WP4: Smart Governance

Deliverable 4.2: Smart Governance 2.0

October 2021

Document change record			
Version	Date	Status	Modified by
0.1	21st of March, 2021	First draft based on on-going discussions in the MIMIC consortium	Mats Janné, LiU
0.2		Inclusion of examples from Oslo	Selamawit, SINTEF
0.3	May 2021	(1) Chapter 2: clarifications/additions; (2) Chapter 3: inclusion of level, gate and goal, actor involvement, input, output and mechanisms; (3) Addition of Chapter 4 (role of procurement)	Nicolas Brusselaers and Sorcha MacIntyre, Vrije Universiteit Brussel
0.4	June 2021		Mats Janné, LiU
0.5	July 2021	*Addition of the implementation of the SGC in Belgium*	*NB, SM (VUB)*
0.6	October 2021	Final version	Anna Fredriksson, LiU
0.7	November 2021	New figures introduced	Anna Fredriksson, LiU, Mats Janné, LiU

MIMIC Deliverable 4.2

Smart Governance 2.0

This delieverable presents the development of the Smart Governance Concept 2.0 and its testing in three cases (Sweden, Norway and Belgium). The Smart Governance Concpet 2.0 combines the different deliverables of the MIMIC project in to a hierarchical process. The hierarchical process is taking place on the strategic, tactical and operational level. The levels are connected to each other through input, output and feedback loops. The other deliverables within the MIMIC project are mechanisms within the process levels or part of the feedback loops. When tested in the tree cases the Smart Governance Concept 2.0 proved very useful as a way to show where further initiatives are needed to increase the speed of implementing sustainable construction logistics in cities, urban development projects or single projects. Based on the testing of the Smart Governance Concept 2.0 we could see that Sweden, Norway and Belgium have different areas in need of improvement and thereby have great opportunities to learn from each other.

Version: 0.6

Date: 20211001

Responsible partner: LiU & VUB

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1. Introduction

The purpose of MIMIC is to demonstrate how Smart Governance concepts can be used as an aid in the construction and city planning processes to facilitate and support logistics to, from and on urban construction sites to improve mobility and reduce congestion within cities and thereby reduce the negative impact of construction sites on the surrounding community. The MIMIC project integrates research within construction logistics, construction management, city logistics, sustainability, and optimization of flows, with the goal of developing the Smart Governance Concept 2.0. This concept provides the implementation partners (Cities and companies in the construction process and supply chain) with a structure of tools organized into a supportive platform for construction logistics issues in the urban development decision and procurement processes (D4.2 and D4.3). The tools help to increase the knowledge of construction logistics (D1.3), collecting stakeholder needs and criteria of construction logistics scenarios (D1.1, D1.2 and D1.4), and to evaluate the impact of construction logistics solutions on different stakeholders (D2.2, D2.3, D3.1, D3.2 and D3.3).

The Smart Governance Concept 1.0 was a first structure to support the inclusion of construction logistics planning in the construction project planning on a city level. Building on the Smart Governance Concept 1.0 developed in the CIVIC project and its evaluation (D4.1), this deliverable aims at developing and testing the Smart Governance Concept 2.0 within the scope of the MIMIC project. This deliverable is summarized in the paper Smart Construction Logistics Governance - A systems view of construction logistics in urban development, written by Mats JANNÉ, Linköping University, Sweden, Anna FREDRIKSSON, Linköping University, Sweden, Monica BILLGER, Chalmers University, Sweden, Nicolas BRUSSELAERS, Vrije Universiteit Brussels, Belgium, Selamawit Mamo FUFA, SINTEF, Norway, Rodrigue AL FAHEL, Closer, Sweden, Koen Mommens, Vrije Universiteit Brussels, Belgium and presented at the 57th ISOCARP World Planning Congress 8-11 November 2021, Doha, Qatar.

2. Improvement areas Smart Governance Concept 1.0

The Smart Governance Concept 1.0 (Fredriksson et al., 2018), developed during the CIVIC project, combines different tools to improve construction logistics and its governance. It aimed to help local governments in collaborating with private partners to realise more sustainable, and safer, construction works with less inconvenience and cleaner air. In addition, it also aimed at helping clients, developers, and contractors to ensure smooth and efficient construction operations. The goal is to introduce construction logistics as an important topic for development/construction projects from the very beginning, meaning already in the project or program planning phase.

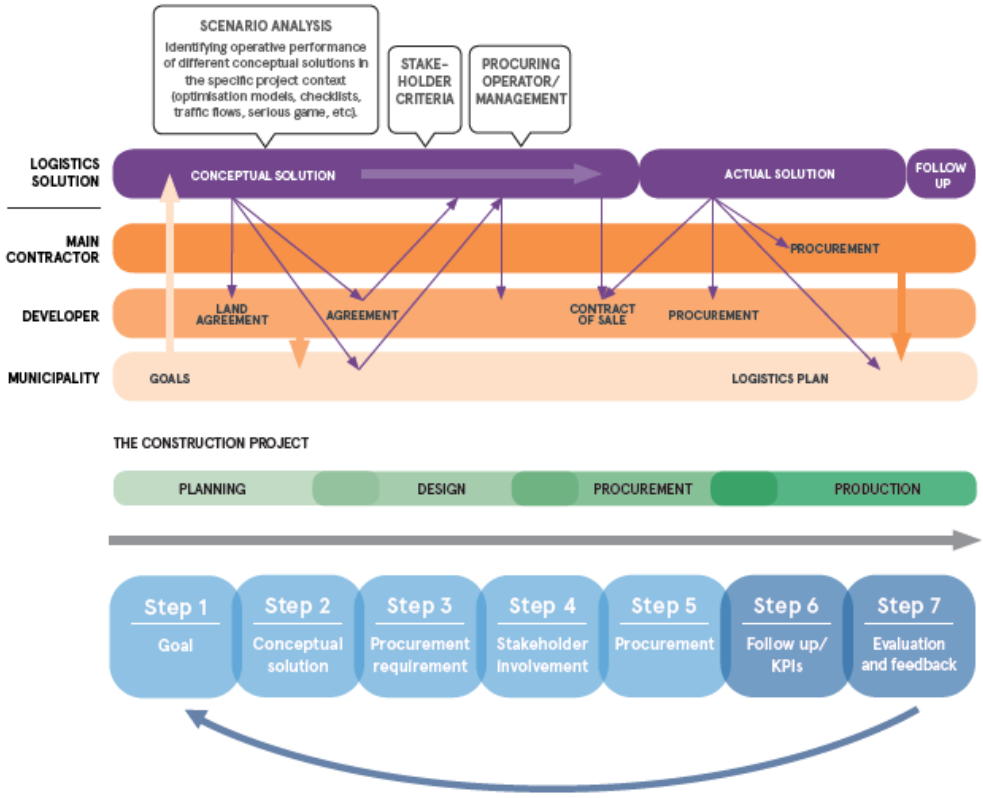

Figure 2.1 - Smart Governance Concept 1.0 (Fredriksson et al., 2018)

The Smart Governance Concept 1.0 follows seven steps:

1. Creating a sense of shared ownership and urgency to optimise construction logistics on the project level.
2. A conceptual solution is developed to create a common understanding of the prerequisites for the specific project and possible methods for organising logistics.
3. Step 3 entails the different instruments, policies and guidelines that are needed for creating the formal conditions for the solution.
4. The specific stakeholders are involved to identify important criteria that influence the selection of the final solution.

