# MOVECO

Mobilising Institutional Learning for Better Exploitation of Research and Innovation for the Circular Economy

# CIRCULAR ECONOMY INNOVATION TOOLS

## Report on PPP-Investment Opportunities

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# Content

## Executive Summary

In the following report public-private partnerships (PPPs) are examined and explained from several sides. The report shows what opportunities and risks PPPs can hold for the transition from a linear to a circular economy. In particular, the possibilities of cooperation between research and industry are shown.
By involving the project partners of the MOVECO project in the research, various approaches and practical examples of successful and less successful PPPs in various branches of business could be worked out in order to offer the reader an extensive picture of PPPs in the Danube region.
In the course of the report, numerous advantages and disadvantages of PPPs could be identified that should be taken into account when implementing PPPs, including the long project duration of typical PPPs, a lack of transparency and increased project management effort. In addition to these factors, there are many other hurdles to consider when planning PPPs.
Nevertheless, PPPs can be an interesting way of financing projects, especially in times of economic weakness. Although PPPs have so far been used more in traditional fields such as the construction of infrastructure projects, this form of financing can certainly strengthen the transition from a linear to a circular economy. Particularly interesting here would be, for example, the cooperation between industry and research in the form of PPPs, as is already being used in some MOVECO countries.
Experience in the individual MOVECO countries also shows that PPPs can be evaluated positively if project planning and project management work. One factor that plays a significant role in PPPs is the long project duration, which carries many risks. For example, partners can become insolvent during the project or turn to the legal framework to worsen the situation, etc.
In addition to the practical examples given in the report, great importance was also attached to providing information on existing programs, tools, organisations and literature on PPPs.

# 1. Introduction

In recent years, cooperation between the public and private sectors has become increasingly important in many countries. While public-private partnerships (PPPs) are still less common or well known in some countries, many EU countries already have many years of experience with this type of financing. The areas in which PPPs are applied also vary from country to country.

In the literature, PPPs are primarily seen as a way of implementing large projects in economically unfavourable times. The public sector shares the costs of planning, implementation and operation with a private partner.

For the MOVECO project and circular economy in general, PPPs could be an interesting way for financing projects of public interest (e.g. waste management, recycling) but also in other fields where PPPs are not traditionally used. As PPPs have been used especially in the fields of building, water and waste projects, certain topics of circular economy projects could also benefit from this way of project execution.

This report gives an overview on how public-private-partnerships can be one way to finance circular economy approaches. It begins with a theoretical part that gives an overview of definitions, literature, platforms and existing tools. The project partners were asked to participate in a mapping process in order to incorporate experiences from the MOVECO countries. For this purpose, a questionnaire on PPP-investment opportunities in the MOVECO-countries was sent to the project partners. The last part of the report attempts to relate the findings of literature research and the survey in the MOVECO countries to the topic of circular economy.

## MOVECO Project Partners

| Official Name in English | Acronym | Country |
|---|---|---|
| Chamber of Commerce and Industry of Slovenia | CCIS | SLOVENIA |
| Chamber of Commerce and Industry Bistrita-Nasaud | CCIBN | ROMANIA |
| Europa Consortium Regional Development Non-profit Ltd. | ECN | HUNGARY |
| Bavarian Research Alliance GmbH | BAYFOR | GERMANY |
| Business Upper Austria | Biz-up | AUSTRIA |
| Slovak University of Agriculture in Nitra | SUA | SLOVAKIA |
| Ministry of the Environment and Spatial Planning of the Republic of Slovenia | MESP | SLOVENIA |
| Cluster of Environmental Technology Bavaria | UCB | GERMANY |
| Tera Tehnopolis Ltd. | TERA | CROATIA |
| Bulgarian Chamber of Commerce and Industry | BCCI | BULGARIA |
| Slovak Business Agency | SBA | SLOVAKIA |
| Institute Mihajlo Pupin | PUPIN | SERBIA |
| Science and Technology Park Belgrade | STPB | SERBIA |
| Ministry of Economy of the Slovak Republic | MoE | SLOVAKIA |
| Agency for Innovation and Technology Transfer | AITT | MOLDOVA |
| City of Osijek | Osijek | CROATIA |

This report was created in collaboration with all organizations involved in the MOVECO project. The individual research results for the individual institutions, regions and countries do not reflect the official position of these institutions, regions or countries on PPPs.

## 2. Definitions, Nomenclature

PPPs are defined differently across the literature. The nomenclature for PPPs has not been standardized. This report, therefore, lists various common definitions of PPPs.

The Organisation for Economic Co-operation and Development (**OECD**) defines PPPs as follows:

> Arrangements whereby the private sector provides infrastructure assets and services that traditionally have been provided by government, such as hospitals, schools, prisons, roads, bridges, tunnels, railways, and water and sanitation plants. (OECD, 2018).

The European PPP Expertise Centre offers the following definition of PPPs:

> Put simply, a public-private partnership ("PPP") is an arrangement between a public authority and a private partner designed to deliver a public infrastructure project and service under a long-term contract. Under this contract, the private partner bears significant risks and management responsibilities. The public authority makes performance-based payments to the private partner for the provision of the service (e.g. for the availability of a road) or grants the private partner a right to generate revenues from the provision of the service (e.g. tolls from users of a bridge). Private finance is usually involved in a PPP. When properly prepared, PPP projects can provide significant benefits to the public sector as well as to the project users. (EPEC, 2018)

The **PPP Knowledge Lab** defines PPPs as follows:

> A long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility and remuneration is linked to performance. (The World Bank Group, https://pppknowledgelab.org/guide/sections/1-introduction, 29.03.2018)

In the **Official Journal of the European Union**, PPPs are described this way:

> Public-private partnerships (PPPs) are long-term contracts between two units, whereby one unit acquires or builds an asset or set of assets, operates it for a period and then hands the asset over to a second unit. Such arrangements are usually between a private enterprise and government but other combinations are possible, with a public corporation as either party or a private non-profit institution as the second party (Article 15.41 of Regulation (EU) No 549/2013).

There are various types of PPPs described in the literature. This paper sticks to the definitions of the "Guidelines for Successful Public-Private Partnerships" designed by the European Commission:

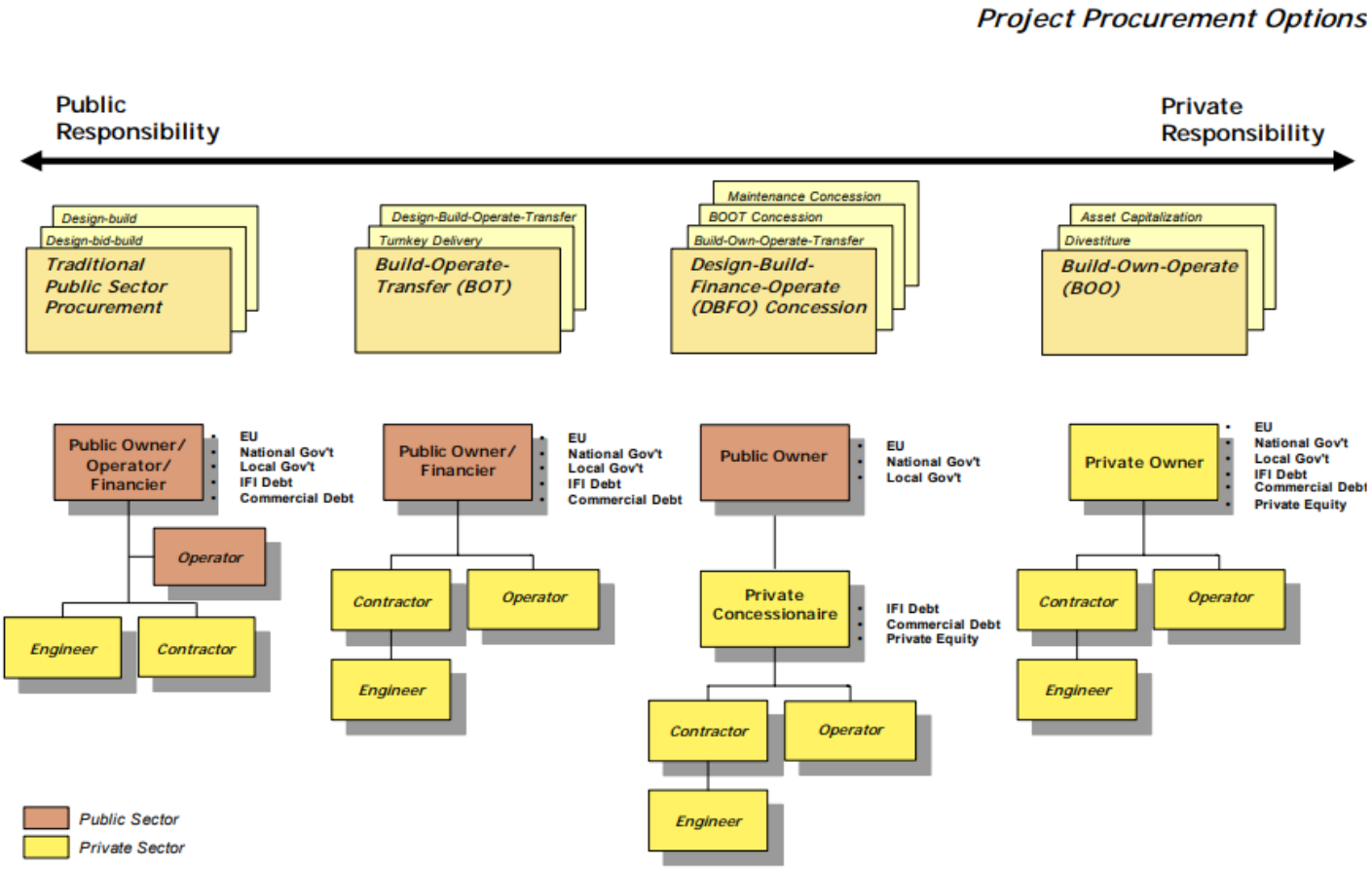


*Figure 1: Project Procurement Options. Source: Guidelines for Successful Pulbic-Private Partnerships. European Commission, 2003, p. 18. file://tcl.local/dfs/profiles/bizup/stb/Desktop/PPP-approach/PPP.pdf*

In the **traditional public procurement**, a ministry or public authority is responsible for developing certain types of infrastructure or carrying out certain other projects. When the project is finalized, it is mostly maintained and/or operated by this ministry or public authority. Within traditional public procurement, the private sector can be part of the project via services for design and construction. This type of cooperation is performed on the basis of individual contracts made on a competitive basis. Normally, the function of the private sector is limited within this type of cooperation between the public and the private side. Former public functions can be outsourced in three ways (European Commission, 2003):

## 2.1. Service Contracts

- Private sector companies take on special tasks for the public sector
- Often focus on procurement, operation and maintenance of new equipment
- E.g. installation, maintenance, waste collection, etc.
- Mostly awarded on a competitive basis
- are only sustained for a limited period of time (a few months up to a few years)
- allow the public sector to benefit from technical expertise of the private company
- can allow cost-savings for the public side
- management and responsibility for the project remains with public sector

## 2.2. Operation and Management Contracts

- responsibility is transferred through operation and management contracts to the private sector
- designed to enhance efficiency and technological sophistication
- often short term – but often extend for longer periods than service contracts
- fix payment or payment with incentive basis
- responsibility for investment topics remains with public authority or ministry
- can further private sector involvement (e.g. identification of economic opportunities in high-risk markets for private firms)
- possibility for building trust between the public and private sector in fields where barely any PPPs have been carried out

## 2.3. Leasing

- commercial risk is transferred to private sector partner
- responsibility for planning and financing overall remains with public sector owner
- extend over a period of 5-15 years
- appropriate for infrastructure systems that generate independent revenue streams
- often used in public transport/water sector (European Commission, 2003)

## 2.4. BOT-systems

In the models above, the responsibilities and possibilities for improvement are very limited for the private sector partner. In integrated partnerships, more responsibility for design, construction and operation is transferred to the private partner. Most of these integrated partnerships are known as “turnkey” procurement or “**build-operate-transfer**” (**BOT**) systems.

In BOT systems, the responsibility for the design, construction and maintenance is combined under one single entity from the private sector. This combination can produce major cost

advantages. BOT contracts are awarded by competitive bid with a transparent tender process. The specification of all standards for the service have to be defined in detail by the project sponsor. The public sector transfers a large part of the responsibility to the private sector in BOT models. Nevertheless, the public sector remains the financier of the project. BOT-models can have a contract term of more than 20 years. They are often used for example in the field of wastewater treatment (European Commission, 2003).

In PPP arrangements, the financing part of projects can also be provided by the private sector partner. The advantage is that owners can implement projects sooner and independent from government budget cycles for funding (European Commission, 2003):

## 2.5. Concessions

The design-build-finance-operate (DBFO) model one opportunity for direct investment for private sector partners. The private investment partner finances, constructs and operates a revenue generation infrastructure. In exchange, the private partner gains the right to collect the associated revenues for a specific period of time.
Concessions are mostly extended over a period of 25 to 30 years. Before, a competitive bidding is carried out. The ownership of all assets, remains with the public sector. PPP concessions can be very complex – for this reason, many states have an own agency for overseeing PPP concession projects (European Commission, 2003).

## 2.6. Private Divestiture

The concept of private divestiture includes the (partial or complete) sale of assets or shares of a state-owned entity to the private sector. Private divestiture is often a step from central governments to local governments or to private utility companies. In the following sections, the different forms of private divestiture are explained.

### *2.6.1. Complete Private Divestiture*

The entire assets of a utility are sold to a single investor, a group of investors or possibly through a management buyout. In a complete private divestiture, the private investor has complete control over investment and the operation and maintenance of the company. The ownership is permanent. The government has only a regulatory role, e.g. protecting the consumers from monopolistic pricing.

### *2.6.2. Partial Private Divestiture*

In a partial private divestiture, a certain portion of the former public company's assets remain within the ownership of the government. The European Commission recommends this type of PPP as following: "A partial divestiture is an excellent way for the public sector to attract private capital and encouraging improvements in operational and management efficiency, while also protecting the public consumers as well as assets of national significance." (European Commission, 2003).

## 3. Why PPPs?

The reason for using a PPP rather than using a conventional public procurement is that by using PPPs, an optimal risk sharing with the private partner can deliver better "value for money" for the public sector and the end users. PPPs can be set up in a more complex way than conventional public procurement. Nevertheless, PPPs involve increased planning effort and preparation. In the procurement phase, proper planning and preparation are required to incentivise competition among bidders. Careful contract design is of great importance while using PPPs to implement projects (EPEC, 2018).
The European Commission has identified four principal roles for the private sector in PPP schemes, to provide:

- additional capital
- alternative management and implementation skills
- value added to the consumer and the public at large
- better identification of needs of optimal use of resources (European Commission, 2003)

These four roles that the private part can take on in PPPs, show areas that the private partner is in many cases better able to fulfil than the public authority.

## 4. Risks & opportunities

PPPs can hold many opportunities, but also risks. Some opportunities and risks of PPP projects are presented below:

**Opportunities & advantages of PPPs:**

- A prior public service can be created more efficient by including the private sector
- Integration of planning, construction, maintenance and operation: The individual project is considered over a longer period of time - this allows the costs of the entire life cycle of a project to be analysed over a longer period of time.
- Risk shift / risk bearing in partnership
- Acceleration potential in the implementation of projects (Schrefel & Hajsazn, 2005)
- …

**Risks of PPPs:**

- The public sector must focus its attention on the legal safeguarding of PPPs and cannot pursue the definition and control of quantifiable targets
- PPP as complex and non-transparent complexes in the form of complex and no longer manageable contractual relationships
- Long-term contractual commitment leads to monopoly position of the private sector partner
- Creditworthiness / Qualification of partners
- Private sector partners only take on profitable projects - unprofitable tasks remain with the public sector
- In some cases, PPPs serve to avoid politically necessary decisions being made as to which measures should be dispensed with due to the tight budget situation
- The true life cycle of PPPs usually extends beyond the concession period under discussion (Schrefel & Hajsazn, 2005)
- …

