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Lead author(s):	Jacques Magen (AUSTRALO), Blanca Arregui (AUSTRALO), Alessandro Bedeschi (5G IA), Patrick Cogez (AENEAS)
Contributing partners:	5G IA, AENEAS, AUS, IFAG, IMEC, NXP, TUD
Reviewers:	Yaning Zou (TUD), Alessandro Bedeschi (5G IA)

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List of Abbreviations and Acronyms

Abbreviation	Denotation
2ZERO	Towards zero emission road transport
5GAA	5G Automotive Association
5G ACIA	5G Alliance for Connected Industries and Automation
5G IA	5G Infrastructure Association
AENEAS	Association for European NanoElectronics ActivitieS
ALICE	Alliance for Logistics Innovation through Collaboration in Europe
AI	Artificial Intelligence
AIOTI	The Alliance for Internet of Things Innovation
ARTEMIS	Association for actors in Embedded Intelligent Systems within Europe
BDVA	Big Data Value Association
BVME-SG	Business Validation, Models, and Ecosystems Sub-Group
CCAM	Connected, Cooperative and Automated Mobility
CISPE.cloud	Cloud Infrastructure Services Providers in Europe
CSA	Coordination and Support Action
DoA	Description of the Action
EBU	European Broadcasting Union
ECHAlliance	European Connected Health Alliance
ECS	Electronic Components and Systems
ECSEL	The ECSEL JU, the PPP for Electronic Components and Systems
ECSO	European Cyber Security Organisation
EFECS	European Forum for Electronic Components and Systems
EFFRA	European Factories of the Future Research Association
EG	Expert Group
EPoSS	The ETP on Smart Systems Integration
ERRAC	European Rail Research Advisory Council
ERTRAC	European Road Transport Research Advisory Council
ESA	European Space Agency
ETP	European Technology Platform
ETPIS	European Technology Platform on Industrial Safety
euRobotics	International non-profit association for all stakeholders in European robotics
EUTC	Europe Utility Technology Council
EuCNC	European Conference on Networks and Communications
GA	Grant Agreement
GPU	Graphics Processing Unit
HiPEAC	High Performance Embedded Architecture and Compilation
ISA	Instruction Set Architectures
JU	Joint Undertaking
KDT	Key Digital Technologies
ML	Machine Learning
MoU	Memorandum of Understanding
MPSoC	Multi-Processor Systems on a Chip
NEM	New European Media Initiative, the ETP dealing with Connected, Converging and Interactive Media & Creative Industries, driving the future of digital experience
NetWorld2020	The ETP for communications networks and services
NESSI	The ETP dedicated to Software, Services and Data
OS	Operating System(s)
Photonics21	The ETP representing the European Photonics Community
PPP	Public-Private Partnership
SNS	Smart Networks and Services
SoC	Systems on a Chip
SRIA	Strategic Research & Innovation Agenda
WG	Working Group

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Abbreviation	Denotation
WP	Work package

Disclaimer

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1 Introduction – Overall Strategy

1.1 Introduction

This document, COREnect Deliverable 4.1, "Initial report on community building and outreach strategy", describes the initial strategy for stakeholder engagement and community building as well as the communication and dissemination plan of the project. It also includes some preliminary ideas for the impact and exploitation of the expected results. This document covers initial results from Tasks 4.1 "Stakeholder engagement and community building" and 4.2 "Outreach, dissemination and exploitation".

It covers the activities performed during the first 6 months of the project, i.e., from 1st July 2020 to 31st December 2020. Although COREnect formally started on 1st July, most of the activities addressed in this deliverable actually kicked off in September 2020. This, along with the COVID-19 context, led the project to adapt the 1st COREnect workshop and the co-located expert meeting. Indeed:

- The whole EFECS 2020 conference, including the 1st COREnect workshop, were organised as online events.
- The initial plan forecasted a start of the project in September 2020, and the EFECS workshop was then envisioned as the opportunity to hold a first meeting between experts of the 3 Expert Groups. Upon request of the European Commission, the project started on July 1st, 2020. Due to the summer vacation period, Expert Groups became operational in September, and they already started to get together – in remote mode – before EFECS.

The content of the 1st COREnect workshop content was therefore adjusted accordingly, and involved both the EG experts and external participants.

Engagement activities are described in details in section 2, while dissemination activities are detailed further in section 2. The initial activities in terms of community building and dissemination have been in line with the expectations. Therefore, the COREnect partners decided that there was no need for any revision to the overall engagement and dissemination strategy at this stage. Of course, this will be re-evaluated regularly during the course of the project.

The only change that was made with respect to the plan was about the tool used to engage with the COREnect community. Microsoft Teams was preferred to LinkedIn. See details in section 2.1.1.2.

1.2 Overall stakeholder engagement and community building strategy

The first objective of Task 4.1 "Stakeholder engagement and community building" is to identify and engage the stakeholders to become part of the "European core technologies for future connectivity systems," in short, the COREnect community. The second objective is to identify the external communities that will benefit from the results obtained and released by the community described above.

During the first six months of the project, the initial engagement activities focused on identifying and starting to engage the relevant stakeholders to start building the "COREnect community". An initial stage of identification of the external communities was performed as well.

All the details of the initial engagement activities may be found in section 2.

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1.3 Overall outreach, dissemination and exploitation strategy

Key activities and objectives of Task 4.2 “Outreach, dissemination and exploitation” are as follow:

- Promote the COREnect community.
- Disseminate the project results in order to engage the relevant stakeholders.
- Increase awareness and promotion towards targeted external stakeholders, to maximise the visibility of the project, its community and its impact on the European industry and beyond. Initial plans for dissemination included the set-up a public project website to disseminate the COREnect community concepts, news and reports, and the set-up and moderation of COREnect social media accounts which will be used to promote the results (Twitter) and to engage the stakeholders in the community (LinkedIn Group).
- Prepare dissemination material for events, conferences and workshops.
- Organise workshops to gather the community and present the project results in conjunction with EFECS and EuCNC, which are the main annual events for the ECS and SNS communities.
- Provide dissemination material to partners attending other events, e.g., ICT Proposers’ Days.
- Provide ideas for the exploitation of the expected results.

Initial dissemination activities of the COREnect project are described in details in section 3.

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2 Initial Report on Stakeholder Engagement and Community Building Outreach

This section includes the process and outcomes of the 1st phase of the COREnect stakeholder identification, as well as the first steps towards an actual attempt at building up the COREnect community.

2.1 Current status

2.1.1 The COREnect stakeholder engagement methodology

2.1.1.1 Agile Engagement Stakeholder Framework

As originally planned, a specific methodology is used within COREnect to identify and engage the relevant stakeholders. The initial phase of this methodology, called "scouting",

a) builds upon the objectives of COREnect and the initial ecosystem, and
b) focuses on exploring and assessing the spectrum of stakeholders of relevance for the project.

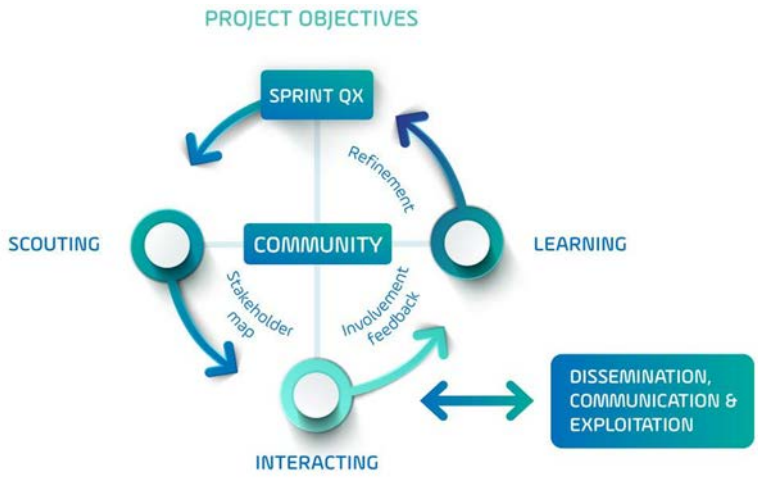

Figure 1: COREnect's Agile Engagement Stakeholder Framework[1]

The key result is a version of the "stakeholder map," a graphical instrument to

1) list key actors and specific candidates within them;
2) thoughtfully organise and correlate these audiences;
3) define a common terminology to be used in all the project's references.

As stated in the GA, Part B, section 2.2.1.2 "target groups", the methodology is used to identify, and later engage,

a) the stakeholders that should become part of the COREnect community;
b) the external communities that will benefit from the results obtained and released by the COREnect community.

[1] "Sprint Qx" in Figure 1 refers to a generic time period defining each cycle. Depending on the project, it could be one quarter, ½ year, or more.

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There are several Working Groups within the 5G Infrastructure Association (5G IA). One of them is the Vision and Societal Challenges WG, whose activities are focusing on developing a vision of future Smart Networks and Services (SNS) and Next Generation Internet from various angles (scientific, technical and socio-economic). One of their sub-groups, the Business Validation, Models, and Ecosystems Sub-Group, or BVME-SG, is currently drafting a "5G ecosystems" White Paper. This document makes a distinction between:

- the "provisioning ecosystem", corresponding to the community a) above, and
- the "use-case ecosystem", corresponding to the community b) above.

We propose to follow the same distinction in this document, and identify separately those two ecosystems (or stakeholder communities) within the COREnect project[2].

2.1.1.2 Means to engage the COREnect ecosystem

The promotion and dissemination activities are being used not only to promote the outcomes of the project but also to make the relevant stakeholders aware of the activities and objectives of the project. In addition, they contribute to directly engage those stakeholders. Specific tools were planned to be used for the engagement of the COREnect community stakeholders, i.e., LinkedIn, and for the promotion of the results of the project, i.e., Twitter. After a thorough reflection among partners, it was finally decided to use LinkedIn as a means to disseminate technical information towards experts, while the tool that was selected to directly engage with the COREnect community is Microsoft Teams. It was agreed to try Microsoft Teams first with the experts involved in the Expert Groups.

Therefore, in COREnect, we have been using Microsoft Teams as a platform to collaborate within the three Expert Groups. We have evaluated different potential platforms, and we concluded that Microsoft Teams offers the most advanced features to enable and stimulate interaction and collaboration. Microsoft Teams comes with different features which are actively used, namely the video function for teleconferences and the SharePoint function for sharing digital material and joint editing of document. Moreover, we have created different discussion channels in Microsoft Teams to enable the experts to chat & share information on different topics. All experts can contribute to all discussions and they can initiate new discussions. This feature is increasingly used in projects as it stimulates engagement and eases the follow-up and back-tracking of conversations. Microsoft Teams offers even more features which will be evaluated and might be used in the near future: e.g., news feeds, whiteboards with sticky notes for brainstorming, and action lists and timelines to track the experts' engagements. The Microsoft Teams has been perceived very positively by the COREnect experts. Many of the experts are already acquainted with this platform and are already using it in their organisation. All experts have been admitted to access the COREnect expert group Microsoft Teams site. As this platform is secure, and only accessible to members, it is currently neither considered for connecting to, nor engaging with, open communities.

[2] COREnect examples shall be part of the BVME-SG document.

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2.1.2 Information available

2.1.2.1 COREnect proposal

At proposal stage, the COREnect consortium already identified a number of potentially relevant communities of stakeholders, as illustrated in Figure 2.

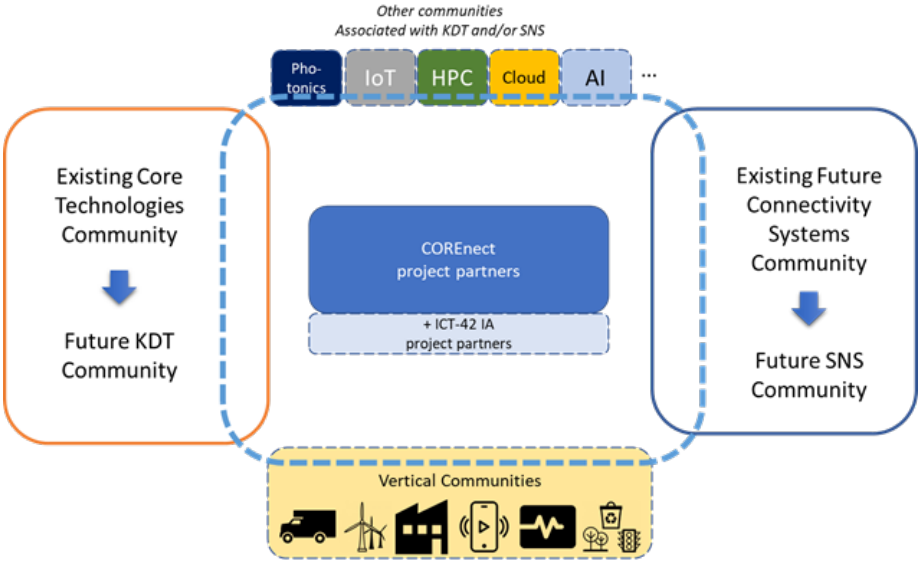

Figure 2: initial vision of the COREnect community

Further information and considerations in relation with the external stakeholder communities that are relevant to COREnect include:

- Stakeholders from vertical sectors. Identifying the most relevant sectors for the COREnect community to be targeted among those verticals will be part of the objectives.
- Players involved in the communities related to telecommunications and related services and to core technologies who may integrate the hardware enabling solutions in their products in the future. Those are mainly the stakeholders currently involved in the SNS and ECS communities but who will not be part of the provisioning COREnect ecosystem but rather part of the use-case ecosystem.
- Policy makers (including but not limited to EC and Member States). Policy makers shall play a pivotal role in the emergence of a strong COREnect community, both at national and European level.
- A specific effort will be dedicated to engaging the various SME communities with the following objectives: a) identify those who should become part of the COREnect communities; b) identify those who should be targeted as external stakeholders; and c) interact with those communities to better understand and define future opportunities for SMEs in relation with the scope of this project.

In addition, work has already been performed both in the 5G PPP and in the ECS communities that shall be used as a starting point in COREnect. Information that should be used as a starting point for identifying and engaging the COREnect stakeholders is listed in the following sub-sections.

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2.1.2.2 5G PPP stakeholder picture and glossary

A revision of the 5G PPP stakeholder picture and glossary, considering the up-to-date situation of the 5G PPP, was released in April 2020 on the 5G PPP web site[3], as illustrated in Figure 3.

