



The Regulatory Frameworks Dashboard

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| Organisation | Country | Abbreviation |
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| UNION INTERNATIONALE DES TRANSPORTS PUBLICS | BE | UITP |
| FIT CONSULTING SRL | IT | FIT |
| UNIVERSITY COLLEGE LONDON | UK | UCL |
| POLIS - PROMOTION OF OPERATIONAL LINKS WITH INTEGRATED SERVICES, ASSOCIATION INTERNATIONALE | BE | POLIS |
| RUPPRECHT CONSULT-FORSCHUNG & BERATUNG GMBH | DE | RC |
| CAPITAL HIGH TECH SAS | FR | CHT |
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LIST OF ACRONYMS

- SUMP** – Sustainable Urban Mobility Plan
- 2RL** – Regulation Readiness Level
- MaaS** – Mobility as a Service
- AV** – Automated Vehicles
- GDPR** – General Data Protection Regulation
- WP** – Work Packages
- MOU** – Memorandum of Understanding
- UAS** – Unmanned Aircraft Services
- V2X** - Vehicle-to-everything



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EXECUTIVE SUMMARY

This deliverable describes the methodology employed in order to develop the Regulatory Frameworks Dashboard, which is a regulatory supportive tool aiming at providing new regulatory responses to policy makers regarding disruptive mobility solutions, with an impact assessment related to the implementation of these regulations.

This tool was designed as an interactive tool, relying on the work carried out for the development of the multidimensional Regulatory Matrix (see GECKO deliverable 2.4 Regulatory approaches and governance models for disruptive innovation).

The end-user of the tool will provide inputs which will be processed in order to propose the most suitable regulatory scheme. This regulatory scheme should address the challenges, risks, issues for each social, economic and political, environmental and safety criteria, linked to disruptive innovations and mobility services.

A first version of the tool is provided with this deliverable and a first layout with filters applied to the regulatory database, the final version will be developed by M24 (November 2020), based upon the overall design shared among the involved project partners as well as within the Stakeholder Hub engagement process.



1 INTRODUCTION

GECKO (Governance principles and mEthods enabling deCision maKers to manage and regulate the changing mObility systems) aims at supporting authorities with tools and recommendations in order to create a new regulatory framework, suitable for the transition to a new mobility era.

In order to achieve this objective, an important building block of this project is the design and the development of regulatory supportive tools that will highlight new approaches for the regulations of disruptive mobility solutions.

Among these tools, the Regulatory Dashboard evaluates the socio-economic, environmental and safety impacts of the policies. **The development of this tool is the subject of this deliverable**, coming within the scope of the Work Package 3, “Impact assessment and prospects for new regulatory schemes”.

This work gathered the results coming from previous work packages WP1 and WP2:

- Review of new mobility solutions and business models (WP1);
- Investigation of main political, social and economic variables (WP2);
- Regulatory approaches and governance models for disruptive innovation, which led to the development of the Regulatory Matrix that provides new regulatory responses for disruptive mobility solutions (WP2).

Relying on that work, an impact assessment methodology was designed, with the choice of the relevant parameters or Key Performance Indicators (KPI), criteria of success for the implementation of regulations.

An important activity carried out in the scope of this task in WP3 was to integrate the Regulatory Matrix into the Dashboard, in order to provide **a unique interactive tool** that will have all the required functionalities for policy makers.

This interactive tool provided with this deliverable will be finalized as a user-friendly tool by M24 (November 2020).

2 GLOSSARY

This glossary aims at defining some key elements that are at the core of the GECKO project, related to several deliverables that were or will be published.

2.1 Disruptive mobility innovations in the scope of the GECKO project

Categories of transport innovation: a selected group of transport innovation that are most disruptive and subject to GECKO investigations. These categories are (refers to D1.1 Review of new mobility services and technologies and set-up of knowledge bank):

- 1) Cooperative, connected, and automated mobility (CCAM)
- 2) Infrastructure, network, and traffic management:
- 3) MaaS and MaaS platform, and
- 4) Shared and on-demand mobility

- **Case Studies:** specific mobility solutions investigated by GECKO activities and grouped per categories:
 - For CCAM:
 - Connected and automated vehicles: refers to automated/connected vehicles or self-driving cars.
 - Passenger urban air mobility: refers to the use of aerial autonomous vehicles or vertical take-off and land vehicles to transport people living in populated urban areas.
 - Last mile drone delivery
 - For Infrastructure, network and traffic management:
 - Big data for transport and mobility
 - Cooperative traffic management: traffic optimization through the processing of real-time information provided by road users, service providers in new traffic management centres.
 - Hyperloop: ultra-high-speed ground transportation system.
 - MaaS and platforms: a new concept aiming at providing consumers with flexible, efficient, user-oriented and ecological mobility services
 - Shared/On-demand mobility:
 - Car-pooling/Car-sharing
 - Bike sharing: self-service bikes for short trips in urban areas.
 - E-scooter sharing/micromobility: collaborative mobility service with the use of electric powered mobility devices (segways, scooters, etc.)
 - Ride-hailing and TNC: on-demand transport through transactional platforms.
 - On-demand ridesharing: system that matches riders and drivers in order to share transportation at random time and locations.

