Construction Consolidation Centers: the SUCCESS project approach

SUCCESS: Sustainable Urban Consolidation CentrES for conStruction

NOVELOG Workshop

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 633338.

Content

- Introduction to SUCCESS Project
- Lessons Learnt
- The approach to Business Models for CCC
- How to contribute

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SUCCESS Id card

- **Aim**: Investigate how the **supply chain management** and **Construction Consolidation Centres** (CCCs) concepts could bring about tested and replicable solutions (adequate collaborative framework, sustainable business models), to address problems in the construction supply chains, reducing costs and negative impacts of freight distribution in urban areas
- **Thematic area**: Reduction of costs and negative impacts of the construction supply chain
- **Funding tools**: H2020-Societal Challenges, MG-5.2-2014: Reducing impacts and costs of freight and service trips in urban areas
- **Duration**: 36 months (Start 01/05/15)
- **Total budget**: 3.2 M €
- **CIVITAS**: SUCCESS is one of ten H2020 projects selected to becomes member of the network
- **Partners**: 11 partners from 4 countries

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SUCCESS Consortium

Luxembourg Institute of Science and Technology (LIST)
Valenciaport Foundation (VPF)
Institute for Transport and Logistics Foundation (ITL)
En&Tech Research Centre (EN&TECH)

Tralux
Federation of Construction Companies (FEVEC)
Cooperativa Muratori e Braccianti di Carpi (CMB)
Vinci Construction France (VCF)

Emilia Romagna Region (RER)
Foundation of the Valencian Community for Strategical Promotion, Development and Urban Innovation (INNDEA)
Association pour la Formation professionnelle dans les Transports (AFT)

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SUCCESS Project

Expected results and impacts

- **Sustainable business models** to address problems in the construction supply chains, focusing on distribution networks, construction sites and reverse logistics.
- **New policies and regulations and infrastructure design improvement**
- Transport companies: **transportation cost reduction assessment** related to the CCCs implementation
- Construction Companies: propose a **strengthened ROI estimation facilitating the investment decision making process**
- Research organisations: **refine scientific data on CCCs overall performance**

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SUCCESS Pilots

Luxembourg (Luxembourg)

- 11 400 m²
- 21 M €
- Refurbishment & construction of apartments, shops, offices
- Residential area, close proximity with business district, one road to access the site
- No public space rental for temporary delivery areas and living accommodation

Paris (France)

- 55 475 m²
- 230 M €
- Conversion of two buildings into a single complex with offices
- Highly dense area, sensitive buildings
- Dedicated logistics team, delivery area booking system, public space rental

Valencia (Spain)

- 7 772 m²
- 16 M €
- Urbanization of a park area in Russafa, transforming over 66 hectares of former railway yards
- Dense area, very close proximity to train stations
- Large space on site, coordination with railway operations

Verona (Italy)

- 83 914 m²
- 126 M €
- Enlargement and renovation of two hospitals
- Highly dense area, sensitive buildings
- Traffic lights, control at entrance, BIM (partial)