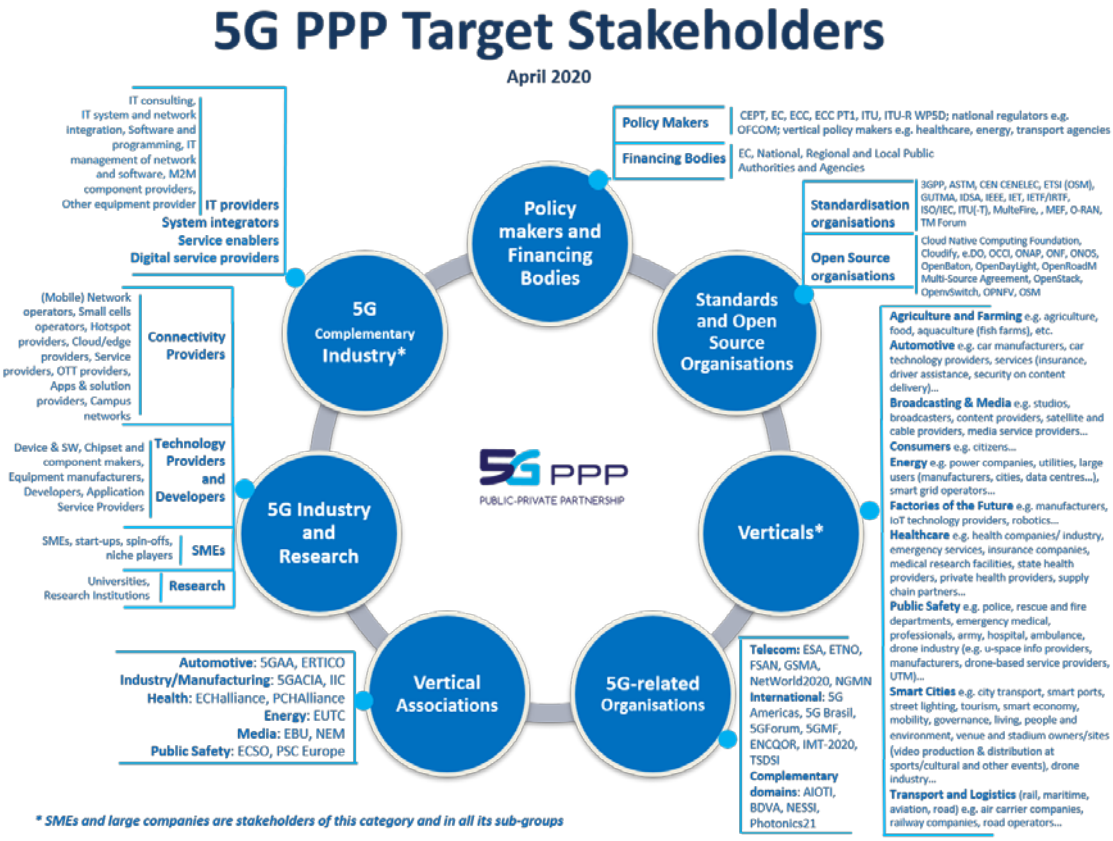

Figure 3: 5G PPP target staleholder picture

2.1.2.3 Additional relevant information from SNS-related documents

SNS Partnership proposal

In June 2020, the "Draft proposal for a European Partnership under Horizon Europe – Smart Networks and Services" [1], supported by 5G IA, NetWorld2020, AIOTI, CISPE.cloud and NESSI, was released. This SNS Partnership Proposal includes a description of the SNS value chain and its main constituents, as illustrated in Figure 4.

[3] https://5g-ppp.eu/revised-5g-ppp-stakeholders-picture-and-glossary/

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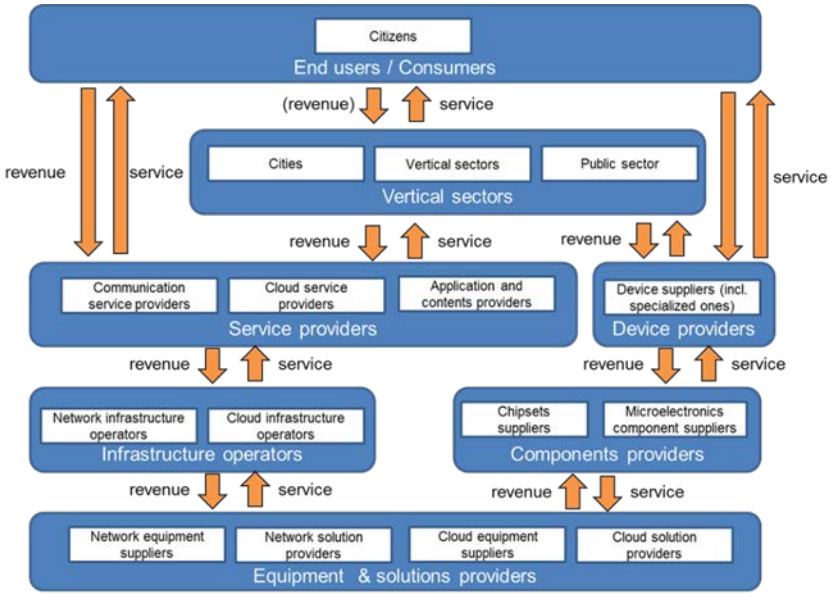

Figure 4: SNS value chain and main constituents

Section 1.4 of the document is fully dedicated to "partner composition and target groups". It provides information on the likely composition of the upcoming SNS partnership, cf. Figure 5.

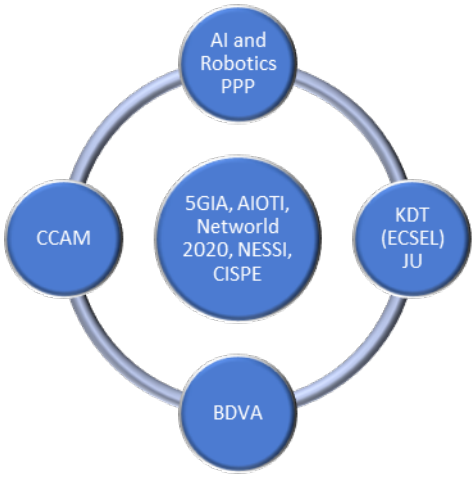

Figure 5: SNS related initiatives

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It even provides further details on the role that each of those constituents could play to reach the objectives of the SNS Partnership, as shown in Figure 6.

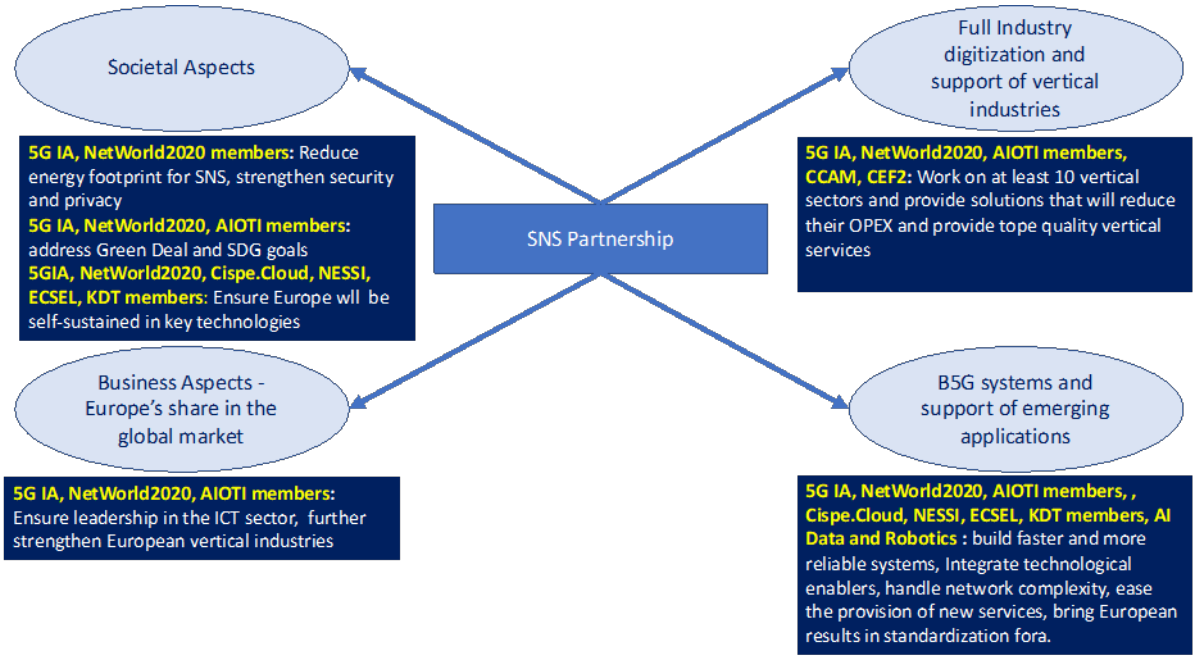

Figure 6: SNS Partnership aspects

Sub-section 1.4.2 of the SNS Partnership Proposal [1] describes the "composition of partners for the SNS Partnership", while sub-section 1.4.3 provides details about the "target groups and stakeholder communities", as shown in Figure 3 of the present document.

In addition, the following sub-sections of [1] are of particular relevance to COREnect:

- Sections 2.2.1.4 "Key digital technologies and photonics", 2.2.1.5 "Approach to components", and 2.2.1.6 "Approach to devices".
- Several mentions of the European Green Deal, in relation with vertical sectors that are relevant to SNS.

<u>NetWorld2020 SRIA</u>

NetWorld2020 released in May 2020 a new edition of its SRIA [2]. It includes in particular the following information that is relevant to COREnect:

- A Chapter entitled "Opportunities for Devices and Components".
- The list of experts and organisations who have contributed to the SRIA.

<u>5G PPP / 5G IA White Papers</u>

The 5G PPP and 5G IA Working Groups released many white papers, including the following ones that are particularly interesting for COREnect:

- "Empowering Vertical Industries through 5G Networks", September 2020 [3].
- "5G Strategic Deployment Agenda for Connected and Automated Mobility in Europe", October 2020 [4].
- "5G Trials for Cooperative, Connected and Automated Mobility (CCAM) along European Cross-Border Corridors", October 2020 [5].

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The verticals identified in those documents as being addressed in the 5G PPP are: Automotive, Transportation, Media, Smart City, Healthcare, Factory of the future, Energy, Public safety, Ports-Airports, Tourism, and Agrifood.

5G IA MoUs

The 5G IA, with support from its "Verticals Task Force" has signed MoUs with several associations representing vertical sectors. The latest status of interactions between 5G IA and vertical associations is represented in Figure 7.

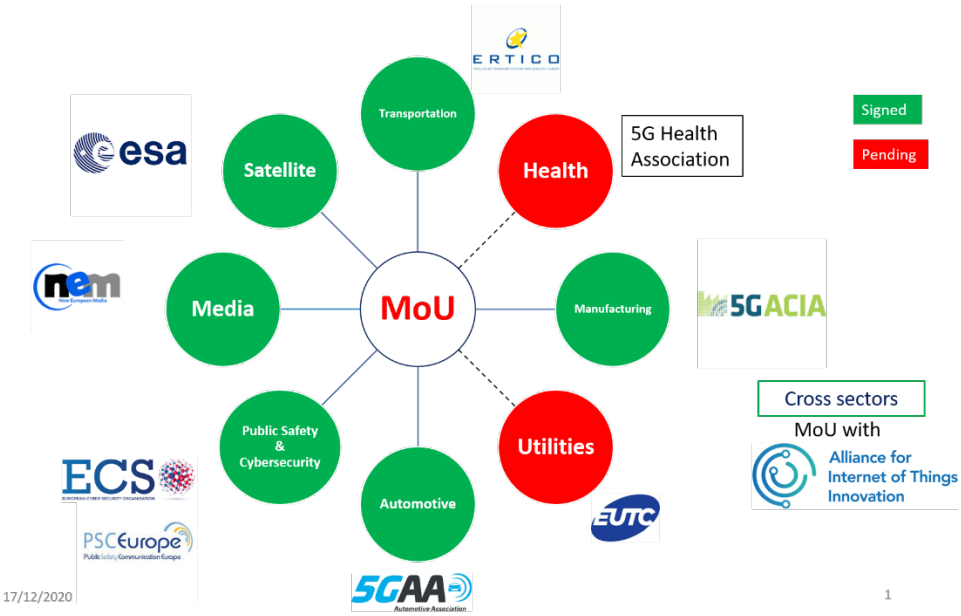

Figure 7: 5G IA MoUs with vertical initiatives, as of 17 December 2020

5G IA Business Validation, Models, and Ecosystems Sub-Group

As already stated in section 2.1, the 5G IA BVME-SG is currently working on a document provisionally entitled "5G Ecosystems", that shall be quite relevant to COREnect when completed.

Additional information available on the current SNS community

Additional information is available on the SNS community and may be used by COREnect:

- The list of 5G IA members[4].
- The full list of organisations involved in the 5G PPP[5].
- The list of NetWorld2020 members, including country of origin and category (industry, research, SME)[6].
- The list of AIOTI members[7].
- The list of CISPE.Cloud members[8].

[4] https://5g-ia.eu/members/

[5] https://5g-ppp.eu/parties-to-the-5g-ppp-collaboration-agreement/

[6] https://www.networld2020.eu/wp-content/uploads/2020/10/september2020_member-organisations-rev1.pdf

[7] https://aioti.eu/members/

[8] https://cispe.cloud/members/

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- The list of NESSI members[9].
- The list of EFFRA members (it is possible to sort per category i.e. research, industry, association)[10].
- The list of the Photonics21 PPP Association Board members, and the list of the Photonics21 PPP Board members[11].
- The list of BDVA members[12].
- The list of euRobotics members[13].
- The list of EuroHPC members, that includes the list of BDVA members mentioned above, as well as the list of ETP4HPC members[14].

2.1.2.4 Relevant information from KDT/ECS documents

KDT Partnership Proposal

At the time of drafting this document, the "KDT Partnership Proposal" is not public yet. A draft document is available, which includes a figure depicting the synergies with other EU initiatives (cf. Figure 8).

