



**EXPERIMENTATION AND VALIDATION OPENNESS FOR LONGTERM
EVOLUTION OF VERTICAL INDUSTRIES IN 5G ERA AND BEYOND**

[H2020 - Grant Agreement No.101016608]

Deliverable D7.5

Dissemination, Communication and 5GPPP Engagement Activities (final)

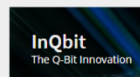
Editor Vasileios Mavrikakis (INF)

Contributors All WP7 Partners

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LIST OF AUTHORS

Partner ACRONYM	Partner FULL NAME	Name & Surname
INF	INFOLYSIS	Vasilis Mavrikakis
INF	INFOLYSIS	Vaios Koumaras
INF	INFOLYSIS	Konstantinos Fragkos
INF	INFOLYSIS	Margarita Meleti
INF	INFOLYSIS	Georgios Koumaras
INF	INFOLYSIS	Theodoros Papadopoulos
LNV	Lenovo (Deutschland) GmbH	Dimitris Dimopoulos,
LNV	Lenovo (Deutschland) GmbH	Apostolis Salkintzis
TID	Telefónica	Javier Garcia
IQBT	InQbit Innovations	Raisia Gorbunov
IQBT	InQbit Innovations	Constantinos Patsakis
IQBT	InQbit Innovations	Dimitrios Dres
IQBT	InQbit Innovations	Dimitrios Drakoulis
ININ	Internet Institute	Jaka Cijan
ININ	Internet Institute	Rudolf Susnik
ININ	Internet Institute	Janez Sterle
ININ	Internet Institute	Luka Korsic
GMI	GMI Aero SAS	George Kanterakis
GMI	GMI Aero SAS	Marc-Olivier Sauer
COSM	COSMOTE Mobile Telecommunications	Foteini Setaki
COSM	COSMOTE Mobile Telecommunications	Ioanna Mesogiti
NCSR	NCSR "Demokritos"	George Makropoulos
NCSR	NCSR "Demokritos"	Harilaos Koumaras
NCSR	NCSR "Demokritos"	Dimitris Fragkos
NCSR	NCSR "Demokritos"	Ioannis Manolopoulos
NCSR	NCSR "Demokritos"	Xenia Galia
NCSR	NCSR "Demokritos"	Evaggelia Alexopoulou
UMA	University of Malaga	Laura Panizo
UMA	University of Malaga	Almudena Díaz

All partners participating in T7.1 and T7.2

GLOSSARY

<i>Abbreviations/Acronym</i>	<i>Description</i>
<i>3GPP</i>	<i>3rd Generation Partnership Project</i>
<i>5G-IA</i>	<i>5G Infrastructure Association</i>
<i>5G-PPP</i>	<i>The 5G Public Private Partnership</i>
<i>6G-IA</i>	<i>The 6G Smart Networks and Services Industry Association</i>
<i>CO</i>	<i>Communication Objectives</i>
<i>CSP</i>	<i>Communication Service Provider</i>
<i>DoA</i>	<i>Description of Action</i>
<i>Dx.y</i>	<i>Deliverable y of Work Package x</i>
<i>EuCNC</i>	<i>European Conference on Networks and Communications</i>
<i>GA</i>	<i>Grant Agreement</i>
<i>GA meeting</i>	<i>General Assembly meeting</i>
<i>HE</i>	<i>Horizon Europe</i>
<i>IEEE</i>	<i>Institute of Electrical and Electronics Engineers</i>
<i>IoT</i>	<i>Internet of Things</i>
<i>KPI</i>	<i>Key Performance Indicator</i>
<i>Mx</i>	<i>Month x</i>
<i>Network App</i>	<i>Network Application</i>
<i>NGI</i>	<i>Next Generation Internet</i>
<i>NGIoT</i>	<i>Next Generation Internet of Things</i>
<i>PU</i>	<i>Public</i>
<i>SME</i>	<i>Small Medium Enterprise</i>
<i>SNS</i>	<i>Smart Networks and Services</i>
<i>Tx.y</i>	<i>Task y of Work Package x</i>
<i>WG</i>	<i>Working Group</i>
<i>WP</i>	<i>Work Package</i>

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EXECUTIVE SUMMARY

The D7.5 of the EVOLVED-5G project sums up a comprehensive overview of the project's progress in dissemination, communication activities, and its interaction with 5GPPP and other affiliated research projects during the second reporting period (M21-M36). This detailed report accurately outlines all communication channels utilized and related communication/dissemination activities, providing a comprehensive evaluation in comparison with predetermined goals set in the EVOLVED-5G communication, dissemination, and impact activities plan. Through a detailed analysis of statistics, results, and impact assessments, this deliverable offers insights into the efficacy of the performed actions. Furthermore, the report mentions strategic plans and key performance indicators (KPIs) for performed activities, laying the groundwork for future impact endeavours.

In addition, this document serves as a comprehensive report and evaluation of EVOLVED-5G's engagement with the 5G-PPP association, along with dedicated information and details on the contributions of EVOLVED-5G partners in the attended 5G-PPP Working Groups, as well as details on several project collaborations and joint actions.

This report also presents a detailed analysis of the overall communication and dissemination performance, total contributions to 5G-PPP for the full project duration and provides interesting insights on how all the set impact KPIs have been successfully met.

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1 INTRODUCTION

1.1 SCOPE

This deliverable is part of the deliverables' set associated with WP7 and has a direct connection to two specific tasks: T7.1, which focuses on Dissemination and Communication Activities, and T7.2, which involves Engagement in 5G-PPP Activities. The primary goal of T7.1 was to outline the initial plans for creating an impact and to develop and implement effective strategies and actions for generating maximum visibility. These actions have been crucial for ensuring that the project achieves significant influence in both the business and scientific communities. The aim was to ensure efficient communication, dissemination, exploitation, and adoption of the project's outcomes. The planned activities were continuously monitored throughout the project's duration and adjusted periodically to ensure their long-term effectiveness and feasibility. The dissemination efforts targeted towards relevant markets and industries, with the objective of fully capitalizing on emerging business opportunities arising from related market activities and business functions.

In parallel, T7.2 focused on the engagement with 5G-PPP activities. The project and technical coordinators of the project represented EVOLVED-5G in Steering Board and Technology Board respectively. In addition, the project contributed to 5G-PPP advances through its participation to several 5G-PPP Working Groups (e.g., SME, Pre-Standardization, Architecture, Test, Measurement and KPIs Validation).

The EVOLVED-5G project, through this deliverable provides details to its partners, target audience and stakeholders, about the actions and activities that have been applied by the EVOLVED-5G consortium during the second reporting period and are related to project's activities of communication, dissemination, and engagement with the 5G-PPP association.

Within the framework of this deliverable, it's important to highlight that the utilization of EVOLVED-5G's impact channels and the content communicated through them, addresses all project's activities, and this impact/influence applies not only to the activities of WP7 but also extends its reach to all work packages of the EVOLVED-5G project.

1.2 TARGET AUDIENCE

All partners involved in the EVOLVED-5G project, as part of their engagement in WP7 tasks, particularly in T7.1 and T7.2, are actively participating in a variety of impact activities tailored to their expertise and resources. These activities are designed to address different audiences and serve multiple purposes.

For instance, industrial partners focus on relevant industrial sectors through their existing collaborations, while academic and research institutions target technical and scientific communities by presenting and highlighting the project's achievements and KPIs. The identification of diverse target audiences is essential for crafting and executing effective communication, dissemination, and interaction strategies with both 5G-PPP/SNS and other EU related projects. This ensures that each audience receives information about EVOLVED-5G activities and results that align with their interests, knowledge, and expertise, throughout the project's lifetime.

In specific, the target audience of D7.5 includes:

- **All EVOLVED-5G partners, collaborators, and stakeholders:** this document serves as a report to the impact means that have been established and employed over the project's duration, and it is targeted to the whole EVOLVED-5G consortium. Target stakeholders that could adopt and/or complement and extend the EVOLVED-5G concepts, technologies, and applications include industrial players, SMEs, and researchers in the industry 4.0, 5G, and Network App vertical segments. The objective is to reach to a common understanding on pilots, functionality, and planned performance, as well as to increase public knowledge of the project's activities and outcomes. The consortium, which unites a number of industry players well-known in the 5G/Network App scene, can effectively reach the industry through joint efforts. It will also be crucial to the continued involvement of other industry players from the wider ICT field such as IoT, EUCloudEdgeIoT, NGIoT.
- **Industrial and 5G related research projects and communities:** in order to coordinate strategic and operational efforts, help validate and sustain the EVOLVED-5G outcomes, and ensure more effective uptake of technological innovations in the target verticals—all with the aim of advancing the excellence and leadership of the European industry from a global perspective—these entities will be contacted as the reference research and innovation community.
- **Industry sector:** any group operating in industry-related fields and possessing technical knowledge and skills as well as an industrial professional background.
- **Academia and Research institutions:** Academic institutions from the ICT and industrial sectors, e.g., higher education institutions, like universities and educational centers as well as national, public, and private research institutes.
- **Researchers and freelancers, both in the academia and the industry:** in addition to transferring and promoting the scientific and technological know-how produced within the project, researchers and freelancers in both academia and industry will be committed to promoting the advantages of using the EVOLVED-5G pillars and technologies. Initiatives and organizations throughout Europe and around the world can successfully reach this target group.
- **Public and private service providers:** 5G/B5G service providers, network operators, verticals and other relevant telecommunication providers that are interested in 5G services and systems.
- **Standardization Bodies and Open-Source Communities:** to optimize the industrial effect, it is imperative to focus on Standardization Bodies and Open-Source Communities. These entities facilitate the adoption of 5G and Network App innovations within an industrial setting and aid in the development and modification of new standards and services.
- **Public Authorities, Initiatives and Policy Makers:** given the continuous evolution and versatile worldwide applicability of 5G interoperability, and the speed of its spreading adoption, good information and meaningful engagement can go a long way to facilitate timely and effective exploitation.
- **Citizens / General Public:** comprises a wide group of stakeholders including citizens, students, and non-governmental organizations (NGOs) that could benefit from the adoption of the new IoT services and enhanced IoT capabilities offered via the EVOLVED-5G outcomes.



- **General Press:** encompasses online and offline platforms, as well as specialist press and media organizations, that are utilized to boost the EVOLVED-5G's communication efforts and, as a result, raise the effect of the planned dissemination and showcasing activities.

2 DISSEMINATION AND COMMUNICATION

2.1 CHANNELS OF COMMUNICATION

During the initial months of the project, the communication channels and tools employed to boost project's visibility were put in place and effectively maintained throughout the reporting period. During the reporting period (M21-M36), the INFOLYSiS team, responsible for communication procedures, made concerted efforts to enhance and broaden all associated activities.

The scope of channels and means, which has been used during the reporting period for completion of communication activities of EVOLVED-5G are listed below and updates on their status are provided in the upcoming sections:

- EVOLVED-5G logo
- EVOLVED-5G website
- EVOLVED-5G social media channels
- EVOLVED-5G newsletter
- EVOLVED-5G press releases and articles
- Other Means and Channels
- Leaflets
- Posters

2.1.1 EVOLVED-5G Website

The official website for the EVOLVED-5G project, accessible at <https://evolved-5g.eu/>, serves as a central platform for disseminating information related to the project, including its objectives, activities, and outcomes. This website plays a crucial role in ensuring that the project's mission is effectively reflected to a diverse range of industries and stakeholders. The development of the EVOLVED-5G website was initiated in early January 2021, and it was officially made public on Friday, January 8th, 2021. To provide a more detailed description of the EVOLVED-5G website:

- Developed using WordPress by NCSRD and INF teams and it is constantly updated to newer versions.
- Domain name owned by INF partner for 6 years.
- Website hosting is offered by INF.
- Content is being constantly updated by INF and NCSRD teams on a weekly basis.
- Contact Form is provided addressing the Project Coordinator, Technical manager and T7.1 leader.
- reCAPTCHA protection is enabled.
- Google Analytics is enabled.
- Multiple menu constantly enriched with new webpages.

Please note that a detailed presentation of the website and all its webpages is included in the previous deliverables ([D7.1](#) and [D7.3](#)). This deliverable mainly focuses on presenting the additions and updates that have been performed during the reporting period.

2.1.1.1 Constantly Updated Website Sections

The website effectively meets the communication and impact goals of the EVOLVED-5G project through its streamlined, inclusive, and user-friendly layout. It offers nine main menu options,

including Home, Objectives, Pilot 5G Sites, Consortium, Dissemination, Community – Accelerator, Marketplace, News, and Contact, to provide comprehensive information and support these project objectives.

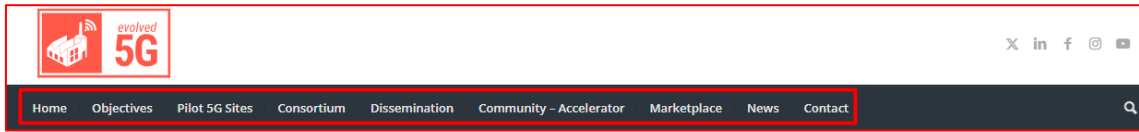


Figure 1: Website's updated menu

While detailed explanations of all submenus have been provided in previous deliverables, we believe it's necessary to include concise descriptions of the latest sections and components of the website in this current deliverable. This will ensure that the reader has a clear and up-to-date understanding of the website's contents.

- **Dissemination** (<https://evolved-5g.eu/dissemination/>)

This page serves as a comprehensive resource for information regarding the dissemination and communication efforts carried out by the partners of EVOLVED-5G. In particular, it functions as a menu that includes multiple subtabs, categorizing and presenting the various activities performed by the EVOLVED-5G project. There are 7 different submenu options in this page, each dedicated to a specific section of the communication/dissemination activities. These menu options are the following ones:

- Publications
- Workshops/Presentations/Trials
- Articles
- Press Releases
- Deliverables
- Newsletters
- Events

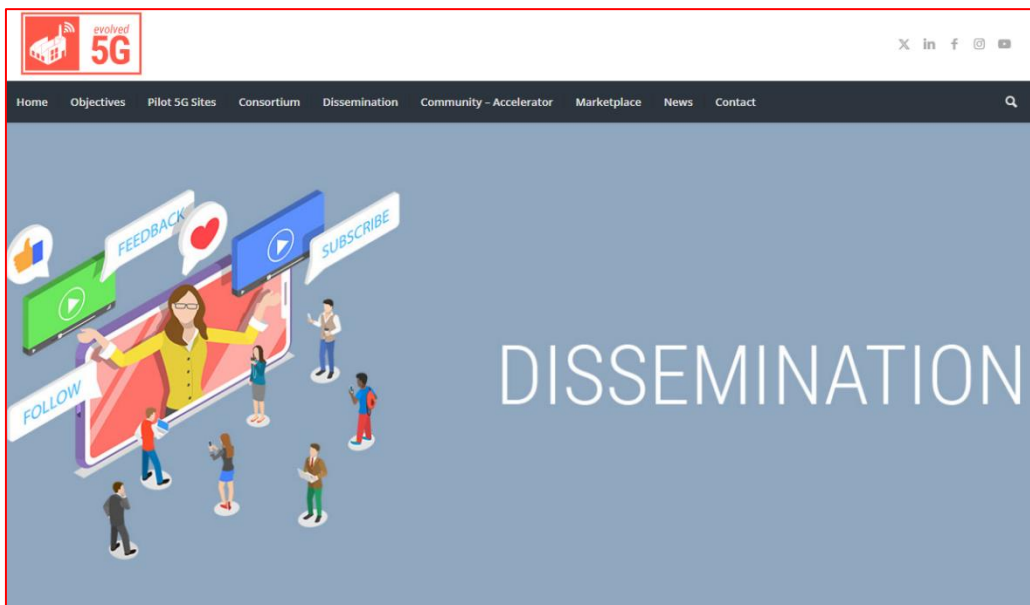


Figure 2: Dissemination Section

- **Community – Accelerator** (<https://evolved-5g.eu/community-accelerator/>)

Established in March 2022, this menu was designed for the purpose of documenting and overseeing activities linked to WP6 activities. WP6 is specifically dedicated to fostering the EVOLVED-5G Community, making it crucial to track and direct visitors to various platforms and channels where they can obtain further insights about the community. The Community-Accelerator menu is segmented into five distinct submenus to facilitate navigation and access to equivalent information.

- **Trainings** (<https://evolved-5g.eu/community-accelerator/trainings/>)

This page compiles the training activities organized by EVOLVED-5G, specifically tailored for developers. These activities have the form of workshops, webinars, seminars, demonstrations, and other synchronous events (Figure 3). The primary aim is to engage academic audiences, including students, researchers, and lecturers in higher-education institutions. The goal is to encourage them to participate in the development and validation of Network Applications within the context of 5G network. Details on the trainings are provided in the WP6 related deliverables.

Training Events of EVOLVED-5G Community			
EVENT	DATE / LOCATION	TITLE	LINK
1. Seminar: Testing & Optimizing 5G for Vertical Industry	2-4 February, 2022, Faculty of Electrical Engineering of University of Ljubljana, Slovenia	"Testing and optimizing 5G for industry verticals",	
2. Innovation Course: EVOLVED-5G Project	5-20 March, 2022, ValenciaPort Foundation, Valencia, Spain	Course addressing the digital transformation of port sector, showing the potential of 5G & EVOLVED-5G NetApps for the digital transformation of ports & port industries.	
3. 5G Programmability Training Workshop by EVOLVED-5G and the Computer Science department of Athens Metropolitan College	21 & 22 March 2022 Athens Metropolitan College (Hybrid)	"5G Programmability New Opportunities and Perspectives in the context of European Research Project EVOLVED-5G"	Link 1 Link 2
4. Development of 5G Applications Training Seminar at the Universitat Politècnica de València (or by EVOLVED-5G & Communications Department of the Polytechnical University of Valencia)	30 May 2022 Universitat Politècnica de València (Hybrid)	"5G Applications"	
5. NCSR Demokritos Summer School	12 July 2022 NCSR Demokritos Campus (Physical)	5G Networks: Programmability Training Panel	http://summerschool.demokritos.gr/
6. Seminar on Industry 4.0 Communications	22 November, 2022, Polytechnic University of Valencia, Spain	Full lecture devoted to a related EVOLVED-5G topic, Industry 4.0 communications & Introduction of the EVOLVED-5G project as an Industry 4.0 5G-related innovation initiative.	
7. Seminar on EVOLVED-5G Network Apps	26 January, 2023, Polytechnic University of Valencia Valencia Valencia	Lecture on EVOLVED-5G Network Apps, SDK & GitHub exploration	

Figure 3: Training Activities

- **Courses** (<https://evolved-5g.eu/community-accelerator/courses/>)

The EVOLVED-5G consortium, through UPVx platform, provides online courses that are available for on-demand access (Figure 4). These courses are strategically focused on enhancing the project's community-building efforts, with the aim of facilitating the broader adoption and

expansion of the EVOLVED-5G platform throughout the European Union. Details on the courses are provided in the WP6 related deliverables.

Courses			
COURSE	DESCRIPTION	AUTHORS	LINK
1) EVOLVED-5G Network Apps	Network App concept	NCSRD	Link
2) EVOLVED-5G Network App Development	Development of Network Apps: – Network App development process – Software tools for Network App development	NCSRD, ATOS, MAG, INF, UPV	Link
3) EVOLVED-5G Network App Verification	Verification of Network Apps	ATOS, UPV, TID, INTRA	Link
4) EVOLVED-5G Marketplace	Use of Network App Marketplace	MAG, NCSRD	Link
5) CAPIF	What is CAPIF and CAPIF API Services	FOGUS	Coming soon

Figure 4: Courses webpage

- **Forum** (<https://forum.evolved-5g.eu/>)

The forum provides assistance to individuals using the EVOLVED-5G Marketplace. Users have the opportunity to delve into forum discussions to gain insights into the process of creating a Network Applications or utilizing the existing ones, available in the marketplace (Figure 5). During the reporting period, the content of the Forum has been enriched a lot by all partners.










