Deliverable D.1.2

Cyber Secure Light map of envisaged cluster collaboration opportunities and value chain linkages

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D.1.2 Cyber Secure Light map of envisaged cluster collaboration opportunities

Contents

Premises

The following document summarises the mapping of collaboration opportunities and information and data collected at cluster and partnership levels. The mapping includes the envisaged Cyber Secure Light cluster collaboration opportunities and value chain linkages detailed by the thematic, sectoral and technologies complementarities, cooperation interests and expected mutual added value between the partnership members.

The document includes the main conclusions drawn from the survey addressed to SME members by the partner clusters. The survey targeted the innovation management level, the demand of SMEs for technology transfer, difficulties to access to KET solutions and financing/funding for improving the SMEs technological assets, skills and investment rate and approach to international networking. The survey also addressed the assessment of distance-to-target between SMEs actual needs, technological interests, market goals and the cluster business support and technology transfer services currently provided by the clusters concerned in Cyber Secure Light. The mapping includes a SWOT analysis of the targeted smart building value chain.

The mapping exercise was carried out through two main different phases. A first phase included the cluster presentations and a second phase on the complementarities between each cluster with the other clusters of the network. The document also includes a SWOT analysis based on the summary of the potential collaboration opportunities for innovation and market investments for partnership clusters' SMEs.

1. Mapping of Collaboration Opportunities

1.1 Cluster presentation

Q1. Which is the main industrial sector and focus area of the clusters?
ARCHENERG: Renewable energy project development & implementation, introduction of innovative building materials and construction techniques through demonstration projects and training programmes. These include solar, wind, biomass and geothermal energy use, energy management to improve efficiency, production and utilisation of hemp based insulation and structural materials.
ELCA is a non-profit Association whose main objectives are to strengthen the competiveness of the European lighting sector in the smart and connected lighting (S&CL), to accelerate growth within the sector, deployment of energy-efficient lighting solutions and to contribute to societal benefits associated to lighting. ELCA gathers local Lighting Cluster Initiatives in Europe. Main area: Lighting industry and electrical equipment.
LUCE IN VENETO: Lighting industry and electrical equipment.
POLE SCS: The cluster focuses on digital technologies especially Electronics, Telecommunications and Software and target various market segments, especially Smart Cities, Retail, Transport & Logistics, Industry 4.0 and Health.
DOMOTYS: Home and building automation and smart cities.
SIPH: Civil engineering. Construction of buildings.

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SGG: CONSTRUCTION CLUSTER OF SLOVENIA (SLOVENSKI GRADBENI GROZD, Acronym SGG) is an Economic Interest Grouping (not-for-profit) and an innovation cluster. Its members a broad range of companies with a wider field of building and construction, especially for energy efficient and sustainable construction and renovation of buildings, new materials, products and services, and business models - but also all the other organizations that are related to construction or to sustainable development of the built environment, green, and circular economy.

The mission or purpose of the cluster is to support and promote:

- access to new skills, the development of competencies and technologies needed to ensure competitive advantage
- innovation, commercialization of innovation and access to the market and new customers, and hence economic growth
- development and business cooperation between cluster members and the sector in order to optimize the use of their own resources
- cross sectoral cooperation and participation in new value chains to open new business opportunities
- international development and business cooperation with the aim of expanding into new markets.

Q2. Which are the main thematic areas covered in the clusters?

ARCHENERG: Dissemination of R&D results through education and training programmes and securing financial support by participation in national and international tendering and preparation of feasibility studies for loan applications.

ELCA & LUCE IN VENETO: Smart and connected lighting, including energy efficient and human centric lighting.

POLE SCS: Contactless, Mobile networks & IoT, Security and Digital Identities.

DOMOTYS: Heating, ventilation and air conditioning, Lighting control systems, Public Lighting, Occupancy-aware control systems, Appliance control and integration, Home security, Digital Transformation, Smart Industry, Energy Efficiency.

SIPH: Our cluster facilitates the transfer of knowledge and modern technologies, the increase of personnel's skills and promotion of enterprises.

SGG areas of interest are:

- New and renewed technologies of the sustainable building and in construction, protection of the environment, heritage preservation,
- Energy efficiency and renewable energy in building and districts, water efficiency, green skills,
- Resource efficiency, green, circular construction and economy,
- Digitalization of construction sector, BIM, IOT, smart building,
- New business and financial models in building and construction,
- Collaborative innovation management and internationalization.

Q3. Which are the main value-chain linkages (both horizontal and vertical) in the clusters?

ARCHENERG: Horizontal: renewable energy technology, Vertical: project development and design, EPC contracting.

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ELCA: Horizontal linkages: ELCA members as lighting clusters from

- Belgium (Groen Licht Vlaanderen – GLV cluster https://www.groenlichtvlaanderen.be/),
- Spain (Clúster d'il luminació de Catalunya – CICAT http://www.clusteriluminacion.es/),
- France (Cluster Lumière https://www.clusterlumiere.com/en/home-page/) and
- Italy (Luce in Veneto – CSL Coordinator).
  Vertical linkages: R&D centres and academia linked to ELCA's members.

LUCE IN VENETO:

Horizontal linkages - the value-chain of LIV SMEs consists in the following activities: lighting fixtures manufacturing (companies involved in glass processing, metal processing, wood working, ceramic working, plastic materials working, electronic components, product design); lighting fixtures transports (delivery vectors); lighting fixtures selling (e-commerce companies, lighting shops, electrical material distributors)

Vertical linkages: LIV works closely with Local Public Authorities as regional government bodies and municipalities, Industrial institutions as chambers of commerce and business networks, Research Centres, Clusters, laboratories, engineers, professional organizations both locally and at European level in order to increase the participation in new development projects and to foster a debate on the possible thematic areas of common interest in the lighting field. R&D centres in the Venetian Region (University of Padua https://www.unipd.it/ , University of Verona https://www.univr.it/it/ , University Cà Foscari of Venice https://www.unive.it/ , IUAV Venice http://www.iuav.it)

POLE SCS:

Strengths in the value chain
- IP, semi-conductors, test & measurement
- **Contactless** – contactless objects and readers, trusted service management
  Embedded and application software
- **Networks** – communicating modules sensors, smart objects
  Embedded and application software
  Cloud infrastructure and services
  Mobile apps, Operators/MVNOs
- **Security & Digital Identities**
  Smart cards & terminals, trusted/connected objects
  Security software
  Cloud infrastructure and services
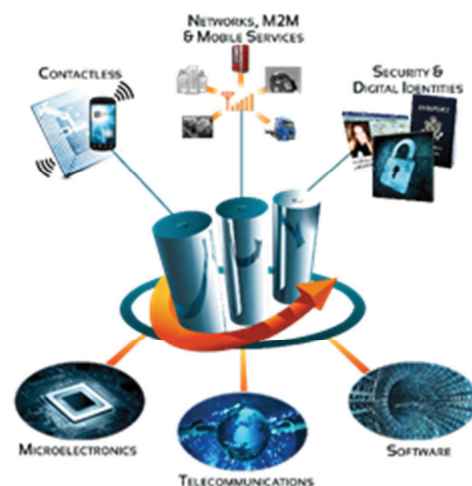
- Vertically
1) R&D Projects - 500 certified, 230 funded, €1 B invested, €500 M subsidies;
2) Innovation ecosystem – 60,000 jobs in the ICT field, N°1 in; Secured Microcontrollers, Secured Embedded Memories, Smartcards & secured objects, RFID & NFC, Wireless/mobile chips design, Largest volume of chips production;
3) SMEs - in more than 78% projects, more than 70M€ grants and 200 members of Pôle-SCS

- Horizontally
1) Partnerships with more than 20 clusters in Europe
2) Partnership with large corporates
3) Member of Silicon Europe Alliance
4) Presence in EU projects (H2020, COSME, Erasmus +)
5) Support to SMEs in EU R&D projects (H2020, Eureka, Euro Stars)

International missions and fairs (MWC, CES, TRUSTECH, Hannover Messe, SEMICON)

DOMOTYS:
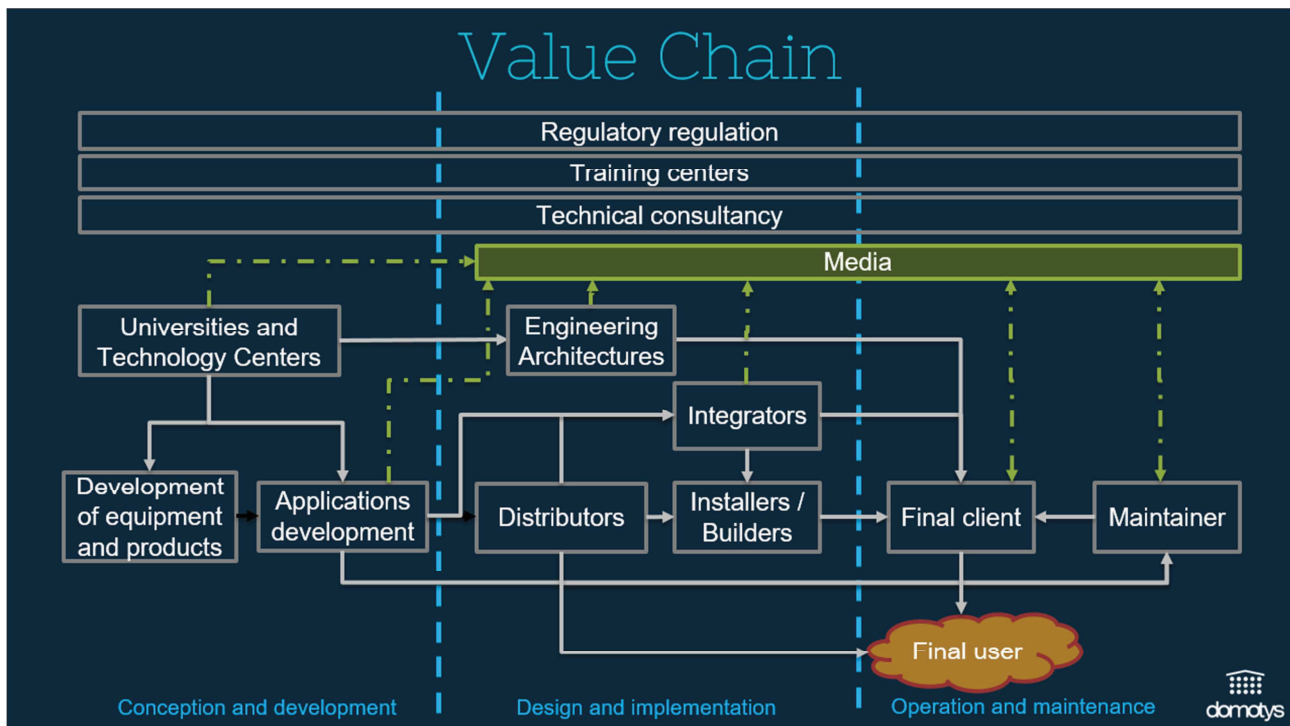
SIPH: The main value–chain linkages in Cluster INNOWATOR concern Vertical linkages. They are e.g.: sharing information, access to the university R&D centres for technology transfer, laboratories as well as trainings, conferences, trade missions organizing, b2b meetings. Horizontal linkages comes from individual contacts of SMEs of the cluster.

SGG: The Cluster is an open organisation and supports whole construction value chain: research and development, Building Design and Engineering, Production of building materials and components, Supply of components, services, utilities, Contracting, Maintenance, Retrofitting, Demolishing, CDW (Construction and Demolition Waste) management. Currently, after major reorganisation of the cluster, the new value chains are being formed, supported also by value chain partners from other CSL clusters.

Q4. Which are the main industrial sectors covered in your cluster?

ARCHENERG: Energy efficient building design, construction and management, computerized control of heating, cooling, ventilation and lighting of buildings. Power generation: photovoltaic, wind, mini hydro. Heat energy: heat pumps, geothermal energy use, biomass and biogas use, heat recuperation, energy efficient heating, cooling and ventilation. Waste to energy, waste recycling, waste to secondary raw material, and process control of hazardous waste incinerators.

ELCA & LUCE IN VENETO:

- Indoor Lighting
- Outdoor Lighting
- SSL (LED) Lighting
- Light management systems

POLE SCS:

- Telecom
- Security
- Industry
- Energy & Environment
- Health
- Smart homes & buildings
- Smart Cities
- Retail
- Mobility & Logistics
- Banking
- E-Government
- Robotics
- Automotive
- Printers
- Textile
- Chemical
- Household machines
- Energy Transport
- Agro-food
- Biomedicine
- Aerospace
- Waterborne

DOMOTYS:

- Software industry
- Construction industry
- Energy industry
- Electrical power industry
- Hospitality industry
- Information and Telecommunications industry.

SIPH: Building materials, chemical industry (nano-technology), building automation systems, technical and telecommunication installations.

SGG:

- Building and construction
- Design and engineering
- Real estate management
- Energy supply, other utilities sectors

- ICT; communication services.

Q5. What is the clusters' structure? Who are the main cluster actors (members, associates, etc.)?

ARCHENERG Cluster has 80 members: 73 SMEs, 5 large companies and two academic institutions. It has signed 43 cooperation agreements with various regional and international organisations, including MABIM, the Hungarian Business Information Modelling Association. The chairman is supported by five vice chairmen responsible for organisational development and international relations (in Canada, Germany, India & Romania). The managing director is supported by three advisors, an international project manager and three assistants responsible for cluster management, financial and program administration.

ELCA has four member clusters in lighting industry:

- Belgium (Groen Licht Vlaanderen – GLV cluster https://www.groenlichtvlaanderen.be/),
- Spain (Clúster d'il luminació de Catalunya – CICAT http://www.clusteriluminacion.es/),
- France (Cluster Lumière https://www.clusterlumiere.com/en/home-page/)
- Italy (Luce in Veneto – CSL Coordinator https://www.luceinveneto.com/)

There are ongoing contacts with clusters in Poland, Germany, Hungary, Finland and Greece.

LUCE IN VENETO is a cluster consisting of over 50 SMEs in the smart lighting sector based mainly in the Veneto Region. LIV connects different companies and their specific expertise in order to generate synergies and new business opportunities. The main actors are:

- Otylight Srl (http://www.otylight.com/it/)
- '& Costa (http://www.andcosta.com)
- Nectogroup Srl (https://www.nectogroup.com/)
- Fairwind Srl (http://www.goodlight.it/)
- Elesi Luce Srl (http://www.elesiluce.it/it/)

The management of LIV is entrusted to a Board of Directors consisting of 3 to 5 members appointed for a period of three years. The board defines the strategic approach and promotes new activities to the network. The Board of Directors is supported in these activities by a Cluster Manager, working at the headquarters in Piombino Dese (PD).