5. Step 5 aims to select the final solution by providing cost calculations and traffic optimisation models.
6. Step 6 entails the collection of data and follow-ups of KPIs.
7. Step 7 regards the evaluation of the different projects that feed back into the continuous development process of the optimisation of construction logistics at a city level. This final step is presented together with step 1 since these both concern the city level.

In the evaluation of the Smart Governance Concept 1.0 (D4.1; Fredriksson et al., 2021a), it was found that the governance concept needed further developments to provide more clarity on what each of the seven steps entail.

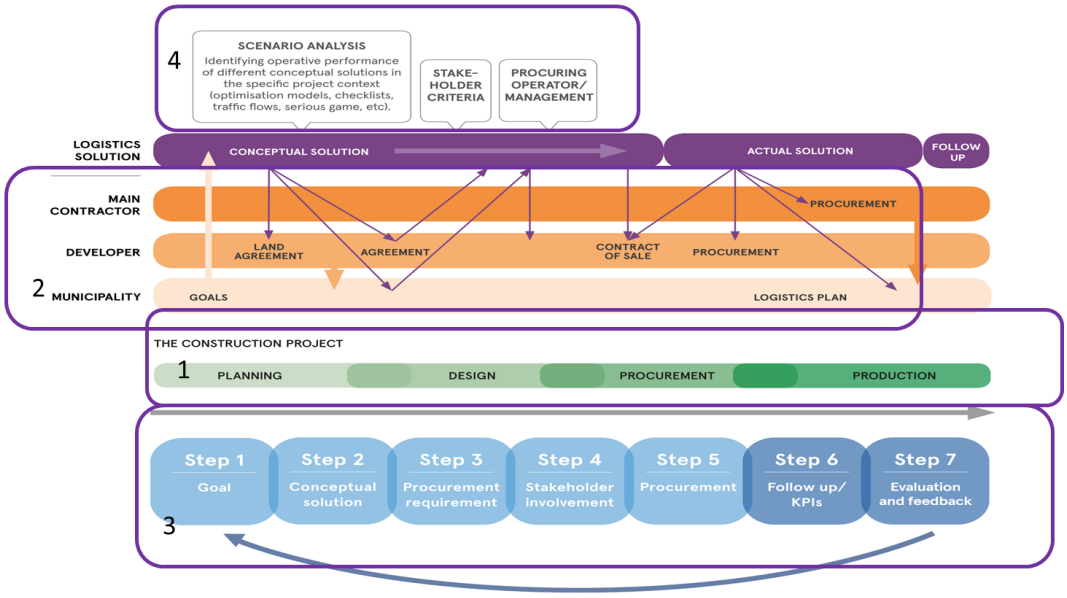

Figure 2.2 - Identification of the improvement areas within the Smart Governance Concept 1.0 – from D4.1

The developed Smart Governance Concept 2.0 therefore addresses these improvement areas, which are:

1. The introduction of planning (hierarchy) levels and gates (such as scope, scenario and setup decisions) to coordinate the construction management and supply chain planning;
2. The clarification of the project's and actors' involvement, their responsibility, geographical scope and output;
3. The iterative process of activities, allowing for changes in the governance structure, and introducing clear input, output and mechanisms/tools specific to each process' purpose;
4. The clarification of scenario analyses, both using qualitative and quantitive methods across the strategic, tactical and operational levels;
5. The inclusion of policies and legal framework at core of the Smart Governance Concept.

Improvement area 1 identified, is that the Smart Governance Concept 1.0 does not include any planning levels. A suggestion was put forth in Deliverable 4.1 to include both planning levels and gates into the governance concept to allow for a more nuanced approach. This suggestion is shown in Figure 2.2 below.

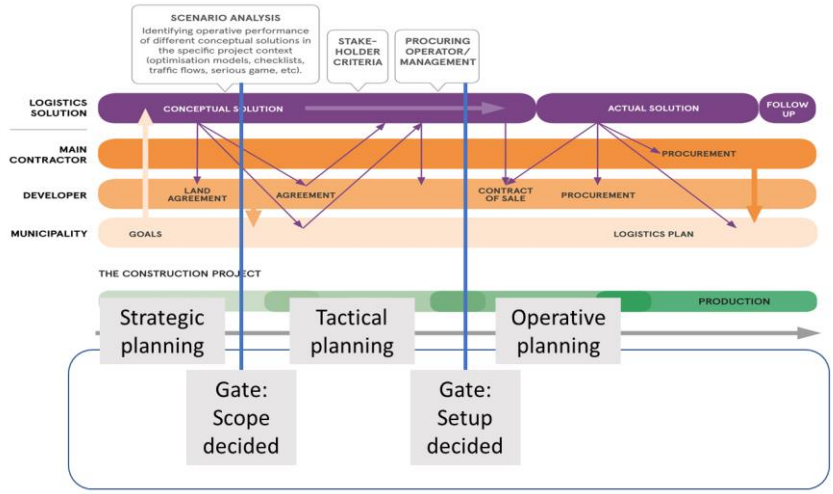

Figure 2.2 - Suggestion of how to add the planning levels and the gates to the Smart Governance Concept 2.0 – from D4.1

The reason behind the inclusion of the planning levels is that planning in construction logistics are perceived as hierarchical, with processes at different planning levels: strategic, tactical and operative. Strategic planning has a long-term horizon and sets the boundaries for the mid-term horizon tactical planning, which sets the boundaries for the short-term horizon operative planning. Furthermore, D1.1, presented a suggestion of how the strategic, tactical, and operational planning levels can be connected, see Figure 2.3 below. This figure highlights how the gates in Figure 2.2, scope, scenario, and setup relate to the planning levels, and which actors are most likely responsible within the different planning levels.

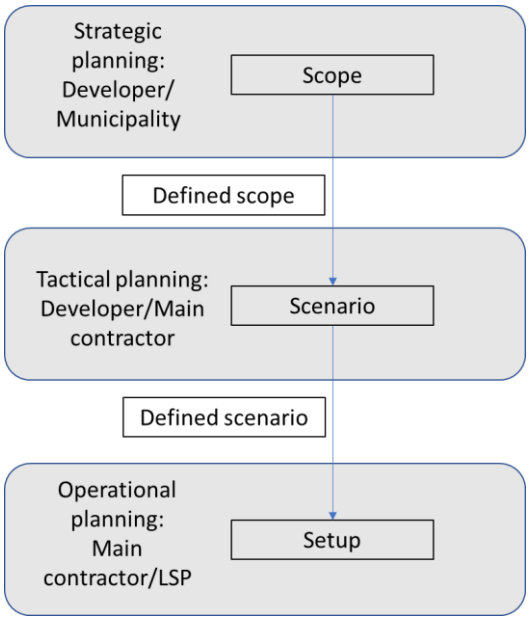

Figure 3.2 - Relationship between scope, scenario, and setup in the Smart Governance Concept 2.0 – from D1.1

3. Development of Smart Governance Concept 2.0

This chapter focus on describing the development of the Smart Governance Concept 2.0. It takes the starting point in the improvement areas identified for the Smart Governance Concept 1.0 in chapter 2 as well as the existing development already done within D1.1.