Different maturity levels of logistics

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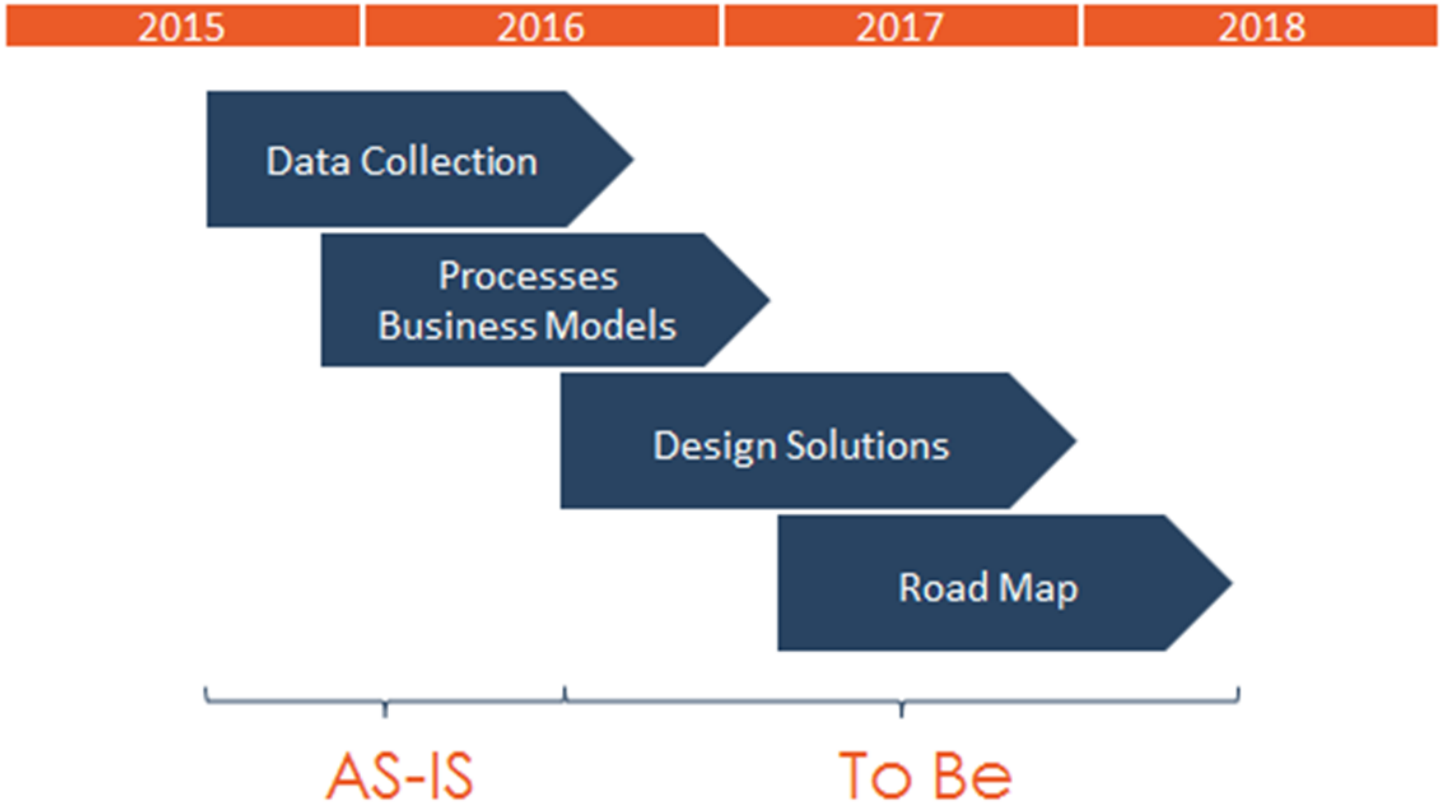
SUCCESS approach



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SUCCESS achievements and discoveries (1/2)

- Data collected and analysed to assess the AS-IS situation
- Set of relevant KPI to evaluate project achievements under economic, environmental and social sustainability point of view
- Factors that influence a construction site logistic performance are:
  - Availability of storage area
  - Relative location of the construction site within the urban area
  - Location of the suppliers
  - Organisation of logistics on the construction site

A better organisation of deliveries could reduce their impact on city congestion, improve Environmental and Social sustainability performance.

We have to wait for the simulation results to be able to confirm the positive impact of a CCC on emissions.

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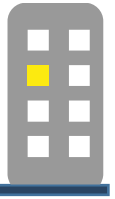
SUCCESS achievements and discoveries (2/2)



- ICT solutions for construction supply chain management have been identified: ERP systems (Enterprise Resource Planning), BIM (Building Information Model), eBusiness, web-based applications, tracking systems
- Process Mapping (PM) and Value Stream Mapping (VSM) techniques have been studied and applied to the construction sector
- Business models for the implementation of CCC's were produced and analysed
- A set of mathematical tools to optimize the construction logistics supply chain in urban areas have been defined

Need of the construction sector to have an integrated ICT tool for supply-chain management, as current solutions lack of interoperability.