POLE SCS's members are:
Thales
Telecom Italia
Telecom Orange
SAP
CEA
INRIA
CNRS
École Nationale Supérieure des Mines Saint-Étienne
Université Nice Sophia Antipolis
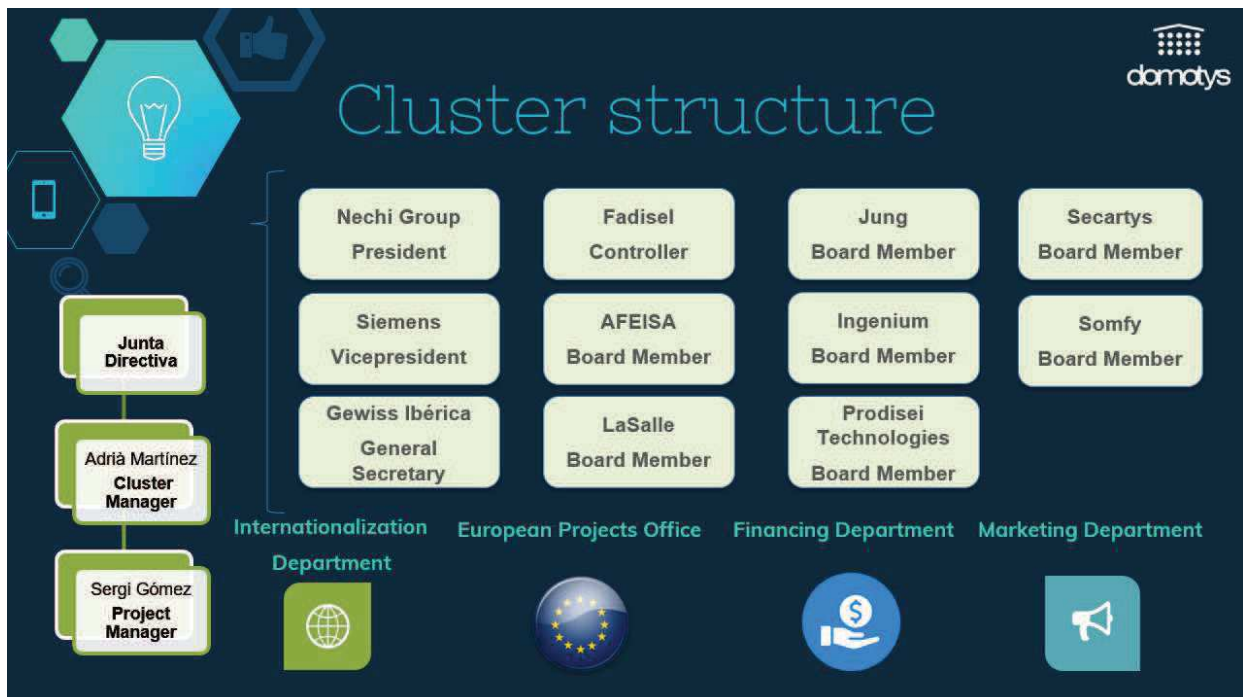Institut Telecom
STMicroelectronics
Gemalto
Schneider Electric
Amadeus

Qualcomm
Hewlett Packard Enterprise
Docapost
Symag – BNP Paribas
Aeroports De La Côte D'Azur
Business France
Aix Marseille Université
Eurecom
https://www.pole-scs.org/en/members-directory/

DOMOTYS:

Manufacturers, Engineering, Technology Integrators, Suppliers, Distributors, Universities, Technology & Research Centres, Specialized Media.

SIPH: The Cluster is based on the consortium agreement. The leader and co-ordinating body is the CCI "SIPH", Kielce, working in the close collaboration with the Regional Chamber of Commerce in Rzeszów. The members of the cluster are mainly SMEs of the two regions in Eastern Poland: Świętokrzyski and Podkarpacki. Except SMEs among member of the Cluster are: Kielce University of Technology, Rzeszów University of Technology and Warsaw University.

CCI SIPH affiliates the EEN centre which facilitates business contacts of EU SMEs.

SGG: Construction cluster of Slovenia is an economic interest grouping (association) which is open for member in construction sector and related sectors. It is open and dynamic, also in terms of members.

Currently there are three constitutive members (after a major reorganisation), and a number of associates (companies, experts) in Slovenia and abroad, and networked partners, including European Circular Construction Alliance ESCP4i members.

The constitutive members are:

- 360 - ARHITEKTURNI POSNETKI SMILJAN SIMERL S.P. / 2D scanning of buildings, BIM integration
- CIRCON d.o.o. / consultancy in new, innovative construction technologies transfer, mainly circular economy related
- Izobraževanje za osebni poslovni uspeh, Andro Goblon s.p. / business model consultancy and training

Associate members are:

- Robotina d.o.o.: Intelligent buildings, building automation
- E-NETSI d.o.o.: Consulting and engineering in buildings and environment protection, HVAC
- Marko Kramar, architect, s.p.: BIM technologies implementation, Design and engineering of energy efficient and sustainable building,
- Building and Civil Engineering Institute Consulting engineering, R&D institute, Sustainable building solutions
- University of Maribor, Faculty of Civil Engineering: Graduate and post graduate studies, basic and applied research, management of SIBIM association

CSL related and optionally interested members of the Strategic research and innovation partnership Smart building and cities

- 3 PORT, informacijski inženiring, d.o.o.
- Agitavit Solutions d.o.o.
- CGS Labs d.o.o.
- Enertec d.o.o.
- ETI Elektroelement d.o.o.
- FMC d.o.o.
- Infotim Ržišnik Perc d.o.o.
- Internet institut d.o.o.
- Institute for environmental protection and sensors, Ltd.
- IPMIT - Institut za projektni management in informacijsko tehnologijo d.o.o.
- Iskra d.d.
- Kolektor Sisteh d.o.o.
- Lancom d.o.o.
- LOOP SKUPINA, d.o.o.
- Marand d.o.o.
- METRONIK elementi in sistemi za avtomatiko, d.o.o.
- Nomnio d.o.o.
- NTR Inženiring d.o.o.
- Pleksimo d.o.o.
- Reflecta GmbH
- Robotina d.o.o.
- SMARTIS CITY d.o.o.
- SOLVERA LYNX d.d.
- Špica International d.o.o.
- TECES
- Technological part Ljubljana
- TENZOR, d.o.o.
- U-centrix d.o.o.

- Viris, varnost in razvoj informacijskih sistemov, d. o. o.
- XLAB razvoj programske opreme in svetovanje d.o.o.
- ZARJA Elektronika d.o.o.
- ICT Technology Network Institute
- Abelium d.o.o., raziskave in razvoj
- AL-KO THERM d.o.o.
- ASCALAB d.o.o.
- GOAP d.o.o.
- NOMNIO d.o.o.
- PROF.EL, d.o.o.
- STRIP'S d.o.o.

Q6. What are the main business support services for SMEs?

ARCHENERG:

- Project Generation,

- Cluster marketing,

- Training and curriculum design,

- Presentations and lectures.

ELCA supports SMEs indirectly through business services for its member lighting clusters.

Luce in Veneto promotes strategic actions to make the whole chain of lighting companies more competitive: starting from providing support to find raw material suppliers (glass, steel, electric ware, wood, plastic and electronics) to the companies dealing with packaging and trading of final products. The aim is to involve enterprises working in the field even through projects promoted by the Veneto Region, the National Government and the European Union.

Pôle-SCS supports technology transformation for existing members requiring assistance with developing and bringing their ideas/product to the marketplace and business transformation for start-ups - helping them achieve market requirements within their domain. The key support of Pôle-SCS is facilitating the labelling/certification process that involves reviews & recommendations by project committee.

DOMOTYS:

International Connection

- More than 45 shared trade delegations

- Participation on worldwide shows & fairs

- Trade missions

- Search of customers and distributors

- Currency exchange

- International Advisory Service

Networking & Training

- Workshops

- Seminars

- Matchmaking & brokerages events

- Sectorial meetings

- Customized training

Funding

- Funding search

- Financial grants & subsidies proceeding

- Negotiation with public bodies

- Search of Loans and guarantees

- Legal advice

- Corporate discounts

Innovation

- Search of technology and partners

- Technology transfer

- Technological Surveillance

- Design management

- European Projects

- Corporate Entrepreneurship

SIPH:

- Access to the European Internal market
- Access to public support (regional/national programmes, innovation vouchers, etc.)
- Access to private funding (connecting to investors, seed-capital, venture-capital, crowd-funding, etc.)
- Support of knowledge transfer
- Support of technology transfer

SGG:

- Training and transfer of knowledge, development of innovation and other competences, workshops for the introduction of modern business practices, customer recognition, partners, technological trends, policies, training in the areas of innovation management, the development of business models, and the use of business modelling tools for various business processes.
- Promoting innovation and business development: consulting and innovation coaching to support the development of innovation processes in the company.
- Information and promotion: news, current calls, opportunities for participation in R & D projects, establishing identity and maintaining visibility, active participation in social networks LinkedIn,

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Facebook, Twitter.

- Networking with project partners, clusters, through sectoral, cross-border, continuity of communication, maintaining contacts, including through social networks.
- R & D and innovation projects: preparation and management of national and EU R & D projects and innovation projects, Membership, Networking and Partnering, Financing (EU, national resources), dissemination and exploitation of results.
- Development of new and transformation of value chains, development and business cooperation, new business processes and cross sectoral cooperation.
- Internationalization: networking and integration into cross-border development and business links and cooperation, entering new markets outside the EU.

Q7. What are the clusters' services for the promotion of cross-sectoral collaboration?

ARCHENERG:

- Searching for financial support

- Tender monitoring,

- Partner search,

- Demand assessment,

- Needs assessment.

- Application writing, consulting,

- preparing feasibility studies,

- organizing audits,

- tender consultations.

ELCA provides access to various services and allows its members to:

- to be linked to European and international specialized networks and platforms in this sector
- to access specific and qualified information and participate in the knowledge transfer process
- to receive opportunities of economical, organizational and technological development in the field of new smart & connected lighting technologies and promote them in specific markets
- to participate in seminars, workshops, forums and events designed to deepen issues of interest to members, with particular reference to new technological solutions
- to benefit from proposed activities and international collaboration and R&D projects
- to get dedicated assistance in generating project ideas and services for the search of adequate funding EU programs and tenders
- to get support in identification of industrial or academic partners for your innovation projects
- to get support and participate in internationalization projects
- to promote the competences of the organization and its enterprise members
- to promote one's technology and services inside the cluster network
- to take advantage of the ELCA communication channels and resources

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LIV works in the following macro-areas:

A) Export strategies - Since the beginning of its activities LIV has promoted a board for companies willing to go international coordinated by an expert of international marketing, with the aim of sharing the goals targeted. This approach, based on challenges and sharing of the projects to be implemented has been able to meet the real needs of the firms involved. The board naturally led to an "Export Strategy" conceived as a tool to connect guide lines and planning to implement and coordinate actions in the local area. The plan represents also an operative mean for the future international activities of the Consortium

B) Research projects - Together with the actions aiming to improve the position of the companies in international markets, LIV believes in promoting projects that will improve the value of the products. Therefore LIV promotes among its companies, and also actively participate, in several research and collaborative projects, co-financed by regional, national and EU funds.

C) Training - Every year LIV organizes training courses aiming to deepen the know-how of companies regarding the legislation of specific issues and technical topics of common interest. The training courses give opportunity for a mutual exchange of ideas between and within companies themselves and the tutors holding the courses (experts, academia etc.), in order to pick out projects to be developed individually and as a cluster.

Pôle-SCS's promotion services include:

- Projets Nationaux
- Projets régionaux (PACA)
- Projets Européens

DOMOTYS: Interaction with other clusters to identify and address specific needs and demands in terms of packaging from other client sectors. In Catalonia clusters are the reference networks business entities as regards innovation and strategy, enabling to work with companies and reference entities.

Currently the Catalonia Clusters network has more than 1,800 member companies, that enable on one hand **to identify the needs of specific sectors**, and secondly, to **develop solutions together** with companies.

The **Inter-cluster workshops** are conducted by developing a specific methodology, to enable the success and achievement of the objectives. So, it starts with a **meeting where they cross needs to solve (supply) with the possibilities (demand), and specific working groups are generated to carry them out.**

These workshops can result in **R&D&i projects or in specific actions**, in order to give added value to Packaging companies, working with real needs and challenges with client companies willing to adopt the solution.

SIPH: Organization of conferences and seminars concerning new technologies in civil engineering, enterprise management, promotion of clustering.

SGG:

- Training for introduction of modern business practices, technological trends, and the areas of innovation management.
- Networking with project partners, clusters, through sectoral, cross-border, continuity of communication, maintaining contacts, including through social networks.
- Networking and Partnering with different organisation in EU and beyond

- Development of new and transformation of value chains, development and business cooperation, new business processes and cross sectoral cooperation.

1.2 Technologies

Q8. Which are the main technologies (technologies of technology providers) existing in your cluster?

ARCHENERG:

- Solar energy utilization: installation of photovoltaic and solar systems for the production of domestic hot water, including water needed for the heating system or for producing domestic solar electricity
- Geothermal energy utilization: installation of heat pump systems
- Biomass utilization: compact biomass utilization (furnace, wood, brick, pellet), planning and building of plants based on biogas
- Prefabricated and passive houses: planning and implementation of energy efficient houses
- Building industry, engineering: planning, implementation, heat insulation, renovation, building information management.

ELCA:

- Technologies linked to **Indoor lighting, Optical design, Appearance & Perception and Metrology** – provided by the Light & Lighting of the Department of Electrical Engineering (ESAT) of KU Leuven (associated to ELCA through GLV cluster) and to **indoor & outdoor lighting** provided by several laboratories and research centres linked to the Cluster Lumiere and RI Luce in Veneto (ELCA's members)
- Technologies linked to **lighting materials and control systems**, as well as **photometry and colourimetry** – provided by The Lighting Group of the Research Institute on Energy, IREC Catalonia Institute for Energy Research (associated to ELCA through CICAT cluster)
- Technologies linked to **informatics and cyber security** – provided by the University Ca'Foscari, University of Verona and University of Padua (associated to ELCA through RI LiV cluster)
- Technologies linked to **sustainable urban design, Innovation and efficient building** – provided by the University IUAV of Venice (associated to ELCA through RI LiV cluster)
- Technologies and research linked to **photonics engineering** provided by Vrije Universiteit Brussel, VUB B-PHOT Brussels Photonics Team (a part of the Department of Applied Physics and Photonics) and Ghent University, The Photonics Research Group (a part of the Department of Information Technology) - (associated to ELCA through GLV cluster)

LIV:

- Technologies linked to **Indoor lighting & outdoor lighting, Appearance & Perception and Metrology** – provided by Department of Industrial Engineering (University of Padua)
- Technologies linked to **informatics and cyber security** – provided by the University Ca' Foscari, University of Verona and University of Padua
- Technologies linked to **sustainable urban design, Innovation and efficient building** – provided by the University IUAV of Venice
- Technologies and research linked to **human centric lighting technologies** – provided by HIT

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Research Centre (University of Padua)

Pôle-SCS: Microelectronics, Telecommunications, and Security & Digital Identities

DOMOTYS: Artificial Intelligence, Cloud Computing, Blockchain, 5G networks, Augmented Reality and Virtual Reality, Electric and self-driving vehicles, 3D printing, Internet of things

SIPH: Kielce University of Technology, Rzeszow University of Technology and Warsaw University. Engineering and Architecture, Electrical Engineering, Automatic Control and Computer Science, Environment, Geomatics and Energy Engineering.

SGG: The cluster (e.g. cluster office) is a service organisation with the know-how and competences in the following field:

- R & D and innovation projects: preparation and management of national and EU R & D projects and innovation projects, acquiring of EU & national funding (grants).
- Networking across sectors and beyond, memberships in EU associations/platforms, and policy influencing
- Innovation management, collaborative innovation management business processed management, business model design and development, innovation competences development
- Circular construction and sustainable building development.

Q.9 which are the main technologies (technologies of SMEs) exiting in the clusters?

ARCHENERG: All of the technologies described above are being developed by SMEs in cooperation with academic institutions.

ELCA: Technologies related to indoor / outdoor lighting solutions, lighting sources as LED, OLED, Compact Fluorescent, Iodide (food, electronics, optics, plastics, metals,...), lighting design, lighting equipment, lighting management software, human centric lighting.

LIV: Technologies related to indoor / outdoor lighting solutions, lighting sources as LED, OLED, lighting design, lighting equipment, lighting management software, human centric lighting.

