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D4.3 - COMMUNICATION, STAKEHOLDER ENGAGEMENT AND COORDINATION PLAN – 2ND REPORT

Work Package	**WP4** - **Vertical Stakeholder Engagement and Cooperation**
Lead Author (Org)	Trust-IT
Contributing Author(s) (Org)	INNO, AALTO, IDC
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X	PU: Public
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Executive Summary

"D4.3 Communication, Stakeholder Engagement and Coordination Plan – 2nd report" revolves around the outputs and niche products of Global5G.org for the 5G PPP family of projects. The Report covers the activities and impacts of Global5G.org from October 2018 through to June 2019, and outlines future actions for the final six months of the project.

Global5G.org added value for the 5G PPP

Global5G.org online tools and trackers: Verticals Cartography on 5G PPP phase 2 use-case experiments (63 updated entries); the 5G Standards Tracker monitoring inputs within 5G PPP and progress on the 3GPP work plan; the Performance KPIs assessing coverage and intensity of the 5G PPP indicators for 5G. A new entry in D4.3 is the development and rollout of the *INNO Mapping Tool* to enable interactive visualisation of data related to the EU 5G Observatory.

Global5G.org joint and project publications: *Pan-European Trials Roadmap V4.0* (5G-IA Trials WG); the white paper on *Business Feasibility Study for 5G V2X Deployment* (5G PPP Automotive WG); *5G PPP Architecture white paper V3.0*. *Global5G.org White Paper on Small Cells – How Europe can accelerate Network Densification for the 5G Era*.

Global5G.org inputs to collaborative work: Inputs to working groups and task forces within 5G PPP, the 5G Infrastructure Association and NetWorld2020 SME. **A new entry is the formation of a task force with a sub-set of 3GPP Market Representation Partners in April 2019** aimed at supporting vertical industry inputs to 5G standardisation. The TF is highly complementary to the 5G-IA Verticals Task Force and Pre-Standardization Working Group, where Global5G.org also plays key roles.

Community development, stakeholder engagement and joint events: outcomes of events organised, co-hosted and attended by Global5G.org with a view to strengthening the project's multi-stakeholder approach and showcasing its work. Joint exhibition stands with 5G PPP (To-Euro 5G) at ICT2018 and the workshop with NetWorld2020-SME at EuCNC 2019.

Impacts: KPIs and Qualitative Metrics: Overview of impacts achieved with statistical analysis alongside samples of the thriving Global5G.org community, spanning verticals, SMEs, the telecoms industry, a.o. as an important qualitative metric.

Future Actions

Global5G.org plans for the final six months of the project are peppered throughout D4.3 with a summary table in the concluding section. Major activities include a revamp of the website to shine the spotlight on outputs, rollout of new online tools, and extending inputs from phase 3 projects for the 5G PPP tracking tools (standardisation and performance KPIs) alongside updates to the Mapping Tool.

Impacts from these actions will be reported in "D4.5 - Communication, Stakeholder Engagement and Coordination Plan – final report" in December 2019. It will include a sustainability plan.

1 Introduction

1.1 Purpose and Scope

This document is the re-submission of "D4.3. Communication & Stakeholder Engagement Plan – 2nd Report" (June 2019).

Its purpose is to review its high-level goals and evolve its multi-stakeholder approach and content strategy. Specifically, D4.3 reports on:

- Contributions to Task Forces and Working Groups of the 5G Infrastructure Association, the 5G PPP and NetWorld2020-SME.
- Outputs, such as the online tools, trackers, new mapping tool, publications and market forecasts.
- Multi-stakeholder engagement and community growth through events, webinars, SMART and recruitment campaigns on the LinkedIn professional networks and social media channels like Twitter.
- Profiled community members, spanning vertical industries, standards specialists, telecommunication industry, SMEs and other targeted stakeholders.
- Quantitative indicators (KPIs) and qualitative metrics to gauge impacts.

D4.3 updates D4.1, the first such plan. D4.5 is the final report in this series of deliverables due in December 2019. It will report on the final six months of Global5G.org, describing impacts achieved and a sustainability plan through FULL5G.

1.2 Relationship to other project outcomes

D4.3 is relevant to all Global5G.org work packages as it covers all outcomes and outputs across WP2 and WP3, as well as activities with the Advisory Board under WP1.

1.3 Structure of the document

The rest of this document is structured as follows:

Section 2: Summarises the focus of Global5G.org communications and stakeholder engagement in relation to the project's high-level goals.

Section 3: Updates Global5G.org outputs & coordination work with working groups and task forces on 5G with dedicated sections on the Mapping Tool and Performance KPI tracker.

Section 4: Focuses on stakeholder engagement through events and webinars, highlighting key takeaways and summary reports of selected events, e.g. joint events with to-Euro 5G and the 5G vertical user workshop series.

Section 5: Reports on the KPIs and qualitative metrics for the period covered, with samples of the Global5G.org thriving community across key stakeholder segments. It also zooms in on the impacts of the project's SMART campaigns.

Section 6: Draws the main conclusions and outlines next steps with an overview of future actions.

2 Updated goals for communications, stakeholder engagement and coordination

2.1 High-level goals

Global5G.org pursues strategic goals also with a view to ensuring a sustainability path. Key goals for D4.3 are:

- Supporting vertical industries and 5G standardisation by playing central roles in the 5G-IA Vertical TF, the Pre-Standardization WG and the new TF set up with a sub-set of 3GPP MRPs.
- Rolling out and updating online tools and trackers, tracking progress in terms of 5G PPP demonstrations, trials and pilots (online Verticals Cartography); rollout of 5G capabilities through (Performance KPI tracker) and EU contributions to 5G standardisation (5G Standards tracker).
- Working alongside peers in 5G PPP, 5G-IA and NetWorld2020 WGs contributing inputs to roadmaps, white papers, and co-hosted events.

2.2 Communication and stakeholder engagement goals

Overarching communication goals of Global5G.org are:

- Broadcasting project outputs and synergies as widely as possible through SMART-based campaigns with clearly defined timelines and goals.
- Pursuing a multi-stakeholder engagement strategy through events, webinars and regular campaigns to recruit and profile new members to the community.
- Organising and co-hosting events and webinars, e.g. with To-Euro 5G and the NetWorld2020 SME WG, and established synergies, e.g. with STANDICT.eu.
- Monitoring impacts through both quantitative KPIs and qualitative metrics with potential revisions can reflect new opportunities in an evolving landscape.

To this end, regular activities focus on:

- Pinpointing relevant events, defining agendas for workshops and webinars and coordination with stakeholders involved (e.g. projects, groups, task forces, external experts, members of the project's Advisory Board).

- Creating SMART campaigns geared towards the targeted stakeholders, with a clear start and end timeline for promotion across LinkedIn, LinkedIn groups, Twitter and other channels. Activities also include the creation of core messages, banners and Twitter cards. Impact monitoring takes place and during and after each campaign (e.g. number of views on LinkedIn, Twitter impacts).
- Ensuring regular engagement and stakeholder recruitment through professional networks. These campaigns often coincide with sector events and plenaries/meetings of standards bodies as they organically lead Global5G.org to relevant stakeholders. Relevant linkedIn groups are also targeted.

3 Global5G.org outputs and collaborations for 5G PPP

3.1 Online Tools, Trackers and Findings

The table below updates work on online tools, trackers and publications. It includes next steps, and shows which outputs will be part of the sustainability plan. As a new entry, the mapping tool more details are given below in a dedicated section along with first outcomes for the Performance KPI tracker.

Global5G.org Outputs for the 5G PPP	Future Actions
#1 Online Verticals Cartography • Release 2.0 in March 2019 designed to improve visualisation of each use-case experiment (63). The release also features several examples of multi-vertical use scenarios from the D2.2 analysis, with new icons created.	Plans for July-December 2019 – integration of phase 3 projects (ICT-17-18-19) with an updated blueprint to track and analyse inputs. Continued updates from running phase 2 projects. This is a sustainable tool. Updates are part of an on-going process based on a new template agreed upon with the Trials WG. Each new update/entry is accompanied by a SMART campaign.
#2 Standards Tracker: under the Pre-Standardization WG and new Task Force • 5G PPP Standards Tracker - Phase 2 projects: collection of inputs to various SDOs via monthly calls and analytical updates. • 3GPP Tracker – progress towards the 3GPP Work Plan (Rel-16 and Rel-17; totally 1000+ items/reports), tracking leadership and involvement of EU organisations. • Collaboration and coordination:	Plans for July-December 2019 – rollout of a collaboration platform tailored to vertical industries to ease their entry into 3GPP standardisation with online guides, specific and common requirements. This is a sustainable tool. Complete the on-boarding of Phase 3 projects. Revise and extend the blueprint for tracking progress in the 3GPP work plan and the 5G PPP inputs to SDOs.

EU priorities (e.g. broadcasting, non-terrestrial networks). • Gap analysis for 3GPP Rel-18 with industry leaders and 3GPP specialists.	
#3 Performance KPIs • 5G PPP Phase 2 Tracker on programme level KPIs (e.g. latency, data rates, energy efficiency etc.) • Analysis of coverage and intensity. • Energy Efficiency Report.	Plans for July-December 2019 – rollout of an online tool and analysis to showcase achievements in phase 2. This is a sustainable tool though subject to potential evolutions aligned with phase 3.
#4 High-quality video (launched in Dec 2018; available on the 5G PPP YouTube Channel) • Targeting a broad audience, the video focuses on 5G for verticals. Two highly renowned experts talk viewers through the main differentiators.	Plans for July-December 2019 – ensure the video keeps prominence on the website and in SMART campaigns.
#5 Emerging Business Models for Verticals • A report on emerging business models for selected verticals, an analysis into neutral hosts and opportunities for SMEs.	Plans for July-December 2019 – Re-purpose the deliverable for EU and national projects as a graphically designed report. D2.5 will merge an updated analysis together with the rollout to market and verticals.
#6 Vertical Industries and Rollout to market • Macro-economic overview and expected impacts on the development of 5G with analysis of four selected verticals.	Plans for July-December 2019 – edit, update and publish selected content as part of the website revamp.
#7 Market overview and expected impact • Overview and descriptions on potential investments and drivers for investment. Indicators on 5G readiness.	Plans for July-December 2019 – edit selected parts and publish as part of the website revamp.
#8 Small Cells White Paper • Condensed version of the project's study with updated data from the Small Cells Forum (e.g. neutral hosts, edge computing and verticals).	Plans for July-December 2019 – create a graphically designed version and SMART campaign. Organise a webinar to broadcast main findings.

• Graphically designed white paper.	
#9 Benchmarking Reports on international deployments • Investigation into 5G rollouts in the international landscape, with the first report focusing on the US.	Plans for July-December 2019 - Two more reports will analyse China and Japan. Create graphically designed versions of the report, publish on website and promote across channels.

Table 1: Outputs and Plans for Online Tools

3.1.1 Mapping Tool

A new feature of Global5G.org is the design and rollout of a **Mapping Tool** led by INNO in close collaboration with the EU 5G Observatory and partner IDC.

The Tool has been designed to enable the interactive tracking of 5G deployment indicators aimed at filling gaps in terms of:

- Driving closer collaboration with the 5G Observatory to ensure complementary information is available to the very broad set of stakeholders in the context of 5G rollouts by offering multiple perspectives and insights.
- Offering a missing visualisation tool on 5G deployment indicators. While a lot of work has been done on indicators assessing the level of 5G deployments, the 5G Observatory does not have a tool to make these accessible in a user-friendly way.
- Combining the data sources used by the 5G Observatory with sources from Global5G.org, primarily IDC, as well as the Global Economy and Internet World Stats. The data is collected on a spreadsheet shared with all partners to enable them to further enrich the underlying database. Updated versions are then made publicly available.

The first release of the tool in June 2019 focuses mostly on EU countries though some indicators also cover countries outside Europe.

The figure below shows the entry point for the Mapping Tool.

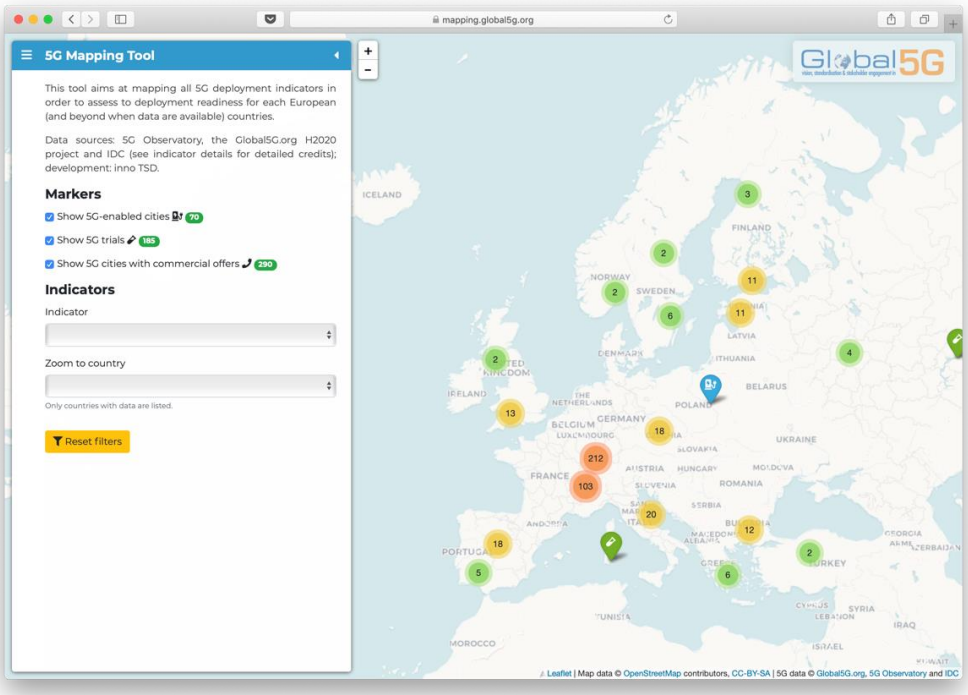


Figure 1: Global5G.org Mapping Tool

Methodology: The data is collected on a spreadsheet shared with all partners to enable them to further enrich the underlying database. Updated versions are then made publicly available.

