Digital innovation and circular economy ecosystems analysis

Interreg Europe

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CEI BOOST – Boosting Circular Economy Innovation through emerging technologies application

The CEI BOOST – Boosting Circular Economy Innovation through emerging technologies application project aims to increase the use of digital innovations to support the circular economy. The goal is to enhance the development and implementation of sustainable digital solutions in the circular economy, especially in relation to new technologies, and to ensure that the solutions are used to accelerate the transition to a sustainable circular economy. The countries participating in the project are Bulgaria, Finland, France, Greece, Lithuania, Portugal, Romania, Spain and Sweden.

Digitalization is a wide spectrum, and most people and companies use digital solutions to some extent. However, the degree of use and purpose varies. Digitalization should be looked at as a whole, when e.g., developing the level of digitalization in the businesses. It would also be beneficial to have a strategic approach.

Common everyday solutions which combine circular economy and digitalization we use are applications and platforms. We have city bikes, online flea markets and apps to purchase surplus lunch. On the bigger scale, our waste goes through a massive waste separation plant, that separates recyclable items from the waste stream with the help of separators, magnets and optical sorters using the state-of-art technology.

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While policymakers are yet to actively link digitalization with wider sustainability efforts when developing policies and financing projects, there is a growing need to align the circular and digital agendas. The Green Deal recognises that circular economy and strong involvement from industry is central to making the EU's economy sustainable.

The CEI Boost project aims at improving policies for easing and speeding up the twin transition to ensure that Green Growth and Digital Transformation go hand in hand to drive regions' recovery and prosperity. The project focuses at enhancing policies conditions in 9 countries for boosting the application of emerging digital innovations to support the growth of circular economy at regional, local or national level, gathering expertise from different regions, different levels' policymakers and leading innovation ecosystems' actors. (CEI Boost 2023)

One of the first activities of the project has been to identify the actors and stakeholders related to both digitalization and the circular economy, and to analyse the current state and maturity of the regions in digitalization and circular economy.

The analyses by the regions highlight potential projects and approaches that have already exploited the potential of digitalization to boost sustainable development and the circular economy in particular.

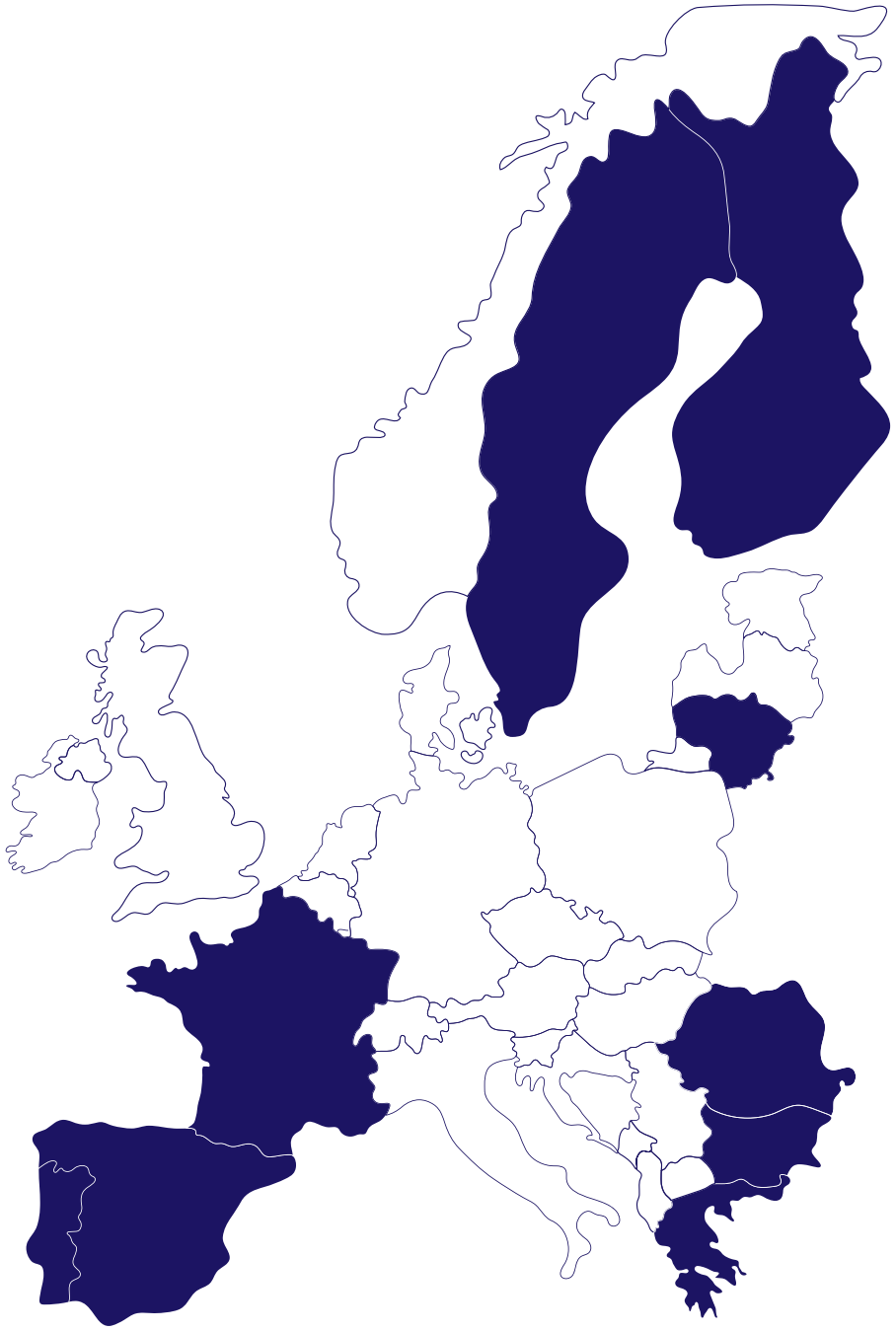
The analysis shows that the level of maturity of the regions in the field of digitalization and circular economy varies, but the general observation is that all the regions included in the analysis have made recent progress and many policies and potential projects are underway and recently initiated. On the other hand, the full potential of digitalization to promote and boost the circular economy has not been exploited.