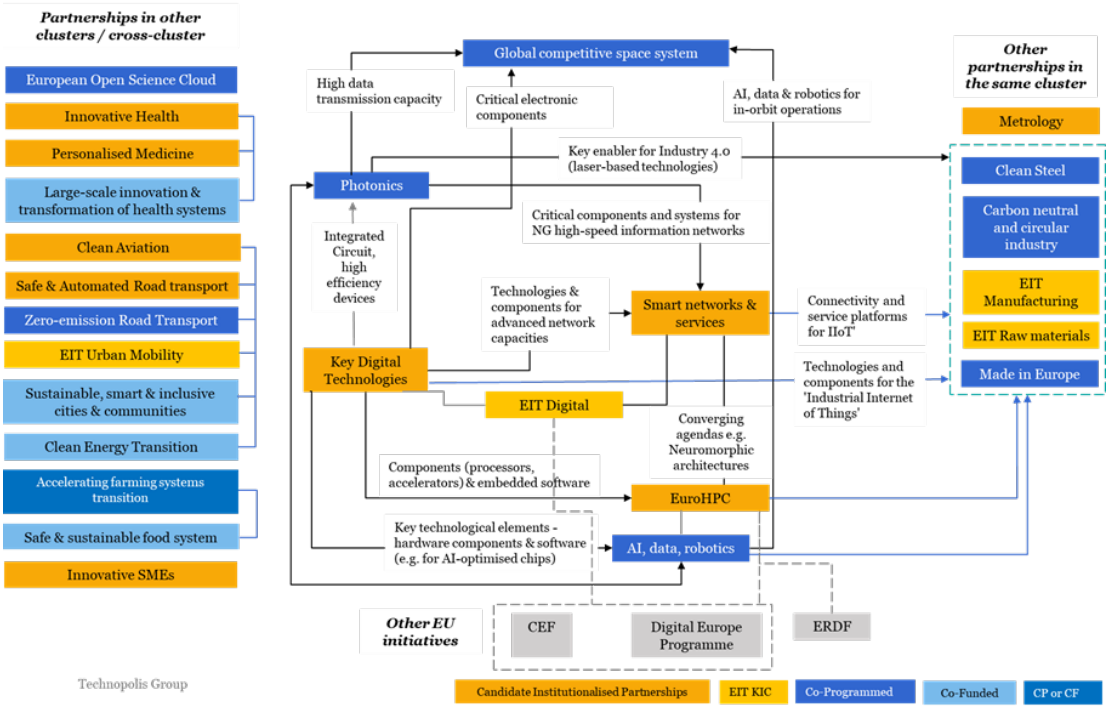

Figure 8: KDT positioning amongst possible European Partnerships[15]

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9 http://www.nessi-europe.com/default.aspx?page=find_a_member

10 https://www.effra.eu/members

11 https://www.photonics21.org/download/about-us/photonics-ppp/photonics21-association-board_10.08.2017.pdf?m=1513606078&, https://www.photonics21.org/download/about-us/photonics-ppp/partnershipboardmembers_january2017.pdf?m=1513606778&

12 https://www.bdva.eu/members-all

13 https://www.eu-robotics.net/eurobotics/membership/members/index.html

14 https://www.etp4hpc.eu/membership.html

15 From https://www.era-learn.eu/news-events/events/workshop-supporting-the-preparation-of-future-european-partnerships/plenary2-ah.pdf, initial figure by Technopolis Group. Since this is a temporary document, it is not included in the References section.

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ECS SRA

The 2020 edition of the ECS SRA [6] includes important information about the various targeted vertical sectors, as well as technological domains, and the list of contributing experts and organisations. The 2021 edition (named "Strategic Research and Innovation Agenda") will be available in January 2021, and a public draft has been publicly available since mid-November 2020[16]. Of particular interest to COREnect:

- The verticals identified in the 2021 edition, currently under elaboration, are: Mobility; Digital Industry; Energy; Health and Wellbeing; Agrifood and Natural Resources; and Digital Society[17].
- Among the technological domains identified, there is one of particular relevance to COREnect, i.e., Chapter 7 "Connectivity and Interoperability".
- The list of contributing experts provides a basis for identifying potential organisations that will be relevant to be engaged by COREnect.

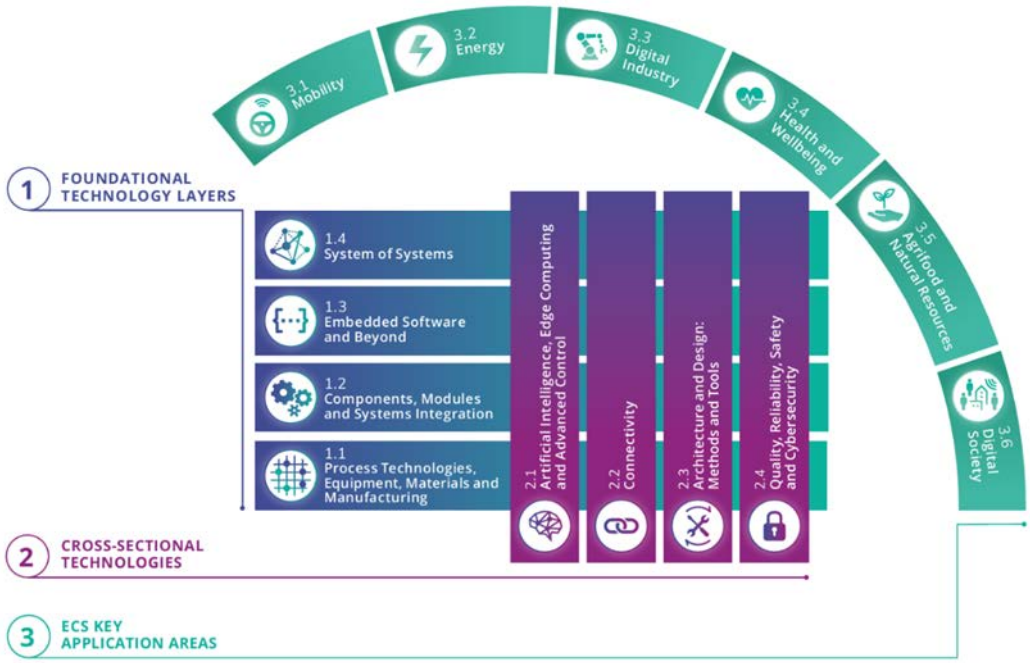

Figure 9: ECS relation with cross-sectional technologies and application areas

In addition, the ECS SRIA application chapters translate application roadmaps into requirements for Electronic Components and Systems (see Figure 9 for an illustration of the SRIA global structure). Conversely, technology chapters map out future advances and prompt for potential new breakthroughs in applications. The ECS SRIA is therefore an instrument promoting the synergies with many neighbouring application-oriented communities. To cite a few:

- The "Mobility" chapter has strong links with ERTRAC, ERRAC and the ALICE ETP.
- The "Industry" chapter with EFFRA.
- The "Agrifood" chapter with the working group of AIOTI in Smart Farming and Food Security.

[16] https://aeneas-office.org/wp-content/uploads/2020/11/ECS-SRIA2021_Book_Draft.pdf. Since this is a temporary document, it is not included in the References section.

[17] In the 2020 edition, "Agrifood" was included in "Digital Industry".

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There are also close interactions and alignments with other European PPP initiatives, e.g. Towards zero emission road transport (2ZERO) [7] and Connected, Cooperative and Automated Mobility (CCAM) [8].

Technology chapters also leverage the links of the ECS community with other technology-oriented domains, such as:

- The ETP4HPC platform and BDVA, with strong relations with the ECS "Artificial Intelligence, Edge Computing and Advance Control" chapter.
- The 5G Infrastructure Association, with the chapter on "Connectivity".

Additional information available on the current ECS community

Additional information is available on the ECS community and may be used by COREnect:

- The list of AENEAS members[18]. There is a tab for each of four categories SME, research, Corporate, Associated.
- The list of ARTEMIS-IA members[19]. The type of members is indicated.
- The list of EPoSS members[20].
- The list of ERTRAC members[21].
- The list of ALICE members[22].

The list of members of 5G IA, AIOTI, BDVA, and ETP4HPC, are already referenced in SNS in the previous section. The list of ERRAC members does not seem to be available publicly.

The list of participants in ECSEL projects, if needed, could be derived from the information available in the H2020 dashboard[23].

Other associations and organisations, not mentioned above, have shown their links with the ECS community, e.g., by having a common booth at EFECS events:

- The European Processor Initiative (https://www.european-processor-initiative.eu/).
- HiPEAC (https://www.hipeac.net/).
- ETPIS (http://www.industrialsafety-tp.org/).
- SEMI Europe (https://www.semi.org/eu).
- Silicon Europe (https://www.silicon-europe.eu/home/).
- SiNANO Institute (http://www.sinano.eu/).
- Textile ETP (http://www.textile-platform.eu/).

18 https://aeneas-office.org/membership/members/

19 https://artemis-ia.eu/member-list.html

20 https://www.smart-systems-integration.org/members

21 https://www.ertrac.org/index.php?page=members

22 https://www.etp-logistics.eu/?page_id=131

23 https://webgate.ec.europa.eu/dashboard/hub

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2.1.2.5 Other ECS relevant information

There are two pictures showing the ECS value chain that are referenced in several documents. The first one, illustrated in Figure 10, shows the electronics value chain in 2018, and focuses on products and solutions, rather than on identifying the various categories of stakeholders in the value chain. Still, it includes relevant information, as shown below, and constitutes without a doubt an interesting source when it comes to defining the ECS stakeholders as well as their customers.

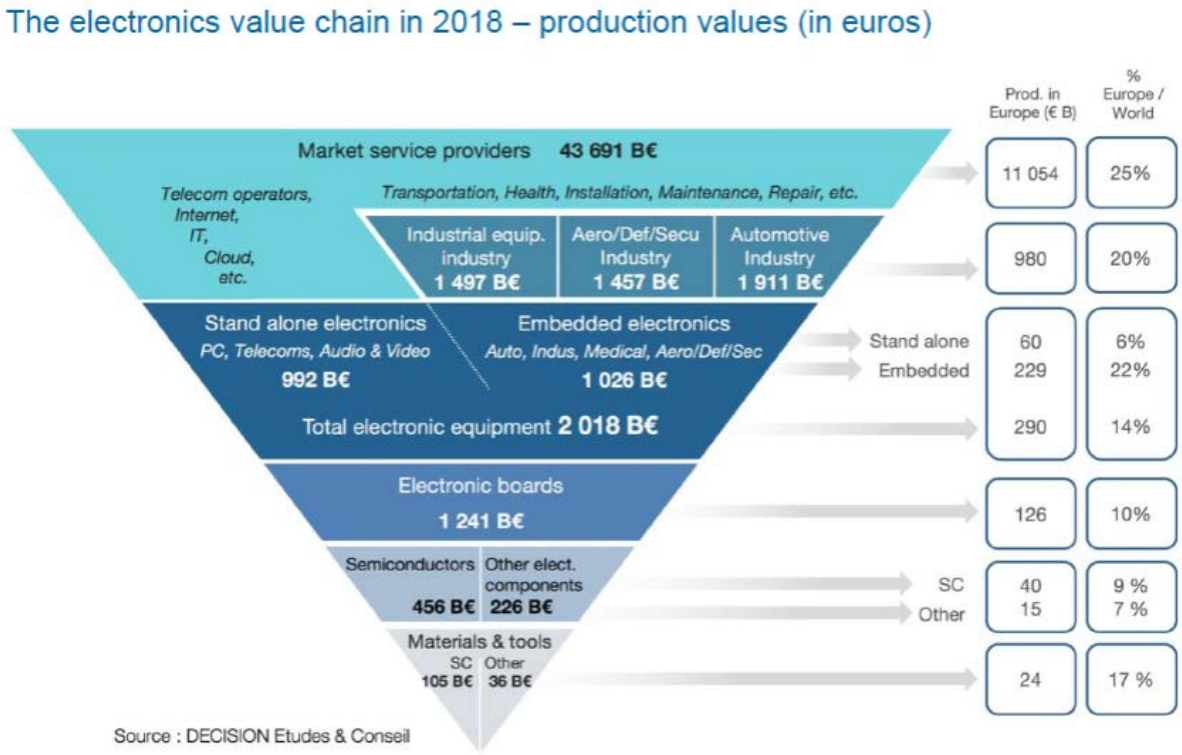

Figure 10: The electronics value chain in 2018 – production values (in euros) [9]

The second picture is widely used as a reference [10] [11], with various variants. It is coming from the SIA, the Semiconductor Industry Association [12]. This picture focuses more on the various types of stakeholders in the ECS value chain, see Figure 11.

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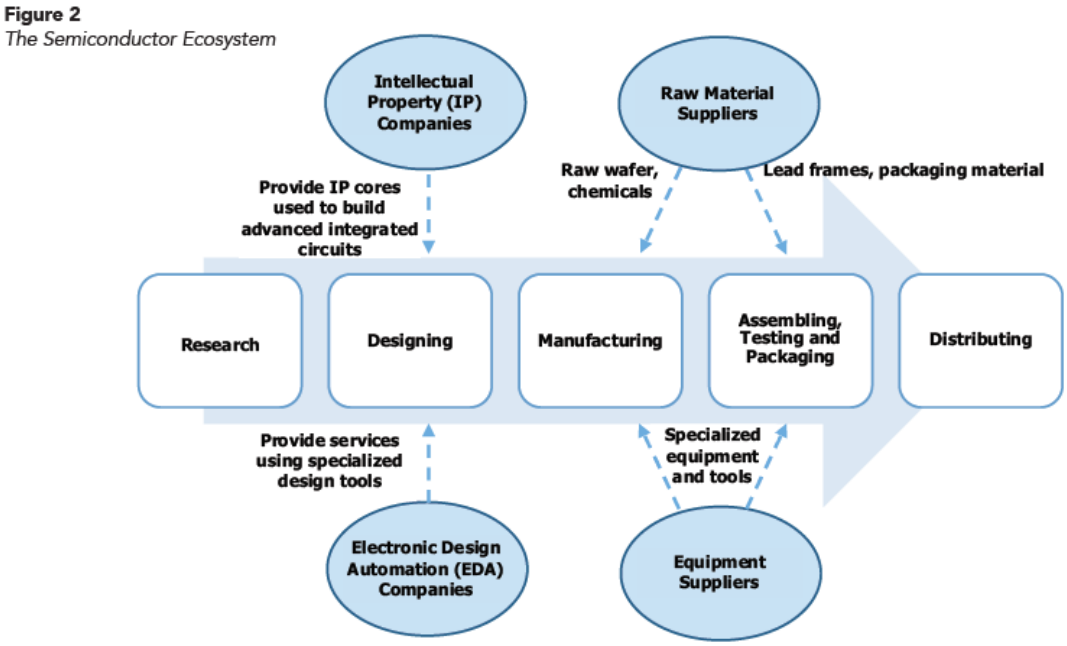

Figure 11: The semiconductor ecosystem (SIA Semiconductor Industry Association, May 2016) [12]

According to the EIB study [11], "the actors above form part of the semiconductor ecosystem, along with material suppliers, design service providers, developers of intentional programming core/blocks and producers of semiconductor manufacturing equipment".

2.1.2.6 Additional information on "complementary domains"

An interesting picture, showing the various constituencies interacting with each other to form the "digital continuum" [13]. SNS is identified in the picture, while "Cyber Physical Systems" and "Smart Sensors & IoT" are topics covered by the KDT Partnership proposal. This representation, illustrated in Figure 12, is showing a "dynamic continuous workflow" between the various constituencies, coming "back to Cyber Physical Systems".