The European Commission defines the following advantages and disadvantages of PPP relationships in the “Guidelines for successful public-private partnerships” (European Commission, 2003):

| PPP Type | Main Features | Application | Strengths | Weaknesses |
|---|---|---|---|---|
| **Contracting** | • Contract with Private party to design & build public facility<br>• Facility is financed & owned by public sector<br>• Key driver is the transfer of design and construction risk. | • Suited to capital projects with small operating requirement.<br>• Suited to capital projects where the public sector wishes to retain operating responsibility. | • Transfer of design and construction risk.<br>• Potential to accelerate construction programme. | • Possible conflict between planning and environmental considerations.<br>• May increase operational risk.<br>• Commissioning stage is critical.<br>• Limited incentive for whole life costing approach to design.<br>• Does not attract private finance |
| **BOT** | • Contract with a private sector contractor to design, build and operate a public facility for a defined period, after which the facility is handed back to the public sector.<br>• The facility is financed by the public sector and remains in public ownership throughout the contract.<br>• Key driver is the transfer of operating risk in addition to design and construction risk. | • Suited to projects that involve a significant operating content.<br>• Particularly suited to water and waste projects. | • Transfer of design, construction and operating risk<br>• Potential to accelerate construction<br>• Risk transfer provides incentive for adoption of whole life costing approach<br>• Promotes private sector innovation and improved value for money.<br>• Improved quality of operation and maintenance.<br>• Contracts can be holistic<br>• Government able to focus on core public sector responsibilities. | • Possible conflict between planning and environmental considerations.<br>• Contracts are more complex and tendering process can take longer<br>• Contract management and performance monitoring systems required.<br>• Cost of re-entering the business if operator proves unsatisfactory.<br>• Does not attract private finance and commits public sector to providing long term finance. |
| **DBFO** | • Contract with a private party to design, build, operate and finance a facility for defined period, after which the facility reverts to the public sector.<br>• The facility is owned by the private sector for the contract period and it recovers costs through public subvention.<br>• Key driver is the utilisation of private finance and transfer of design, construction & operating risk.<br>• Variant forms involve different combinations of the principle responsibilities. | • Suited to projects that involve a significant operating content.<br>• Particularly suited to roads, water and waste projects. | • As for BOT plus:<br>• Attracts private sector finance;<br>• Attracts debt finance discipline;<br>• Delivers more predictable and consistent cost profile;<br>• Greater potential for accelerated construction programme; and<br>• Increased risk transfer provides greater incentive for private sector contractor to adopt a whole life costing approach to design. | • Possible conflict between planning and environmental considerations.<br>• Contracts can be more complex and tendering process can take longer than for BOT.<br>• Contract management and performance monitoring systems required.<br>• Cost of re-entering the business if operator proves unsatisfactory.<br>• Funding guarantees may be required.<br>• Change management system required. |
| **Concession** | • As for DBFO except private party recovers costs from user charges.<br>• Key driver is the *Polluter Pays Principle* and utilising private finance and transferring design, construction and operating risk. | • Suited to projects that provide an opportunity for the introduction of user charging.<br>• Particularly suited to roads, water (non-domestic) and waste projects. | • As for DBFO plus:<br>• Facilitates implementation of the *Polluter Pays Principle*; and<br>• Increases level of demand risk transfer and encourages generation of third party revenue. | • As for DBFO plus:<br>• May not be politically acceptable<br>• Requires effective management of alternatives / substitutes, eg alternative transport routes; alternative waste disposal options) |

*Figure 2: Advantages and Disadvantages of PPP Relationships. European Commission, 2003.*

# 5. Tools & information platforms

There are already many platforms that offer interesting information and tools about PPPs. In the following chapters individual platforms, interesting links and tools from different areas of PPPs are presented.

## 5.1. EPEC – European PPP Expertise Centre

The European PPP Expertise Centre (EPEC) was founded by European Investment Bank in 2008, to support member states of the EU, EU candidate states and others in their work on PPPs. The aim of the EPEC is to support the public sector across Europe in delivering better public-private partnerships (PPPs). Today, EPEC's team of experienced PPP professionals, based in the Advisory Services Department of the European Investment Bank (EIB), serves

41 EPEC member organisations. These organisations are typically national or regional PPP units, and other public entities in charge of PPPs, as well as the European Commission. (EPEC, 2018).

The European PPP Expertise Centre offers a platform (http://www.eib.org/epec/) where the user can find information material concerning PPPs and publications and tools for further use. On the platform, the three EPEC-principles are presented:


*Figure 3: What EPEC does. http://www.eib.org/epec/index. 03.04.2018*

EPEC consists of 41 members (2018). Members of EPEC are national and regional public authorities that are responsible for PPP policy programmes in EU member states, candidate countries and some other eligible countries.

On the EPEC platform, several publications on the topic of PPPs are available, e.g. “A Guide to the Statistical Treatment of PPPs” of a “Review of the European PPP Market for 2017” can be found there.

### *5.1.1. EPEC-Tools*

In the section “Tools”, the EPEC platform also provides a “The EPEC PPP guide” and the “PPP project preparation status tool”. The EPEC PPP guide is designed as an interactive online tool that enables the user to access regularly updated PPP guidance and interaction with the EPEC team.
Each section of the EPEC PPP Guide deals with a “phase” of the PPP project cycle and is broken down into two “stages”. For each stage, key “steps” which the public procurement authority and its advisers need to take are identified. The discussion of the key steps includes

the rationale for the step and the key tasks involved (EPEC, 2018). See the table below for the PPP project cycle:

| Phase | Stage | Step |
|---|---|---|
| 1 Project Identification | 1.1 Project Selection | • Investment assessment<br>• Output specification |
| | 1.2 Assessment of PPP Option | • Affordability<br>• Risk allocation<br>• Bankability<br>• Value for money analysis<br>• Debt and deficit treatment of PPPs according to Eurostat |
| 2 Detailed Preparation | 2.1 Getting organised | • Set up project team and governance structure<br>• Engage team of advisers<br>• Develop project plan and timetable |
| | 2.2 Before launching the tender | • Carry out further studies<br>• Prepare detailed design of PPP arrangement<br>• Select procurement method<br>• Select bid evaluation criteria<br>• Prepare draft PPP contract |
| 3 Procurement | 3.1 Bidding process | • Procurement notice, prequalification and shortlisting<br>• Invitation to tender<br>• Interaction with bidders<br>• Evaluation of tenders and PPP contract award |
| | 3.2 PPP contract and financial close | • Finalise PPP contract<br>• Conclude financing agreements<br>• Reach financial close |
| 4 Project Implementation | 4.1 Contract management | • Attribute management responsabilities<br>• Monitor and manage project delivery and service outputs<br>• Manage changes permitted in the PPP contract<br>• Manage changes not provided for in the PPP contract<br>• Dispute resolution<br>• When the contract ends |
| | 4.2 *Ex post* evaluation | • Define institutional framework<br>• Develop analytical framework |

*Figure 4: Structure of the EPEC PPP Guide: the typical project cycle. EPEC, 2018. http://www.eib.org/epec/g2g/intro1-guide.htm*

The “PPP Project Preparation Status Tool” “aims to assess the preparation status of a given PPP project by reference to a typical good-practice PPP project development process up to the point of determining if the project is ready for the launch of the public procurement process.” (EPEC, 2018). The tool is designed as a structured questionnaire (Excel sheet). The output of the questionnaire summarises the preparation status of the PPP project and points out missing preparation in certain fields (EPEC, 2018).