Over 50 indicators are available in the Release 1, spanning the number of base stations, 5G maturity levels, 5G-enabled cities with commercial offers, spectrum auctions, penetration rates of internet users, mobile phone subscribers, national 5G roadmaps and budgets.

It is possible to view the data and indicators from various perspectives:

- Coloured maps (e.g. diverse degrees/levels).
- Markers (e.g. map pinpointing diverse locations such as 5G trials or cities with a 5G offer.
- Graphs (e.g. country fact sheets).

Additionally, the tool includes country factsheets which show country-specific information (spectrum, 5G cities...) along with the possibility to compare the selected country with others.

The figure below shows (from left to right) the 5G-enabled cities, 5G maturity levels and country factsheets.

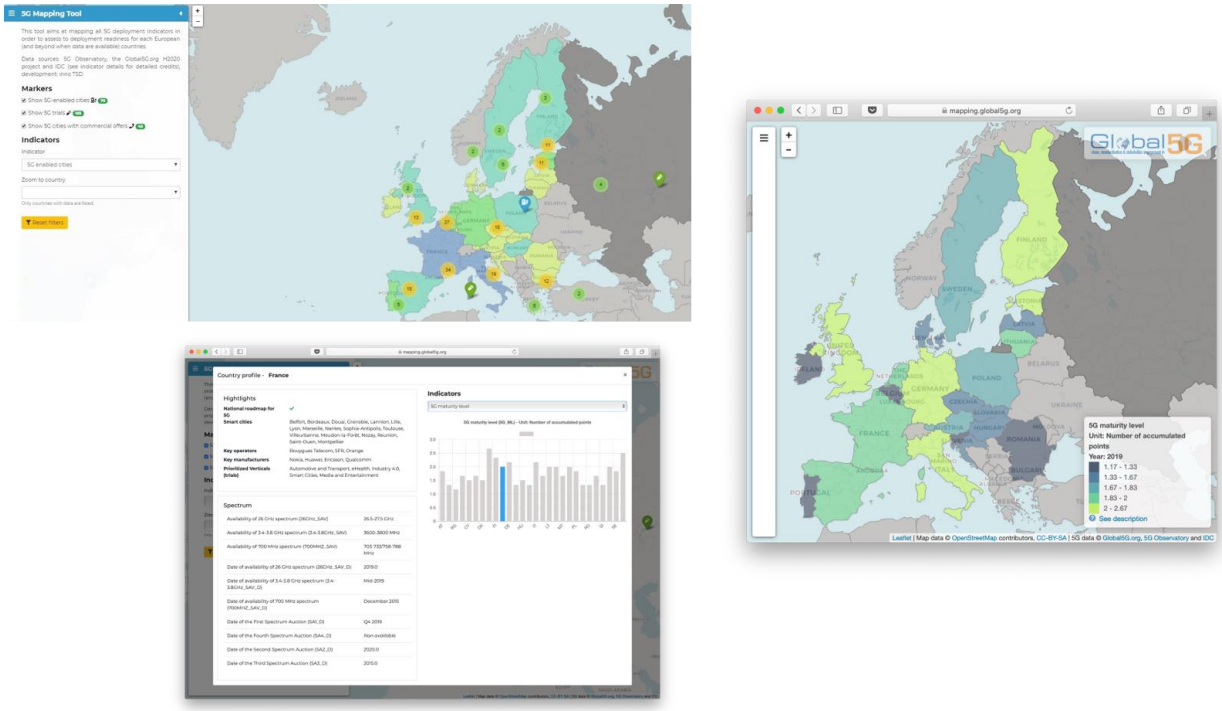


Figure 2: Mapping Tool Features and Data

The Tool Team has also created a composite indicator to assess the 5G maturity level across countries. This indicator includes: number of trials, 5G roadmap, national budget spent on 5G deployment per head, number of cities with 5G offer, number of mobile phone subscribers per 100 people, penetration rate of internet users.

For each included indicator a scale was realised as shown in the table below. The scales have been established on a collaborative approach and trough the calculation of the average numbers of the European countries. The unit used for these included indicators are “Low”, “Medium” and “High”.

Indicator	Scale
Number of trials	Between 0-5 trials = Low Between 5-10 trials = Medium Over 10 trials = High
5G Roadmap	Yes = High No = Low
5G National Budget per population	Over 600 = High Between 300 and 600 = Medium Under 300 = Low
Cities with 5G commercial offers	Over 5 cities = High Between 1 and 5 cities = Medium No city = Low
Mobile Phone subscribers per 100 people	Over 135 = High Between 120 and 135 = Medium Under 135 = Low

Penetration rate of internet users	Over 90% = High Between 80% and 90% = Medium Under 80%

Table 2: Assessment criteria for 5G Maturity Levels

To calculate the 5G maturity level, the scales have been given points and an average has been calculated based on these points as following:

- High = 3 points.
- Medium = 2 points.
- Low = 1 point.

The 5G Maturity level indicator is an average of these results on a scale from 1 to 3 (1 being low and 3 being high).

Future actions: Q3-4 2019

- Enriching the database by adding information for other countries or more indicators on 5G deployments.
- Pursuing opportunities to sustain and expand the tool.
- Request and implement feedback from the Trials WG.

3.1.2 Performance KPI Tracker

Global5G.org contributes to the 5G-IA Ad Hoc WG on **Performance KPIs** in relation to the ambitious targets set for 5G PPP. Members within the WG have worked together to harmonise definitions of the KPIs and agree on a methodology for contributing inputs. These are tracked in a dedicated spreadsheet and a regularly updated report.

Based on the data collected, Trust-IT will design and develop an online tracking tool along the lines of the Verticals Cartography to showcase progress towards programme-level targets.

The tool will help understand the various levels of maturity, in terms of technology and market readiness levels through the on-going analysis by Global5G.org, which examines both coverage and intensity of the KPIs across the phase 2 projects.

Actions include:

- A first analysis of the data collected within the WG.
- A development plan aligned with progress within the WG.

The figure below shows coverage and intensity of the Performance KPIs in phase 2.

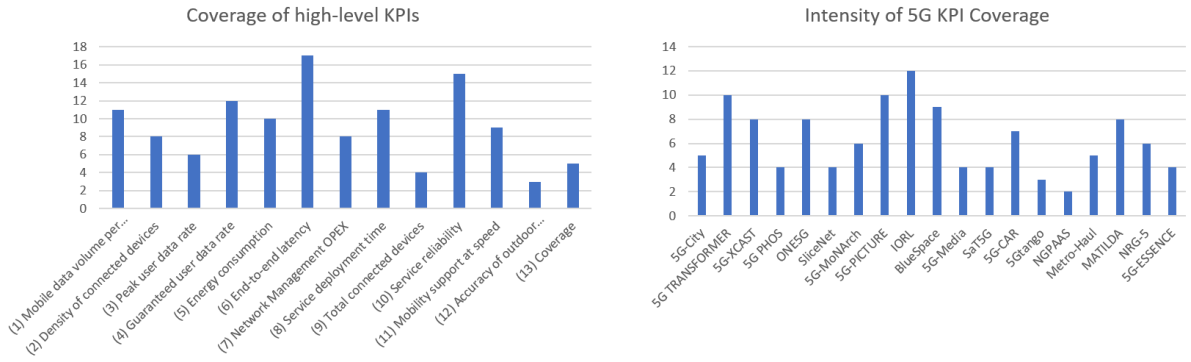


Figure 3: Global5G.org First Analysis of the 5G PPP Performance KPIs

Future Actions: Q3-4 2019

- Update and validate the analysis in the figure above.
- Finalise the design of the online KPI Performance Tracker.
- Launch the online tool and promote it across 5G PPP and Global5G.org channels.

3.2 Outputs from Cooperation and Coordination

Global5G.org actively contributes to several other WGs not listed above. The table below summarises the main collaborative outputs to date, such as joint publications, strategies and on-going analyses. It is important to note that future actions are defined by the groups on an ad-hoc basis.

Working Group/Task Force	Collaborative Outputs
Automotive (5G PPP) and the **EC Strategic Deployment Agenda group** **Chair:** Ericsson **Global5G.org role**: contributor and co-author.	Working with the WG on the White paper (February 2019*): Business Feasibility for 5G V2X Deployment.* Graphically designed version by Trust-IT. Inputs to the WG has led to the involvement of Global5G.org in the SDA. Global5G.org is contributing support on specific subjects in the SDA where there is a gap in background, particularly functional safety. For example, Global5G.org has given background information on functional safety standards and initiatives.
Architecture (5G PPP): **Chairs:** Nokia and Huawei **Global5G.org role**: contributor and co-author.	*5G PPP Architecture White Paper Revision 3.0* (June 2019) with authorship of chapter 7 on Impact on Standardisation covering inputs to standards developing organisations/bodies, industry and open-source groups on 5G architectures.
Spectrum (5G-IA)	Global5G.org has worked with the WG and its Chair to create an interactive workbook of analyses of responses to the RSPG

Chair: TIM **Global5G.org role**: contributor	3rd Opinion, as the basis for further analyses by the full Working Group.
Trials (5G-IA) **Chair:** Nokia **Global5G.org role**: contributor and co-author.	Global5G.org has provided inputs to the *Pan-EU Trials Roadmap V4.0* (November 2018) with an assessment of the Verticals Cartography and the analysis of 4 country roadmaps (Germany, Greece, Italy and the UK). Member of the Evaluation Committee for the selection of best use cases in phase-2.
Verticals TF **Chair:** TIM **Global5G.org role**: co-leading activities	Global5G.org strongly supports this TF through regular interactions with the Chair on engagement strategy, 5G-IA and 3rd-party events, synergies and MoUs with key associations.
Task Force with sub-set of 3GPP MRPs **Chair:** Trust-IT **Global5G.org role**: Leader	Global5G.org leads this TF, which was set up in April 2019 with a sub-set of 3GPP MRPs (5G-IA, 5GAA, 5G-ACIA and PSCE) and liaison with 3GPP Project Coordination Group (PCG). The TF tracks progress on the work plan, reviews processes, defines templates for requirements tracking across verticals and mapping of common requirements. These are all key inputs for the Standards Tracker as a collaboration platform. A core activity is the organisation of a workshop series: 5G Vertical User Workshops, with two events in 2019 (February and July), with post-event reports on impacts and actions.
Global5G.org Advisory Board	
Advisory Board Members: *https://www.global5g.org/advisory-board*	Global5G.org has re-animated its AB with new members. The AB focuses mostly on healthcare with a view to supporting industry engagement on 5G and reinforcing work in the 3GPP MRP TF. Experts include: Brian O'Connor, Chair of the European Connected Health Alliance (ECHA) bringing to Global5G.org the entire healthcare ecosystem; Christoph Thuemmler, Clinician at Helios Park-Klinikum in Leipzig; Mark Roddy, Cork Institute of Technology and SLICENET smart ambulance use case; David Lund, president of Public Safety Communications Europe and member of the 3GPP MRP Task Force; Maxime Flament, CTO of 5GAA and member of the MRP TF. Other members include Hamid Falaki, University of Bristol and phase 2 project 5GCity with expertise in smart

	cities and energy; Simon Forge, SCF Associates and EC tender lead on regulations for small cells.

Table 3: Collaborative Outputs: WGs and TFs

4 Stakeholder Engagement

4.1 Summary of Events

The table below summarises the events and webinars that Global5G.org has attended, (co-)organised, followed and promoted during the period covered between October 2018 and June 2019. These events are also used as an opportunity to recruit new members to the project's networks.

