



SUCCESS

*Sustainable Urban Consolidation Centres
for construction*

Il progetto SUCCESS ed i Centri di
Consolidamento per le Costruzioni

Bologna, 27/02/2018

Presentato da:

Anna Giarandoni



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



Carta d'identità



- **Area tematica:** Riduzione dei costi e delle esternalità negative della supply chain nel settore delle costruzioni
- **Problema:** In che misura e come una migliore gestione della supply chain e i Centri di Consolidamento per la Costruzione possono apportare soluzioni generali per migliorare la supply chain del settore edilizio?
- **Durata:** 36 mesi (Dal 01/05/2015 al 30/04/2018)
- **Budget:** 3.2 M €
- **Finanziamento:** Commissione Europea, Programma Horizon 2020, MG-5.2-2014: Reducing impacts & costs of freight & service trips in urban areas
- **CIVITAS:** SUCCESS è uno dei progetti H2020 che sono stati selezionati per diventare partner del network CIVITAS



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Il contesto – Le città europee



OGGI

73%

NEL 2050

80%

Della popolazione
europea vive nelle
città



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Obiettivi della City logistics



Congestion
Air pollution
Noise
Safety

- Sviluppare delle strategie per la distribuzione delle merci minimizzandone gli impatti negativi nelle aree urbane
- Diminuire il numero di veicoli commerciali/km
- Promuovere l'utilizzo di veicoli a basso impatto ambientale per le consegne di ultimo miglio
- Ottimizzare le operazioni di carico-scarico per ridurre la congestione
- Ridurre le interferenze con altre componenti della mobilità urbana (cittadini, passeggeri del TPL, pedoni e ciclisti)



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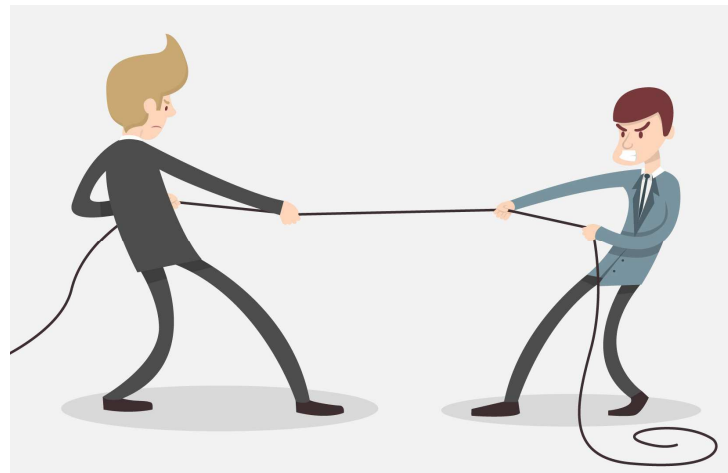


Logistica urbana



Full of space/time conflicts

Contesti dinamici con forte attenzione alla qualità della vita e bisogni di consumo sempre più rapidi



Difficoltà nella pianificazione di fenomeni ancora poco conosciuti e poco attenzionati



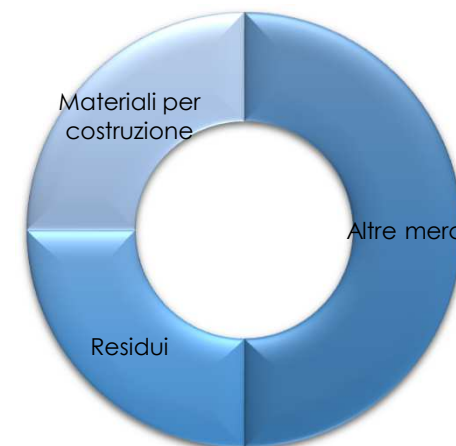
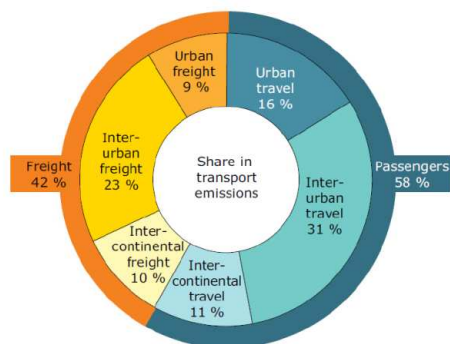
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L'importanza di SUCCESS



Sfida: **una logistica urbana priva di CO₂ nei principali centri urbani entro il 2030***



- La logistica urbana causa:
 - Il **20%** del traffico urbano
 - Il **25%** delle emissioni di CO₂ (e **42%** delle emissioni di gas a effetto serra)
 - Il **20%** dei costi legati ai trasporti

*Libro Bianco sui Trasporti al 2050, Commissione Europea, 2011



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Gli obiettivi



- Diminuire le esternalità negative prodotte dal trasporto di merci in città: traffico, inquinamento, rumore e incidenti
- Migliorare l'utilizzo delle infrastrutture esistenti
- Diminuire i costi di costruzione e restauro degli edifici e l'impatto ambientale dell'edilizia sulle città
- Aumentare il grado di cooperazione e coordinamento tra gli attori della supply chain
- Sviluppare metodi e strumenti riutilizzabili per le amministrazioni locali, le società di costruzione, i trasportatori e il mondo della ricerca



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I risultati perseguiti



- Per **tutti gli attori**:
 - Modelli di business sostenibili per risolvere i problemi della supply chain della costruzione, in particolare delle reti di distribuzione, dei cantieri e della logistica inversa
 - Strumenti per decidere quali migliori pratiche sono piú efficaci per uno specifico cantiere
- Per le **amministrazioni locali**: strumenti per valutare l'impatto di nuove politiche e regolamenti e per migliorare la progettazione delle infrastrutture
- Per i **trasportatori**: strumenti per valutare i costi e i benefici derivanti dall'implementazione di uno o piú Centri di Consolidamento per la Costruzione
- Per le **società di costruzione**: strumenti per valutare i costi e i benefici derivanti dall'implementazione di uno o piú Centri di Consolidamento per la Costruzione
- Per il **mondo della ricerca**: dataset e strumenti per modellizzare e simulare l'impatto di diverse strategie per il miglioramento della logistica dei cantieri