- Crowdsourcing: crowdsources delivery, uses free capacity available in various transport modes.

2.2 Definitions of regulatory terms and tools

2.2.1 Regulatory terms

- **Regulation:** as defined by the OECD, any instrument by which governments, their subsidiary bodies, and supranational bodies set requirements on citizens and businesses that have legal force (refers to D2.1 Analysis of regulatory responses and governance models¹).
- **Jurisdictional level:** The territorial level to which a regulation applies (international, European, national).
- **Regulatory schemes:** a generic model defining a typical scheme of a regulation. Examples are market governance (policy instrument used to influence on economic variables) or Regulatory Sandboxes (deployment of the innovation on restricted and controlled conditions). Other examples are reported in D2.4 Regulatory approaches and governance models for disruptive innovation².

2.2.2 Regulatory tools

- **Regulatory database:** collection of regulations and related attributes.
- **Regulatory Matrix:** The Regulatory Matrix is the regulatory database, completed with the analyses of regulations with the Regulatory Readiness Level assessment.
- **Regulatory Frameworks Dashboard:** This regulatory supportive tool aims at providing an impact assessment by assigning KPIs to the regulations in the database. An interactive layout was developed in the framework of this deliverable, in order to filter the database and extract relevant information for the end-user (see the Dashboard excel file attached with this report). A final version of this tool will be developed by M24 (November 2020) (milestone of the GECKO project), which will be more user-friendly for the policy maker, and will integrate other tools such as the Compliance Map.
- **Compliance Map:** a visual dashboard displaying the content of the Regulatory Matrix/Regulatory Framework Dashboard and allowing dynamic interaction to the user for retrieving the information. More specifically, the dashboard could allow guided searches

¹ « Deliverable D2.1: Analysis of regulatory responses and governance models », A. Reynaud & al.

² “Deliverable D2.4: Regulatory schemes and governance models for disruptive innovation”, C. Busquet & al.

upon specific filtering criteria (by region, by period, by category, etc.) and free searches (by free text input). This tool will be designed/developed at a later stage in WP3.

- **Knowledge bank:** compendium of results from WP1 and WP2: key results of both WPs summarised in a document.
- **Position paper:** Political joint document with key political statements regarding new mobility vision for passenger and freight to 2040.
- **Adaptive Roadmap:** This task will develop an Adaptive Roadmap 2040 that:
 - will allow assessment (with outlook to 2040) of evolving technology and use innovations in the field of mobility system (for all transport modes) in view of their systemic decarbonisation potential (focus on urban applications), identify and monitor needs and priorities for further R&I actions at European level;
 - will establish an ambitious programme for governance models, facing city future mobility and social challenges and market transformation with an outlook to 2040, in order to ensure that the future mobility system(s) serve overarching social and political goals in the benefit of the widest and comprehensive range of stakeholders.
 - becomes a strategic decision-making tool supporting consensus-based and transparent policy, facilitating policy makers to take early warning and effective actions forward when new technology or mobility service is introduced in the market, reducing mismatching between regulatory framework and market deployment.

2.3 Impact assessment definitions

- **KPI (Key Performance Indicator):** Information reporting the performance of a service with respect to the set objectives. The quantification of the KPI usually takes place through measurements of some significant measures of the service provided. KPIs can be quantitative and qualitative; usually, qualitative KPIs are estimated using a scale of values and procedures for normalizing estimations, in order to provide a quantification with a certain degree of accuracy/reliability with respect to the assessed service.
- *Remark:* regarding the development of the tool in the framework of this deliverable, KPIs apply to regulations and not to case studies, according to the project scope, meaning that the aim is to evaluate the capacity of a regulation to enable the implementation of certain mobility solutions while ensuring policy objectives are achieved (safety, security, data privacy, social protection etc.).
- **Evaluation Categories:** set of KPIs, grouped per conceptual class facilitating the evaluation process. Evaluation categories identified so far are: Business Ecosystem, Data Management, Governance, Environmental Aspects, Social Aspects, Customer protection

and Public Safety. Other suggested categories are Technology and Infrastructures and Innovation.

- **Metrics:** measurement units applied to quantify KPIs. Metrics can be objective (measurement retrieved by a quantifiable process, e.g. CO₂/Km measuring environmental emissions) or non-objective (measurement retrieved by a qualitative process, although standardised upon certain criteria, e.g. percentage of people liking/disliking, measuring the acceptance of a certain service).
- **Target groups:** set of stakeholders (subjects affected by a certain service/regulation) to whom KPIs apply (as producer or consumer of the measurements). Examples are Local authorities, commuters, ICT companies, etc.