In the following subchapters, we divide the Smart Governance Concept 2.0 in three hierarchical levels (Figure 3.1). Each of these levels will be detailed on:

(1) *Level and gate*: the introduction of planning (hierarchy) levels and gates (such as scope, scenario and setup decisions) to coordinate the construction management and supply chain planning, as well as the scope of activities and feasible services;
(2) *Actor involvement*: the clarification of the project's and actors' involvement, their responsibility, geographical scope and output, specific per project and per purpose of process;
(3) *Input, Output and Mechanisms*: the Smart Governance Concept 2.0allows for changes in the goverance structure due to its iterative nature: each process step requires *Input*, *Output* and *Mechanisms* to trigger and generate next steps to each process' purpose. As introduced in Deliverable 4.1, *Input* is based on previous projects' data and knowledge, the project context, the type of project, agendas and questions during meetings. *Output* are the identified scope on the strategic level, the scenario analysis on the tactical level and the actual setup and its evaluation on the operational level. *Mechanisms* aid in translating the input to the output, thereby reaching the level's associated gate; these *Mechanisms* include the tools we develop in the MIMIC project, such as the assesment framework (Bruesselears et al., 2021b) the game and the megagame (Bergström et al., 2020), the MAMCA (Bruesselears et al., 2021a), and the scenario analysis (Graser et al., 2020). These are then clarified based on scenario evaluations, using both qualitative and quantitive methods across the strategic, tactical and operational levels.

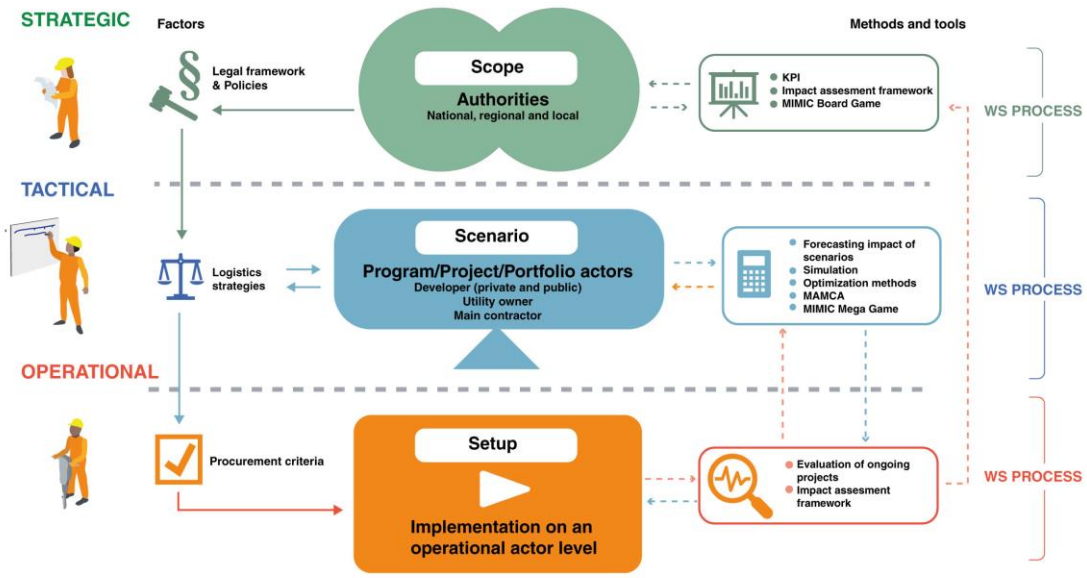

Figure 3.1: The Smart Governance Concept 2.0 and its 3 hierarchical planning levels: Strategic, Tactical and Operational

3.1 The strategic level

The focus in the strategic level is how authorities can affect the scope by setting policies and regulatory frameworks for how to approach construction logistics.

3.1.1 Specification of level and gate

Building from a traditional planning hierarchy, the Smart Governance Concept 2.0 should start on the strategic planning level and lead to the first gate; deciding the scope of the construction logistics setup and/or plan. The scope enables the alignmnet of the construction planning at strategic level with the tactical and operational levels.On this level, the wider contextual considerations of the program, portolio, or project need to be considered in order to allow for the scope of the setup to be set.

Figure 3.2. The strategic level of the Smart Governance Concept 2.0

3.1.2 Actor involvement

An important question in the early strategic stages of the Smart Governance Concept 2.0 is to identify which actor has the lead of the development of a construction logistics scope, scenario or setup as the project evolves. In other words, the notion of who 'owns' or has the power or responsibility over a process is introduced. The strategic level mainly involves municipal, regional and national authorities in the fields of construction transport and logistics, urban mobility and urban planning. However, all main actors (such as the main contractor, developer and municipality) can, at a strategic level, present a strategy of construction logistics including goals and scope of the project. There is nonetheless a distinction to made between the different actors' degree of involvement, responsibility and their geographical reach (such as on the project, company or city level). At this level, the scope is clearly defined by the governance of the involved authorities.

Thus, at the strategic level, the main actors that are to be involved or considered in the process initiated in the Smart Governance Concept 2.0 are identified. The stakeholder identification will also be used on the tactical and operational levels, where a more in-depth collaborative analysis is done, however knowing main stakeholders early on favouring the chances of success in a given project.

3.1.3 Input, Output and Mechanisms

The main Input at the strategic level are the legal boundaries and global policy guidelines in which construction and construction logistics sectors operate. These are housed under the umbrella term *"Legal Framework and Policies"* and focus on long-term goals and organisational values and policies. These legal framework and policies are detailed as part of D 4.3 (Bö et al., 2021), and present an (inter)national overview of the current practices in construction logistics. These include

but are not limited to: the regulatory framework across the involved institutional actors, national and European directives, the environmental construction (logistics) requirements, and sustainable urban mobility and logistics plans (SUMP/SULP), which are, in turn, impacted by local, regional, national, and international political ambitions and regulations. The main barrier in this process is to clarify the format of agreements, contracts and legal frameworks, as well as when agreements and contracts are introduced in which process.

The policies and regulations translate into requirements from developers, stipulated in the agreement between developer and main contractor. Other actors might however have their own strategic ambitions or processes, which do no not always align with the broader context (Brusselaers et al., 2020). In order to increase the likelihood of a governance approach that reduces friction between the different stakeholders, there is thus a need to include the policies and legal frameworks at core and start of the process.

