs that entail gathering or generation of relevant data, affecting the results of the CoEXist project. The level of access is also indicated for each.

Table 1 Milestones and deliverables in relation to data gathering or generation, and their access level

WP	Milestone (MS)/ Deliverable (D)	Data Type	Responsible Partners	Data access level
1	MS1: Automation-ready online survey	Report (.pdf)	Rupprecht Consult	Aggregated results available in publicly in CoEXist website and D4.7 Guidelines: how to become and automation-ready road authority?
2	MS14: Empirical data collection with three AVs on DICTM test track in Helmond	Compiled in .txt .xls .xlsx .csv	TASS International	Selected relevant data from MS14 available in D2.6
2	D2.3: Default behavioural parameter sets for AVs	Report in .pdf	PTV Group	Deliverable D2.3 is available for public
2	D2.6: Technical report on data collection and validation process	Report in .pdf	PTV Group	Deliverable D2.6 is available for public
3	D3.3: AV-ready hybrid road infrastructure assessment tool	Report (pdf.), scripts and spreadsheet - based tools	VTI	Deliverable D3.3. is available for public (incl. set of scripts and spreadsheet-based tools)
4	D4.2: Technical report on the application of AV-ready modelling tools (incl. Input & output data)	Reports (.pdf), Experimental design tables (.xlsx)	VTI	Deliverable D4.2 is available for public
4	D4.3: Technical report on the application of AV-ready hybrid road infrastructure assessment tool	Reports (.pdf), spreadsheet - based tools with input & output data	VTI	Deliverable D4.3 is available for public

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3 Exploitation & Innovation Plan

In general, CoEXist's mission and brand "automation-readiness", will be exploited through an application- and practical-oriented approach in terms of implementation of tools, capacity development and further stakeholder involvement.

CoEXist's road authority partners will be "early adopters" of automation-ready transport modelling and impact assessment tools. They will constitute valuable good practice examples and guide the way for other road authorities to test, validate and further develop CoEXist's 'Automation-ready framework', tools and design recommendations.

In particular, partners as FEHRL, iD4Car and Polis will engage their broad networks and collaboration platforms, to set the scene for broader stakeholder involvement and raising awareness about CoEXist results and outputs. In this way, CoEXist will be able to reach a wide variety of key actors, including OEMs, NRAs, city and regional authorities, as well as academics and researchers, through CoEXist's technical and academic partners (PTV, VTI, UNIFI, USTUTT, VEDECOM, TASS).

PTV Vissim and PTV Visum have been essential for microscopic and macroscopic modelling and simulation throughout the project. The developed features, including manuals on how to use them, have since been included in PTV's product portfolio and will be subject to further development outside the realms of CoEXist. Several webinars on the new functionalities of the software have taken place and recordings are available online.

In the context of academic research, CoEXist outputs will clearly provide the scientific foundation for new recommendations on vehicle automation, as the tools for transport planners and modelers will be part of further research and academic curricula. Additionally, through the universities' networks, project results will reach national public entities, exemplarily through the Board of Academic Advisers to the Federal Minister of Transport and Digital Infrastructure of Germany, and decision-makers in the automotive sector in formats like the strategic dialogue for the automotive sector in Baden-Württemberg.

Furthermore, CoEXist research outputs, such as results of the use cases carried out in Gothenburg, Milton Keynes, Helmond and Stuttgart, deliver best practice examples on the deployment of new modelling and simulation tools. These can be used in future pilot projects and the core control logics could constitute a basis for the further development of software for any simulator provider.

Such project outcomes, and notably the automation-ready framework, have profound impacts on the cities' mobility strategies. As direct contributors to the project, the cities have disseminated CoEXist throughout their local ecosystems of regional and municipal authorities, public transport operators, private sector entities such as vehicle OEMs, academia and its citizens. F urthermore, as shown by the ParkAV project (a collaboration between Appyway, Jaguar Land Rover, Milton Keynes Council and Coventry City Council), modelling approaches developed in CoEXist use cases can be taken as a basis for similar use cases. Other CoEXist use cases have shown the possibility of capturing quick wins in the field of C-ITS, as shown in Helmond and their efforts on ISA (Intelligent Speed Assistance). Furthermore, the importance of setting up effective working structures and collaboration models has been recognized by the participating cities and will be considered in the future.