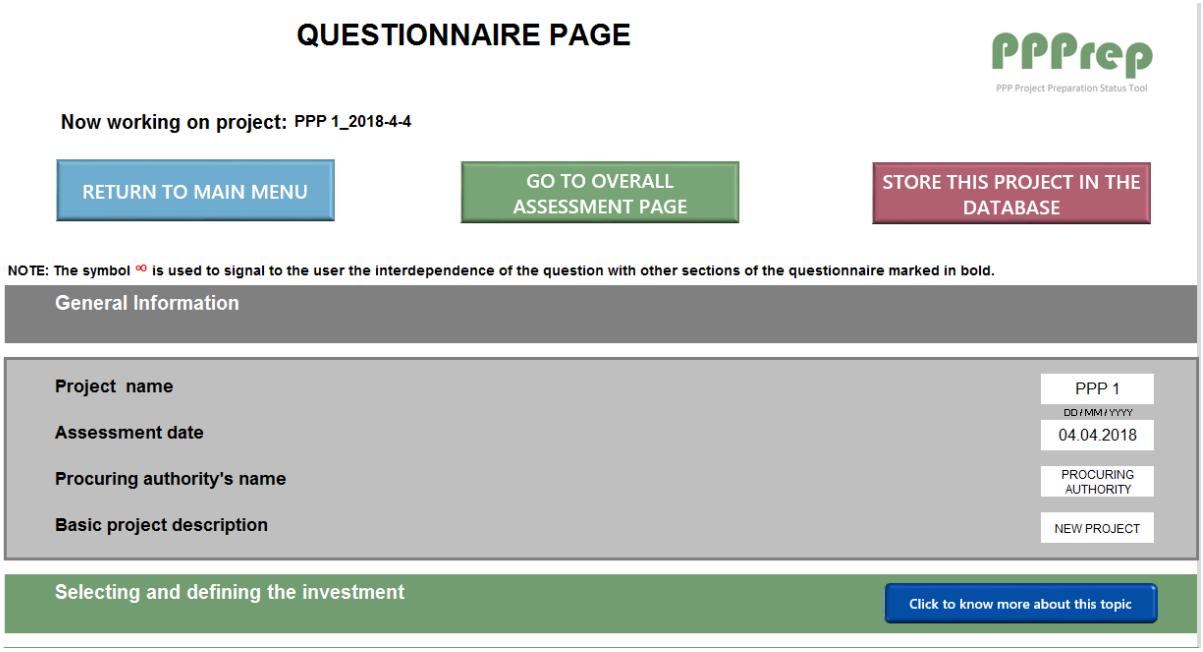


*Figure 5: PPPrep Tool, Starting Page. EPEC, 2018. http://www.eib.org/epec/what-we-do/index*

## 5.2. PPP Knowledge Hub

The PPP Knowledge Hub was launched in 2015 by the Asian Development Bank (ADB), the European Bank for Reconstruction and Development (EBRD), the Inter-American Development Bank (IaDB), the Islamic Development Bank (IsDB), and the World Bank Group, with the support from PPPIAF and is designed as a platform with the aim to provide knowledge about PPPs for governments and practitioners.

### *5.2.1. PPP Reference Guide*

The Reference Guide provided at the PPP Knowledge Hub provides examples and resources on key PPP topics. It is designed to help government officials and other interested parties in answering the following questions:

- What are PPPs, and why use them?
- What kind of policy, legal and institutional framework is need to ensure PPPs achieve their stated objectives efficiently and effectively?
- What is the process for developing and implementing a PPP project" (The World Bank Group, 2018)

In the guide, additional topics such as stakeholder communication and engagement, environmental and social due diligence and climate change are included.

The Reference Guide is not only useful for government officials but also for civil society organisations, private sector participants and universities. The Reference Guide is published by the Asian Development Bank (ADB), European Bank for Reconstruction and Development (EBRD), Global Infrastructure Hub, the Inter-American Development Bank (IDB), Islamic Development Bank (IsDB), Organisation for Economic Co-operation and Development (OECD), United Nations Economic Commission for Europe (UNECE), United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), and the World Bank Group.

The PPP Knowledge Hub provides several tools concerning PPPs that are described below.

### *5.2.2. PPP Fiscal Risk Assessment Model (PFRAM)*

PFRAM is an analytical tool to assess the potential fiscal costs and risks arising from PPP projects. Assessing a PPP involves both gathering specific project information and making judgments about the government's role at key stages of the project cycle. PFRAM provides a structured process for gathering this information in an Excel platform. It is mainly designedfor PPP units (The World Bank Group, 2018). PFRAM is designed as an Excel sheet that is provided under https://pppknowledgelab.org/tools/project-preparation-structuring.

### *5.2.3. PPP Screening Tool*

The PPP Screening Tool is an Excel-based tool for screening projects to determine, whether they are suitable as a PPP. The tool uses a combination of qualitative and quantitative inputs and can be adapted to specific requirements in different countries (The World Bank Group, 2018). The tool is also available under https://pppknowledgelab.org/tools/project-preparation-structuring.

### *5.2.4. PPP Qualitative Value-for-Money Toolkit*

This tool is designed to find out, whether a PPP could be a suitable method for infrastructure development or not. The tool also aims to identify the project's strengths and weaknesses as well. The toolkit can improve the project selection process, prioritize projects and focus on those with the highest potential (UNESCAP, 2018).


*Figure 6: Qualitative Value-for-Money Toolkit. UNESCAP, 2018. https://ppp.unescap.org/*

## 5.3. Public-Private-Partnership in Infrastructure Resource Center – PPPIRC

The PPIRC is provided by the World Bank. On the PPPIRC platform (https://ppp.worldbank.org/public-private-partnership/overview/practical-tools/toolkits), a collection of tools concerning PPPs is provided:

### *5.3.1. Tools*

- Benchmarking
- Checklists and Risk Matrices
  - PPP Sector Specific Checklists
  - Checklists of Key Legal/Drafting Issues in PPPs and Sample Clauses

### *5.3.2. PPP Toolkits by Sector*

- Energy and Power PPP Toolkits
- Water and Sanitation PPP Toolkits
  - Irrigation PPP Toolkit
- Transportation PPP Toolkits
- Solid Waste PPP Toolkits
- Toolkit for Pro-Poor Municipal PPPs

The platform also provides sample PPP clauses and sample terms of reference for PPP advisors (PPPIRC, 2018).

## 6. PPPs funded by the European Commission

There are several sorts of PPPs that are financed through the European Commission concerning different core topics. In the following sections, a selection of PPPs by the European Commission is presented. In 2013, the European Commission launched eight contractual PPPs of strategic importance for European industry.

**Factories of the future (FoF):** aims at helping EU manufacturing enterprises, in particular SMEs, to adapt to global competitive pressures by developing the necessary key enabling technologies across a broad range of sectors (European Commission 2, 2018).

**Energy-efficient Buildings (EeB):** a partnership between the European Commission and the private sector as represented by the Energy Efficient Buildings Association (E2BA), an initiative of the European Construction Technology Platform (European Commission 3, 2018).

**Green vehicle:** a public-private partnership based on Article 19 of the Horizon 2020 Regulation setting out a contractual arrangement between the Commission and the private sector. The private side of the PPP will be represented by the European Green Vehicles Initiative Association (EGVIA). The role of the Association is to engage in the contractual PPP with the European Commission (EC) and collaborate with the EC services responsible for the implementation of Horizon 2020 on research, technological development along the value chain, and demonstration (European Commission 4, 2018).

**Sustainable Process Industry PPP (SPIRE):** a new public-private partnership (PPP) brought to life by the European Commission together with eight sectors of the process industry: chemicals, cement, ceramics, minerals, steel, non-ferrous metals, industrial water and process engineering. The SPIRE association proposes a clear vision for the future of the process industry in Europe, a long term commitment and ambitious targets. SPIRE supports the development of novel technologies for improved resource and energy efficiency in the process industry, making it more sustainable and competitive (European Commission 5, 2018).

**PPP Photonics:** brings together all players from the European photonics sector and related activities including end-user industries and professionals. Together they have created a strategic roadmap which outlines the main research and innovation objectives for the European photonics sector for 2014-2020 which includes securing technology leadership in key areas, translating that leadership into a competitive advantage for European companies and skills generation (European Commission 6, 2018).

**PPP Robotics:** is the teaming up of the robotics industry, research, academia and the European Commission to launch a joint research, development and innovation programme in

order to strengthen the competitive position of European robotics. The basic aim of the PPP in robotics is to boost robotics research, development and innovation in Europe, by better connecting academia and industry (European Commission 7, 2018).

**5G Infrastructure:** brings together a broad range of stakeholders from the communications technology sector and from its extended value chain including the user industries or actors from the microelectronics and IT sectors. Together they have created a shared vision for the next generation of communications infrastructure beyond 2020, a multiannual strategic roadmap for research & innovation which will be updated yearly until 2020. Its objectives include actions for leveraging 5G research to improve competitiveness and innovation with the ultimate aim of stimulating economic growth and more job creation in other industrial sectors (European Commission 8, 2018).

**High Performance Computing:** will bring together technology providers and users in the European Technology Platform for HPC (ETP4HPC) for (a) developing the next generation of HPC technologies, applications and systems towards exascale (i.e. 10 to the power of 18 operations per second) and (b) achieving excellence in HPC applications. The PPP will work in cooperation with PRACE as the provider of a world-class Pan-European HPC infrastructure. The PPP is expected to start on 1 January 2014 and end in 2024 (European Commission 9, 2018).