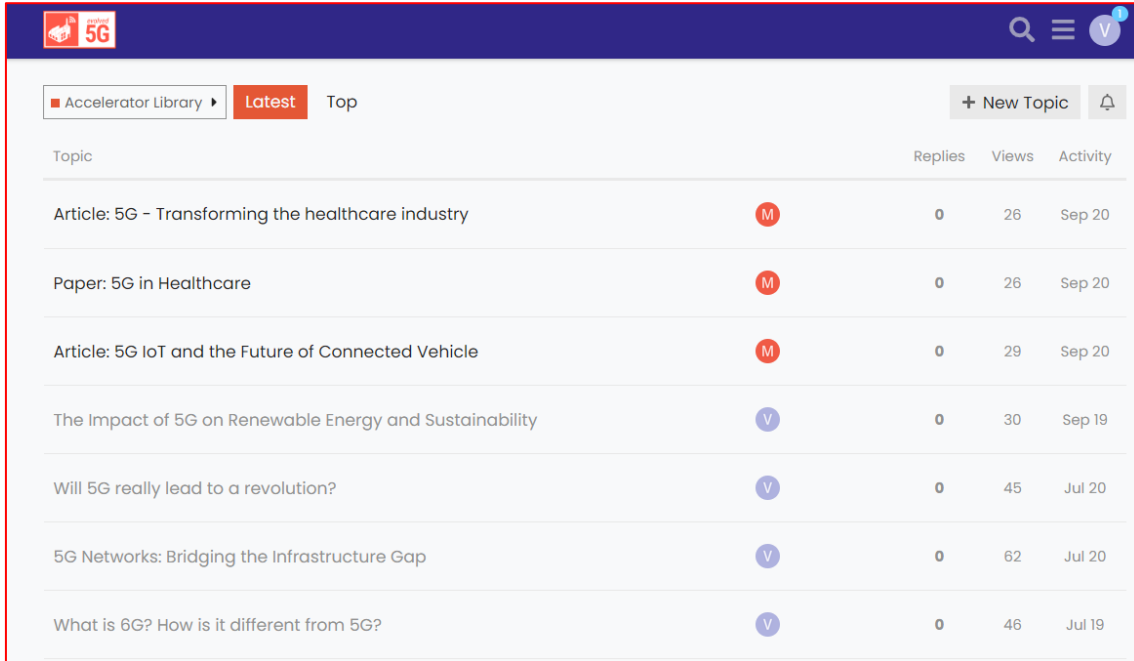
all categories ▾ Categories Latest Top		+ New Topic	
Category	Topics	Latest	
Network App Development Support Network App creators can use the forum to create topics about their network apps. Also use this category to post questions for specific network apps that exist in the Product Catalogue	17	 Network Apps Open Course ■ Training Courses from EVOLVED-5G project	0 5d
How to build a Network App This category contains information you will need, as a Network App creator, in order to start creating Network Applications in the Evolved5G platform.	6	 Network App Development Course ■ Training Courses from EVOLVED-5G project	0 5d
Training Courses from EVOLVED-5G proj... This space shows relevant information regarding the EVOLVED-5G Online Training Courses, devoted to different technical topics such as Network App development, validation and certification, or the use of the EVOLVED-5G Network App Marketplace.	6	 Network App Verification Course ■ Training Courses from EVOLVED-5G project	0 5d
EVOLVED-5G Ecosystem This category addresses topics related to the EVOLVED-5G vision regarding Network Apps, the EVOLVED-5G framework and the EVOLVED-5G Network App Ecosystem.	2	 Course on the use of the EVOLVED-5G Network App Marketplace ■ Training Courses from EVOLVED-5G project	0 5d
Accelerator Library Explore this category Educational material related with https://evolved-5g.eu/community-accelerator/	59	 Course for Network App Validation ■ Training Courses from EVOLVED-5G project	0 5d
Support for Purchased Network App	0	 Network App Certification course ■ Training Courses from EVOLVED-5G project	0 17d
Uncategorized Topics that don't need a category, or don't fit into any other existing category.	3	 Pip3 install evolved5g installs 1.0.7 instead of latest (1.1.0) ■ Network App Development Support	3 Sep 26
		 Article: 5G - Transforming the healthcare industry ■ Accelerator Library	0 Sep 20
		 Paper: 5G in Healthcare ■ Accelerator Library	0 Sep 20

Figure 5: EVOLVED-5G's Forum

- **Accelerator Library** (<https://forum.evolved-5g.eu/c/library/>)

The library serves as a resource where any interested stakeholder can access a variety of materials provided by the EVOLVED-5G partners (Figure 6). These materials offer guidance and information related to Network Applications. It is important to mention that the material

uploaded to the library is not only referred to the project but some of them have general content on the topics addressed by EVOLVED-5G. During the reporting period, multiple resources and content have been uploaded to the Accelerator Library.



Topic	Replies	Views	Activity
Article: 5G - Transforming the healthcare industry	0	26	Sep 20
Paper: 5G in Healthcare	0	26	Sep 20
Article: 5G IoT and the Future of Connected Vehicle	0	29	Sep 20
The Impact of 5G on Renewable Energy and Sustainability	0	30	Sep 19
Will 5G really lead to a revolution?	0	45	Jul 20
5G Networks: Bridging the Infrastructure Gap	0	62	Jul 20
What is 6G? How is it different from 5G?	0	46	Jul 19

Figure 6: Accelerator's Library

- **GitHub** (<https://github.com/evolved-5g>) and **WIKI** (<https://wiki.evolved-5g.eu/>)

GitHub, Inc. is a prominent internet hosting provider known for its focus on Git-based software development and version control (Figure 7). In the EVOLVED-5G GitHub repository, developers can easily locate comprehensive information regarding Network Applications and the coding attributes specific to EVOLVED-5G.

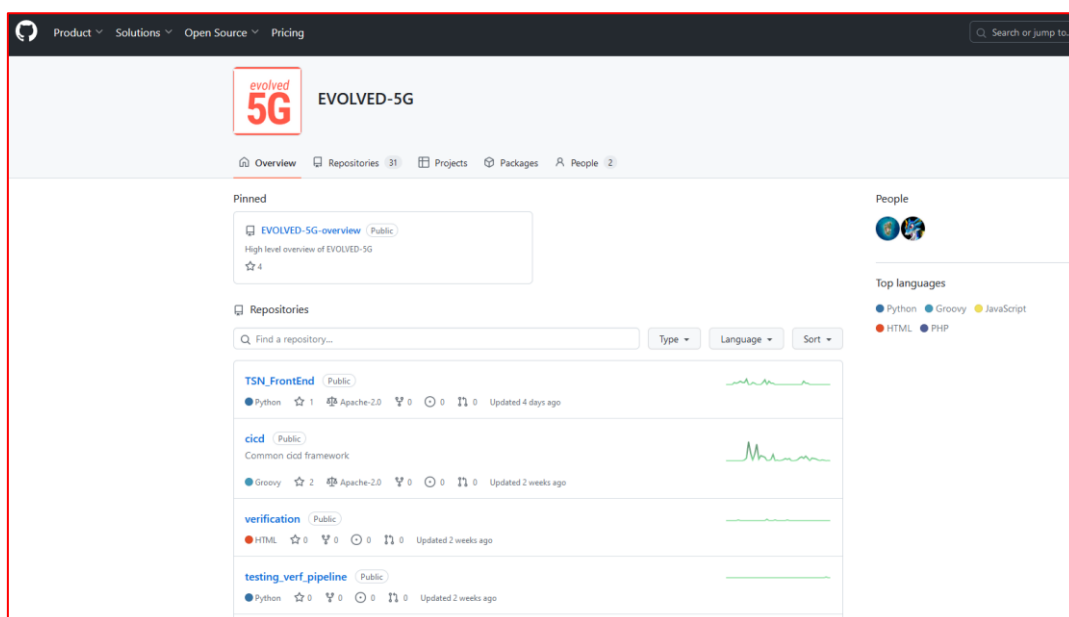


Figure 7: EVOLVED-5G GitHub Repository

WIKI is also located under Community-Accelerator menu and provides access to EVOLVED-5G WIKI the official centralized source of documentation of the EVOLVED-5G project (Figure 8).

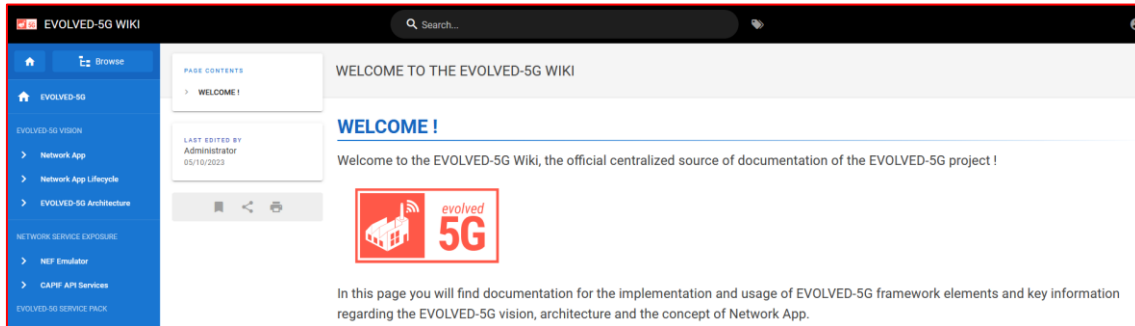


Figure 8: EVOLVED-5G WIKI

- **Marketplace** (<https://marketplace.evolved-5g.eu/>)

The marketplace menu was introduced on the EVOLVED-5G website immediately following the official launch of the EVOLVED-5G Accelerator Program. This menu essentially functions as a hyperlink, seamlessly directing visitors to the EVOLVED-5G marketplace which is constantly updated (Figure 9).

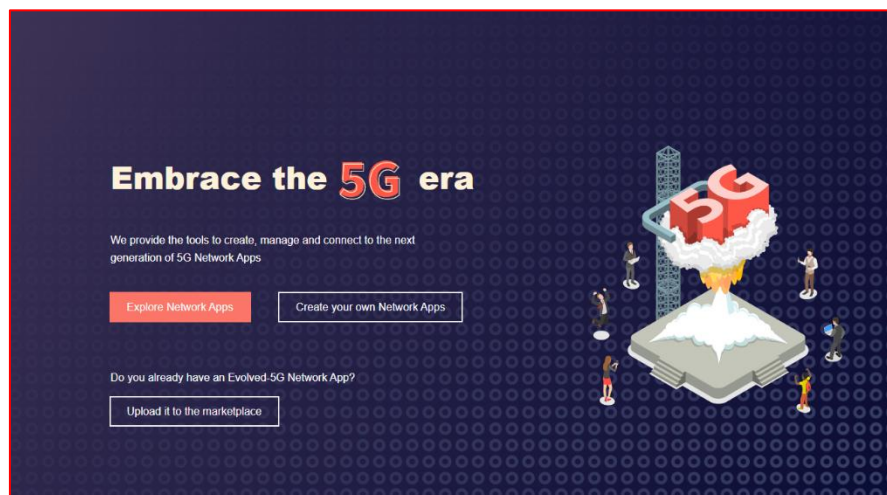


Figure 9: EVOLVED-5G Marketplace

- **News** (<https://evolved-5g.eu/news/>)

The news section of the EVOLVED-5G website is the most frequently updated page. At least on a weekly basis, concise descriptions along with hyperlinks are added to this page, highlighting all the dissemination activities, news, trials, and other materials aimed at generating impact for the EVOLVED-5G project and the broader 5G ecosystem, including associations like 5G-PPP and other 5G projects (Figure 10). This approach allows users to gain a rapid overview of the project's activities and access more in-depth information through online news articles.



Figure 10: EVOLVED-5G news webpage

2.1.2 EVOLVED-5G Social Media Channels & Statistical Dashboards

Utilizing various social media platforms, in conjunction with the project website, plays a significant role in facilitating the communication of EVOLVED-5G's activities and raising awareness among a broader audience. The project's active presence across a multitude of social media channels allows for increased visibility among diverse demographics, all in a cost-effective and efficient manner. This expanded outreach not only enhances the project's reach but also intensifies its influence. Specifically, the following social media channels were created and ran since early January of 2021: X (Twitter), LinkedIn, Facebook, Instagram, and YouTube. The links of all the EVOLVED-5G social media channels are provided below (Table 1).

Table 1: EVOLVED-5G Social Media Channels

X (formerly Twitter)	https://twitter.com/evolved5g
LinkedIn	https://www.linkedin.com/in/evolved-5g-project/
Facebook	https://www.facebook.com/evolved-5g
Instagram	https://www.instagram.com/evolved5g/
YouTube	https://www.youtube.com/@evolved-5gproject/videos

EVOLVED-5G project utilizes different social media channels in order to address different target audiences and gain the maximum visibility. A short description of each EVOLVED-5G social media channel follows.

- **X (Twitter): @EVOLVED5G** (<https://twitter.com/evolved5g>)

X (formerly Twitter) remains one of the most impactful social media platforms in the world, despite the recent changes in ownership/name/logo/policies, and it is used to promote

EVOLVED-5G material to the general public while also boosting its worldwide reach and influence in various technical and non-technical fields.



Figure 11: EVOLVED-5G Twitter account

- LinkedIn: @EVOLVED-5G-project (<https://www.linkedin.com/in/evolved-5g-project/>)

LinkedIn is widely regarded as the world's largest professional and business networking platform. It's a dynamic social network that allows the consortium to adequately communicate the project's accomplishments and impact to key businesses and professionals.



Figure 12: EVOLVED-5G LinkedIn account

- Facebook: @EVOLVED-5G (<https://www.facebook.com/evolved-5g>)

Facebook is one of the most widely used social media platforms among the general public, as well as the strongest media choice for expanding a project's social media presence and reaching a broad audience of general interest. Because of its popularity, this platform has a good chance

of facilitating successful interaction between stakeholders and the EVOLVED-5G Project using a less technical approach and content exchange.

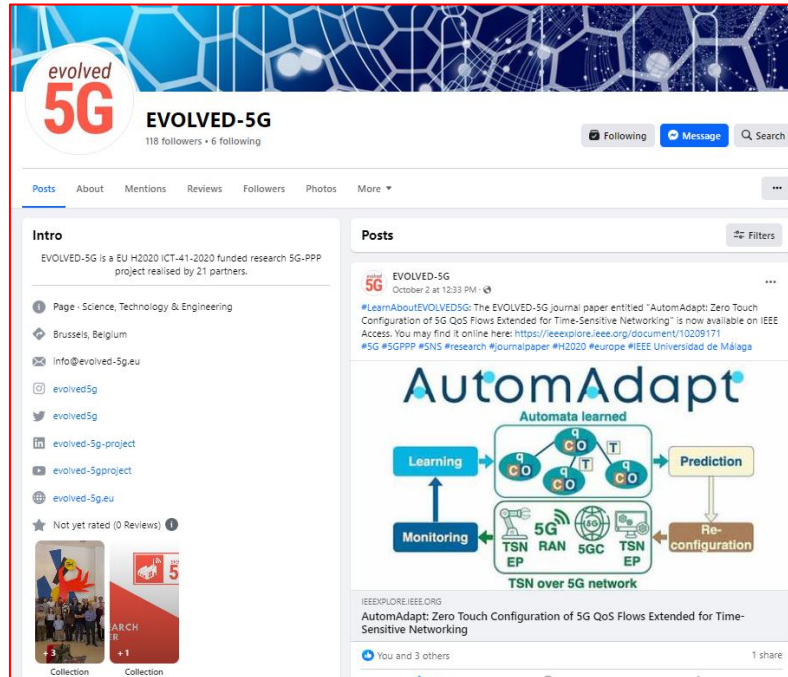


Figure 13: EVOLVED-5G Facebook account

- Instagram: @EVOLVED-5G (<https://www.instagram.com/evolved5g/>)

Instagram is the most popular social networking site for posting photos and videos. The EVOLVED-5G can reach new audiences and improve its visual distribution and communication impact by sharing photographs of the project's work and achievements, as well as other important material.

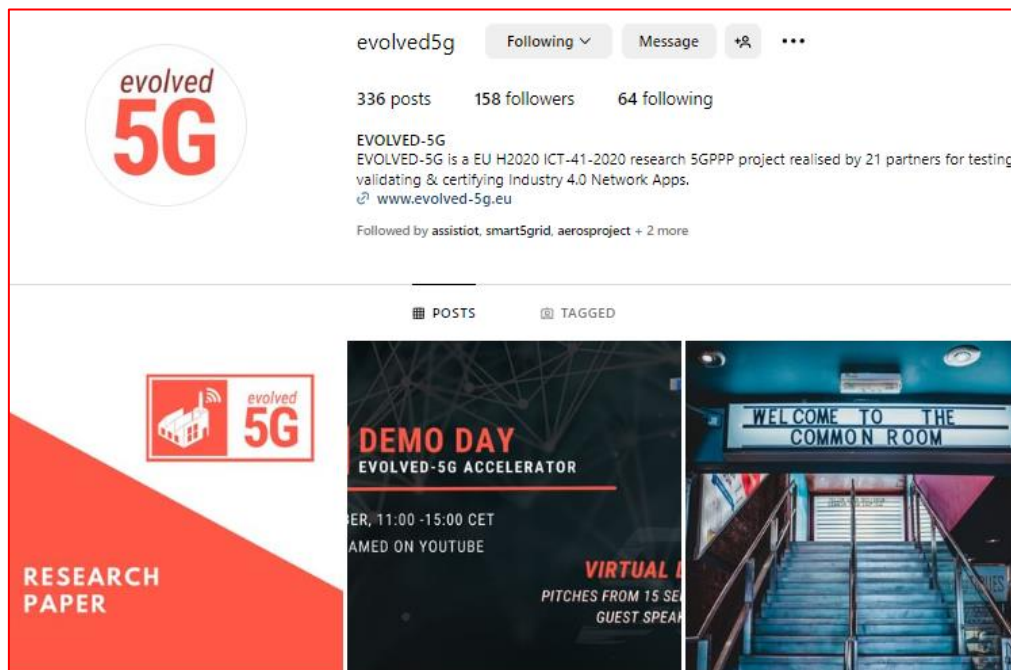


Figure 14: EVOLVED-5G Instagram Account

2.1.3 EVOLVED-5G Newsletter

The Newsletter serves as a crucial communication tool, disseminating recent news, updates, and achievements of the EVOLVED-5G project regularly. Its primary aim is to keep the community informed, engaged, and enhance awareness and credibility for the project. Published quarterly, the first issue of the EVOLVED-5G newsletter appeared in the initial project quarter (January-March 2021). 6 issues planned for each reporting period (12 in total). The latest issue, Newsletter #11, covers the period of July – September 2023. The final issue of the EVOLVED-5G newsletter (Issue 12) is under editing during this deliverable conclusion. All previous newsletter editions, along with dedicated links, are accessible for download on the EVOLVED-5G website's Newsletter page at <https://evolved-5g.eu/dissemination/newsletter/> and in Table 2 below.