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On the policy side, CoEXist outputs will gain traction in several working groups on CCAM at the European Commission and be positioned in Horizon Europe's strategic research and innovation agenda (SRIA) as well as in ERTRAC's urban mobility working group. Apart from that, the network partners will disseminate, promote and further develop CoEXist findings towards European city and regional authorities. For this, CoEXist partners will continue the work on the definition of Automation-readiness beyond the project and foster an informed public debate about AV and how cities should look in the future

In terms of further research, especially among OEMs and public transport operators, CoEXist project outputs will be integrated into technology R&D processes and into the development and commercialization of new services. Several project outputs will be further exploited in the experimental design of new pilot and testing projects. Lastly, all project findings will be made available to a network of research centres and academics, guiding further research efforts.

Below, specific exploitation efforts and strategies are described for each member of the consortium, setting up the necessary actions to ensure the fulfilment of the exploitation objectives described.

Rupprecht Consult

Rupprecht Consult has been responsible of various dissemination efforts and plans to integrate CoEXist deliverables in several areas. As project coordinator, Rupprecht will continue to represent the project at conferences and dissemination events, and support take up of its results through outreach efforts in relevant publications and media.

For instance, Rupprecht organised a session at AVS 2020, where CoEXist further cooperated with its US twinning partners and collaborated with other relevant projects (e.g., INFRAMIX) to reach joint conclusions and contribute to a future research agenda on CCAM. Rupprecht will also represent CoEXist at the upcoming POLIS Conference and H2020 Road Transport Research Results Conference, among other events. In addition, Rupprecht will continue to broadcast and disseminate CoEXist results and conclusions through its network, new projects and media platforms, including a soon to be published Podcast series.

Exemplarily, CoEXist's Automation-ready Framework, as one of the projects key outputs, is being used in INTERREG projects such as PAV and Dynaxibility4CE, to prepare further cities towards automation-readiness. Additionally, the framework provides significant value for SUMP-related consulting of cities that seek guidance in preparing for increased automation. In the development of new SUMP practitioner briefings and topic guides, the automation-ready framework will also play a central role for the further development of a more comprehensive topic guide for CCAM planning.

The automation-ready framework and guidelines for authorities will also be used to adapt the recently updated SUMP self-assessment tool towards CCAM planning, i.e. a quick online assessment functionality regarding automation-readiness. Finally, Rupprecht Consult is involved in several working groups and initiatives, e.g. CIVITAS Thematic Groups for integrated planning or game changers and the UITP SPACE project, in which the results from CoEXist will be incorporated.

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PTV Group

PTV Vissim and PTV Visum, and the developed functionalities and modelling framework (e.g., driving logics, default behavioural parameters, experimental design, etc.) for automation-ready traffic flow and travel demand modelling, are key innovation elements to be exploited and broadly disseminated.

The developed features, including manuals on how to use them, have since been included in PTV's product portfolio and will be subject to further development outside the realms of CoEXist. Each of the automation-ready traffic flow simulation features are available for the over 16,500 PTV Vissim users worldwide and, in the same way, the developed automation-ready travel demand modelling functionalities are available for the over 10,000 licensed professionals using PTV Visum globally.

For both software, a manual on how to use the feature is available and can be found in the manual document that is provided when installing the software, but also online in the online help and in CoEXist's website. Several webinars* are also online on the CoEXist YouTube Channel and on PTV YouTube channel to provide practical information and examples.

The features developed within CoEXist have been added in the training program PTV is providing to its customers. It ensures that the software developments that were part of the CoEXist project will be used after the project. Furthermore, further developments will be considered based on customers' requests and market analysis.

By a simple search on Google Scholar with the 2 words "CoEXist" and "Vissim" (https://scholar.google.de/scholar?start=10&q=Vissim%2BCoEXist&hl=de&as_sdt=0,5), one can get a glance at the use of the CoEXist project for research purposes and can expect to see even more articles in the near future (86 hits since 2018) showing that the exploitation of the project by external people has started already.