Pôle-SCS:

Number 1 is: Networks & Mobile Services, Internet Objects

Number 2: Security & identity

Number 3: Contactless

DOMOTYS: Monitoring and energy control software, Lighting control, Big Data, Sensors, Internet of Things, System integration in voice assistants, Beacons, Digital Twins, Cyber-physical systems, cybersecurity, industrial automation systems

SIPH: Nano technology in building materials, building automation systems, technical and telecommunication installations, a unique system of sliding platforms for mounting skylights, daylight - free energy, dry floor heating systems and ceiling cooling systems, digital orthophotomaps, numerical terrain models and situational and altitude maps developed by photogrammetric method and supplemented with measurement in the field, Photovoltaic installations integrated with the BIPV building, unmanned aerial system designed for autonomous inspection of bridge structures, Innovative recycling materials that increase the durability of bridges, Image analysis systems, optical detection of visual damage as well as closed process lines.

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SGG:	
Company	Solution, Technologies, services
Constitutive members	
CIRCON d.o.o.	Consultancy in new, innovative construction technologies transfer, mainly circular economy related
360 - ARHITEKTURNI POSNETKI SMILJAN SIMERL S.P.	2D scanning of buildings, BIM integration
Izobraževanje za osebni poslovni uspeh, Andro Goblon s.p.	Business model consultancy and training
Associate members and members of S3 (Smart Specialization Strategies) Strategic research and innovation partnerships: Smart building and home with wood chain and Smart cities and communities	
Robotina d.o.o.	Intelligent buildings, building automation
E-NETSI d.o.o.	Consulting and engineering in buildings and environment protection, HVAC
Marko Kramar, architect, s.p.	BIM technologies implementation, Design and engineering of energy efficient and sustainable building
Building and Civil Engineering Institute	Consulting engineering, R&D institute, Sustainable building solutions
3 PORT, informacijski inženiring, d.o.o.	Custom software development, specific application for the control and management of smart devices, smart buildings, smart cities
Agitavit Solutions d.o.o.	Consulting and management of IoT projects, Design and development of custom solutions with elements of the IoT-architecture, The SensIoT smart platform for smarter management of devices and services
CGS Labs d.o.o.	Development and integrating of BIM solutions in infrastructure, roads planning, and buildings.
Enertec d.o.o.	Engineering and set-up or PV power plants, management and maintenance
ETI Elektroelement d.o.o.	Fuse manufacturers and leading global niche manufacturer of devices for the protection and control of electrical circuits
FMC d.o.o.	System integration, member of FMC group
Infotim Ržišnik Perc d.o.o.	Real estate development and IT Solution development
Internet institut d.o.o.	Wireless and fixed networks management and monitoring
Institute for environmental protection and sensors, Ltd.	Institute for environmental protection and sensors
IPMIT - Institut za projektni management in informacijsko tehnologijo d.o.o.	Business and project information system planning.
Iskra d.d.	Digital grid solutions, distributed Smart Grid Data Monitoring solutions
Kolektor Sisteh d.o.o.	Services and technologies for automation and digitalization in industry and businesses, including buildings and facilities.
Lancom d.o.o.	Integrated systems, IT solutions and our flagship Passenger Information System software for the Slovenian and foreign markets. We complement our IT solutions and services with our own IT Test Center.
LOOP SKUPINA, d.o.o.	Retail of video surveillance, and home automation systems and equipment
Marand d.o.o.	Sytsem integration, cyber security solutions
METRONIK elementi in sistemi za avtomatiko, d.o.o.	HVAC systems design and management
Nomnio d.o.o.	Ready-to-use hardware module that allows you to connect your products to the

D.1.2 Cyber Secure Light map of envisaged cluster collaboration opportunities

	Internet.
	NOMNIO PLATFORM - Secure, robust and globally accessible cloud communication infrastructure service.
NTR Inženiring d.o.o.	Development of innovative technological solutions in the field of data centres and electrical power supply systems.
Pleksimo d.o.o.	Wireless solutions for smart homes and buildings
Reflecta GmbH	REFLECTA Group is one of the market leaders in the professional industrial lighting sector. For many years, REFLECTA® have been producing and perfecting advanced intelligent industrial lighting systems in order to guarantee customers energy-efficient, long-lasting lighting solutions.
Robotina d.o.o.	PV power stations, Smart Green technologies, Smart buildings, Automation in industry, components and OEM solutions.
SMARTIS CITY d.o.o.	IoT and Industry 4.0: Unleash Connected Things, Services and Data potential with our IoT Platform. Smart City: Empower City Managers and Citizens through Governance and Collaboration
SOLVERA LYNX d.d.	COMPREHENSIVE SOLUTIONS FOR ENERGY MANAGEMENT: controlling energy use, we help some of the most important companies in the fields of energy, manufacturing, infrastructure and transport.
Špica International d.o.o.	Spica is an identification and IoT specialist with offices in five European countries where it acts as the leading regional supplier of workforce management and supply-chain management solutions.
TECES	Technological centre: development competencies and solutions in the field of inverters, electrical drives and power electronics, TECES has to this day grown into a recognized Slovenian innovation mechanism for strengthening the development cooperation, competencies and technologies in the fields of efficient energy conversion and use, as well as energy-efficient systems.
Technological part Ljubljana	Development Collaboration & Global Commercialization, Collaborative innovation ecosystems
TENZOR, d.o.o.	Tenzor has been successfully providing advance technical security services, maintenance of technical solutions in other low voltage solutions since 1993.
	In the last 16 years the company positioned itself on Slovenian market as an integrator of technical system, electrical installation and "one-stop-shop" for electrical installations
U-centrix d.o.o.	Consulting services, development of software solutions.
Viris, varnost in razvoj informacijskih sistemov, d. o. o.	Cyber security of information systems, penetration tests, development of cyber secure systems (SW, HW).
XLAB razvoj programske opreme in svetovanje d.o.o.	R&D company with a strong research background in the fields of distributed systems, cloud computing, security and dependability of our systems, information visualization (medical, 2D, 3D GIS, sensors) and image processing (3D reconstruction, segmentation, GIS data fusion).
ZARJA Elektronika d.o.o.	Technical security systems development and implementation.
ICT Technology Network Institute	ICT Technology Network develops and strengthens the mechanisms, know-how and tools enabling efficient services related to the transfer of technologies, innovation, intellectual property management and protection, preparation and realisation of joint R&D projects, application for national and international projects, market penetration, promotion of technologies and skills as well as finding new partners (suppliers, subcontractors, customers).
Abelium d.o.o., raziskave in razvoj	With the help of the development of digital platforms and the implementation of intelligent IT services, Abelium enables digital transformation of subscribers. Research focuses on targeted applied research in the areas of intelligent passenger transport, smart cities, smart agriculture and forestry, knowledge

D.1.2 Cyber Secure Light map of envisaged cluster collaboration opportunities

	management and the use of IT in the field of public services
AL-KO THERM d.o.o.	
ASCALAB d.o.o.	Technologies for secure data storage and transfer.
GOAP d.o.o.	Development of its own quality high-tech and innovative automation products and solutions. GOAP's products, registered under the brand NETIC, are widely used in hotels, residential buildings, office buildings and cruise ships. NETIChome: Complete Smart Home Solutions
NOMNIO d.o.o.	NOMNIO PLATFORM A complete end-to-end solution for connecting your products and enabling new possibilities. Connected products: Easily connect your existing and future products to the internet using our COMMUNICATION MODULE or build one yourself. Nomnio cloud services: Remotely monitor and manage your connected products. Retrieve REAL TIME and HISTORICAL operation data using our secure, robust and scalable cloud services. Custom applications::Build mobile and web applications that will help your customers get MORE OUT OF YOUR PRODUCTS. Or let us do that for you.
PROF.EL, d.o.o.	Development and production of controllers and automation systems.
STRIP'S d.o.o.	Strip's is an innovative privately-owned company with a focus on electronics development and decades of experience in product industrialisation. Our expertise in the fields of electronics, LED technology, sensors, smart measuring, connectivity devices and IoT make us a strategic, reliable and flexible EMS and ODM partner. We offer design for manufacturing from idea to the serial production, ensuring the best price performance concept for each project.

Q.10. What are the technology transfer services / opportunities offer by the clusters to its members?

ARCHENERG:

- The Cluster organizes symposia and workshop seminars on specific technologies.
- Supports cluster members to participate in international conferences and trade fairs.
- Participation in internship programmes by receiving and sending young specialists to and from cluster member organizations.

ELCA: Knowledge and technology transfer and networking through join collaborative projects and thematic workshops.

LIV: Knowledge and technology transfer and networking through Regional and European research projects.

Pôle-SCS:

Bringing the idea to the market:

- Idea = emergence & Incubation, workshops & matchmaking, other clusters;
- Project idea = certification, review & recommendations by project committee, label;
- Funding = calls for projects, information on calls, proposal writing & submission support, negotiation with funding body;
- Business = go to market, product marketing pitch, mission & trade shows, large companies

DOMOTYS:

Advice to corporate entrepreneurship

It seeks to identify both latent projects within organizations and the most relevant resources and capabilities, from a strategic point of view, to generate new opportunities that allow the organization to create value and grow, both in its own sectors and in third parties.

Technology Transfer and Marketing

Aimed at any company that wants to look for business opportunities for its products / services (in / out licensing, search for partners, sale of Industrial Property, among others). Innovation is promoted in companies as a tool to improve their competitiveness, through the transfer of national and / or international technology. It also facilitates the search for technology partners by contacting suppliers and applicants, giving support throughout the process, until the materialization of contacts.

Design management

Promote and implement the management of design in all areas of the product, communication and spaces of the company. Design management allows the generation of innovative concepts in new products, services or strategies through the exhaustive study of people and the way they interact with the market and its environment. Research on emerging behaviours, analysis of particular contexts and the detection of new trends in the market become strategic keys for the determination of innovative concepts, that is, those that generate a greater value and socio-economic impact in a sustainable way for the business.

Valuation of intangibles and legal support

Intangible assets can be a new or core source of business. The company must choose what and how to protect intangible assets to obtain the maximum return on investment by proposing a management based on the commercial opportunity and not only as a defensive strategy barrier. The proposed service is based on a system of identification, valuation, strategic management and exploitation of intangible assets such as patents, trademarks and designs.

Personalized technology monitoring, technology and partner search

One of the determining factors for the success of innovation in organizations is adequate monitoring, understood as the systematic effort made by an organization to search, analyse and disseminate scientific and technological information, allowing the identification of emerging and obsolete trends in Technological development, which in turn prepares organizations to anticipate changes in the environment.

SIPH: Information and advisory of sources of financing technology transfer. Support in searching partners or technology providers.

SGG:

- Transfer of results (dissemination) developed within R & D and innovation projects where CCS is involved via different means (information and communication, training,
- Consulting for preparation of new national and EU R & D projects and innovation projects
- Consulting & training for innovation management, collaborative innovation management business processed management, business model design and development, innovation

competences development
- Training and consulting for Circular construction and sustainable building development.

1.3 Cluster interests and expectations

Q11. Which are the main areas of cooperation of interest for your cluster?

ARCHENERG is considering participating in the CSL project an unique opportunity to learn from leading organizations in the forefront of cyber secure light research the latest technologies and adopt by specialist members.

ELCA

- International cooperation projects focused on smart buildings (and smart lighting), human centric lighting (supporting health, wellbeing and performance of humans through lighting), energy efficiency (energy efficiency of lighting systems, both outdoor and indoor), cyber security of connected lighting, photonics, Internet of Light (Li-Fi), circular economy (to minimize ecological footprint of lighting industry)
- Cooperation/networking at thematic conferences/fairs and events
- cross-sectoral matchmaking of companies and clusters
- internationalisation of clusters services

LIV:

- International cooperation projects focused on smart lighting, human centric lighting (supporting health, wellbeing and performance of humans through lighting), energy efficiency (energy efficiency of lighting systems, both outdoor and indoor), cyber security of connected lighting, photonics, Internet of Light (Li-Fi)
- cooperation/networking at thematic conferences/fairs and events
- cross-sectoral matchmaking of companies and clusters

Pôle-SCS:

- Cybersecurity and digital securities
- Internet of Things
- Manufacturing and smart factories
- Smart cities

DOMOTYS: Inter-cluster and cross-sectoral Projects.

D.1.2 Cyber Secure Light map of envisaged cluster collaboration opportunities

SIPH: Companies development, increase of membership, attracting cluster activity, setting new contacts, new projects to develop cluster and cluster member co-operation as: catching-up new technologies, finding business opportunities.

SGG areas of interest are:

- New and renewed technologies of the sustainable building and in construction, protection of the environment, heritage preservation,
- Energy efficiency and renewable energy in building and districts, water efficiency, green skills,
- Resource efficiency, green, circular construction and economy,
- Digitalization of construction sector, BIM, IOT, smart building
- New business and financial models in building and construction
- Collaborative innovation management and internationalization

Q12. Which added-value do clusters expect to provide to other CSL clusters?

ARCHENERG: Authentic market information on the demand of the building management information technologies in Hungary and in the region of Central and Eastern Europe.

ELCA:

- Knowledge and expertise on smart lighting/connected lighting solutions in the framework of smart building sector
- Linkages to ELCA's members technical expertise and lighting companies products and services
- Opportunities for further cooperation actions under the EU funding programmes/other cooperation
- Expertise on EU policy, legislation and administration

LIV:

- Knowledge and expertise on smart lighting/connected lighting solutions in the framework of smart building sector
- Knowledge and expertise on lighting fixtures manufacturing and integration of electronics and software components

Pôle-SCS:

- Digital security and Networks & Mobile Services, Internet Objects knowledge

- Business models and certification process

DOMOTYS: Collaborative projects between our members, Search for partners for projects, Collaboration with specialized media, Organization of trade missions, Strategic vision of automation technologies.

SIPH: Co-operation, exchange of knowledge and experience, b2b contacts.

SGG:
- Networking with the SGG cluster members, associate members and members of S3 Strategic research partnerships: Smart building and home with wood chain and Smart cities and communities
- Mapping and analysing of optional development and business value chain collaboration
- Training for introduction of collaborative innovation in new value chains.
- Networking and Partnering with European Circular Construction Alliance clusters and their members interested for Cyber security in smart buildings and cities.
- Initiation and new and transformation of value chains, development and business cooperation, new business processes and cross boarder cooperation.

Q13. Which added-value do clusters expect to receive from other CSL clusters?

ARCHENERG: Direct contact and active information exchange with leading European research organizations working in the field of cyber secure light system development.

ELCA:

- Knowledge and expertise on cyber security issues in smart lighting/building sector and intelligent domotic systems
- Opportunities to network with innovative companies, experts and technology providers from connected sectors to set new collaborations and follow-up projects
- Knowledge and Best practices on innovative and effective business services (provided by other CSL clusters)

LIV:

- Knowledge and expertise on cyber security issues in smart lighting sector
- Knowledge and expertise on cyber security issues in smart building
- Knowledge and expertise on cyber security issues in intelligent domotic systems

Pôle-SCS:

- Knowledge on various components indirectly connected to digital security such as construction for Smart Cities
- Tendering for EU project calls

DOMOTYS: Knowledge of new partners for future projects, detection of new business opportunities, increase our cross-sectoral experience and capabilities, identify the opportunities and challenges facing the sector in the coming years.

SIPH: Co-operation, exchange of knowledge and experience, b2b contacts.

SGG:
- Active engagement in identifying optional synergies and complementarities for value chains collaboration and innovation, with provision of information gathered from their members.
- Moderation, trust building and support of cross cluster collaboration within identified fields.
- Identification of optional financial resources to support collaboration innovation (new R&D project) and/or technology transfer including join investments and external funding.