The desired Output at a strategic level is therefore a document presenting the identified scope, which serves as Input on the tactical level. The latter is achieved by building further on stakeholder cohesion, by including the right decision-makers and organize educational activities on the importance of urban construction logistics solutions or collaborative exercices. Here can tools such as MAMCA (Brusselears et al.,2020a) or the developed mega-games and Construction Logistics boardgame D1.3 and also published in Bergström *et al.*, (2020).

Given the iterative nature of the Smart Governance Concept 2.0, an important loop is the identification and assessment of key performance indicators (KPI), feeding back to the strategic level from the tactical and operational levels. This feedback loop is ensured by the data and knowledge collected at the operational levels, and quantified by the Mechanisms used on the tactical and operational levels, as these focus on the project at hand (in some cases one among several if it is program or portfolios of projects for which the scope is set). The KPI model allows for operational and/or tactical decisions to further evaluate, adapt and follow up existing and upcoming existing construction logistics, transport, mobility and urban development policies and strategies.

3.2 The tactical level

The focus on a tactical planning level is the program/project/portfolio actors and how they implement strategies through procurement directives and forecasting scenario.

3.2.1 Specification of level and gate

On a tactical planning level, the decided scope needs to be adapted to the program, portfolio, or project in question and translated into scenarios. On this level, more detailed contextual considerations need to be taken, alongside making an inventory of possible scenarios (combinations of logistics services (Fredriksson et al., 2021b)) that could be implemented in the program, portfolio or project. The outcome of the tactical planning is to decide on the setup to be implemented on the operational level, which is also the second gate. Focus should be on presenting a logistics plan including both the contextual and logistics scenarios identified.

Figure 3.3. The tactical level of the Smart Governance Concept 2.0

3.2.2 Actor involvement

On the tactical level are mainly logistics service providers (LSP), logistics consultants, project contractors and developers involved, whose main responsibility lie in the conception of logistics scenarios in line with (1) the defined scope on the strategical level and (2) efficient transport and construction logistics planning to, from and on site as input for the operational level (Hulthén et al., 2021). Urban construction logistics processes are site-, actor- and condition-specific, and although there is often a common built object across the various stakeholders, this is often based on different motivations and concerns (Brusselaers et al., 2020). Therefore, crucial in this step is the inclusion of a broad spectrum of stakeholders in the decision-making process.

3.2.3 Input, Output and Mechanisms

The main Input on the tactical level is based on the defined scope and includes (1) the system borders (one vs. several development areas; one vs. several projects), (2) the involved stakeholders and their cooperation, and (3) the contextual Construction Logistics Scenarios, project descriptions including logitstics challenges and opportunities.

In the MIMIC project several mechanisms to develop and evaluate construction logistics scenarios have been developed.

1) The participatory stakeholder framework, developed within MIMIC and based on the Multi-Actor Multi-Criteria Analysis (MAMCA) (Figure 3.4), as presented in D1.4 (Brusselaers et al., 2021b; Brusselaers et al., 2020a). First, the stakeholder framework (MAMCA, using qualitative and quantitative approaches) aims to identify the importance of different logistics elements to find the most suitable scenarios to send out to LSP for offerings or to put as procurement criteria to contractors. Further details and results can be read in Chapter 5.

2) The scenarios can also be analysed with the help of quantitiative methods traffic and planning optimization tools (D3.1 Graser et al (2020); D3.3 Brusselaers & Huang, forthcoming).

3) Or as a part of a design process for developing construction logistics setups (Janné, 2020).

4) Or taking a supply chain analysis approach, analysing the transport triad and its effect on transport efficiency (Eriksson, 2021).

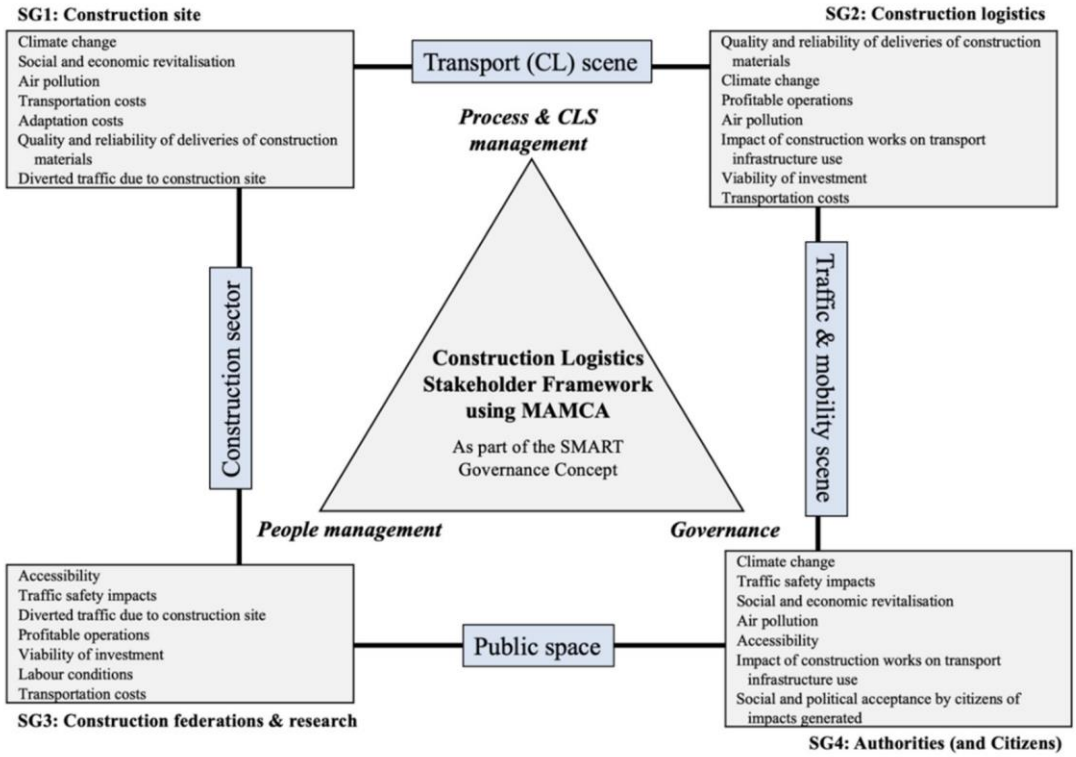

Figure 3.4. Construction Logistics Stakeholder Framework and its different inter-relational spaces within the Smart Governance Concept 2.0 (Brusselaers et al., 2021).

The Output on the tactical level is a document providing defined scenario definitions, also known as the second gate in this model. This consists of defined construction logistics scenarios, traffic planning scenarios, a mapping and understanding of challnges and opportunities, the order of developments, and agreements on procurement criteria. The procurement criteria are exemplified in Chapter 5.1. The offerings and procurement criteria are then serve as starting point for the operational level, Also further stakeholder cohesion can be achieved by organizing large-scale educational activities on the importance of urban construction logistics solutions by means of the digital and interactive Construction Logistics Mega-Game (online) (Bergström et al., forthcoming).