Table 2: EVOLVED-5G Newsletter Issues

Newsletter Issue	Link
#1 January-March 2021	https://evolved-5g.eu/wp-content/uploads/2021/04/evolved-5g-Newsletter-Issue-1.pdf
#2 April-June 2021	https://evolved-5g.eu/wp-content/uploads/2021/07/evolved-5g-Newsletter-Issue-2.pdf
#3 July-September 2021	https://evolved-5g.eu/wp-content/uploads/2021/10/evolved-5g-Newsletter-Issue-3.pdf
#4 October-December 2021	https://evolved-5g.eu/wp-content/uploads/2022/01/evolved-5g-Newsletter-Issue-4.pdf
#5 January-March 2022	https://evolved-5g.eu/wp-content/uploads/2022/04/evolved-5g-Newsletter-Issue-5.pdf
#6 April – June 2022	https://evolved-5g.eu/wp-content/uploads/2022/06/evolved-5g-Newsletter-Issue-6.pdf
#7 July – September 2022	https://evolved-5g.eu/wp-content/uploads/2022/10/evolved-5g-Newsletter-Issue-7.pdf
#8 October – December 2022	https://evolved-5g.eu/wp-content/uploads/2023/01/evolved-5g-Newsletter-Issue-8.pdf
#9 January – March 2023	https://evolved-5g.eu/wp-content/uploads/2023/04/evolved-5g-Newsletter-Issue-9.pdf
#10 April – June 2023	https://evolved-5g.eu/wp-content/uploads/2023/07/evolved-5g-Newsletter-Issue-10_Final.pdf
#11 July – September 2023	https://evolved-5g.eu/wp-content/uploads/2023/10/evolved-5g-Newsletter-Issue-11.pdf
#12 October – December 2023	<i>Under final editing when this deliverable was submitted</i>

2.1.4 EVOLVED-5G Press Releases

EVOLVED-5G press release is an essential and formal means of communication that publicizes key project news when it is required, and aids in reaching a wider audience through the press, as well as attracting traffic to the website and social media. All the press releases related to the EVOLVED-5G are available in the project's website here: <https://evolved-5g.eu/dissemination/press-releases/>

2.1.5 Other Means and Channels

2.1.5.1 Leaflets

In addition to other communication methods, the partners of the EVOLVED-5G project have developed a specialized leaflet for further outreach. This project-specific leaflet offers a concise yet comprehensive overview of the project's goals and objectives, making it an engaging resource for readers. The two-folded leaflet can be either printed or used digitally, serving various dissemination needs of the project. On the first side, you'll find the project's logo, title, website URL, and a QR-Code for easy access. The second side includes a brief introduction to the EVOLVED-5G partners, relevant contact information, and links to the project's social media profiles (Figure 15). You can access these leaflets at the following link (at the bottom of the webpage): <https://evolved-5g.eu/dissemination/>.

PARTNERS

EVOLVED-5G consortium brings together 21 partners, i.e. 3 research and academic institutions, 11 SMEs, 6 industrial partners, and 1 entrepreneurship accelerator, from 11 countries. The project is led by Telefonica I+D



INFORMATION AND CONTACT

Communication: info@evolved-5g.eu evolved-5g.eu

Call: H2020-ICT-2018-2020
Topic: ICT-41-2020
Type of Action: Innovation Action
Duration: 36 months
Start date: 1 January 2021

Follow @evolved5g in     



Experimentation and Validation Openness for Long-term evolution of Vertical industries in 5G era and beyond

evolved-5g.eu



Project funded by the European Union's Horizon 2020 research and innovation programme under grant agreement No 101016608
This project is part of the 5G Public and Private Partnership



MOTIVATION

The intense research work on 5G experimentation in Europe has reached the point where the evolved 5G capabilities, provided through the Service-Based Architecture (SBA), are to be exploited by third party innovators. Key enabler for this openness is the realization of network programmability through standard APIs. An endeavor that is expected to shape a new and dynamic ecosystem in mobile networks from both the technology and monitoring perspectives. Indeed, SBA allows the exposure of network services and capabilities through the Network Exposure Function, a border function of the 5G core network. Already, 5GPPP has specified the procedures and the information flows for a common API framework to address applicability, duplication and inconsistency aspects of the 5G northbound service APIs.

In this context, vertical industries will be able to develop NetApps, i.e., to compose services by consuming 5GPPP APIs as well as other telco assets. For example, a NetApp could consume APIs that provide monitoring events and network slice configuration analysis to compose a service that guarantees quality of experience for latency-sensitive applications.

EVOLVED-5G embraces the potential of the emerging NetApp ecosystem under a twofold scope:

- Build an open experimentation facility for NetApp creation, validation, and certification, and
- Provide the means and the tools for long-term evolution of 5G-enabled vertical industries.

EVOLVED-5G will focus on Factory of the Future (FoF) applications, validated in 5G pilot sites to showcase the developed NetApps. The project shall also release a portable set up on-site (real factories) demonstrations.



Abstract representation of the EVOLVED-5G approach

PILOT 5G SITES

EVOLVED-5G proposal is built on top of two 5G-PPP ICT-17 experimentation infrastructures in Athens and Malaga, which have been developed in the framework of SCENARIOS Project. Both facilities are composed of distributed components and are equipped with 5G-PPP 5G-NR infrastructure in bundle with a set of automation tools to support the experimentation by vertical users across multiple domains.

- The Athens platform will be implemented on the Athens 5Glink (www.athens5glink.eu) testbed. The testbed is going to be extended to offer the telecommunication ecosystem an E2E experimental 5G platform, showcasing features of next generation networks, with particular focus on software network technologies (NFV/SDN) and edge computing for small cell infrastructures.
- The Malaga platform aims the validation of selected 5G KPIs in indoor and outdoor 5G scenarios. The platform integrates 5G with other access technologies (4G, WFI, fiber, etc.) with great automation capabilities to execute experiments both unattended and with real users.

NETAPPS & FACTORY OF FUTURE APPS

EVOLVED-5G framework is expected to lead to solutions in the following areas:

 Mixed Reality assisted manufacturing	 Intelligent-driven chatbots for precise maintenance
 Haptic-driven console for industrial Surface repairing	 IoT/MQNN-based remote monitoring platform
 AI-based video analyzer for industrial and robotics	 ML-driven anomaly detection system for industrial processes
 Blockchain data brokerage engine	 Security information and event management system
 AI-driven humanoid robot	 L7-aware whitebox switch with dynamic SFC & TSN support
 AI-driven logistics robotic fleets	

Figure 15: EVOLVED-5G leaflet

2.1.5.2 Posters

The EVOLVED-5G project partners have also created a dedicated EVOLVED-5G Poster to support their communication and dissemination efforts across various activities such as workshops, booths, presentations, webinars, seminars, trainings, and trials. This poster has been thoughtfully designed to convey the project's core concepts concisely and comprehensively, aiming to effectively communicate the project's main ideas, raise awareness, and boost engagement. It provides concise information about the project's structure, objectives, and Network Applications (Figure 16). You can choose to either print this poster in A1 size or utilize it digitally or its rollup version. You can access the latest poster version through the following link as poster size A1 <https://evolved-5g.eu/wp-content/uploads/2021/03/evolved-5g-POSTER-final-A1.pdf> or as a rollup <https://evolved-5g.eu/wp-content/uploads/2023/06/evolved-5g-roll-up.pdf>

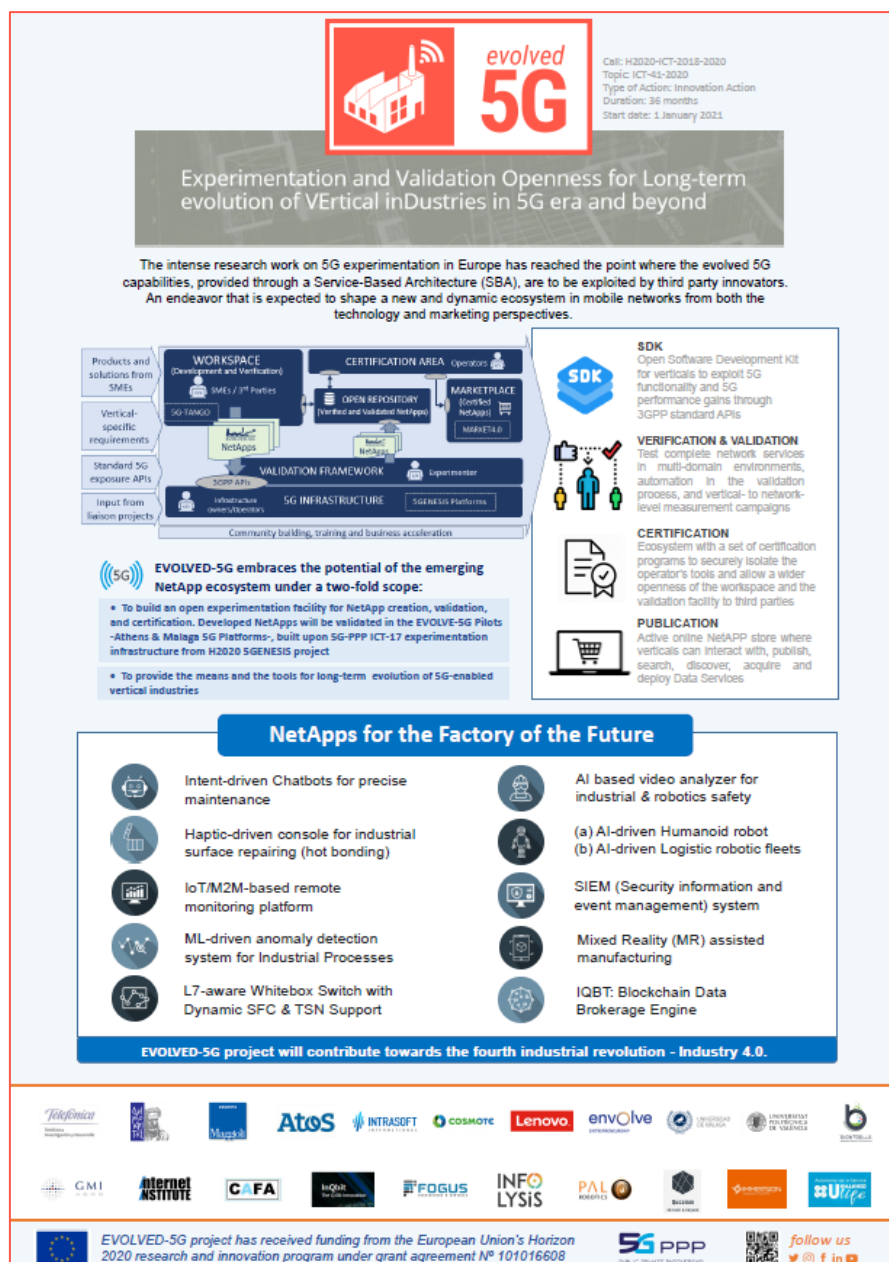


Figure 16: EVOLVED-5G poster

2.2 MEANS OF DISSEMINATION

2.2.1 Publications in journals

One of the keyways to disseminate scientific discoveries effectively is by sharing them in prominent community journals that have a broad readership. By publishing in the appropriate journals, the EVOLVED-5G project has been able to enhance its visibility among other 5G initiatives, thereby gaining recognition within the scientific and academic community. Additionally, this made the project's findings easily accessible to well-established distribution networks like libraries, institutions, and organizations. You can access all the publications related to the EVOLVED-5G project at this link: <https://evolved-5g.eu/dissemination/publications/>.

2.2.2 Publications in workshops, conferences and white papers

Partners possessing expertise in research and academia were anticipated to demonstrate their scientific competence by presenting their work at prestigious international conferences and publishing a substantial volume of papers in journals, acknowledging the contribution of the EVOLVED-5G project. You can access the list of publications in workshops and conferences at the following link: <https://evolved-5g.eu/dissemination/publications/>.

EVOLVED-5G contributions have been coordinated, published, and presented at prominent international conferences, as well as peer-reviewed publications and magazines. Up to now, EVOLVED-5G project has in total 18 publications in Journals, conferences, and white papers. For more information you may refer to Section 2.4.2.1.

2.2.3 Active participation in 5G-PPP activities

The partners involved in EVOLVED-5G have been fully informed about the contractual obligations of the 5G-PPP, as well as the organizational framework detailed in the GA and technical annex. They acknowledge the roles and commitments of key entities such as the European Commission, the 5G-PPP/SNS Partnership Board, the 5G Infrastructure Association, and the 5G for Europe initiative. Furthermore, all project partners have been committed to engage with these organizations actively and constructively as an integral part of their efforts within EVOLVED-5G. More details are available in Section 3 of this deliverable.

2.2.4 General Publications in Magazines, Books, Newspapers, Websites

Consortium members actively participated in various communities, such as 3GPP and 5GPPP, which regularly release articles, books, papers, and several presentations. These publications offered partners the opportunity to showcase and publish their work achieved within the EVOLVED-5G project.

You may also check section 2.4.2.2 for all the 5G-PPP papers with EVOLVED-5G contributions.

2.2.5 Presentations in scientific events, conferences and forums

Delivering presentations at scientific events and forums has served as a valuable entry-point for receiving feedback from the specific research and industrial communities targeted by the project. Additionally, it enhanced the project's credibility. You can find all the EVOLVED-5G presentations conducted by consortium members at this location: <https://evolved-5g.eu/dissemination/workshops-presentations-and-trials/>.

During the reporting period, the project has accomplished a total of 48 presentations in the context of EVOLVED-5G. (More information in section 2.4.2.3)

2.2.6 Pre-trials, Trials and Demos

The trials and showcases organized by EVOLVED-5G partners play a crucial role in drawing the interest of potential users and consumers, collecting valuable feedback, and fostering interaction between researchers and the market. Details on the trials carried out as part of the EVOLVED-5G project are available in the corresponding WP4 and WP5 deliverables and also summarized at: <https://evolved-5g.eu/dissemination/workshops-presentations-and-trials/>.

2.2.7 Organization of events (workshops/seminars/webinars)

Workshops, seminars, and webinars hold significant importance in guiding various stakeholders through the project's Use Cases and findings. They also offer essential training on using the EVOLVED-5G platforms and accessing the Network Applications Repository. You can find information about all the events organized or co-organized by the project at this link: <https://evolved-5g.eu/dissemination/workshops-presentations-and-trials/>.

During the reporting period, the project has accomplished a total of 15 organised/co-organised events (note details on Sections 2.4.2.4)

2.2.8 Exhibitions in industrial and scientific events

A significant priority for EVOLVED-5G has been to present the project to a broader community, which encompasses professionals from diverse sectors, including industry, SMEs, academia, and those with technical interest. This goal has been accomplished through active participation in significant industrial and scientific events. By engaging with telecom operators, technology providers, content providers, service providers, energy providers, and manufacturers across different verticals, EVOLVED-5G enhanced its visibility and enlarged the opportunity to showcase its achievements. This involved demonstrating project outcomes and evaluating the EVOLVED-5G Use Cases. More information about related material during the reporting period on sections 2.2.9 and 2.2.7.

2.2.9 Highlight Dissemination Event: EuCNC & 6G Summit 2023

EVOLVED-5G project applied for a “booth exhibition and demonstration proposal” at the EUCNC & 6G summit that took place in Gothenburg (Sweden) on 06-09 June 2023. The application was granted by EUCNC organizers and Several representatives from the EVOLVED-5G team supported the booth, including the project coordinator, the technical manager deputy, platform and work-package leaders. The full list of representatives is detailed below:

- Mr. Javier Garcia Rodrigo – Project Coordinator (Telefónica Investigación Y Desarrollo S.A.U)
- Mr. David Artuñedo Guillén – WP5 leader (Telefónica Investigación Y Desarrollo S.A.U)
- Mr. Jorge Moratinos Salcines – T5.3 leader (Telefónica Investigación Y Desarrollo S.A.U)
- Dr. Dimitris Tsolkas – Technical Manager Deputy (Fogus Innovation and Services)
- Mr. George Makropoulos – WP4 leader and representative of the Athens Platform (NCSR “Demokritos”)
- Mr. Vasilis Mavrikakis – Communication and Dissemination T7.1 leader (INFOLYSIS)
- Prof. Pedro Merino – Málaga Platform leader (Universidad de Málaga)
- Dr. Apostolis Salkintzis – T7.3 leader and Standardization Manager (Lenovo)
- Mr. Janez Sterle – ININ’s network app leader (Internet Institute)



Figure 17: EuCNC 2023 EVOLVED-5G's team

The goal of the proposed exhibition was threefold:

- **Demonstration of the EVOLVED-5G implementation on network core openness.** The objective was to showcase for the very first time and in a vertical-familiar way how information and capabilities of core network functions (e.g., the NEF and TSN) are exposed through the implementation of standardized API managers (such as the 3GPP APIs Framework - CAPIF) and exploited by verticals through the implementation of network applications.
- **Demonstration of EVOLVED-5G programmability features offered to the network applications ecosystem.** The objective was to convey through a live demonstration the capabilities of the DevOps approach and CI/CD framework of the EVOLVED-5G facility.
- **Demonstration of performance improvements that openness brings to an Industry 4.0 application.** The objective was to showcase how a robot control application can use information from the core network, through a network app, and provide context awareness operation.

For the realization of the above objectives, two demonstration activities were orchestrated around the following phases:

- **Elucidation of the full lifecycle of network applications.** During this phase, the orchestration of the EVOLVED-5G facility via the CI/CD framework along with the four main phases of the Network Applications lifecycle (verification, validation, certification, and publication) were demonstrated, through live executions of the CI/CD framework, designed and conceived by the EVOLVED-5G project. The audience witnessed how network applications (i) were able to secure access to the network through NEF and CAPIF southbound interaction, (ii) retrieve network quality conditions through access to the QoS NEF API, and (iii) determine if QoS is guaranteed or not.

- **Performance enhancement of Industrial robot controller with a network application.**
During this phase, it was showcased how the exchange of QoS information from the network core to a haptic device enabled a context aware teleoperation movement from PAL Robotics' TiAGO robot controller. The audience witnessed through a real-life example the benefits that network core openness could provide to verticals.

In addition to the demonstrations, other activities such as papers, presentations, panel discussions also took place, accompanied by plenty of EVOLVED-5G communication material (leaflets, posters, stickers, videos). Captions and pictures from the three days in which the exhibition took place are shown in Figure 18: EuCNC Interaction.



Figure 18: EuCNC Interaction

2.3 MEANS OF MONITORING AND CONTROL ACTIVITIES

2.3.1 Collaborative and file sharing Platform

As reported in the previous versions of this deliverable, members of the EVOLVED-5G WP7 have implemented various monitoring methods as part of T7.1 to constantly assess and gauge the success of EVOLVED-5G communication initiatives throughout the project's duration. These methods have been crucial for maintaining the project's objectives and goals without deviating from them. Moreover, these tools guaranteed the seamless collaboration of consortium members. The subsequent sections delve into greater detail about these mechanisms.

2.3.2 MS-Teams Online Platform

Similarly, the Microsoft Teams platform continued to be the primary file sharing/collaboration tool, which played a crucial role in enabling effective collaboration and alignment among consortium members. Specifically, the Microsoft Teams platform has been structured into sub-sections (folders and sub-folders) to facilitate the organization and distribution of project

materials among consortium members. Each of these sub-sections has been designated for a particular Work Package and Task, and partners consistently update them. Additionally, it offers the capability to edit files online, which is extremely valuable for documenting communication and dissemination activities. A comprehensive guide to the MS Teams platform can be found in the "[D7.1 Dissemination, Communication, and 5G-PPP Engagement Plan](#)," where it has been thoroughly analyzed.