*List of the Webinars:

- CoEXist Vissim Webinar - Autonomous vehicles new features and how to? https://www.youtube.com/watch?v=C_bouqPNSw4&feature=youtu.be (05.10.2018)
- What's new in PTV Vissim 11 https://www.youtube.com/watch?v=yz04_sC9cLo (14.11.2018)
- CoEXist Automation-ready transport modelling tools https://www.youtube.com/watch?v=Gbht_gZZHM8 (19.11.2018)
- PTV Talks: CoEXist, Preparing the Transition to Automated Vehicles with PTV Vissim https://ptvtraffic.us/resources/ptvtalks-coexist/ (12.04.2019)
- Modelling of Autonomous Vehicles (AVs) in PTV Visum https://www.youtube.com/watch?v=PHDeRbvpfkw (CoEXist) https://www.youtube.com/watch?v=Sum-AHhz4pw (PTV) (25.09.2019)
- PTV Talks: Modelling Autonomous Vehicles in PTV Visum 2020 https://ptvtraffic.us/resources/ptv-talks-modeling-autonomous-vehicles-in-ptv-visum-2020/ (14.11.2019)
- Automation-ready transport modelling tools https://www.youtube.com/watch?v=Gbht_gZZHM8 (20.11.209)
- What's new in PTV Visum 2020 https://ptvtraffic.us/resources/webinar-whats-new-in-ptv-visum-2020/ (23.12.2019)

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- PTV Talks: CoEXist: Modelling autonomous vehicle mit PTV Vissim https://ptvtraffic.us/resources/coexist-2/ (12.03.2020)
- CoEXist Automation ready Modelling Training https://www.youtube.com/watch?v=HL-NPQNsJV8 (03.04.2020)

VTI

VTI has already utilized the microscopic automation-ready modelling tools in the national project SMART (Simulation and Modelling of Automated Road Transport) funded by Trafikverket to conduct further investigations on traffic performance impacts on motorways due to different mixes of different types of automated vehicles.

VTI and UNIFI will conduct a common master thesis project in which the microscopic automation-ready modelling tools will be utilized to investigate potential spontaneous platoon formation and traffic performance consequences of such phenomena. Through VTIs close collaboration with Linköping University, they will also exploit knowledge on traffic simulation of automated vehicles with courses on traffic theory and simulation.

Versions of the scripts in the road infrastructure assessment tools are utilised in other projects and the tool itself will be used in later projects on estimation of effects of automated vehicles (given that the projects are granted).VTI has and will continue to disseminate the evaluation framework and the assessment tool, and represent the project at relevant conferences and communication events.

VEDECOM

VEDECOM is covering several large-scale deployment projects and FOTs, involving both private vehicles and automated shuttles, SAE L3 or L4, and various use cases. The institute is coordinating the implementation, evaluation and impact assessment methodologies for the French SAM project, and the demonstrations in the 2 French demo sites of the EU SHOW project.

Those projects aim at proposing recommendations in terms of integration of the automated services in the city environment (physical infrastructure and transport offers), as well as governance and urban planning, and defining the future public/private ecosystems for automated mobility development. In this context, CoEXist gives VEDECOM an accurate framework for a global approach of local authorities in existing and future projects, as well as additional tools to address the upscaling issues through simulations.

For instance, the outcomes of CoEXist, and particularly the guidelines for developing and implementing the urban mobility plan will be exploited, as well as the results of simulations in comparable use cases (Goteborg and Milton Keynes particularly).

VEDECOM will also link CoEXist results and outputs to its research activities in service and technology development, and the activities of the IVM[1] in the field of societal approach of urban mobility.

On the other hand, the contribution of VEDECOM in the WP2 of CoEXist, offers a wide panel of possibilities to propose to simulator providers, with the core control logic of VEDECOM as a plugin bundle installable in order to evaluate the effect of automation on several aspects, economical, societal and environmental.

[1] Institut pour la Ville en Mouvement – City on the Move Institute, VEDECOM entity dedicated to research on the societal and urban aspects of mobility

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The Core control logic can be optimised and improved to deal with several kind of researches, this offers to VEDECOM the possibility to propose it in different research projects dealing with transportation systems, automation etc.

TASS

For the tested and calibrated control logic AV-simulator connection software, a major CoEXist output developed in D2.1, TASS' software PreScan has been an integral component next to PTV Vissim. Thorugh its broad network within Siemens and its extensive R&D efforts, TASS will continue to disseminate CoEXist results and outputs and also further develop their product based on experiences and findings from the abovementioned development process, with high potential for innovation in the integration of driving logics for AVs.