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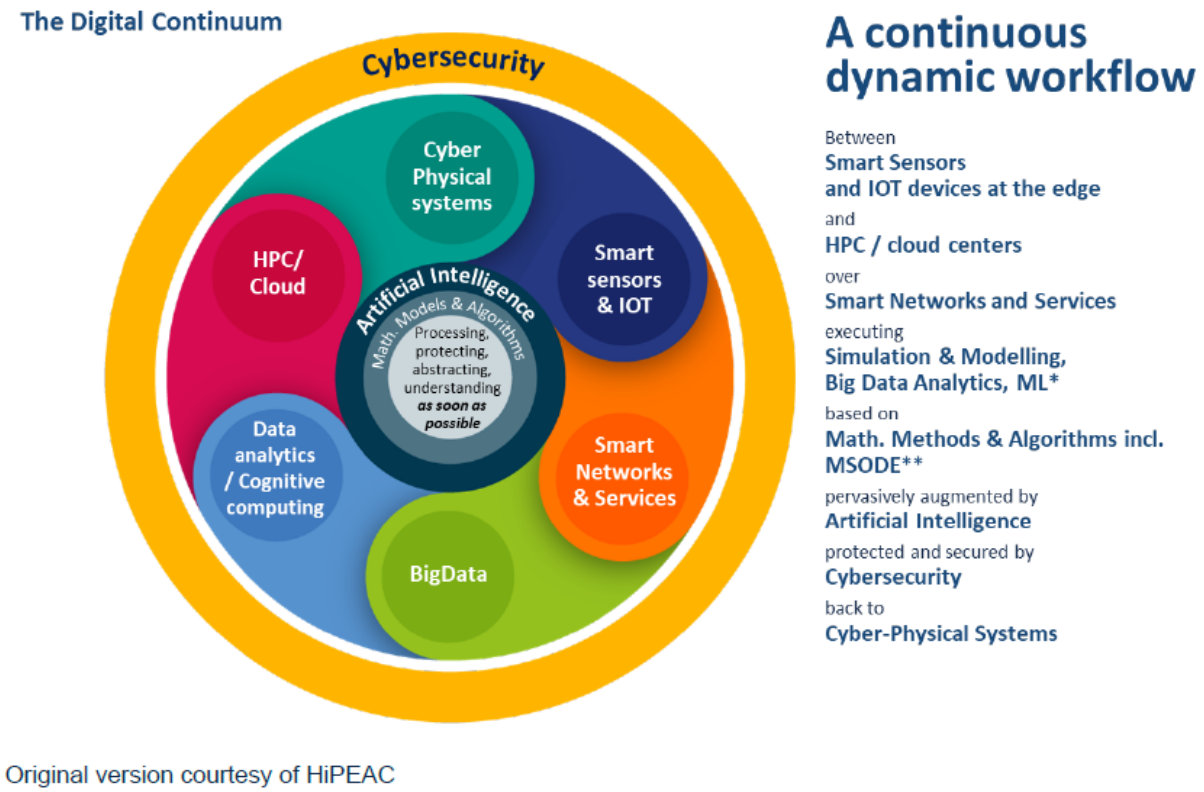

Figure 12: The Digital Continuum

2.1.2.7 Relevant information on SMEs

In the ECS market, according to the EIB, "Europe is a fragmented market which is SME-dominated in terms of volume. Nevertheless, many large corporates have their roots in Europe and as a result, have high-end manufacturing activities located on the continent. However, European companies are mainly focused on the early stages in the value chain […]. To an extent, some countries are also specialized in the supply of equipment and materials".

In the 5G and beyond ecosystem, distinction is more and more often made between "technological" and "vertical" SMEs. Technological SMEs are those possessing skills and expertise in one or more domains directly related to 5G/6G, while vertical SMEs are those who are knowledgeable in one or more vertical sectors e.g., media, health, energy. An SME may be both a technological and a vertical SME. However, many of them are not, and would need to find a partner, to be able to release effective vertical solutions based on 5G/6G. As SNS and KDT are expanding the scope of 5G PPP and ECS, many SMEs from "complementary domains" such as IoT, AI, Cloud, and others will be added to the ecosystem.

There is additional information available on SMEs:

- AENEAS provides an "SME members directory" [14].
- NetWorld2020, via its SME Working Group, releases regular updates of an SME brochure [15]. Information on SMEs is also available online on a dedicated "Find the SME you need" web page[24].

[24] https://www.networld2020.eu/find-the-sme-you-need-new-page/

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2.2 The initial COREnect ecosystems

COREnect is attempting to help identify and (re)build an industrial sector in Europe that does not currently exist as such (any longer). This applies both to the COREnect community i.e., the COREnect provisioning ecosystem, and to the external stakeholders i.e., the COREnect use-case ecosystem. It was decided to split for the time being those two ecosystems, in line with the recommendations of the BVME-SG[25]. An initial description and picture of each ecosystem is proposed in the following sub-sections.

2.2.1 Initial COREnect provisioning ecosystem: the COREnect community

Considering all of the above, the main stakeholder categories of the provisioning ecosystem are proposed as follow:

1. 5G/6G Industry & Research
2. ECS Industry & Research
3. Complementary Industry & Research
4. COREnect Related Initiatives
5. 5G/6G Standards Organisations
6. 5G/6G Policy Makers and Financing Bodies

The stakeholders from the current telecommunications and ECS industry and research communities involved in the development of 5G and 6G technologies and services are represented by categories 1 and 2.

Category 3 represents complementary industries, that are also likely to contribute to the development of the COREnect technologies. In particular, they would support the expansion from the existing 5G and ECS communities into the future SNS and KDT ecosystems.

Those stakeholders (1, 2 and 3) represent together the stakeholders from SNS and KDT that should be involved in the development of the future COREnect technologies -what is called here the "COREnect community".

The 5G/6G stakeholders (1) are extracted from the work already performed in the 5G PPP. The ECS stakeholders (2) have been categorised by COREnect on the basis of the documents listed in section 2.1.2 and additional interactions and brainstorming among COREnect partners, leading to the following categorisation:

- **Layer 1: Equipment and Materials Suppliers** (similar to "materials & tools" in Figure 9). Equipment includes process and metrology equipment – it is a field where Europe is still one the world leader, in particular in lithography with ASML, a Dutch company, being the undisputed leader. Materials goes up to wafer providers. Here again, Europe has a leading position with for example SOITEC, providing Silicon-on-Insulator Wafers, well suited for RF and for Ultra Low Power with nevertheless high computing performances (for Artificial Intelligence at the Edge). It is also very well positioned for the provision of III-V compound wafers. CAD tool suppliers are also part of the ecosystem at that level. Here Europe used to be lagging, but in March 2017, Siemens completed the acquisition of Mentor Graphics, one of the world leaders of the domain

[25] The document, entitled "5G Ecosystems", is currently being drafted.

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- **Layer 2: Chip and other Electronic Device providers** (similar to "semiconductors and other electronic components" in Figure 9). This includes integrated device manufacturers (doing both chip design and manufacturing) and fabless (just doing design, and subcontracting the manufacturing to foundries) – this layer goes up to the "assembly and packaging" stage.
- **Layer 3: Components and Modules providers** (similar to "electronic boards" and "embedded electronics" in Figure 9).
- **Layer 4: Systems and System of Systems Providers** (in Figure 9, "stand-alone electronics" and some of the industries listed in the "Market Service Providers" section.

Complementary Industry & Research (category 3) and COREnect Related Initiatives (category 4) were selected among the complementary domains and related initiatives currently identified in both the KDT and SNS upcoming partnerships. The term "initiatives" refer to organisations, associations, or fora that are related to the complementary domains of relevance to COREnect. Beside SNS and KDT, other upcoming Horizon Europe Partnerships should prove relevant to COREnect, if adopted, e.g., "European Partnership on Artificial Intelligence, Data and Robotics"[26], or "European Partnership on High-Performance Computing"[27].

The question was raised as to whether big data, robotics and software / embedded software were of direct relevant to COREnect. Discussion among partners led to the conclusion that all those domains are relevant as they are dependent on COREnect technologies, even though they also need many other technologies such as data centres, cloud computing, high-performance computing and high-performance connectivity systems and networks. If we dig further:

- Big data is typically processed in the cloud and thus require significant CPU power and storage. This thus impacts computing and storage at the data server site. In addition, for cloud processing, the data must be transported by means of wired and wireless transmission, thus impacting all the networking hardware (routers, switches, bridges, optical, etc..) and the wireless modems (Antennas, RF, mixed-signal, digital, embedded processors). Finally, to reduce the bandwidth requirements, there is a cost and power trade-off between edge computing and communications. Embedded processing capabilities are also an important component in the big data picture.
- The robotics sector has been growing steadily for many years and its impact is growing. Robots such as drones, autonomous vehicles, bricklaying robots, and domestic robots to critical operational robots in the medical field; robotic technology is changing our daily lives. Robots are everywhere, from robotic wearables to companion robots, medical devices, and even drones and devices that will scan buildings and landscapes autonomously. Robotics will be a key trend for many years to come, with the possibility of changing many industries in unexpected ways[28]. All these examples and applications require sensors, actuators, controllers, embedded computing, local storage and communications means that are all directly relevant to COREnect technologies.
- Software / embedded software: our daily life is increasingly dependent on a wide variety of electronic devices, from simple IoT sensors to the incredibly complex autonomous vehicles. All these devices come with some form of programmable unit, from a basic micro-controller to more complex SOCs to powerful multi-processor systems with GPUs and accelerators. Software,

[26] https://ai-data-robotics-partnership.eu/

[27] file:///C:/Users/jmage/AppData/Local/Temp/090166e5c639b467.pdf

[28] Cf. https://info.vercator.com/blog/robotics-trends

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including embedded software is key to provide flexibility, adaptation, control capabilities, learning capabilities and AI/ML support and updates. The interplay of software, AI/ML and processors creates a vast and complex ecosystem that is expected to further grow in importance with time.

Identifying the most relevant 5G/6G Standards Organisations (5) that are relevant to COREnect has been more of a challenge. First of all, no open source organisation has been identified as being directly relevant to COREnect, unlike for the 5G ecosystem itself. Then, The COREnect domain is highly competitive, where proprietary chip technology and processes are applied. Competitive advantages are achieved by better and more cost-efficient technology processes, which are not shared, which is understandable considering the huge investment required in fabs. Standardization is coming in for the algorithms, radio interface technologies etc., which are implemented in chip technology. In this step, the design capabilities and know how are relevant. This is where Europe could develop advantages. In conclusion, standardization seems to be more relevant for algorithms, radio interface technologies and interfaces between networking elements etc., but not necessarily for the implementation itself. The implementation in hardware and software will be mostly proprietary. Therefore, at this initial stage, only a high-level list of relevant standardisation bodies is provided.

Expanding on the major stakeholder categories listed previously, Figure 13 shows the initial COREnect provisioning ecosystem stakeholder picture.

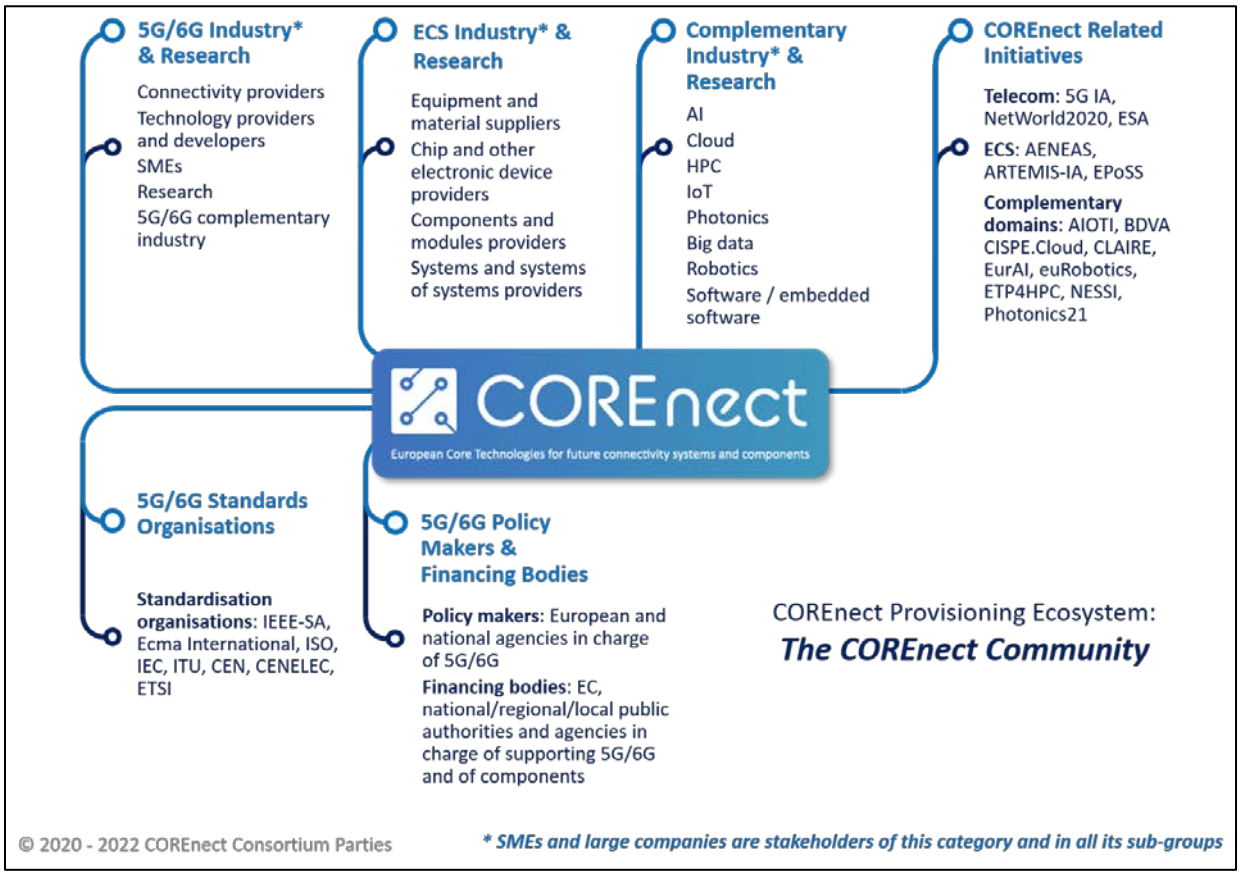

Figure 13: initial COREnect provisioning ecosystem stakeholder picture: the COREnect community

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2.2.2 Initial COREnect use-case ecosystem: users of the COREnect technologies

At this initial stage, the definition of the COREnect use-case ecosystem is more challenging than the provisioning ecosystem. Two possible options were envisaged:

1. Consider that COREnect technologies will only (or rather mostly) be used by specific 5G/6G technology users, or intermediaries, that would then incorporate those technologies into products and solutions; or
2. Consider that COREnect technologies may also directly be used by industry involved in vertical sectors.