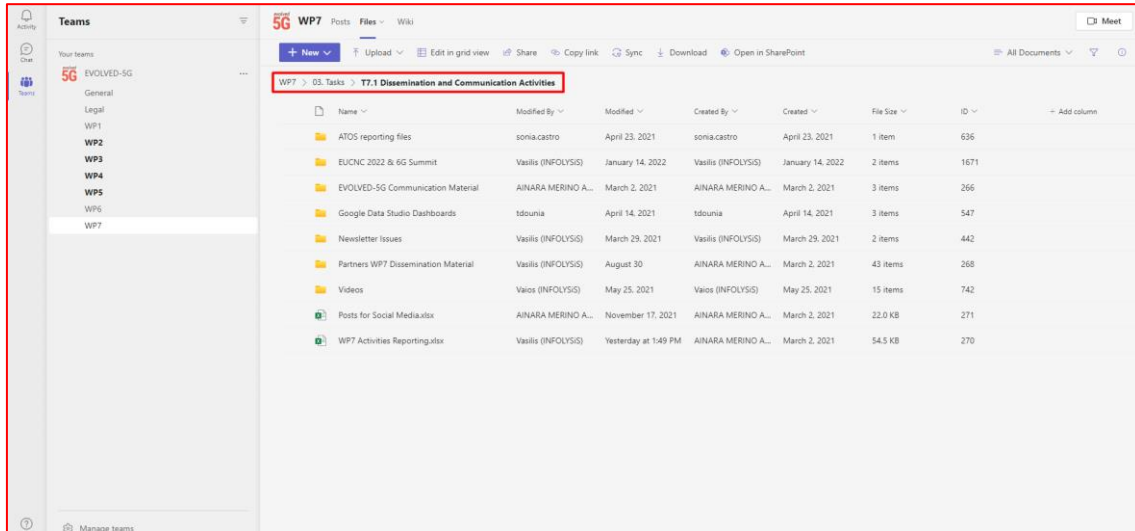


Figure 19: EVOLVED-5G MS Teams environment

2.3.3 WP7 telcos

The WP7 telcos served as an extra method for tracking the status and advancements of the work package. In this work package, meetings are conducted on a monthly basis using MS-Teams, scheduled for the first Thursday of each month. During these meetings, there is a dedicated time slot for each task to present and report its progress, as well as address any issues associated with the tasks. Moreover, as part of T7.1, all partners receive information regarding upcoming opportunities/events for dissemination.

2.3.4 GA Meetings

The General Assembly (GA) meetings serve as the primary platform for convening all project partners to discuss project-related matters at a comprehensive level. These gatherings involve the participation of all partners, allowing for in-depth discussions regarding project progress and pertinent issues. During the reporting period, in total 6 GA meetings were organized where WP7 activities were presented and discussed in detail with all partner.

Table 3: EVOLVED-5G Plenary Meetings – Period 2

Meeting	Dates	Type
6 th GA plenary	27-29/9/2022	Physical
7 th GA plenary	13-15/12/2022	Physical
8 th GA plenary	15-16/3/2023	Physical
9 th GA plenary	20-21/6/2023	Physical
10 th GA plenary	20-21/9/2023	Physical
11 th GA plenary	23/11/2023	Virtual

2.3.5 Mailing lists

As reported in the previous versions of this deliverable, one additional means that helps partners to communicate and coordinate the project, is the mailing lists. Mailing lists were created by the coordination team and each work package has its own. Many of them were updated and further extended with more dedicated mailing lists during the reporting period.

2.4 PERIOD EVALUATION, STATISTICS, AND IMPACT

2.4.1 Period Summary of Communication Achievements and Statistics

The Table 4 summarizes all the communication activities and material of the second reporting period (M19-M36).

Please note that all quantitative data and statistics provided in this section are mainly up to M34 since this deliverable was under finalization process during final months (M35 and M36, and statistics could not be processed for running months). The full period statistics up to M36 will be presented during the final project review in March 2024.

Table 4: Communication Achievements (M19-M34)

Activity	M19-M34 Achievements
Communication channels used	1 website 5 Social Media Channels
Total Number of News posted in Website (News webpage)	>79 news posted on the website
Total Dissemination Activities communicated through the EVOLVED-5G Website	>60 Dissemination activities
Total website visitors	630 visitors
Total website hits	4,435 hits
Total website sessions	2,194 sessions
Total Number of Posts in Social Media channels	748 Posts (LinkedIn:189, X:213, Facebook:175, Instagram: 171)
Total Number of Followers in Social Media channels	532 Followers (LinkedIn:263, X:211, Facebook: 23, Instagram:35)
YouTube channel	14 Videos and 3 playlists
YouTube subscribers	25 subscribers
YouTube views	911 views
Newsletter issues published	5 (&1 under editing)

Leaflets	Leaflet (A4 two-fold) updated several times 500 printed
Posters	Poster (A1) updated several times 2 printed
Stickers	300 stickers
Online Articles, Book Chapters and Press releases	13 articles, 6 press releases, 2 book chapters

In this section, the analysis and presentation of the website and social media statistics from the M19-M34 period have been processed and presented in the form of statistical dashboards per channel (more details on the use and creation of the quarterly EVOLVED-5G statistical dashboards are provided in [D7.1](#)).

- **Website Dashboards and Statistics**

(<https://lookerstudio.google.com/u/0/reporting/8d000e95-ef7f-43ef-92cc-b740d925d73a/page/pmtsB>)

Figure 20 and Figure 21 depict the dashboards of the website. The website dashboard is divided into two distinct sections. The first section comprises of one infographic displaying the total count of new users in comparison with the total ones. Also here, readers can access information regarding the number of sessions (2.194), the engagement rate (64.59%), views (4.435), and the average engagement duration (2 min 54 sec). The second section of the website's dashboard provides stakeholders with details on visitor acquisition, demographic data, and information about the devices used to access the project's website. For instance, a majority of visitors (77.3%) accessed the website directly, and Greece stands out as the country with the highest number of visitors. Notably, desktops emerged as the most popular device, followed by mobile phones and tablets.

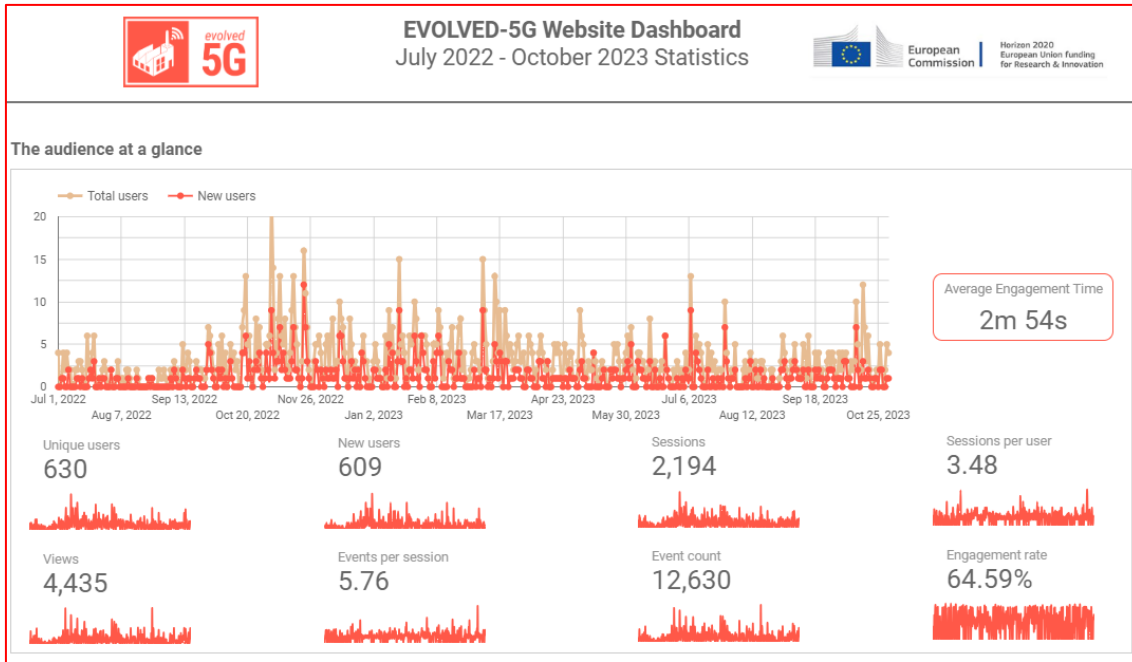


Figure 20: Website Dashboard for M19-M34 (A)

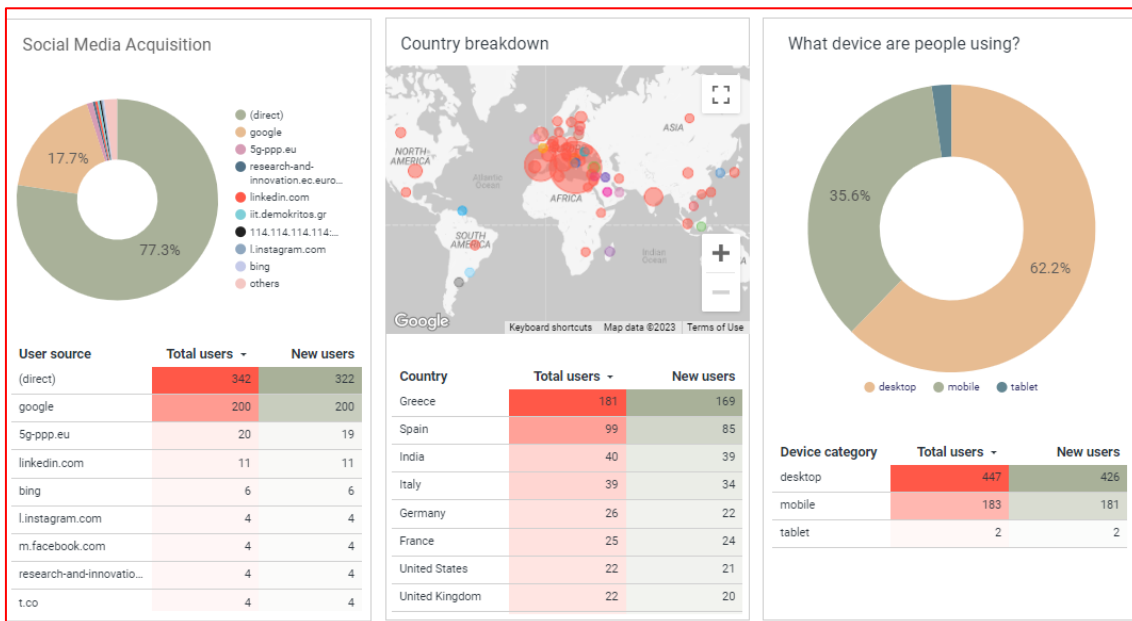


Figure 21: Website Dashboard for M19-M34 (B)

- **LinkedIn Dashboard and Statistics**
(<https://lookerstudio.google.com/u/0/reporting/d927ca3f-8c54-49ea-b558-e21332a9a14d/page/1SSqB>)

Figure 22 displays the statistics for EVOLVED-5G on LinkedIn, showcasing views per post/date activity and a dropdown list containing all posts during the given period. The statistics indicate that throughout this recorded period, there were 189 posts made, accumulating 3,841 likes and 96,418 post views.

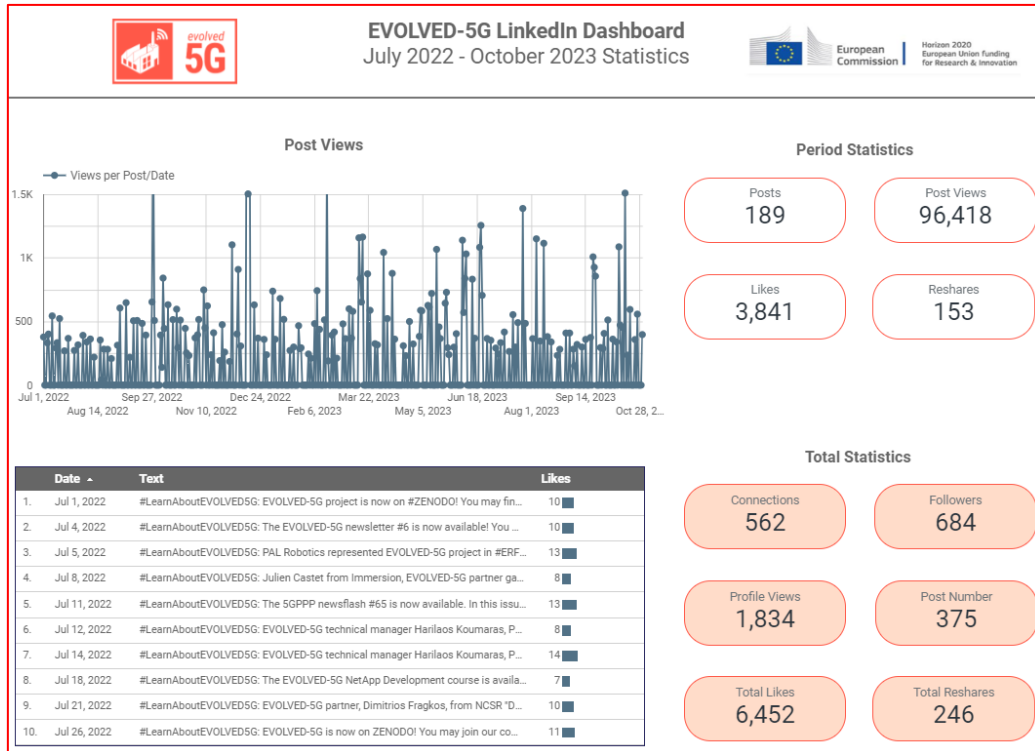


Figure 22: LinkedIn Dashboard for M19-M34 period

Figure 23 and Figure 24 illustrate both the cumulative followers and the monthly post number trends from July 2022 to October 2023.

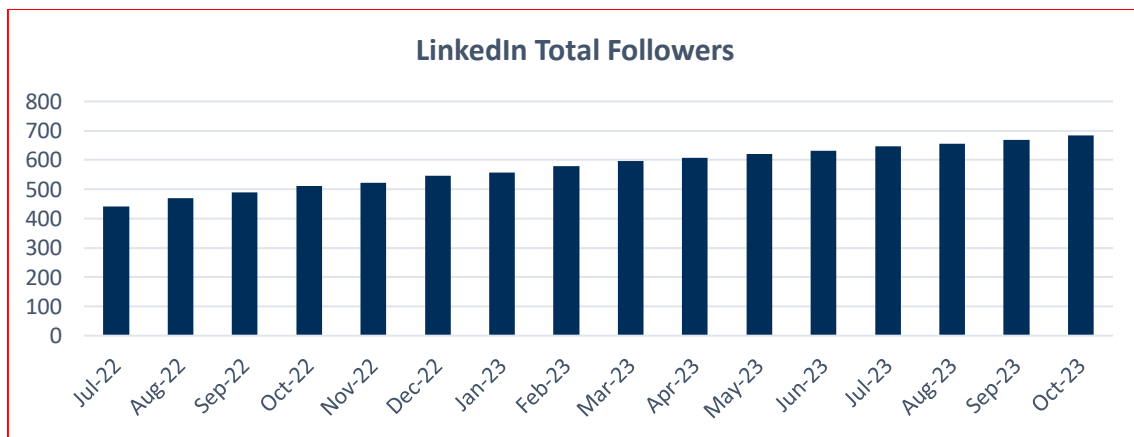


Figure 23: LinkedIn Total Followers

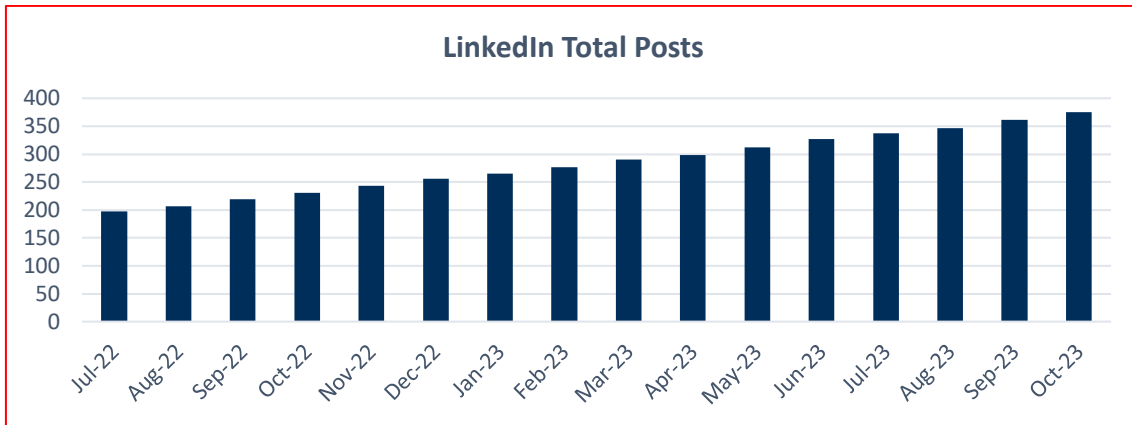


Figure 24: LinkedIn Total Posts

Specifically, concerning followers' graph, there's a consistent upward trend with occasional fluctuations, indicating a continual expansion of the EVOLVED-5G community. Additionally, the LinkedIn account typically maintains an average of 9 posts per month. However, the variability in the number of posts across project months is evident due to differences in activity types and availability. That is why there is this upward trend in the Total Posts graph.

- **X (formerly Twitter) Dashboard and Statistics**

(<https://lookerstudio.google.com/u/0/reporting/7c0aae47-510c-4df7-9eec-efc641f5f7a9/page/4YFqB>)

During this reporting period (M19 – M34), the X (Twitter) channel was very active, making 213 tweets and accumulating 1,069 likes. Additionally, the EVOLVED-5G Twitter channel generated 2,655 engagements.

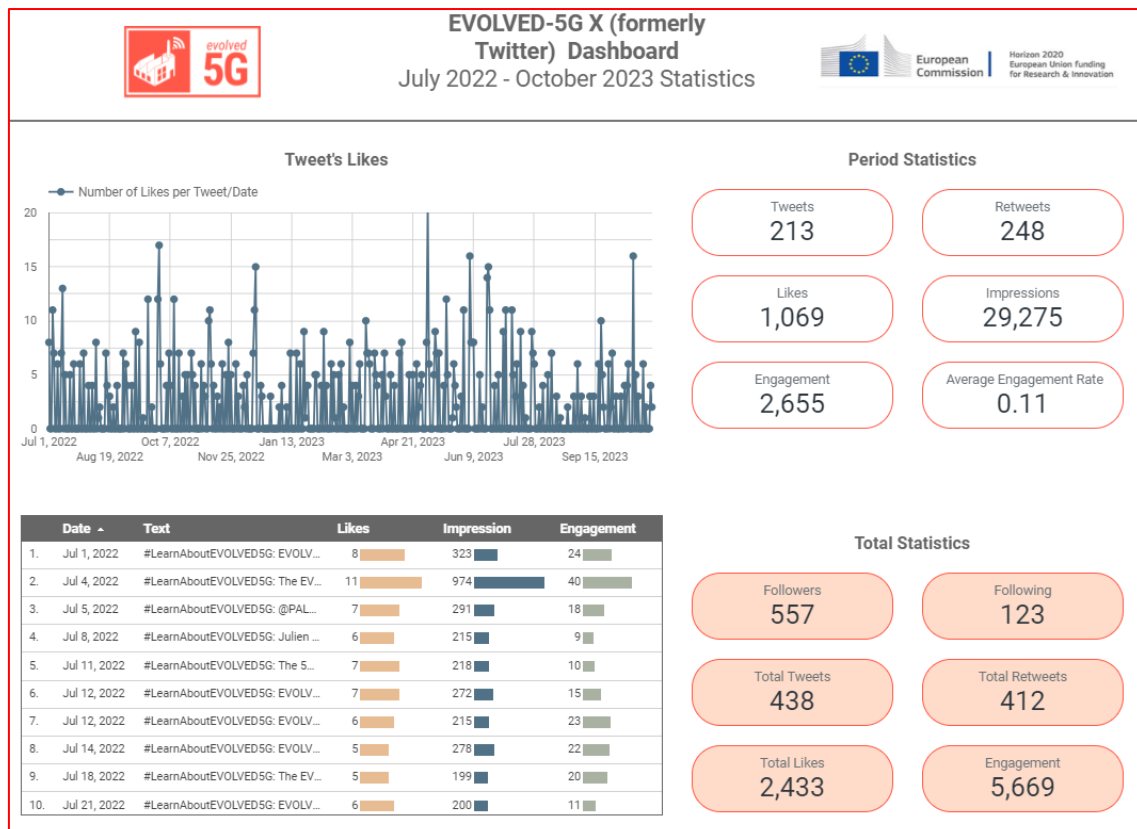


Figure 25: X(Twitter) Dashboard for M19-M34 period

The EVOLVED-5G X (Twitter) account follows a similar course as the LinkedIn one. More specifically, the number of followers continues to systematically increase each month building a substantial and dedicated community (Figure 26).