Name, Date and Venue	Main activities, Audiences and Impacts
EuCNC 2019, 15-19 June 2019, co-located with the 7th Global Event, Valencia	Attended by all partners. Live reporting and social media work (IDC, Trust-IT) of the conference and exhibition. A key event for 5G PPP stakeholders, attended mostly by research organisations with industry keynotes and perspectives. INNO demonstrated the new Mapping Tool at the 5G PPP stand. Global5G.org also attended the launch of the Phase-3 (ICT-19) projects to start on-boarding these new projects in the activities to expand the Verticals Cartography. Other specific activities of Global5G.org are reported below.
Emerging Business Models for SMEs, Workshop held at EuCNC 2019 on 17.06.2019	Organisation of the workshop together with NetWorld2020 SME WG Chairs and To-Euro 5G with co-chairing roles. The workshop mostly targeted SMEs to zoom in on exploitation and go-to-market strategies, and share insights into business models. The workshop was well attended (full room) with participants from industry (SMEs, large companies and the EBU), researchers mostly from phase-2 project, EC policy officers. https://www.eucnc.eu/2019/www.eucnc.eu/workshops/workshop-5/index.html. A full report is available on the project's website https://www.global5g.org/news/report-eucnc-2019-business-models-workshop.
5GArch 2019: International Workshop on 5G Architecture, Workshop at EuCNC 2019 on 18.06.2019	Presentation of the Global5G.org contribution to the new white paper of the Architecture WG, analysing the impacts of phase-2 inputs. The presentation and panel debate triggered interesting discussions on measuring impacts and the alignment of project lifecycles with the standardisation cycles, e.g. projects ending while standards impacts are still at nascent phase.

	https://www.eucnc.eu/2019/www.eucnc.eu/workshops/workshop-8/index.html
5G EU Observatory Stakeholder Workshop, 17 May 2019, Brussels	Participation at the workshop: European 5G Observatory – Is Europe ready for 5G? with a view to strengthening links with the Observatory leaders and positioning the new Mapping Tool in the EU and global context. Participation gave Global5G.org key insights into the main findings of the 1st phase of the Observatory and next steps for implementing the 5G Action Plan. Discuss developments of the 5G Mapping tool. https://ec.europa.eu/digital-single-market/en/news/european-5g-observatory-europe-ready-5g.
Global5G.org Webinar: "How 5G can support transformation in the healthcare industry", 15 May 2019	Webinar co-hosted with STANDICT.eu, to which Global5G.org has contributed inputs on EU priorities and gap analysis for 5G standardisation as part of its role in the Pre-Standardization WG. The webinar brought multiple perspectives on 5G for healthcare: 3GPP delegate (member of STANDICT.eu external advisory board), IDC external expert, Global5G.org AB member (clinician), and market player (Italtel). The webinar recording is available online along with a post-event report: https://www.global5g.org/news/global5gorg-insights-report-webinar-how-5g-can-support-transformation-healthcare-industry.
1st Vertical User Workshop, 12-13 February 2019, Brussels	Co-organisation of the first event organised by the 3GPP sub-set of MRPs with a view to supporting vertical industry contributions to 5G standardisation. Besides the 5G-IA, 5GAA, 5G-ACIA and PSCE, the workshop saw the participation of the EUTC, ESOA and EBU. The workshop was well attended (target of 60 participants met) with an executive summary and detailed report (April 2019) covering the presentations of the Verticals Cartography and Roadmap. The post-event reports were promoted via the April 2019 5G PPP newsflash, https://5g-ppp.eu/newsletter-12/.
IET Conference: The Advent of 5G, 30 January 2019, UK	Key research themes and company strategies for the rollout of 5G. Participants were mostly industry (e.g. BT, Samsung, U-Blox) and national UK 5G projects (e.g. Bristol Open). Global5G.org published a news piece summing up key insights from selected speakers: https://www.global5g.org/news/highlights-iet-conference-advent-5g.

TCCA Webinar on Broadband Roadmap, 10 January 2019	Participation in webinar: TCCA View on Broadband Roadmap - Critical Communications for all professional users, with the strategic aim of understanding also how this early vertical mover in 3GPP standardisation is defining a roadmap for future work in this area. Inputs for online report on the transition from TETRA to 3GPP, with a news piece on the Global5G.org website. https://www.global5g.org/news/tcca-calls-action-ahead-critical-communications-europe-2019.
ICT 2018, Vienna, 4-6 December 2018: exhibition and conference	In co-operation with to-Euro 5G, Global5G.org co-organised two stands on 5G: the 5G PPP Phase-2 "5G in Action" and the "Smart Connectivity" in the PPP zone. 11 phase-2 projects came together to showcase their achievements through live demos. The main outcomes of the ICT2018 stands were reported on the project's website: https://www.global5g.org/news/highlights-5g-ppp-demo-and-exhibition-stands-ict2018 Global5G.org also supported the conference session on the Next Generation Internet with inputs on next-generation networks.
7th EU-Japan Symposium on ICT Research and Innovation, 3 December 2019, Vienna	Hosted at the University of Vienna, the Symposium focused on ICT strategies and EU-Japan cooperation. As such, it covered a range of ICT research topics and projects between EU and Japan: human-centric AI, data economy, big data, cloud, 5G and network technologies, e-health and future research topics. Represented projects include Fed4IoT, BigClouT, 5G!PAGODA, among others, exploring key advances and priorities for future calls.
A light regulation regime for SAWAPs – Stakeholder Workshop, 22 November 2018, Brussels	Global5G.org attended the workshop both physically and remotely to gain insights into the EC's policy on small area wireless access points in the light of the forthcoming EECC and into the findings of the EC Tender Study: SMART 2018/0017. The workshop was attended by national regulators, small cell specialists (including 3GPP) and EC policy makers. A post-event report with the main discussion points is published on the website: https://www.global5g.org/news/outcomes-sawap-stakeholder-workshop
Global5G.org Webinar on: How 5G Can Support Transformation in the Automotive Industry,	The 2nd in a series of vertical industry webinars. The webinar highlighted the opportunities and challenges that 5G will bring to the European Automotive Industry over the next few years

10 October 2018	The webinar featured IDC insights from the analyst's European mobility expert alongside use cases and non-technical aspects (e.g. policy, regulatory regime) from Ericsson and 5GCAR coordinator. The webinar recording and post-event report are available on the project's website: https://www.global5g.org/news/webinar-report-5g-automotive-industry.

Table 4: Summary of Event Outcomes

4.2 Outcomes of selected Events

4.2.1 ICT2018 Exhibition

5G In Action Phase-2 Demo Stand: Live demo showcases of 11 phase-2 projects selected through the COMMS WG in close co-operation with To-Euro 5G. Both projects jointly wrote and submitted the exhibition proposal (May 2018). The pre-scheduled demos (led by Global5G.org) served to promote R&I achievements:

- **5GCAR**: automotive use cases and demos, spanning see-through, lane merge and vulnerable road users to highlight benefits of cellular networks (C-V2X) for this vertical industry.
- **5G-MEDIA**: services and tools such as the 5G-MEDIA Software Development Kit, with tools for service validation and testing before deployment; Media Service MAPE loop, optimising the execution of media services; Function-as-a-Service capabilities; VIMs supported by the 5G-MEDIA platform.
- **5G-MONARCH**: 5G enablers for transportation and logistics, and smart-city cultural applications, showing also testing at the Port of Hamburg, also as a small-scale example of a 5G-enabled smart city infrastructure.
- **5G-TRANSFORMER**: bringing the network slice concept into 5G mobile transport networks for vertical industries like automotive, emergency health services, media and entertainment.
- **5G-CORAL**: international cooperation between Europe and Taiwan to deliver a convergent 5G multi-RAT access with applications for the transport and automotive industries.
- **5GTANGO**: flexible programmability of 5G networks based on sustainable open source software.
- **IoRL**: improvements to 5G indoor connectivity and service delivery by combining mmWave and visible light communication.
- **MATILDA**: validating and evaluating its 5G solution in verticals like public safety, smart cities, factory and industrial processes.

- **NGPaaS**: “Cloud Native” End-to-End (E2E) mobile network (RAN 4G + CORE 5G) over a distributed cloud infrastructure EDGE/CENTRAL/PUBLIC clouds.
- **SAT5G**: a cost effective “plug-and-play” satcom solution for 5G to enable telcos and network vendors to accelerate 5G deployment across all geographies and multiple use cases.
- **SLICENET**: meeting the challenging requirements from the management and control planes of network slicing for early and smooth adoption of 5G slices demonstrated in verticals like health and smart cities.

The stand was a hive of activity and a valuable exercise for showcasing phase-2 projects achievements on the road to 5G, with an overall high satisfaction rate from the participating projects. The stand was also an excellent example of joint dissemination of results within the 5G PPP.

Promotion of the joint stand started as soon as the proposal was officially accepted.

Figure 4: Pre-ICT2018 Joint Stand Announcement

Figure 5: Snapshot of 5G PPP Demo Stands at ICT2018

5G Smart Connectivity Stand in the Public Private Partnership Zone: this small stand offered a strategic location for high-level discussions and new alliances, with the signing of two MoUs between 5G-IA, AIOTI and ECSO. Global5G.org widely promoted the alliances, achieving over 1000 views of the image showing the 5G-IA Chair with ECSO's Luigi Rebuffi.

Overall, ICT2018 was the occasion for the Global5G.org team to communicate with other EC-funded projects on the findings of each other's projects. Moreover, it allowed to exchange knowledge on the various specific subjects and do networking activities.

4.2.2 Vertical User Workshops

The Vertical User Workshop series was triggered by a recommendation of the 3GPP Project Coordination Group, where Global5G.org has supported the 5G Infrastructure Association as a Market Representation Partner (MRP) since the outset.

1st 5G Vertical User Workshop, 12-13 February 2019, Brussels

The organisation of the first 5G Vertical User Workshop started in mid-December 2018 by four MRPs (5GAA as hosts, 5G-ACIA, 5G-IA and PSCE) along with 3GPP TSG Chairs, ETSI CTO and board members,

with the support of Global5G.org. Brussels and 12-13 February 2019 were chosen as the venue and dates for the workshop with the aim of driving a collaborative approach to 5G standardisation between verticals and 3GPP. The agenda was co-developed with each MRP inviting its own members. The agenda also shone the spotlight of some key outputs of MRPs like PSCE activity tracking, the 5G-IA Pan-EU Trials Roadmap and the Global5G.org Verticals Cartography.

Each vertical industry in the agenda gave an overview of its 5G mission and drivers for standardisation, including current activities, typically through internal working groups:

- **PSCE: Public Safety**. Due to launch a pre-procurement tender in mid-2019, where standardised solutions play a key role along with security. Need for alignment between PSCE as a contributor to 3GPP and standardisation work on critical communications to support procurement cycles.
- **5GAA: Automotive**. Success stories include the submission of C-V2X use cases and an interoperability and compliance test framework for LTE-V2X (Rel-14) with a product roadmap and automotive-grade mass market readiness in vehicles from mid-2020 onwards and inclusion of PC5-based V2P in the smartphone product roadmap. Further work is based on a gap analysis for Rel-17 and beyond.
- **5G-ACIA: Industrial Internet of Things**. 5G as an enabler of machine-type communication, IIoT and completely new applications (e.g. mobile robots, factory automation, AR, logistics). Since many Operational Technology (OT) 5G-ACIA members are not 3GPP members, it is important to lower entry barriers through better understanding of the industry, its needs and innovation cycles.
- **ESOA: satellite/Nonterrestrial networks**. Satellite is an enabler of vertical industries as part of the drive towards an ecosystem of connected people and things through cross-sector collaboration (e.g. media distribution, ITS, maritime, disaster recovery etc.). Collaboration between the telecom industry and verticals is key to the integration of satellite into 5G with the ESOA commitment to 5G standardisation based on the priorities set.
- **EUTC: utilities.** Stakeholders include the vendor and operator community to ensure alignment with new products, standards and spectrum allocation with the needs of the utility sector. This generally risk-aversion vertical has several unique characteristics (e.g. low throughput, long solution life-span, ubiquitous coverage, elevated levels of cyber security, large amount of self-provision of connectivity). However, EV solutions, smart metering and the need for increased control and visibility of devices is driving new attitudes towards utility connectivity, presenting opportunities for a symbiotic relationship with 5G stakeholders, where the utilities could provide the required fibre backhaul and power supplies for 5G deployments.
- **EBU: broadcasting and media.** Broadcasting has major requirements in terms of content production and distribution, such as large network overage, high reliability, resilience and scale. To this end, EBU supports the combination of broadcast technology, 5G cellular

infrastructure and satellite technology, as well as collaboration with other verticals (e.g. automotive, transportation). In this context, standardisation is an important enabler for 5G-enabled devices and coverage.

Other features of the workshop include discussions on the standardisation processes, 5G vertical involvement and lessons learned that can help newcomers.

Key lessons learned: The 1st Vertical User Workshop marked a key step towards boosting inputs into 5G standardisation work. However, there are several lessons learned for future such events. The structure and participation was very much focused on a networking-oriented approach, leaving little time for the necessary technical discussions and the definition of concrete plans. It also pointed to the need for a more careful choice of participants with a technical background to ensure greater engagement on the work ahead in 3GPP.

2nd Vertical User Workshop, 9-10 July 2019, Rome

These lessons learned were an important starting point for the organisation of the 2nd Workshop, which started in mid-April 2019 and included the setting-up of a new task force with the people involved in the 1st workshop as per a 3GPP PCG recommendation with the involvement also of the 5G-IA VTF. Global5G.org was selected for leadership of the task force and overall workshop organisation.

To boost impacts and overcome the issues of the 1st event, it was decided early on to co-locate the 2nd workshop with the meeting of SA6 (mission-critical applications) in Rome at the same venue, thereby ensuring a close synergy with on-going standardisation work applicable to diverse verticals while taking a first key step towards having a technical constituency onboard.

The co-development of the agenda has focused on a highly interactive format to ensure all participants feel involved in 5G standardisation. Key features of the agenda include:

Day 1

- Requirements Tracking: a technical viewpoint from MRPs and selected verticals based on a set of speaker guidelines to keep the discussions on track, including actions and progress since the 1st workshop (as applicable). Interactive panel discussion encouraging the involvement of all participants. The targeted outcome is a clear overview of drivers and requirements, as well as potential challenges ahead for the Task Force to take on board. Verticals targeted include:
    - **Automotive**: 5GAA CTO and TF member. Continental, operating in several vertical markets (Head of Wireless Communication Research).
    - **Industrial Internet of Things**: 5G-ACIA Chair and TF member.
    - **Transportation**: UIC (International Rail Union), specialist on the shift to 5G (FRMCS).
    - **Public Safety**: PSCE President and TF member.
    - **Utilities**: EUTC Technical Director.
    - **Maritime**: IALA (international association of lighthouse authorities).
    - **Nonterrestrial networks**: ESOA.