Here are some initial reflections from COREnect partners and external experts on this important issue:

- "The value chain is blurring especially for verticals, because there are many different suppliers for vertical sectors. The IoT domain with specialized end devices needs microelectronics. In this domain there seems to be an opportunity for industry in Europe to move into end devices (not smart phones as consumer devices). Applications for artificial intelligence require specialized microelectronics to provide the necessary processing power. In summary, the expected market for COREnect technology will go far beyond classical telecommunications technology".
- "[The boundaries of the ECS domain are becoming more and more] fuzzy: a mobile phone is definitely an electronic system, but what about a car? According to Statista[29], electronics value in a car will reach 50% of the total cost by 2030. Will car makers consider themselves as providers of ECS?"
- "Over the recent years, an increased clustering can be observed in the value chain and within the [ECS] ecosystem. Vertical sectors are increasingly integrated; OEMs and even service providers own bigger parts of the value chain. Prime examples are Waymo and Google in the automotive sector, and Huawei in the telecom sector. The reason for this evolution is multi-fold. Economically, vertical integration enables them to grow their market share. Strategically, increased ownership of the value chain secures their supply chain sovereignty. But an increasingly important factor is digitalization which is goes across the entire value chain. Leveraging this cross-layer digitalization enables unique services with increased innovation, efficiency and performance. The counterpart of this evolution is an increased market consolidation which might hamper the synergetic technological research and innovation".

In light of this, the more likely orientation is that the two above-listed options will in fact cohabit with each other. There will likely be intermediaries, who would incorporate COREnect technologies into products and solutions, and those intermediaries may either be stakeholders in the 5G/6G market, or in vertical markets, or in both. A company like Bosch is already present both in the ECS and automotive markets, making it a potential "intermediary" in the future COREnect ecosystem.

This orientation is consistent with the latest approach from the BVME-SG which, in its work around the upcoming "5G Ecosystems" white paper, consider that, depending on the context, a given stakeholder may have different roles.

The major stakeholder categories for the use-case ecosystem are therefore proposed as follow:

1. 5G/6G COREnect Technology Users

[29] https://www.statista.com/statistics/277931/automotive-electronics-cost-as-a-share-of-total-car-cost-worldwide/

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2. Vertical Industry
3. Vertical Initiatives
4. Vertical Standards and Open Source Organisations
5. Vertical Policy Makers and Financing Bodies

Expanding further, Figure 14 shows the initial COREnect use-case ecosystem stakeholder picture.

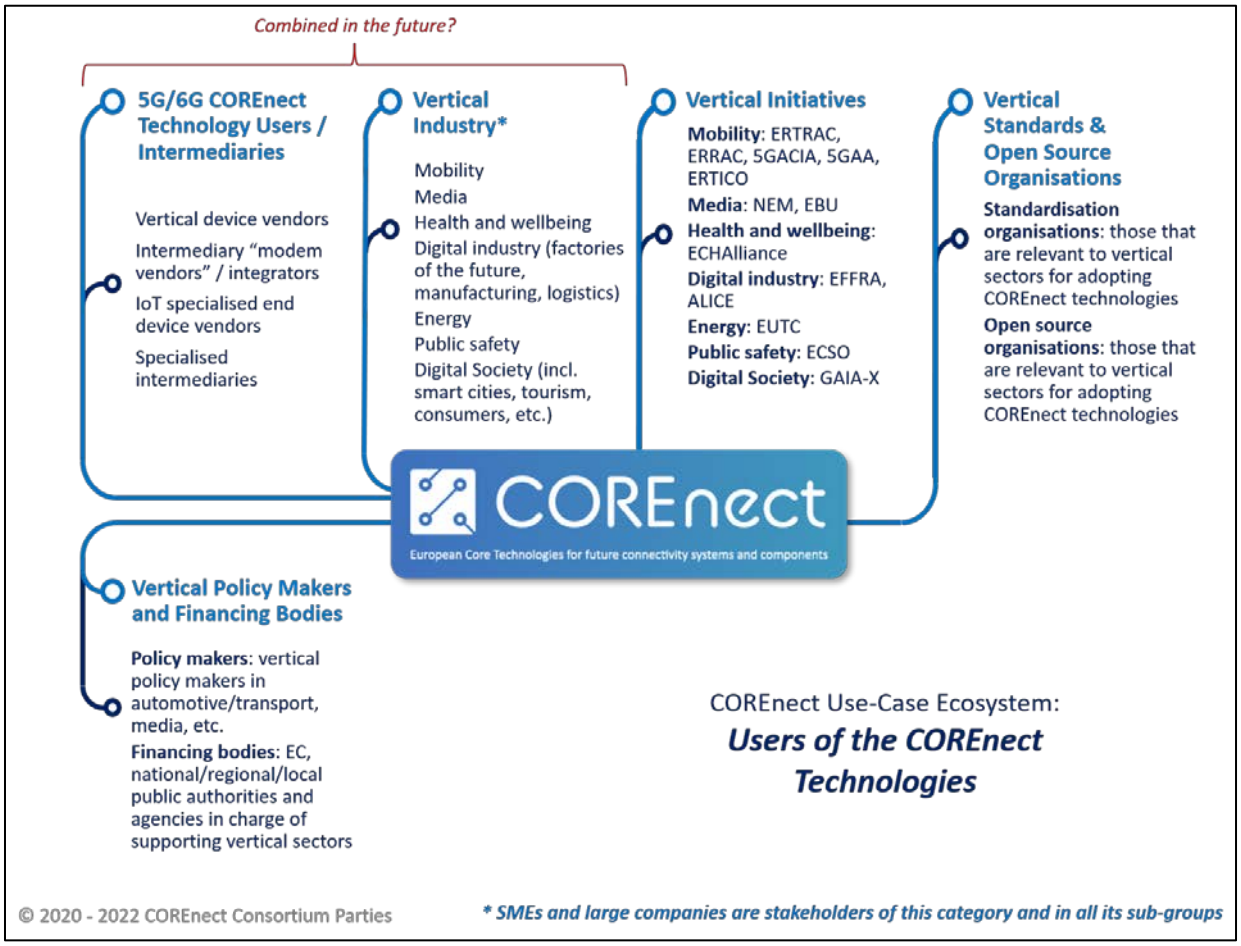

Figure 14: initial COREnect use-case ecosystem stakeholder picture: users of the COREnect technologies

The representation of the COREnect provisioning and use-case ecosystems is only at the initial stage. More work needs to be performed to provide more details and dig further into the most relevant stakeholders. The next steps in relation with this activity are described in section 4.4.1.

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3 Initial Report on Outreach, Dissemination and Exploitation Strategy

3.1 Initial outreach of the COREnect ecosystem

3.1.1 Reaching out to the initial COREnect community

As already mentioned in the introduction to this document, the first priority of COREnect in terms of community building is to support the set-up of the COREnect community, i.e., those stakeholders who will be part of the development of the COREnect related technologies.

The initial activities were all oriented towards initiating the effort to reach this objective. They were structured around three main axes:

- The COREnect partners themselves, along with their counterparts in the European Commission;
- Identifying and inviting relevant technical experts to join the COREnect Expert Groups;
- Making other stakeholders, both in the ECS and SNS communities, aware of the activities and objectives of COREnect, and start engaging them via communication means.

Complementary details about the Expert Groups and their activities may be found in Deliverable 3.1 "1st Report on the Activities of Expert Groups".

3.1.1.1 COREnect partners, EC

The first step towards reaching the initial COREnect community was to mobilise the COREnect partners along with the European Commission. This was done via two workshops that were organized early September 2020.

Workshop with the EC (September 2, 2020)

The COREnect project kicked off in the mid of pandemic with strong commitment from its 12 partners as well as with great support from the European Commission. To ensure the relevance and impact of its outcomes to the European R&I and industry landscape in both microelectronics and connectivity domains, a strategy meeting was held in the beginning of September between the COREnect consortium and the EC, clarifying expectations, discussing and aligning views on the subjects and agreeing on the way forward.

Strategy & Vision workshop (September 10-11, 2020)

The COREnect project organised its first internal workshop on strategy and vision on 10-11 September, 2020. In this workshop, all COREnect partners presented their own visions on "what should Europe do to address the problem of telecom component deficiencies", sharing different perspectives from industry, RTOs, university and SME in microelectronics, telecommunications and vertical domains. The outputs of this internal workshop have been developed further into Deliverable 2.1 "Initial vision and requirement report", that is due end of December 2020. It is scheduled to be published early 2021 on the COREnect website, for public consultation.

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3.1.1.2 COREnect Expert Groups

The aggregation and the onboarding process of COREnect's internal and external experts for the three Expert Groups (EGs) "Computing and Storage Core Technologies", "Communication/Sensing Core Technologies", and "Peripheral Core Technologies" were initiated as soon as the project started.

The first general meeting took place on October 1st, 2020. It was the initial Expert Group Kick-off Meeting, with experts from each EG as well as the European Commission participating. The main objective of the meeting was to introduce the experts to the project partners, provide them with an overview of the project, clarify the work and contributions expected from the EGs to COREnect's WP3, as well as the importance of our work for the EU. It ended with an open discussion with the experts. The output was a great baseline with mutual consent, understanding and enthusiasm for future collaboration. Furthermore, the consortium received first inputs on major research gaps within the EU, covering both SNS and KDT topics.

A total of 94 experts are registered in the EGs, representing 54 different organisations. 40% of the experts come from industry, and 60% from research institutes and universities. All the details about the work performed in the EGs, as well as which category of organisation was involved, are available in Deliverable 3.1 "1st Report on the Activities of Expert Groups".

3.1.1.3 COREnect workshop

As planned, the 1st COREnect workshop was organised in co-location with EFECS2020. Its content was adjusted to take into account the fact that the project started earlier than expected (i.e., July 1st, 2020, instead of September 1st, 2020) and moreover that EFECS was held as an online event, because of the COVID-19 context. The workshop was quite successful, and attracted about 120 participants.

More specifically, the agenda included:

- Presentation of COREnect objectives
- Keynote from the project officer: Towards European strategic autonomy in future connectivity systems
- Initial findings from WP2 (Strategy and vision for building European technological sovereignty in 5G and beyond) and panel discussion
- Initial findings from the 3 expert groups (presented by the EG Chairs) and Q&A session

The presentations and the video of the workshop have been published on the COREnect web site[30].

The registration to EFECS allowed participants to attend the COREnect workshop at no additional charge. Furthermore, the workshop was scheduled early afternoon, just following the closure of the main event, so it was convenient for members of the ECS community to attend it. However, there were some concerns that stakeholders from the SNS community, not spontaneously attending EFECS, would not be ready to pay for the EFECS online fee in order to attend the COREnect workshop. To overcome that difficulty, COREnect decided to grant free EFECS tickets to SNS stakeholders. This option was advertised mostly by 5G IA to the SNS community. 50 people registered for such a free registration via an online form made available on the COREnect web site, and eventually 31 actually requested formally their ticket via this means. As initially planned, the EG experts were also invited by COREnect.

[30] https://www.corenect.eu/news/efecs-2020-corenect-workhop

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As already mentioned, the workshop attracted about 120 participants in total. According to the statistics provided by EFECS, the session was viewed 304 times.

Information on who attended the session is not available, therefore we cannot analyse further the type of participants nor the organisations they come from.

3.1.2 Reaching out to the COREnect users: initial steps

COREnect was invited in September 2020 to present its candidature to the "Mobility.E Lighthouse". The Mobility.E Lighthouse is a collaboration and networking platform for excellent projects, whose objective is to keep the European industry ahead of the global competition in the area of mobility related electronic components and systems. It assists in the uptake of future relevant technologies for electric, connected, automated driving (ECAD) and mobility solutions that address societal challenges. The Mobility.E Lighthouse is an initiative of the ECSEL JU, a public-private partnership launched by the EC. Its goal is to promote research and development in the field of electronics.

The projects are clustered together around 7 Urgent Priority (UP) domains, as can be seen in Figure 15.

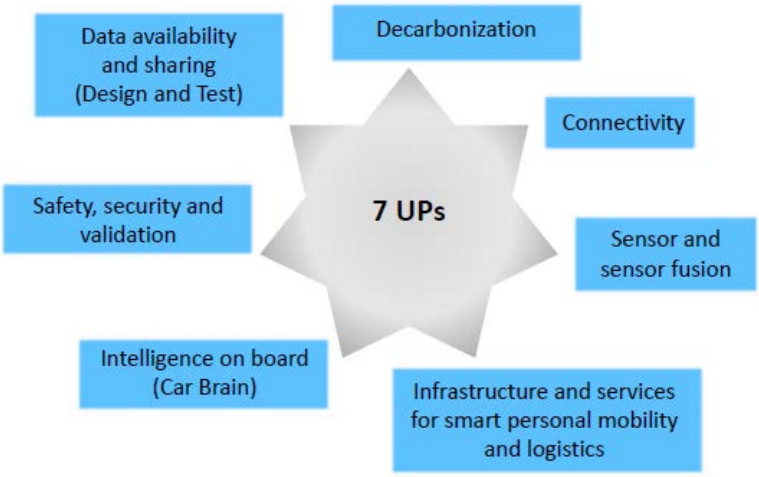

Figure 15: Mobility.E Lighthouse 7 Urgent Priority (UP) domains

Up to know, most of the projects are related to 4 of the 7 UPs, in particular:

- Intelligence on board (car brain)
- Safety, security and validation
- Decarbonization
- Sensor and sensor fusion

Recently, a number of other projects were invited to join the platform. On October 19th, 2020, the COREnect project was presented, and was considered as bringing a signification contribution to the Connectivity UP. There will be a bilateral cross-fertilization between COREnect and the Mobility.E Lighthouse in terms of defining joint RD&I priorities and roadmaps, connecting the automotive world with the 5G/6G connectivity world.

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Although engaging with external stakeholders of the "use-case ecosystem" was planned later in the project, COREnect seized this opportunity and is now involved in this interesting initiative[31].

3.1.3 Dissemination and promotion activities

Key dissemination and promotion activities have been successfully carried out as planned in the first six months of the project:

- A press release was issued on 1st July 2020 to describe the project and announce its kick-off.
- COREnect issued its first Newsletter in October 2020.
- A fully functional website has been available since September 2020 at https://www.corenect.eu.
- COREnect's accounts for LinkedIn and Twitter have been created and are now in full use[32].
- AENEAS disseminates the COREnect activities to the ECS community and 5G IA to the SNS community via their newsletters / newsflashes, social media, and mailing lists, and to their press contacts. In addition, 5G IA also forwarded relevant announcements to complementary initiatives in the SNS domain.
- The 1st COREnect workshop was held in co-location with EFECS 2020.

The following subsections describe in details the activities performed with respect to dissemination and promotion in COREnect.

3.1.3.1 COREnect logo and branding

The COREnect project has defined a brand, represented by a logo and an icon. All communication material is aligned with this branding. A specific colour palette has been designed.