POLIS

Polis plays an active role in the automated vehicle research, innovation and policy development environment at European level. It plans to capitalise on the CoEXist findings and general approach as follows:

- Polis is a member of the EC's CCAM platform which is a platform of experts whose role is to assist the European Commission in building a framework for CCAM research, innovation and pre-deployment. Polis will ensure the CoEXist outputs are fed into the work of various CCAM platform WGs that it is part of, including Research and Innovation coordination, Infrastructure and Road safety.
- Polis is part of the drafting committee of the CCAM partnership to be submitted under Horizon Europe and is involved in building a strategic research and innovation agenda as part of this partnership. Polis will ensure that the CoEXist findings are reflected and built upon in the partnership and in particular the SRIA.
- Polis is heavily involved in ERTRAC, the European Road Transport Research Advisory Council, including as co-chair of the urban mobility working group.

Polis will also continue to promote the CoEXist findings and tools among Polis members (city and regional authorities) and more broadly, in particular through the Polis working group that is addressing automated vehicle issues, the Polis Traffic Efficiency Working Group.

FEHRL

FEHRL's members include national road administrations across Europe and the world, and through its function as a research forum, it can not only disseminate findings and encourage further research through its Future Research Agenda, but also give strategic policy recommendations to its members. FEHRL as a consulting network for road authorities is specialized on governance for implementation, multimodal integration and digitalisation in the context of automated vehicle infrastructure. Therefore, FEHRL is expected to make meaningful contributions in the ongoing exploitation and innovation of CoEXist outputs.

IDforCAR

ID4CAR will exploit the CoEXist results through:

- Product innovation: the results will be presented in a session in June 2020 in Rennes to ID4Car's members, enabling new projects and research efforts to emerge from the work done. Also, as new questions raise from the COVID crisis on the place and role in cities of AVs, the cities and operators

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support ID4Car's post-COVID innovation campaign and will build upon CoEXist's findings to develop new technologies, use cases and services. The outcome will be innovative projects supported by cities and operators to be developed and financed end 2020. This will lead to commercialization of new products and services in 2021-2022.

- Innovation: ID4CAR is a partner in the SHOW H2020 project and is the coordinator of a large test site for AVs shuttles in Rennes in the new hospital CHU. CoEXist outcomes will be extensively exploited in designing the experimentations and the new infrastructures' equipment and digital services.
- Policy recommendations: ID4CAR will have face-to-face sessions with its partner cities in West France to present policy outcomes of CoEXist and support their take up in these cities' plans and AVs strategies (Rennes, Nantes, Bordeaux, La Rochelle, Poitiers, Niort, Brest, Saint Nazaire, etc.)
- OEM strategies: ID4CAR will pursue OEM awareness by presentations of CoEXist results in its sessions with OEMs end 2020 and beyond, as the evolution of the importance of AVs in OEM strategies is refocused after COVID.
- Academic: ID4CAR gathers 10 universities' research centres focused on AVs (technology and SHS) and will make CoEXist results available for use in training by these centres for students and young professional, and as a basis for new research projects to be developed and submitted for financing by the National research Agency in France in 2021.

USTUTT

Policy development

- USTUTT provides background information and recommendations for decision makers in politics, in road authorities and in transit authorities, and, through CoEXist results, it will provide the scientific foundation for recommendations on vehicle automation.
- Prof. Friedrich is member of various boards (e.g. Board of Academic Advisers to the Federal Minister of Transport and Digital Infrastructure, Strategic dialogue for the automotive sector in Baden-Württemberg), where further dissemination of CoEXist outcomes will take place.

Product innovation & commercialization

- USTUTT provides tools developed within the project for transport planners and modelers (e.g. webinar material to download at the website of the Institute for Road and Transport Science at Universität Stuttgart).
- USTUTT will use the developed tools and the accumulated knowledge for future research projects.
- The experiences made through participating in the project CoEXist increases USTUTT's ability to meet the requirements of future projects on the national and international level.

Academic and teaching

- USTUTT includes the results in teaching ranging from general information on vehicle automation to specific modelling lectures.
- Students test and apply the developed tools and software functionality in their master theses.