The Mechanisms presented on the tactical level enable the monitoring and evaluation of KPIs, which feed back to both the strategic and operational levels. This can be achieved by means of the assessment framework D2.2 (Brusselears et al., 2021b).

3.3 The operational level

The focus on the operational level is the implementation of a setup on an inter-actor level in the specific projects and the evaluation of the impact of the implemented setup.

3.3.1 Specification of level and gate

On the operational planning level, the regulations and logistics services are refined and the setup is implemented. At this level, the setup is made operational and evaluated in order to iteratively finetune the setup and its service offerings.

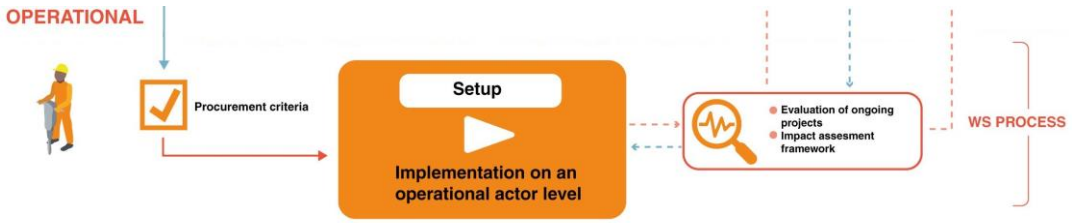

Figure 3.5. The operational level of the Smart Governance Concept 2.0

3.3.2 Actor involvement

On the operational level, the specific construction logistics setup needs to be presented including a business model and governance structure (Janné, 2020). Though, there is a need to develop checklists and drafts of these plans at an early stage of the project (for further detail see Chapter 5.2). At this stage, the construction planning includes workers as well as the broader surrounding community.

3.3.3 Input, Output and Mechanisms

The main Input on the operational level is based on the available construction logistics services and material and resource requirements and supplies, which are prescribed in the defined Scenario. Additionally, operational activity tools are required such as the site layout plan, delivery schedules and the resource planning.

The Mechanisms in this regard aid to quantify the scenario analyses, as to coordinate, plan and optimise material deliveries and timely meet site demand. The purpose of the scenario analysis on the operational level is to give the logistics service provider (LSP) the chance to picture the logistics setup in light of operational activities, such as transport planning and trips, material and resource planning and supply and waste forecasts. By doing so, the logistics setup can be fitted to the program, portfolio or project that it will serve on the tactical level. This operational scenario analysis can also allow for a logistics setup better suited to the stakeholders needs.

First, optimization models and tools have been developed with the aim to evaluate construction planning scenarios and the construction site impact on city traffic (Fredriksson *et al.*, 2021c). These provide support for understanding the relationship between storage area and transport.

Secondly, the developed environmental impact assessment framework (Figure 3.6) provides a comprehensive tool to measure and monetize the negative effects of construction logistics, both on- and off-site, based on the External Cost Calculator and Life Cycle Assessment Methodologies. The tactical level provides an important first step in the collection of the necessary transport and logistics data to feed the impact assessment. The framework develops further depending on the progress of, and the degree of data gathering in the operational planning level. More information about the Impact Assessment framework can be found in D2.2 (Brusselears et al., 2021b).

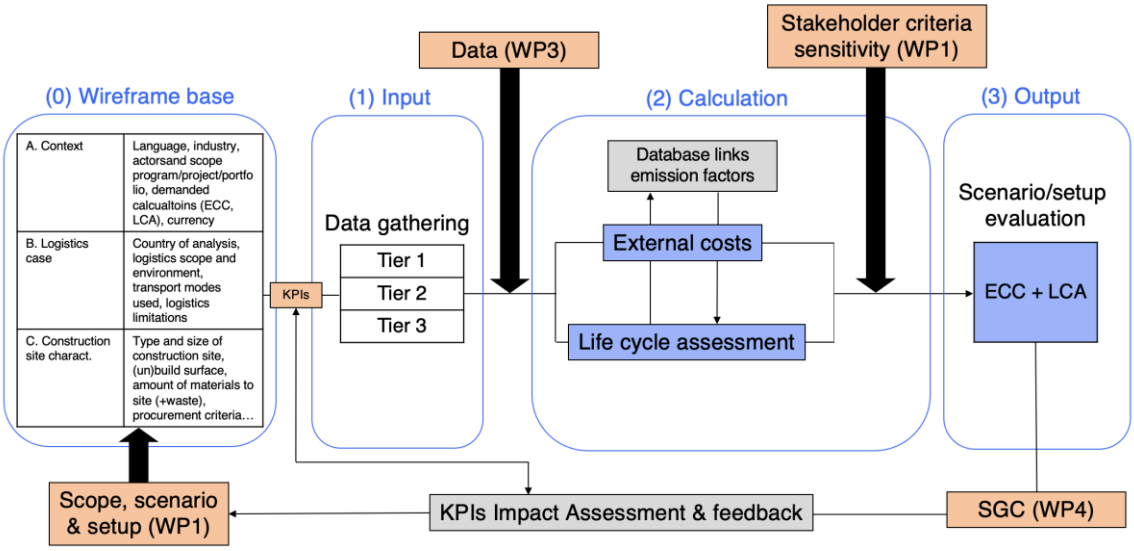

Figure 3.6. Impact assessment Framework within the Smart Governance Concept 2.0 using ECC and LCA methodologies for holistic urban construction logistics environmental impact assessments (Brusselears et al., 2021b)

Furthermore, there is a direct intercommunication between the impact assessment and stakeholder frameworks, as the impact assessment can be calibrated according to the criteria's degree of impact for various stakeholder groups (allocation of criteria weights), as shown in Figure 3.7. Hence, a sensitivity analysis tailored the specific local context is possible, and further enhances the interplay to suit the involved actors.