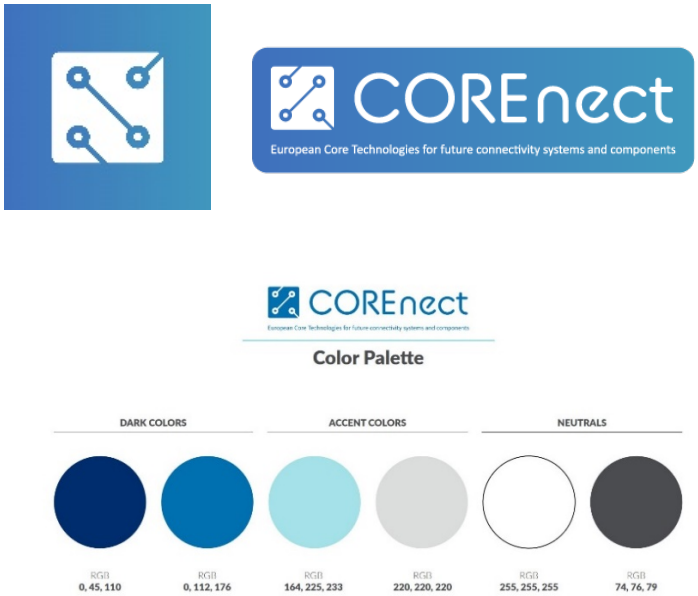

Figure 16: COREnect branding

[31] More information on Lighthouse and the different projects involved at https://www.mobilitye.eu/projects

[32] https://www.linkedin.com/company/corenect/, https://twitter.com/core_nect

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A PowerPoint template has also been designed to fit the needs of the project. Two versions are available: one for public presentations, and another one internal to the project.

Figure 17: COREnect PPT template

Some generic images were also designed to be used in the social media channels.

Figure 18: COREnect images for social media

3.1.3.2 COREnect web site

The initial website was set up in September 2020, and has been progressively evolving, in line with the needs of the project. So far, it has served as a general presentation of the purpose of the COREnect project, showing information about the different working packages and relevant expert groups. A News page was added lately, to show the relevant events organised and attended by COREnect.

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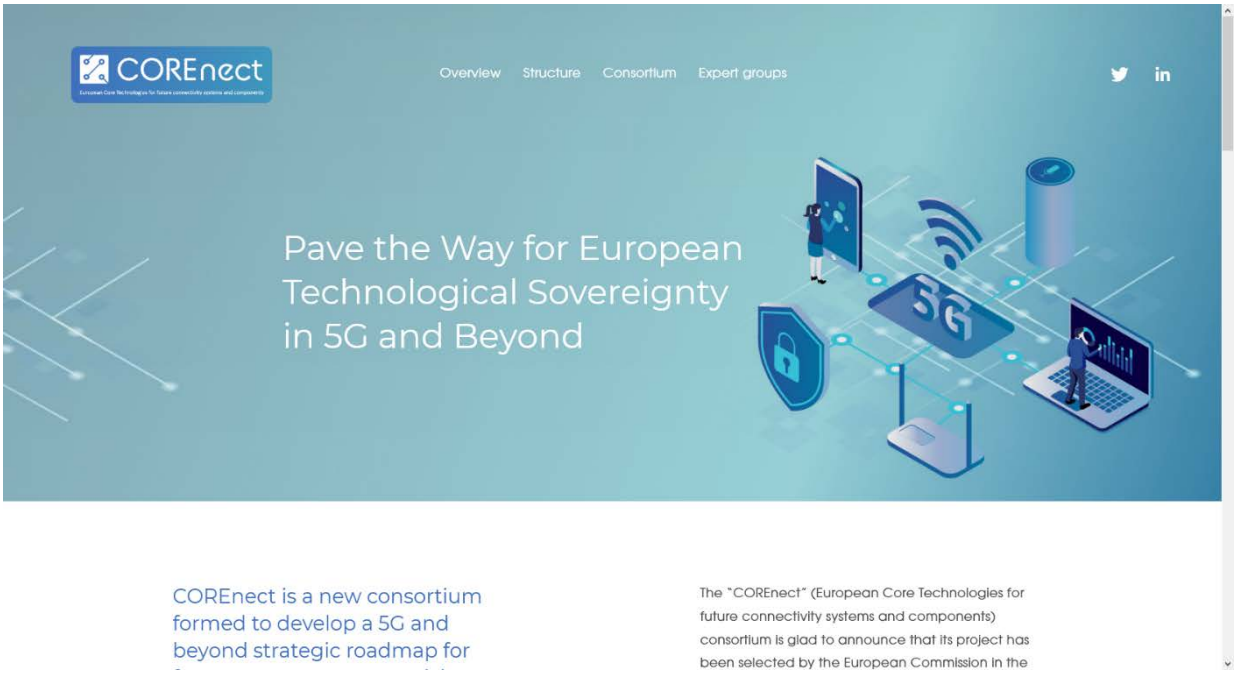

Figure 19: COREnect web site

A specific online form was created in accordance with the decision of COREnect to allow specific individuals to request a free EFECS 2020 registration.

A dedicated dynamic pop-up window has been designed for subscribing to the COREnect news, as illustrated in Figure 20.

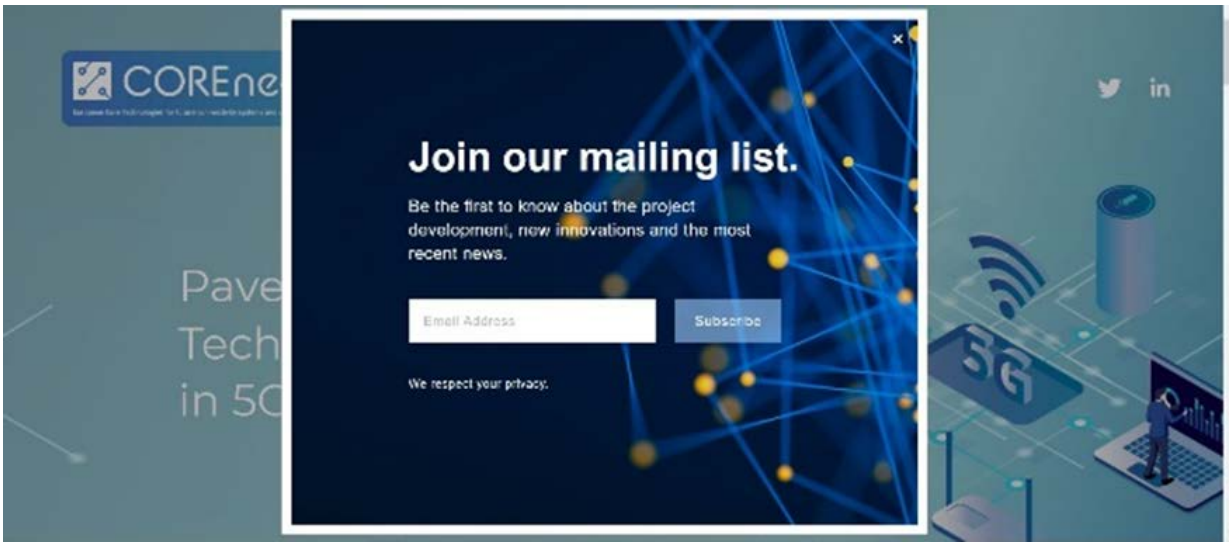

Figure 20: COREnect newsletter subscription pop-up window

3.1.3.3 COREnect social media

The LinkedIn and Twitter social channels have been used to build a community around the challenges COREnect faces, and to expand the communications in relation with the events in which the consortium participates. The social channels are managed (internally) thanks to a posting calendar helping us to schedule the content, daily and weekly, see Figure 21.

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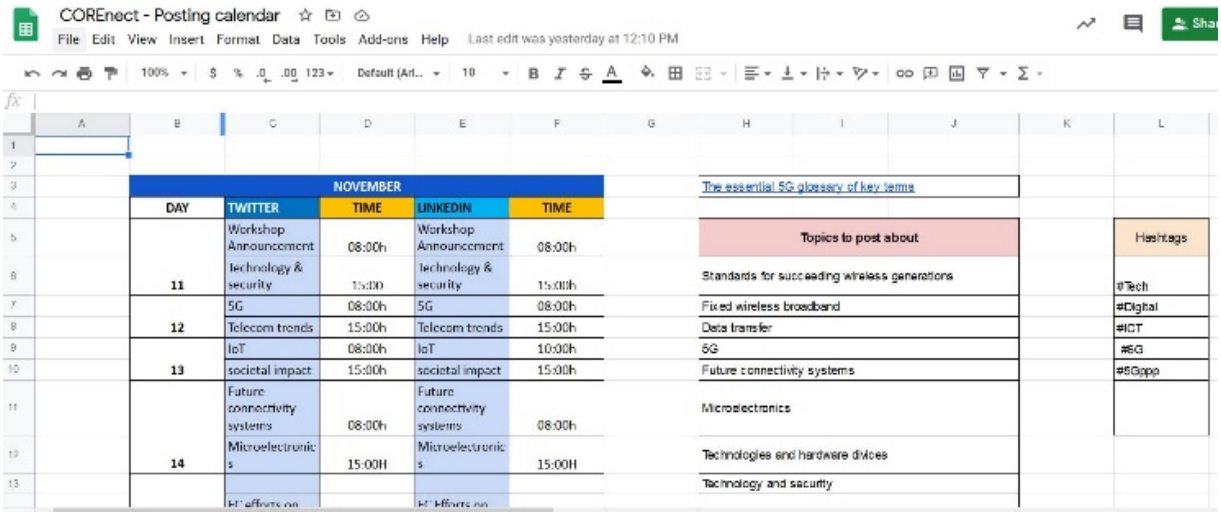

Figure 21: COREnect's internal calendar for social media

The marketing strategy is adapted to each of the channels. Twitter is used towards a broader audience, while LinkedIn focuses on longer posts that should be more relevant for technical experts.

Lists were created on Twitter, e.g., 5G, Computer Science, Cybersecurity, Electronic components, IoT, and are related to specific profiles. Relevant profiles are monitored, and information that is interesting to COREnect is published.

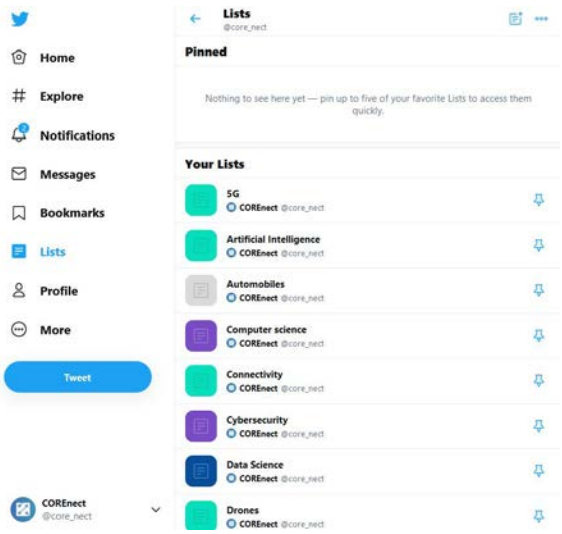

Figure 22: COREnect's internal profiles for social media

On LinkedIn, COREnect is trying to participate in third-party conversations about related challenges. There is a community strategy for recommending posts of people who have shared COREnect's posts.

In both social networks, COREnect promotes articles and events in which some of the partners participate, starting with its own events. A major activity in the first six months was around the 1st COREnect workshop. A special promotion was put in place weeks before the workshop. During the event, Twitter was used to cover the presentations and debates. Once the workshop was over, a summary was posted on the two social networks.

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Examples of posts are shown in Figure 23.

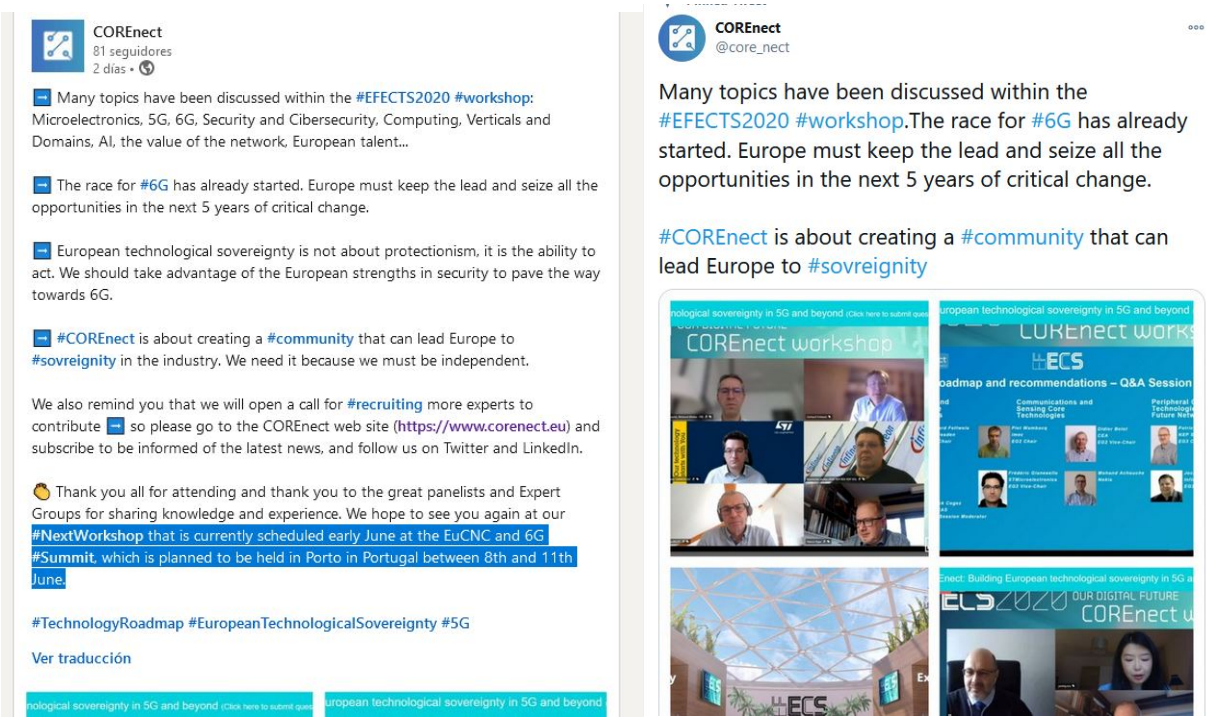

Figure 23: Examples of COREnect posts on Twitter and LinkedIn

3.1.3.4 COREnect newsletters

The 1st COREnect newsletter was issued in the last week of October 2020. It was broadly disseminated to the ECS and SNS communities, in particular via the 5G IA and the AENEAS mailing lists. It was also disseminated to complementary initiatives, i.e., NetWorld2020, AIOTI, CISPE.cloud, NESSI, Photonics21, BDVA, euRobotics, and EuroHPC.

The newsletter included an editorial from Gerhard Fettweis, COREnect project coordinator, as well as a section entitled “Forward”, written by Bernard Barani from the EC. Yaning Zou wrote a short overview of the project, and an overview of next activities. The newsletter also included an overview of the COREnect Expert Groups, and the announcement of the 1st COREnect workshop.