1.4 Barriers to cooperation at Cluster internal level

Q14. Which are the main barriers and hold-ups that slow down potential cooperation of clusters and members?

ARCHENERG:

- SMEs are preoccupied with daily business management and do not have resources for development of capacity for adopting future business opportunities.
- Academia is focusing on fulfilling educational tasks and there is very little capacity for pursuing technology development and research, albeit, it is a requirement to familiarize students with cutting edge, state of the art technologies.
- Government agencies are promoting regional development by attracting investors in the region, but do not have the capability of strategic focus on innovative technologies and long term objectives.

LIV: Difficulty in involving companies in training – capacity building activities at the LIV headquarter because of logistical problems – the cluster companies are scattered throughout the whole regional territory (distances, traffic jam, event scheduling).

Pôle-SCS:

- SMEs – funding opportunities
- Academia – projects that link TRL 1 – 3 (knowledge development) with that of industry TRL 4 – 6 (Technology development) and how to implement TRL 7 - 9 (business development)
- Government organisations – Measurements (the cost benefit analysis and the cost effectiveness analysis)

DOMOTYS:

SMEs: lack of internal human resources, lack of time to pursue innovation, inadequacy and sometimes lack of funding, Lack of strategic partnerships to access public funding, lack of private investors.

Research Centres: inadequacy and sometimes lack of funding compared to the needed investment, Time commitments, and mismatch between supply and demand.

Government organisations: Lengthy delays in negotiation; lack of experience and appropriate skills; and lengthy delays because of political debate, Lack of competition; lack of suitable skills and experience; lack of flexibility.

SIPH: SMEs – lack of means (human resources, time, financial); potential business risk; mentality.

Academia – legislation, lack of direct contacts with potential partners and understanding of business problems, lack of experience in technology transfer, detachment of university science environment from business specifics.

Business Organisations (CCI, Cluster) – insufficient means (human resources, financial, technical, experience).

SGG:

- Cluster activities were highly focused on the EU project application and implementation, involving limited number of cluster member within these projects.
- Lack of cluster services customised for member needs, also short-term needs such as lack of

competent field workers and engineers.

- The cluster as an innovation eco-system support organisation don't receive any public support in terms of financing of cluster services or cluster project from national funds.
- Cooperation is limited to B2B collaboration where cluster services have not so big importance. Especially in the field of business collaboration (join application to public and private construction tenders).

Q15. Which are the main barriers and hold-ups linked to horizontal value-chain linkages?

ARCHENERG does not see hold-ups, but they acknowledge that there is a tendency of ignorance, especially among SMEs, to other focus areas than their current business; therefore, it will be difficult to attract cross-sector interest.

LIV: Lack of knowledge of local skills among the cluster companies; as many cluster companies are direct competitors, they are very reluctant to share their knowledge with each other. Very often when they search for a specific competence/product solution they look outside the cluster because do not know that their "colleagues" from other cluster companies might have what they are looking for.

Pôle-SCS:

- Providing access to new buyers and new markets for developed cybersecurity solutions and
- Becoming more attractive to both international and domestic commercial partners.

DOMOTYS: The lack of capital in enterprises, a lack of skilled personnel, Uncertainty in the results of joint research and development, The fear of technology acquisition by competitors, the lack of a scientific approach by entrepreneurs, the mismatch between supply and demand, a lack of skills and technical resources.

SIPH: Lack of means (human resources, time, financial), lack of experience in technology transfer, lack of direct contacts with potential partners and understanding of business problems.

SGG:

- Due to small market, fierce competition on public tenders, or for projects and customers, it is hard to manage collaboration among direct competitors, small supplier for the same market segment or value chain.
- The collaboration (business one) is done according to established linkages, trust, and via subcontracting schemes.
- Conservative thinking – novel technologies can only slowly progress on the market and penetrate to existing supply chains.

Q16. Which are the main barriers and hold-ups linked to vertical value-chain linkages?

ARCHENERG There are only a few vertical value-chain linkages among cluster member, but these few work without barriers and hold-ups. On the other hand, developing new vertical value-chain linkages appears to be a challenge for the cluster management.

LIV: Difficulty in managing meetings between SMEs and Universities – very often they speak "different" languages (practice vs theories), and it becomes quite challenging to moderate such dialogs and boost bilateral cooperation.

Pôle-SCS:

- Technology push – identify when upgrades of cyber security solutions are required i.e. what are the various different types of solutions, how do they compare with each other, what is the ROI on

purchasing such solutions, and what type of training is required;

- Business pull – purchasing devices/equipment because of market pressure while not having information on what is really required for one's business.

DOMOTYS: The lack of information on research and development activities, Differences in defining the objectives of research and development, The lack of capital in the science sector, uncertainty in the results of joint research and development, a lack of motivation / involvement, the lack of administrative support, the mismatch between supply and demand.

SIPH: Potential business risk; mentality,

SGG:

- Conservative thinking – novel technologies and innovation is related to new machinery and solutions provided on the market, and not being developed in R&D processes.
- Research organisations and R&D projects are not too weakly linked to business, market needs (value of death between research and commercialisation of innovation).

1.5 Existing collaboration relations with Cyber Secure Light partner clusters

Q17. What collaboration opportunities and value chain linkages currently exist between partner clusters?

ARCHENERG had cooperation only with a few consortium members, but it did not qualify as value chain linkage. Most of the partners are new to Archenerg, a good opportunity to develop value chain linkages.

ELCA: Direct link with Rete di Imprese Luce in Veneto that is also a member and co-founder of ELCA.

LIV: Direct link with ELCA members

Pôle-SCS:

- Cybersecurity with The Hague Security Delta and LSEC and on a new H2020 call. Pôle-SCS has also joined Global EPIC, an ecosystem that The Hague Security Delta and LSEC are already a part of.
- Software industry – past and current collaboration with TICE.pt and GAIA.
- Technology clusters such as; AMUBELA and who are involved in fields such as Automation, Robotics Control Systems and Applications for Health
- The following website link provides details of the extent of current value chain linkages
  https://www.pole-scs.org/en/ecosystem/scs-international-network/

INDUSTRIAL INTERNET CONSORTIUM

The Industrial Internet Consortium is the world's leading organization transforming business and society by accelerating the Industrial Internet of Things (IIoT).

Our mission is to deliver a trustworthy IIoT in which the world's systems and devices are securely connected and controlled to deliver transformational outcomes: www.iiconsortium.org

SILICON EUROPE ALLIANCE

Silicon Europe Alliance gathers leading European Clusters in all fields of the electronics and semiconductor: www.silicon-europe.eu

D.1.2 Cyber Secure Light map of envisaged cluster collaboration opportunities

CLUSGRID

Partnership :

- Wschodni Klaster ICT (Poland)
- Canarias Excellencia Technologica (Canary Islands)
- SECPhO (Spain)
- SECARTYS (Spain)
- Industrial Cluster Srednegorie (Bulgaria)

EUROPEAN DIGITAL INDUSTRY ALLIANCE (DIA) Partnership:

- MITC (Sweden)
- GAIA (Spain)
- MESAP Innovation Cluster (Italy)
- TICE.PT (Portugal)
- BalticNet-PlasmaTec e.V. (Germany)

ADPACK – EUROPEAN STRATEGIC CLUSTER PARTNERSHIP FOR ADVANCED SMART PACKAGING

Partnership :

- PLASTIWIN (Belgium)
- Packaging Cluster (Spain)
- InovCluster – Associação do Cluster Agroindustrial do Centro (Portugal)
- BalticNet-PlasmaTec e.V. (Germany)
- Secured Communicating Solutions cluster – SCS Cluster (France)

IOT4INDUSTRY Partnership:

- MicroTech SüdWest e.V. (Allemagne)
- DSP Valley (Belgique)
- MESAP Innovation Cluster (Italie)
- Mont Blanc Industries (France)
- Pôle MecaTech (Belgique)
- Manufacturing Technology Centre (Royaume-Uni)
- inno TSD (France)

CLUSTER4SMART Partnership :

- Amuebla (Spain)
- ArchEnerg Cluster (Hungary)
- Université de Strasbourg (France)
- IKOSZ (Hungary)
- CEEI Burgos (Spain)

MoU signed with Secartys / Domtoys and Archenerg

European partners:

AUSTRIA :
Silicon Alps

BELGIUM :
DSP Valley
LSEC – Leaders in Security
Plastiwin
Pôle Mecatech

BULGARIA

D.1.2 Cyber Secure Light map of envisaged cluster collaboration opportunities

Q18. Are these collaboration opportunities and value-chain linkages related to business collaboration opportunities for innovation and market investments for the clusters' SMEs?

ARCHENERG: Yes, very much hope so, but it is yet to be proven at this stage.

Pôle-SCS: Yes – the Global EPIC ecosystem is based on the following:
ADVOCACY - Advocate for, and raise awareness of, causes, policies, and recommendations.
CONTENT - Share content across keystones.
EMERGING - Scan horizons, anticipate emerging issues, analyse trends, and investigate new domains.
EVALUATION - Evaluate the resilience of system-of-systems against cyber-attacks.
EXCHANGE - Match make people and assets across keystones.
INVESTMENT - Fund research and innovation and define budget allocations.
NETWORK - Each keystone provides resources and processes to other keystones.
PROJECTS - Generate solutions to domain specific challenges.
STANDARDS - Standardize our understanding of cybersecurity.
TALENT - Expand skillsets and knowledge of individuals and organizations.
It is envisioned that by including other members in the cluster i.e. TICE.pt, GAIA and AMUBELA, Pôle-SCS can also avail of the innovation benefits. The projects that Pôle-SCS are involved with generally require deliverables based on C2C events and B2B events and even B2C events. So yes, value-chain linkages are related to business collaboration opportunities for innovation and market investments between cluster and cluster members**.**

DOMOTYS: N/A

SIPH: Yes, they are.

SGG: Prospects for value chains linkages have been outlined at the proposal stage. The proposal ware not approved so this collaboration didn't take place.

Q19. Are there collaboration opportunities framed in another type of collaboration setting (i.e. EU or international projects)?

ARCHENERG So far not, but looking for opportunities of continuing cooperation in case of finding practical synergies in research and project development.

ELCA: Currently not, but there are several collaboration ideas that ELCA would like to transform in specific project proposals (to be submitted under different EU calls for proposals, both international and interregional)

Pôle-SCS: Yes the strand 2 projects feature an international collaboration forum that includes soft landing opportunities between members etc.

DOMOTYS: N/A

SIPH: They are related to the Regional Operational Programme for Świętokrzyskie Region; POIR (Smart Growth Operational Programme) and POPW (Operational Programme Eastern Poland) 2014-2020.

SGG: No, not yet.

2. Mapping of Collaboration Opportunities

Complementarities between each cluster with the other clusters of the network

2.1 ARCHENERG

Q1. Which are the main thematic complementarities between your cluster and other partner clusters?
We understand the Hungarian and CEE market, they can bring here the latest technologies in CSL.

Q2. Which are the main sectoral complementarities between your cluster and other partner clusters?
Energy management, building design and construction.

Q3. What are the main technologies complementarities between your cluster and other partner clusters?
Building information management & cyber security.

Q4. What are the main cooperation interests between your cluster and other partner clusters?
Participate in cutting edge technology development.

Q5. What are the main technologies complementarities between your cluster and other partner clusters?
Building information management & cyber security.

Q6. Which is the expected/ potential added value to provide and receive between your cluster and other partner clusters?
We hope to adopt state of the art technologies in building information management and cooperate in dissemination in Hungary and the region of Central and Eastern Europe.

Q7. Which are the existing barriers and hold-ups that hamper the collaboration opportunities between your cluster and partner clusters?
Despite of almost 15 years of integration within the EU preceded by 15 years of preparation of joining EU, there are still differences in business approaches and perception of need for state support and role of international cooperation. These are not unsurmountable barriers and definitely not expected to build up hold-ups for the implementation of the project.

2.2 DOMOTYS

Q1. Which are the main thematic complementarities between your cluster and other partner clusters?
The main thematic complementarities detected between our cluster and the areas covered by the other participants are the following: • Dissemination of R&D results and transfer of knowledge • Smart and connected lighting • Cybersecurity • IoT for Smart Homes and Buildings

D.1.2 Cyber Secure Light map of envisaged cluster collaboration opportunities

- BIM
- New business models in building and construction

Q2. Which are the main sectoral complementarities between your cluster and other partner clusters?

The main sectoral complementarities detected between our cluster and the other participants are the following:

- In the field of renewable energies and in energy management to improve its efficiency. The members of our cluster can provide added value due to their activity related to the control and monitoring technologies of both the energy itself and the systems that use it.
- In reference to the lighting sector, Domotys can complement this sector by providing software development and technological solutions that promote Smart & connected lighting and all the advantages derived from this trend.
- About the digital technologies, Domotys and its members are specialized in the incorporation of this kind of technologies at three different levels such as homes, buildings and cities, but we are not specialized in the field of cybersecurity, so here we would find a great sectoral complementarity.
- As for the construction sector, Domotys can complement this sector with the integration of different technological solutions that facilitate energy efficiency and sustainability both for construction and for the subsequent exploitation of buildings.

Q3. What are the main technologies complementarities between your cluster and other partner clusters?

The main technological complementarities detected between our cluster and the other participants are the following:

- Building industry and engineering
- Informatics & cyber security
- Innovation and efficient building
- Telecommunications
- Security & Digital identities
- Networks & Mobile Services
- Internet of Things

Q4. What are the main cooperation interests between your cluster and other partner clusters?

The main interest of this international cooperation is to increase the knowledge and good practices of the sector to identify new opportunities to add value to their products and lighting solutions.

Additionally, this project will be really interesting for our members as they will be able to meet international partners with whom to carry out collaborative projects in this field.

For the cluster it will be essential to know how to work on an important and relevant topic such as cybersecurity in future projects.

Q6. Which is the expected/ potential added value to provide and receive between your cluster and other partner clusters?

- Increase the knowledge of cluster members in relation to cybersecurity. Transformation of this knowledge into business opportunity or added value for their products or solutions.
- Positioning this cluster partnership as expert agents in the field of data security (each one in its

sectoral field).

- Facilitate access to other business networks complementary to our value chain for the generation of projects both from the cluster and from our members.

Q7. Which are the existing barriers and hold-ups that hamper the collaboration opportunities between your cluster and partner clusters?

- Different goals and objectives during the execution of the project.
- Physical distance between partners
- Convince our members of the real possibilities for the companies in exploring a future business opportunity.
- Differences could be found in the regulations of each region in terms of technological solutions
- The project links sectors with different degrees of innovation, such as the digital technologies sector and the construction sector.

2.3 ELCA

Q1. Which are the main thematic complementarities between your cluster and other partner clusters?

Common interest for technologies of the sustainable and intelligent building systems (All PPs).

Common interest for cross-sectoral activities addressed to clusters and their SMEs to trigger business collaborations (B2B) and new cooperation projects among CSL clusters (new EU proposals).

Q2. Which are the main sectoral complementarities between your cluster and other partner clusters?

Complementarities with:

Archenerg – energy efficiency in buildings, energy management systems in buildings (with incorporated lighting systems), computerized control of heating, cooling, ventilation and lighting of buildings

POLE SCS - digital technologies for smart lighting systems (with focus on interconnection and cyber security aspects)

DOMOTYS – domotic solutions including lighting systems

SIPH+SGG - digitalization of construction sector

Q3. What are the main technologies complementarities between your cluster and other partner clusters?