3 METHODOLOGY: FROM A REGULATORY MATRIX TO A DASHBOARD

The Regulatory Dashboard, as written in the Gecko proposal, is an interactive matrix which is initially structured as following:

- **In the rows:** Regulatory schemes, as clustered in WP2 (T2.3) and provided by the Regulatory Matrix³, which relies on a Regulatory Database that gathers regulations related to case studies.
- **In the columns:** Disruptive technologies, services and business models, as clustered in WP1.
- **In the cells:** Strategic social, economic and safety criteria and KPIs to assess the impact generated by the different regulatory schemes and their maturity levels in enabling new technologies and models.

The objective of the Dashboard is thus to assess these regulations with Key Performance Indicators, that will assess the impact generated by these regulatory schemes.

As there are many parameters to include in the cells, we adopted a different layout, with the development of a unique interactive tool carried out in two stages:

- First, an interactive table, attached with this deliverable, provides **the whole database with impact assessment**. This table is completed by preliminary interactive features (research parameters to get first visualizations).
- Then, **a final layout** will be developed by M24 to achieve a user-friendly tool, which will gather the Regulatory Matrix, the Regulatory Frameworks Dashboard, as well as the Compliance Map that will be delivered at the same time. This tool aims at developing a complete regulatory supportive tool that will address all policy makers' requirements.

This tool will process through the following steps:

1. Public authority's framework:

First of all, this tool starts with a search bar that will be filled by the policy maker in order to propose regulations according to the mobility solutions studied, the challenges and the key features related to the deployment of the disruptive mobility solution in the territory, country/city, etc. This provides self-assessment for the policy maker that could be integrated into the SUMP's questionnaire⁴.

2. "Regulation package":


A set of regulations will be proposed to the policy maker, that will be the more suitable regarding the mobility solution regulated and the city profile, the expected impacts, the territory characteristics, etc. Each regulation addresses a challenge, barrier, or a risk that has been

³ See Deliverable D2.4

⁴ <https://www.mobility-academy.eu/course/index.php?categoryid=15>

previously identified, according to the assessment of the Regulatory Readiness Level (positioning in the regulatory process time scale defined within Deliverable D2.4 Regulatory approaches and governance models for disruptive innovation):

Table 3-1: 2RL definition - Extracted from Deliverable D2.4



| 2RL | Description | Regulatory approach |
|-----|---|--|
| 1 | Related to a disruptive technology/service for which norms and standards have to be defined | Collaborative approach to define norms and standards to ensure long-term security and safety at the EU level |
| 2 | Related to the experimentation of a new technology/service | Binding rules to allow the deployment of the mobility solution (amendment of the national traffic code, etc.) for the experimentation Regulatory sandboxes to test the solution on a restricted area and provide impact assessment. Market approach to select operators to carry out the experimentation (subsidies, tradeable permit, etc.) |
| 3 | Related to the regulation of a new technology/service already deployed | Binding rules to define the conditions of use of the mobility solution (traffic code, insurance, etc.) Collaborative approach , local private-public cooperation to deploy the solution (e.g. Memorandum of Understanding) Market approach to limit the number of operators or set up a cap on a fleet (licensing), to ensure the policy makers that the mobility solution provider will respect policy objectives through the fulfillment of specifications defined with a tradeable permit. |

The regulations are proposed relying on the Regulatory Database.

This process is summed up on the scheme below:

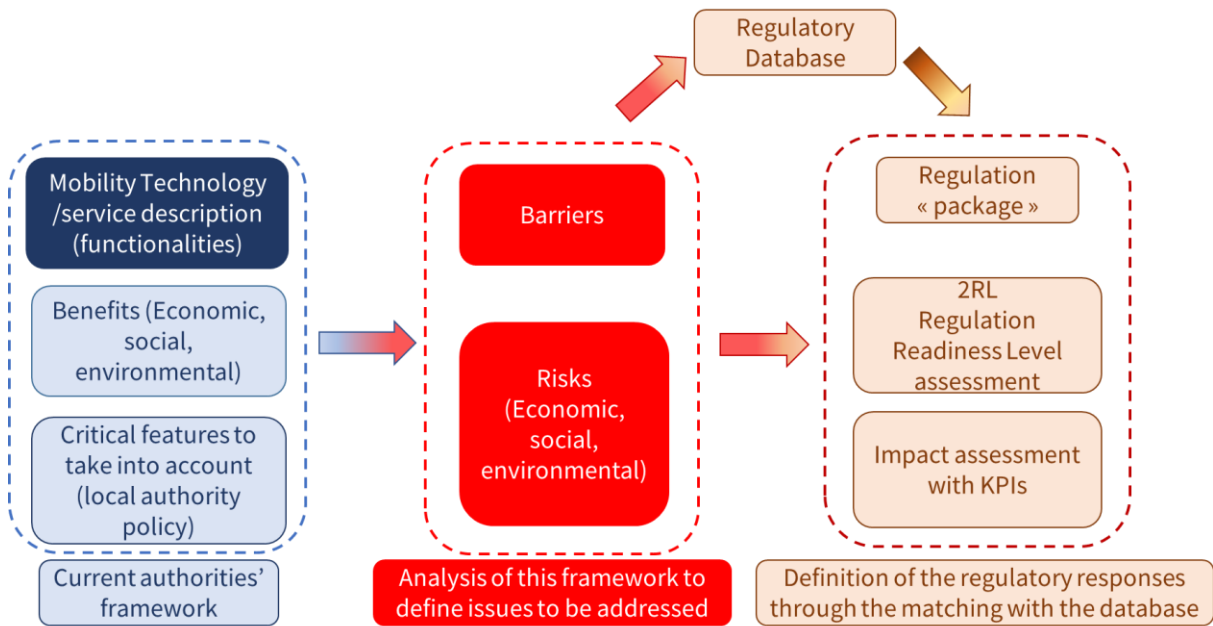


Figure 1: User-friendly tool concept

This could be also illustrated by an example. If we consider an urban environment, with a large mobility service offer, we could consider for MaaS:

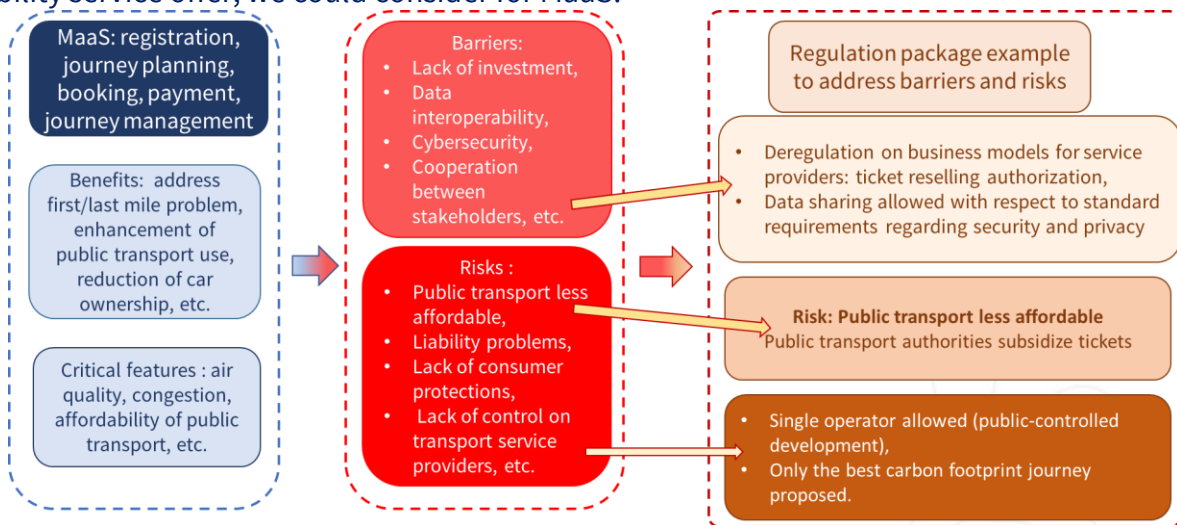


Figure 2: MaaS example illustrating the tool concept

4 KEY PERFORMANCE INDICATORS (KPIs)

KPI is an indicator that generally quantifies the performance of a service with respect to the set objectives (usually numerical). Therefore the quantification of the KPI usually takes place through measurements of some significant quantities of the service provided. However, referring to GECKO purposes, KPIs will be not used to evaluate a transport service but the capacity of the regulatory schemes to implement it (i.e. ensuring that the service and the legal context in which it is implemented respect safety, security, data privacy and social protection and provide efficiency and effectiveness to the addressed service). For this reason, unlike the usual KPIs, those defined in the present deliverable will not always be expressed in quantitative terms or derived from direct on-field measurements but will be captured as qualitative perception of a sufficient number of experts and stakeholders.

In particular, the task to which this deliverable refers, first of all defines a structured list of the KPIs and attributes of each KPI. Subsequently the assignment to each regulation of a certain number of KPIs had been performed. This allows to evaluate how effectively the regulation enables the adoption of the new mobility solutions (identified in D1.1 Review of new mobility services and technologies and set-up of knowledge bank) while continuing to guarantee adequate level of security, safety, data privacy and social protection.

The quantification of the KPIs (i.e. the actual assessment of the effectiveness of the regulations) will be performed in T3.2 by the stakeholders.