Processes are not standard, so VSM is not the best tool to be used in construction industry.

PM resulted more relevant in the construction industry to discover main problems, weaknesses, and strengths and identify relevant parameters to considered for a CCC implementation.

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Lessons learned (1/2)

- Material costs represent 30-40% compared to the other construction costs (hidden transport cost)
- Very limited use of ICT (BIM, tracking system, …)
- Lack of communication between stakeholders
- Lack of expertise in logistics (human resources, methods, …)
- Poor logistical performance:
  - Inefficient planning of deliveries and resources (e.g. crane) leading to congestion on and outside the site
  - Multiple handling of materials
  - Large time slots for suppliers deliveries
  - Not JIT deliveries
  - No clear assigned storage area
  - Unsorted waste

Opportunity to make construction logistics more sustainable (financially, environmentally and socially)

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Lessons learned (2/2)

- Dedicated logistics team (FR) seems to reduce unproductive times
- Construction site features (ES) are also impacting unproductive time due to logistic issues
- Preliminary analysis of production time shows that CCC is one of the solutions to increase productivity: JIT deliveries with adapted delivery vehicles
- Differences in the performance of each site suggest a high potentiality to improve logistics by transferring best practices

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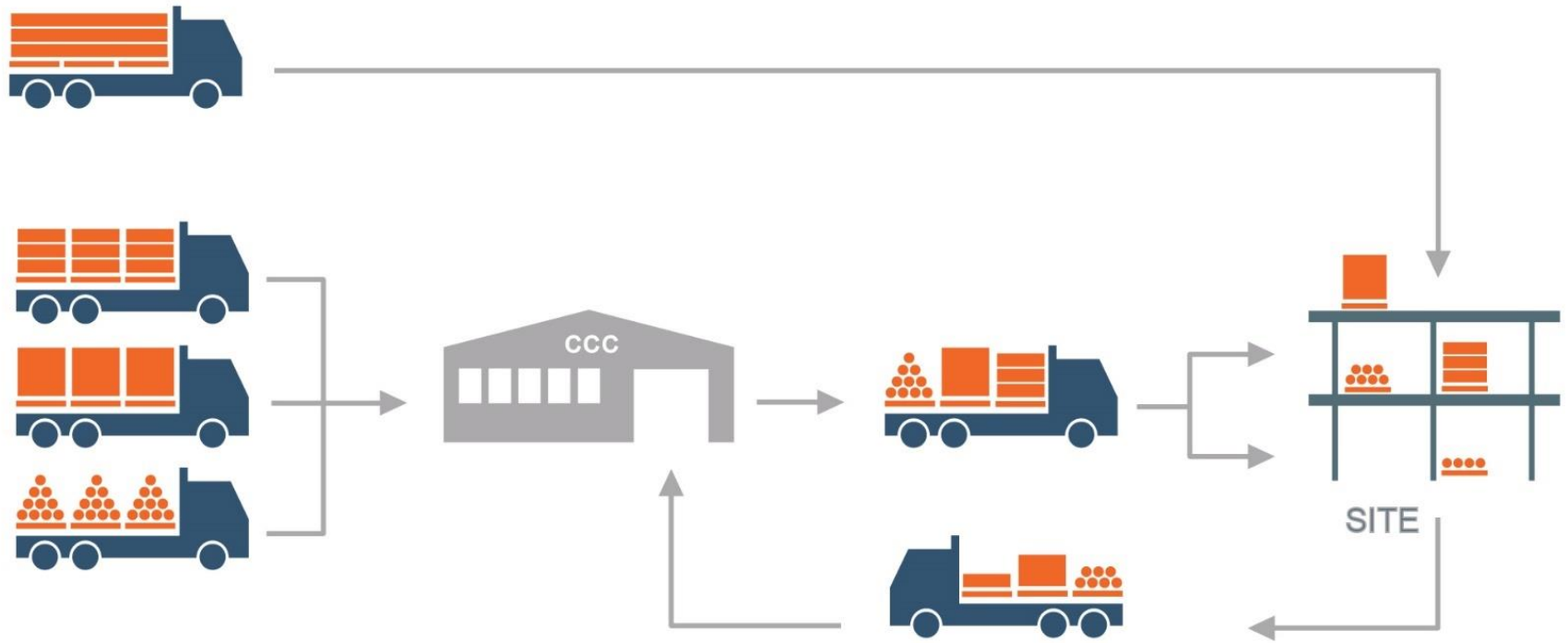
Possible optimisation solution: CCC