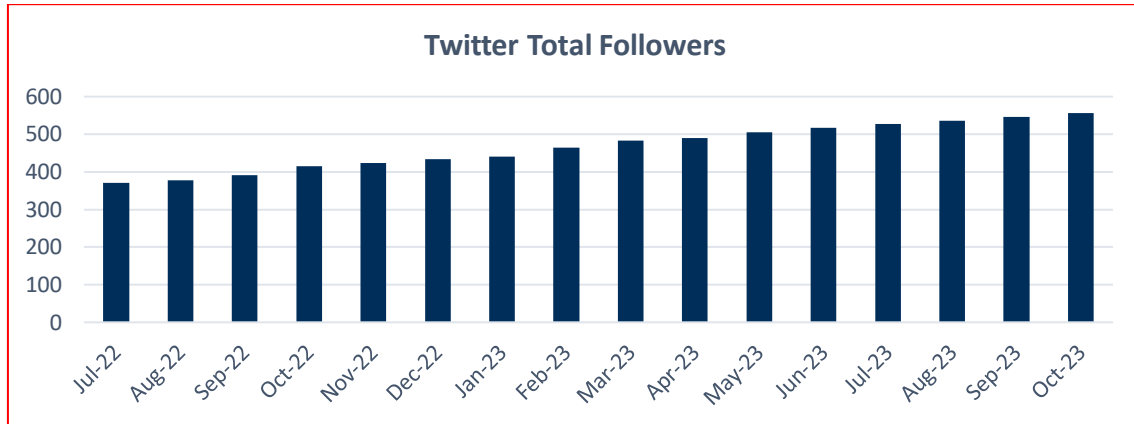


Figure 26: X (Twitter) Total Followers

Similarly, the number of posts faces a smaller increase according to the activities that have been completed during specific periods. (Figure 27).

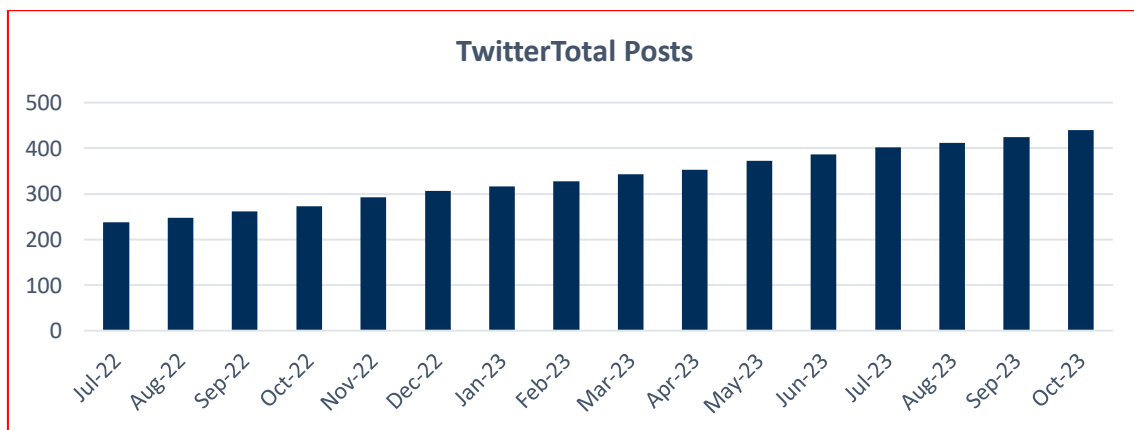


Figure 27: X (Twitter) Total Posts

- Facebook Dashboard and Statistics**
<https://lookerstudio.google.com/u/0/reporting/c5375bc1-f2a8-4d44-828a-dea2207d7376/page/j5mpB>

Figure 28 displays the Facebook dashboard, showcasing a total of 175 posts made through this social media platform, having 1,563 engagement and generating 8,679 reach. Additionally, several new individuals have liked our Facebook page.

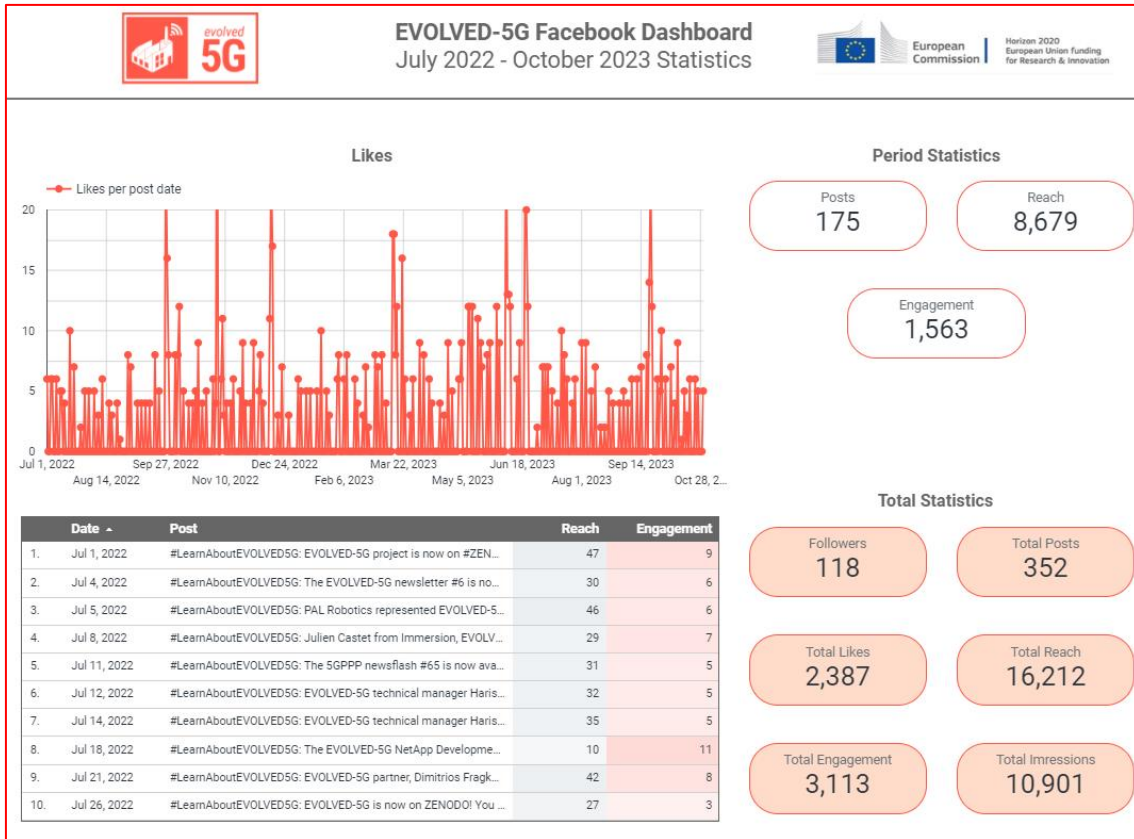


Figure 28: Facebook Dashboard for M19-M34 period

In Figure 29 and Figure 30, the graphs highlight the followers, and the posts' count to the corresponding reporting months for the EVOLVED-5G Facebook profile. The number of followers remains consistent with minor fluctuations but in an increasing trend.

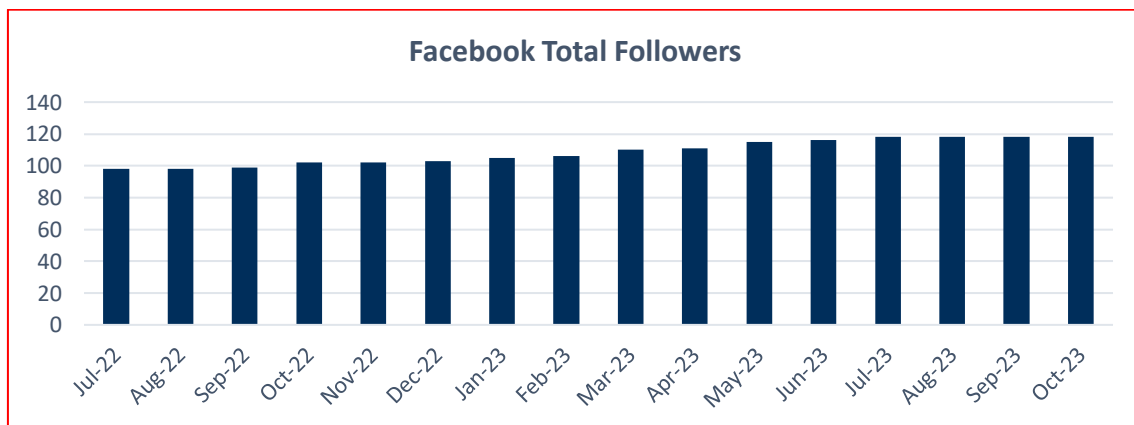


Figure 29: Facebook Total Followers

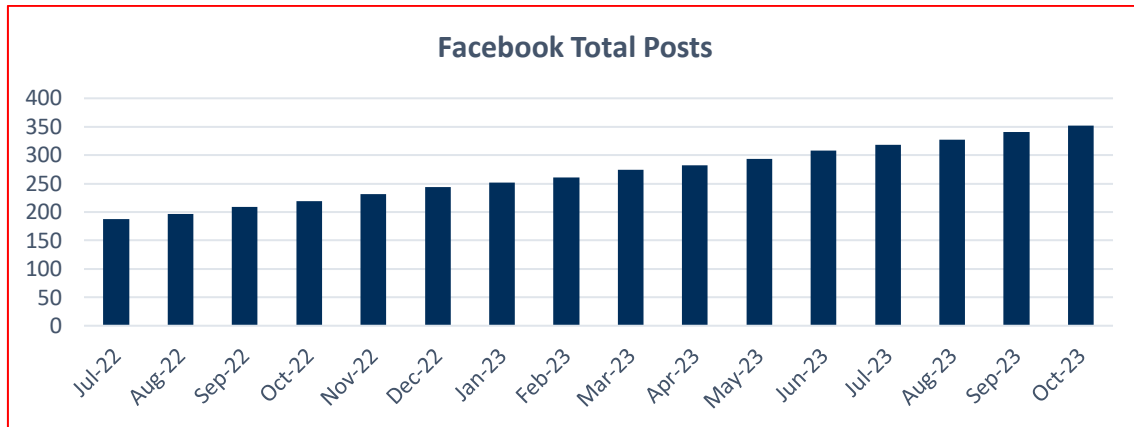


Figure 30: Facebook Total Posts

This outcome aligns with expectations as Facebook predominantly engages a non-technical audience. Currently, as the project progressed for 3 years, the scientific community's interest tends to concentrate on monitoring advances through platforms like LinkedIn and Twitter, letting Facebook to address the general public and mainly non-technical audience. Concerning the posts frequency, it remains relatively stable at an average of 9 posts per month, while following a consistent upwards trend.

- **Instagram Dashboard and Statistics**

(<https://lookerstudio.google.com/u/0/reporting/45366de3-7e15-4b72-8de7-963629564eff/page/rKQqB>)

Finally, the Instagram dashboard (Figure 31) showcases statistics indicating that 171 posts were shared, amassing 945 likes and reaching 7,332 impressions. Furthermore, the EVOLVED-5G Instagram account recorded a 5,385 number of reaches.

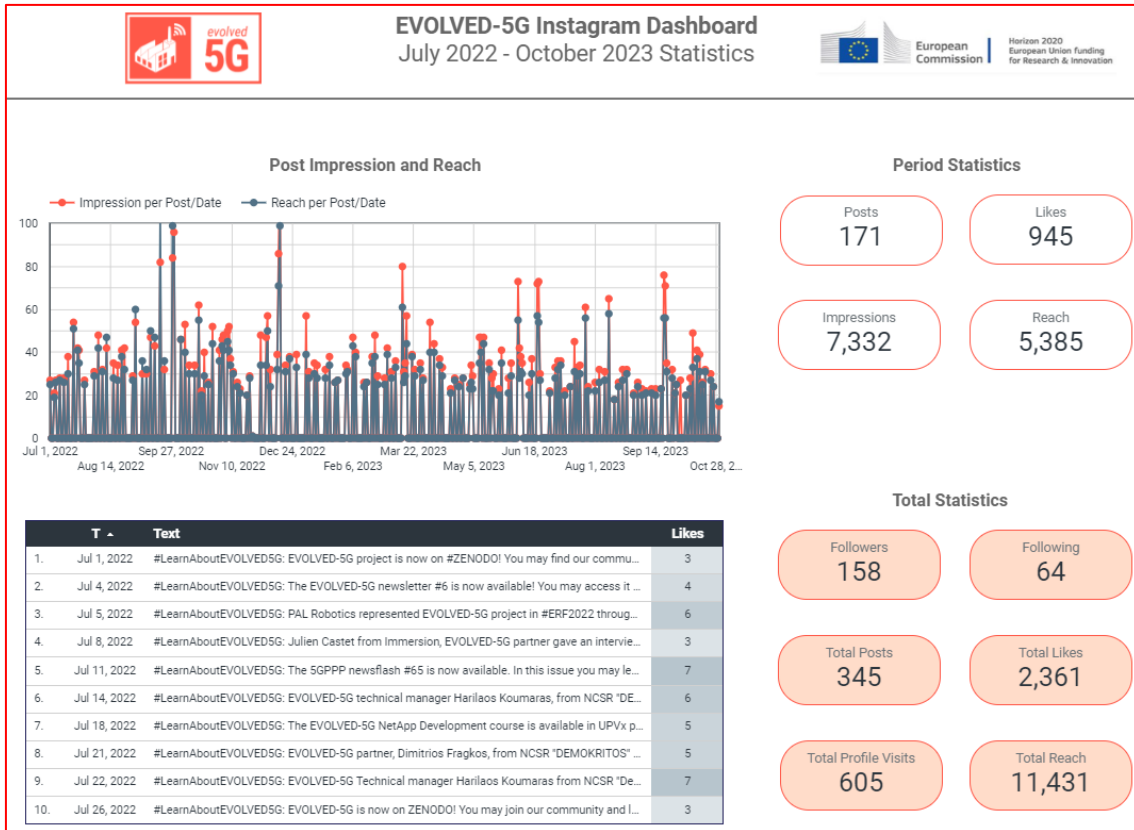


Figure 31: Instagram Dashboard for M19-M34 period

In line with the other social media platforms, the EVOLVED-5G Instagram account consistently grows the number of stakeholders, primarily those from non-technical backgrounds, owing to the channel's nature. The number of followers steadily rises, exhibiting a minor yet consistent upward trend (Figure 32).

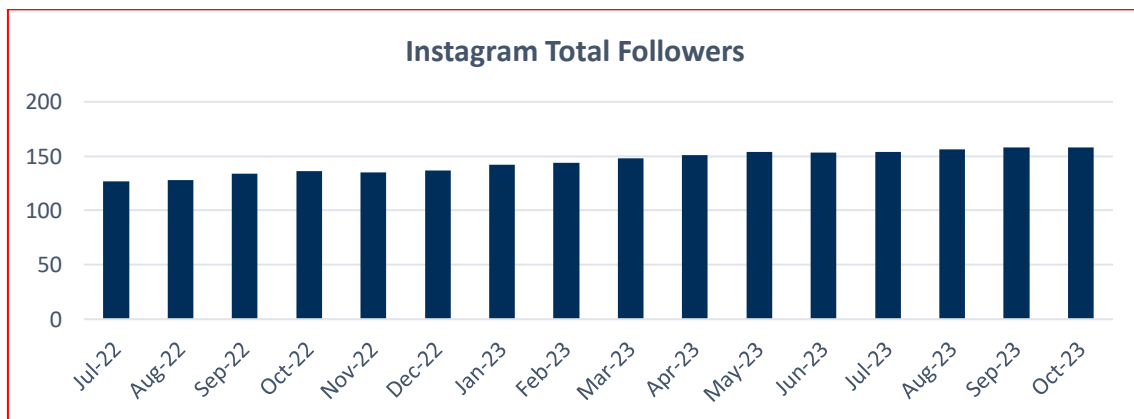


Figure 32: Instagram Total Followers

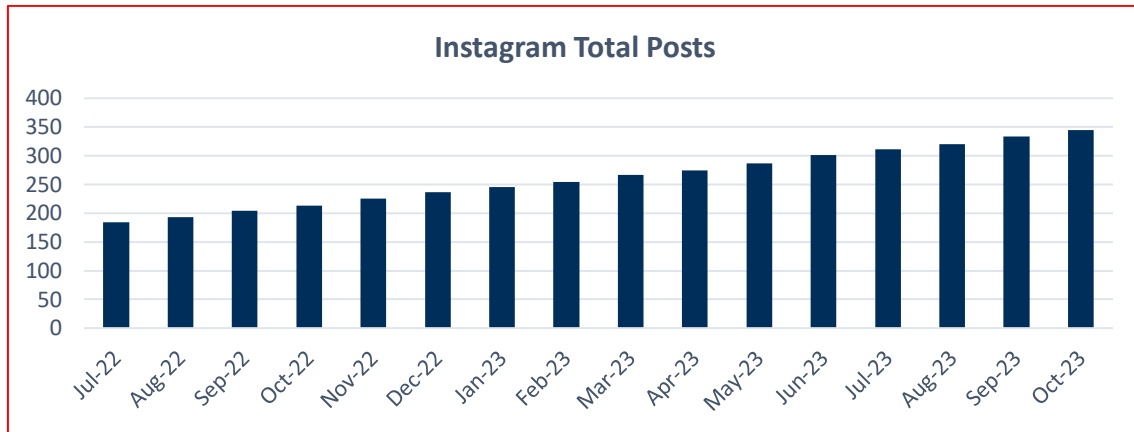


Figure 33: Instagram Total Posts

The average monthly post count remains approximately 9, stemming from variations in the availability of relevant content as per Figure 33.

2.4.2 Period Summary of Dissemination Achievements and KPIs

The following table (Table 5) summarizes the way the communication and the dissemination goals were divided into 2 targeted periods as per dissemination plan (D7.1). The focus of this report is to analyse and evaluate the 2nd period targets/KPIs' fulfilment.