In conclusion, the analysis carried out confirms the need for policies and development work that uses digitalization in an intelligent, user-driven and justified way to boost the circular economy.

This document analyses the current state of Digital Innovation and Circular Economy in the Region Pays de la Loire & Laval Agglomeration in France. The analyses of each partner region and more information of the CEI Boost can be found on the project website: *interregeurope.eu/cei-boost*

CEI Boost Partners

Sweden	Region Västerbotten
Finland	Regional Council of Päijät-Häme LAB University of Applied Sciences
Lithuania	Public Institution Lithuanian Innovation Centre Innovation agency
Bulgaria	Business Agency Association
Romania	Institute for Research in Circular Economy and Environment “Ernest Lupan” West Regional Development Agency
Greece	Industrial Systems Institute
Spain	Tarragona Provincial Council
Portugal	Business Development Institute of the Autonomous Region of Madeira
France	Laval Mayenne Technopole

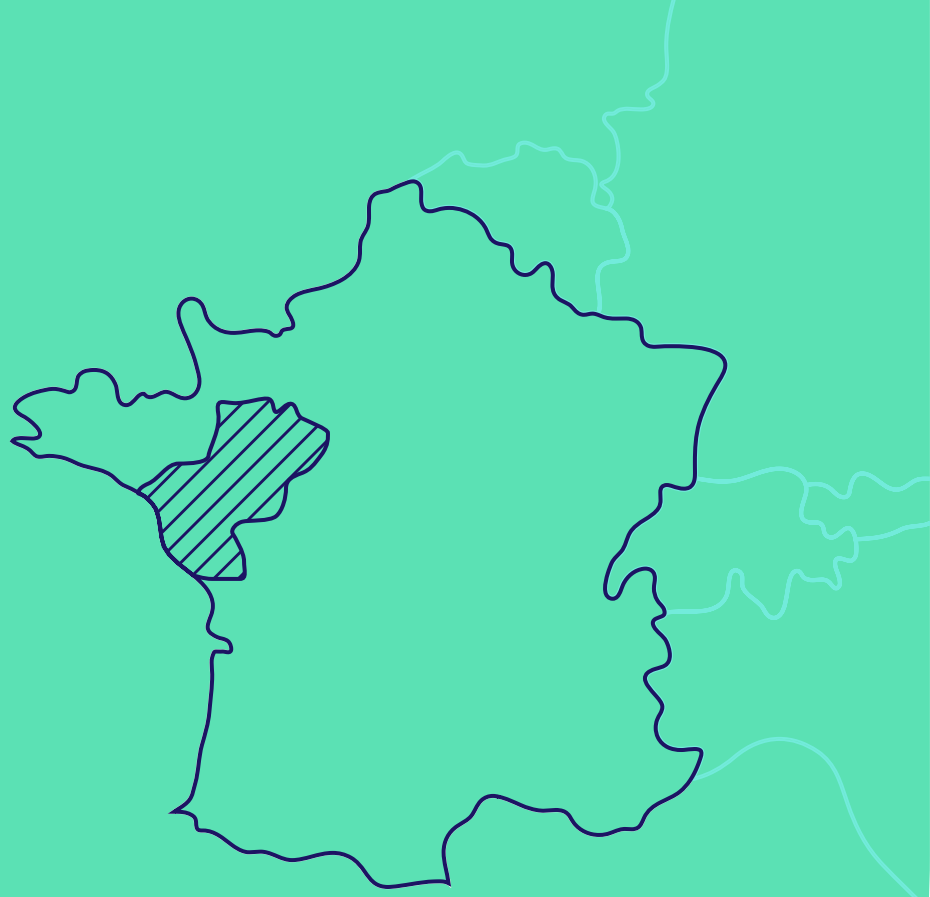


Region Pays de la Loire & Laval Agglomeration

Laval Agglomeration (LA) gathers around 120 000 inhabitants, over 34 municipalities, in the North-West of France. It is the main urbanised area localised in the Mayenne County, one of the most rural territories in Region Pays de la Loire (& France).

Economic activities mainly revolve around an historic agricultural sector, with key companies like Lactalis (#1 worldwide for Dairy Products), but also entail major actors in the circular economy, like Séché Environnement.

More importantly, LA boasts a vibrant technology & research ecosystem, positioned on the digital sector, with top players for VR like CLARTE or Laval Virtual & big scale events like Laval Virtual Convention or West Data Festival (AI-centered fair).



Digital innovations and digitalization in Region Pays de la Loire

The region has recognized the importance of digital transformation and is working towards harnessing its potential for economic growth and competitiveness. The region has implemented several **strategies and ongoing projects** to support digitalization:

- **ERDF Programme "Pays de la Loire"** aims to create a dynamic economy to place the region among the most developed in Europe. It embeds “Collective actions aimed at encouraging the transfer of SMEs to new production and innovation modes by taking account new challenges in terms of development strategies” among which digitisation of the economy.
- **DIVA (Digital Innovation Value Accelerator) European Digital Innovation Hub** is another significant initiative in the Pays de la Loire region that supports digitalization. It is a collaborative project aimed at fostering digital innovation and the adoption of emerging technologies among businesses and organizations. DIVA provides a range of services and support to help companies navigate digital transformation. The goal of DIVA is to strengthen the digital ecosystem in Pays de la Loire, promote collaboration between industry and research, and drive economic growth through digitalization.

In terms of digitalisation progress, Region Pays de la Loire is amongst the strongest digital ecosystems in France: **38 000 employees, 1820 entities, & 5 research labs with 330 teacher-researchers**.

While the region boasts a **thriving digital sector** and a **growing number of digital startups**, there are still challenges to overcome. By looking at the broader digital sector, 13% companies (1300 firms) belongs to the “**Solution Providers**” category while 87% enterprises (8800 entities) are considered part of the “**End-User**” group. And still, according to a cross-regional pool, 56% of the sampled audience (585 persons interviewed) deems that **there is a relative digital resource shortage**.

However, with the support of initiatives like the **Digital Transformation Plan** and the presence of renowned **research centers**, the region is actively working to address these challenges. The increasing number of **high-education**

specialized schools in electronics, computer science, and information technology also indicates a growing emphasis on digital skills development. As a result, the region is gradually **moving towards a more mature state of digitalization**, where businesses and organizations are better equipped to embrace digital technologies and leverage their benefits for growth and innovation.