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The SUCCESS approach to Business models

SUCCESS partners have assessed different business models for the implementation of CCC's by **analysing the cooperation and coordination of the Supply Chain actors from three different perspectives: economic, commercial and organisational point of view**.

The methodology followed to study and analyse business models of UCC's and CCC's has been:

1. Identification of **experiences already developed** in the implementation of UCC and CCC
2. Analysis of the aforementioned experiences by a **SWOT Analysis of each type of Consolidation Centres: UCC's and CCC's**
3. **Identification of general features** of business models for CCC's and UCC's and data requirements
4. Selection of the **CANVAS Business Model** as a structured methodology to describe the business models of the CCC's through a systematic description of nine basic building blocks.

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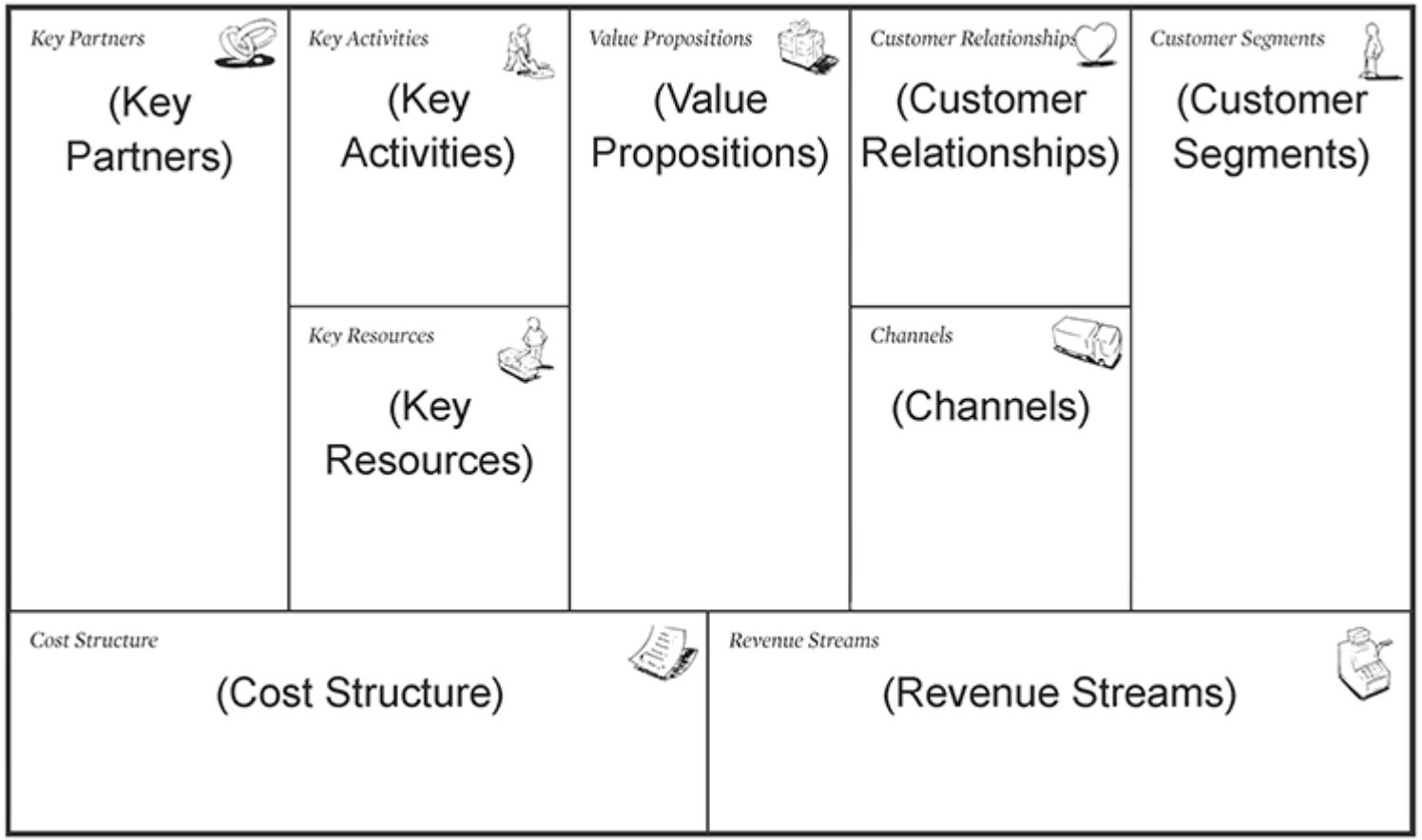
The CANVAS Business Model