- **Broadcasting and media**: EBU.
- **Smart mobility**: SNCF.

- Interactive session on 3GPP processes aimed at lowering the entry barriers and maximise impacts with the resources available. The targeted outcome is a better understanding of how verticals can draw on the technical work and experiences of vendor/operator members.
- Interactive session on creating interest groups across verticals and other 3GPP members, looking at mechanisms to consolidate requirements and accelerate the time to build consensus around them.

Day 2

- Interactive Session with SA6 – multiple vertical perspectives with a 30-minute overview of on-going work led by SA6 chair and co-chairs followed by an interactive discussion on architecture/stage 2 with the targeted support of SA2 Chair.
- Interactive mapping of common requirements and complementarities: vertical champions and other participants interested in conveying their technical viewpoints on the selected topics (e.g. sidelink, URLLC and time-sensitive networking, Nonterrestrial networks etc.). Inputs to be based on template from the task force.
- Interactive session: agreements, action items and next steps. This session is aimed at making concrete plans based on the preceding session. Three main outcome reports are also planned:
  - Outcomes and report to the 3GPP PCG and TSG.
  - Report for 5G-IA Board and other standards bodies.
  - Publishable summary promoted via Global5G.org networks and selected channels.

Participant recruitment*:* It was decided to use a one-to-one recruitment process to ensure the best possible participants attend the workshop. Each TF MRP (5GAA, 5G-ACIA, PSCE) has first sourced interest amongst members while Global5G.org has reviewed participation at the 1st workshop and created a new target participant list, e.g. greater participation from the Pre-Standardization WG, and other key players in the network and direct liaison with targeted 3GPP chairs and delegates. Invites are being sent on a one-to-basis and tracked through a shared spreadsheet on a weekly basis with very effective results achieved by end June 2019.

4.2.3 EuCNC 2019

The Global5G.org team has worked with the chairs of NetWorld2020-SME WG, To-Euro 5G and several phase-2 projects to define the strategy and proposal for a workshop on emerging business models. Following the successful submission, Global5G.org has led activities to organise and promote the workshop under the title: “Emerging Business Models: Opportunities for SMEs and large companies – lessons from 5G PPP”. During the phase of the agenda development, the core team was extended to include other experts from an unsuccessful proposal to extend the insights on techno-economic models, studies on neutral hosts and business models in EU-Japan co-operation projects.

- **Workshop goals**: Explore the new playing field with the advent of 5G and opportunities for SMEs to be at the leading edge.
- **Target outcomes**: Supporting exploitation potential for SMEs and phase-2 and 3 projects and concrete opportunities for innovation in the marketplace.
- **Supporting projects**: 5G City, 5G-CORAL, 5G-EVE, 5G GENESIS, 5G-MiEDGE, 5G-TRANSFORMER, CARMEN, SAT5G, 5G-TANGO.
- **Agenda overview**: Tour de Table to gauge the concentration of stakeholder participants; 5G industry perspectives looking at new applications, services and business models; SMEs in the spotlight with lightning talks and an interactive panel discussion on taking 5G innovations to market; Business Models across verticals.
    - Vertical association and large enterprise.
    - SMEs in the spotlight with a template and guidelines for the lightning talks.
    - Business model panel with a template provided to guide the discussions.
    - Chairs: Nicola Ciulli, Nextworks and Co-Chair of the NetWorld2020-SME WG; John Favaro, Trust-IT and Global5G.org Deputy Coordinator.

Main takeaways

The workshop was EuCNC 2019 “Pick of the Day” and gathered a full room of participants, coming from enterprises large and small, public and private, including EC representatives.

- **EBU**: enormous disruption in broadcasting services from the advent of digital broadband. SMEs leading creativity innovations and offering new local services and applications have much to benefit from 5G.
- **Atos and 5G-TANGO**: 3rd-party, specialised SMEs can benefit from further developments to OSS for 5G networks and help make it mainstream. 5G-TANGO, which builds on sustainable OSS developed in sonata phase 1 with a view to supporting vertical industries.
- **SMEs**. Nextworks: entry to 5G markets can be challenging for SMEs so it’s important to have a product strategy. Telaria: exploring novel federation and zero-touch technologies through network softwarisation in 5G-CORAL. Opportunities include offering novel services, including verticals, e.g. managing the distributed edge and fog facilities in shopping malls, airports, train stations, and others. Innovazione PIIU presented a novel opportunity for SMEs to use project results through 5G-EVE prizes for new use cases across the entire value chain, including verticals. Azcom contributing to a proof of concept development for connected cars. WINGS ICT is an SME specialising in AI-powered solutions for diverse vertical sectors with the example of smart aquaculture, while also highlighting the importance of garnering support at the legislative and regulatory levels and using funding for new product and service development. ENCQOR (presented by Nextworks) is a Canadian initiative with a 5G innovation platform for national provinces that also enables SMEs to connect to innovations hubs.
- **Business models**: SAT5G sees enormous potential of non-terrestrial communication technology in solving several thorny problems such as the digital divide, the lack of connectivity in poorly served areas. Yet with the potential come several challenges such as risk sharing, demand forecasting, managing multi-operator networking situations, among

others. A promising business model could involve a broker, mediating between network operators, handling negotiations and simplifying the overall relationships. Real Wireless presented findings from 5G-MONARCH around the need to make the shift from existing B2C business models of traditional mobile and network operators to new models and transfer the CAPEX of setting up a complex network to pure OPEX for the customer. Feasible alternatives include innovative public private partnership models by creating often-overlooked but equally important public value across the entire ecosystem. InCITES zoomed into the new neutral host model in the context of smart cities with 5G City being one example. The neutral host model brings with it emerging relationships, from new businesses with enterprise customers to new kinds of commercial relationships with MNOs. Intel presented an interesting case from 5G-MiEDGE, which is working on 5G enabling technologies for Tokyo 2020 and analysing cash flows within the business canvas methodology, including CAPEX and OPEX projections as an example of a business case development in a 5G context. Ericsson and 5GCAR outlined key findings from the 5G PPP Automotive WG white paper which includes a cost-benefit analysis to support the feasibility study on pan-European deployment of automotive connectivity.

- **Main points from the interactive discussions**:
    - WiFi is evolving at the same time as mobile generations and still retain a strong value proposition. Hype around 5G often has negative effects vis-a-vis realistic deployment rates by creating undue expectations. Current research and innovation will not have a return on investment that coincides with the peak of the lifecycle. It is also important that 5G is an enabler of real applications and when full 5G arrives, it will bring in new value chains and players that will impact on SMEs, possibly with both negative and positive impacts. It will be interesting to track phase-3 projects and how they exploit 5G to enable many things.
    - In the meantime, SMEs can and should exploit their capacity for innovation in the market now since they have a key role to play in generating new business models that will exploit 5G advantages as it fully matures. In short, SMEs can help shape the future of 5G business models.

Finally, Global5G.org used the workshop to promote its services for verticals and SMEs, spanning intelligence gathering to dissemination in popular white papers and reports. Specific services and tools include the verticals cartography used by the 5G PPP itself, a guide to issues in spectrum allocation and management, and a standardisation tracker helping verticals to orient themselves in the thicket of 3GPP standardisation activities.

4.3 Global5G.org Webinars

4.3.1 Webinar Focus and Format

Global5G.org runs a webinar series on verticals (IDC, Trust-IT) aimed at sharing key insights on market forecasts and rollouts both to the sectors and anyone interested in learning more about 5G developments in the selected vertical industry. The series kicked off in June 2018 with a webinar on energy entitled “5G: what will it change for the energy industry.

The workshop series has continued with three other webinars aligned with the market forecasting in WP2: automotive, healthcare and manufacturing. Each webinar follows a proven format:

- IDC specialist in the sector external to Global5G.org with market insights and strategic advice to decision-makers.
- External experts within the Global5G.org network and/or AB members from the sector or with recognised expertise.
- Announcement publication on the website. Promotion across the networks and channels of IDC and Trust-IT. SMART campaigns (e.g. dedicated Twitter cards, defined start and end promotional campaign, monitoring of impacts) have become a key recent feature in the webinar promotion.
- Recording made available with a post-event report: https://www.global5g.org/webinars, with a news piece summarising the main take-aways.

4.3.2 Automotive Webinar

Automotive (October 2018), using IDC platform. How 5G can support transformation in the Automotive industry. The overall goal of the workshop was to highlight the opportunities and challenges (technical, policy, regulatory regime) that 5G will bring to the EU automotive industry. Transformations will occur as a progression of opportunities for auto makers, service providers, and network operators.

- New business and ownership models based on vehicle digitisation and decarbonisations.
- Series of opportunities spanning infotainment applications, content and services; advanced navigation information.
- Vehicle data collection and sharing (e.g. in-car e-commerce, travel experience customisation. Traffic data analysis from many vehicles in a locality, traffic optimisation, especially for emergency situations.
- Governing the operation of traffic, mediating vehicle to vehicle, vehicle to infrastructure and vehicle to server interactions.
- 5GCAR use cases (e.g. lane merge, protection of vulnerable pedestrians, automated parking) with testing expected in Q2-2019 to demonstrate feasibility.
- Collaboration across diverse stakeholders is key to overcoming technical and non-technical challenges: regulators, public sector, automotive manufacturers, telecom stakeholders.

The image below gives a visual snapshot of the key points emerging from the webinar.

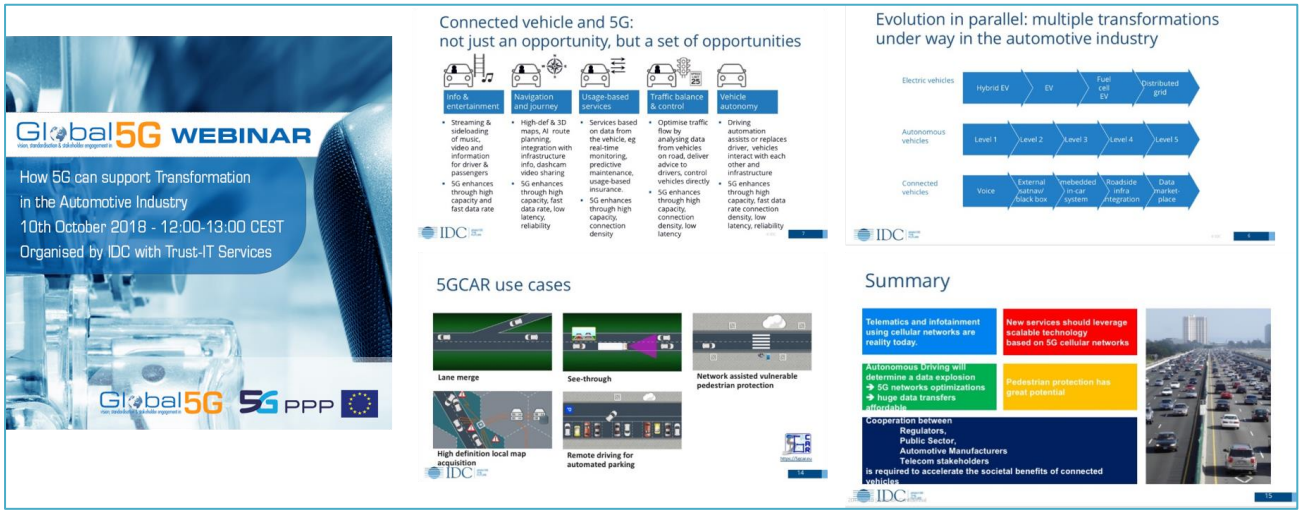


Figure 6: Visual Snapshot of Automotive Webinar

4.3.3 Healthcare Webinar

The Healthcare webinar was hosted in May 2019 under the title "How 5G Can Support Transformation in the Healthcare Industry". It was and co-organised with STANDICT.eu to boost outreach and bring to the table insights into 5G standardisation work on mission-critical medical applications with 3GPP delegate. It also featured the experiences and pilots of the Helios Park-Klinikum with AB member Christoph Thuemmler, and industry perspectives from Italtel.

Key takeaways include:

- Value-based healthcare requires greater data availability and granularity to enable more evidence-based decisions directly at the point of care. The diverse data sizes and formats place complex demands on the network in terms of bandwidth, data rate and latency. The advances of 5G technologies create the right connectivity environment for valued-based healthcare, especially for convenient access to care.
- 5G can improve healthcare enterprise mobility services to support clinical collaboration and communications that are richer in content and need a reliable infrastructure for mission-critical applications and devices.
- 5G will be a game changer especially for the provision of care outside the organisational physical boundaries, with telemedicine benefitting from 5G extended capabilities and a broader range of high-quality remote care services.
- 5G characteristics (e.g. lower latency, higher capacity and connectivity) will also improve video chat between patients and doctors, data transfer from clinical-grade wearables and medical devices with faster and more accurate remote diagnosis and monitoring.