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Figure 24: Header of the 1st COREnect newsletter

3.1.3.5 COREnect press releases

COREnect's first press release[33] was prepared in June 2020 and was issued on 1st July 2020 when the project officially started. All project partners contributed to its preparation and agreed on its content.

The aim of the press release was threefold:

- Inform and raise awareness on the main activities and objectives of the project.
- Start to reach out to strategic stakeholders/domains.
- Present the project's beneficiaries.

The press release was widely distributed by 5G IA and AENEAS, and relayed by all COREnect partners.

33 https://static1.squarespace.com/static/5f46601a7f9764175fb38f1c/t/5f4666101769e32f072ddb01/1598449171086/2020-07-01+COREnect+PR+Final.pdf

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4 Initial Achievements, Conclusions and Next Steps

This section provides a summary of the achievements from the first six months of the project that are relevant to WP4, in relation with the objectives originally highlighted in the DoA.

4.1 Initial achievements vs. COREnect objectives

The following table summarises the initial achievements against COREnect objectives as described in the DoA. Only the objectives related to WP4 are included below.

Sub-objectives		Measure of Achievement	Already achieved
1.a	*COREnect will bring together the stakeholders that should be involved in such a community, starting with the organisations involved in this project, in the ICT-42 Innovation Actions, and in the existing communities where part of the stakeholders shall be involved, primarily the SNS and KDT communities. More details may be found in Subsections 1.3.5.3 and 2.2.2.*	*Initiate and proceed with the creation of a dedicated "European Core Technologies for future connectivity systems" community, i.e. the COREnect community.*	**An initial version of the COREnect provisioning ecosystem stakeholder picture has been drafted. Relevant organisations and experts are being engaged already (cf. section 2).**
2.a	*Organisation of a COREnect workshop by 5G IA and AENEAS for knowledge sharing on this topic. More details may be found in Subsection 1.3.5.2.*	*Obtain reciprocal knowledge of current Strategic Research Agendas and processes for elaboration.*	**The 1st COREnect workshop was organised in co-location with EFECS 2020, and attracted about 120 participants from both the ECS and the SNS communities (cf. 3.1.1.3).**
2.b	*Availability of a mapping of relevant contributing experts of both communities, providing inputs for recruiting and engaging external technical experts for roadmapping activities. More details may be found in Subsections 1.3.5.2 and 1.3.5.4.*	*Identification of the contributors of the two Strategic Research Agendas pertinent to the definition of a roadmap of core technologies for future connectivity systems.*	**Contributors to the sections that are most relevant to COREnect in the ECS SRA and the NetWorld2020 SRIA have been identified. Their organisations are listed, among others, in Annex A.**
3.b	*COREnect will engage with the industrial, academic and SME communities to make them aware of the new community being built up and of the opportunities that it brings in economic and societal terms. More details may be found in sections 2.1 and 2.2. To do so, it will disseminate effective material to the most relevant external stakeholders and invite those stakeholders in workshops and events to make them aware of what this community will produce in the future. More details may be found in section 2.2.3.*	*Promote the preliminary results obtained by the COREnect community to engage and mobilise potential future "champions" as well as potential future users and investors.*	**Cf. section 2 for engagement activities and section 3 for dissemination activities already performed.** **The 1st newsletter and the COREnect workshop were important instruments in making both the ECS and SNS communities aware of the project and its objectives.** **The next major step for engagement, promotion and dissemination shall happen early 2021 with the release of the first COREnect deliverables and the public consultation around Deliverable 2.1.**

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4.2 Initial achievements in relation with the meetings of the Expert Groups (roadmapping activities)

As already stated in section 3.1.1.2, a total of 94 experts are registered in the EGs, representing 54 different organisations. 40% of the experts come from industry, and 60% from research institutes and universities. The following table describes the initial achievements in relation with the expected impact of the project when it comes to roadmapping:

Expected impact - Indicators	Initial results achieved
Number of industry domains involved in the roadmapping activities	**At this initial stage, only ECS and SNS stakeholders have been involved in the EGs, as they constitute the basis of the COREnect community.**
Number of industry domains to which COREnect disseminates the roadmap	**n/a (the roadmap is not available yet).**
Number of large enterprises and SMEs involved in the roadmapping activities	**20 large companies have been involved in the EGs.**
Number of feedbacks received from large enterprises and SMEs across Europe	**n/a (the roadmap is not available yet).**
Number of industry associations to which COREnect disseminates the roadmap	**n/a (the roadmap is not available yet).**

At this stage, SMEs are not represented in the EGs, and there are only a few women involved. The recruitment of additional experts, that shall be launched early 2021, shall be an opportunity to correct the gender balance in the EGs, and to attract experts from SMEs -in addition to attracting the required skills and expertise that are missing to complete the tasks.

4.3 Initial dissemination achievements

The initial results of the COREnect dissemination activities are presented in the table below. *All figures are those reached by end of November 2020.*

Measure	Indicators	Target Nr	Reached
Events (Participation)	No. of events participations	30+	**6**
Events (Organisation)	No. of workshops organised	5	**1**
	No. of participants in the workshops (total)	200+	**≈120**
Project Website	No. of visitors (monthly average)	500+	**257**[34]

[34] Considering that the web site was initiated mid-September, this average figure is not really relevant. In October, there 298 visits, and 355 in November.

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Measure	Indicators	Target Nr	Reached
Articles/ Press Releases	No. edited	6+	**1**
Printed material	No. of hard copies (e.g. flyers) distributed	1,000+	**n/a[35]**
Social media	Size of the online community (Twitter followers, LinkedIn Group members) by the end of the project	Twitter: 500+ LinkedIn: 100+	**Twitter: 89** **LinkedIn: 81**
Newsletters	No. of newsletters contributed/released	6	**1**
Mailing list	No. of subscribers by the end of the project	500+	**72**

Considering that the COREnect activities have effectively started in September 2020, and that the web site and social media did not become fully active before beginning of October, we consider that **the initial dissemination results presented in the table above are well in line with the objectives**. It is a very encouraging start for a growing involvement of the COREnect stakeholders and for reaching out to the relevant communities.

Details on the 1st **COREnect workshop** are provided in section 1.3.3.1. Beside the workshop, COREnect partners attended a few events of relevance to the project, as shown in the table below.

COREnect partner	Who attended	Event	Type of participation	Organised by	Date
TUD	Yaning Zou	5G IA General Assembly	Presentation	5G IA	30/06/2020
NXP	Patrick Pype	LIASE - Mobility.E Lighthouse	Presentation	VDI/VDE Innovation + Technik	16/10/2020
TUD	Gerhard Fettweis	SEMI Europe Think Tank	Presentation and strategy discussion	SEMI	11/11/2020
All COREnect partners	All COREnect partners	EFECS 2020	Attendance	EFECS	26-27/11/2020
AUS	Jacques Magen	Stakeholder Workshop on 5G Equipment and Services Supply Market Trends and Perspectives on Open Initiatives	Attendance	AIT Austrian Institute of Technology	16/12/2020
IFAG	Wolfgang Dettmann	ECA2030 - panel "Connecting European Partnerships in the Field of Mobility"	Presentation and Panellist	COSMOS	27 & 28th Oct 2020

[35] This objective is not relevant because of the COVID-19 context that prevents any dissemination of printed material.

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The **COREnect web site** was initiated early September, and went online mid-September. By the end of November, i.e., in 3 months, it had attracted about 700 visitors, and 1,600 pages views. There was a peak of visits corresponding to the 1st COREnect workshop at EFECS2020, as shown in Figure 25. Most of the views were direct views (63.5%). It is interesting to note that 16.5% of the views came from emails -most likely the emails sent by COREnect to announce the workshop and the email with the 1st newsletter.

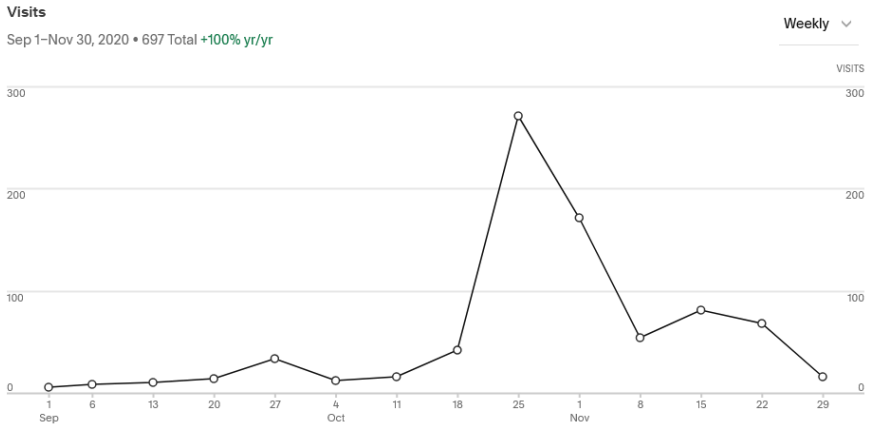

Figure 25: COREnect web site statistics

The 1st COREnect **press release** is described in section 3.1.3.5.

Social media also started to attract followers at a reasonably high rate, considering that the tweets and LinkedIn posts increased significantly only in November, mostly around the 1st COREnect workshop and the 1st newsletter. But of course, the challenge remains ahead. The number of followers of LinkedIn is almost at the same level as the followers in Twitter, showing that COREnect is for now mostly attracting technical experts, which was the primary objective in the early stages of the project. COREnect is indeed planning to use LinkedIn for more detailed posts, more in line with the expectations from experts, and Twitter for more general and short pieces of information, addressing a broader audience. It is worth noting that in November alone, there were more than 1,000 visits to the COREnect Twitter account, and the COREnect LinkedIn posts were viewed 4,700 times. We expect the number of followers to significantly increase on both social media as soon as the outcomes of the first COREnect deliverables will become public, i.e., in Q1 2021.

The 1st COREnect **newsletter** is described in section 3.1.3.4.

By end of November 2020, 72 people had subscribed to receiving **news** from the COREnect project, either via the COREnect web site, or via their request to receive a free ticket to attend the 1st COREnect workshop. It is worth noting that major COREnect news such as the workshop announcement and the newsletter were disseminated to a total of about 25,000 individuals (4,000 in the SNS community and 21,000 in the ECS community), as they were forwarded via the 5G IA, NetWorld2020 and AENEAS mailing lists. Those important news were also relayed by COREnect partners, and by the COREnect social media (see 3.1.33 for more details on activities related to social media).

The dissemination activities performed during the first 6 months of the project are summarised in the table below.

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Measure	Target audience	Plan	Done
Phone Calls/ Meetings	Experts Industry, SME, academia Policy makers	*Although this is not a scalable mechanism, phone calls and meetings are successful means in the conversion strategy for specific key actors. In the case of the project, this is especially relevant when new organisations are willing to join the COREnect community. Specific meetings might be set up e.g. along conferences and events. Phone calls will be used to engage with experts from the expert groups, and to interact with other projects and initiatives. Phone calls have also proven to be more efficient than physical meetings when it comes to engaging SMEs, who often do not wish to travel. Meetings shall also be organised with policy makers at national or European level by consortium partners, together or on their own, to disseminate the results of the project.*	**Considering the COVID-19 context, online meetings were organised with the EG experts (cf. 3.1.1.2) and with the EC (cf. 3.1.1.1).**
Email Promotion	Industry, SME, academia Verticals Policy makers	*COREnect will use its bimonthly newsletters as promotional means of dissemination to the targeted stakeholder communities. In specific cases, additional email promotion may be used e.g. for a specific result or an unexpected participation/presentation of the project in a conference not yet announced in the previous e-newsletter. Those emails will refer to the project website and the social media.* *To that purpose, the existing mailing lists related to the KDT and SNS communities will be used, mainly via 5G IA and AENEAS. Partners will also use their own projects/initiatives mailing lists that may target relevant stakeholders, e.g. the Teraflag (Terahertz flagship) mailing list for TUD[36], the EC B5G Cluster mailing list for IMEC, etc.*	**The 1st COREnect newsletter was released in November 2020 and disseminated by email (cf. 3.1.3.4). The next one is scheduled for January 2021.** **Major COREnect announcements were promoted via the 5G IA mailing lists (for SNS) and the AENEAS mailing lists (for ECS), reaching a total of about 25,000 people.**
Project Website	All	*The main resource for generic promotion of the project activities and results to all target audiences, providing comprehensive information about COREnect, its objectives and references to other resources. The first version will be ready by M02, will be maintained and updated regularly, and will remain available for at least one year after the end of the project. The objective is to make this website the portal of the COREnect community, beyond the project itself.*	**The COREnect web site was initiated in September 2020 and is attracting more and more viewers. A major update is planned in January 2021, with the release of the first deliverables and the public consultation around Deliverable 2.1.**
Social Media	All	*COREnect will actively build and maintain its presence in social media channels, i.e., Twitter for promotion and dissemination towards the external stakeholders, and LinkedIn for building up the community. These two channels have proven to be the*	**COREnect social media channels, i.e., Twitter and LinkedIn, have been initiated and started to be very active in October with the 1st newsletter and the announcement of the 1st workshop. Microsoft Teams was**

[36] https://teraflag.eu/.

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Measure	Target audience	Plan	Done
		most effective tools when engaging with technology communities. While interacting with our target audience, these online channels will promote new publications and participation in different kinds of events. The project will leverage the current traction from accounts like @EUScienceInnov[37] – the official account of DG Research & Innovation with near 79K followers - as well as those from the consortium.	**preferred for engaging the expert community, while LinkedIn will be used for more detailed technical information and Twitter for general promotion.**
Newsletters	Industry, SME, academia Verticals Policy makers	*Online newsletters will provide a snapshot of the main activities and achievements of the project on a bi-monthly basis. Newsletters will anticipate planned actions for the upcoming periods, with special emphasis on results, workshops and events.*	**The 1st COREnect newsletter was released in November 2020 and disseminated by email (cf. 3.1.3.4). The next one is scheduled early 2021.**
Press Releases	Industry, SME, academia Verticals Policy makers	*To reach out to a broader audience, the project shall publish timely press releases through the partners of the consortium, especially those with an established network of partners and customers, in particular AENEAS and 5G IA. Presence at major events could also lead to articles in the press.*	**COREnect issued a press release to announce the beginning of the project (cf. 3.1.3.5). The next press release is scheduled early 2021.**
Printed Material	Industry, SME, academia Verticals Policy makers	*The list of printed material for the COREnect project initially includes:* • *An initial project flyer highlighting the main objectives of the project – to be released at the beginning of the project;* • *A roll-up or poster for display at events;* *A flyer dedicated to policy makers, highlighting the results and recommendations from WP2; A couple of brochures with the main results of the project from WP2 and/or WP3, which will be released at the most relevant time during the project, depending on the contents and the target audience.*	**Printed material is not relevant in the COVID-19 context. Considering that the events were held online, especially EFECS 2020, it was agreed not to release a specific flyer but rather to promote the workshop to the relevant communities.** **The description of COREnect has been sent to the Full5G project for inclusion in the 5G PPP Phase 3 projects brochure[38].**
Logo & Templates	All	*The project will build a brand for the COREnect community that will be used, refined and protected throughout the project. A recognizable visual identity is provided at proposal stage, but it will be adapted, when required, to the specific needs of the project and/or the community. Ultimately, the logo and branding shall identify not this project but the community itself and shall continue to be used beyond the project lifetime.*	**A recognisable logo and icon were designed for COREnect, as well as a PPT template (cf. 3.1.3.1), and several generic images. This branding is being used for the web site, the social media, and the newsletters.**

[37] Cf. https://twitter.com/EUScienceInnov

[38] Not yet released at the time of drafting this document.