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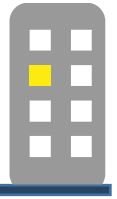
An example: the Verona Construction Site



- Step 1: Urban Environment Identification
- Step 2: SWOT Analysis for the implementation of a CCC
- Step 3: Scenario Definition
- Step 4: CANVAS Business Model

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Step 1: Urban environment identification

- Presence of an intermodal hub "Quadrante Europa" area
- The Borgo Trento pilot site is equipped with 2 entry driveways on Via Mamely – the only useful road for arrivals and departures of building materials
- The construction site is surrounded by a number of urban and natural barriers, causing high traffic congestion, during the peak hours
- Storage areas for input materials have been identified within the site itself; containers for collection of waste material have been positioned in proximity of the exit, to facilitate their removal; management of incoming material is studied in advance

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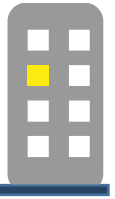
Step 2: SWOT analysis for the implementation of a CCC



S

- **Simplify the logistics activities planning of the construction site**
- Improve the construction supply chain management
- Realize a preliminary quality check of materials
- Increase reliability of delivery times
- Positive evaluation by transport companies
- **Existing logistics hub (Quadrante Europa)**
- Support objectives and strategic plan of the Municipality of Verona

W

- Lack of examples of encouraging cost-benefit analysis
- Centralization of the service: risk of total paralysis in case of problems
- **Supply of fresh concrete**
- Previous experience
- Impact on the Public Administration (difficulties in finding agreements

O

- **In line with the objectives of the Operational Territorial Plan (P.A.T.)**
- Replicable solution
- **Opportunity for the territory: excellence centre, new g policies, employment**

T

- Low reaction from the construction sector
- High investment
- Financial Statements of Public Administrations
- Economic crisis

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Step 3: Scenario 1 definition (1/2)

Scenario 1:

- Actions from the Municipality of Verona:
  - City logistics measures related to road traffic for delivery of goods in urban areas
  - Establishment of tax area for access to the main areas of the city
  - Initiatives for private entities for developing projects in the field of logistics of goods and building materials
- **The Municipality of Verona and ZAI Consortium launch a public call for tenders to build and manage a CCC in the Quadrante Europa area**
- **The Association of Construction Manufacturers of Verona creates a company named ACEVR-LOG (profit company) to manage CCC. ACEVR-LOG wins the call for tenders and creates the CCC.**
- **The CCC management is entrusted by ACEVR-LOG to a specialized logistics operator**
- The CCC is addressed to many Construction Companies, which, in turn, have many construction sites within the city
- The CCC is **permanent**
- Construction Companies may use the CCC on a **voluntary basis**.

NB: infrastructure costs for the construction of the CCC are saved and ACEVR-LOG is obliged to use only environmental-friendly vehicles for deliveries between CCC and construction sites.