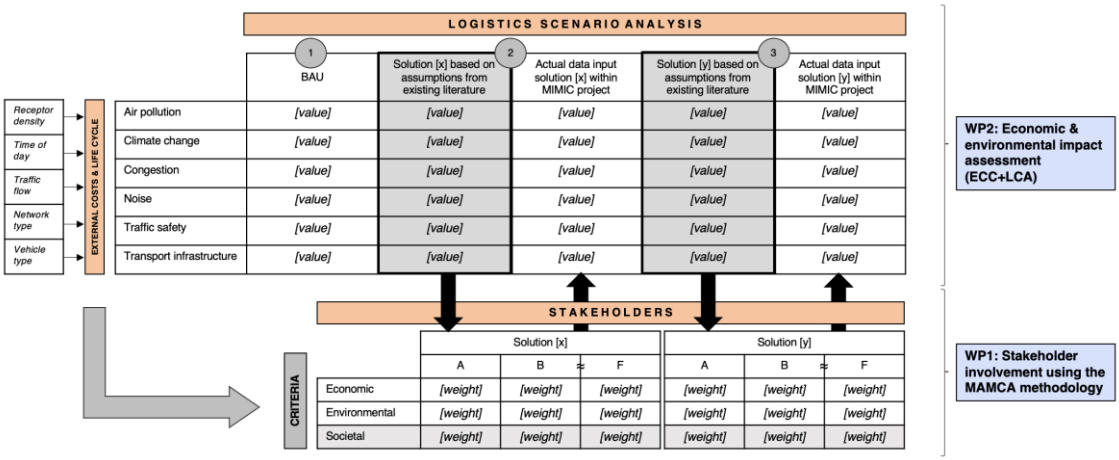

Figure 3.7. The interplay between the Impact Assessment framework and the stakeholder criteria (Brusselears et al., 2021b)

The Output on the operational level describes the selected logistics operators, as well as a clear logistics plan and construction logistics setup. The output is also a feedback loop to tactical level, from the results of evaluation of fulfilment of procurement criteria, and strategic level regarding the fulfilment or contribution to the defined scope.

4. Workshop processes

In Figure 3.3 are workshop processes included. These workshop processes are there to stimulate learning and understanding between actors both within organisations and between organisations and are important parts of setting the Smart Governance Concept 2.0 into action. Therefore, the workshop processes can be organised as either heterogenious or homogenious processes. The purpose of the heterogenious process is to increase understanding between actors. The purpose of the homogenious process is to create common goals within actors. The steps of the workshop processes are presented in 4.1. The homogenious workshop process will be most commonly used on the tactical level versus the heterogenious workshop process will be used on the strategic and operational levels.

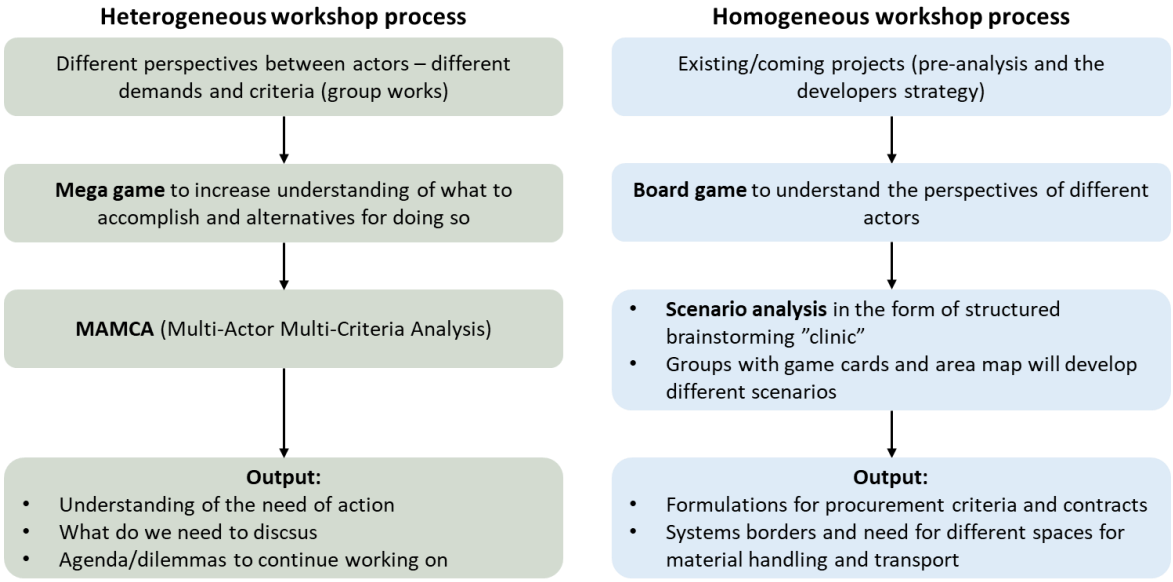

Figure 4.1. The workshop processes

5. Smart Governance Concept 2.0 tested: results from national demonstration cases

4.1 The Norwegian case

The City of Oslo's main goal is to fulful international (e.g. Paris agreement), national (e.g. 55% emission reduction by 2030 and become carbon neutral by 2050), regional and local (e.g. 95% reductions of direct emissions by 2030 in Oslo) environmental goals and ambitons. The City of Oslo has been a leader in using fossil free, and emission free construction strategies to address challenges and needs of projects to achieve environmental goals and ambitions. Omsorgsbygg Oslo (OBY), now part of Oslobygg, is one of several municipal enterprises working in the construction sector, being a large property manager and building owner with more than 900,000m2 in the portfolio, consisting of day care centres, nursing homes, fire stations, drug-related housing, and other municipal purpose properties. OBY has been one of the frontrunners in developing and realising emission free construction sites through their strategies and procurement criterias (Omsorgsbygg, 2019).

Several fragments of the SMART Governance Concept are implemented at strategic, tactical and operational leves in construction logistics of the City of Oslo as shown in Figure 4.1.

There are legal framework and policies (bylaw 1091/19 (Oslo kommune, 2019a) and bylaw 1123/19 (Oslo kommune, 2019b)), and strategies and procurement criterias (Oslo Kommune, 2021) that indirectly describes the scope and approach for efficient and sustainable construction logistics in the municipal procurements in City of Oslo. Six of Norway's biggest cities followed Oslo in setting similar goals, to implement emission free construction requirements in all public project by 2025 and both public and private projects by 2030 (Bellona, 2021). However, the focus has been on GHG emission reduction from construction machinery and transport of mass and waste, focusing (primarily) on technology shift (towards emission-free) rather than optimum construction logistics as the main target. There is also a need for clearly defined KPIs and tools aiding feedback loop and follow up the actual impact of strategies, giving direction towards achieving the goal and scope defined in existing legal framework and policies.

At the tactical and operational level, the scenarios and setup illustrates the current fragmented status of a construction logistic governance concept in the municipal construction projects. There is a need for development of scenario analysis tool for evaluation of possible logistics setups and services, tools to involve and identify the needs of different stakeholders, implementation of construction logistic scenarios in the early project stage, and gathering best practices from actual case studies and pilot project to enable strategic and tactical construction logistic thinking. The knowledge from the MIMIC project can be used to further develop and implement the construction process criterion, enabling an evaluation of the supply process based on the logistic setup in the tenders of the constructors.