4.1 Key Performance Indicators List Definition

As mentioned in the previous paragraph, the first step was to define a structured list of the KPIs which will be used to evaluate the effectiveness of the regulations in achieving the objectives that the regulations set themselves. For this reason, even before defining the KPIs, groups of general and specific objectives have been identified. The identification of these objectives started from the “categorization of economic, political and social variables affecting governance of disruptive mobility solutions” (see D2.2 Investigation of main economic, political and social variables⁵) and was then adapted and increased by a first analysis of the collected regulations (see section 5.1.2).

In the KPI list structure, the general and specific objectives have been called "category" and "sub-category" respectively. Starting from each subcategory (i.e. specific objective) one or more KPIs have been defined, considering the diversity of the regulations that had to be evaluated, for example in terms of purpose and in terms of implementation status.

As for the purpose:

⁵ “Deliverable D2.2: Investigation of main economic, political and social variables”, A. Tsvetkova & al.

- on the one hand, some regulations (in order to enable disruptive technologies) set the goal of creating positive private returns to firms (through the provision of infrastructures, with economic incentives, creating clear laws on insurance issues, etc.). So there is the general objective of creating a market, legal and infrastructural ecosystems to enable the provision of these services. These are objectives that can be directly linked to actions and therefore the KPIs are like: "clarity of the law in establishing different responsibilities (likert scale)" or "km of road network equipped with connectivity system V2X".
- on the other hand there are the environmental and social objectives to be safeguarded. These are objectives that are instead expressed through the definition of targets, priorities and requirements, so the KPIs are of the "extent to which it is necessary to demonstrate that the investment (by public bodies) or service (by the operators) are aimed at contributing to climate change objectives "or" effectiveness of prevention and protection systems for vulnerable users ". So KPIs evaluate how effectively these goals are kept under control in the spread of these innovations.

As regards the implementation status:

- there are regulations already in place for more or less time. The evaluation is therefore of an ex-post type. In this case the KPIs can therefore already assess the effects of regulation and therefore may be similar to the classic definition of KPIs (e.g. "No. of jobs created within the law coming into force" or "No. of new economic operators entering the reference market within the years of the coming law ").
In this sense the KPIs will be both quantitative (they can only be in the case of regulations already implemented and concerning direct actions) but also and mainly qualitative (when they have to evaluate laws not yet implemented, or when they have to assess to what extent the actions are consistent with the objectives).

4.1.1 Key Performance Indicators Attributes

After identifying the list of KPIs, attributes were defined for each KPI.

These attributes make it possible to identify the KPI uniquely and define its structure and content.

- ID: uniquely identifies the KPI
- Name: Name of the KPI
- Definition: short definition of the KPI and what it is measuring
- Metric: measurement units applied to quantify KPIs. Metrics can be objective (measurement retrieved by a quantifiable process, e.g. CO2 / Km measuring environmental emissions) or non-objective (measurement retrieved by a qualitative process, although standardized upon certain criteria, e.g. percentage of people liking / disliking, measuring the acceptance of a certain service).
- Target Group: set of stakeholders (subjects affected by certain service / regulation) to whom apply KPIs (as producer or consumer of the measurements). Examples are Local authorities, commuters, ICT companies, etc.
- Disruptive innovation addressed: assignment of the KPIs to one or several case studies

4.1.2 Examples

Table 4-1: KPI structure example. In yellow, KPI that is also related to “Political” category

| | | | | | | | |
|--|--|----|---|--|--|--|-----|
| <p>This category of KPI assesses political aspects such as liberalization of the market, specific rights for public operators or administrative competences</p> | <p><u>Liberalization of the market</u></p> | 14 | No. of economic operators operating in the reference market | No. of economic operators operating in the reference market within N years of the law coming into force | No. | Mobility solution providers | All |
| | | 15 | free market access | extent to which the freedom to enter the market is guaranteed | likert scale, where: 0 = strongly hampered market 5 = totally free market access | Mobility solution providers | All |
| | | 16 | presence of international operators | share of international operators operating in the reference market within N years of the law coming into force | % | Mobility solution providers | All |
| | | 17 | presence of SME | Share of SMEs operating in in the reference market within N years of the law coming into force | % | Mobility solution providers | All |
| | | 18 | antitrust control | extent to which the agreements to limit competition are controlled (cartels and other unfair agreements in | likert scale, where: 0 = low control 5 = high control | Mobility solution providers, transport authorities | All |

| | | | | | | | |
|--|---|----|---|--|---------------------------------------|-----------------------|-----|
| | | | | which the companies agree to not compete and divide up the market) | | | |
| | <u>Exclusive rights to public operators</u> | 19 | Exclusive rights to public operators | extent to which the law gives exclusive rights to public operators to provide transport services | likert scale, where: 0 = low 5 = high | Public transport | All |
| | <u>Institutional</u> | 20 | Implementation modality (voluntary / mandatory) | extent to which the law delegates the implementation of regulatory actions to subordinate laws | likert scale, where: 0 = low 5 = high | Transport authorities | All |

4.2 KPIs related to disruptive mobility innovations

The full KPI list is provided in annex 1.