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Il consorzio



Luxembourg Institute of Science and Technology (LIST) 
Fondazione Istituto sui Trasporti e la Logistica (ITL) 
Università degli Studi di Modena e Reggio Emilia (UNIMORE) 
Fundación Valenciaport (VPF) 

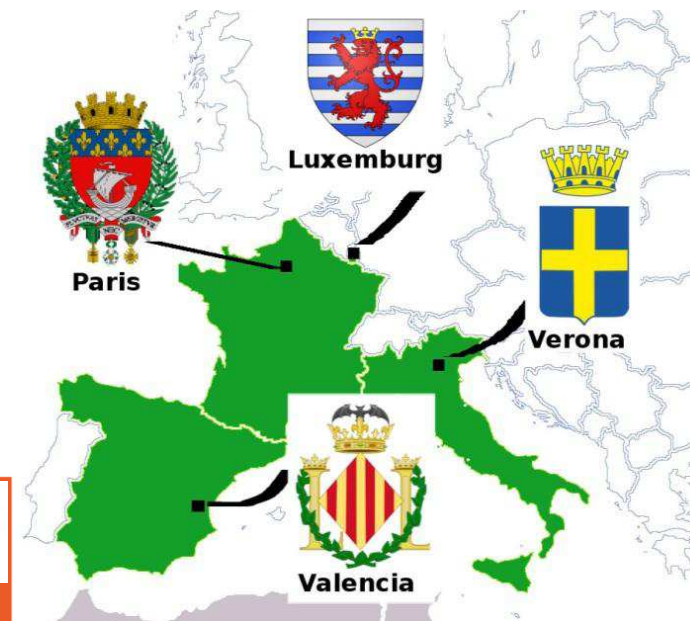


Societa Cooperativa Muratori e Braccianti di Carpi (CMB) 
Tralux Sarl 
Vinci Construction France (VCF) 
Federacion Valenciana de Empresarios de la Construccion (FEVEC) 



Regione Emilia Romagna (RER) 
Fundación de la Comunitat Valenciana para la Promoción Estratégica,
el Desarrollo y la Innovación Urbana (INNDEA / LAS NAVES) 
Association pour la Formation professionnelle dans les Transports (AFT) 

4 siti pilota:



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Principali misure di city logistics



- **Misure Soft:** finestre temporali, regole di accesso restrittive sulla base della classe di emissioni e di portata dei mezzi e zone urbane
- **Misure Hard:** piazzole di carico e scarico, Transit Point, Centri di distribuzione urbana.
- **Misure tecnologiche:** Electronic Data Interchange (EDI) interscambio di dati tra sistemi informativi, applicazioni IT per controllo e aumento fattori di carico
- **Misure collaborative:** schemi di accreditamento Freight Quality Partnerships

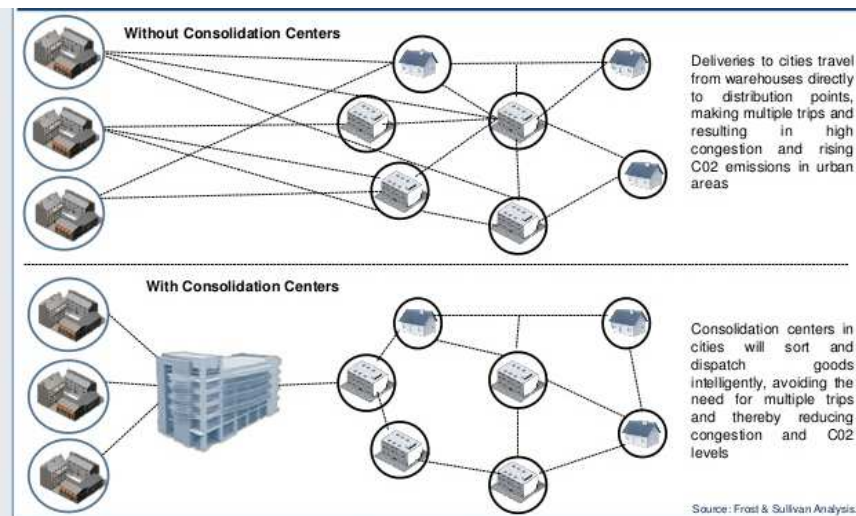
Necessità di elaborare una strategia di medio-lungo periodo con un mix di misure



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Che cos'è un CDU?



- Un **Centro di consolidamento urbano CDU** è un'infrastruttura logistica per il consolidamento delle consegne e la distribuzione ottimizzata di ultimo miglio
- I centri possono essere di grande dimensioni oppure raccogliere piccoli quantitativi per specifici quartieri o strade dei centri urbani (micro depots/micro distribution platforms)
- Permettono di ridurre il numero di veicoli nelle aree servite dai CDU
- Consentono operazioni ad alto valore aggiunto prima della consegna finale



Cityporto Padova



Ecocity Parma



LIFE-CEDM Lucca



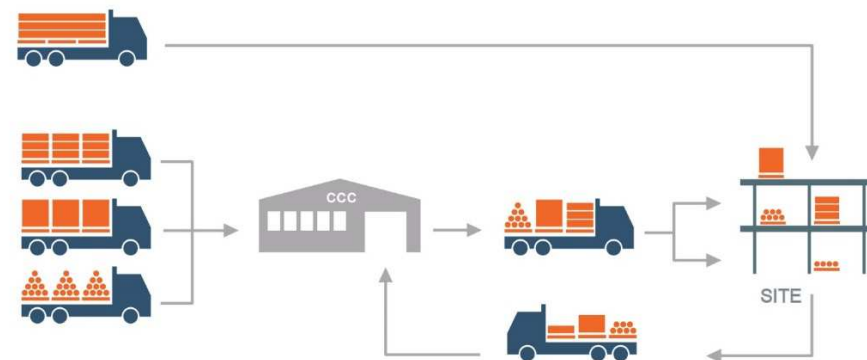
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Che cos'è CCC?