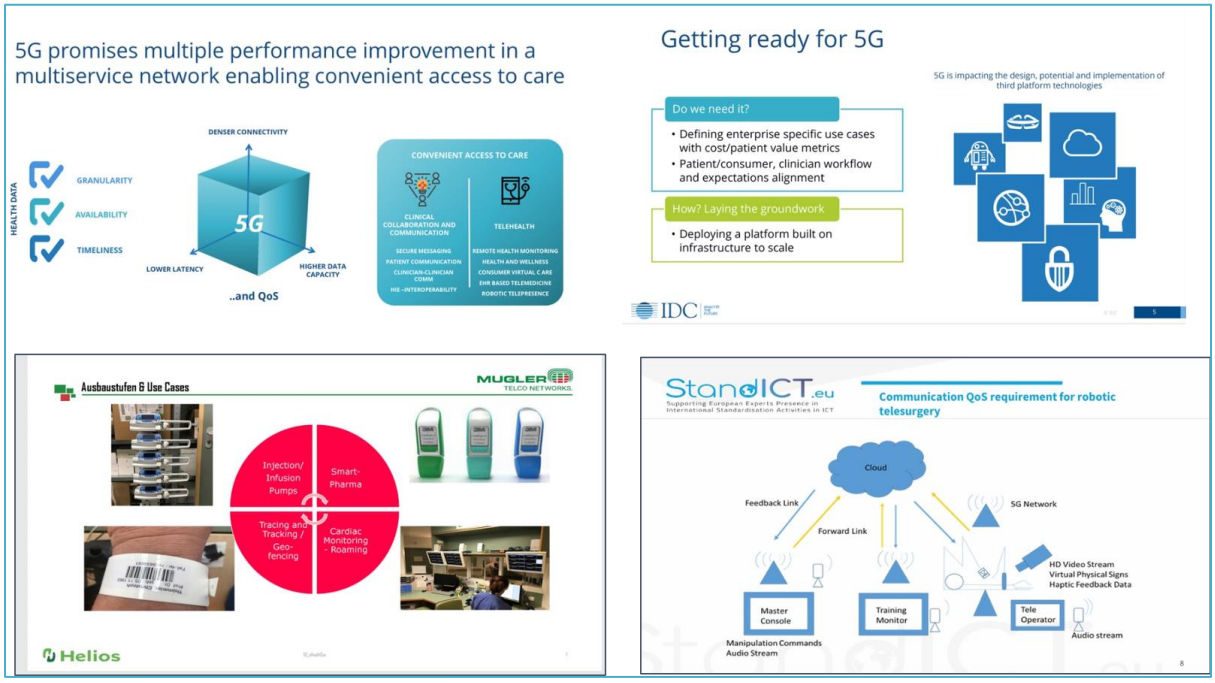


Figure 7: Visual Snapshot of Insights from the Healthcare Webinar

On top of the webinars hosted by the project, we have also followed several other webinars on 5G and vertical industries, e.g. automotive (5GAA) and public safety. One example is the TCCA webinar in January 2019, which zoomed in on PPDR Roadmap for evolution from LMR/PMR to 4G/5G, the standardisation and procurement processes. It thus highlighted the windows of opportunity to make the transition to LTE/3GPP standards, defining the transition from narrowband to operational mission-critical broadband, where "operational" refers to a trusted service that allows the operational use of mission-critical communications by police, fire, rescue officers in safe conditions. Knowledge on the work of TCCA is valuable as the first vertical to contribute to 3GPP standardisation while helping to establish relations directly with representatives through the 1st and 2nd 5G Vertical User Workshop series in close collaboration with the 5G-IA Verticals Task Force.

4.3.4 Planned Webinars

The webinar series on vertical industries with IDC will conclude with a webinar on manufacturing using a similar format as the past webinars. The webinar, "How 5G can support transformation in the manufacturing sector", will take place on 11 July 2019.

Using the same format as the others, it will bring insights on:

- Market data, forecasts and strategic adoption advice from IDC.
- Research perspectives from the Milan University of Technology, including a look at 5G features for the sector.
- Industry perspectives from a 5G-ACIA member, looking at 5G use cases and features for IIoT designed to improve factory processes, e.g. remote monitoring and maintenance, human-machine interfaces, edge computing and analysis, wearables, AR/VR.

The recording of the webinar with a post-event report will be published on Global5G.org.

Other webinars:

- A webinar on Small Cells (AALTO, Trust-IT) in Q3-2019 drawing on the white paper and targeting regulators, the telecom industry and vertical industries.
- Webinars on other topics to be defined with the 5G-IA Verticals TF and various WGs, for example zooming in on phase-2 results with completed projects or close to completion. This webinar series may also spill into FULL5G.

5 Impacts: KPI Monitoring, Qualitative Metrics and SMART Campaigns

5.1 Quantitative Metrics: Summary of KPIs

The Table below gives a summary of the overall KPI achievements, with more details in the sections that follow.

KPI definition	Achieved in June 2018	Achieved in June 2019
KPI #4.1: Number of profiled community members in the Global5G.org networks.	Twitter: 280 LinkedIn (aggregate with 5G-ENSURE): 1670 (498 + 1172) Twitter Impressions: 119,300	Twitter: 1064 LinkedIn (aggregate with 5G-ENSURE): 2300 (923 + 1540) Twitter impressions: 355,600
KPI #4.2-4.3: Number of participants at vertical workshops and sessions; jointly organised events. 2 Joint events: ICT2018 with To-Euro5G and EuCNC 2019 with To-Euro5G and SME WG.	EuCNC workshop 2018: 43 International Robotics festival 2018 (exhibition): 102 Webinar on energy (June 2018): 30	1st 5G Vertical Workshop (February 2019): 63 EuCNC 2019 Workshop: 53 ICT2018 (stands): 100+ Webinars on automotive (Oct 2018) and health (May 2019): 39 + 82
KPI #4.4 Number of features from Global5G.org in 5G PPP newsflashes and newsletters	Not reported as not applicable	1 (1st 5G Vertical User Workshop)
KPI #4.5 Number of views of the high-quality video	Not reported as not applicable	410
KPI #4.6 Number of website views on major Global5G.org outputs	22,108: page views	54, 900: page views

Table 5: Summary of KPIs achieved

5.1.1 Statistical breakdowns

In this section, we give more details on the KPIs, starting with the Global5G.org LinkedIn community based on a total aggregate of 2300 (KPI #4.1) by combining unique members in Global5G.org and 5G-ENSURE.

The breakdown for each stakeholder segment is as follows and illustrated in the figure below:

- Coverage of vertical industries and supply chain, standing at 27% (613 connections).
- Coverage of the Telecom industry and supply chain (not including SMEs), standing at 29% (674 connections).
- Coverage of SMEs (many being part of the supply chain and part of R&I actions at national and EU levels, standing at 17% (399).
- Coverage of academia and research, standing at 24% (550 connections).
- Representatives of telecom and vertical industry associations, standing at 3% (64 connections).

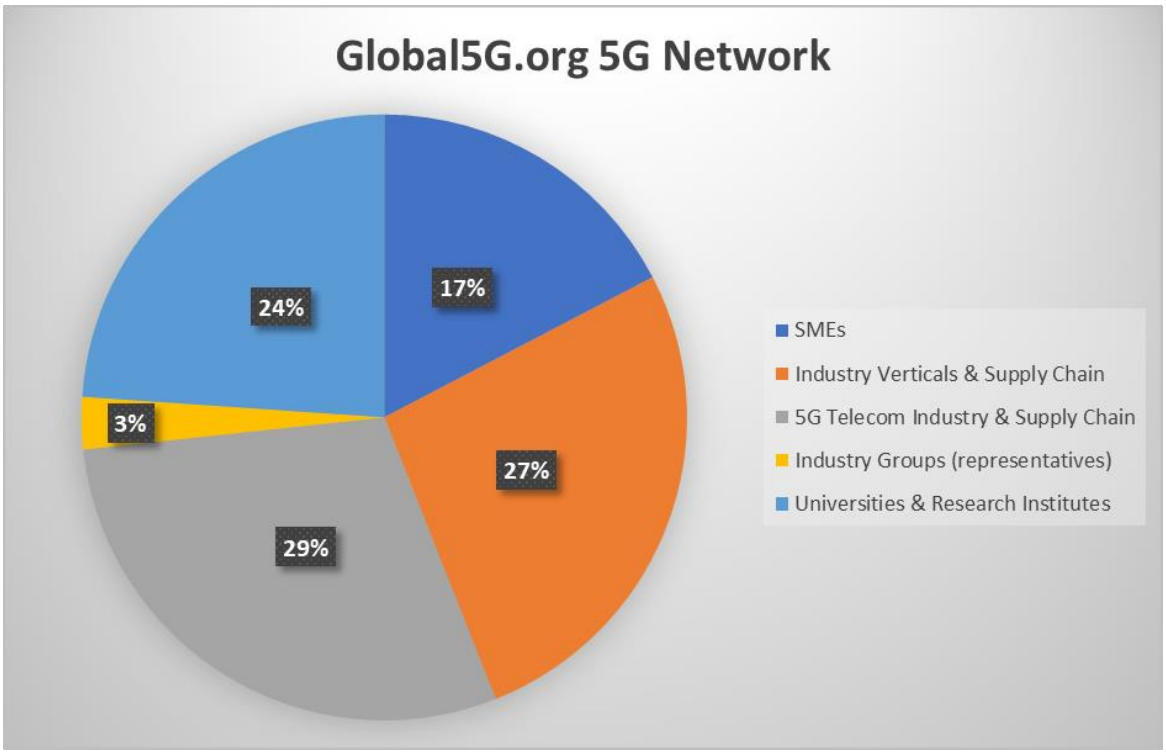


Figure 8: Breakdown of the Global5G.org Network

Participation in WGs and TFs is becoming an increasingly important mechanism for building the community, with many interactions taking place on LinkedIn, from posts and comments to one-to-one messages on specific activities (e.g. promotion of webinars, publications etc.

Impacts are also visible through the increasing number of standards specialists joining the community, with the breakdown for 3GPP, IEEE, ETSI and IETF (from highest to lowest) shown in the figure below.

The total number of specialists is 1,277 connections. These are also treated separately as they cover all stakeholder segments.

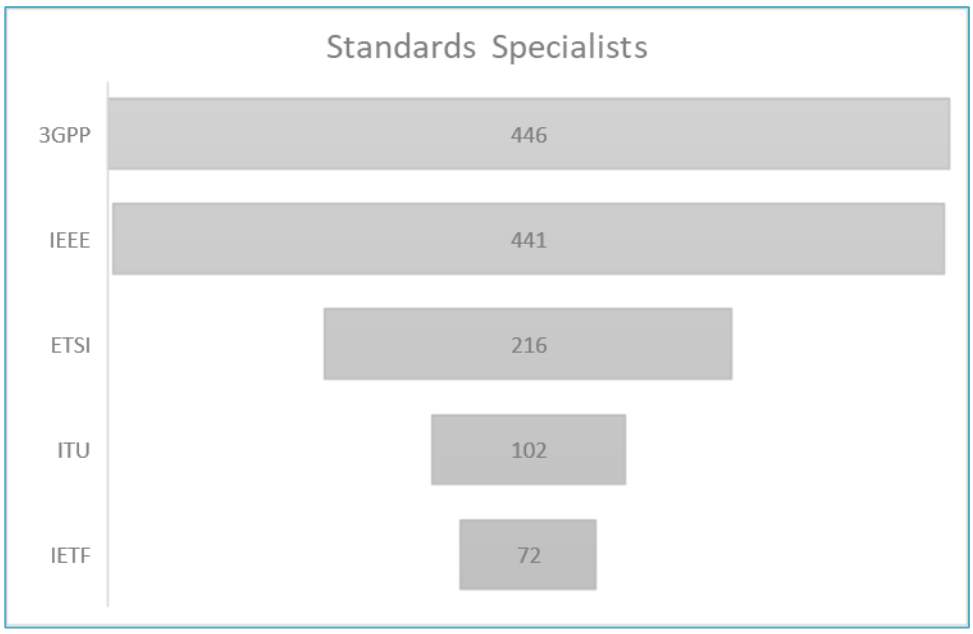


Figure 9: Standards Specialists in Networks

Continuing with KPI #4.1, Global5G.org has achieved the following impacts from July 2018 to June 2019:

- An increase of followers from **280 in June 2018** to **1064 in June 2019**.
- An increase of Twitter impressions from **119, 300 in June 2018** to **355,600 in June 2019**. The regular SMART campaigns have also contributed to this outcome.

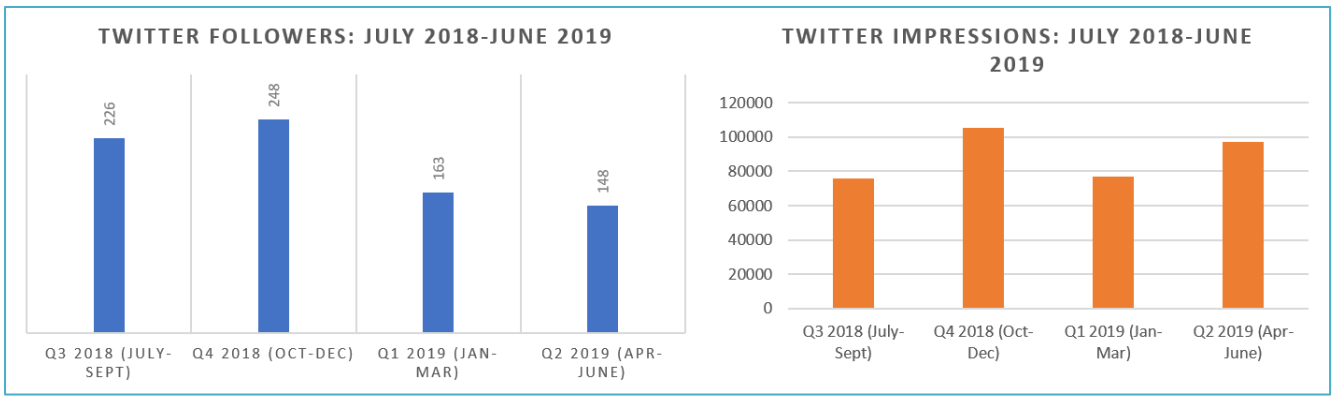


Figure 10: Quantitative Impacts on Twitter

Moving on to participants at events and webinars, we now look at KPIs #4.2 and #4.3. These KPIs count the number of participants at vertical workshops and sessions (co-)organised by Global5G.org, as well as the number of events jointly organised with To-Euro 5G, 5G-IA, working groups and task forces in terms of verticals and topics covered, stakeholders and overall visibility.