Table 5: EVOLVED-5G Reporting Periods

Planned Dissemination Activities	Metrics	Total Target (as per DoA)	Defined Timeline (in Months) as per DoA	1 st Period Target M01-M18	2 nd Period Target M19-M36
Publications in journals, workshops and conferences, white papers	Number of publications	>20	M06-M36	>5	>15
Presentations in scientific events/conferences	Number of presentations	>20	M01-M36	>6	>14
Trials/Pretrials/Demos	Number of Trials/Pretrials/Demos	>5	M19-M36	-	>5
Exhibitions in industrial and scientific events - Booths	Number of exhibitions/ booths	>5	M12-M36	>1	>4
Organization of events (workshops/special sessions/seminars/training/poster sessions etc.)	Number of events	>10	M06-M36	>2	>8

Table 6 below summarizes the Dissemination activities for the 2nd period, performed and confirmed at the time this deliverable was under final editing.

Table 6: 2nd EVOLVED-5G Reporting Period and Achieved Goals

Planned Dissemination Activities	Metrics	2 nd Period Target M19-M36	2 nd Period Target Achievements (M34)
Publications in journals, workshops and conferences, white papers	Number of publications	>15	18 publications
Presentations in scientific events/conferences	Number of presentations	>14	21 presentations
Trials/Pretrials/Demos	Number of Trials/Pretrials/Demos	>5	14 trials, pre-trials & Demos
Exhibitions in industrial and scientific events - Booths	Number of exhibitions/booths	>4	9 Events/booths
Organization of events (workshops/special sessions/seminars/trainings/poster sessions etc.)	Number of events	>8	TOTAL: 15 events 4 Special Sessions/workshops & 11 training events (in the context of WP6 too)
Events attended/participated	Number of events	-	21 events

2.4.2.1 Publications in Conferences, Journals and White papers

In this section of the deliverable, stakeholders have access to a comprehensive list of all publications associated with the EVOLVED-5G project for the reporting period. Each publication is accompanied by a brief description detailing the authors, event, time, publication journal (if applicable), and may include a DOI or publication status. Up to now, during the second reporting period, 18 publications acknowledging the EVOLVED-5G project have been accepted and published in conferences and workshops' proceedings (Table 7), journals (Table 8) and co-authored as 5G-PPP white papers in which EVOLVED-5G partners contributed (Table 9).

Alternatively, all these publications can be found on the EVOLVED-5G project website at:
<https://evolved-5g.eu/dissemination/publications/>.

Table 7: Publications in Conferences

#	Description	Link
1	Cedric Kervegant (IMMERSION), Julien Castet (IMMERSION), Juliette Vauchez (IMMERSION), Charles Bailly (IMMERSION) Distant Assist Cursor (DAC): Designing an Augmented Reality System to Facilitate Remote Collaboration for Novice Users, ACM ISS 2021, November 2021,	https://doi.org/10.1145/3447932.3490520
2	Foteini Setaki, Ioanna Mesogiti, Eleni Theodoropoulou, George Lyberopoulos (Cosmote), David Artunedo Guillen, Javier Garcia Rodrigo (Telefonica), Harilaos Koumaras (NCSR Demokritos), George Avdikos, Ioannis Margaritis, Emmanouil Kafetzakis (8BELLS), Yiannis Karadimas (Maggioli SPA), Dimitrios Tsolkas (FOGUS Innovations & Services), The Network Apps Certification Environment for 5G and beyond Vertical Ecosystems: The EVOLVED-5G Approach, IEEE GLOBECOM 2022: IEEE Global Communications Conference 2022	https://ieeexplore.ieee.org/document/10008597
3	George Makropoulos, Dimitrios Fragkos, Harilaos Koumaras (NCSR "DEMOKRITOS"), Jaka Cijan, Luka Korsic, Rudolf Susnik (Internet Institute), "5G and B5G NEF exposure capabilities towards an Industrial IoT use case", EuCNC 2023.	https://ieeexplore.ieee.org/document/10188241
4	Anastasios-Stavros Charismiadis, Dimitris Tsolkas (Fogus Innovations and Services), Jorge Moratinos Salcines, David Artuñedo Guillen, Javier Garcia Rodrigo (Telefónica), "The 3GPP Common API Framework: Open-Source Release and Application Use Cases", EuCNC 2023, June 2023.	https://ieeexplore.ieee.org/document/10188337
5	Laura Panizo, María del Mar, "xeLTL: Extending eLTL with variables" PROLE 2023 (Ciudad Real), Biblioteca Digital de Sistedes.	https://biblioteca.sistedes.es/entities/art%C3%ADculo/f86d1833-9519-451d-bc88-384fdcf16da6
6	Nikolaos Gkatzios, Nikolaos Vryonis, Constantinos Fragkos, Christos Sakkas, Vasileios Mavrikakis, Vaios Koumaras (INFOLYSIS P.C), George Makropoulos, Dimitrios Fragkos, Harilaos Koumaras (NCSR "Demokritos"), "A Chatbot Assistant for Optimizing the Fault Detection and Diagnostics of Industry 4.0 Equipment in the 6G era" at IEEE Conference on Standards for Communications and Networking (CSCN) – Track on Verticals, Services and Applications, 6-8 November 2023, Munich.	(Accepted and Presented Paper)
7	George Makropoulos, Dimitrios Fragkos, Harilaos Koumaras, (NCSR "Demokritos") Nancy Alonistioti (NKUA), Alexandros Kaloxylas (UOP), Foteini Setaki (Cosmote), "Exploiting Core Openness as Native-AI Enabler for Optimized UAV Flight Path Selection", IEEE Conference on Standards for Communications and Networking (CSCN) – Track on	(Accepted and Presented Paper)

Verticals, Services and Applications, 6-8 November 2023, Munich.	
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Table 8: Publications in Journals

#	Description	Link
1	Francisco Luque-Schempp (UMA), Laura Panizo (UMA), María-del-Mar Gallardo (UMA), Pedro Merino (UMA) and Javier Rivas (UMA) "Towards Zero Touch Configuration of 5G Non-Public Networks for Time Sensitive Networking". Accepted In IEEE Network Magazine (Volume: 36, Issue: 2), Special issue: New Network Architectures, Protocols and Algorithms for the Time-Sensitive Applications, 30 May 2022	https://ieeexplore.ieee.org/document/9785739
2	Emmanouil Pateromichelakis, Dimitrios Dimopoulos, Apostolis Salkintzis, "Network Apps Enabling Application-Layer Analytics for Vertical IoT Industry". Accepted in IEEE Internet of Things Magazine, Volume: 5, Issue 4.	https://ieeexplore.ieee.org/document/10012484/authors
3	Rico, D. (UMA), Grinnemo, K. J. (UMA), Brunstrom, A. (UMA), & Merino, P. (UMA), "Implementation and evaluation of the Multi-connection Tactile Internet Protocol and API", in the context of 2nd IFIP/IEEE International Workshop on Fully-Flexible Internet Architectures and Protocols for the Next-Generation Tactile Internet (FlexNGIA 2022) at IEEE Communications Society.	https://ieeexplore.ieee.org/document/9789842
4	Francisco Luque-Schempp, Laura Panizo, María-Del-Mar Gallardo, Pedro Merino from UMA, "AutomAdapt: Zero Touch Configuration of 5G QoS Flows Extended for Time-Sensitive Networking", IEEE Access, Volume: 11, 2023.	https://ieeexplore.ieee.org/document/10209171

Table 9: White papers in which EVOLVED-5G contributed.

#	Description	Link
1	White paper: 5GPPP, 'Network App: Opening up 5G and beyond networks', September 2022	https://5g-ppp.eu/wp-content/uploads/2021/11/Architecture-WP-V4.0-final.pdf
2	5GPPP, "The 6G Architecture Landscape – European perspective", February 2023	https://5g-ppp.eu/wp-content/uploads/2023/02/Whitepaper-final-version-rev1.pdf
3	6G-IA, "5G and Beyond 5G Ecosystem Business Modelling", February 2023	https://zenodo.org/records/7640478#.ZGyIGHZBxD8
4	5GPPP, "The European 5G Annual Journal 2023", May 2023	https://bscw.5g-ppp.eu/pub/bscw.cgi/d532066/6GStart%20European%205G%20Annual%20Journal%202023-web.pdf?fbclid=IwAR1yfD52JutfU9iwBzeuYHeMBWEfY5neM_wUx8kz7A013kz71v98N8mlq5o
5	5GPPP, Network Applications: Opening up 5G and Beyond networks, V2.0, July 2023	https://zenodo.org/records/8134429

6	5GPPP, Innovation Trends in I4.0 enabled by 5G and Beyond Networks, October 2023	https://5g-ppp.eu/wp-content/uploads/2023/10/Innovation-Trends-in-I4.0-enabled-by-5G-and-Beyond-Networks.pdf
7	5GPPP, Programmatic operation projects heritage and interactions, October 2023	https://5g-ppp.eu/wp-content/uploads/2023/10/5GPPP_Heritage_Brochure2023_web.pdf

2.4.2.2 General Publications in Magazines, Books, Newspapers, Websites

This section cites the general publications of the EVOLVED-5G project. With the term “General Publications” we mean articles (<https://evolved-5g.eu/dissemination/articles/>) and press releases (<https://evolved-5g.eu/dissemination/press-releases/>) related to the project. The following tables provide the reader of the deliverable with a short description of the activity like the title, the timeline, and the authors along with the equivalent link of the publication. Concerning the general publications, EVOLVED-5G project has in total 21 such activities (13 online articles, 6 press releases and 2 book chapter) in the reporting period.

Table 10: EVOLVED-5G Articles

#	Description	Link
1	innovationradar.eu, Telefonica, FOGUS Innovations & Services, Open-Source implementation of the 3GPP CAPIF Core Function	https://www.innoradar.eu/innovation/47486
2	Greek Netweek Magazine (in Greek), Dr. Harilaos Koumaras, 5G private networks and the business opportunities that are created for novel and innovative services	https://evolved-5g.eu/2022/09/21/interview-in-netweek-magazine/
3	ADI Nouvelle-Aquitaine online magazine (in French), Dr. Julien Castet.	https://www.adi-na.fr/actualites/immersion-aide-a-lintegration-de-la-5g-dans-les-industries.html
4	innovationradar.eu, “NCSR DEMOKRITOS”, NEF Emulator utilizing 3GPP’s exposure services	https://www.innoradar.eu/innovation/47484
5	epixeiro.gr (in Greek), “EVOLVED-5G Accelerator – Applications for the Accelerator Program are now open”	https://www.epixeiro.gr/article/378792
6	epixeiro.gr (in Greek), “Envolve: On 8/11 the workshop on how 5G technologies accelerate startups and SMEs”	https://www.epixeiro.gr/article/381533
7	mikrofwno.gr (in Greek), INFOLYSIS, “5G, the first step for a new era”	https://mikrofwno.gr/2023/02/5g-to-protovima-gia-mia-nea-epochi/
8	ENVOLVE GR, INFO DAY: EVOLVED-5G Accelerator	https://envolveglobal.org/info-day-evolved-5g-accelerator/
9	mikrofwno.gr (in Greek) DEFEA 2023	https://mikrofwno.gr/2023/05/defea-2023/

10	Greek Netweek Magazine (in Greek), Dr. Harilaos Koumaras, “New Opportunities in the Development of New Applications”	https://www.linkedin.com/feed/update/urn:li:activity:7064137261688270848/
11	medium.gr, Open Source Common API Framework (CAPIF).	https://medium.com/@googler_ram/open-source-common-api-framework-capif-d83762f65563
12	blog.pal-robotics.com, Developing new use cases in robotics through EU projects.	https://blog.pal-robotics.com/new-case-studies-robotics-eu-projects/
13	mobileeurope.co.uk, New ETSI group to build on 3GPP's Common API framework	https://www.mobileeurope.co.uk/new-etsi-group-to-build-on-3gpps-common-api-framework/

Table 11: Press Release table

#	Description	Link
1	EVOLVED-5G announced at UMA portal	http://www.morse.uma.es/node/1285
2	EVOLVED-5G announced at QUComm website	https://qucomm.eu/h2020-5gppp-evolved-5g-experimentation-and-validation-openness-for-long-term-evolution-of-vertical-industries-in-5g-era-and-beyond/
3	EVOLVED-5G announced at COSMOTE website	https://www.cosmote.gr/cs/otegroup/en/evolved_5g.html
4	EVOLVED-5G announced at CAFA Tech website here	https://www.cafatech.com/evolved-5g/
5	EVOLVED-5G announced at Edukad website	https://edukad.etag.ee/project/4582?lang=en
6	Public release of the “EVOLVED-5G Service Package”	https://evolved-5g.eu/wp-content/uploads/2023/12/EVOLVED-5G-Press-Release-Service-Package-12-Dec-2023.pdf

Table 12: Book Chapters

#	Authors	Description	Link
1	George Makropoulos, Dimitrios Fragkos, Harilaos Koumaras (NCSR “Demokritos”, Institute of Informatics and Telecommunications), Nancy Alonistioti (Department of Informatics & Telecommunications, National and	5G Network Programmability Enabling Industry 4.0 Transformation, Chapter 6, Industrial Applications of the Internet of Things and 5G and 6G Networks, Poshan Yu (Soochow University, China), Xiaohan Hu	https://www.igi-global.com/book/industrial-applications-internet-things-networks/276938

	Kapodistrian University of Athens, Alexandros Kaloxylos (University of Peloponnese), Vaio Koumaras, Theoni Dounia, Christos Sakkas (INFOLYSIS), Dimitris Tsolkas (FOGUS)	(Shanghai University, China), Ajai Prakash (University of Lucknow, India), Nyaribo Wycliffe Misuko (KCA University, Kenya), and Gu Haiyue (Shanghai University, China), IGI Global March 2023	
2	Tsolkas D., Charismiadis A.S (Department of Informatics & Telecommunications, National and Kapodistrian University of Athens), Koumaras H., Foteas A. (NCSR "Demokritos", Institute of Informatics and Telecommunications)	Artificial Intelligence in 5G and Beyond Networks Chapter No4 in Pethuru Raj Chelliah, G. Nagarajan, R.I. Minu Applied Edge AI Concepts, Platforms, and Industry Use Cases, Taylor & Francis Group, 1st Edition, April 2022,	https://doi.org/10.1201/9781003145158

2.4.2.3 Presentations

Disseminating and promoting EVOLVED-5G materials often occurs through presentations, which serve as a primary method to reach a wide audience. Table 13 provides comprehensive information on EVOLVED-5G presentations, including details on the event, date, location, and the presentation titles. Additionally, these presentations are available online at <https://evolved-5g.eu/dissemination/workshops-presentations-and-trials/>. As of now, consortium members have delivered a total of 21 presentations during the second reporting period.

Table 13: EVOLVED-5G Presentations

#	Event	Date/Location	Title
1	"5G Openness and Programmability" session at the 12th Mobile & Connected World	12 July 2022	Dr. Harilaos Koumaras (NCSR DEMOKRITOS) presented "5G Programmability" during the "5G Openness and Programmability" session of the 12th Mobile & Connected World Congress
2	Demokritos Summer School	12 July 2022	Dr. Harilaos Koumaras (NCSR DEMOKRITOS) presented "5G Programmability" during DEMOKRITOS Summer School

3	Demokritos Summer School	12 July 2022	Dimitrios Fragkos presented EVOLVED-5G NEF Emulator during DEMOKRITOS Summer School
4	2nd International Workshop on Advances on Privacy Preserving Technologies and Solutions (IWAPS 2022)	23-26 August 2022	Christos Xenakis presented "EVOLVED-5G: Network App for CAPIF robustness"
5	IEEE MeditCom 2022	5-8 September 2022	Harilaos Koumaras (NCSR "Demokritos") presented "Experimentation and Validation Openness for Longterm evolution of VERTICAL inDustries in 5G era and beyond – EVOLVED-5G" by Dr. at workshop WS2. "Network Apps into Beyond 5G and 6G Networks" in the context of IEEE MEDICOM 2022
6	IEEE MeditCom 2022	5-8 September 2022	Harilaos Koumaras (NCSR "Demokritos") presented "B5G programmability and Network Apps Enablers for XR and Metaverse new business opportunities at Panel P1. 6G Enablers for Extended Reality and the Metaverse of IEEE MeditCom 2022
7	5GPPP TB Meeting	6 October 2022	Dimitris Tsolkas (Fogus Innovations) Deputy technical manager of EVOLVED-5G project presented "EVOLVED-5G Network Applications Ecosystem" and "CAPIF release 2"
8	24th Conference InfoCom World "Fiber & 5G Highways: DigitAll Greece!"	29 November 2022	"Intent-driven Chatbots for Precise Maintenance in 5G-enabled Industry 4.0 Environments", Nikolaos Vrionis, INFOLYSIS
9	24th Conference InfoCom World "Fiber & 5G Highways: DigitAll Greece!"	29 November 2022	"Network Exposure Function simulator: Opening Up 5G network to Verticals", Dimitrios Fragkos, National Centre for Scientific Research "Demokritos" (NCSR)
10	IEEE Conference on Standards for Communications and Networking	28-30 November 2022	Harilaos Koumaras (NCSR) EVOLVED-5G technical manager presented "5G Network Programmability and Openness: A first Step towards 6G with native-AI capabilities" during IEEE Conference on Standards for Communications and Networking
11	EVOLVED-5G Accelerator's Chapter 2 Workshops	3 May 2023	Our Project Coordinator, Javier Garcia Rodrigo, Our Technical Managers Harilaos Koumaras and Dimitrios Tsolkas and Paschalis Tsiaras from Cosmote presented insights of our

			project along with information about 5G network to the accelerator's applicants
12	"Smart networks and services – 5th and 6th generation technologies"	25 May 2023	Dimitris Fragkos from NCSR "DEMOKRITOS" presented 5G Programmable Networks and Exposure Capabilities during "Smart networks and services – 5th and 6th generation technologies" event in Athens
13	"Smart networks and services – 5th and 6th generation technologies"	25 May 2023	George Makropoulos from NCSR "DEMOKRITOS" presented 5G programmability EVOLVED-5G ecosystem during "Smart networks and services – 5th and 6th generation technologies" event in Athens
14	EuCNC 2023	7 June 2023	George Makropoulos from NCSR "DEMOKRITOS" presented "5G and B5G NEF Exposure Capabilities Towards an Industrial IoT Use Case" during AIU2 – IoT Solutions session of EuCNC & 6G Summit 2023
15	EuCNC 2023	7 June 2023	Dimitris Tsolkas from FOGUS presented "The 3GPPP Common API Framework: Open-Source Release and Application Use Cases" during NET2 – AI/ML in service provisioning session of EuCNC & 6G Summit 2023
16	'58th Demokritos Summer School	11 July 2023	'Our partner NCSR "DEMOKRITOS" organized the '58th Summer School', inviting both Undergraduates and Graduates, to attend a conference on technological advancements and discuss on 6G and Edge Cloud continuum research topics. Harilaos Koumaras, PhD from NCSR 'Demokritos', presented, among others, the EVOLVED-5G project.
17	IWAPS 2023	30 August 2023	Dimitris Tsolkas from FOGUS, presented the 3GPP Common API framework (CAPIF) – open-source implementation and innovation potential during the IWAPS 2023 workshop in the context of ARES 2023
18	Skills2Scale Webinar - Beyond 5G Technology, Innovation and Entrepreneurship	31 October 2023	Nick Vrionis from INFOLYSiS presented "How a startup can leverage 5G to improve their services
19	Skills2Scale Webinar - Beyond 5G Technology,	31 October 2023	Maria Gabriella Anagnostopoulos from ENVOLVE presented Exploring

	Innovation and Entrepreneurship		the Ecosystem - Building collaborations
20	IEEE Conference on Standards for Communications and Networking (CSCN)	6-8 November 2023	George Makropoulos from NCSR "DEMOKRITOS" presented the EVOLVED-5G paper entitled "A Chatbot Assistant for Optimizing the Fault Detection and Diagnostics of Industry 4.0 Equipment in the 6G era"
21	IEEE Conference on Standards for Communications and Networking (CSCN)	6-8 November 2023	George Makropoulos from NCSR "DEMOKRITOS" presented the EVOLVED-5G paper entitled "Exploiting Core Openness as Native-AI Enabler for Optimized UAV Flight Path Selection"

2.4.2.4 Workshops and Special Sessions organized/co-organized by EVOLVED-5G

The following contains comprehensive details regarding the Workshops and Special Sessions organized or co-organized by EVOLVED-5G. The information provided includes event type, date, location, and a brief description of each. Alternatively, more details about these workshops and sessions can be accessed at <https://evolved-5g.eu/dissemination/workshops-presentations-and-trials/> within the Workshops & Special Sessions section. It's important to note that this section specifically covers activities falling within the scope of WP7 and not WP6. Information pertaining to WP6 activities can be found in the WP6 deliverable or on the relevant webpages of the project's website. To date, the EVOLVED-5G project has co-organized 4 special sessions across different events.