## 7. Mapping process

The purpose of mapping process was to gather information on existing PPP-approaches on a regional basis in the MOVECO-countries. The project partners were asked to describe their experiences with PPP-approaches and the different types of PPP-approaches that are executed in the particular countries/regions. The following questionnaire was developed to assess the experience with public-private partnerships in the MOVECO countries:

## PPP-Approaches

1. Information about respondent: Please enter your organisation's name and your personal name, address and e-mail address:

Klicken Sie hier, um Text einzugeben.

2. What criteria are used to decide whether a PPP approach should be used for project delivery in your agency?

| | Extremely important | Somewhat important | Not important | N/A |
|---|---|---|---|---|
| Strong political, public and institutional support | ☐ | ☐ | ☐ | ☐ |
| Project acceleration potential | ☐ | ☐ | ☐ | ☐ |
| Project could generate sufficient revenues to attract private investement | ☐ | ☐ | ☐ | ☐ |
| Lack of traditional funding | ☐ | ☐ | ☐ | ☐ |
| High-risk project that could be better managed by private sector | ☐ | ☐ | ☐ | ☐ |
| Other (specify below): | ☐ | ☐ | ☐ | ☐ |

3. What are the benefits of using PPPs for your organisation? Please rate the benefits below:

| | Extremely important | Somewhat important | Not important | N/A |
|---|---|---|---|---|
| Construction of projects on time and on budget | ☐ | ☐ | ☐ | ☐ |
| More efficiency/effective management of the entire project | ☐ | ☐ | ☐ | ☐ |
| Development of more innovative products/services | ☐ | ☐ | ☐ | ☐ |
| Lifecycle optimization (better relationship between design/construction, operation and maintenance over time) | ☐ | ☐ | ☐ | ☐ |
| Private financing | ☐ | ☐ | ☐ | ☐ |
| Better delivery capacity | ☐ | ☐ | ☐ | ☐ |
| Faster implementation | ☐ | ☐ | ☐ | ☐ |
| Better risk allocation | ☐ | ☐ | ☐ | ☐ |
| Improved quality of services | ☐ | ☐ | ☐ | ☐ |

If you want to add other benefits, please add them below:

Klicken Sie hier, um Text einzugeben.

4. Which one statement below best characterizes your agency's overall experience with PPPs?

☐ We have not yet seriously assessed possibilities for any PPPs

☐ We have one or more projects that may be candidates for a PPP

☐ We have received one or more proposals from potential private partners

☐ We have negotiated (are negotiating) one or more contracts to enter into a PPP

☐ We have completed at least one project that involved a PPP

☐ Other: Klicken Sie hier, um Text einzugeben.

5. What types of public-private partnerships (PPPs) are used in your agency/country/region? What types of public-private partnerships (PPPs) are planned to be utilized in your agency/country/region?

Klicken Sie hier, um Text einzugeben.

6. In which fields (industries) are PPPs applied in your country/region?

Klicken Sie hier, um Text einzugeben.

7. Are there certain PPP-approaches in the fields "access to finance", "waste management / recycling", "sharing / renting systems" in your country/region? Please list and describe them below:

Klicken Sie hier, um Text einzugeben.

8. What information on PPP proposals is available to decision makers in your country/region? Who provides the information? (E.g. information about terms of agreement, PPP valuation studies, project cost estimates, etc.)

Klicken Sie hier, um Text einzugeben.

9. In your opinion and based on the outcomes of your PPP project(s), was there some information that you did not have, but that could have been beneficial in the decision-making process? If yes, please explain:

Klicken Sie hier, um Text einzugeben.

10. Please list examples of (successful) PPP-approaches that have been conducted in your country/region.

Klicken Sie hier, um Text einzugeben.

11. What risks could/did occur in your country/region while conducting a PPP-project, e.g. insolvency of the private partner, private/public partner could not fulfil commitment, etc.

Klicken Sie hier, um Text einzugeben.

12. Do you have experience in PPP projects that are carried out through the European Union, in the framework of programs such as “Factories of the Future (FoF)”, “Energy-efficient Buildings (EeB)”, “Green Vehicle”, “Sustainable process industry (SPIRE)”, “PPP Photonics”, “PPP Robotics”, “5G Infrastructure”, “High Performance Computing (HPC)” or “PPP Big Data Value” (for additional information on the programmes mentioned, please see information below)? If yes, please describe the project and its outcomes/project management below:

Klicken Sie hier, um Text einzugeben.

13. Does your country/region have any special PPP-programs/-approaches that could be useful for the MOVECO-project? If yes, please describe the projects:

Klicken Sie hier, um Text einzugeben.

## 7.1. Results Mapping Process

The results from the mapping process varied greatly depending on the MOVECO country. Some organizations that are part of the MOVECO project have little experience with PPPs, while others actively use PPPs or have even financed projects with PPPs.

For almost all respondents, similar topics were crucial for the application of PPPs:

| Criteria | Estimation of project partners |
|---|---|
| **Strong political, public and institutional support** | Extremely / somewhat important |
| **Project acceleration potential** | Extremely / somewhat important |
| **Project could generate sufficient revenues to attract private investment** | Extremely important |
| **Lack of traditional funding** | Extremely / somewhat important |
| **High-risk project that could be better managed by private sector** | Somewhat / not important |

*Figure 7: Criteria for the use of PPPs.*

Opinions on the benefits of PPPs varied widely in the survey as can be seen in the table below:

| Benefits | Important [number of votes] | Not important [number of votes] |
|---|---|---|
| **Construction of projects on time/budget** | 3 | 1 |
| **More efficiency of entire project** | 2 | 2 |
| **Development of more innovative products/services** | 4 | 0 |
| **Lifecycle optimization** | 3 | 1 |
| **Private financing** | 4 | 0 |
| **Faster implementation** | 4 | 1 |
| **Better risk allocation** | 2 | 2 |
| **Improved quality of services** | 4 | 0 |

*Figure 8: Benefits of using PPPs*

All respondents agreed that the creation of PPPs can contribute to the development of more innovative products and services. Private financing is also very important for the participants in the survey. The majority of respondents expect the implementation of projects in connection with PPPs to be faster than with conventional project handling. Respondents' opinions on risk allocation are balanced. It is also noteworthy that the organisations that took part in the survey expect PPPs to improve the quality of services.

The responses to the questionnaires were very similar across all countries in the fields/industries where PPPs are used:

- **security and defence**: prisons, local fire departments
- **structural and civil engineering**: hospitals, schools, museums, theatres, sports infrastructure facilities, renovation of public buildings (e.g. for better engery efficiency), event halls, public baths
- **public services**: waste management, water supply and waste water disposal, communication, radio and television, transportation (e.g. airports, bus stations, road construction
- **energy contracting**: e.g. public lightning
- **R&D**
- …

## 7.2. Experiences with PPPs – Germany

In Germany, PPPs are mainly based on the ownership model, the rental model and the concession model. Furthermore, the acquiring model, corporate model, leasing model and energy saving contradicting model are used.

The main area in which PPPs are used in Germany is the field of construction. In addition to the construction industry, PPPs are also used in Germany in the areas of security and defence, structural and civil engineering (e.g. hospitals, schools, museums, theatres, etc.), public services (waste management, water supply and waste water disposal, communication, radio and television, transportation) and in the field of energy contracting.

**Waste management/recycling:**

In **Germany**, since 1999, there exists a dual system for packaging waste. It is called dual system as it represents a second (private) waste management system, besides municipal (public) waste management. Throughout Germany, the dual system assigns disposal companies with the collection and processing of used sales packaging. The engaging of contracts takes place through tenders. The operator of Germany's first and most widespread waste separation systems is "The Green Dot" (German: *Der Grüne Punkt*).

Regarding the management of waste of electric and electronic equipment (WEEE), the producers are responsible for the collection and the recovering of the WEEE, while municipal collection services are responsible for the collection of B2C (business-to-consumer) WEEE. The municipalities provide collection possibilities at their recycling centres (in German

"Wertstoffhöfe"). This so-called "shared product responsibility" between producers and municipalities could be considered as a public private partnership. Currently most of WEEE are collected via municipal recycling centres. However, the consumer also has the possibility to make use of the take-back obligation of the distributer of electronic devices (BMUB, 2018).

In **Bavaria**, waste management is partly realised by private small- and medium-sized enterprises. Some of these private waste management companies are represented by the Bavarian Association of Disposal Companies (VBS, Verband der Bayerischen Entsorgungsunternehmen e.V.).