- Un Centro di Consolidamento per le costruzioni (CCC) è una piattaforma di distribuzione nel quale il materiale è immagazzinato e le consegne ottimizzate per il cantiere.
- Può essere al servizio di un solo cantiere o di più cantieri
- Durata temporanea o permanente
- Offre servizi ad una sola impresa di costruzioni oppure a molteplici
- L'utilizzo del CCC può essere volontario o obbligatorio
- Gestito dall'impresa di costruzioni oppure da un operatore logistico terzo



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CDU e CCC identificati



Urban Consolidation Centers:

1. Heathrow Airport Retail Consolidation Centre (London, UK)
2. La Petit Reine Consolidation Centre (Paris, France)
3. Broadmead Consolidation Centre (Bristol, UK)
4. Meadowhall Consolidation Centre (Sheffield, UK)
5. Monaco Consolidation Centre (Monaco)
6. Binnenstadservice Consolidation Centre
7. SMILE (Barcelona & Valencia, Spain)
8. La Rochelle (France)
9. Kassel (Germany)
10. Leiden (Germany)
11. Utrecht (Netherlands)
12. City Porto (Padua, Italy)
13. Luccaport (Lucca, Italy)

Construction Consolidation Centers:

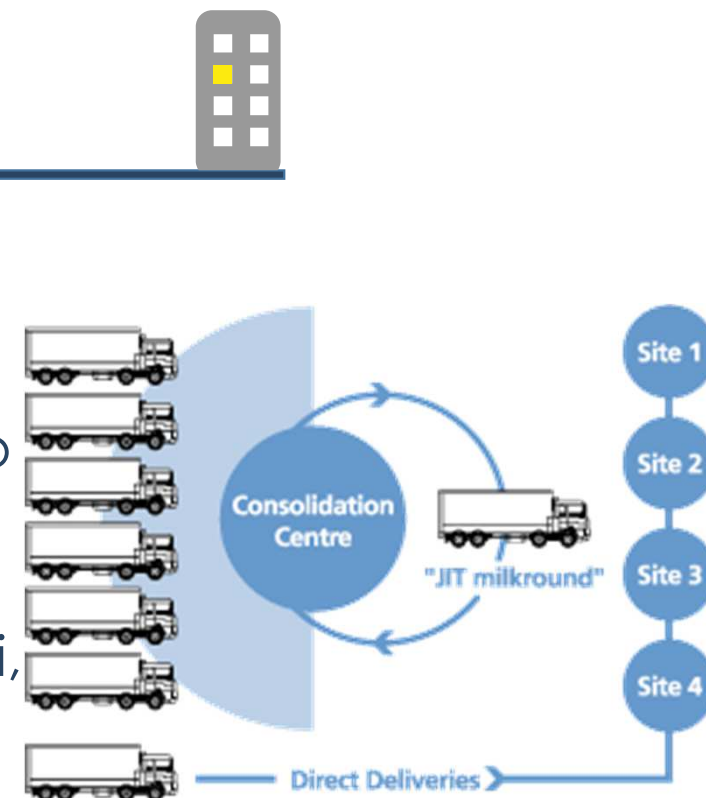
1. Hammarby Consolidation Centre (Sweden)
2. Old London Consolidation Centre (UK)
3. New London Consolidation Centre (UK)
4. Nine Elms Consolidation Centre (London, UK)
5. Sainsbury's Park Royal Consolidation Centre (London, UK)
6. London Construction Link (Port of Tilbury, UK)
7. Wembley CCCC (London, UK)
8. Premier Carriers (Barking and Bow, UK)
9. Lightwood CCC (Essex, UK)
10. DHL Barking Logistic Centre (Essex, UK)
11. Avondale Construction (London, UK)
12. CSB Logistics (Charlton (London), UK)
13. Wincanton Greenford Consolidation Centre (Middlesex, UK)
14. Postdamer Platz (Berlin, Germany)



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Principali evidenze

- Misura che presenta alti costi d'investimento iniziali e operativi elevati
- Necessaria una pianificazione di lungo periodo
- Punto cruciale è la capacità di mobilitare gli stakeholder (aziende, autotrasportatori, corrieri, ecc)
- Necessario il supporto di altre misure di city logistics in grado di modificare le condizioni di fornitura in ambito urbano



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LCCC London Construction Consolidation Centre



Location	London (UK), South of City of London Airport, 40 min drive to central London
Operator	Construction logistics provider
Served projects	Quadrant III, Bloomberg, St Bart's Hospital, University College London, Central St Giles, Café Royale, Grosvenor House Apartments and Willis Tower...
Operating period	Permanent CCC (from 2008)
Scheme	Voluntary
Stakeholders involved	Transport for London, Wilson James, St Bart's Hospital, University College
Type of CCC	Multi-users and Multi-sites
Policies & Regulations	Constraint environment with the LEZ and the congestion charging zone Gold FORS accreditation and CLOCS Champion

Description

- Size: 15,000 m² (13,000 m² of covered warehouse area and 2,000 m² of uncovered warehouse area)
- Storage capacity: 15,000 m² (250,000 pallets per year throughput)
- Vehicles compliant with the LEZ (1x26 tonne flatbed with crane, 2x18 tonne flatbed, 1x18 tonne curtain sided with tail lift, 1x LWB Transit, 4x forklift trucks), Euro 5/6 vehicles
- The vehicles are bio-diesel powered and have GPS tracking, cyclist proximity sensors and side bars to improve safety. Warning signs for cyclists are displayed on the rear of all vehicles. Drivers have completed Crossrail.
- Staff: 8 skilled employees kept at their work stations doing what they do best; 1 site manager; 1 administrator; 42 people from WJ on site, of which 7 are waste operators and 7 materials handling operators including supervisors.
- Opening hours: between 7:30 and 17:30 Monday to Thursday and 7:30 to 16:00 on Friday.