The example below is for the webinar on 5G for health, which attracted 82 registered participants, mostly from large IT companies, SMEs and the telecom industry. Standards organisations include 3GPP and ETSI (e.g. EP eHealth and ISO 27001); associations span Agoria, Digital Catapult and EIT ICT Labs.

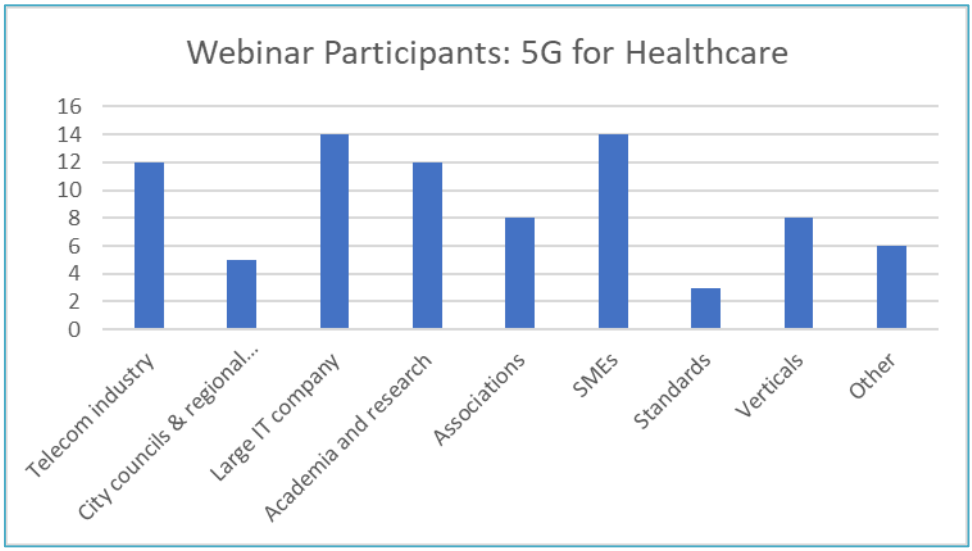


Figure 11: Sample Participant Breakdown for Webinars

Lastly, we show the impacts of the website in terms of page views. It should be noted that it does not include the statistics for the Verticals Cartography, which are reported below (Sec. 5.3.2).

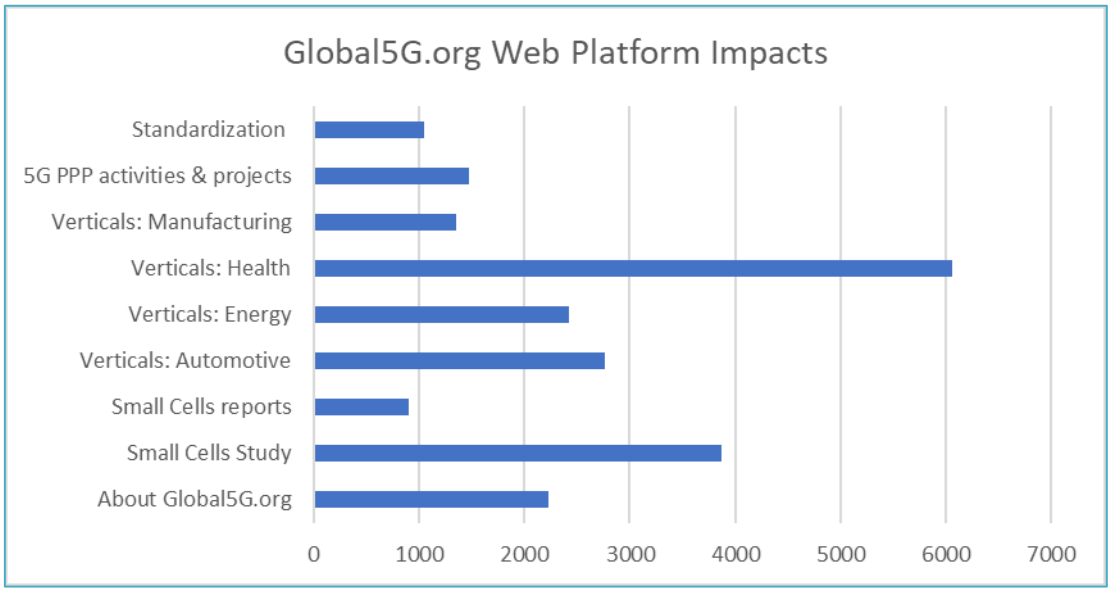


Figure 12: Impacts of the Global5G.org Website

Future Actions: Q3-4 2019

- Website revamp with improved navigation and content creation.
- Integration of new tools: Mapping Tool, Standards Tracker and Performance KPI tracker.

- Continued monitoring of the KPIs with a focus also on qualitative metrics to ensure relevance and high-quality connections with sustainability via FULL5G also in mind.

5.2 Qualitative Metrics

Below, we give a sample of the Global5G.org networks across diverse stakeholder segments as a very important qualitative metric for the project.

5.2.1 Coverage of Vertical Industries

The table below shows a sample of the coverage of vertical industries based on the aggregated Global5G.org and 5G-ENSURE networks, with the former having the highest representation from verticals.

Sample of community members across verticals
Vertical: Automotive **Associations:** 5G Automotive Association (5GAA – CTO, board members, secretary general); ERTICO – ITS Europe (senior manager & 5G-MOBIX). **Sample of connections:** Audi AG, BMW Group, Centro Ricerche FIAT, Continental Automotive, Daimler AG, Daimler; Denso-Auto, Ford-Werke GmBH; Honda Research Group UK, Hyundai, Peugeot, Porsche AG, Groupe Renault and Renault Software Lab; Toyota Motor Europe; Volkswagen AG; Volvo.
Vertical: Aviation, Aerospace & Drones **Associations**: ESOA (EMEA Satellite Operators Association), ACCESS.SPACE Alliance, European GNSS Agency, Satellite Applications Catapult **Sample of connections**: ACC Flug, Airbus Defence and Space, Air France/KLM, Avanti Communications Group Plc, CNS-ATM (digital aviation, drones, flight operations), Dassault-Aviation, European Space Agency, Inmarsat, Thales Alenia Space, TS2 SPACE (Poland; satellite communications, vsat internet, defence and space), UK Space Agency, Zodiac Aerospace.
Vertical: Transportation & Logistics (e.g. maritime, rail, road transport) **Associations**: UIC (Union Internationale des Chemins de Fer – International Railway Union, e.g. Rail System Director; 3GPP rapporteur); European Railway Agency; IRU (international road transport association); ACEA (European Trade Association of the Automobile Industry, covering cars, vans, trucks and buses; Secretary General & Director of Smart Mobility); UNIFE (The European Rail Supply Industry Association); IALA (International Association of Lighthouse Authorities). **Sample of Rail Connections by Country**: France: SNCF; Italy: Ferrovia dello Stato/Trenitalia; Spain: Ferrocarrils de la Generalitat de Catalunya (rail company: metro & commuter lines, tourist mountain rail & rural railway lines) and Spanish Railway Foundation; Sweden: Trafikverket, Transportstyrelsen (Swedish Transport Agency), ÖBB transportation/trucking and railroad; UK: Network Rail, Volvo Trucks. **Sample of maritime connections**: Maersk Line IT. **Sample of logistics connections**: Fedex. **Standards**: GSM-R (Head of Train Radio Systems.

Shift2Rail: Global5G.org/5G-ENSURE networks are also well-connected to the Europe's Joint Undertaking "Shift2Rail" (industrial members: sector-specific & ICT; member state members), including the Executive Director, S2R-X2Rail mission-critical networks, and the S2R LinkedIn group.
Vertical: Energy **Associations:** European Utilities Telecom Council (EUTC), EDSO (Smart Grid; senior technical manager), European Federation of Agencies and Regions for Energy and the Environment (FEDARENE), e.Green for users (eG4U; civic and social organisation for energy management & waste monitoring, e.g. in smart cities), **Sample of connections:** Centrica plc (UK multinational energy and services company), EDF Renewable Energy (France), EDP Distribution (Portugal, global supplier), Electricity Company of Quito, Elektron (UK; London based start-up harnessing blockchain technologies to design more efficient, resilient and flexible systems for the energy sector), ENEL Green Power (Italy), Energynautics GmbH, Energy Total Capital (renewable energy), R.O.M.E. Energy (US; microwatt and milliwatt power), Stimergy (France; start-up for energy and digital).
Vertical: Health Associations: European Connected Health Alliance (ECHAlliance); Personal Connected Health Alliance; HIMSS; COCIR (trade association). Sample of connections, including Trust-IT's participation in H2020 PANACEA project (2019-2022). **Hospitals & Healthcare Facilities:** 7HRC (Seventh Health Region-Crete), Barcelona Hospital Clinic, European InterBalkan Medical Center, Fatebenefratelli, General Hospital of Chania Agios Georgios, Gemelli University Hospital Rome, Helios, Humanitas, Ospedale Bambini Gesù, Fatebenefratelli, San Raffaele, South-South-West Hospital Group of the Health Service Executive (HSE), University General Hospital of Heraklion, University General Hospital of Thessaloniki (AHEPA), Venizelio-Pananio General Hospital of Heraklion. **Patient associations:** Greek Union for the Treatment of multiple Sclerosis in Western Hellas (GUTS in Western Hellas), Panhellenic Federation of Alzheimer's Disease and Related Disorders, Alzheimer's Society of Ireland.
Vertical: Industry - factory and automation process; farming and agriculture **Associations:** 5G Alliance for Connected Industries and Automation (5G-ACIA); Sirris (precision engineering). **Sample of connections:** ABB, BASE, Bosch, Dyson, John Deere, Siemens, Sony, u-Blox, Weidmüller Group, Zvei. Research: Ifak Institute for Automation and Communication. (See also "industry" below).
Vertical: Media, Broadcasting and Entertainment **Associations:** European Broadcasting Union (EBU, e.g. Director of Technology and Innovation; project manager; 3GPP rapporteur), New European Media (NEM, member of the 5G-IA Verticals Task Force). **Sample of connections:** IRT GmbH, RAI, Samsung Electronics, Südwestrundfunk, Sony, Tv3 Latvia. France Télévisions (French public TV broadcaster).
Vertical: Public Safety/public protection and disaster relief (e.g. ministries of the interior and related government agencies for public safety mobile communications; first responders)

Associations: Public Safety Communications Europe (PSCE; president and secretariat), The Critical Communications Association (TCCA; co-chairs; LinkedIn Group) **Sample of connections**: FirstNet (including LinkedIn group "FirstNet Public Safety Broadband"), Ministry of the Interior (Finland), National Emergency Supply Agency (Finland), Quixoticity, Swedish Armed Forces, The Police of the Netherlands, UK Home Office (ENS). Other connections include: 3GPP SA6 rapporteurs; Thales, Airbus, Ericsson and Nokia; Land Mobile and Critical Communications (editor).
Industry & R&D, including multiple vertical supply side **Energy-related**: ABB Power Grids UK (electrical/electronic manufacturing), Efacec Energia (Portugal; electrical/electronic manufacturing, energy, mobility and the environment). **Manufacturers, civil and mechanical engineering-related, including integrators**: Comesvil (Denmark; telecommunication & automation systems, supply and rollout of DCS system in Metro Cityringen Copenhagen), DB Systemtechnik GmbH (Europe's largest competence centre for railway technology), ESG Mobility (automated driving, connected solutions, eMobility), Faresin Formwork (Italy; mechanical engineering company, e.g. sports venues), Harman International Industries, Inc., (part of Samsung Electronics; produces, designs and engineers connected products for automakers, consumers), Kapsch CarrierCom AG (Austria; global system integrator & supplier of end-to-end telecommunications solutions for railway operators, urban transport and real-time asset management, TOPTICA Photonics AG (manufacturer of lasers for research and semiconductor manufacturing), WSP-UK (civil engineering: infrastructure, e.g. bridges and tunnels; energy; maritime, e.g. port facilities, marine/coastal infrastructures, rail and transport schemes). **Healthcare-related**, e.g. medical devices: Healthware, Siemens, Siveco, Videomed. Supply side companies: Agfa Healthcare (Belgium; enterprise imaging, Hospital IT, Digital Radiography, and Integrated Care), Euro Gulf Med GmbH (Germany; medicine, healthcare and related areas), MedTech Europe (Belgium, N-F-P; personalised healthcare). **EU hotspots for innovative healthcare** (identified in cooperation with ECHA): Ireland, e.g. ASSERT Centre at University College Cork, Cork Institute of Technology, Irish Centre for Emergency Management (ICEM), Health Executive Service (HSE); Finland, e.g. universities of AALTO, Oulu (connected hospital) and VTT, Nokia; Spain, e.g. Barcelona Health Hub; Scotland, e.g. Digital Health and Care Institute. **Smart cities**: EUROCITIES (association). Amsterdam City Council (NL), Barcelona City Council (ES), City Council of Lucca (IT), Italian Region of Liguria (IT), Sunderland City Council (UK).