In the following, we present some examples for public-private partnerships in Germany:

- REMONDIS is one of the world's largest recycling service and water companies and has more than 500 business locations in Germany, including numerous locations in Baden-Wuerttemberg and Bavaria. They are cooperating as partner in the FES Frankfurter Entsorgungs- und Service GmbH, a PPP between the city of Frankfurt and REMONDIS
- AWU Abfallwirtschafts-Union Ostprignitz-Ruppin GmbH:
  The administrative district Ostprignitz-Ruppin in northern Germany comprises 23 cities, round about 100,000 inhabitants and an area of 2,500 $m^2$. For a municipal waste disposal, these conditions are very challenging. Therefore the Waste Management Union Ostprignitz-Ruppin GmbH (AWU OPR) was founded as an associated company (51 % administrative district, 49 % ALBA Group- a Recycling specialist and resource provider).
- A quite similar concept exists in Berlin, where the before named ALBA Group cooperates with Berlin's public cleansing service in case of the residual waste.
- In some areas and municipalities, centralised as well as decentralised composting is realised by private companies. A local example for a centralised composting in the Munich area is e.g. the enterprise Wurzer Umwelt in the districts of Freising and Erding (WURZER UMWELT, 2018) in Bavaria/Germany. A decentralised composting system by farmers is realised inter alia in the district of Ebersberg in Bavaria/Germany. (MUELLUNDABFALL, 2018).

The MOVECO project partners from Germany have listed several PPP projects that have been successfully completed (:

Defense:

- The IT project *HERKULES* (2006-2016) of the Federal Armed Forces (*Bundeswehr*) is considered to be the largest PPP-project in Europe with the goal to standardise and modernise the non-military information and communication technology.

Structural and civil engineering:

- Berlin Palace (*Berliner Schloss* or *Stadtschloss*)
- Construction of school buildings (e.g. FOS/BOS Weiden)
- Construction of bridges/streets (e.g. Mainbrücke Klingenberg)

Public services:

- Water supply and disposal (e.g. Berlinwasser Holding GmbH)
- Communication (e.g. WIVERTIS – a partnership between Siemens (Siemens Business Services) and the city of Wiesbaden)
- Transport:
    - private motorways (e.g. motorway A between Hamburg and Bremen)
    - heavy goods vehicle (HGV) toll (‚Toll Collect')

Promoted by the German Waste Management Act[1] (Kreislaufwirtschafts- und Abfallgesetz, KrW-/AbfG), there are numerous PPP-projects in the field of waste management in Bavaria and Germany. According to § 16 Abs. 1KrW-/AbfG, the responsible local bodies for waste management have the possibility to cooperate with external parties in order to fulfil their duty of waste management and disposal.

**Sharing / Renting systems:**

Even though they are no typical PPP-examples, we present two approaches, where public and private partners are involved:

- In contrast to some other European countries, where car sharing and electric vehicles have been promoted for the last years by providing free parking areas for shared cars, this possibility did not exist due to legal limitations in Germany for a long time. Since September 1, 2017, this situation has changed, as a new 'Car Sharing Law' entered in force (BUNDESREGIERUNG, 2018). This new law allows public authorities to assign separate parking areas for car sharing vehicles – even without charging parking fees.
- Another example to mention is a start-up with the vision of "coffee-to-go without waste". It has an office in Berlin and Munich. The concept is coffee-to-go in returnable cups with a practical deposit system. Cafés and stores in the whole of Germany already participate in the system. Even though the startup is a private enterprise, some cities (especially their public waste management operators) actively promote the use of the refillable coffee cups, for instance the cities of Munich and Rosenheim in Bavaria (Source: RECUP, 2018)

[1] Act for Promoting Closed Substance Cycle Waste Management and Ensuing Environmentally Compatible Waste Disposal

In Germany, a platform provides a database for public private partnership projects in the structural and civil engineering sector (Source: http://www.oepp-plattform.de/). Moreover, the Bundesverband (Federal Association) Public Private Partnership (BPPP) provides a forum for discussing the implementation of PPP projects. (Source: http://www.bppp.de/)

### 7.3. Experiences with PPPs – Croatia

At regional and national level, the two main forms of PPPs in Croatia are concessions and long-term lease contracts.

In Croatia, there is an ongoing process of using models of PPPs at EU level at the moment: The National Croatian Agency developed a manual called „Combining PPP models with EU funds“. In the next three to five years, combined financing will be pushed, especially in the fields of public lightning, energy recovery of public buildings, wastewater treatment, waste disposal, transportation, etc.
In Croatia, PPPs are mainly applied in the fields of health, transport, education (schools), sports infrastructure facilities and the energy efficiency sector (e.g. public lightning).
The Agency for Investments and Competitiveness (AIC) has prepared a PPP application program for projects under the concept " smart cities ", following the processes and initiatives of involving the private sector in this area. The programme represents a framework for the implementation of energy efficiency projects in case of application PPP model and is in line with EU regulations and goals, and with domestic strategic documents. The concept of "smart cities", which includes more efficient use of digital and IT technology in traditional networks and services and other urban resources, is globally widespread and focused on sustainable development goals and enabling improved living and working conditions by reducing pollution. It is estimated that the program will include projects in worth approximately EUR 400 million over the next three to five years. According to the concept of " smart cities" there is also set up an application program for using PPPs in public lights projects and energy reconstruction of public buildings.

There is also an approach in the field “access to finance” with a plan to combine the implementation of a public project by the European Structural and Investment funds with public-private partnerships. For that purpose, the Agency for Investments and Competitiveness defined a handbook for the preparation and implementation of public projects combining European Structural and Investment Funds with PPPs.

The most significant Croatian public-private partnership project is the airport “Franjo Tuđman” that has also been the largest infrastructure project in Croatia in the last ten years (value: EUR 300 million). Financing and construction of the new passenger terminal of the Zagreb Airport have been entrusted to a private partner by granting a 30-year concession to managing the Zagreb Airport.

In Croatia, PPP systems are defined by several acts:

- Public Private Partnership Act (Official Gazette 78/12 and 152/14)
- Regulation on the implementation of public-private partnership projects (OG 88/12 and 15/15)
- Rulebook on Small Public Private Partnership Projects (OG 23/15).

The Law on Public Private Partnership (OG 78/12; 152/14) regulates the procedure of proposing and approving public-private partnership projects proposals, monitoring the implementation of these projects, the content of the contract and other key issues in the field of public-private partnership as well as competences of the Agency that carries out this Law. Initially, the jurisdiction was delegated to the Agency for PPP, which was later incorporated to the Agency for Investments and Competitiveness. Except legislation, for PPP decision-makers, are available handbooks and guidelines such as contract structure for PPP, financial model, handbook for preparation and implementation PPP, selection procedure for private partners, determining payments ability in PPP, calculation methods value for money, etc. There are ten handbooks for PPP procedures all developed by the Agency for Investments and Competitiveness. In Croatia, this agency is the main actor in PPP system and source of information.

### 7.4. Experiences with PPPs – Slovenia

The results of the survey show that the execution of major projects using PPPs is not particularly popular in Slovenia. Nevertheless, when PPPs are implemented, they originate from the public sector. Mostly, projects in form of PPPs are some sort of co-working between local authorities and the private sector. The main reason to implement a project via PPPs is to raise additional financing.

Most PPPs that are executed in Slovenia are settled in the fields of construction of infrastructure (nursing homes), transport and logistic and waste water treatment. There are some local PPP initiatives between local companies and their municipalities for waste management, waste water treatment and construction and maintenance of fire departments. In several cities of Slovenia, there are also PPPs in the field of transportation (providing bicycles as part of the public transport system).

In 2017, a type of PPP, in which CCIS is involved (as partner and lead partner) started. The aim of these PPPs is to create strategic research and innovation partnerships (SRIP) between businesses and R&D organisations in different sectors according to our S3. The SRIP shall offer services and create new value chains. However, the SRIP does not provide any services or products to the public.

## 7.5. Experiences with PPPs – Slovakia

In Slovakia, mainly the DBFOM model (design, build, finance, operate, maintain) is used for PPPs. Under Slovak law, PPP projects are governed by a complex legal framework where concessions and PPP projects are regulated by a number of different laws and government resolutions. Although such fragmentation is not an obstacle to the implementation of PPP projects, the logic of the legal framework is not always cohesive, which may cause practical difficulties in their application.