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LCCC London Construction Consolidation Centre



Services delivered in the LCCC :

- Warehousing (charges after 30 days for stored materials)
- Quality control
- 24 hour security, which is important for large quantities of extremely high value goods (vulnerable to damage and theft)
- Pre-assembly (done by the operator)
- Work area for pre-assembly (used by contractors)
- Waste operators and recycling

Services delivered on site :

- Security
- Traffic management
- Welfare/cloakroom
- Forklift driver
- Slinger
- Site management

24/7 operation available if required

Packaging: LCCC encourages suppliers to use pallets, cages or stillages that allow mechanical handling so that manual lifting can be avoided. This means they are not too heavy and can easily be handled on site with hand trucks.



Service provided



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LCCC London Construction Consolidation Centre



Results (operational & environmental benefits)

Reduce waste from over-ordering, damage, packaging, off-cuts, design changes, planning & programme amendments

Improvements:

- Reduction in the number of construction vehicles entering the City of London by 68% (Over a period of 12 months 2000 commercial vehicles did not enter the Congestion Zone).
- Improvement in certainty of supply (100% availability within 24 hours).
- Increase of on-site productivity thanks to less labour downtime (e.g. searching for material) by 47%.
- Reduction of materials waste of 15% resulting from less damage and reduced shrinkage.
- 25% reduction in accidents/injuries thanks to a more secure work environment by the arrival and on-site storage of only those materials intended for immediate incorporation.
- Achievement of delivery performance of 95% of goods delivered right material-right place-right time (less than 50% in the overall industry).
- Reduction in supply journey time, by going directly to the LCCC rather than driving into the City of London (including loading/unloading time), of an average of two hours (average of 40 min in enter and 40 min in exit the city centre).
- Tracking the vehicles allows visibility and real-time control and lead to the reduction in local distribution journey times, from the LCCC to the sites, of up to 10%.
- Reduction of CO2 emissions run up at 80%.
- Reduction of congestion in the served area.



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LCCC London Construction Consolidation Centre



Results (operational & environmental benefits)

- Better fuel efficiency achieved.
- Reduction of unloading time to 40 min instead of hours.
- Reduction in the over-ordering of materials of 14%, saving 25 min per day thanks to better management of materials on site.
- Greater delivery flexibility since companies can order smaller quantities for each site while suppliers can send full loads.
- Reduction in freight journeys by 70%.
- Reduction in journey time of supplier of 2h delivering at the CCC.
- Delivery reliability 97%
- Potential saving with cost of congestion charges (at £8 per vehicle per day) : £21,10

For Central St Giles project:

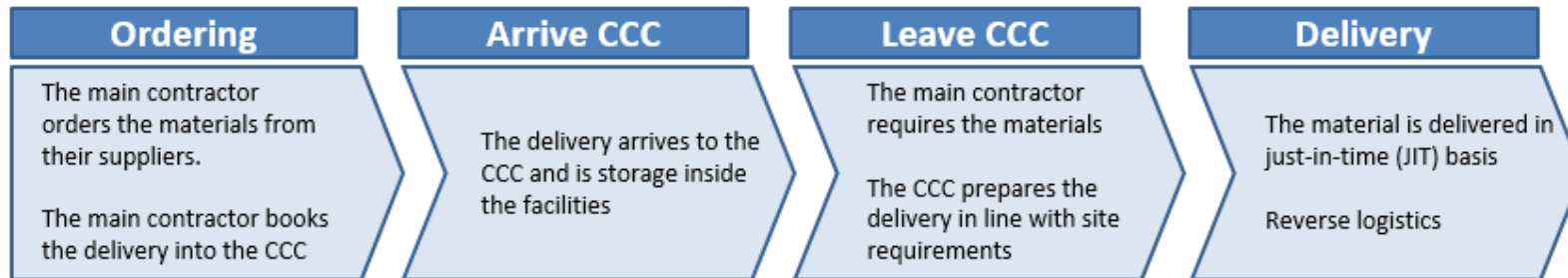
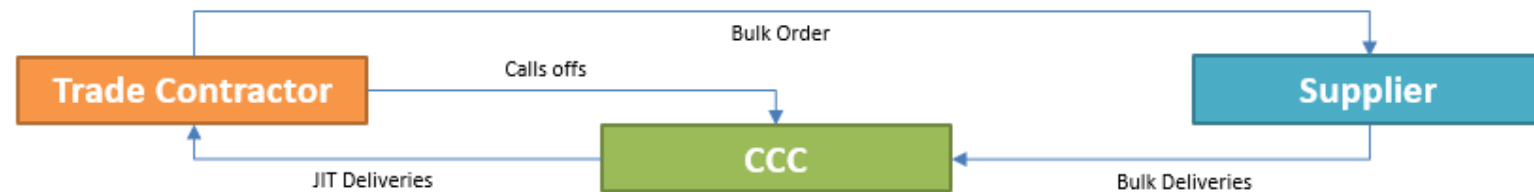
- Reduction in truck journeys leading to a 75% reduction in carbon emissions (i.e. 7.7 t)
- A delivery accuracy averaging over 97% measured as vehicles arriving within ± 15 minutes of required time and with the correct load.
- Consolidation factor: 4.1



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Funzionamento di un CCC



- Flexibility for suppliers
- More efficient equipment for unloading operations

- Flexibility for suppliers
- More efficient equipment for unloading operations
- Secure storage

- Consolidation
- Increment of the load factor

- JIT deliveries
- Performance increment on site
- Reliability Improvement



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I siti pilota



Luxembourg (Luxembourg)