With Pole SCS technologies focused on Security & Digital Identities, in our case linked to lighting systems for intelligent buildings;

With DOMOTYS technologies focused on lighting control systems

With Archenerg, SIPH and SGG technologies focused on building information management, building automation systems, energy management in buildings

Q4. What are the main cooperation interests between your cluster and other partner clusters?

- to strengthen the knowledge on cybersecurity and digital securities applied to intelligent lighting systems / smart buildings

- to leverage new inter-cluster and cross-sectoral projects

Q6. Which is the expected/ potential added value to provide and receive between your cluster and other partner clusters?
- Exchange of valid information on the smart building market in partners countries with focus on the cyber security issues and SMEs approach towards it (from Archenerg, SIPH, Domotys and SGG) - Knowledge on digital security aspects in connected devices (from Pole SCS) - best practices / expertise on organising effective trainings for SMEs
Q7. Which are the existing barriers and hold-ups that hamper the collaboration opportunities between your cluster and partner clusters?
None

2.4 LUCE IN VENETO LiV

Q1. Which are the main thematic complementarities between your cluster and other partner clusters?
The main thematic complementarities are the development of products and technologies for smart building
Q2. Which are the main sectoral complementarities between your cluster and other partner clusters?
The main sectoral complementarities are related to **smart building** and all related barriers and technologies. In particular: ARCHENERG – energy efficiency in buildings, energy management systems in buildings POLE SCS - digital technologies for cyber secure communication DOMOTYS – domotic solutions for smart buildings SGG – advanced technologies for smart buildings
Q3. What are the main technologies complementarities between your cluster and other partner clusters?
The main technologies complementarities are related to technologies focused on: - Security & Digital Identities (POLE SCS) - building information management, building automation systems, energy management in buildings (ARCHENERG) - lighting control systems (DOMOTYS)
Q4. What are the main cooperation interests between your cluster and other partner clusters?
The main cooperation interests are to strengthen the knowledge on cybersecurity and digital securities applied to intelligent lighting systems / smart buildings.
Q6. Which is the expected/ potential added value to provide and receive between your cluster and other partner clusters?

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The expected/potential added value to provide by LIV is the deep knowledge about lighting fixtures manufacture for different kind of application in: residential buildings, hospitals, outdoor public lighting…

The expected/potential added value to receive form other clusters is their expertise about cyber secure technics (SCS), domotic installation problems (DOMOSYS), energy management (ARCHENERG) and advanced building manufacturing technics (SGG)

Q7. Which are the existing barriers and hold-ups that hamper the collaboration opportunities between your cluster and partner clusters?

The existing barriers and hold-ups that hamper the collaboration opportunities are: the different way of conceiving products/services in their specific market.

2.5 POLE SCS

Q1. Which are the main thematic complementarities between your cluster and other partner clusters?

Crantec http://www.crantec.net/ has recently become a member of Pôle SCS and they bring with them the following attributes outlined below. Infrastructure of IP networks and Infrastructures of mobile communication networks LiFi bidirectional, - Expertise in Home Automation and in the autimization of Intelligent Buildings, - Manufacture of Luminaires and Integration of LiFi technology in Luminaires for Smart Home, Smart Building, Smart City, - Integration of Vision and Artificial Intelligence (AI) in Luminaires and and other objects for Security, Detection, Facial Recognition, Identification of objects, goods and services. Manufacture of digital furniture (Touch Table, Street Furniture with Very High Speed LiFi, Vision and Integrated Artificial Intelligence, - Development of Geolocation Solutions and LiFi Mobile Applications (LiFi Location Based Services for Smart Retails, Smart City, Industry Applications), - Manufacture of Safety Lighting Blocks integrating the very high speed LiFi, Vision

For this reason I believe Pole SCS **main thematic complementarities would be in the following order:**

i) DOMOTYS: Heating, ventilation and air conditioning, Lighting control systems, Public Lighting, Occupancy-aware control systems, Appliance control and integration, Home security, Digital Transformation, Smart Industry, Energy Efficiency.
ii) ELCA & LUCE IN VENETO: Smart and connected lighting, including energy efficient and human centric lighting.
iii) SGG areas of interest are:
   - New and renewed technologies of the sustainable building and in construction, protection of the environment, heritage preservation,
   - Energy efficiency and renewable energy in building and districts, water efficiency, green skills,
   - Resource efficiency, green, circular construction and economy,
   - Digitalization of construction sector, BIM, IOT, smart building,
   - New business and financial models in building and construction,
   - Collaborative innovation management and internationalization.
iv) ARCHENERG: Dissemination of R&D results through education and training programmes and securing financial support by participation in national and international tendering and preparation of feasibility studies for loan applications.
v) SIPH: Our cluster facilitates the transfer of knowledge and modern technologies, the increase

D.1.2 Cyber Secure Light map of envisaged cluster collaboration opportunities

of personnel's skills and promotion of enterprises.
Q2. Which are the main sectoral complementarities between your cluster and other partner clusters?

i) DOMOTYS:
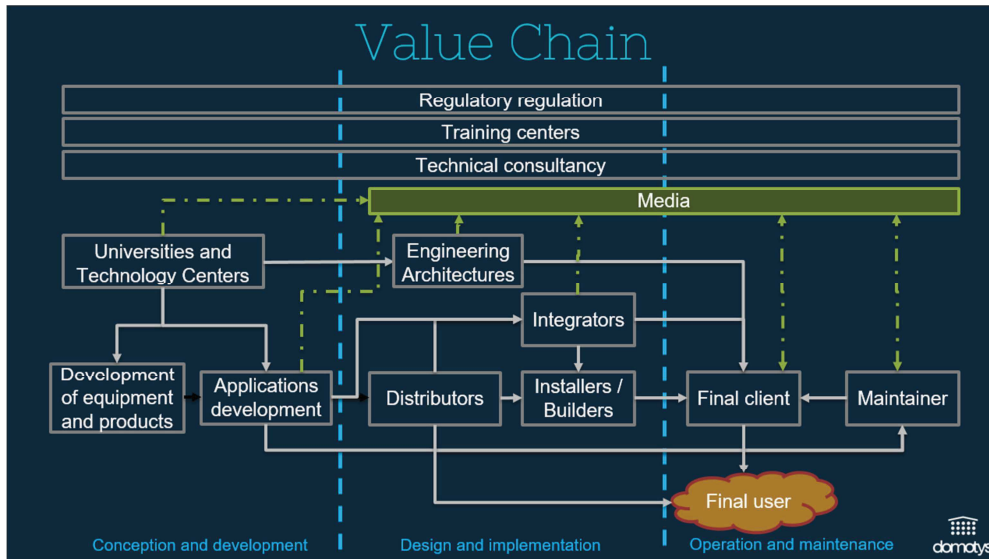
ii) ELCA:
- – Horizontal linkages: ELCA members as lighting clusters from Belgium
- – (Groen Licht Vlaanderen – GLV cluster https://www.groenlichtvlaanderen.be/),
- – Spain (Clúster d'il luminació de Catalunya – CICAT http://www.clusteriluminacion.es/),
- – France (Cluster Lumière https://www.clusterlumiere.com/en/home-page/) and
- – Italy (Luce in Veneto – CSL Coordinator).

iii) SGG:
- – The Cluster is an open organisation and supports whole construction value chain: research and development, Building Design and Engineering, Production of building materials and components, Supply of components, services, utilities, Contracting, Maintenance, Retrofitting, Demolishing, CDW (Construction and Demolition Waste) management. Currently, after major reorganisation of the cluster, the new value chains are being formed, supported also by value chain partners from other CSL clusters.

iv) LUCE IN VENETO:
- – Horizontal linkages - the value-chain of LIV SMEs consists in the following activities: lighting fixtures manufacturing (companies involved in glass processing, metal processing, wood working, ceramic working, plastic materials working, electronic components, product design); lighting fixtures transports (delivery vectors); lighting fixtures selling (e-commerce companies, lighting shops, electrical material distributors)
- – Vertical linkages: LIV works closely with Local Public Authorities as regional government bodies and municipalities, Industrial institutions as chambers of commerce and business networks, Research Centres, Clusters, laboratories, engineers, professional organizations both locally and at European level in order to increase the participation in new development projects and to foster a debate on the possible

		thematic areas of common interest in the lighting field.
v)	SIPH:	
		– The main value–chain linkages in Cluster INNOWATOR concern <u>Vertical linkages.</u> They are e.g.: sharing information, access to the university R&D centres for technology transfer, laboratories as well as trainings, conferences, trade missions organizing, b2b meetings. <u>Horizontal linkages</u> comes from individual contacts of SMEs of the cluster.
vi)	ARCHENERG: <u>Horizontal:</u> renewable energy technology, <u>Vertical:</u> project development and design, EPC contracting.	

The majority of our companies that are seeking to be involved in this project are at TRL 6-9 so the supply chain requires entities that can suppor tour SMEs in the value chain i.e. market access, infrastructure and the relevant environment for example; construction of physical entities.

Q3. What are the main technologies complementarities between your cluster and other partner clusters?

i)	DOMOTYS:
	– **Artificial Intelligence, Cloud Computing, Blockchain, 5G networks, Augmented Reality and Virtual Reality, Electric and self-driving vehicles, 3D printing, Internet of things**;
ii)	ELCA:
	– Technologies linked to **Indoor lighting**, Optical design, Appearance & Perception and Metrology – provided by the **Light & Lighting of the Department of Electrical Engineering** (ESAT) of KU Leuven (associated to ELCA through GLV cluster) and to **indoor & outdoor lighting provided by several laboratories and research centres linked to the Cluster Lumiere and RI Luce in Veneto (ELCA's members)**
	– **Technologies linked to lighting materials and control systems**, as well as photometry and colourimetry – provided by The Lighting Group of the Research Institute on Energy, IREC Catalonia Institute for Energy Research (associated to ELCA through CICAT cluster)
	– **Technologies linked to informatics and cyber security** – provided by the University Ca'Foscari, University of Verona and University of Padua (associated to ELCA through RI LiV cluster)
	– **Technologies linked to sustainable urban design, Innovation and efficient building** – provided by the University IUAV of Venice (associated to ELCA through RI LiV cluster)
	– Technologies and research linked to photonics engineering provided by Vrije Universiteit Brussel, VUB B-PHOT Brussels Photonics Team (a part of the Department of Applied Physics and Photonics) and Ghent University, The Photonics Research Group (a part of the Department of Information Technology) - (associated to ELCA through GLV cluster);
iii)	LIV:
	– Technologies linked to **Indoor lighting & outdoor lighting**, Appearance & Perception and Metrology – provided by Department of Industrial Engineering (University of Padua)
	– **Technologies linked to informatics and cyber security** – provided by the University Ca' Foscari, University of Verona and University of Padua
	– Technologies linked to sustainable urban design, Innovation and efficient building – provided by the University IUAV of Venice
	– Technologies and research **linked to human centric lighting technologies** – provided by HIT Research Centre (University of Padua);

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iv) SIPH:
- Kielce University of Technology, Rzeszow University of Technology and Warsaw University. Engineering and Architecture, **Electrical Engineering, Automatic Control and Computer Science, Environment**, Geomatics and Energy Engineering;

v) ARCHENERG:
- Solar energy utilization: installation of photovoltaic and solar systems for the production of domestic hot water, including water needed for the heating system or for producing domestic solar electricity
- Geothermal energy utilization: installation of heat pump systems
- Biomass utilization: compact biomass utilization (furnace, wood, brick, pellet), planning and building of plants based on biogas
- **Prefabricated and passive houses: planning and implementation of energy efficient houses**
- **Building industry, engineering: planning, implementation**, heat insulation, **renovation, building information management.**

vi) SGG:
- The cluster (e.g. cluster office) is a service organisation with the know-how and competences in the following field:
- R & D and innovation projects: preparation and management of national **and EU R & D projects and innovation projects, acquiring of EU & national funding (grants).**
- Networking across sectors and beyond, memberships in EU associations/platforms, and policy influencing innovation management, collaborative innovation management business processed management, **business model design and development**, innovation competences development Circular construction and sustainable building development.

I have referenced the clusters in order of preference based on the cluster partners technologies that are most suited to our needs. In bold I have highlighted the key technologies.

Q4. What are the main cooperation interests between your cluster and other partner clusters?

i) DOMOTYS:
- Inter-cluster and cross-sectoral Projects.
- Smart cities; smart buildings, smart industry, IoT, safety, Big Data

ii) ELCA :
- International cooperation projects focused on smart buildings (and smart lighting), human centric lighting (supporting health, wellbeing and performance of humans through lighting), energy efficiency (energy efficiency of lighting systems, both outdoor and indoor), cyber security of connected lighting, photonics, Internet of Light (Li-Fi), circular economy (to minimize ecological footprint of lighting industry)
- Cooperation/networking at thematic conferences/fairs and events
- cross-sectoral matchmaking of companies and clusters
- nternationalisation of clusters services

iii) LIV:
- International cooperation projects focused on smart lighting, human centric lighting (supporting health, wellbeing and performance of humans through lighting), energy efficiency (energy efficiency of lighting systems, both outdoor and indoor), cyber security of connected lighting, photonics, Internet of Light (Li-Fi)

       −   cooperation/networking at thematic conferences/fairs and events

       −   cross-sectoral matchmaking of companies and clusters

iv)   SGG areas of interest are:

- New and renewed technologies of the sustainable building and in construction, protection of the environment, heritage preservation,
- Energy efficiency and renewable energy in building and districts, water efficiency, green skills,
- Resource efficiency, green, circular construction and economy,
- Digitalization of construction sector, BIM, IOT, smart building
- New business and financial models in building and construction
- Collaborative innovation management and internationalization

Q6. Which is the expected/ potential added value to provide and receive between your cluster and other partner clusters?

i)   ELCA:
- Knowledge and expertise on smart lighting/connected lighting solutions in the framework of smart building sector
- Linkages to ELCA's members technical expertise and lighting companies products and services
- Opportunities for further cooperation actions under the EU funding programmes/other cooperation
- Expertise on EU policy, legislation and administration

ii)   LIV:
- Knowledge and expertise on smart lighting/connected lighting solutions in the framework of smart building sector
- Knowledge and expertise on lighting fixtures manufacturing and integration of electronics and software components

iii)   SGG:
- Networking with the SGG cluster members, associate members and members of S3 Strategic research partnerships: Smart building and home with wood chain and Smart cities and communities
- Mapping and analysing of optional development and business value chain collaboration
- Training for introduction of collaborative innovation in new value chains.
- Networking and Partnering with European Circular Construction Alliance clusters and their members interested for Cyber security in smart buildings and cities.
- Initiation and new and transformation of value chains, development and business cooperation, new business processes and cross broader cooperation.

iv)   DOMOTYS:
- Collaborative projects between our members, Search for partners for projects, Collaboration with specialized media, Organization of trade missions, Strategic vision of automation technologies.

vii)   ARCHENERG: Authentic market information on the demand of the building management information technologies in Hungary and in the region of Central and Eastern Europe

viii)   SIPH: Co-operation, exchange of knowledge and experience, b2b contacts.