The different types of PPPs are not explicitly named by the applicable laws. In addition, the law applicable to PPP projects is rather short and does not provide for the concrete basic rights and obligations of the parties participating in the PPP. This may be an obstacle to the realization of smaller PPP projects (especially at municipal level).

The Public Procurement Act (which is the main source of law for the award of PPP projects) ensures the enforcement of the principles of non-discrimination, transparency, economy and efficiency during the selection process in a sufficient manner. It is also to be noted that the award of projects (especially the restriction of awards without a competitive tender), the publicity of the award proceedings and the available legal remedies are adequately regulated as well.

In addition to the Public Procurement Law (regulating public contracts and possibly certain works or service concessions), the development of PPP in the Slovak Republic requires the adoption of a specific PPP law or substantial expansion of the existing part of the Public Procurement Law in particular with respect to PFI type of PPP.

There is currently no plan to make legislative changes to improve the PPP legal environment. The current Slovak government seems less inclined to promote PPP projects. Unfortunately, some of the pilot PPP highway projects were terminated after the award has been granted to the preferred bidder for the reasons on the side of the private partner (financial closing has not occurred). In such situation it is not surprising that there is currently no public authority in charge for providing economic and consulting support to potential contracting authorities of PPP projects.

Although the successful financial close of the first major PPP project in Slovakia related to construction and operation of R1 expressway, in 2010, gave a positive sign for the possible success of project financing in Slovakia despite, several project for which concession was awarded could not reach financial closing. Instructive documents issued by the Ministry of Finances to facilitate the participation of International Institutions such as EIB and EBRD have improved the situation. However, the Ministry of Finance is no more in charge of administrative and economic guidance of the Contracting Authorities, which means that the applicability of these documents is questionable.

Additionally, institutional design for PPPs has weakened since a dedicated unit within the Ministry of Finance was discontinued, in 2010. Project awards have also faced difficulties,

especially with regard to award fairness and the length of the bidding process. Political support for PPPs had been in decline during the previous government and remains uncertain after the March 2012 elections, as it is likely that public investments will be scaled back and that the government favours the use of EU and multilateral funds. Slovakia's track record of financing PPP projects is mixed as some infrastructure projects have faced delays or cancellation due to a lack of state funds (two of the three pilot highway PPP projects were cancelled) According to the previous government the three pilot PPP projects related to the construction of highways were extremely expensive and therefore other forms of construction of highways (classical form of contract for work or EU funds were supported.

There is no official statistical information on PPP projects in the Slovak Republic available. The database of PPP Projects of the Ministry of Finance that is publicly available on the Internet contains only data in relation to one PPP Project.
The PPP Projects in the Slovak Republic have been awarded for example in the sectors of road infrastructure, reconstruction of residential buildings, health, municipal infrastructure investments (such as pedestrian zones, playgrounds, public green areas) and technical services, water, sewage and environment (waste).

Some examples of the most significant projects awarded:

- concession related to the design, construction, financing, operation and maintenance of the express road R1 Nitra – Tekovské Nemce and Banská Bystrica – north bypass (so called second package), legal form – concession (DBFO), Contracting Authority – Ministry of Transport, Construction and Regional Development;
- contract related to the complex service of electronic toll collection, legal form – DBFTO, Contracting Authority – National Motorway Company (joint-stock company with sole shareholder - the Slovak Republic);

Examples of PPP projects awarded but not implemented (or not implemented under a PPP form):

- concession related to the design, construction, financing, operation and maintenance of the motorway D1 dated April 15, 2009 (so called "first package") terminated on 31st August 2010 because of the failure of the concessionaire to ensure the financing of the project (financial closure) and to fulfil the conditions precedent;
- concession related to the design, construction, financing, operation and maintenance of the motorway D1 dated January 22, 2010 (so called third package) terminated on 15 December 2010 because of the failure of the concessionaire to ensure the financing of the project (financial closure) and fulfil the conditions precedent.

### 7.6. Experiences with PPPs – Romania

Most PPPs in Romania are executed on a regional or national level, e.g. PPPs between the city council, country council and CCI BN for implementing the project Europe Direct Information Centre. PPPs Proposals are regulated by the law of PPPs in Romania and, if the case, it must be posted on the Public Procurement Electronic System and public procurement legislation applies.

PPPs are carried out in Romania e.g. in the fields of waste management, biodiversity conservation, forestry and public buildings (schools). The partnerships project “A Centenary Celebrated in a Clean Environment” is running since 2017.

### 7.7. Experiences with PPPs – Hungary

There are various PPP types used in Hungary: according to types of assets involved, there are both greenfield and brownfield PPP projects (greenfield project: new venture is constructed in a country outside of where the company is headquartered; brownfield project: entity purchases an existing facility to begin new production/service). According to functions for which the private party is responsible, PPPs are built in several variations regarding design, building or rehabilitating, finance, maintaining and operating. In Hungary, there are the following other types of PPPs: user-pays PPP, government-pays PPP, combined (user and government-pays) PPP.

PPPs have been judged negatively recently by several different ministries and actors. According to the present negative judgement of PPPs in Hungary, there were many PPP initiations stopped. There is hardly any information on the types of PPPs that are to be used in Hungary in the future available. Perhaps research and IT infrastructure developments may be on the agenda, as H2020 is financing such projects.

Past PPPs of Hungary were carried out in the fields of construction of education buildings (schools), event infrastructure (sport halls), public buildings (baths), prisons, road construction, etc.

Information on PPPs is available through specialised lawyer offices and public procurement experts. The recent communication of the government presently is rather contra-PPP, therefore there are no new PPP initiations. The supply side of PPP related information is rather limited. The present government is trying to end most of the PPP projects as they were unbeneficial for the public bodies. From the public point of view, these projects were unsuccessful.

### 7.8. Experiences with PPPs – Austria

In Austria, after lengthy discussion and a few months of negotiations on the infrastructure expansion smaller trials (Ebelsberg bypass, Vienna wind project, Werndorf cargo terminal, various municipal projects) only strengthened the integration of the private sector after 2000

with a major project: financing, construction, operation and maintenance of 52 km of motorways and motorways in the Eastern Region (A5, S1, S2) were transferred to a private concessionaire in December 2006. Because of the problems on the capital markets, interest in PPP projects has waned again in recent years.

Bonaventura Straßenerrichtungs-GmbH, a consortium of various private construction companies, was awarded the contract for the major project, which was estimated at around EUR 800 million. The concession agreement was signed in 2006. The concession ends on 31 August 2039. A particular challenge in the forefront of this project, whose concession period extends over three decades, was compliance with certain quality standards. For this reason, the quality standards and a catalogue of services were laid down in the concession agreement. In 2008, the Court (Rechnungshof) analysed the strengths and weaknesses of the project and found "no serious advantages over a conventional procurement procedure". On the contrary, the award procedure took around three times as long as conventional procurement (Puwein & Weingärtler, 2010).

Other PPP projects have also been implemented in Austria:
In the field of education, the city of Krems founded IMC Fachhochschule Krems GmbH together with the private educational institute ITM GmbH. The Ministry of Science pays a cost subsidy per student. IMC bears the risks for the maintenance as well as the risks for the utilization and for the raising of research and sponsorship funds to finance the infrastructure.
The planning, construction and operation of the "Behördenfunk" ("public authority radio") system was also handed over to the best bidder TETRON for a concession period of 25 years. Construction began in autumn 2004; construction costs amounted to around € 130 million (Puwein & Weingärtler, 2010).

In order to demonstrate the experiences, strengths and weaknesses of PPP projects, a questionnaire survey was conducted by the WIFO (Austrian Institute of Economic Research Vienna). According to the report, the biggest hurdle for PPP projects in Austria is the high organisational effort involved in the preparation phase of such projects. This increased effort often has to pay for itself through efficiency advantages, which requires a corresponding project size. In the survey, 23% of respondents said they rejected PPP projects because they were uneconomical. Another obstacle in PPP projects is legal difficulties. Other reasons against PPP projects include their long duration, competitive constraints and lack of work quality, according to the survey. Most PPPs were developed in 2003 and 2004. PPPs have been used particularly frequently in the fields of sport, leisure, tourism and education. The waste management and construction sectors were also represented (Puwein & Weingärtler, 2010).