Regarding future prospects of virtuous evolution for digitalisation, several initiatives are underway with for example for LMT **two additional European Projects** relating to NFT platform for video clips (VIDEOMuse) & Remote Interaction Tools (CODIL). Furthermore, a third impetus has been initiated alongside the Regional Council as Associated Partner, with the submission of the DeepTechValley project, which aims at developing the Deep Tech ecosystem in the Pays de la Loire Region. Moreover, it is expected to organise several new occurrences in the forthcoming years for **Laval Virtual International Convention** (26th edition in 2023), focusing on VR/AR/XR, & for **West Data Festival** (5th edition in 2023), relating to the AI & Data topics. These local actions reflect the vibrant regional ecosystem which endeavours to push the digital transition towards new highs.

There are two perspectives to be pointed out of the available policy instruments:

- At the regional level (Pays de la Loire Regional Council), **Pays de la Loire investissement numérique** has been set up in order to encourage the digital transition of all its territory & to help SME's to invest in digital tools for added value to their business. The objective of this initiative is to assist small businesses with fewer than 50 employees in acquiring and adopting high-value digital tools (software) to improve productivity and create value. It is part of the **Regional Plan for Digital Economy (PREN)** implemented since June 2017.

- At the local level (Laval Agglomeration), **Schéma Directeur des systèmes d'information et données numériques 2022-2026** is reference policy heralded by the public authority for digitisation ; it aims at favouring the uptake of remote interaction tools. On the other hand, a **broader project relating to IoT & Smart City via the installation of LoRa technology**, has been prepared for years & struggle to concretise.

A study carried out by LMT in the framework of the DEVISE project (Interreg Europe) has identified the following challenges. Traditional SMEs in the region face **difficulties** in adopting digital technologies due to a **lack of knowledge** about new technologies and how to implement them, **fear of the disruption** they could cause on the model and the processes of the firms, and on the relations with their employees and clients, and perceiving digital transformation as a **difficult process** and as a cost rather than an investment.

The **digital sector** in Pays de la Loire, an ecosystem with a total turnover of about 2 billion euros, is very **rich and diversified**, including especially software publishing, large information systems and cloud computing companies as well

as software engineering, decision making, big data, artificial intelligence as well as virtual, augmented and mixed realities. Moreover, the region is one of the most dynamic in terms of digital **start-ups creation**. This is also related to a large number of high-education specialized schools. However, the main sector affected by digitalisation in Pays de la Loire are: **the Green Transition Companies, Cultural & Creative Industries, Medical service providers & "Industry of Future**". Furthermore, by reframing the focus on Laval & the Mayenne County, it appears, following a LMT survey, that the **Building, Trading, Industry & Services are amongst the main sectors impacted by digitalisation.**

The status of circular economy in the region

At the regional level, the circular economy sector can be paradoxically qualified: on one hand, several full-fledge initiatives from local associations or specialised companies propel concrete progress & elevate the region has a high potential & flourishing area ; on the other hand, the policies remain quite shy & lack ambition for impacting efforts, which lead Pays de la Loire region to appear lagging in terms of public incentives.

With regards to specific projects, the region has developed few isolated initiatives, like SolutionPartage, a web platform enabling individuals to pool & share several resources like car, bycicle, washing-machine, etc. Despite an honourable success, few to no other circular initiative have arisen. On the contrary, several entrepreneurial projects like Les Pieds sur Terre (recycling of chemical waste), ZicEthic (second-hand restoration & retail of music instruments), les Marsiens (children outfits 100% made with recycled materials) or MBPack (nutri-score-like rating system for recyclability of packaging) have endeavoured to place circular economy at the forefront of their actions. Besides, some pre-existing companies have adopted on their own intents new habits, procedures or logics for enhancing the circular aspect of their approach: Lactalys (biggest dairy products supplier in France) with data analytics & automation for optimising production & prevent waste, Numains/MCT (datacentre company) with their Hyperion project where excess heat from servers are reallocated in the neighbouring areas for building heating for instance, or else Groupe Hamelin (a prominent office supplier company) with a new policy of recycling/paper waste management, plus promotion of digital tools for parperless workflows.

Aside from the CEI BOOST project undertaken by LMT at the local stage & sparse initiatives on different regional level bases, few concrete examples or plans are underway. The SolutionPartage platform might be the major illustration when not considering EU-funded project. Besides, some local authorities are working increasingly with circular economy institutions to propel new territorial dynamics, like the GAL Haute Mayenne.