Q7. Which are the existing barriers and hold-ups that hamper the collaboration opportunities between your cluster and partner clusters?

i)   DOMOTYS:
  – SMEs: lack of internal human resources, lack of time to pursue innovation, inadequacy and sometimes lack of funding, Lack of strategic partnerships to access public funding, lack of private investors.
  – Research Centres: inadequacy and sometimes lack of funding compared to the needed investment, Time commitments, and mismatch between supply and demand.
  – *Government organisations:* Lengthy delays in negotiation; lack of experience and appropriate skills; and lengthy delays because of political debate, Lack of competition; lack of suitable skills and experience; lack of flexibility.
ii)   ARCHENERG:
  – SMEs are preoccupied with daily business management and do not have resources for development of capacity for adopting future business opportunities.
  – Academia is focusing on fulfilling educational tasks and there is very little capacity for pursuing technology development and research, albeit, it is a requirement to familiarize students with cutting edge, state of the art technologies.
  – Government agencies are promoting regional development by attracting investors in the region, but do not have the capability of strategic focus on innovative technologies and long term objectives.
iii)   SIPH:
  – SMEs – lack of means (human resources, time, financial); potential business risk; mentality.
  – Academia – legislation, lack of direct contacts with potential partners and understanding of business problems, lack of experience in technology transfer, detachment of university science environment from business specifics.
  – Business Organisations (CCI, Cluster) – insufficient means (human resources, financial, technical, experience).
iv)   SGG:
  – Cluster activities were highly focused on the EU project application and implementation, involving limited number of cluster member within these projects.
  – Lack of cluster services customised for member needs, also short-term needs such as lack of competent field workers and engineers.
  – The cluster as an innovation eco-system support organisation don't receive any public support in terms of financing of cluster services or cluster project from national funds.
  – Cooperation is limited to B2B collaboration where cluster services have not so big importance. Especially in the field of business collaboration (join application to public and private construction tenders).

2.6 SIPH

Q1. Which are the main thematic complementarities between your cluster and other partner clusters?
Transfer of knowledge and modern technologies

Q2. Which are the main sectoral complementarities between your cluster and other partner clusters?
Civil engineering. Construction of buildings.

| **Q3. What are the main technologies complementarities between your cluster and other partner** |

clusters?
Engineering and Architecture, Electrical Engineering, Automatic Control and Computer Science, Environment, Geomatics and Energy Engineering.
Q4. What are the main cooperation interests between your cluster and other partner clusters?
Exchange of knowledge, experience, information on potential partners of business co-operation and opportunities for SMEs.
Q6. Which is the expected/ potential added value to provide and receive between your cluster and other partner clusters?
Co-operation, exchange of knowledge and experience, b2b contacts.
Q7. Which are the existing barriers and hold-ups that hamper the collaboration opportunities between your cluster and partner clusters?
Potential business risk; mentality Lack of means (human resources, time, financial), lack of experience in technology transfer, lack of direct contacts with potential partners and understanding of business problems.

2.7 SGG

Q1. Which are the main thematic complementarities between your cluster and other partner clusters?
Building and construction, especially for energy efficient and sustainable construction and renovation of buildings, sustainable development of the built environment, green, and circular economy need new construction materials, products and services - but also a number of embedded systems, including smart lighting, and other systems based on ICT/IOT. Smart (ELCA, LUCE in VENETO, POLE SCS) but also user oriented (DOMOTYS), energy efficient/sustainable (ARCHENERGY) and circular buildings (SGG, SIPH) and cities need complemented solutions which are provited by CSL partners clusters.
Q2. Which are the main sectoral complementarities between your cluster and other partner clusters?
SGG cluster is an open organisation and aims to support whole construction value chain: research and development, Building Design and Engineering, Production of building materials and components, Supply of components, services, utilities, Contracting, Maintenance, Retrofitting, Demolishing, CDW (Construction and Demolition Waste) management. Currently, after major reorganisation of the cluster, the new value chains are being formed, supported also by value chain partners from other CSL clusters. The ambition of SGG is to set-up value chain collaboration based on best competences of actors involved not on the location of delivery of services or products. Smart lighting solutions provided by ELCA members, especially LUCE in VENETO, digital technologies (POLE SCS), solutions for home (indoor environment) and home avtomation (DOMOTYS members), energy efficient/sustainable (ARCHENERGY) and circular buildings (SGG, SIPH) and cities solutions can be embedded in number of different value chain collaboration schemes of smart building/city.
Q3. What are the main technologies complementarities between your cluster and other partner clusters?

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Many technologies complementaries between partner clusters and SGG`s members and associate members. The main (core) complementaries are:

- Value chain management / business model development / innovation management (cluster office competences)
- BIM/design/engineering support of systems development, training, installation, maintenance (cluster members)
- Smart building design/engineering, provision so system and components (SGG cluster members, associate members)
- Cyber security system validation and penatratrion tests. (SGG associate members)

With stakeholders within Slovenian Strategic Research and Innovation Partnerhips (SRIPs), we identified a number of potential technological complementarities, but also some "competive overlapping" as sume of them alredy provide complete solutions for smart lighting. The key technology complementarity is advanced cyber security, and collaboration in supply chain.

Q4. What are the main cooperation interests between your cluster and other partner clusters?

SGG main cooperation interest is to set-up intensive cluster to cluster collaboration, jointly connecting our members in new value chains supporting investments, design, construction and operation of smart buildings and cities. Secondly, to support initiation and implementation of R&D projects, and investments (linked to Smart Specializations) to market ready solutions. And thirdly, support this process with cluster services in the field of training, coaching, and internationalization.

Q5. What are the main technologies complementarities between your cluster and other partner clusters?

The cluster (e.g. cluster office) is a service; organisation with the know-how and competences in the following field: R & D and innovation projects: preparation and management of national and EU R & D projects and innovation projects, acquiring of EU & national funding (grants).

Networking across sectors and beyond, memberships in EU associations /platforms, and policy influencing Innovation management, collaborative innovation management business processed management, business model design and development, innovation competences development; Circular construction and sustainable building development.

Q6. Which is the expected/ potential added value to provide and receive between your cluster and other partner clusters?

Incresing the number of SGG cluster members with opening new R&D and business cooperation opportunities with other partner cluster and their members. More intensive involvement of S3 Strategic research partnerships: Smart building and home with wood chain and Smart cities and communities. Mapping and analysing of optional development and business value chain collaboration; Training for introduction of collaborative innovation in new value chains. Networking and Partnering with European Circular Construction Alliance clusters and their members interested for Cyber security in smart buildings and cities. Initiation and new and transformation of value chains, development and business cooperation, new business processes and cross boarder cooperation.

Q7. Which are the existing barriers and hold-ups that hamper the collaboration opportunities between your cluster and partner clusters?

On the cluster side: cluster activities were highly focused on the EU R&D project application and

implementation, involving limited number of cluster member within these projects. Lack of cluster services customised for member needs, since the cluster as an innovation eco-system doesn't receive any public support in terms of financing of cluster services or cluster project from national funds. Lack of members portfolio, for specific field.

On the members site: The local thinking of members as there is a lack of competences and many times also willingness (interest) for cross boarder collaboration. One of concerns is IPR/know-how protection within open innovation projects. The limitations in scope of available resources, mainly human ones as these organisations as mainly SMEs. Lack of financial resources (available to SMEs) supporting smart investments.

3. Mapping of Collaboration Opportunities – Matchmaking Table

	LUCE IN VENETO	DOMOTYS	SIPH	POLE SCS	ELCA	SGG	ARCHENERG
Main area/ thematic areas	Lighting industry and electrical equipment. Smart and connected lighting, including energy efficient and human centric lighting.	Home and building automation and smart cities. Heating, ventilation and air conditioning, Lighting control systems, Public Lighting, Occupancy-aware control systems, Appliance control and integration, Home security, Digital Transformation, Smart Industry, Energy Efficiency.	Civil engineering. Construction of buildings. Our cluster facilitates the transfer of knowledge and modern technologies, the increase of personnel's skills and promotion of enterprises.	Digital technologies i.e. Electronics, Telecommunications and Software for Smart Cities, Retail, Transport & Logistics, Industry 4.0 and Health.	Lighting industry and electrical equipment, smart and connected lighting, including energy efficient and human centric lighting.	Building and construction, especially for energy efficient and sustainable construction and renovation of buildings, new materials, products and services, and business models - business cooperation with the aim of expanding into new markets.	Renewable energy project development & implementation, introduction of innovative building materials and construction techniques through demonstration projects and training programmes. These include solar, wind, biomass and geothermal energy use, energy management to improve efficiency, production and utilisation of hemp based insulation and structural materials.
Value-chain linkages	Shared R&D capacity, raw material supply, and marketing, joint project development within and outside Veneto region.	Universities and R&D centres members of DOMOTYS-SECARTYS, Companies and theur network of distributors, installers, maintainers and clients	Vertical linkages. are e.g.: sharing information, access to the university R&D centres for technology transfer, laboratories and trainings, conferences, trade missions organizing, b2b meetings. Horizontal linkages	R&D projects, partnerships with other clusters, corporates, alliances, etc.	Cooperation among member clusters, R&D centres and academia linked to ELCA's members	Cluster is an open organisation and supports whole construction value chain: research and development, Building Design and Engineering, Production of building materials and components, Supply of components, services, utilities, Contracting, Maintenance, Retrofitting,	Dissemination of R&D results in the above industrial areas through education and training programmes. Securing financial support for these programmes by participation in national and international tendering and preparation of feasibility studies for loan applications.

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	LUCE IN VENETO	DOMOTYS	SIPH	POLE SCS	ELCA	SGG	ARCHENERG
			comes from individual contacts of SMEs			Demolishing, CDW (Construction and Demolition Waste) management. Currently, after major reorganisation of the cluster, the new value chains are being formed, supported also by value chain partners from other CSL clusters.	
Main sectors	Indoor & Outdoor Lighting, SSL (LED) Lighting. Light management systems	• Software industry • Construction industry • Energy industry • Electrical power industry • Hospitality industry • Information and Telecommunications industry.	Building materials, chemical industry (nano technology), building automation systems, technical and telecommunication installations.	Contactless, Mobile networks & IoT, Security and Digital Identities	Indoor & Outdoor Lighting, SSL (LED) Lighting, Light management systems.	Building and construction; Design and engineering; Real estate management; Energy supply, other utilities sectors; ICT; communication services.	Energy efficient building design, construction and management, computerized control of heating, cooling, ventilation and lighting of buildings. Power generation: photovoltaic, wind, mini hydro. Heat energy: heat pumps, geothermal energy use, biomass and biogas use, heat recuperation, energy efficient heating, cooling and ventilation. Waste to energy, waste recycling, waste to secondary raw material, and process control of hazardous waste incinerators.

D.1.2 Cyber Secure Light map of envisaged cluster collaboration opportunities

	LUCE IN VENETO	DOMOTYS	SIPH	POLE SCS	ELCA	SGG	ARCHENERG
Main techno-logies	Indoor & outdoor lighting, Appearance & Perception and Metrology; informatics and cyber security; sustainable urban design, Innovation and efficient building; human centric lighting technologies.	Artificial Intelligence, Cloud Computing, Block-chain, 5G networks, Augmented Reality and Virtual Reality, Electric and self-driving vehicles, 3D printing, Internet of things. Monitoring and energy control software, Lighting control, Big Data, Sensors, Internet of Things, System integration in voice assistants, Beacons, Digital Twins, Cyber-physical systems, cybersecurity, industrial automation systems	Engineering and Architecture, Electrical Engineering, Automatic Control and Computer Science, Environment, Geomatics and Energy Engineering. Nano technology in building materials, building automation systems, technical and telecommunication installations. Photovoltaic installations integrated with the BIPV building, unmanned aerial system designed for autonomous inspection of bridge structures, Innovative recycling materials. Image analysis systems, optical detection of visual damage as well as closed process lines.	Microelectronics, Telecommunications, and Security & Digital Identities	Indoor & outdoor lighting, Appearance & Perception and Metrology; lighting materials and control systems, photometry and colourimetry, informatics and cyber security; sustainable urban design, Innovation and efficient building; photonics engineering.	R & D and innovation projects: preparation and management of national and EU R & D projects and innovation projects, acquiring of EU & national funding (grants). Networking across sectors and beyond, memberships in EU associations /platforms, and policy influencing Innovation management, collaborative innovation management business processed management, business model design and development, innovation competences development; Circular construction and sustainable building development.	Solar energy utilization: installation of photovoltaic and solar systems for the production of domestic hot water, including water needed for the heating system or for producing domestic solar electricity Geothermal energy utilization: installation of heat pump systems Biomass utilization: compact biomass utilization (furnace, wood, brick, pellet), planning and building of plants based on biogas Prefabricated and passive houses: planning and implementation of energy efficient houses, Building industry, And engineering: planning, implementation, heat insulation, renovation, building information management.

D.1.2 Cyber Secure Light map of envisaged cluster collaboration opportunities

	LUCE IN VENETO	DOMOTYS	SIPH	POLE SCS	ELCA	SGG	ARCHENERG
Co-operation interests	International cooperation projects focused on smart lighting, human centric lighting (supporting health, wellbeing and performance of humans through lighting), energy efficiency (energy efficiency of lighting systems, both outdoor and indoor), cyber security of connected lighting, photonics, Internet of Light (Li-Fi) through cooperation/networking at thematic conferences/fairs and events and cross-sectoral matchmaking of companies and clusters	Focus on 4 strategic work areas: - Energy (Climate change, energy efficiency, smart grids, eco-innovation) - Life Quality (Health, Leisure, Active ageing, Comfort, Education) - Smart Cities (Smart Industry, Smart building, IoT, safety, Big data, accessibility)	Company development, increase of membership, attracting cluster activity, setting new contacts, new projects to develop cluster and cluster members' co-operation as: catching-up new technologies, finding business opportunities.	Cybersecurity and digital securities, Internet of Things, Manufacturing and smart factories, Smart cities	International cooperation projects focused on smart lighting, human centric lighting (supporting health, wellbeing and performance of humans through lighting), energy efficiency (energy efficiency of lighting systems, both outdoor and indoor), cyber security of connected lighting, photonics, Internet of Light (Li-Fi) through cooperation/net working at thematic	SGG areas of interest are: New and renewed technologies of the sustainable building and in construction, protection of the environment, heritage preservation, Energy efficiency and renewable energy in building and districts, water efficiency, green skills, Resource efficiency, green, circular construction and economy, Digitalization of construction sector, BIM, IOT, smart building New business and financial models in building and construction Collaborative innovation management and internationalization	Participate in cutting edge technology development

D.1.2 Cyber Secure Light map of envisaged cluster collaboration opportunities

	LUCE IN VENETO	DOMOTYS	SIPH	POLE SCS	ELCA	SGG	ARCHENERG
					conferences/fairs and events and cross-sectoral matchmaking of companies and clusters, internationalisation of cluster services.		
Expected added value to provide and receive	Provide: knowledge and expertise on smart lighting, connected lighting solutions in the framework of smart building sector and on lighting fixtures manufacturing and integration of electronics and software components. Receive: knowledge and expertise on cyber security issues in smart lighting sector, in smart building and	Provide: Collaborative projects between our members, Search for partners for projects, Collaboration with specialized media, Organization of trade missions, Strategic vision of automation technologies, Receive: Knowledge of new partners for future projects, detection of new business opportunities, increase our cross-sectoral experience	Co-operation, exchange of knowledge and experience, b2b contacts.	Provide: digital security and Networks & Mobile Services, Internet Objects knowledge, Business models and certification process. Receive: knowledge on various components indirectly connected to digital security such as construction for Smart Cities &	Provide: knowledge and expertise on smart lighting solutions in the framework of smart building sector, Linkages to ELCA's members technical expertise and lighting companies products and services, Opportunities for further cooperation	Networking with the SGG cluster members, associate members and members of S3 Strategic research partnerships: Smart building and home with wood chain and Smart cities and communities; Mapping and analysing of optional development and business value chain collaboration; Training for introduction of collaborative innovation in new value chains. Networking and Partnering with European Circular Construction Alliance clusters and their	Provide: Authentic market information on the demand of the building management information technologies in Hungary and in the region of Central and Eastern Europe. Receive: Direct contact and active information exchange with leading European research organizations working in the field of cyber secure light system development.