**PPPs between science and business – Christian Doppler Research Association**
Close cooperation between science and industry can enrich and advance particularly complex areas such as the circular economy. Specifically, this takes place in specially established **research units with fixed terms**, in which **application-orientated basic research** is pursued: Christian Doppler Laboratories at universities and non-university research

institutions, Josef Ressel Centres at universities of applied sciences. Under the direction of highly qualified scientists, research groups work in close contact with the commercial partners on innovative responses to business-related research issues. Nevertheless, there are certain requirements for building a research group: There has to be a specific need of a company for knowledge and know-how from the application-orientated basic research and the willingness of scientists to open themselves up to this commercial need in the long term is a basic requirement.
In the Christian Doppler Research Association, several funding models are applied:

**The Christian Doppler (CD) model - established at universities and non-university research institutions**

- Application-oriented basic research on a high level
- Integration into scientific environment of universities and non-university research institutions
- Maximum duration of seven years
- Rigorous scientific quality monitoring
- Bottom-up orientation
- Compact research groups (5-15 people)
- Key position of the Head of Laboratory
- Guaranteed scientific freedom for the scientists
- Joint financing by the public purse and companies
- Flexibility and relatively little organisational effort

**The Josef Ressel (JR) model - established in universities of applied sciences**

- Application-oriented research on a high level
- Integration into the scientific environment of universities of applied sciences
- Maximum duration of five years
- Rigorous scientific quality monitoring
- Bottom-up orientation
- Compact research groups (3-10 people)
- Key position of the Head of Centre
- Joint financing by the public purse and companies
- Flexibility and relatively little organisational effort

**New Special Funding Programme of the CDG: "Partnership in Research" (PiR)**

- Scientists of application oriented basic research that have not yet cooperated with the private sector are encouraged to build cooperation in research with private enterprises
- projects with high scientific content and a high potential to be useful for enterprises can be supported by the programme with a maximum sum of 250.000 EUR
- duration: 12-36 months
- since now very successful programme, where the public sector cooperates with private entrepreneurs (CDG, 2018)

## 7.9. Problems & risks of PPPs – experiences in MOVECO-countries

As described in chapter 4, numerous risks associated with PPPs are mentioned in the literature. The mapping process made it possible to detect numerous risks that have occurred in practice in the MOVECO countries. The figure below shows the main results of the survey:

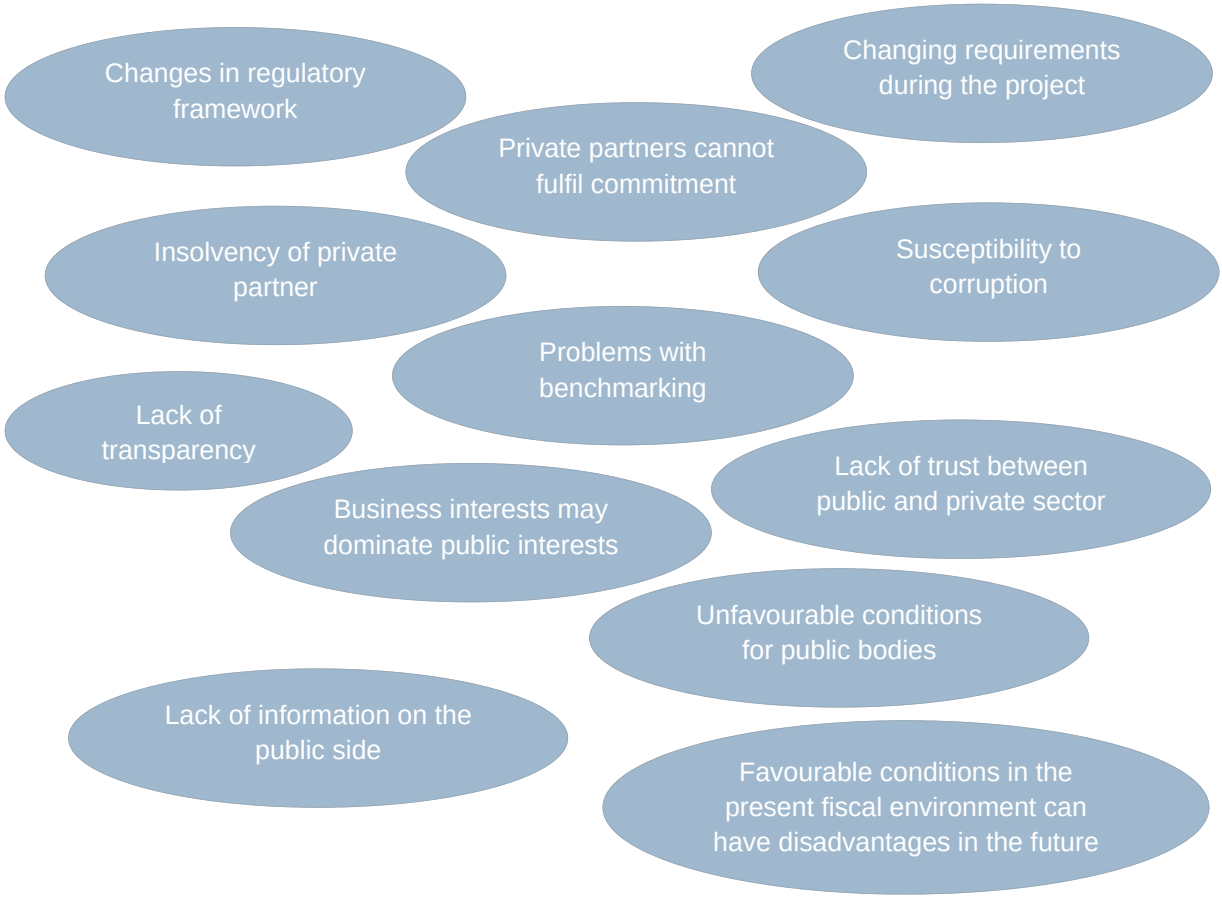


*Figure 9: Problems & risks of PPPs. Findings of the MOVECO-PPP-questionnaire. 2018*

PPPs and Circular Economy – discussion and conclusions

PPPs have arisen from the need to implement public projects with the help of private partners despite financing problems on the part of the public sector. PPP projects flourished in economically unfavourable times. Meanwhile in some MOVECO countries, PPP projects are looked at with a critical eye, there are also many positive examples of cooperation between the public and private sectors.

## Opportunities associated with PPPs

### Waste management

Especially in the area of waste management, there are numerous well-functioning projects that are managed on a PPP basis. In connection with circular economy it is important to use PPPs' strengths, e.g. the professional competence of the private partner, the new input that private partners can provide and of course the financial potential that can be utilized.

### Research and education

In addition to "classic" areas in which PPPs have already been successfully implemented, such as waste management or wastewater disposal, PPPs could also be used in research and education. Cooperation between research and industry, particularly on issues relating to the circular economy, could benefit both sides. The industry could receive market-relevant results from research through its financial support. Conversely, research would not be an end in itself, but would focus parts of its research on the needs of business. Of course, PPP projects between industry and research cannot replace traditional basic research or independent research funded by the state, but greater cooperation could push the issue of the circular economy. It would be important not only to gain scientific knowledge in this field, but also to develop marketable solutions and business models through joint cooperation.

### Financing

In some areas, however, PPPs could also make sense today. Although Central Europe is currently experiencing an economic upturn again, PPPs in the context of a circular economy could be a good opportunity to successfully implement projects. Although financing through PPPs is currently not necessarily or only partially necessary, PPPs can be a good alternative to the traditional implementation of projects in the public interest.

### Transfer of knowledge to SMEs

Mutual transfer between science and business is essential, especially for "new" topics such as the circular economy, in order to generate economic success. Companies, especially small and medium-sized enterprises, must recognize that business models that are oriented towards the circular economy can also lead towards economic success.

## Challenges associated with PPPs

### Transparency and legal constraints

Problems that are mentioned in connection with PPPs include the increased effort involved in the run-up to projects, the lack of transparency, the size of the projects, legal difficulties and complex contractual constructs, the long duration of the projects and restrictions on competition due to this long duration. Due to the sometimes very long project runtimes, changes in the legal framework conditions can also occur, which in turn can have a negative effect on the success of the project. Successful PPPs can only be carried out if the partners remain reliably in the project and no problems arise, e.g. insolvency of a partner. Many more obstacles were mentioned, which can be found in the previous chapters.

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