At the county level, the Council has developed a well-structured strategy for the sustainable management of wastes

through collect in rubbish dumps while Laval Agglomeration authority is still struggling with elaborating a full-fledge & circularity-focused action plan beyond the current PCAET (local policy instrument embedded in the project). However, one recent input may be noted in the form of a call for application, launched by Laval Economie, with the intents to accelerate & implement results of local circular economy experimentations at the whole area level.

Globally, the different initiatives nurtured in the domain have been matching with several categories of actions, namely:

- Waste Management Policies (promotion of waste reduction, recycling & proper disposal practices + regulations on waste sorting, recycling targets & incentives for waste reduction initiatives)
- Sustainable Procurement Policies (public and private entities to consider environmental and social factors when procuring goods and services with priority to products with longer lifecycles, recyclable materials, or those from sustainable sources)
- Eco-design and Extended Producer Responsibility (EPR) (eco-design and EPR place responsibility on manufacturers to design products with a focus on durability, repairability, and recyclability + may require manufacturers to take responsibility for the disposal or recycling of their products at the end of their life)
- Renewable Energy Incentives (adoption of renewable energy sources can indirectly support the circular economy by reducing reliance on finite resources and promoting the use of sustainable energy)
- Green Public Procurement: (public entities to prioritize environmentally friendly products and services when making purchasing decisions. This can create a market demand for more sustainable products and services, stimulating the circular economy)

Nonetheless, despite their emergence & the County's ambition to be the top #1 Green County of France, endeavours towards more circularity remain scarce, inconsistent & reluctant, due to authorities' slow adaptation & work-in-progress expertise. The vibrant ecosystemic dynamics must be fostered via appropriate & ambitious political schemes & a broader coordination between public & private organisations.

In Laval (Mayenne), some sectors where circular economy models might have replaced the linear economy model or gained traction could include:

- **Waste Management and Recycling:** Implementation of recycling programs, waste reduction strategies, and the establishment of recycling facilities.
  EX: the Council initiative with rubbish dumps // Collectif R
- **Sustainable Agriculture:** Adoption of organic farming practices, regenerative agriculture, and efficient resource utilization.
  EX: Les Pieds sur Terre
- **Manufacturing and Product Design:** Emphasis on eco-design, remanufacturing, and incorporating recycled materials into production processes.
  EX: Les Marsiens // MBPack

- **Energy:** Promotion of renewable energy sources, energy efficiency measures, and the development of circular energy systems.
  EX: Enerfox // Fengtech

In terms of business vitality & success, it is especially energy which pave the way towards more circular opportunities due to growing companies (like Enerfox) & the general context of the Ukrainian War. Overall, the Pays de la Loire region is actively working towards promoting and implementing circular economy practices across various sectors, with a focus on waste management, sustainable agriculture, manufacturing, and energy.

Digitalization & Circular economy

Examples of projects and business cases in Region Pays de la Loire where digital innovations have boosted the circular economy:

- **Manufacturing and Industry**: Digital technologies have facilitated the implementation of circular economy practices in manufacturing and industrial sectors. For example, the use of Internet of Things (IoT) devices and sensors in production processes enables real-time monitoring of resource utilization, energy efficiency, and waste management. This data-driven approach helps optimize resource consumption, reduce waste generation, and promote circularity. Companies like Groupe SEB, a global manufacturer of household appliances based in the Pays de la Loire region, have integrated IoT and data analytics to optimize their production processes and reduce environmental impacts.

- **Waste Management and Recycling**: Digital innovations have improved waste management systems and facilitated recycling efforts. Smart waste management solutions, such as smart bins equipped with sensors and communication technologies, enable efficient waste collection and monitoring. These systems optimize waste collection routes, reduce collection costs, and promote recycling by providing real-time data on bin fill levels. For instance, Nantes Métropole, the capital city in the Pays de la Loire region, has implemented a smart waste management system using sensors and a mobile application to optimize waste collection and increase recycling rates.