- 11 400 m²
- 21 M€
- Restauro e costruzione appartamenti, negozi, uffici

Paris (France)

- 55 475 m²
- 230 M€
- Uffici del Primo Ministro, Auditorium



Valencia (Spain)

- 7 772 m²
- 16 M€
- Restauro di edifici storici e costruzione di nuovi edifici

Verona (Italy)

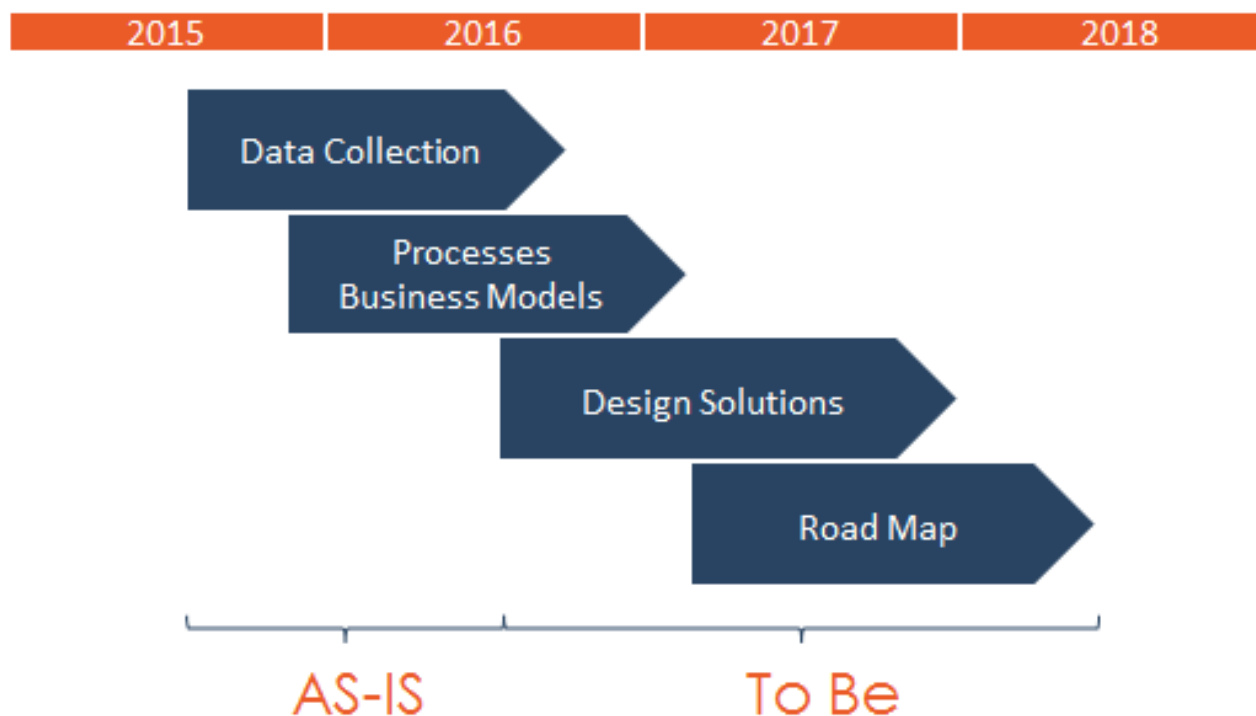
- 83 914 m²
- 126 M€
- Ampliamento e ristrutturazione di 2 ospedali



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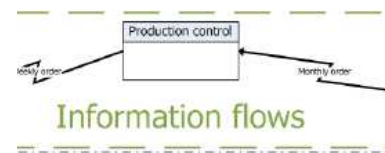
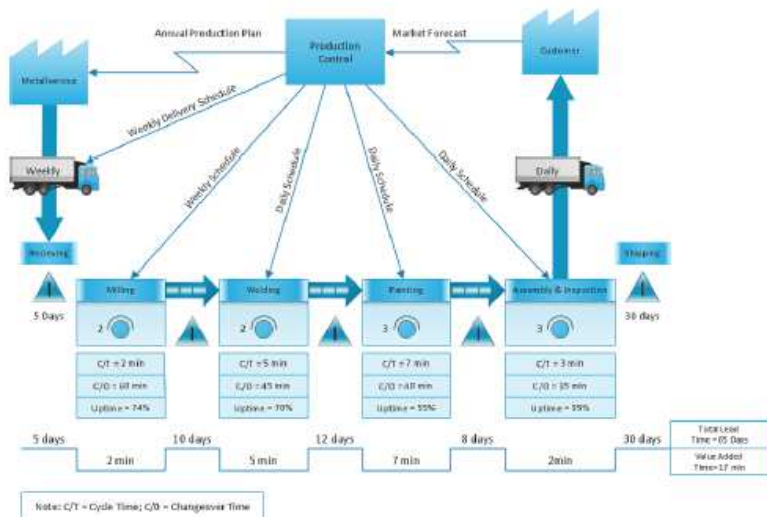


L'approccio

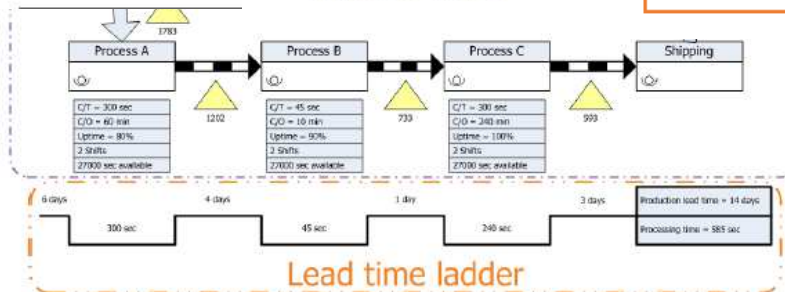


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Definizione di metodologie e strumenti