5 DEVELOPMENT OF THE REGULATORY FRAMEWORKS DASHBOARD

5.1 Regulatory Database

5.1.1 Definition of the data model: Relationship diagram

The entity-relationship diagram was designed by Peter Chen in 1976 in order to structure a database⁶, by an IT system that allows the visualization of relationships between entities (people, objects, place, concepts, etc.) and their attributes with connecting lines formalized through different notations.

In the framework of this study we will use the Crow's foot notation:

| Notation | Meaning | Example |
|----------|--------------|---------|
| | Relationship | |
| | One | |
| | Many | |
| | One or Many | |
| | Zero or Many | |

Figure 3: Crow's Foot notation

In the following figure is represented the relationship diagram that we carried out with the data model used for the interactive table that gathers both the Regulatory Matrix (regulations with

⁶ ACM Transactions on Database Systems (TODS) - Special issue: papers from the international conference on very large data bases: September 22–24, 1975, Framingham, MA

general impacts and 2RL assessment, that addresses challenges, barriers and risks related to a case study in a mobility category innovation) and the Regulatory Frameworks Dashboard which provides impact assessment through the assignment of KPIs.

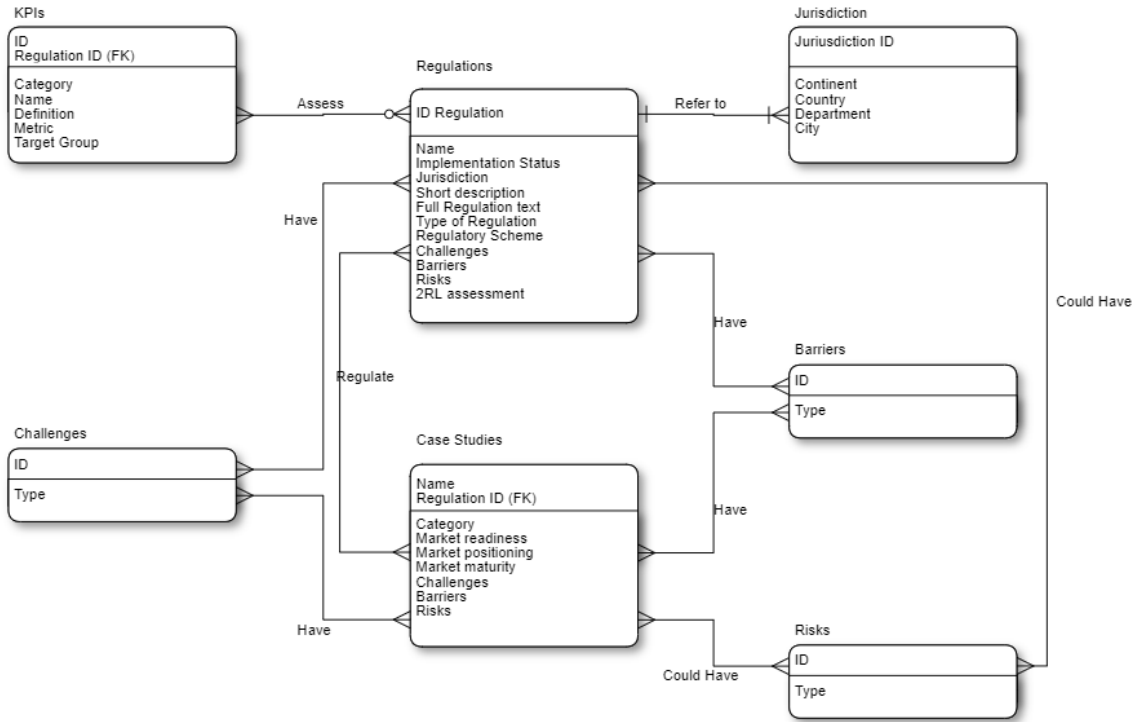


Figure 4: Relationship-diagram for the Matrix/Dashboard

As introduced above, all entities have their Primary Keys, Relationships linking each other and Attributes that assume values as analytically reported in the following tables.