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UNIFI

Similarly, to the University of Stuttgart, the University of Florence will disseminate CoEXist findings across several research faculties for further research and add modelling lectures specific to automated vehicles to the curricula.

Furthermore, UNIFI has entered a partnership with VTI that enables UNIFI master thesis students to conduct further investigations of traffic performance effects utilizing the CoEXist developed tools at VTI.

UNIFI will continue its research efforts in the field, building upon the results from CoEXist on further projects and initiatives, and collaborating key partners, such as experts at FRED Engineering, who internally collaborated with UNIFI in its CoEXist activities, continuing the development of safety-assessment procedures and recommendations for CAVs.

Gothenburg

As already shown in the City of Gothenburg's automation-ready action plan (D4.6), Gothenburg works together closely with industry partners such as Volvo and national authorities such as the Swedish Transport Agency. To further enhance this collaboration, the partners are working on setting up interfaces and working structures that allow for effective testing and development processes coherent with the city's adaptive approach.

Future and ongoing measures that exploit CoEXist results in Gothenburg are, amongst others, a deep-dive into potential impacts of MaaS and the establishment of C-ITS-related services and digital regulations based on analyses made utilizing CoEXist tools.

Milton Keynes

Policy and planning development

During the lifetime of the CoEXist project, Milton Keynes Council published its new mobility strategy. The strategy development was able to benefit from some of the early outputs from CoEXist, notably the early iteration of the automation-ready framework. This work helped refine policy makers' thinking in developing and creating a new approach to mobility strategy thinking, which now has placed CCAM at the heart of mobility strategy development. CoEXist (final outputs) is also influencing the council's longer-term development strategy. As the city looks towards 2050, with significant growth and development planned, the council has defined a specific 'big' project based around smart, shared sustainable mobility. This project will develop mobility options which include CCAM, and these will in turn will utilise the tools and transport planning (modelling) approach developed in CoEXist.

Transport Modelling

MKC is about to tender for a new strategic and local transportation model. The features and tools developed in CoEXist (or similar outputs) will be a required feature of any modelling approach that the council tenders. The council's new transport modelling lead has recently engaged with the wider council team involved in CoEXist to take the modelling approach forward into the council's mainstream transport planning activity.

Product innovation & commercialisation

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Milton Keynes Council has been actively involved in a number of CCAM related innovations including technical development of vehicles to improve performance on 'open' highway in Milton Keynes, these include:

- SWARM: a UK innovate sponsored project to developed self-managing controls to reduce the need for human interventions. This was in collaboration with Aurrigo and Warwick University.
- Starship Robots: a commercial autonomous robot delivery service deployed in several areas of Milton Keynes.
- Park-AV: development (a collaboration between Appyway, Jaguar Land Rover and Coventry city council) of a business case for the deployment of autonomous valet parking. It is perhaps of most relevance to CoEXist as the business case looked at the CoEXist use case 5 (drop off and pick up) as the starting point and considered in detail the commercial factors, and city benefits that could accrue if this form of city centre operation was widespread. A full project summary is available at (https://its-uk.org.uk/appyway-in-av-valet-parking-solution-consortium/). The Park AV team had detailed meetings with MKC and Cambridge University to develop business models and understand the potential implications on city roadspace and use.
- Future project: Milton Keynes Council, working with Red Bull Racing based in Milton Keynes, has defined a live trial of the use case 5, using the Red Bull campus carpark as a drop off and pick up zone for a variety of vehicles to access before transferring to a last mile autonomous shuttle. The project will be supported by a new standalone 5G network, and is planned to be operational in mid-2021.

These live projects have utilised the approaches developed in CoEXist to engage with city planners, the legal team and citizens to 'prepare' communities for the deployment of CCAM.

Academic & teaching

MKC has established a productive and strong working relationship with Cambridge University. Cambridge University were MKC's subcontractor, brought into the CoEXist project to provide specialised transport modelling input. The team at Cambridge were able to work with other consortium members to develop the new approach and since have retained the capability to give ongoing support to Milton Keynes Council and others.

An important extension to the work has been to undertake research into the CoEXist approach to developing assessment tools and methodologies with other developed as part of other research projects, most notably the UK Autodrive project. This research has given a valuable set of insights into the robustness of the CoEXist approach and has to a certain degree validated the work undertaken by technical partners.