Material flows

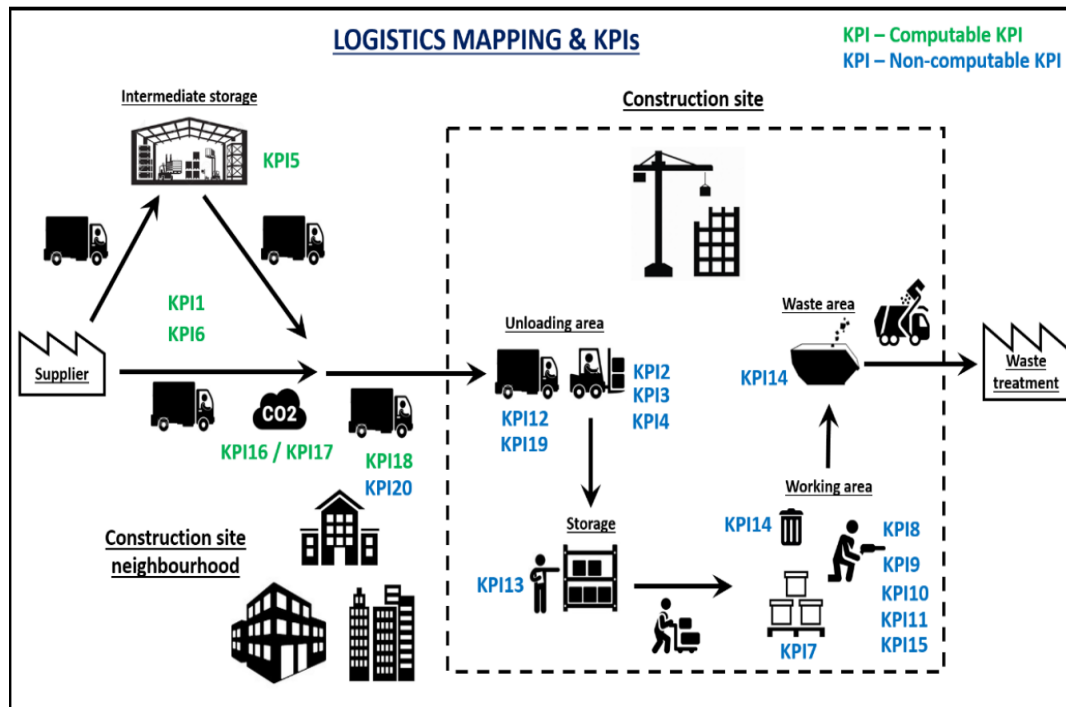


Distribution Network Processes	Construction Site Processes	Reverse Logistics Processes
1) Sourcing	4) Material Reception and Expedition	8) Waste Management
2) Ordering	5) Inventory and Storage Management	9) Return Management
3) Delivery	6) Material Handling and Equipment Management	
	7) Housekeeping	
Support Processes		
10) Planning and scheduling Resources		
11) Complaint Management		
12) Entrance and exit management		



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Mappatura della catena logistica



Category	Code	KPI designation	Unit
Economic / haulier journey time	KPI1	Travel time (outside and in the city centre)	hour
	KPI2	Truck waiting time (outside and inside the site)	hour
	KPI3	Construction site punctuality	hour
	KPI4	Loading / unloading time	hour
Economic / haulier route	KPI5	Number of intermediate storage	number
	KPI6	Distance from the suppliers to the construction site	km
Economic / material waste	KPI7	Material waste	€
	KPI8	Rework in connection with material issue	hour
Economic / workforce productivity	KPI9	Waiting time for the workforce	hour
	KPI10	Looking for material / equipment	hour
	KPI11	Several handling time	number
	KPI12	Truck punctuality	hour
Economic / supply chain management effort	KPI13	Time dedicated to logistic activities	hour
Economic / waste management costs	KPI14	Costs of unsorted bins	€
Social / safety on construction site	KPI15	Number of accidents and related causes	number
Environmental	KPI16	CO ₂ equivalent	gram
	KPI17	PPM	gram
Social / wellbeing for residents	KPI18	Number of deliveries	number
	KPI19	Congestion on construction site	m ² h
	KPI20	Rate of obstructing vehicles	%



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Sviluppo di Business Model per CCC



Definizione di Business Model:

Obiettivi del CCC

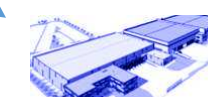
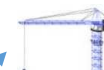
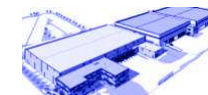
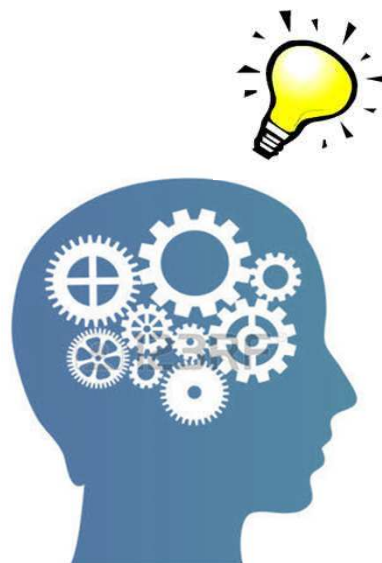
Assetto proprietario CCC