- **Sharing Economy and Collaborative Platforms**: Digital platforms and sharing economy models have supported circular economy principles by promoting resource sharing, product reuse, and peer-to-peer exchanges. Platforms such as BlaBlaCar, which originated in the Pays de la Loire region, facilitate carpooling and maximize the utilization of existing vehicles, reducing the need for new car production and minimizing environmental impact. Similarly, platforms like Le Bon Coin, a popular online marketplace in France, enable the sale and purchase of second-hand goods, extending their lifespan and reducing overall consumption.

- **Sustainable Agriculture and Food Systems**: Digital technologies have been employed to enhance sustainability in the agricultural and food sectors. Precision agriculture tools, such as IoT sensors, drones, and data analytics, optimize resource management in farming, minimizing chemical inputs, improving water efficiency, and reducing waste. Additionally, digital platforms and apps connect consumers with local producers, facilitating direct sales and reducing food waste by ensuring better inventory management. Examples include La Ruche Qui Dit Oui!, a platform that connects consumers with local producers for direct sales, and Agriloops, a company using insect farming and digital technologies to produce sustainable animal feed.

These examples demonstrate how digital innovations have contributed to the circular economy across various sectors in the Pays de la Loire region. By leveraging technology and data-driven approaches, these initiatives promote resource efficiency, waste reduction, and sustainable practices, ultimately supporting the transition towards a more circular economy.

Stakeholders of digitalization and digital innovation in the region

Companies

- Agogy
- All4Tec
- Arti'Bain Energie
- CLARTE
- Clever Cloud
- Conty
- DoctoLib
- Eram
- Frémont Affûtage
- Goubault Imprimeur
- HRV
- Laval Virtual
- Lexystem
- Logicia
- Lydia
- INOD Solutions
- Luminess
- Numidev
- Orkester
- Pole Images et Réseaux
- Qarnot
- Reality Cad
- ShortWays
- Tennaxia
- TIXIA
- Thierry Immobilier

Policy makers

- Laval Agglomeration
- Laval Mayenne Technopole
- Regional Council Pays de la Loire

Academia

- ESIEA
- IUT Laval

Associations

- ADN Ouest
- Digital Loire Valley

Stakeholders of circular economy in the region

Companies

- ADEME
- Alternatri
- Collectif R
- Enerfox
- Fengtech
- HYPERION NUMAINS MCT
- Lactalis
- Les Marsiens
- Les Pieds sur Terre
- MBPack
- Renaissance Textile
- SAS Néoval
- Séché Environnement
- ZicEthic

Policy makers

- AMI Bas Carbone Mayenne County
- CCI Mayenne
- CRESS
- Groupe Action Local Haute Mayenne
- Laval Agglomeration
- Laval Economie
- Regional Council Pays de la Loire

Associations

- ADECC
- EMMAÜS Laval
- FDCUMA – Filiaire Bois Mayenne
- IPC
- Laval Economie Sociale & Solidaire
- Répar' Acteurs
- Solutions Partage
- Société Nouvelle des Fonderies de Laval

Stakeholders boosting circular economy with digitalizion

Companies

- Enerfox
- Groupe Hammelin
- HYPERION NUMAINS MCT
- Lactalis

Policy makers

- CCI Mayenne
- Laval Agglomeration
- Regional Council Pays de la Loire

Associations

- ADECC
- Laval Mayenne Développement
- Solutions Partage

Summary

As a conclusion, it appears that Region Pays de Loire is constituted with a vibrant & ever-expanding digital ecosystem whose unleashed potential has unveiled huge assets for the territory. On the other side, circular economy dynamics offer a promising landscape of opportunities at this scale but it is still refrained by a lack of commitment & ambition from local political bodies. Besides, if the digital sector is well-distributed & represented all over the territory, circular economy is still emerging at different speed, according to the local stakes & objectives.

Consequently, a mixed perspective over digital boost for circularity practices, tools & logics should propose a set of innovative solutions & prospects. However, it has been stressed how those two domains, despite a fast-paced implementation via the entrepreneurial fabric & considering their own distinct evolution, have yet few concrete connections. The chance to capitalise upon both expertises for common actions is still very nascent. On a widened viewpoint, the current digital & circular economy frameworks necessitate to be liaised to one another via a proper coordination. This virtuous endeadvour might be optimally reached through engaging the public authorities & political incentives in order to trigger high potential synergies.

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