Helmond

The results of participating in the CoExist project have given the city of Helmond a lot of knowledge and experience about automated vehicles that can be used in (future) policies and also in implementing measures in street applications. For example, Helmond has learned from its own use cases that when the automated vehicles are advanced enough and can communicate with roadside systems, there is profit to be made in traffic light regulation. This can be used to handle more traffic at an intersection, but also, for example, to set other priorities at an intersection such as more green-time for cyclists and pedestrians without inconveniencing other traffic more.

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Also, the conclusions of other use cases (e.g., with macroscopic travel demand modelling focus) are certainly very important to consider when developing policies such as the outcome of the Stuttgart use case that automated driving represents a challenge for urban transport planning.

Helmond will also disseminate these results in other projects and tests in which they will be involved in the coming years as being a living lab. Furthermore, Helmond has also learned a lot to be able to calculate developments with automated vehicles with the help of a (micro)simulation model, something that Helmond certainly wants to apply more often to future developments in the city.

Stuttgart

As stated in its Automation-ready Action Plan, the city of Stuttgart plans to undertake the following measures to exploit and take up CoEXist's results and outputs:

A german version of the Action Plan will be developed and published in the city's website: stuttgart.de. This will allow for local authorities, mobility stakeholder and citizens in general, to learn CoEXist's results and the conclusions relevant to the city's efforts to prepare for CCAM.

Also, the city will engage in presentation and discussion around CoEXist's research findings and developed tools, guidelines and recommendations, especially in the following committees / expert committees:

- City council (public meeting with press)
- Stuttgart Region (Department of Transport Planning and Economic Development) regarding joint use and strategy, possible cooperation
- Working groups of the Ministry of Transport BW (especially in the SDA BW)
- Working groups of the PUM
- Expert committees of Deutscher Städtetag

Stuttgart will coordinate a strategy in the mobility working group, building upon CoEXist's conclusions to consider the set up of further pilot projects, also in cooperation with resident development and research institutions.

The Civil Engineering Office and the Integrated traffic management centre (IVLZ) are already preparing further project applications, e.g. in the fields of strategy-compliant routing and testing of roadside units to improve road safety.

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4 Conclusion

As summarized above, the project has already spurred exploitation and innovation in numerous instances, chiefly in the areas of policy development, product innovation & commercialisation, and academic & teaching.

In light of the automation-ready framework (D1.2), an essential way of exploiting CoEXist project results is their dissemination with the aim of creating “automation awareness”. As the partners’ exploitation measures reflect the aim of putting liveability at the focus of policy development and strategic goal setting, there has been a paradigm shift in policy development towards people friendliness and making CAVs city-ready, instead of simply making cities Automation-ready with the risk of losing focus on human-centred urban design. Extensive collaboration with important stakeholders such as local citizens, exemplarily through automation-ready fora (D4.4), showcase the implementation of this shift.

Concrete “action planning for automation readiness” can be found in the exploitation plans of various project partners that have started to reassess mobility strategies by considering options to integrate CCAM into collective mobility systems. Such considerations also incorporate updated travel demand models and touch on new infrastructural requirements, especially for C-ITS. In the field of connected mobility, upscaling processes have already begun in some cities, as quick wins can be captured in this domain.

The need to set up organisational structures, as specified in the last phase of automation readiness, is also displayed in the exploitation and innovation plans of participant cities. Also, the importance of collaborative approach to access know-how and experience is highlighted, as well as the necessity of optimally organising internal processes to steer cooperation among their various sectors and entities.

Apart from the cities, also stakeholder networks, technical / research partners and academic partners will utilize CoEXist outputs on a policy level by positioning them in other projects and consortia. Through these channels, authorities on national and European level are encouraged to continue supporting joint efforts in preparing for automation, which enables further collaborative projects helping cities, researchers and policymakers to co-develop clearer implementation scenarios of CCAM.

Through networks including vehicle OEMs as well as private individual and collective mobility providers, it is likely that product and service innovation will similarly follow a participatory approach by including key stakeholders. Lastly, research institutes and universities are heavily involved in developing new means of fact-finding (impact assessment, microscopic and macroscopic modelling, defining performance metrics), which is essential develop clear strategic visions for the coexistence of conventional and automated vehicles in a broader urban mobility setting.

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