Table 5-1: Relationship linkages - Detailed description

| Entity | Attribute | Data type | Values |
|--------------------|-----------------------|---|---|
| Regulations | Name | Text | |
| | Implementation Status | Binary | Implemented/Not Implemented |
| | Jurisdiction | Structure | |
| | Short Description | Text | |
| | Full regulation text | File | |
| | Type of Regulation | List | EU Directive/Regulation National/Regional/Local law Technical standard Recommendation Open method for coordination Education and information Taxes/charges/fees/fines Penalties Liability and compensation schemes Subsidies and incentives Deposit-refund schemes Tradeable permit Call for tender (bids) Not implemented yet Licensing Worldwide conventions Labelling scheme |
| | Regulatory scheme | List | Binding rules Adaptive regulation Regulatory sandbox Outcome-based reg. Risk-based reg. Collaborative reg. Market |
| | Challenges | Structure | |
| | Barriers | Structure | |
| | Risks | Structure | |
| 2RL Assessment | | Related to a disruptive technology/service for which norms and standards have to be defined Related to the experimentation of a new technology/service Related to the regulation of a new technology/service already deployed | |

| Entity | Attribute | Data type | Values |
|--------------|--------------------|-----------|---|
| Case Studies | Category | List | Cooperative, connected, and automated mobility (CCAM), Infrastructure, network, and traffic management, MaaS and MaaS platform Shared on-demand mobility Alternative fuels All |
| | Market Readiness | List | TBD |
| | Market Positioning | List | TBD |
| | Market Maturity | List | TBD |
| | Challenges | Structure | |
| | Risks | Structure | |
| | Barriers | Structure | |
| | | | |
| | Risks | Structure | |
| | 2RL Assessment | | Related to a disruptive technology/service for which norms and standards have to be defined Related to the experimentation of a new technology/service Related to the regulation of a new technology/service already deployed |

| Entity | Attribute | Data type | Values |
|--------|--------------|-----------|-----------------------|
| KPIs | Category | List | See Annex |
| | Name | Text | |
| | Definition | Text | |
| | Metric | List | Likert Scale or other |
| | Target Group | List | |

| Entity | Attribute | Data type | Values |
|--------------|------------|-----------|--------|
| Jurisdiction | Continent | List | |
| | Country | List | |
| | Department | List | |
| | City | List | |

| Entity | Attribute | Data type | Values |
|-----------------|-----------|-----------|---|
| Barriers | Type | List | Social Economic Environmental Political Organisational Security Safety Legal |

| Entity | Attribute | Data type | Values |
|-------------------|-----------|-----------|---|
| Challenges | Type | List | Social Economic Environmental Political Organisational Security Safety Legal |

| Entity | Attribute | Data type | Values |
|--------------|-----------|-----------|---|
| Risks | Type | List | Social Economic Environmental Political Organisational Security Safety Legal |

The described data model is an ongoing work that will be further developed during the next period and will constitute the pillar for designing the compliance map and its functionalities.

5.1.2 Collection of regulations

This work was carried out in the framework of this task and the task T2.3 regarding the development of the Regulatory Matrix. Related results (survey and statistics) are presented in the deliverable D2.4 Regulatory approaches and governance models for disruptive innovation.

The collection of regulations was performed via surveys, interviews with stakeholders from Europe and Asia and desktop research. The goal was to get as much regulations as possible to get the regulatory state-of-the art.

In the first version of the Regulatory Dashboard provided with this deliverable, it is possible to see the latest version of this database that will evolve during the project with the new regulations coming up, metrics assigned in the frameworks of the task 3.2.

5.2 Analysis of regulations

After having gathered more than 130 regulations related to disruptive mobility innovations, the research team started the analysis of the full regulatory texts to assign the KPIs, through the methodology presented hereafter. The different steps described for this analysis are illustrated by an example of regulation: *“supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the deployment and operational use of cooperative intelligent transport systems”*⁷.

- STEP 1: To identify the purpose of the regulation.

Why was this regulation enacted?

Generally, the purpose of the regulation is contained in the title itself or in the introductory paragraphs (Context, Scope etc.).

EXAMPLE:

- Purpose → *The deployment and operational use of cooperative intelligent transport system.* From reading the policy context we learn what V2V, V2I and V2X communications are, but also what the potential negative and positive effects of the adoption of C-ITS can be: *“New technologies aimed at improving the efficiency, safety and environmental performance of road transport are playing a significant role in achieving the Commission’s goals in this area. One emerging field is that of cooperative intelligent transport systems (C-ITS), which enable vehicles to interact directly with each other and the surrounding road infrastructure. In road transport, C-ITS typically involves vehicle-to-vehicle (V2V), vehicle-to-infrastructure (V2I) and/or infrastructure-to-infrastructure (I2I) communication, and communication between vehicles and pedestrians or cyclists (‘vehicle-to-everything’, V2X). This enables a wide range of information and cooperation services”; “The benefits of C-ITS span a range of areas and include better road safety, less congestion, greater transport efficiency, mobility and service reliability, reduced energy use, fewer negative environmental impacts, and support for economic development”*

- STEP 2: To identify the objectives of the regulation.