Table 14: Workshop, Special Sessions and Trainings

#	Event	Date/ Location	Description
1	5G FORUM	12 May 2022	EVOLVED-5G Special Session at 5G FORUM "EVOLVED-5G & 5G USE CASES INNOVATION"
2	17th International Conference on Availability, Reliability and Security (ARES 2022)	23 – 26 August 2022	2nd International project Workshop on Advances on Privacy Preserving Technologies and Solutions co-organised by EVOLVED-5G
3	IWAPS 2023 (in the context of ARES 2023)	August 29 – September 01, 2023	EVOLVED-5G project co-organizes the "3rd International Workshop on Advances on Privacy Preserving Technologies and Solutions" IWAPS 2023, in the context of ARES 2023. The ARES conference will take place in Benevento, Italy during August 29 – September 01, 2023 period. The Call for Papers deadline is on 31st of May!
4	Open Conference 2023	10&11 November 2023	Cybersecurity workshop in the context of Open Conference 2023 at University of West Attica
Special Sessions – Training Events			

1	Seminar: Testing & Optimizing 5G for Vertical Industry	2-4 February, 2022, Faculty of Electrical Engineering of University of Ljubljana, Slovenia	"Testing and optimizing 5G for industry verticals"
2	Innovation Course: EVOLVED-5G Project	5-20 March, 2022, ValenciaPort Foundation, Valencia, Spain	Course addressing the digital transformation of port sector, showing the potential of 5G & EVOLVED-5G NetApps for the digital transformation of ports & port industries.
3	5G Programmability Training Workshop by EVOLVED-5G and the Computer Science department of Athens Metropolitan College	21 & 22 March 2022 Athens Metropolitan College (Hybrid)	"5G Programmability New Opportunities and Perspectives in the context of European Research Project EVOLVED-5G"
4	Development of 5G Applications Training Seminar at the Universitat Politècnica de València (or by EVOLVED-5G & Communications Department of the Polytechnical University of Valencia)	30 May 2022 Universitat Politècnica de València	"5G Applications"
5	NCSR Demokritos Summer School	12 July 2022 NCSR Demokritos Campus (Physical)	5G Networks: Programmability Training Panel
6	Seminar on Industry 4.0 Communications	22 November, 2022, Polytechnic University of Valencia, Spain	Full lecture devoted to a related EVOLVED-5G topic, Industry 4.0 communications & Introduction of the EVOLVED-5G project as an Industry 4.0 5G-related innovation initiative.
7	Seminar on EVOLVED-5G Network Apps	26 January, 2023, Polytechnic University of Valencia, Valencia	Lecture on EVOLVED-5G Network Apps, SDK & GitHub exploration

8	Telefonica presentation on master students	10 March 2023	“CAPIF: Common API Framework for 3GPP Northbound APIs”
9	Telefonica presentation on master students	14-15 March, 2023, NCSR Demokritos Athens, Greece	Testing and Validation Session
10	Seminar on 5G & Digital System Security	3 July, 2023, University of Piraeus Athens, Greece	Lecture on 5G, 5G Security and Evolved 5G concepts
11	Summer School NCRS Demokritos	11 July 2023, NCSR Demokritos, Athens, Greece	Panel on EVOLVED-5G

2.4.2.5 EVOLVED-5G trials, Pre-trials and Demos

This section in addition to the demos already presented in Section 2.2.9 “Highlight Dissemination Event: EuCNC & 6G Summit 2023”, summarizes the trials and pre-trials that took place by partners (especially SMEs) as part of their role in the various use cases and network applications developed. All this information is also available online at <https://evolved-5g.eu/dissemination/workshops-presentations-and-trials/>

- GMI Aero, performed Pre-Trials at Athens Platform on 6th-7th December 2022
- INFOLYSIS partner performed Pre-Trials at Athens platform on NCSR DEMOKRITOS premises, on 6th of December 2022.
- FOGUS partner performed Pre-Trials at Athens platform on NCSR DEMOKRITOS premises, on 23rd of February 2023.
- 8Bells partner performed Pre-Trials at Athens platform on NCSR DEMOKRITOS premises, on 24th of February 2023.
- Internet Institute performed Pre-Trials at Athens platform on NCSR DEMOKRITOS premises, on 2nd of March 2023
- INFOLYSIS performed Pre-Trials at Athens platform on NCSR DEMOKRITOS premises on 14th of March 2023
- InQBit performed Trials at Athens platform on NCSR DEMOKRITOS premises on 27th of June 2023
- FOGUS performed Trials at Athens platform on NCSR DEMOKRITOS premises on 28th of June 2023
- 8Bells performed Trials at Athens platform on NCSR DEMOKRITOS premises on 29th of June 2023
- Zortenet performed Trials at Athens platform on NCSR DEMOKRITOS premises on 30th of June 2023
- Internet Institute performed Trials at Athens platform on NCSR DEMOKRITOS premises on 11th of July 2023
- INFOLYSIS performed Trials at Athens platform on NCSR DEMOKRITOS premises on 17th of July 2023
- GMI AERO performed Trials at Athens platform on NCSR DEMOKRITOS premises on 1st of August 2023

2.4.2.6 Other Activities-Events

In this section, a dedicated table summarizes various combined activities not thoroughly reported in the previously mentioned categories, including poster sessions, booths, early-stage demonstrations, and panel discussions. Overall, the EVOLVED-5G project has been engaged in a total of 4 such related combo-activities (Table 15).

Table 15: Other Activities

#	Activity	Date/ Location	Description
1	Booth/ Demonstration	21-24 June 2022/ Automatica 2022	PAL Robotic's Booth through their booth demonstrated the project's overview and how it will try to bring the transition to industry 4.0.
2	Booth/ Demonstration	28-30 June 2022/ ERF 2022	Visitors got to learn about EVOLVED-5G Project, which uses TIAGo robot with the aims to contribute towards the Industry 4.0., by upgrading the 5G experimentation potential in Europe, materializing the openness of 5G to vertical industries, to industrial mobile robots and much more.
3	Panel Discussion	10&11 November 2023	"5G Technology as innovation enabler. Present and Future" Panel Discussion during Transfiere 2023, European Meeting on Science, Technology and Innovation
4	Booth promotion	9-11 May 2023	InQbit and INFOLYSiS partners promoted our project with rich communication material to interested visitors at DEFEA 2023 through InQbit's booth.

In addition, EVOLVED-5G partners have attended/contributed to several dissemination events. An indicative list of events, for the reporting period, in which EVOLVED-5G was present, is presented below:

- IEEE International Workshop on Computer Aided Modeling and Design of Communication Links and Networks, 6-8 November 2023, Edinburgh, Scotland
- IEEE Conference on Standards for Communications and Networking (CSCN) – Track on Verticals, Services and Applications, 6-8 November 2023, Munich, Germany
- Open Conference 2023, 10-11 November 2023, Athens, Greece
- Skills2Scale Webinar – Beyond 5G Technology, Innovation and Entrepreneurship, 31 October 2023, online
- ARES Conference, 29 August – 1 September, 2023, Benevento, Italy
- EUCNC & 6G Summit 2002, 6-9 June 2023, Sweden
- IEEE International Conference on Communications, 28 May – 01 June 2023, Italy
- DEFEA 2023, 9-11 May 2023, Athens, Greece
- EVOLVED-5G Accelerator's Chapter 2 Workshop, 3 May 2023, online
- EVOLVED-5G Accelerator's Kick-Off, March 2023, online
- Transfiere 2023, 16 February 2023, Malaga, Spain
- Mobile Week Malaga 2022, 1-4 December 2022, Malaga, Spain

- 24th Conference InfoCom World “Fiber & 5G Highways: DigitAll Greece, 29 November 2022, Athens, Greece
- IEEE Conference on Standards for Communications and Networking, 28-30 November 2022, Thessaloniki, Greece
- 31st International Electrotechnical and Computer Science Conference”, 19-20 September 2022, Portorož, Slovenija
- IEEE International Mediterranean Conference on Communications and Networking, 5-8 September, Athens, Greece
- 17th International Conference on Availability, Reliability and Security (ARES 2022), 23-26 August 2022, Vienna, Austria
- 12th Mobile & Connected World Congress, 12 July 2022, Online
- Demokritos Summer School, 11-15 July 2022, Athens Greece
- ERF 2022, 27-30 June 2022, Rotterdam, Netherlands
- Automatica 2022, 24-27 June 2022, Munich, Germany

2.5 COMMUNICATION AND DISSEMINATION OVERALL IMPACT (M1-M36)

This section presents the full performance of Communication and Dissemination activities for the full project period.

2.5.1 Communication: Summary of Achievements and Statistics

This section summarizes the communication performance and statistics for the full project period (Table 16).

Please note that all quantitative data and statistics provided in this section are mainly up to M34 since this deliverable was under finalization process during M35 and M36 and statistics could not be processed for running months. The actual full period statistics (M1-M36) will be presented during the final project review in March 2024.

Table 16: Total Communication Achievements

Activity	M1-M34 Achievements
Communication channels used	1 website 5 Social Media Channels
Total Number of News posted in Website (News webpage)	>168
Total Dissemination Activities communicated through the EVOLVED-5G Website	101
Total website visitors	1.410
Total website hits	10.574
Total website sessions	3.329

Total Number of Posts in Social Media channels	1510 (LinkedIn:375, Twitter: 438, Facebook:352, Instagram:345)
Total Number of Followers in Social Media channels	1517 (LinkedIn: 684 Twitter: 557, Facebook:118, Instagram:158)
YouTube channel	18 videos and 3 in playlists
YouTube subscribers	72 subscribers
YouTube views	1305 views
Newsletter issues published	11 (and 1 under final editing)
Leaflets	Leaflet (A4 two-fold) updated several times 800 printed
Posters	Poster (A1) updated several times 6 printed
Stickers	600 stickers
Online Articles, Press releases, Book Chapters	23 articles, 15 press releases, 3 book chapters

2.5.1.1 Website Performance, Statistics and Dashboards

The EVOLVED-5G website serves as the primary digital platform of the project. It functions both as a news platform, offering updates on project-related activities for any interested visitor, and as an online repository where individuals can access various project resources, including publications and activities. Additionally, users can easily navigate to different project-related links like the library and the marketplace. Therefore, it is crucial to monitor and assess the website's performance effectively. To achieve this, Google Analytics and Google Data Studio are employed to present the website's activity in a comprehensive and easily comprehensible manner. The total statistics of the EVOLVED-5G are available online here: <https://lookerstudio.google.com/u/0/reporting/da7d363b-b817-473d-ad42-db47e30207c8/page/pmtsB>

Figure 34 and Figure 35 are sharing details about the project's website from the beginning since M34. An important note at this stage is that in this deliverable we present data until M34, because processing data for the ongoing M35 and M36 months, when the current version of the deliverable was at its final editing, was not possible (ongoing months). The same applies also for the social media total dashboards. Months' M35 and M36 statistics will be included in the statistical dashboards to be presented during the final project review in March 2024.

As evident, the website dashboard is split into two distinct sections. The initial section comprises a single infographic displaying the total users alongside new user statistics. In this segment, readers can access data on session count (3329), engagement rate (59.06%), total views (10574), and average engagement time (2 min 59 sec). Moving to the second section of the dashboard,

interested stakeholders can delve into visitor acquisition methods, demographic insights, and the devices used to access the project's website. For instance, most of the visitors (73.5%) arrived directly at the website, with Greece being the country with the highest visitor number. Notably, the desktop remains the most popular device, followed by mobile phones and tablets.

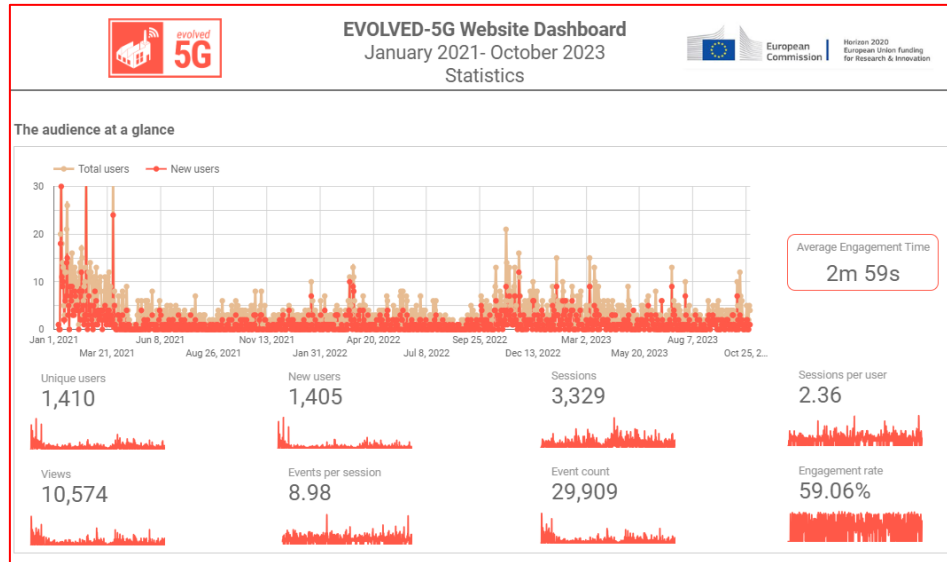


Figure 34: EVOLVED-5G website Total Statistics A (M1-M34)

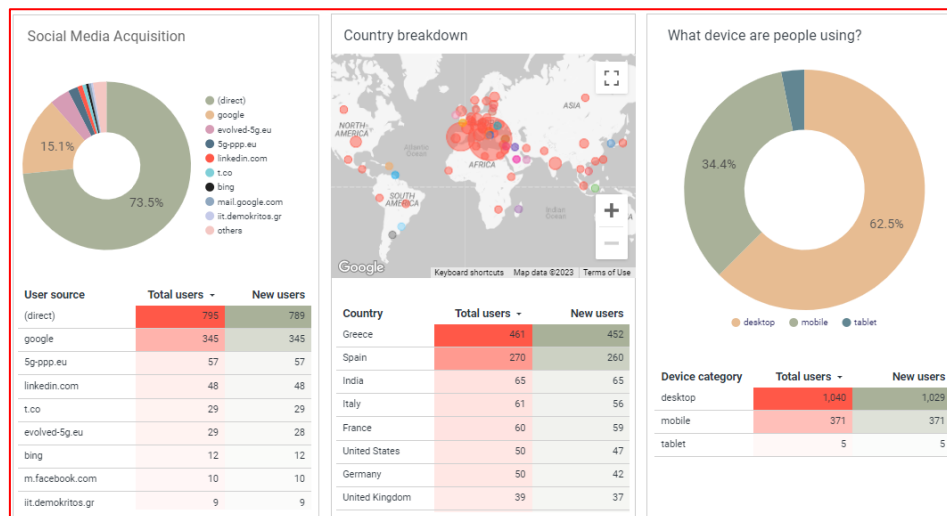


Figure 35: EVOLVED-5G website Total Statistics B (M1-M34)

2.5.1.2 Social Media Performance, Statistics and Dashboards

In addition to the website, we've created distinct statistical dashboards for each individual social media channel. Each dashboard is structured into various sections, featuring an infographic segment that provides insights into post views. Moreover, there's a dropdown list that allows visitors to browse different posts from the specified time frame. On the right side of each dashboard, we've included statistics for both the current period and the overall period. These dashboards are generated on a quarterly basis, or upon special requests for specific occasions and periods, like the current deliverable. Alongside the social media dashboards, we've included dedicated charts that display the total number of followers and the flow of posts.

- LinkedIn Total Statistical Dashboards
(<https://lookerstudio.google.com/u/0/reporting/55164c44-052c-45ae-a3c1-10bbab53ebed/page/1SSqB>)

EVOLVED-5G LinkedIn statistics are presented in Figure 36 where details about the views per post/date activity and the table with all the posts of the period are presented. During the specific duration, there were 375 posts made, garnering 6452 likes, 174,027 post views, and 562 connections according to the statistics.

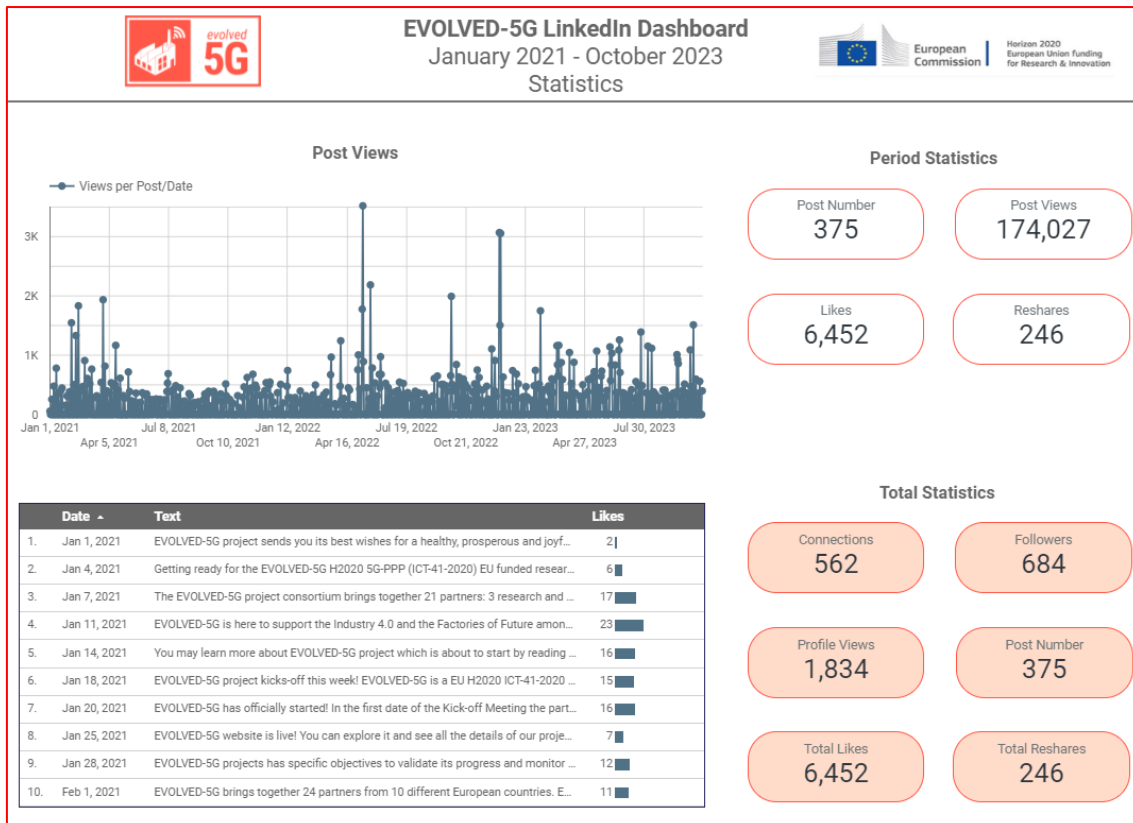


Figure 36: LinkedIn Total Statistical Dashboard (M1-M34)

- X (Twitter) Total Statistical Dashboards
(<https://lookerstudio.google.com/u/0/reporting/42ae4d4f-1fee-4779-af4d-786c6a10e219/page/4YFqB>)

The Twitter channel is presented in Figure 37. Throughout this 34-month period, the Twitter channel was very active with 438 tweets posted and 2,433 likes obtained. Additionally, the EVOLVED-5G Twitter channel has gained 557 new followers and amassed 5,669 engagements.