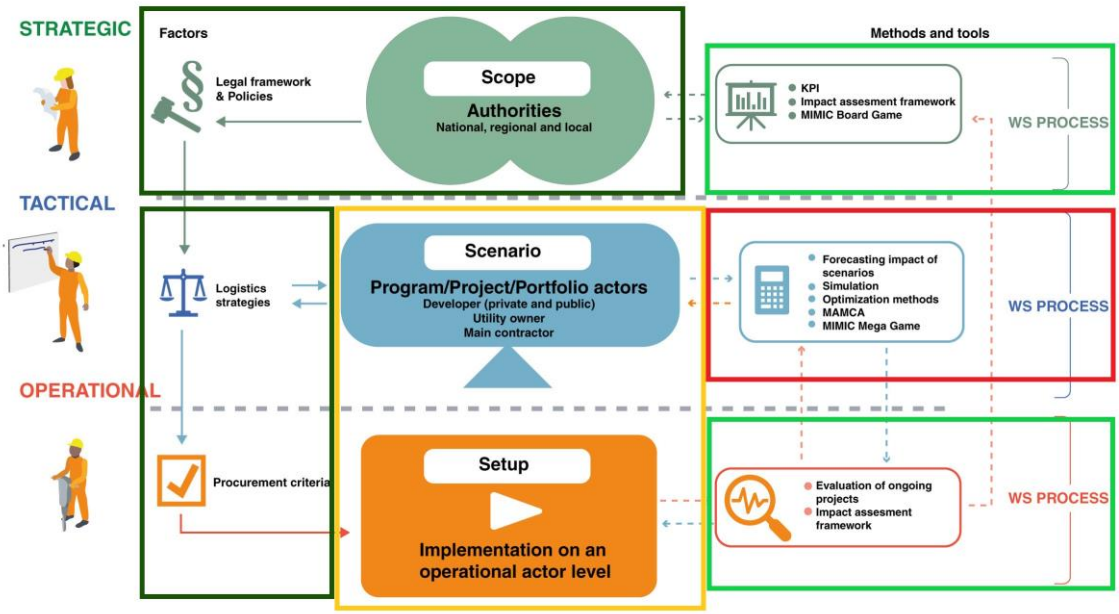

Figure 5.1 Examples of Smart Governance Concept 2.0 implementation in Norway. Green – implemented; light green box –on-going activities; orange box –relatively less implemented; red – not implemented at all.

4.2 The Swedish case

On the strategi level in Sweden there is a lack of focus on construction logistics among cities and national agencies. Though, the focus is increasing due to the congestion in urban areas and a new legislation were emissions from transports should be reported as part of the environmental reporting in construction projects (see D4.3, Bö et al., 2021).

On the tactical level there are activities taking place in both Stockholm and Gothenburg. In Stockholm much is related to the Stockholm Royal Seaport (see e.g. Janné and Fredriksson, 2019). Also in Gothenburg action is taken as it is growing with the ambition of having 115 000 new inhabitants in fifteen years' time. As part of this ambition, the municipal developer Älvstranden Utvecklings AB (ÄU) is developing several large-scale construction projects in the central parts of the city, close to other ongoing projects. Additionally, there are several other major projects underway by the city, or the state (for example, the Swedish Transport Administration, which is building the Western Link). This leads to congestion both at the entrances of, and around, the construction sites. ÄU, just like all urban planning actors, faces the great challenge of reducing the emissions that building a city generates. Since 2019, the company has the goal of halving greenhouse gas (GHG) emissions by 50% by 2024. Additionally, there is a belief that construction logistics is a temporary problem and as soon as the project is completed, it disappears. However, given that ÄU and the city of Gothenburg have many long-term projects planned and in progress, it is no longer possible to consider construction logistics as a temporary problem.

To deal with construction logistics, ÄU has developed a construction logistics strategy, consisting of two parts. Part 1 aims at developing a goal for construction logistics that applies to all projects regardless of size. To achieve the goal, several possible conceptual CLSs that can streamline or improve the construction logistics in a project have been developed. Each project assesses which setup to utilize. Part 2 consists of a framework with a number of checklists that serve as support in the developing an action plan for construction logistics. Adding to this the there is a Swedish

law on national level coming in 2022, stipulating that CO2 emissions for material deliveries should be evaluated in projects. The question is if these evaluations should be based on actual or template data. The latter is a problem due to the lack of data regarding construction transport. Though, the Swedish Transport Agency is planning to demand data gathering in future projects to enable environmental impact calculations.

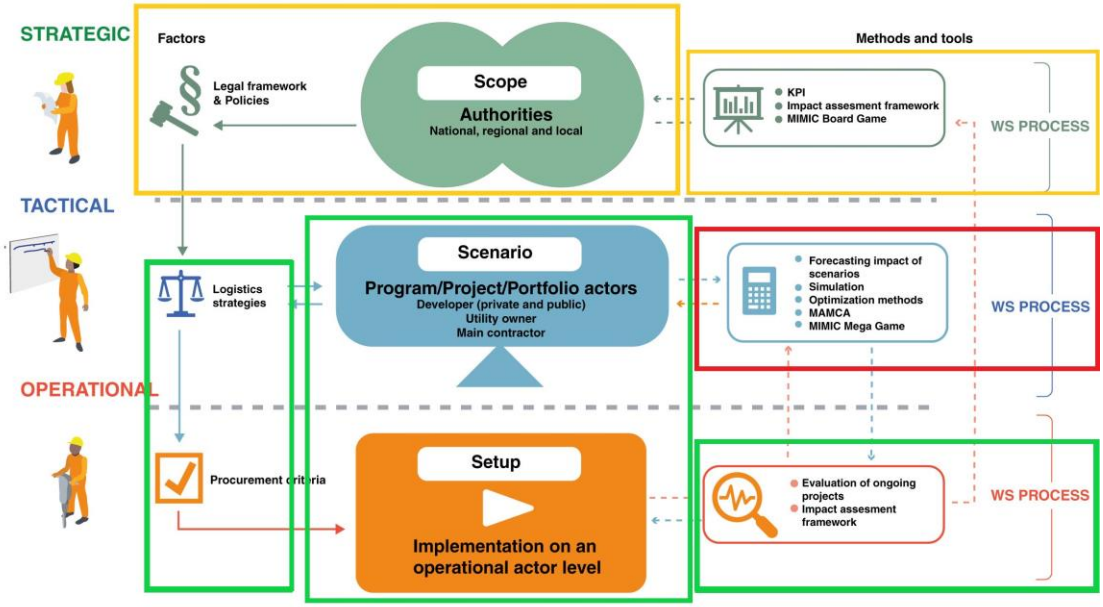

Figure 5.2. Smart Governance Concept implementation in Sweden. Green – implemented; light green box –on-going activities; orange box –relatively less implemented; red – not implemented at all.

4.3 The Belgian case

The Belgian case concerns the mixed 'City Campus' pilot site in Brussels-Capital Region (BCR), a 17.600 m² site for an SME park for agri-food companies and social and student residences. City Campus is organized in association with the public-private partnership between owner and city development agency CityDev and main building contractor Van Roey Vastgoed. Interviews where conducted to gain feedback with partner actors on all planning levels on the implementation of the Smart Governance Concept 2.0 in Brussels: Brussels Mobility (strategic), CityDev (tactical), Port of Brussels (stretgic/tactical) and Van Roey Vastgoed (operational). The results of these semi-structered interviews and implementation considerations are summarised below.