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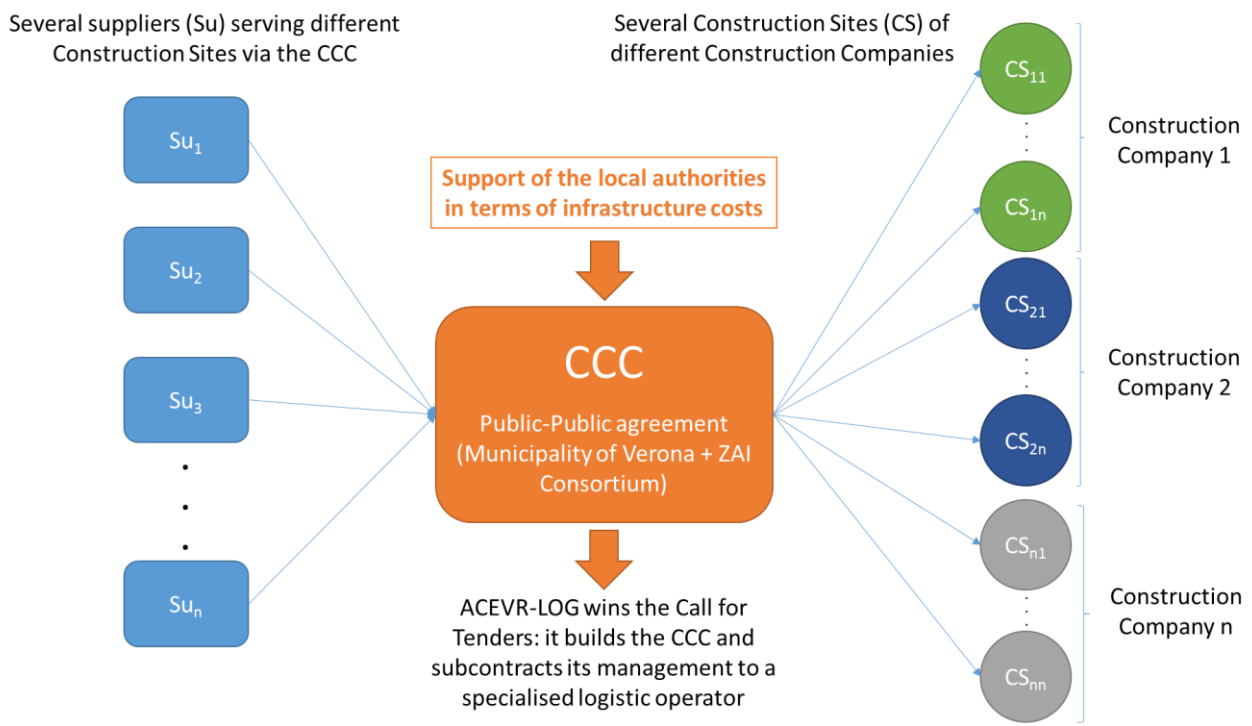
Step 3: Scenario 1 definition (2/2)



Services offered by the CCC:

- Pick-up and delivery service to 1st level suppliers: the CCC organizes the pick-up of materials that the construction site needs by suppliers warehouses
- Transport and delivery to the construction site (2nd level suppliers): the CCC organises the delivery of material from the CCC to the construction site
- Logistics services within the CCC: storage, material movements, supporting the logistics operators
- Reverse Logistics service: waste material do not run within the CCC, but they are directly sent to the garbage dump

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Step 3: Scenario 2 definition (1/2)

Scenario 2:

- Actions from the Municipality of Verona:
  - City logistics measures related to road traffic for delivery of goods in urban areas
  - Establishment of tax area for access to the main areas of the city
  - **Agreement to reduce the tax area to those companies that decide to create a CCC and develop plan to optimize the supply chain of construction materials, including the reverse logistics.**
- **A single construction company creates and manages the CCC**
- **The CCC is directly run by the construction company**
- The CCC is dedicated to the construction sites of the construction company
- The CCC is **temporary**
- The construction company adopts a CCC on a **voluntary basis**