Operatori del CCC

Dimensione del CCC

Tipo di CCC

- Multi/Single project
- Multi/Single client



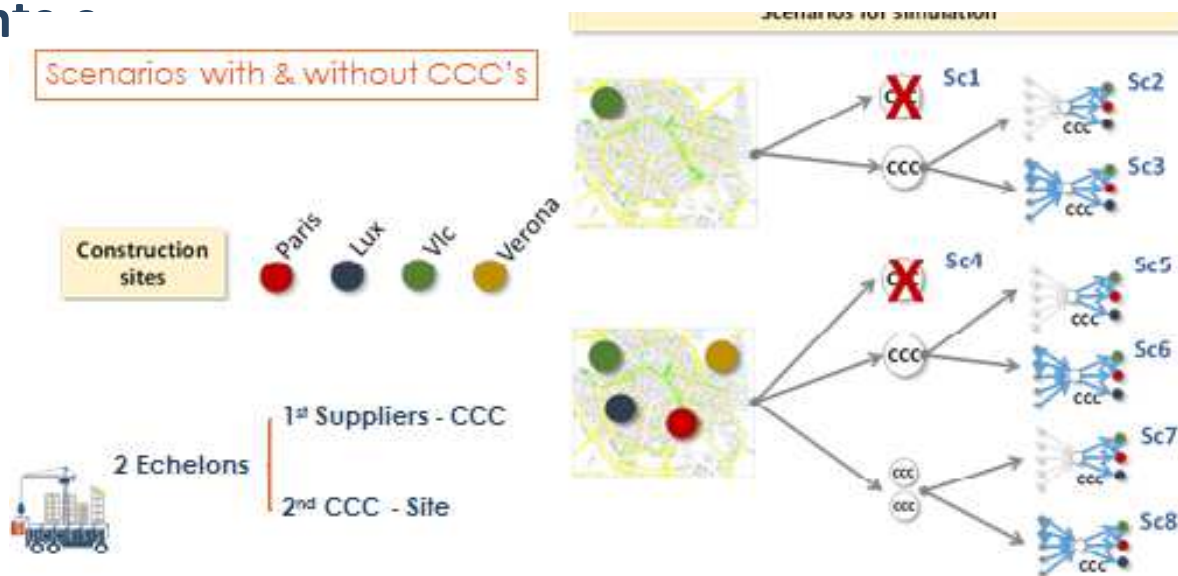
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Simulazioni



- Sono state effettuate simulazioni partendo dalla situazione esistente per nei prossimi 3 anni
 - Simulazioni di scenari di ottimizzazione con & senza CCC
- Analisi delle emissioni e
- delle ottimizzazioni logistiche
- Analisi economica della Construction Supply Chain



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http://www.success-urbanlogistics.eu/



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Project presentation

Sustainable Urban Consolidation Centres for construction Project

The development of urban centres is becoming an essential need for the growing population of European Cities, calling for a continuous rise in construction material freight logistics. However, this development leads to several economic and environmental challenges.



Cost Benefit Analysis of a CCC implementation



CBA Tool for CCC implementation

Try the SUCCESS CBA tool to see the benefits of the implementation of a CCC

START



Analisi costi benefici per implementazione CCC



Construction Consolidation Center Results Scenario 1 & 2 – Economic Savings

Annual Labor force savings

€/year

Annual savings of materials wasted, damaged and stolen

€/year

Annual savings due to unsorted bins

€/year

Annual savings due to other performance improvements on site

€/year



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EN|ES|FR|IT



Construction Consolidation Center Results Scenario 2 - Dimensioning



Facility Dimensioning

- Storage Surface Needed in the CCC [m2]
- Facility Surface Needed [m2]



Fleet Dimensioning

- Number of 2 axes trucks (7.5 tones)
- Number of vans (3.5 tones)
- Number of 3 axes trucks (15 tones)
- Number of articulated trucks (40 tones)



Labor force and Machinery Dimensioning

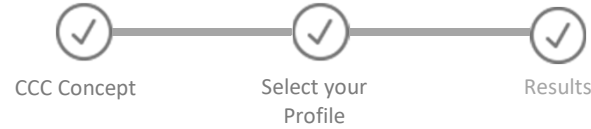
- Manager
- Operators
- Drivers
- Other Personnel
- Forklifts
- Pallet transporter



Note: This results have been obtained based on assumptions. Please, use this results as a reference.



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Construction Consolidation Center

Results Scenario 2 – CBA Analysis

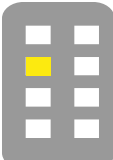
Year	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 1. CURRENT SITUATION	ALTERNATIVE 2. Using CCC											TOTAL BENEFITS ALTERNATIVE 2 INSTEAD OF ALTERNATIVE 1 (EUROS)
	No CCC	CCC		Additional Cost of CCC					Savings			CCC Summary			
	INVESTMENTS (EUROS)	INVESTMENTS (EUROS)		Facility Rent Costs (€)	Workforce Costs (€)	General expenses CCC (€)	Transport Costs (€)	Maintenance Costs (€)	Labor Force Savings [€/year]	Material Savings [€/year]	Performance Savings [€/year]	TOTAL ANNUAL COSTS	TOTAL ANNUAL SAVINGS	BENEFITS	
1	0	757.816	0 €	151.200	730.643	37.800	40.625	8.280	708.522 €	474.715 €	144.913 €	968.548 €	1.328.150 €	359.602 €	-398.214
2	0	0	0 €	154.224	745.255	38.556	41.438	8.446	722.692 €	484.209 €	147.811 €	987.919 €	1.354.713 €	366.794 €	366.794
3	0	0	0 €	157.308	760.160	39.327	42.267	8.615	737.146 €	493.893 €	150.767 €	1.007.677 €	1.381.807 €	374.130 €	374.130
4	0	0	0 €	160.455	775.364	40.114	43.112	8.787	751.889 €	503.771 €	153.783 €	1.027.831 €	1.409.443 €	381.613 €	381.613
5	0	0	0 €	163.664	790.871	40.916	43.974	8.963	766.927 €	513.847 €	156.858 €	1.048.387 €	1.437.632 €	389.245 €	389.245
6	0	10.800	0 €	166.937	806.688	41.734	44.854	9.142	782.266 €	524.124 €	159.996 €	1.069.355 €	1.466.385 €	397.030 €	386.230
7	0	0	0 €	170.276	822.822	42.569	45.751	9.325	797.911 €	534.606 €	163.196 €	1.090.742 €	1.495.713 €	404.970 €	404.970
8	0	0	0 €	173.681	839.279	43.420	46.666	9.511	813.869 €	545.298 €	166.459 €	1.112.557 €	1.525.627 €	413.070 €	413.070
9	0	0	0 €	177.155	856.064	44.289	47.599	9.701	830.146 €	556.204 €	169.789 €	1.134.808 €	1.556.139 €	421.331 €	421.331
10	0	-23.285	0 €	180.698	873.185	45.174	48.551	9.895	846.749 €	567.328 €	173.184 €	1.157.504 €	1.587.262 €	429.758 €	453.043