Table 6: Sample of Vertical Industry Community

5.2.2 Coverage of Standards Bodies and Specialists

Global5G.org has a strong community of standards specialists, building on the connections made during the lifecycle of 5G-ENSURE. The table below lists a sample of specialists in the community.

Sample of connections: Standards Organisations
3GPP – a major target for Global5G.org having also set up the task force with a sub-set of MRPs. The community counts over 446 1st-degree connections, including:

- 3GPP RAN TSG Chair and Vice-Chair.
- RAN standards strategist.
- RAN 1 Chair.
- RAN2 delegates.
- RAN3 delegates.
- RAN 4 delegates.
- 5G NR delegates.
- 3GPP SA TSG Chair and Vice Chair.
- SA1 Chair and Vice-Chair; former SA1 chair; delegates.
- SA2 Chair and Vice-Chair; delegates.
- SA3 Chair; delegates.
- SA5 Vice Chair; delegates.
- SA6 Chair, Vice-Chairs, delegates.
- 3GPP CT: TSG Chair; Vice-Chair CT1.
- 3GPP Marketing and Communications

ETSI: good relations have been set up with this important target, including the CTO, several board members through the MRP Task Force and Pre-Standardization WG, and communication specialists (general and for ETSI OSM).

Community members (216 1st-degree connections) come from ETSI Board, committees, projects and industry specification groups.

- ETSI CTO.
- ETSI NFV ISG (network functions virtualisation): Chair and Vice-Chair; Advisor; Technical Manager.
- ETSI CYBER TC: chair, vice-chair and specialists.
- ETSI ENI ISG (Experimental networked intelligence): Chair; specialists.
- ETSI Open Source MANO (project): Chair and specialists, including 10 phase-2 projects.
- ETSI MEC ISG (Multi-access edge computing): Chair and 5G PPP phase 2 project specialists.
- ETSI ZSM ISG (zero touch network and service management): Chair.
- ETSI SCP TC (Smart card platform): specialists.
- ETSI RRS (Reconfigurable Radio Systems) WG1 Chair.
- ETSI SES TC (Satellite earth stations and systems): chairs and technical officers.
- ETSI OneM2M: Chair.
- ETSI INT TC (Core network and interoperability testing): specialists.
- ETSI TCCE TC (TETRA and Critical Communications Evolution): specialists.
- ETSI Centre for Testing and Interoperability.
- ETSI IPR Committee Chair.
- ETSI Senior Research Officer and Chair of AIOTI.
- ETSI Innovation Manager.
- Director of Spectrum and Equipment Regulation at ETSI.

ITU: a key organisation for IMT-2020. Strong connections were made with SG17 during 5G-ENSURE with Global5G.org aiming to further increase its ITU community, with just over 100 1st degree connections, including:

- ITU Head of Europe Office.
- ITU Chief, Study Groups Department TBS (Telecommunication Standardisation Bureau).
- ITU ICT Policy and Regulation.

• Director International Relations. • Radio Regulations Board – member. • ITU SG17 (security) specialists. • ITU programme manager. • ITU SG20 (IoT) members. • Rapporteur of ITU-T SG11.
IEEE: an important standards body for 3GPP, also in view of the work undertaken within the MRP TF. The community spans over 300 connections, including: • IEEE Tactile Internet Sub-committee chair. • IEEE Sensors Council. • IEEE specialist for 5G, IoT, smart cites. • IEEE IoT Chair – scenario track. • IEEE 5G initiative co-chair. • IEEE Privacy specialist.
IETF: an important standards body for 3GPP, also in view of the work undertaken within the MRP TF. The community has over 50 members of IETF. • IETF-ITU Liaison Manager at IETF. • IETF CCAMP WG Co-chair. • IETF ACE Group Chair. • IETF Simplified Use of Policy Abstractions (SUPA): Chair.
Policy & Standards: EC Deputy Head of Unit for European Standardisation; EC Policy Officer for Standardisation.

Table 7: Sample of Standards Specialist Community

5.2.3 Coverage of Telecommunications Industry

Actors within the 5G ecosystem are assuming multiple roles, e.g. Swisscom has transformed into a large IT company and Deutsche Telekom's portfolio spans artificial intelligence and verticals like connected cars/automotive and health, blurring the boundaries between traditional stakeholder categories.

Sample of community members: telecom industry
Telecommunications supply side (large companies; small companies within enterprise groups) are important also in the context of standardisation since they play a dominant role in 3GPP, where it is important to encourage synergies with vertical industries. **Europe (EU and Associated Countries)** • AT: A1 Telekom Austria AG • BE: KPN BASE, Proximus/Belgacom, Orange Belgium • DE: Vodafone Germany GmbH; Deutsche Telekom, T-Systems International GmbH • ES: Telefonica, Parlem • FI: Elisa: Ålands Telefonandelslag • FR: France Telecom/Orange, Bouygues Telecom, Com4Innov; Orange Labs; SFR • GR: OTE/COSMOTE, Intracom Telecom • IT: TIM/Telecom Italia

- LU: Tango S.A (Proximus)
- NL: Vodafone Ziggo Netherlands, T-Mobile Nederland
- SE: Telia Sverige
- SL: Telekon Slovenia
- UK: BT; 02/Telefonica, Vodafone UK.
- CH: Swisscom
- NO: Telenor

Outside EU - Argentina**:** Frixtel; Bangladesh: Robi Axiata ltd; Brazil: Oi S.A; China: China Telecom; Huawei, Egypt: Vodafone, Telecom Egypt; India: Jio; Iran: MTN Irancell; Japan: NTT DOCOMO; KDDI Corporation; Saudi Arabia: Mobily; South Korea: SK Telecom; Vietnam: Viettel Network Technologies Center - Viettel Group; US: Verizon & Verizon Wireless, Liberty Global, T-Systems.

Vendors/manufacturers: Cisco Systems, Ericsson, Huawei Technologies European Research Center and Huawei, Intel, Nokia, Qualcomm, Samsung Electronics.

Telecom industry associations:

- NGMN Alliance: members and Executive Programme Manager.
- GSMA: members and Technical Director.

Table 8: Sample of Community Members for the Telecom Industry

5.2.4 Coverage of SMEs

The table below gives a snapshot of the SME ecosystem that is part of the Global5G.org community.

Sample of community members: SME technology providers [from micro (0-10 & 11-50 employees) to up to 200-250 employees]

- **Airrays GmbH** (Germany; Cellular Wireless, Adaptive Antenna Systems, Massive MIMO, Active Antenna, and 5G).
- **Azcom** (Italy; physical layers & protocol stack SW for wireless communications, small cell base stations).
- **Bisdn GmbH** (Germany; SDN, NFV, Whiteboxing, Switches, software, Open source, OpenFlow, and Routers).
- **Blueworld** (Denmark; methanol fuel cell components and systems for mobility and automotive applications).
- **Brown-Iposs GmbH** (Germany; network and service providers with planning, integration, and operation services for LAN/WAN-networks, IP-services, and for GSM, UMTS, LTE, WiFi).
- **EICT GmbH** (Germany; Automated Driving, Connected Mobility, Collaborative Research, Autonomous Driving, Technical Coordination of large-scale research projects)
- **eMotion srl** (Italy; applications, e.g. tourism).
- **Fruuts GmbH** (Germany; software house).
- **HOP Ubiquitous** (Spain; smart Cities, Internet of Things, Future Internet, RESTFul/CoAP, OMA, Sensors, LoRA, Personal Area Networks, M2M Communications, IPv6, Bluetooth Low Energy, and Cloud Computing).
- **Hypermesh** (Germany; start-up (2017) blockchain protocol for the telecommunications industry; decentralised wireless networks).

- **Incites Consulting S.A.R.L** (Luxembourg; micro company; techno-economic studies, business models, telecom regulations).
- **IRT GmbH** (Germany; research centre of German broadcasters, Austria's broadcaster and Swiss public broadcaster).
- **MIRANTIS OpenStack Spain** (cloud computing, Kubernetes, Containers, IaaS, edge computing, VFN).
- **Mobile Streams** (U.S.; mobile internet, games, apps and content).
- Montimage (France; network traffic monitoring).
- **Nextworks** (Italy; automation, networking, cloud computing, support to vertical industries).
- **Nomor Research** (Germany; standard-compliance simulations of communication systems; cellular, mobile, vehicular and satellite communications, mission-critical communications; broadcast transmission).
- **Ombre Digital sarl** (Africa; telecommunications and certification for radio and telecom equipment).
- **Pure LiFi Ltd** (UK; LiFi, Visible Light Communications, wireless communications, LED).
- **Qualigon GmbH** (testbed for LTE smell cells – testing from quality perspective).
- **Re2you GmbH** (Germany; consumer internet, *Whitelabel – harmonising defragmented HW, Web 3.0).
- **SmartEnds** (Belgium; designs wireless sensor devices for IoT applications. These sensors work on Low-power Wireless WAN technologies (LoRaWAN, Sigfox and Narrowband IoT).
- **Space Application Services** (Belgium; system and software engineering for ESA, national space agencies and the aerospace industry).
- **Stimergy** (France; redefining the datacentre as a distributed collection of computing units interconnected by optical networks.
- **Tech Connect GmbH** (Germany; automotive and IoT).
- **Telcaria** (Spain; micro-company; advanced network service virtualisation company serving the dynamic network operators).
- **TriaGnoSys GmbH** (Germany; part of Zodiac Inflight Innovations, a division of Zodiac Aerospace).
- **TXO Systems** (UK and global; asset management services & consultancy, e.g. for fixed and mobile operators).
- **Ubiwhere** (Portugal; smart cities, future internet, telecom solutions, energy solutions, IT mobility).
- **Visiona** (Spain; smart cities, audio-visual technologies).
- **WINGS ICT** (Greece; SW & HW development for diverse verticals, including advanced wireless networking, AI & IoT).
- **Worldsensing** (UK; wireless sensor networks, critical asset monitoring, traffic flow monitoring, location-based intelligence).
- **Zeetta Networks** (UK; development of fully programmable, open ICT network infrastructures, made possible by the network slicing and network splicing® capabilities of NetOS®, Zeetta's programmable network infrastructure platform).

Table 9: Sample of SMEs

5.2.5 Coverage of other Stakeholder Groups

5G PPP projects are reached directly through the boards and working groups, e.g. Technology Board, Steering Board; Automotive WG, COMMS WG, Pre-Standardization WG, SME WG, Spectrum WG, Trials WG. Global collaborative projects are reached through the International Cooperation Stream. Some of these groups also give access to large companies from verticals (e.g. Trials WG) and standards specialists (e.g. Pre-Standardization WG).

Stakeholder Group	Sample of Community members
5G PPP project representatives	Coverage of all phase 2 projects and phase 3 (ICT-17 – 18 and 19).
Large companies (including supply chains)	ESG Mobility (automated driving, connected solutions, eMobility); Harman International Industries, Inc., (part of Samsung Electronics; produces, designs and engineers connected products for automakers, consumers); TOPTICA Photonics AG (manufacturer of lasers for research and semiconductor manufacturing.
Research centres and universities (EU and global)	CNIT; CTTC; Eurecom; Fraunhofer FOKUS and Fraunhofer IIS; i2CAT Foundation; VTT; Aalto University (external); Ajman University; Brunel University; Harbin Engineering University; King's College London; Politecnico di Milano; Scuola Superiore Sant'Anna; Shenzhen University; Shiv Nadar University; Thakur College of Engineering and Technology; The Open University; The Johns Hopkins University Applied Physics Laboratory; TU Dresden; University of Genoa; University of Glasgow; University of Leeds; University of Leicester; London South Bank University; University of Oulu; University of Piraeus; Universidad Carlos III de Madrid; University of Surrey and the 5G Innovation Centre; Xi'an Jiaotong-Liverpool University.

Table 10: Sample of SMEs

Future Actions: Q3-4 2019

- Global5G.org will continue to grow its networks with a focus on vertical industries and standards specialists to boost its work on 5G standardisation for market sectors. To this end, we will scout relevant events, including active participation and from the 2nd Vertical User Workshop and members of the vertical associations.

5.3 Impacts of SMART Campaigns

Global5G.org has intensified its use of SMART campaigns to help boost visibility and maximise impacts of its work. Below, a sample of such impacts.