NB: the construction company optimises costs of the supply chain. The Municipality of Verona gets closer to the objectives of the plan for a sustainable re-organisation of urban freight logistics

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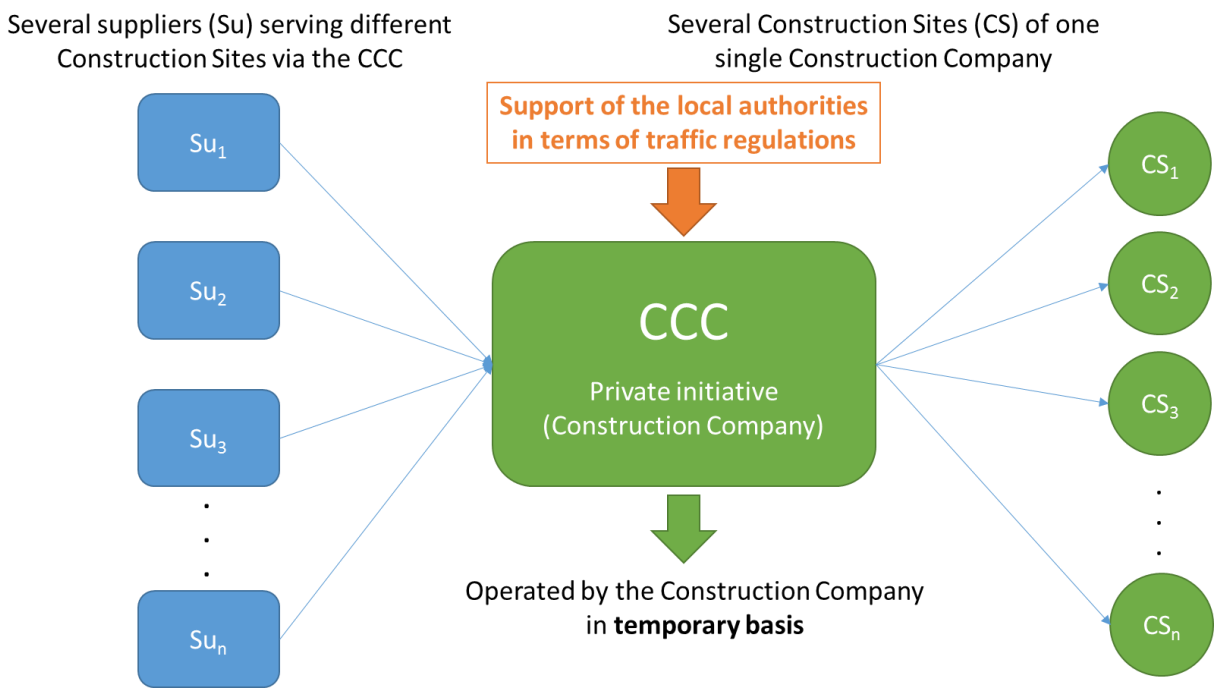

Services offered by the CCC

- Pick-up and delivery service to 1st level suppliers: the CCC organizes the pick-up of materials that the construction site needs by suppliers' warehouses
- Transport and delivery to the construction site (2nd level suppliers): the CCC organises the delivery of material from the CCC to the construction site.
- Logistic services within the CCC: storage, movement of materials, assisting the logistic personnel
- Reverse Logistics service: waste materials run within the CCC, but they are directly sent to the garbage dump.