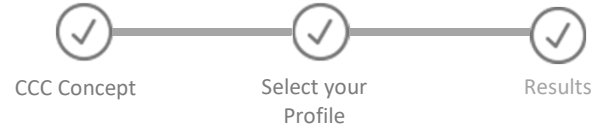
NPV	2.300.887 €
IRR	93,7%

[Click here to download the complete analysis](#)

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Note: This results have been obtained based on assumptions. Please, use this results as a reference.





Construction Consolidation Center

Results and benefits for Public Authorities

Total kilometers avoided inside the city

km/year

Congestion avoided inside the city due to construction activity

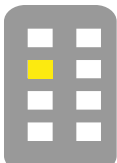
%

Total Emissions and Pollutants avoided inside the city

CO₂ t/year NO_x t/year PM t/year

Economic value of the emissions and pollutants savings

€/year



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SUCCESSFUL Road Map



Which kind of logistics profile is your construction project ?

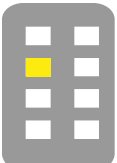
The test provides both local authorities and construction companies a framework for making the construction logistics and supply chain more efficient.

It is designed to assess the logistics complexity of a construction project and explore solutions adapted to your profile among **75 solutions** to address the logistics challenges.

Follow the 4 step approach



Take the test





Logistics profile

High priority

Hamilius is an **extremely constraint** construction site taking place in a **very constraint** city.

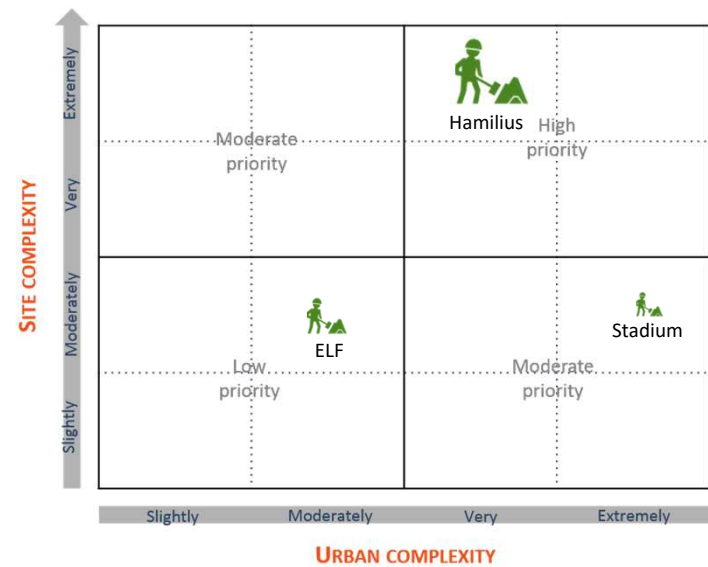
Moderate priority

ELF is a **moderately constraint** construction site taking place in a **moderately constraint** city.

Low priority

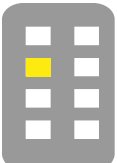
ELF a **moderately constraint** construction site taking place in an **extremely constraint** city.

Receive your results by email



Plan your actions

Add a site





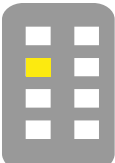
Please rank your objectives in order of preference.

Drag and drop the objectives within the frame starting with the highest ranking item.

- Logistic efficiency
- Reduce dust pollution
- Reduce waste material
- Reduce congestion surrounding the constru

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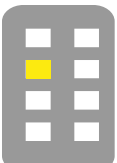




Solutions

A list of solutions adapted to your context

	Cost	Time	Difficulty	Resources	Pre-requisite	Follow-up	Control
Framework agreement ▼	★☆☆	★★★★	★★★★	★★☆☆	★★☆☆	★★★★	★★★★
Delivery area booking system ▼	★★☆☆	★★★★	★★★★	★★☆☆	★★☆☆	★★★★	★★★★
Logistics team ▲ A specific team dedicated to the improvement of the support actions on site and requiring the collaboration among different stakeholders, such as the coordination of material flows for all the sub-contractors. See Good Practice LO1 - Logistics team in deliverable D6.1 for further details and examples. 	★★☆☆	★★☆☆	★★☆☆	★★★★	★★★★	★★☆☆	★★★★
Truck tarpaulin ▼	★★☆☆	★★☆☆	★★☆☆	★★☆☆	★★★★	★★★★	★★☆☆



La replicabilità in Europa – Il programma di trasferimento



Promuovere il trasferimento dei Modelli SUCCESS in Europa



- **ITL ha selezionato** 12 città non partner in 3 aree dell'Europa (Nord, Est e Mediterranea) in cui organizzare dei workshop di approfondimento dei temi del progetto
- **Lo stato dell'arte è stato analizzato con SWOT analysis** (problemi e opportunità) per i cantieri attivi nelle aree urbane
- **L'obiettivo è stato trasferire** le lesson learned di SUCCESS attraverso l'organizzazione di **3 Joint Transfer Exercise Internazionali**



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



La replicabilità in Europa: le città coinvolte



Evento internazionale a Bruxelles

Settembre 2017 a Novembre 2017

I workshop

- Genova
- Londra
- Torino

II workshop

- Durazzo
- Koper
- Trieste
- Rijeka

III workshop

- Roma
- Limassol
- Bruxelles
- Anversa
- Graz



Premio a conferenza finale Bruxelles aprile 2018



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Grazie per l'attenzione!