On the strategic planning level, Brussels copes with a lot of hierarchical and political layers, which renders the implementation of new solutions in a harmonious and country/regional-wide level difficult (cf. Deliverable 4.3). Brussels Mobility therefore emphasises that thorough stakeholder assessments can lead to a better understanding on how the construction logistics sector operates and can evolve. The framework can then also be specifically implemented towards the micro-level needs (e.g. on city-level), ultimately leading to a better understanding of the legal framework and who is involved within the process ("who does what?"), which is the most difficult for the Region of Brussels. CityDev further reinforces this by adding there is no national authority that

will aid in this process, as the decision-making power cascades automatically onto the regional level.

On the Tactical level, CityDev highlights the longevity of certain construction projects lasting over a decade before completion. Certain (environmental) goals thus have to be set a long time in advance, something which cannot always be set by the strategic (governmental or regional institutions) planning level. These operational decisions (such as building materials, construction logistics operations, tendering etc.) ultimately cascade down to lower levels, as it proves difficult to alter core environmental aspects in the last stages before actual construction, years after obtaining permits, as the rules where set in the past. A first step on the strategic level is thus to compile the scopes that authorities such as Brussels Mobility or the Port of Brussels aim to set by 2030. Thereafter, the tactical (and operational) levels abide by the rules set forth, within their respective time frames. The Port of Brussels identifies most with the presented SGC 2.0, as they use a similar process for the big construction sites planning and their logistical intervention in Brussels. The stakeholder problematic calls for a currently missing database on all the (potential) stakeholders and capabilities to construct a good plan within their operations**.** Most often, the most flexible transport mode is by truck, driven by common prices. Inland waterway transport on the other hand requires more goodwill to change operational activities, which forms a communication barrier between the tactical and operational planning levels. A strong consideration is thus to bring people together within a unified legislatory framework. Pilot cases such as MIMIC and BCCC already demonstrate the potential of information exchange throughout the 3 levels and KPI/criteria definitions for good scenario evaluations.

On the Operational level, Van Roey emphasises the need for a clear top-down scope definition from the strategic to the operational level. This definition of the rules to follow should be set by the Strategic, so that construction companies can define logistics scenario's within this scope. However, more bottom-up communication between actors could lead to realistic guidance from the government to implement more sustainable alternatives. An example is set by the MIMIC stakeholder framework, in which CityDev aided Van Roey Vastgoed in finding an area to implement a waterbound transport hub for distribution on 4 construction sites in Brussels. This was negotiated between parterns after the MAMCA workshop organized within the project and demonstrates the power of stakeholder involvement. This is however still very uncommon in Brussels. Is is thus also necessary for the government to provide a guiding framework for construction companies.

Overall, the interviewed instances found the presented Smart Governance Concept 2.0 an enrichment to the sector, with emphasis on the implementation mechanisms and tools the framework provides. The procurement aspect was a recurring discussion point which will be highluighted in a separate deliverable. Both CityDev and Van Roey found academic projects, such as MIMIC, to form a strong katalysator to shift operations in the right direction, and bring stakeholders together. One striking example is that the Port of Brussels, CityDev and Van Roey collaboratively found alternative transport flows utilizing the inland waterways for deliveries to the City Campus site; these discussions were held as an effect of the organized MAMCA stakeholder workshop in MIMIC.

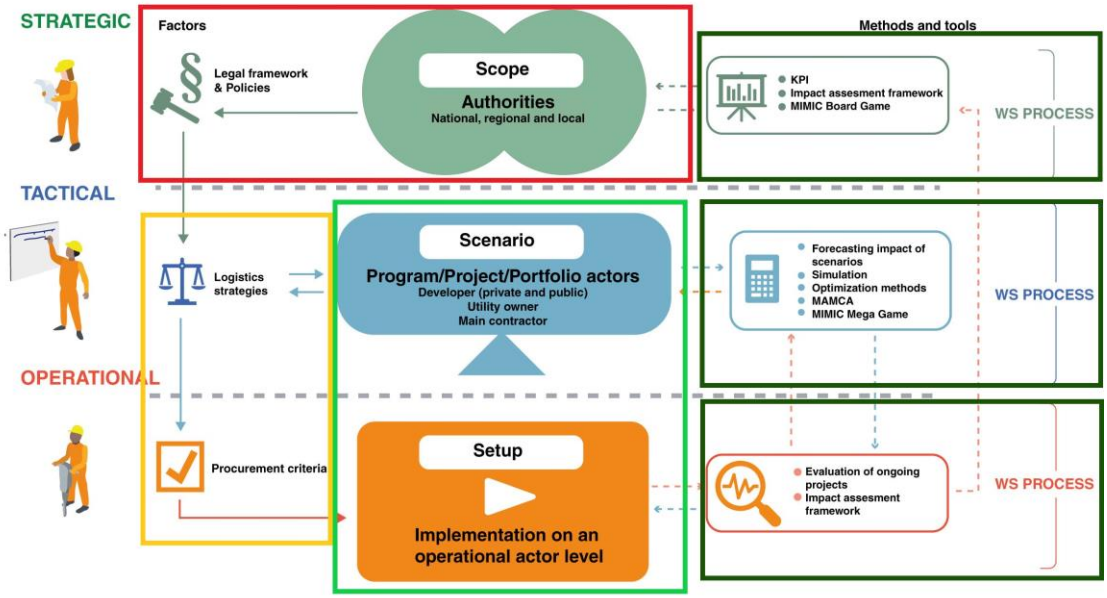

Figure 5.3. Smart Governance Concept implementation in Belgium. Green – implemented; light green box –on-going activities; orange box –relatively less implemented; red – not implemented at all.

5. Concluding remarks

This deliverable has presented the Smart Governance Concept 2.0. The Smart Governance Concept 2.0 focus on the need to take a holistic approach to construction logistics from a national level down to each and every project. The Smart Governance Concept 2.0 aim to foster the implementation of continuous improvement work of construction logistics in urban areas by focus on iteration from setting scope by national/regional/loacal authorities, implementing it through legislation and procurement criteria as actual setups in the projects and finally follow up through collection of data in the projects that are translated into KPIs evaluated by both the program/portfolio/project actors as well as the authorities. Though to make change happen we need to increase the understanding of the need to take action on all levels, strategic, tactical and operational. Unfortunately, construction logistics are still today mainly seen as a operational issue. From figures 4.1-4.3 we can also see that the different countries have started in different areas, therefore there is great potential in learning on an international level of how to best implement and adopt construction logistics on wider scale.

6. Acknowledgements

This project has received funding from the European Union's H2020 research and innovation programme and is part of the research programme JPI Urban Europe with project number 438.15.403 (MIMIC). This project is subsidised by the Brussels Capital Region - Innoviris and the European Union and receives funding from the Swedish Governmental Agency for Innovation Systems (Vinnova), the Austrian Federal Ministry for Transport, Innovation and Technology (BMVIT) in the framework of the research programme "Stadt der Zukunft" and the Austrian Federal Ministry of Science, Research and Economy (BMWFW) and The Research Council of Norway.

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