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LUCE IN VENETO	DOMOTYS	SIPH	POLE SCS	ELCA	SGG	ARCHENERG
intelligent domotic systems.	and capabilities, identify the opportunities and challenges facing the sector in the coming years.		Tendering for EU project calls.	actions under the EU funding programmes & other cooperation, Expertise on EU policy, legislation and administration. Receive: knowledge and expertise on cyber security issues in smart lighting sector, in smart building and intelligent domotic systems. Opportunities to network with innovative companies, experts and technology providers from connected sectors	members interested for Cyber security in smart buildings and cities. Initiation and new and transformation of value chains, development and business cooperation, new business processes and cross boarder cooperation.	

D.1.2 Cyber Secure Light map of envisaged cluster collaboration opportunities

	LUCE IN VENETO	DOMOTYS	SIPH	POLE SCS	ELCA	SGG	ARCHENERG
Barriers and hold-ups	Logistical problems and lack of cooperation among cluster members in organisation of capacity building training sessions.	SMEs: lack of internal human resources, time to pursue innovation, inadequacy and sometimes lack of funding, Lack of strategic partnerships to access public funding, or private investors. Research Centres: inadequacy and sometimes lack of funding compared to the needed investment, Time commitments, and mismatch between supply and demand. Government organisations: Lengthy delays in negotiation; lack of experience and appropriate skills; and lengthy delays because of political debate, Lack of competition; lack of suitable skills and experience; lack of flexibility.	SMEs: lack of means (human resources, time, financial); potential business risk; mentality. Academia: legislation, lack of direct contacts with potential partners and understanding of business problems, lack of experience in technology transfer, detachment of university science environment from business specifics. Business Organisations (CCI, Cluster): insufficient means (human resources, financial, technical, experience).	SMEs – funding opportunities. Academia – projects that link TRL 1 – 3 (knowledge development) with that of industry TRL 4 – 6 (Technology development) and how to implement TRL 7 - 9 (business development). Government organisations – Measurements (the cost benefit analysis and the cost effectiveness analysis).	N/A	Cluster activities were highly focused on the EU project application and implementation, involving limited number of cluster member within these projects. Lack of cluster services customised for member needs, also short-term needs such as lack of competent field workers and engineers. The cluster as an innovation eco-system support organisation don't receive any public support in terms of financing of cluster services or cluster project from national funds. Cooperation is limited to B2B collaboration where cluster services have not so big importance. Especially in the field of business collaboration (join application to public and private construction tenders).	N/A

4. SWOT ANALYSIS of CYBER SECURE LIGHT Consortium

STRENGTHS

– We represent 1,115 SMEs engaged in lighting and home automation systems development, design and building across seven European countries.

– We have formed a Cluster Partnership and we are able to pursue proactive and business-oriented cross-sector cooperation of SMEs and industrial clusters of the smart building value chain, with a particular focus on the security aspects.

– The knowledge, skills and capabilities of the consortium partners complement each other.

– Consortium members enjoy competitive advantages through sharing R&D capacity, raw material supply, and marketing, joint project development.

– Networking with other consortium cluster members, forming strategic research partnerships.

WEAKNESSES

– Our Cluster Partnership has little experience in facilitating interregional cooperation among SMEs.

– Our consortium partners are just getting acquainted with each other's skills and capabilities.

– Some of our SME members suspect direct competition; therefore, reluctant to share information.

– Sometimes it is difficult to reach out to all 1,115 members in seven countries; therefore, response times are quite long.

OPPORTUNITIES

– Our business sector is expanding, with many future opportunities for success.

– Buildings we live and work in are getting better, smarter, and more connected.

– Most new facilities are equipped with network-connected products including Building Management Systems for controlling lighting, power, heating, ventilation and air conditioning, security cameras, fire safety, elevator access and much more.

– Lighting positions itself at the heart of Smart Buildings and at the forefront of the Internet of Things revolution. However, this evolution has its downside linked to the digital security aspects of internet enabled systems.

– Local governments encourage the fostering of local SME businesses.

– Our competitors may be slower than us in adopting new technologies.

– As the largest group of companies engaged in development of cyber secure light systems in Europe we will be able to influence European regulation of our industry sector.

THREATS

– Developments in technology may change the cyber secure light systems market beyond our ability to adapt.

– Logistical problems due to large distances and lack of cooperation among cluster members in organization of capacity building training sessions.

D.1.2 Cyber Secure Light map of envisaged cluster collaboration opportunities

- Lack of knowledge of each-other's skills among cluster companies; many cluster companies are direct competitors and they are very reluctant to share their knowledge with each other.

- Providing access to new buyers and new markets for developed cybersecurity solutions and becoming more attractive to both international and domestic commercial partners instead of joint research and development with consortium partners.

- The lack of capital and lack of skilled personnel. SMEs are preoccupied with daily business management and do not have resources for development of capacity for adopting future business opportunities.

- Uncertainty in the results of joint research and development.

- The fear of technology acquisition by competitors.

- Government agencies are promoting regional development by attracting investors in the region, but do not have the capability of strategic focus on innovative technologies and long-term objectives.
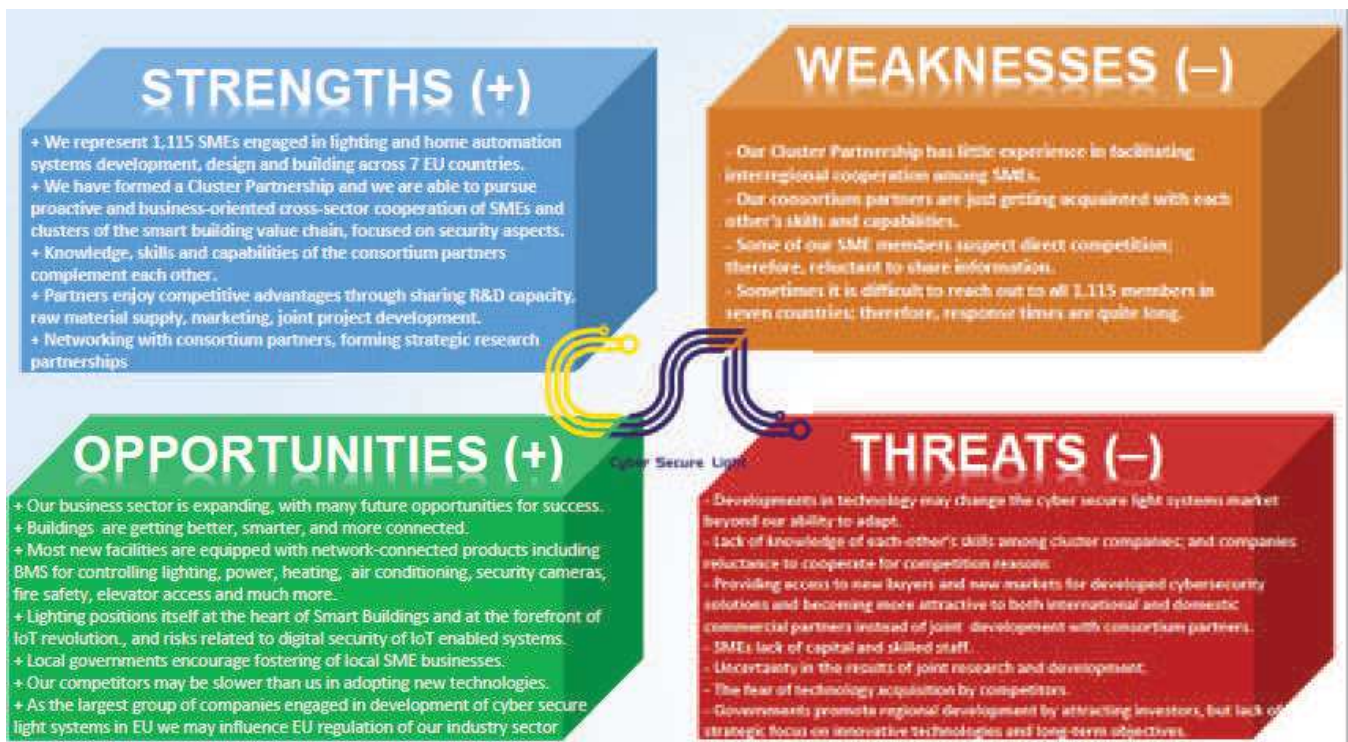
5. Focus on hold-ups and current barriers slowing down cross-sectoral cooperation among clusters and SMEs

The mapping exercise has included an assessment of the main barriers and hold-ups that slow down potential cooperation of clusters and the members, including linked to horizontal value-chain linkages and vertical value chain-linkages. Archenerg Cluster has received each partner's summary of these with the main conclusions. The chapter below describes the main hold-ups and current barriers that slow down the cross-sectoral cooperation among SMEs and how these could be tackled to boost business collaboration opportunities for innovation and market investments for clusters SMEs.

1. **The main barriers and hold-ups of potential cooperation:**
All partners agree that SMEs are preoccupied with daily business management and do not have resources (human capacity, technical knowledge, financial means, etc.) for development of capacity for adopting future business opportunities.

Most of the partners mentioned, that the mentality of SMEs, academic research institutions and governmental organisations are very different. It is a challenging task to motivate all three groups to focus on innovative technologies and long term objectives.

Many partners mentioned lack of funding (shortage of public funds, both EU and national, and lack of interest of private investors) and difficulties with financing joint research programmes or adaptation of innovative solutions.

Some of the partners mentioned problems with communication among partners, logistic problems of organising meetings or even teleconferences, or B2B meetings.

Some others mentioned overwhelming bureaucracy in connection with public funding applications.

2. **The main barriers and hold-ups linked to horizontal value-chain linkages:**
Most partners mention lack of knowledge of each other's skills, some others complain about lack of willingness of sharing information with "competitors".

They also mention the lack of capital, lack of skilled personnel, the lack of a scientific approach by entrepreneurs, the mismatch between supply and demand, uncertainty in the results of joint research and development.

Due to small market, fierce competition on public tenders, or for projects and customers, it is hard to manage collaboration among direct competitors, small suppliers for the same market segment or value chain.

3. **The main barriers and hold-ups linked to vertical value-chain linkages:**
Some of the partners find it difficult to develop vertical value chain linkages due to different business approach of academia and SMEs.
On the other hand, there is a technology push to identify when upgrades of cyber security solutions are required, what are the various different types of solutions, how do they compare with each other, what is the return on the investment of purchasing such solutions, and what type of training is required; and there

is a business pull of purchasing devices and equipment because of market pressure while not having information on what is really required for one's business.

Some partners complain about the lack of information on research and development activities, differences in defining the objectives of research and development, and the lack of capital in the science sector, uncertainty in the results of joint research and development, a lack of motivation / involvement, the lack of administrative support, the mismatch between supply and demand. Some research organisations and R&D projects are only weakly linked to business, market needs (valley of death between research and commercialisation of innovation).

6. Thematic surveys for SMEs

The SMEs survey is an integral part of the Task 1.2 focused on mapping of envisaged CYBER SECURE LIGHT cluster collaboration opportunities and value chain linkages.

The survey addressed to clusters' companies (mainly SMEs) aims to verify their innovation management level, demand for technology transfer, difficulties to access KET solutions and financing/funding for improving their technological assets, skills and investment rate, approach to international networking. It also aims to assess distance-to-target between the companies' actual needs, technological interests, market goals and the cluster business support and technology transfer services currently provided by the clusters concerned in CYBER SECURE LIGHT. A draft version in English was prepared and it was translated into partners national languages in order to facilitate its dissemination among respective companies and data collection. Partners disseminated the survey in a paper format or through digital channels (email, google forms, specific survey platform as for example surveymonkey.com, survio.com, etc.) choosing the best mean to reach the widest range of their companies. A sample of the standard version used is included in this document as annex.

The **Annex 1 – Cyber Secure Light Partners surveys** includes the surveys, the replies given by responding companies and main conclusions made by Project Partners.

7. Drivers for the Cyber Secure Light consortium shared value strategy

The main objective of the CYBER SECURE LIGHT Joint Cluster Partnership Strategy is to pursue proactive and business-oriented cross-sectoral cooperation of SMEs and industrial clusters of the IoT smart building value chain, with a particular focus on the cybersecurity aspects. The Strategy will outline the common vision and target goals of the consortium on how to tackle the future trends and challenges of the security in Smart Buildings industry. Moreover, it will exploit synergies, common assets, innovation sources and growth potential of the targeted project clusters and their SME members in order to ensure mutual benefits, to foster new business collaborations and mobilise private and public financing for joint smart specialisation investments.

The CYBER SECURE LIGHT project is fully aligned with the Smart Specialisation Strategies of six target regions (Veneto IT, Catalonia ES, Western Slovenia SI, PACA FR, Świętokrzyskie PL and Southern Great Plain HU) that all identified IoT and ICT as Cross-cutting Key Enabling Technologies of paramount importance for their S3 priorities focusing on smart manufacturing, smart buildings and cities, sustainable living, energy-efficient construction, digital, circular and industry 4.0.

Smart specialisation emphasises the identification of niches, cross-sectorial innovation and solving societal challenges. With this comes a need for an outward looking dimension, to widened the approach to economic development policies from purely economic considerations (productivity, GDP growth), to include social and environmental considerations ("beyond the GDP").

In this framework, the new competitiveness and innovation policies require the mobilisation of public and private actors at the regional (and in some cases national) level, as well as economic and social agents, to establish an open, inclusive and constructive dialogue and prepare a common ground to jointly deliver new solutions and solve common challenges by creating shared value.

As businesses are the main actors in creating value in a region, the Cyber Secure Light consortium will investigate new perspective on the role clusters and their innovation initiatives can play within a society. The partnership will liaise with target RIS3 policy makers to recapture the ability to address social needs by both private and public players in order to create a basic alignment of interests that can be harnessed in specific Creating Shared Value settings. The project will explore how added value can be created if the macro-micro role of public policy is more aligned with the micro-macro role of businesses, especially in the area of innovation and clustering policies.

7.1. The concept of shared value

Porter and Kramer in their article "*Creating shared value: how to reinvent capitalism - and unleash a wave of innovation and growth*"[1] published in Harvard Business Review (2011) define shared value creation as "**policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities in which it operates**" (2011, p. 6).

Therefore, Creating Shared Value (CSV) is a business strategy focused on companies creating measurable economic benefit by identifying and addressing social problems that intersect with their business.

Hence, societal problems should not be viewed just as limiting the potential for value creation, but also as sources for value creation. Porter and Kramer describe that creating value for society "opens up many ways to serve new needs, gain efficiency, create differentiation and expand markets" (p. 7) and Pfitzer, Bockstette and Stamp advise that social problems represent vast opportunities for growth[2].

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[1] Porter, M. E., & Kramer, M. R. (2011). Creating shared value: how to reinvent capitalism--and unleash a wave of innovation and growth. Harvard Business Review, 89(1).

[2] Pfitzer, M., Bockstette, V., & Stamp, M. (2013). Innovating for Shared Value. Harvard Buisiness Review, 91(9), 100-107.

The CSV concept acknowledges the importance of business, with its capital, market access, scale and capacity for innovation, and its capability of having a meaningful impact on societal problems. Shared value considers the social dimension of a company, the relationship between its people, assets, products, services, investments and systems to external stakeholder groups such as communities, suppliers and supply chains, customers and regulators. The CSV approach recognises that companies can create economic value by creating societal value.

According to Porter and Kramer, there are three distinct ways to do this: by reconceiving products and markets, redefining productivity in the value chain, and improving the local and regional business environment. Each of these is part of the virtuous circle of shared value. Improving value in one area gives rise to opportunities in the others.