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4.4 Conclusions and Next Steps

4.4.1 Community building

4.4.1.1 Stakeholder identification

As highlighted in the previous sections, a lot of work has been done already and is still being done when it comes to identifying the 5G and ECS stakeholders (and ecosystems). In addition, a lot of work has also been performed in terms of identifying on the one hand the complementary domains, and on the other hand the vertical sectors, that should be targeted and potentially involved, both by the future SNS and KDT communities. COREnect shall thus build its stakeholder ecosystems by considering the evolution of the 5G PPP and ECS communities towards SNS and KDT.

Other opportunities shall facilitate the initial definition of the COREnect ecosystems:

- The COREnect consortium assembles a few major industrial and academic players that are willing to play a role in the COREnect domain;
- COREnect has already assembled three Expert Groups currently involving 80+ experts;
- 7 projects are currently starting to work on Innovation Actions in relation with the COREnect domain: 5GLOGINNOV, 5GMETA, 5GRECORDS, AFFORDABLE5G, DRAGON, FUDGE5G, and Int5Gent[39].
- Many ECSEL projects have been addressing core technologies pertinent to the COREnect domain. Examples include BEYOND5, UltimateGaN, 5G_GaN2, TARANTO, REFERENCE, BRAINE, and AI4DI[40].

The main challenge will be to select the most relevant stakeholder communities, and later the most relevant organisations, to be either engaged into the COREnect community or targeted as potential users, among the many communities involved and targeted by KDT and SNS. Indeed, this document already lists an impressive number of organisations and initiatives related to KDT and SNS, but only a (small?) subset of those will be actually relevant for COREnect. The question for example of whether it is required to directly engage vertical initiatives, associations and organisations, or to rather leave this responsibility to the associations representing the private side in the KDT and SNS partnerships, in particular AENEAS and 5G IA, is one of the key challenges.

The initial stakeholder pictures should be worked out further and include sub-categories. The accompanying glossary should be initiated. It should also include the outcomes from the work currently being performed in the BVME-SG when the reference document on “5G Ecosystems” will be released.

4.4.1.2 SMEs in the COREnect ecosystems

Another challenge is the role of SMEs in the COREnect ecosystems. Components manufacturers need a critical size to actually build components and associated systems. What is the role that SMEs could play

[39] https://5g-ppp.eu/5g-ppp-phase-3-5-projects/

[40] https://www.ecsel.eu/projects

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in the value chain? How to create the conditions for tomorrow's European champions, and what form should they take? These are some of the questions to be answered. As already highlighted in section 4.2, a specific effort shall be made in the coming months to engage further with SMEs, including with experts from SMEs who will be willing to contribute to the COREnect EGs. The work performed in WP2 and in WP3 shall help us progress on that front.

The potential role of SMEs in the future COREnect provisioning and use-case ecosystems must be looked upon. The work of the BVME-SG on the distinction between roles and stakeholder categories shall be used to this effect. Moreover, the role of the SMEs in the current ECS and 5G value chain must be further explored, to find out how SMEs could be positioned in the future COREnect ecosystem.

A first orientation has been provided on the ECS side by the Member States' Joint Declaration entitled "A European Initiative on Processors and semi-conductor technologies" [16], which states that the Member States "agree to […] support the use of semiconductor in Europe and to this end, facilitate the exploitation by SMEs of advanced chip technologies in innovative products". This positions SMEs mostly in the use-case ecosystem.

Another interesting path to explore, comes from the "5G Supply Market Trends" preparatory report [17], that is focusing on the 5G infrastructure market, i.e., the provisioning ecosystem rather than the use-case ecosystem. The report stresses that "there is an opportunity for new European players to enter the market", as long as "Europe collectively [develops] a plan of action". According to the report, this opportunity comes from the fact that "diversification is paramount for European and America operators, which will do all they can to hurry the development of 'new kids'".

4.4.1.3 Stakeholder engagement

Considering that the "COREnect community" does not exist as such yet, we shall not only identify the most relevant stakeholders but also immediately start engaging the ones already identified and progressively build the community. We have already identified an initial list of organisations that should be the most relevant to engage first in the COREnect community. Those organisations have been spotted for the following reasons:

- They have contributed to Chapter 7 "Connectivity and interoperability" of the 2020 edition of the ECS SRA, and of the 2021 edition of the ECS SRIA.
- They have contributed to Chapter 10 "Opportunities for Devices and Components" of the 2020 edition of the NetWorld2020 SRIA.
- They are involved in the COREnect consortium or are a partner in one or more of the new ICT-42 Innovation Action projects.
- They are contributing as experts in the COREnect Expert Groups.
- They have registered to receive the COREnect news[41].

The list of organisations that COREnect should initially engage as part of the COREnect community is presented in Annex A.

Then, when COREnect's work and plans will have sufficiently progressed, it will be time to proceed further with the engagement of the external communities, i.e., the "COREnect use-case ecosystem". Build-

[41] Either directly via the COREnect web site, or by requesting a free registration to attend the 1st EFECS workshop.

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ing strong relations with the various ICT-42 IAs would be a starting point. Monitoring closely the evolution from 5G PPP to SNS, and from ECSEL to KDT is another important issue, already highlighted in this document. COREnect will build upon the engagement with vertical stakeholders supported by the Full5G project at 5G PPP level and by the 5G IA Verticals Task Force, as well as the interaction between AENEAS and its complementary verticals counterparts.

4.4.2 Communication and dissemination

A major revision of the web site is planned in January 2021. The following revisions are currently planned:

- A new page or section called “News & publications”, probably including PR material as well.
- A new page or a section about “Relation with European & Worldwide Initiatives".
- An online form for the public consultation in relation with Deliverable 2.1.
- Another online form for recruiting additional experts to the EGs.
- The content of the Consortium page will be revised to make it shorter more appealing.
- The Expert Group page will be revised to include more information on the outcomes of each EG.

Progressively, through the engagement of more and more stakeholders, the project web site should become the web site of the COREnect community.

On the social media channels, we will continue to communicate key moments in the life of the consortium, as well as specific promotions for newsletters and events, or other important COREnect announcements such as the public consultation for expert recruitment planned early 2021. There as well, those channels shall progressively become the voice of the COREnect community.

The 2nd newsletter is scheduled early 2021. It shall focus on the outcomes of the first main COREnect deliverables, and the related public consultation on Deliverable 2.1, as well as the recruitment of additional experts for the EGs. Other newsletters will be scheduled in line with major announcements and events.

The next press release is planned early 2021. The idea to provide some information about the scope of COREnect, the latest news about the activities of the Expert Groups, and moreover the first steps in analysing the landscape (in relation with Deliverable 2.1).

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Annex A: initial List of Organisations to be Engaged into the COREnect Community

The list below is an initial list of organisations that are relevant to be engaged in the COREnect community. This list is composed of organisations that have been gathered by COREnect from the following sources:

- COREnect consortium
- EG experts
- Experts involved in relevant chapters of ECS SRA and NetWorld2020 SRIA
- Organisations involved in ICT-42 IA projects
- Individuals registered in the COREnect workshop
- Individuals registered to receive COREnect news

The category "industry" represents large industrial companies, while the category "SME" represents small and medium-sized companies (as identified by the EC). "Research" includes both research centres and universities. Organisations not belonging to any of the three mentioned categories are listed as "Other", e.g., associations.

Company	Category
AENAS	Other
5G IA (The 5G Infrastructure Association)	Other
8BELLS	Research
ABB	Industry
Accelleran	SME
Acciona	Industry
Acreo	Research
ADVA	Industry
Airbus	Industry
AKKA High Tech	Industry
Altice Portugal	Industry
ARISTOTELIO PANEPISTIMIO THESSALONIKIS	Research
Asociación Centro Tecnológico Ceit-IK4	Research
AT&S Austria Technologie und Systemtechnik AG	Industry
Athonet	Industry
Australo	SME
AVL List GmbH	Industry
Barkhausen Institute	Research
BBC	Industry
BEIA Consult International	SME
BMW	Industry
BnearIT	SME
BOSCH	Industry
C Tech	SME

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CEA-LETI	Research
CELLNEX (RETEVISION)	Industry
CENTRE TECNOLOGIC DE TELECOMUNICACIONS DE CATALUNYA	Research
Circle SpA	
Consorzio Interuniversitario Per L'ottimizzazione E La Ricerca Operativa	Research
CONTINENTAL AUTOMOTIVE ROMANIA SRL	Industry
COSMOTE KINITES TILEPIKOINONIES AE	Industry
CTTC	Research
Cumucore	SME
Cyberus	SME
DEKRA Testing and Certification S.A.U.	Industry
Deutsche Telekom	industry
DLR	Industry
EAB	Industry
EANTC AG	SME
eCom Scotland	SME
EGESYS Ltd.	SME
Eindhoven University of Technology	Research
ENSTAB	Research
EPFL	Research
Ericcson	Industry
ESA	Research
EURECOM	Industry
European Road Transport Telematics Implementation Coordination Organisation S.C.R.L.	Other
Eurotech	SME
FAU Erlangen	Research
Ferdinand Braun Institute Berlin	Research
FERON TECHNOLOGIES P.C.	SME
Ferrocarrils de la Generalitat de Catalunya	Industry
FIVECOMM	SME
Fraunhofer FOKUS	Research
Fraunhofer HHI	Research
Fraunhofer IAF	Research
Fundació I2CAT	Research
FUNDACIÓN CENTRO DE TECNOLOGÍAS DE INTERACCIÓN VISUAL Y COMUNICACIONES Vicomtech	Research
Gdansk University of Technology	Research
Gemalto	Industry
Gigasys Solutions	SME
GIOUMPITEK MELETI SCHEDIASMOS YLOPOIISI KAI POLISI ERGON PLIROFORIKIS ETAIREIA PERIORISMENIS EFTHYNIS	Other
GKN	Industry
Gradiant	SME
GreenWaves SRL	SME
Grenoble-Alpes University	Research

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HCL TECHNOLOGIES Italy SpA	Industry
Hendrik Berndt Consulting	SME
HOLISTIC INNOVATION	SME
Honeywell	Industry
Huawei	Industry
IFAG	Research
IHP	Research
III-V	Research
III-V Lab	Research
IIIV/Nokia	Research
Image Matters	SME
IMEC	Research
IMS laboratory	SME
IMST	SME
InCITES	SME
INDRA	Industry
Infineon Technologies AG	Industry
Institut du Véhicule Décarbonné et Communicant et de sa mobilité	Research
INSTITUTE OF COMMUNICATION AND COMPUTER SYSTEMS	Research
Instituto de Telecomunicações /Networld2020 SB	Research
Instituto de Telecomunicações, University of Porto	Research
Intel	Industry
INTEMPORA	SME
InterDigital	Industry
INTERNET INSTITUTE, COMMUNICATIONS SOLUTIONS AND CONSULTING LTD	SME
INTERUNIVERSITAIR MICRO-ELECTRONICA CENTRUM	Research
INTRASOFT INTERNATIONAL SA	Industry
KU Leuven	Research
LANDE Endüstriyel Metal Ürünler Sanayi ve Ticaret A.Ş.	Other
LIFTT	SME
LINKS Foundation – Leading Innovation & Knowledge for Society	Research
LioniX International B.V.	SME
LiveU	Industry
LUKA KOPER, PORT AND LOGISTIC SYSTEM, D.D.	Other
Malaga University	Research
MARTEL	SME
MELLANOX TECHNOLOGIES LTD – MLNX	Industry
Mondragon	Research
NATIONAL & KAPODISTRIAN UNIVERSITY OF ATHENS	Research
Nearby Computing	SME
NEMERGENT	SME
NeoGLS	SME
Networld2020	Research
NEXTWORKS	Research
Nilfisk	Industry

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NOKIA	Industry
NXP Semiconductors	Industry
one2many	Industry
OneSource	
Orange	Industry
Philips	Industry
Politecnico Milano	Research
PREMIX OY	
Procenne	SME
Quobis Networks SL	SME
RAI Radiotelevisione Italiana	Industry
Real Wireless Ltd	SME
RED Technologies	SME
Research Unit RF at Silicon Austria Labs	Research
RunEL	SME
SAP	Industry
Schneider	Industry
Sennheiser Electronic	Industry
Sequans	SME
SIEMENS	Industry
Sigfox	Industry
SIKLU COMMUNICATION LTD	SME
SINOWAVE AB	SME
SINTEF	Research
SKF	Industry
ST Microelectronics	Industry
STATHMOS EMPOREVMATOKIVOTION PEIRAIA AE	Industry
Super Radio AS	
SWARCO Traffic Systems GmbH	Industry
Tages	
tec4U Ingenieurgesellschaft mbH	SME
Technische Universitaet Dresden	Research
Telecom	Industry
Telefonica Investigacion y Desarrollo	
TELEKOM SLOVENIJE DD	Industry
Telenor	Industry
Thales Group	Industry
THINK SILICON	SME
TIM	Industry
TNO	Research
T-SYSTEMS INTERNATIONAL GMBH	Industry
TTI NORTE, S.L.	
TU Delft	Research
TUD/BI	Research
Turkcell Teknoloji Araştırma ve Geliştirme A.Ş.	Industry
Twente University	Research

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UBITECH	Industry
Ubiwhere	SME
UMS	SME
United Technology	Research
Universidad Carlos III de Madrid	Research
Universiity of Sussex	Research
Università degli Studi di Pavia	Research
Universitat Politecnica de Catalunya	Research
Universitat Politecnica de Valencia	Research
University Carlos III of Madrid, Imdea Networks	Research
University of Athens	Research
University of Florence and CNIT	Research
University of Nice	Research
University of Oulu	Research
University of Pavia	Research
University of Peloponnese	Research
UNIVERSITY OF PIRAEUS	Research
University of Stuttgart	Research
University of Surrey	Research
University of Valencia	Research
University of Wuppertal	Research
V2VC	Research
VALMET	Industry
VODAFONE INNOVUS ANONIMI ETAIREIA SYSTIMATON EPIKOININIAS AY-TOMATISMONKAI EFARMAGIS PLIROFORIKIS	Industry
Volvo	Industry
VTT	Research
Wind Tre S.p.A	Industry
WIT/TSSG	Research
WORLDSENSING SL	Industry
ZF	Industry

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