A first way to identify regulatory objectives may be to analyse the table of contents (or article titles). In any case, at this stage it is necessary to understand what the different aspects of the regulation are. Generally, it should be possible to assign each specific objective within some of the categories of the list of KPIs or find it directly among the sub-categories.

EXAMPLE:

- Objective → Interoperability

⁷ https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=PI_COM%3AC%282019%291789

From article 1 we read: *“This Regulation establishes specifications necessary to ensure compatibility, **interoperability** and continuity in the deployment and operational use of Union-wide C-ITS services based on trusted and secure communication”*

- STEP 3: To identify requirements, measures and aspects that allow the objective to be achieved (KPIs) from each different point of view (Safety, economic, organizational...)

In general, it is not enough to consider only the objectives mentioned in the regulation. To quantify KPIs, the regulation must identify requirements, measures or aspects that allow the objective to be achieved.

EXAMPLE1:

- Objective→Interoperability
*“This Regulation establishes specifications necessary to ensure compatibility, **interoperability** and continuity in the deployment and operational use of Union-wide C-ITS services based on trusted and secure communication”*
- Requirements/measures/aspects that allow the objective to be achieved→
“The practical implementation of the hybrid communication approach, combined with the need to ensure the interoperability and continuity of services, imposes certain technological choices. These are reflected in a minimum set of functional and technical requirements for the interoperable exchange of messages between C-ITS stations. As this should not hinder further innovation, this Regulation ensures that future technologies can be integrated in the ‘hybrid communication’ mix”

EXAMPLE 2:

- Objective→Congestion (reduction of)
*“The benefits of C-ITS span a range of areas and include better road safety, **less congestion**, greater transport efficiency, mobility and service reliability, reduced energy use, fewer negative environmental impacts, and support for economic development”*
- Requirements/measures/aspects that allow the objective to be achieved→ Not further specified
→therefore the KPI “congestion” should not be attributed. In this sense it must be remembered that we are not evaluating the effectiveness of the mobility solution, but the effectiveness of the measures identified by the regulation.

- STEP 4: To assign the regulation with KPIs

From this previous analysis, KPIs can be assigned in the regulatory database.

5.3 Regulatory Frameworks Dashboard: the first layout

The first layout was developed to provide to the end-users (the policy maker), an interactive interface to access the data available in the regulatory database, as presented in the figure hereafter. Three filters were set-up to highlight some regulations for one specific case study:

- Governance model
- Policy instruments
- Jurisdiction level

Select your case study :

Select Regulations by:

Filter 1: Governance model Filter 2: Policy instruments Filter 3: Jurisdiction level

For each case study selected, select the filter below:

Filter 1: Governance model

Filter 2: Policy instruments

Filter 3: Jurisdiction level

| Regulation | Status | Jurisdiction | Country | Region | City | |
|---|---------------------|--------------|-------------|---------------|-----------|----------|
| e-scooter service exploitation within the city borders | Already implemented | Local | Spain | Aragon | Zaragoza | TI se bc |
| Ordinance in Boston MA USA that creates regulations for electric scooters | Already implemented | Local | U.S.A | Massachusetts | Boston | IT sy |
| Licensing shared e-vehicles | Already implemented | Local | Spain | Catalonia | Barcelona | TF |
| Ordinance cyclopartage | Already implemented | Local | Belgium | Brussels- | Brussels | E- |
| Administrative Rule Adopted by Portland Bureau of Deelmobiliteit, kansen voor de stad | Already implemented | Local | U.S.A | Oregon | Portland | Se |
| Memorandum of understanding | Already implemented | Local | Netherlands | | Amsterdam | pc |
| | | | Sweden | | Stockholm | TF |
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Figure 5: Regulatory Frameworks Dashboard: First layout



6 GENERAL CONCLUSION AND PERSPECTIVES

In the framework of the Deliverable D3.1, we have thus built up the methodology to develop a regulatory supportive tool that evidences regulatory approaches related to disruptive mobility innovations: the Regulatory Frameworks Dashboard.

Then, we set up a regulatory database, in synergy with other WPs, with more than 130 regulations collected for all the case studies. These regulations were analysed for KPIs assessment. This impact analysis will be further completed with metrics, precise indicators also assigned for each regulation.

A first interactive layout was also developed to highlight results from the database with three filters: governance model, policy instruments and jurisdiction levels.

A second layout will integrate a compliance map in a unique user-friendly tool that will be delivered at M24 (November 2020). The stakeholders will be engaged in this process, to ensure that this tool will comply with end-users' requirements (policy makers).

7 Annex 1 – Table of KPIs

Available on the GECKO website: www.H2020-gecko.eu

8 Annex 2 – Regulatory Dashboard

Available on the GECKO website: www.H2020-gecko.eu



GECKO CONSORTIUM

The consortium of GECKO consists of 10 partners with multidisciplinary and complementary competencies. This includes leading universities, networks and industry sector specialists.



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