Fig. 1 – Three ways to create shared value[3]
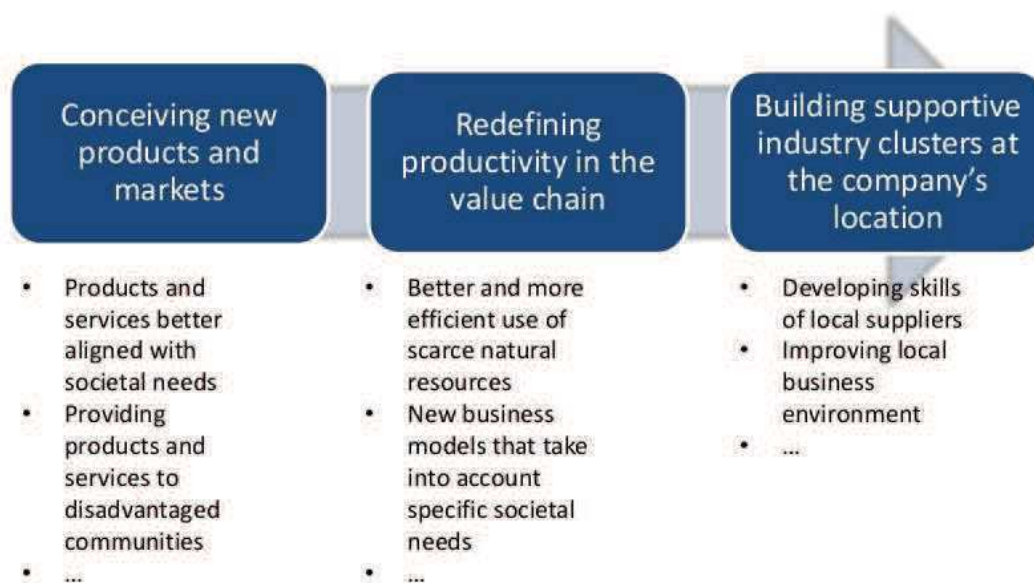
7.2 Shared Value and Corporate Social Responsibility

Creating Shared Value may be understood as a humanization of business operational activities. Even though, this aspect has been related historically with the idea of Corporate Social Responsibility (CSR), and Shared Value wants to be set clearly apart from what is understood as CSR until today.

The distinction between CSR and CSV can be puzzling and there is a considerable amount of confusion and debate about the difference. Organizations like the Shared Value Initiative at FSG Social Impact Advisors (http://www.sharedvalue.org/), Business for Social Responsibility (www.bsr.org), the World Busines Council on Sustainable Development (http://www.wbcsd.org/home.aspx), the Clinton Global Initiative (http://www.clintonglobalinitiative.org/), Business in the Community (http://www.bitc.org.uk/) , Aspen Network of Development Entrepreneurs (http://www.aspeninstitute.org/policy-work/aspen-networkdevelopment-entrepreneurs) and many others are at the forefront of this discussion.

While Corporate Social Responsibility does not understand the social context as a priority but as residual within a business project, Shared Value understands the social value as a part of the whole. It can be said that it is at the heart of the project. And this difference is important, as it turns social value in a business

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[3] Source: *Presentation of Alberto Pezzi, at the TCI2018 European Conference Sofia, based on Porter, M. E., & Kramer, M. R. (2011). Creating shared value: how to reinvent capitalism--and unleash a wave of innovation and growth. Harvard Business Review, 89(1).*

bet instead of understanding it as a part of a corporate marketing campaign to improve the competitive and evaluative situation of the company.

Considering the above, the main differences between CSR and CSV are illustrated in the figure below.

Fig. 2 – Shared Value and Corporate Social Responsibility[4]

The CSR is fundamentally about taking resources from the business, and investing those resources in being a good corporate citizen: recycling, giving money to social causes, reporting on social and environmental impacts, and engaging employees in community works. Shared Value is aimed at changing how the core business operates - strategy, structure, people, processes and rewards - in order to deliver triple bottom line returns. Thus the main distinction is that CSR is about doing something separate from the business and CSV is about integrating social and environmental impact into the business, using that integration to drive economic value.

7.3 Shared value and Innovation

Innovation is the engine that drives shared value creation.

A company cannot create a shared value strategy by holding up a retrospective, self-validating lens to business-as-usual. Shared value requires innovation in products, processes or value chain relationships. Innovation across two or more of these areas often reformulates the business model, elevating its disruptive potential.
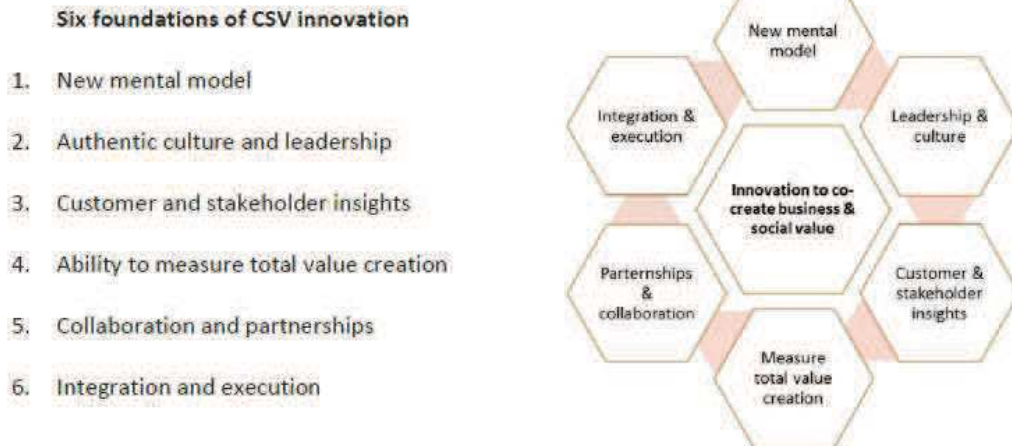
According to many scholars the core of a company's ability to create shared value are its people – their sense of purpose, learning and creativity are key facets of a culture of innovation. The pace at which a company can identify social issues and produce an innovative solution that addresses the social issue will provide true competitive advantage in the long term.

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[4] Source: *Presentation of Alberto Pezzi, at the TCI2018 European Conference Sofia, based on Porter, M. E., & Kramer, M. R. (2011). Creating shared value: how to reinvent capitalism--and unleash a wave of innovation and growth. Harvard Business Review, 89(1).*

D.1.2 Cyber Secure Light map of envisaged cluster collaboration opportunities

M. Leth and L. Hems in their insights about linkages between CSV and innovation[5] defined **six key mutually reinforcing foundations which underpin an organisation's ability to create innovative solutions that address both business and social needs and create value for the long term.**

Fig. 3 – Six foundations of CSV innovation

Six foundations of CSV innovation

1. New mental model
2. Authentic culture and leadership
3. Customer and stakeholder insights
4. Ability to measure total value creation
5. Collaboration and partnerships
6. Integration and execution

They further specified that companies needs to adopt a new mental model to their business strategies that enables a company to develop a culture of learning and adaptation to the outside world that results in innovation and hence a competitive advantage. A new mental model is required also for creating shared value, with some obvious additions around social purpose, stakeholder needs and total value creation.

Fig. 4 - The mental model for shared value innovation

Innovation for Shared Value

A new mental model for organisations to create a culture of innovation for shared value creation

	Traditional Innovation Mental Model — Standardise, simplify and rationalise to improve efficiencies and scale	Innovation for Shared Value Creation Mental Model — Learning and adaptation to identify new opportunities for value creation
Value creation	- Financial value for shareholders	- Total value for stakeholders
Problem solving	- Deductive and inductive – what is - Technical - Exploitation – scientific - Certainty – know the answer - Insight-out	- Abductive – what could be - Humanistic - Exploration – creative and intuitive - Uncertainty – ask the right questions - Outside-in
Leadership & management	- Hierarchy of power – management - Control - Know the answer	- Diffusion of power – leadership - Flexibility - Ask the right question
Insights	- Product-focused market research	- Observation of and enquiry into behaviour, drivers, needs and perceptions eg design thinking
Measurement	- Measure stability and what can be proven	- Measure innovation and total value created
Developing ideas	- Internal and individuals	- External, networks and collaboration
Strategy	- Social and environmental issues are separate - Set strategy	- Economic, social and environment issues are integrated - Ongoing dialogue
Potential for change	- Incremental	- Transformational
Growth	- Growth through acquisition	- Growth through new commercial and social value creation – new products and markets

Source: M.Leth and L.Hems (2013)

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[5] M. Leth and L. Hems, "The Potential for Creating Shared Value in Australia. How Australian companies co-create long-term commercial and social value. Draft Insights for a Green Paper", presented at the Creating Shared Value Forum, Melbourne 26 November 2013; Net Balance and the Tomorrow's Agenda Research Institute, Australia.

7.4 Shared value and Clusters

As Porter and Kramer explain in their article, the competitiveness of a company and the welfare of the community in which it operates, are strongly linked. A company needs a successful community not only for creating demand of its products but also for providing with crucial assets like occupation and opportunities for creating wealth for its citizens.

At the same time no company is a self-sufficient unity. The success of a company is also affected by support structures being around it and it is in this point that the concept of clusters may be a key issue in order to create and generate shared value.

Clusters do not only include companies but also other agents related to a certain business activity (institutions, associations, public administrations, homologation centres, technological centres, training centres, among others) so that they make possible that actors that before operated without being taken into account, may find within the ensemble cooperation debate an attractive opportunity for redesign their attitudes and positions and getting closer to a much more inclusive model than that carried out until now.

**Fig.5 - Clusters and Shared Value communities and opportunities [6]**
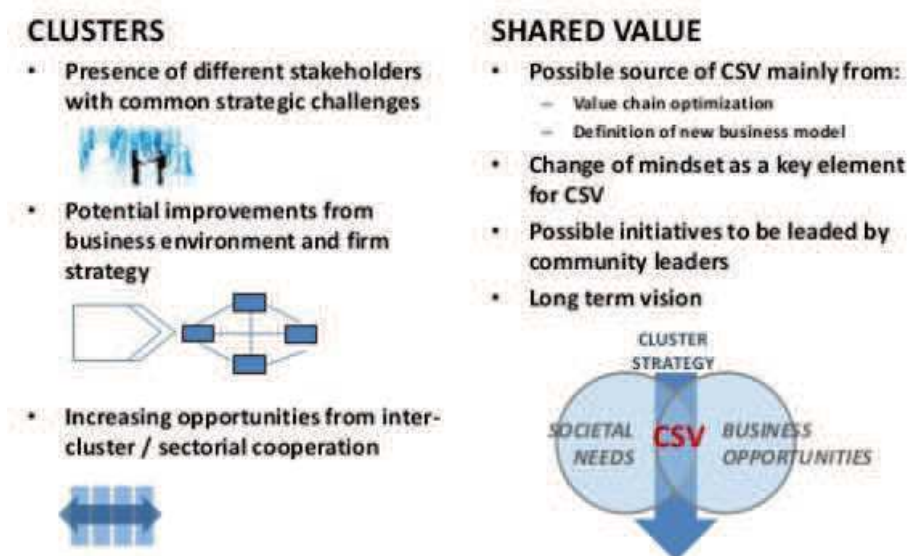
A cluster provides the companies with some intangible assets such as networking among companies of the whole chain of value, competence and other agents (universities, research centres, etc.) by increasing the potential to generate cooperation projects related to shared value. At the same time, it also allows the achievement of knowledge on how companies of a certain industry sector are competing, which are the tendencies and which strategic challenges are generating.

Cluster development tends to place the firm and other triple-helix actors at the centre of policy objectives, but the scope of cluster could be widened to other actors and objectives by introduction of the Shared Value approach. The CSV create opportunities to proactively explore the roles that cluster initiatives and polices can play in bridging social and economic processes.

J. Wilson and A. Konstantynova in their article "Cluster policies and cluster institutions: an opportunity to bind economic and social dimensions?"[7] highlight the potential space for cluster policies to work more explicitly on the social embeddedness of clusters in their territories (see fig. 6)

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[6] Source: Presentation of Alberto Pezzi, at the TCI2018 European Conference Sofia, based on Porter, M. E., & Kramer, M. R. (2011). Creating shared value: how to reinvent capitalism--and unleash a wave of innovation and growth. Harvard Business Review, 89(1).

Fig. 6 – Promotion of Shared Value concept at cluster level
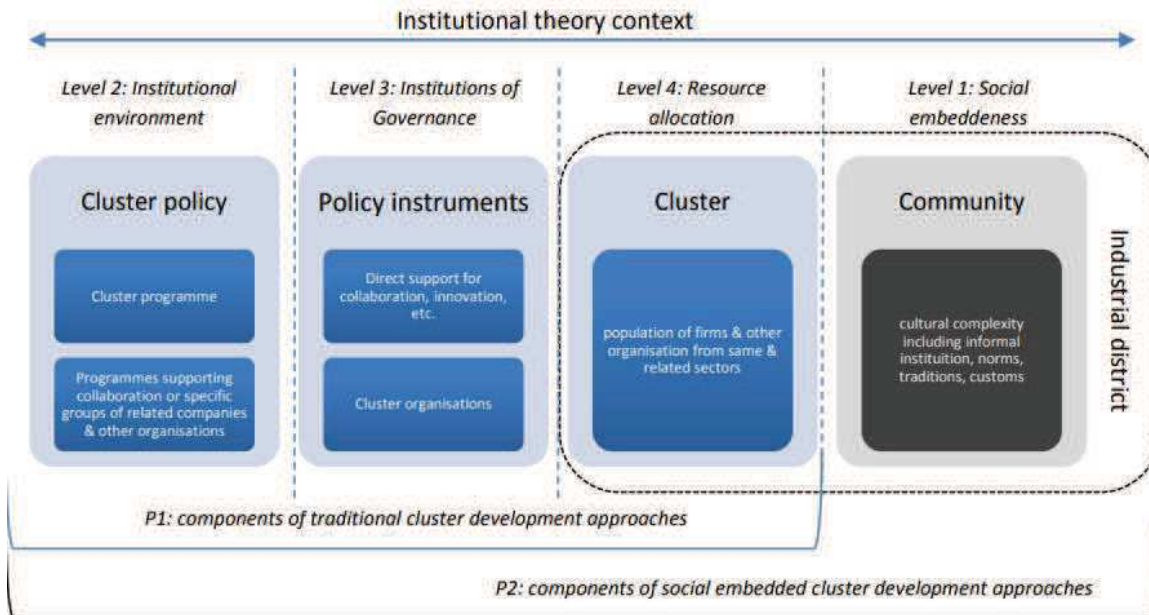
7.5 Cyber Secure Light partnership shared value strategy

The project consortium considers networking as one of the main assets for dynamization of its partner clusters, and cooperation activities set in the Cyber Secure Light project as important opportunity to spread concepts and break terms related to competitiveness and social and economic development such as the idea of "shared value" applied to cluster ecosystem.

Participation, integration, dialogue, differentiated involvement, sharing, social legitimization, governance, and increased responsibility are key terms in this context.

During the project implementation, CSL partners will discuss and investigate methods and tools to integrate the CSV concept in their cluster management schemes and business services provided to companies. They will analyse cluster policies under a Shared Value perspective in a twofold optics: Shared Value within the cluster and Inter-cluster Shared Value.

The Cyber Secure Light partnership will promote networking and co-creation among clusters, their companies and other relevant actors (government institutions, associations, public administrations, homologation centres, technological centres, training centres, among others) of the whole chain of value for creating innovative ideas and cooperative projects to create commercial and social value.

[7] A. Konstantynova and J. Wilson, "Cluster policies and cluster institutions: an opportunity to bind economic and social dimensions?" 2017, Economia e Politica Industriale 44(7):1-16