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Step 4: CANVAS Business Models – Scenario 1

Key Partners 8
- Transport Companies
- Vehicles Rental Agencies
- Suppliers of fuels
- Public authorities

Key Activities 7
- Meeting customers' expectations
- Management of contingencies and singularities

Key Resources 6
- Logistic operator
- Position of the CCC
- CCC dimensions
- Technologies
- Flexibility

Value Propositions 2
- Reduction of logistics costs
- Last minute deliveries
- Less human resources costs for logistic activities
- 24H service

Customer Relationships 4
- Specialised logistic operator
- WEB application for the management of logistic processes

Channels 3
- Call for Tenders
- ZAI Consortium website
- ACEVR-LOG website
- Face-to-face contacts
- Advertising
- Mailing-lists

Customer Segments 1
- Construction companies

Cost Structure 9

Direct costs:
- Labour costs
- Vehicles costs
- Equipment costs
- Waste disposal

Indirect costs:
- Amortization of CCC construction costs
- Management costs for CCC
- Consulting costs

Revenue Streams 5
- Transport of materials in txKM or m3xKM
- Consulting services
- Renting warehouse spaces

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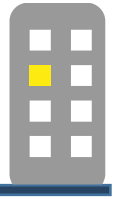
Step 4: CANVAS Business Models – Scenario 2



Key Partners 8

- Transport Companies
- Vehicle and Equipment Rental Agencies
- Public authorities

Key Activities 7

- Meeting customers' expectations
- Management of contingencies and singularities

Key Resources 6

- Personnel with logistics functions
- Position of the CCC
- Dimension of the CCC
- Technologies

Value Propositions 2

- Reduction of logistics costs
- Last minute deliveries
- Less human resources costs for logistic activities

Customer Relationships 4

- Specialised logistic operator
- WEB application for the management of logistic processes

Channels 3

- Municipality of Verona website

Customer Segments 1

- Construction company

Cost Structure 9

Direct costs:

- Labour costs
- Vehicles costs
- Equipment costs

Indirect costs:

- Rental costs for the rent of the infrastructure to build the CCC
- Management costs for CCC

Revenue Streams 5

- Scale economies aimed at reducing indirect costs
- Renting warehouses

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Works in progress

- Define and design new solutions for the whole construction supply chain of each pilot site (including the introduction of a CCC) and simulate these solutions
- Analyse, compare and evaluate the scenario results obtained;
- Select and validate specific solutions for each pilot urban area;
- Define how city logistics optimisation solutions will be included into future urban policies;
- Show the replicability of the project solutions by developing intervention plans based on pilots with related Road maps to be applied to non-partner cities and construction sites
- Guarantee the take up the SUCCESS results through a European-wide Enlarged Transfer Programme

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The Europe-wide Enlarged Transfer Programme

The SUCCESS project aims at guaranteeing the take up of results through a ***Europe-wide Enlarged Transfer Programme:***

- Involving 12 non-partner cities
- In 3 "**Transnational Joint Transfer Exercise**" **workshops,** located in Eastern Europe, Northern Europe and MED
- To transfer the SUCCESS Project's solutions, best practices, tools, methodologies and lessons learned that can improve the construction logistics
- The cities will gain knowledge of the SUCCESS solutions and have the occasion to discuss with other local stakeholders about the impact of construction logistics on their urban area.
- The main activities that we will carry out with the selected cities are the following:
  - Analysis of state of the art of the local context, in terms of city logistics measures that could have impacts on construction sector, in order to understand issues, needs, problems and opportunities. This will be done before the workshop, by a desk work and eventually with specific interviews;
  - 2 days of workshop, to present the SUCCESS solutions, discuss on each city context (SWOT) and evaluate the applicability of the project solutions.
- Finally, a major event will be organised in Brussels to award the most innovative city on construction logistics policies, chosen among the 12 cities involved in the Transnational Joint Transfer Exercise.
- Candidates interested to apply are invited to contact ITL Chiara.Iorfida@regione.emilia-romagna.it

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How you can contribute

- Participate to the ***Europe-wide Enlarged Transfer Programme***
- If you are a Construction Company, fill the survey: **http://survey.list.lu/index.php/423994**
- Join the SUCCESS Linkedin Group «Sustainable Urban Consolidation CentrES for conStruction Project»: **https://www.linkedin.com/groups/8403850**

For more information: michela.apruzzese@unimore.it

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Thank you for your kind attention!

http://success-urbanlogistics.eu

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