5.3.1 Pan-EU Trials Roadmap V4.0

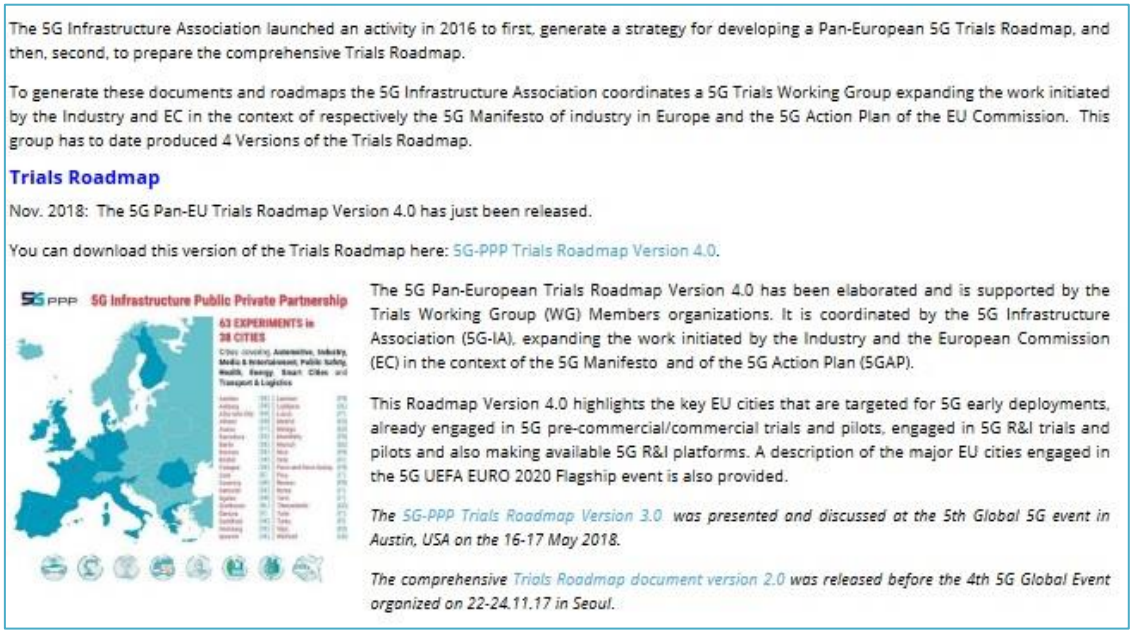
A key output of the Trials WG is the *Pan-EU Roadmap V4.0* (November 2018) working with a core team

on the section dedicated to trials across the EU, including the 5G PPP.

Global5G.org has contributed the following:

- An overview of the Verticals Cartography with the creation of a special image showing both the verticals and city landscapes.
- High-level overviews of 5G programmes in 4 European countries based on desk research:
  - Germany.
  - Greece.
  - Italy.
  - UK.
- Overall editing of the section.

The Roadmap is available at, https://5g-ppp.eu/5g-trials-roadmap/, where the Verticals Cartography takes centre stage.



The 5G Infrastructure Association launched an activity in 2016 to first, generate a strategy for developing a Pan-European 5G Trials Roadmap, and then, second, to prepare the comprehensive Trials Roadmap.

To generate these documents and roadmaps the 5G Infrastructure Association coordinates a 5G Trials Working Group expanding the work initiated by the Industry and EC in the context of respectively the 5G Manifesto of industry in Europe and the 5G Action Plan of the EU Commission. This group has to date produced 4 Versions of the Trials Roadmap.

Trials Roadmap

Nov. 2018: The 5G Pan-EU Trials Roadmap Version 4.0 has just been released.

You can download this version of the Trials Roadmap here: 5G-PPP Trials Roadmap Version 4.0.

The 5G Pan-European Trials Roadmap Version 4.0 has been elaborated and is supported by the Trials Working Group (WG) Members organizations. It is coordinated by the 5G Infrastructure Association (5G-IA), expanding the work initiated by the Industry and the European Commission (EC) in the context of the 5G Manifesto and of the 5G Action Plan (5GAP).

This Roadmap Version 4.0 highlights the key EU cities that are targeted for 5G early deployments, already engaged in 5G pre-commercial/commercial trials and pilots, engaged in 5G R&I trials and pilots and also making available 5G R&I platforms. A description of the major EU cities engaged in the 5G UEFA EURO 2020 Flagship event is also provided.

The 5G-PPP Trials Roadmap Version 3.0 was presented and discussed at the 5th Global 5G event in Austin, USA on the 16-17 May 2018.

The comprehensive Trials Roadmap document version 2.0 was released before the 4th 5G Global Event organized on 22-24.11.17 in Seoul.

Figure 13: Verticals Cartography in Pan-EU Trials Roadmap

The launch of the Roadmap generated a lot of visibility for the Verticals Cartography.

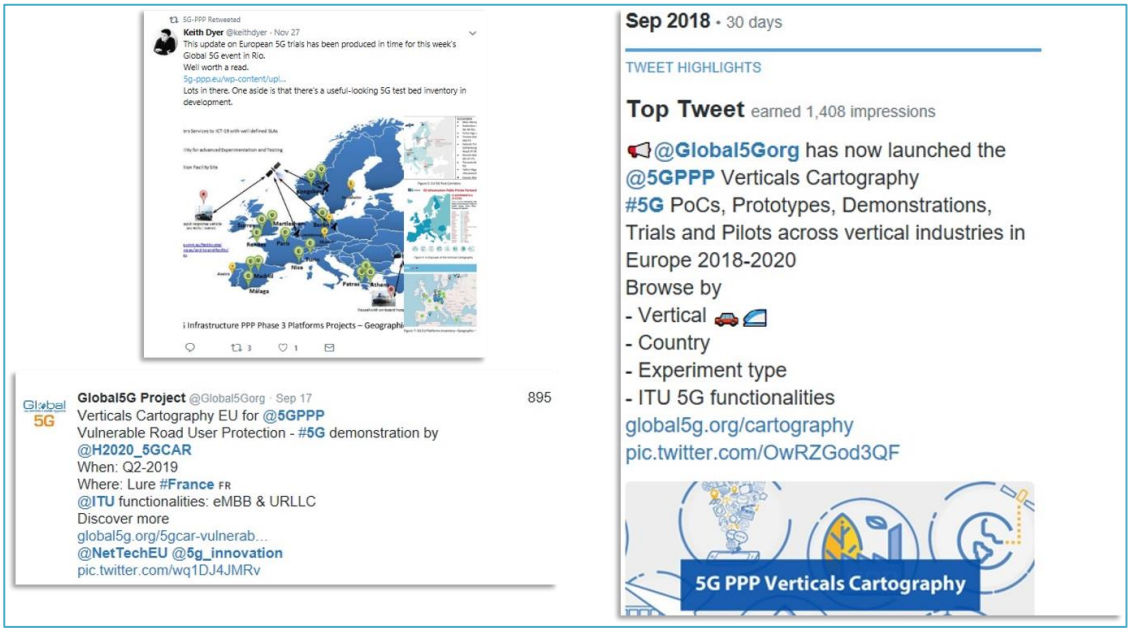


Figure 14: Impacts of Pan-EU Trials Roadmap

5.3.2 Online Verticals Cartography

The online Verticals Cartography is a major result of Global5G.org with considerable effort taken to improve and keep it updated. Release 2.0 of the tool was launched in early April 2019 along with several new graphically designed icons for use cases targeting multiple verticals. The SMART campaign in Q2-2019 helped boost visibility of the tool and its content:

- 10,000 views between April and June 2019 on top of the 18,404 views between mid-September 2018 and March 2019, totalling 28,404.
- The promotion of Release 2.0 was Top Media Tweet in June 2019.

Figure 15: Impacts of SMART Campaign on Verticals Cartography

Future Actions: Q3-Q4 2019

- Further impacts are being generated through the SMART campaigns on updates to the use-case experiments. A Twitter card is produced for each updated entry. The figure below shows an example for 5G-MONARCH.

Figure 16:Example of new SMART campaigns

- On-boarding of Phase 3 projects from calls ICT-17-18-19 with the development of a new blueprint under WP2 and new template for distribution to the projects.
- Inputs to the Trials WG competition to select the top 10 use-case experiments in Phase 2 for inclusion in a 5G PPP brochure, with online updates of the cases selected.
- Potential organisation of webinars with projects interested in disseminating their results through Global5G.org in synergy with the Technology Board.

5.3.3 Dissemination of the 5G PPP Automotive WG White Paper

Global5G.org has used the graphically-designed white paper as the basis for its SMART campaign to help disseminate the main findings via a set of Twitter cards. Each card conveys a key takeaway from the white paper. The campaign was top tweet in consecutive months from February to April 2019, as shown in the figure below.

Figure 17: Impacts from Automotive WP SMART Campaign

5.3.4 Promotion of Global5G.org webinars on verticals

SMART campaigns have also been used to promote the webinar series on vertical industries. The figure below shows an example for the Webinar, “How 5G can transform the healthcare industry” (May 2019).

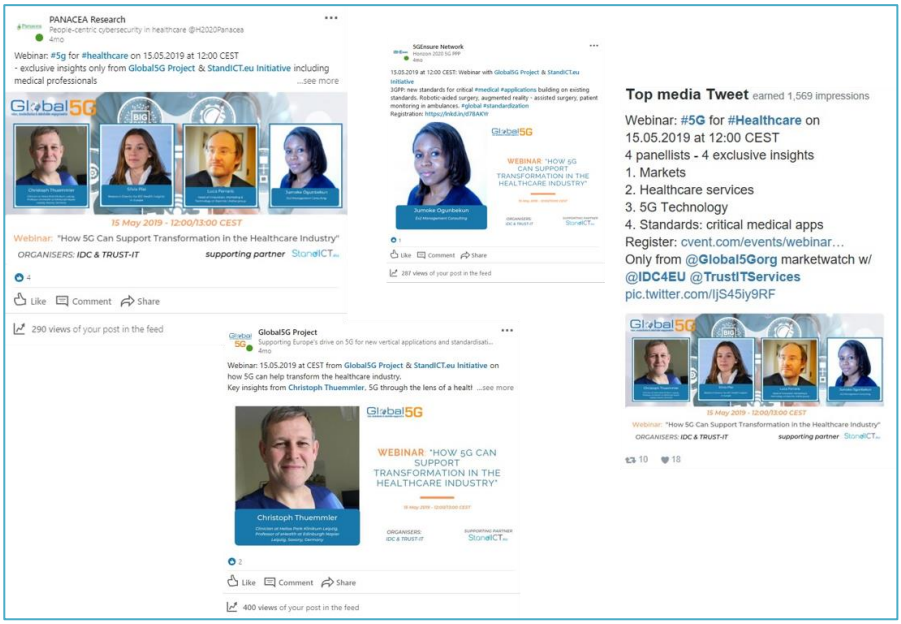


Figure 18: Impacts of SMART Campaign for Healthcare Webinar

5.3.5 Promotion of the EuCNC 2019 Workshop

A SMART campaign was carried out for EuCNC 2019 workshop on emerging business models in synergy with To-Euro 5G and the SME WG. The main impacts are shown in the figure below for the posts on LinkedIn.

Figure 19: SMART Campaign for EuCNC 2019

6 Conclusions and Next Steps

6.1 Main conclusions

D4.3 is a revised version of the document in response to the Global5G.org 2nd Interim Review (July 2019). Specifically, it sets out to make the section on the outputs and collaborations more concise with dedicated sections only on the new Mapping Tool (available in mid-June) and Performance KPI tracker. It also includes detailed sections on the KPIs and qualitative metrics, as well as examples of the impacts from the SMART campaigns. These campaigns are now a regular feature of the strategy for broadcasting outputs and key findings. D4.3 also includes the plans for the final six months of the project. Impacts from the action plan will be reported in D4.5 (December 2019) along with a sustainability plan for the online tools and collaborations.

6.2 Future Actions

The table below is a summary of the main actions for the period July-December 2019.

Overview of Future Actions: July to December 2019
The revamp of the website is a major activity for the forthcoming period**.** This work will improve on the graphic look and feel, updated and curated texts and integration of tools and outputs. The overall aim is to create as many web sections as possible that can be sustained beyond the lifecycle of the project but that are also practical and useful tools/data for the 5G PPP, standards bodies and verticals.
#1 Online Verticals Cartography: Integration of phase 3 projects (ICT-17-18-19) with an updated blueprint to track and analyse inputs. Continued updates from running phase 2 projects. Updates on phase-2 use case experiments and SMART campaigns for all new/updated content.
#2 Standards Tracker (under the Pre-Standardization WG and new Task Force): Post-workshop report and action plan for the 3GPP PCG and TSG; publishable summary promoted via Global5G.org networks and selected channels; technical report for other standards bodies. Rollout of a collaboration platform tailored to vertical industries to ease their entry into 3GPP standardisation with online guides, specific and common requirements. This is a sustainable tool. Complete the on-boarding of Phase 3 projects into the Pre-Standardization WG. Revise and extend the blueprint for tracking progress in the 3GPP work plan and the 5G PPP inputs to SDOs for the Pre-Standardization WG and help members and verticals prepare for Rel-18.
#3 Performance KPIs: Rollout of an online tool and analysis to showcase achievements in phase 2. Promotional SMART campaigns. This is a sustainable tool though subject to potential evolutions aligned with phase 3.
#4 High-quality video: Ensure the video keeps prominence on the website and in SMART campaigns.
#5 Emerging Business Models for Verticals: Re-purpose the deliverable for EU and national projects as a graphically designed report. D2.5 will merge an updated analysis together with the rollout to market and verticals.
#6 Vertical Industries and Rollout to market: Edit, update and publish selected content as part of the website revamp. D2.5 will update the analysis in a concise report.
#7 Market overview and expected impact: Edit selected parts and publish as part of the website revamp.
#8 Small Cells White Paper: Create a graphically designed version and SMART campaign. Organise a webinar to broadcast main findings.
#9 Benchmarking Reports on international deployments: Two more reports will analyse China and Japan. Create graphically designed versions of the report, publish on website and promote across channels.

#10 Mapping Tool: Request and implement feedback from the Trials WG. Enrich the database by adding information for other countries or more indicators on 5G deployments. Pursue opportunities to sustain and expand the tool via FULL5G (where iDATE is a partner).

Table 11: Overview of Future Actions