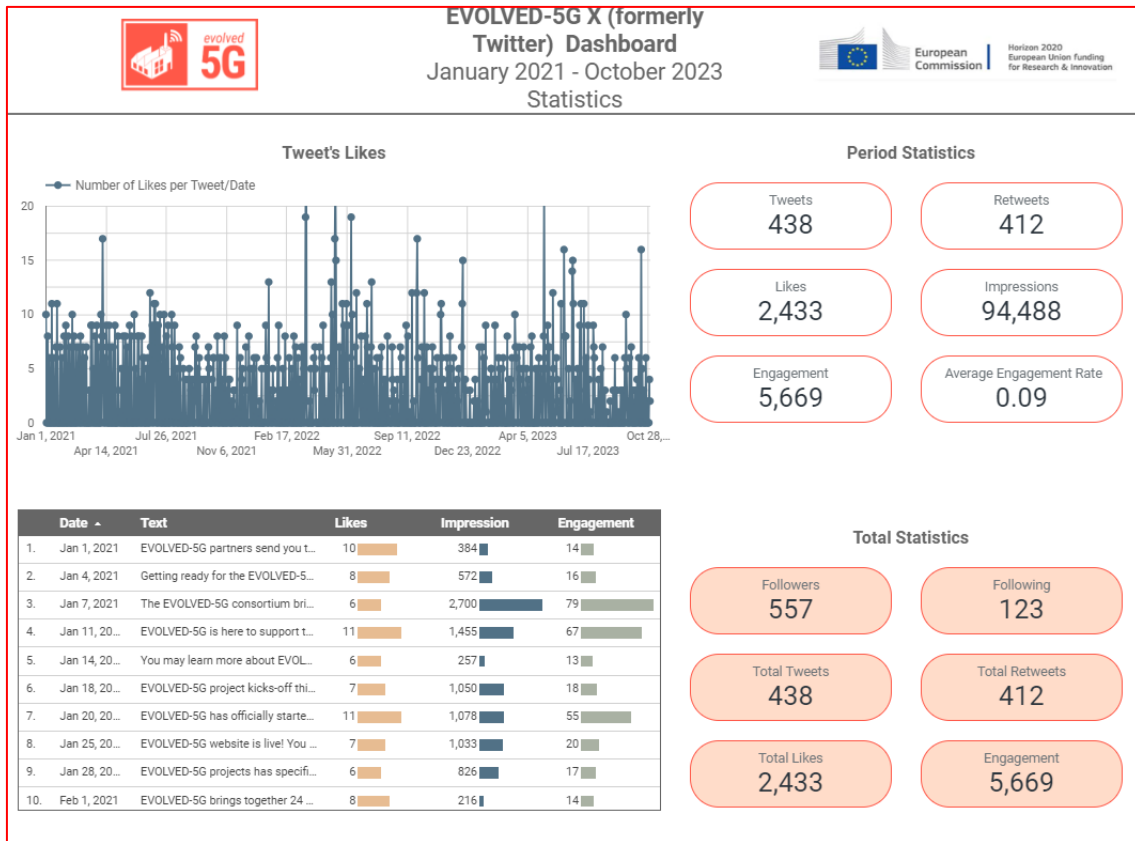


Figure 37: X (Twitter) Total Statistical Dashboard (M1-M34)

- Facebook Total Statistical Dashboards
(<https://lookerstudio.google.com/u/0/reporting/6e96afe2-daf9-4cac-9c7b-b346e330c125/page/j5mpB>)

Figure 38 illustrates the Facebook dashboard. A total of 352 posts were published via this Facebook, receiving 2,387 likes. Additionally, 118 individuals have shown appreciation for our Facebook page, resulting in 10,901 impressions and 3,113 engagements. Since the project initiation, there has been a cumulative reach of 16,212.

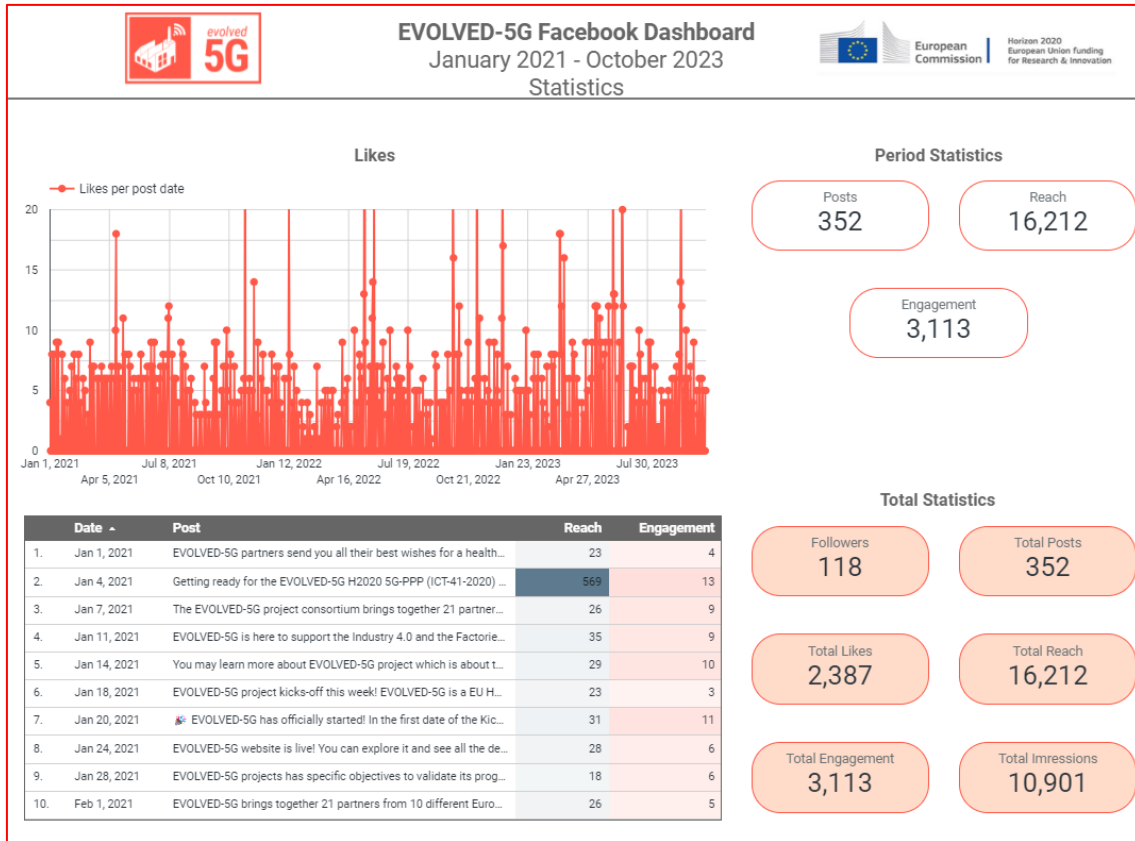


Figure 38: Facebook Total Statistical Dashboard (M1-M34)

- Instagram Total Statistical Dashboards
(<https://lookerstudio.google.com/u/0/reporting/13c3d2db-2580-4d7a-a551-f2f51b8e3094/page/rKQqB>)

Last but not least, the Instagram dashboard (Figure 39) is showcased. Over the course of 34 months, 345 posts were shared, accumulating 2,361 likes, and reaching 14,932 impressions. Furthermore, the EVOLVED-5G Instagram account has received 605 profile visits and acquired 158 followers.

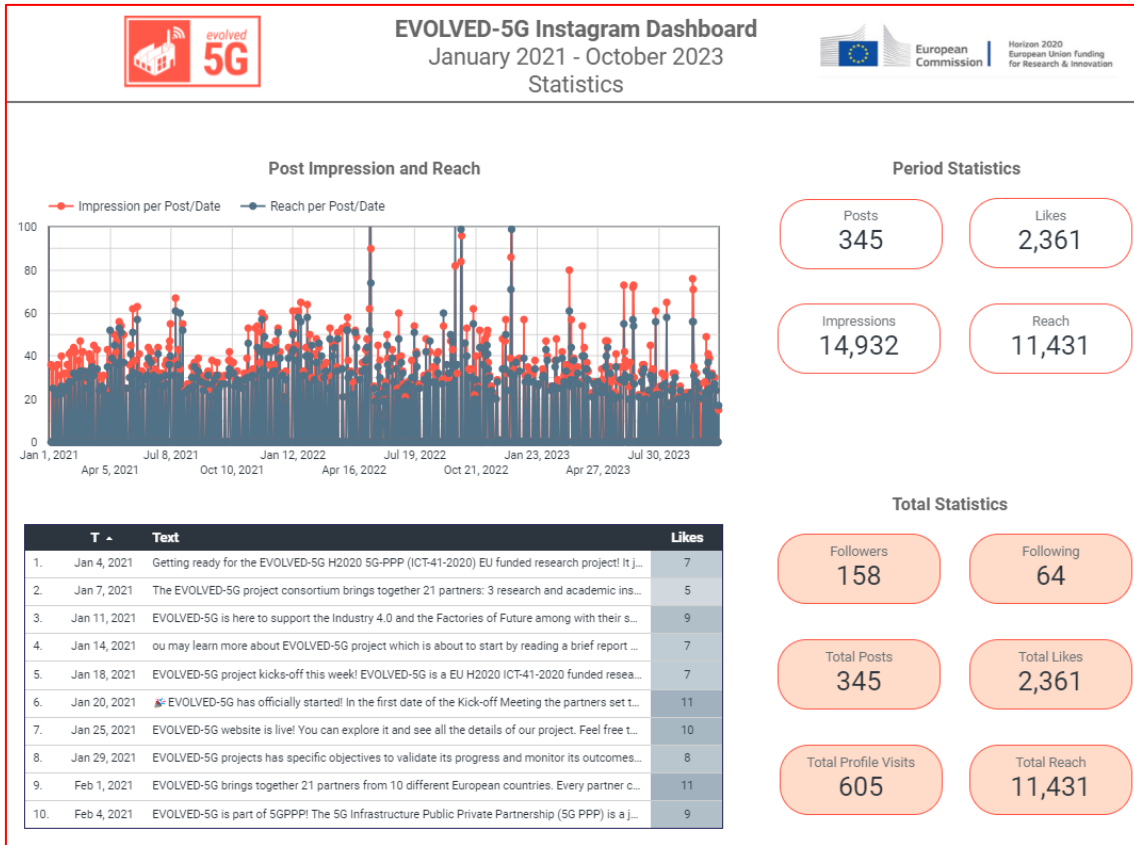


Figure 39: Instagram Total Statistical Dashboard (M1-M34)

2.5.2 Dissemination: Summary of Achievements and KPIs

Table 17 summarizes the Dissemination achievements for the full period of the project (until the very end of the editing period of this deliverable, up to M34-M35 approximately). The full quantitative dissemination results and statistics (M1-M36) will be presented during the project's final review in March 2024.

Table 17: Total Dissemination Achievements

Planned Dissemination Activities	Metrics	Target (as per DoA)	Defined Timeline (in Months) as per DoA	Current Status at M34
Publications in journals, workshops and conferences, articles, white papers	Number of publications	>20	M06-M36	33
Presentations in scientific events/conferences	Number of presentations	>20	M01-M36	48
Trials/Pretrials/Demos	Number of Trials/Pretrials/Demos	>5	M19-M36	14

Exhibitions in industrial and scientific events - Booths	Number of exhibitions/ booths	>5	M12-M36	15
Organization of events (workshops/special sessions/seminars/training/poster sessions etc.)	Number of events	>10	M06-M36	17
Events attended/participated	Number of events	-	M01-M36	38

3 5G-PPP ENGAGEMENT AND ACTIVITIES

3.1 EVOLVED-5G PARTICIPATION IN 5G-PPP BOARDS, WGs AND MEETINGS

As outlined in the document D7.3 "Dissemination, Communication, and 5G-PPP Engagement Plan," and more specifically in the section titled "EVOLVED-5G Participation In 5G-PPP Boards, WGs And Meetings/Activities," the EVOLVED-5G consortium has been actively engaged in collaborative dissemination efforts with the primary goal of contributing to the 5G-PPP Working Groups (WGs) and to establish alignment and foster synergies with these 5G-PPP WGs.

This series of activities during the lifetime of the project holds significant importance in ensuring that the outcomes of the EVOLVED-5G project are in harmony with the broader research ecosystem. Furthermore, it played a pivotal role in ensuring that the project's major achievements, especially those of a technical nature, receive the necessary visibility within the research community.

The following subsections describe some of the main points of interest and activities for the EVOLVED-5G partners stemming from the 5G-PPP WGs, and the respective meetings that took place.

3.1.1 Steering Board

EVOLVED-5G project has maintained a robust and impactful presence within the Steering Board (SB) of the 5G-PPP. Indeed, the project has been represented in all SB meetings by its project coordinator, Mr. Javier Garcia Rodrigo, who attended all online meetings and the two in-person meetings following the alleviation of COVID-19 travel restrictions (Athens and Barcelona, respectively):

- 2021-02-08_SB (large) Telco
- 2021-04-07_SB_Telco
- 2021-06-07_SB (large) Telco
- 2021-07-20_SB_Telco
- 2021-09-27_SB (large) Telco2021-11-29_SB Telco
- 2022-01-24_SB (large) Telco
- 2022-03-14_SB Telco
- 2022-05-09_SB (large) Telco
- 2022-06-23_SB_Telco
- 2022-10-05_SB_Athens
- 2022-11-23_SB Telco
- 2023-02-03_SB_Barcelona
- 2023-04-04_SB-Telco
- 2023-09-18_SB Telco

In these meetings the project had the chance to advertise activities of interest for the 5G-PPP community. For example, it was strongly advertised the project's presence at the EUCNC & 6G summit that took place in Gothenburg (Sweden) on 06-09 June 2023 with a physical booth, as well as the accelerator online demo day for SMEs and startups that EVOLVED-5G organized as part of the envisioned support toward SMEs and startups community in the context of T6.2.

In the SB meetings the project also supported the suggested cross collaboration task force among all ICT-41 projects, which ended up falling under the coordination of the 5G-PPP Technical Board (TB) and in particular, within the scope of the 5G-PPP “Software Network Working Group”. Such collaboration was indeed realized with the production of the final white paper of the working group titled “Network Applications: Opening up 5G and Beyond networks (version 2.0)” in which EVOLVED-5G provided valuable contributions (see section 4.1.4). A summary was also added to the “5G-PPP in review report”, the final white paper produced by all the working groups of the 5G-PPP with the aim of wrapping up the work done throughout the lifetime of 5G-PPP.

As the 5G-PPP was coming to the end in 2023 and with the emergence of the 6G-IA replacing the 5G-IA as main voice of the European Industry and Research for next generation networks and services and also fundamental body of the private side in the Smart Networks and Services Joint Undertaking (SNS-JU) (which in turn was replacing the 5G-PPP as new public-Private Partnership aiming at developing the industrial leadership in Europe in 6G networks and services), EVOLVED-5G, through the affiliation of Telefónica Investigación y Desarrollo S.A.U as full industry member of both the 5G-IA and 6G-IA association, joined the discussions for the handover of the activities between the 5G-PPP and the SNS-JU (the so-called “passing the torch events”) in which three main ideas were shared:

- Telecom networks must find a balance between performance and sustainability to properly support the implementation of 5G/6G services.
- Network Applications are key software components that undeniably facilitate the integration between vertical applications and the exposure of network resources. Network Applications also connect key stakeholders of the ecosystem of future telecom systems: SMEs (on the service side) and telecom operator/infrastructure owners (on the networks side).
- More efforts in standardization are required to facilitate interoperability and seamless interactions between network components, devices, and final users.

3.1.2 Technical Board

Dr. Harilaos Koumaras from NCSRDI, who serves as the Technical Manager of the project, and Dr. Dimitris Tsolkas from FOG, who holds the position of deputy Technical Manager, have actively taken part in the telecommunications conference calls of the 5G-PPP Technical Board, serving as representatives for the EVOLVED-5G project. Below are listed and described both the meetings and the most important topics of prime interest for the project:

Meeting, 13th of January 2022

During the meeting held on the 13th of January 2022, several important topics were discussed regarding the upcoming TB workshop. The agenda included discussions on various key areas, including the insights gained from trials like 5GCroCo, emphasizing the significance of security in the context of 5G technology. Additionally, participants delved into identifying commonalities and touchpoints within the 5G-PPP framework, as well as the integration of Network Applications and Northbound interface. Notably, the meeting also revolved around the discussion of key achievements in projects such as 5GASP, 5G-INDUCE, EVLOVED-5G, 5GMediaHUB, 5G-IANA, 5G-EPICENTRE, 5G-ERA, and Smart5Grid, with ongoing considerations about the possibility of creating a collaborative joint workshop to further explore these advancements and developments in the 5G domain.

Meeting, 10th of February 2022

During that meeting, several key topics were discussed to better align the scope and initial triggers within the project, particularly concerning platforms spanning from ICT-17 to ICT-19. It was noted that new projects do not always operate at the same level regarding platform integration; some projects, as exemplified in ICT-41, embrace this integration, while others, like those in ICT-52, do not necessarily prioritize it. This raised the question of whether the focus should be reshaped to better serve the project's objectives, with a suggestion to maintain the active KPI cartography as a fundamental element.

Furthermore, there was deliberation on the 5G-IA TB White Paper, including the possibility of broadening the scope to encompass ongoing White Paper activities within the Working Groups. This required active participation by projects in the Test, Measurement, and KPIs Validation Working Group (TMV) to gather crucial insights and information regarding KPIs, with an emphasis on the latest white papers. Collaboration between the TMV and projects like ICT-52 (such as Hexa-X) on KPI findings, particularly in the context of 6G KPIs, was discussed as a potential avenue for enhancing cooperation and knowledge-sharing within the project.

17th of March 2022

In this meeting, important decisions were on the agenda, with the first concerning the usage of the same Key Achievements in version 3.2 as in version 3.1. Projects were tasked with evaluating whether new Technical Areas were required or if current ones needed to be rephrased to more accurately represent their activities.

Meeting, 7th of April 2022

The KA-Table, which represents the Key Achievements (KAs) table, was a subject of discussion during the meeting. The participants reviewed and deliberated on the need to work on a reference figure that would complement the KA-Table. The objective was to enhance the visual representation of key achievements and provide a more comprehensive overview of the project's accomplishments, ensuring that this information is presented in a clear and effective manner. The discussion emphasized the importance of creating a reference figure that would be aligned with the project's goals and objectives (Figure 39).

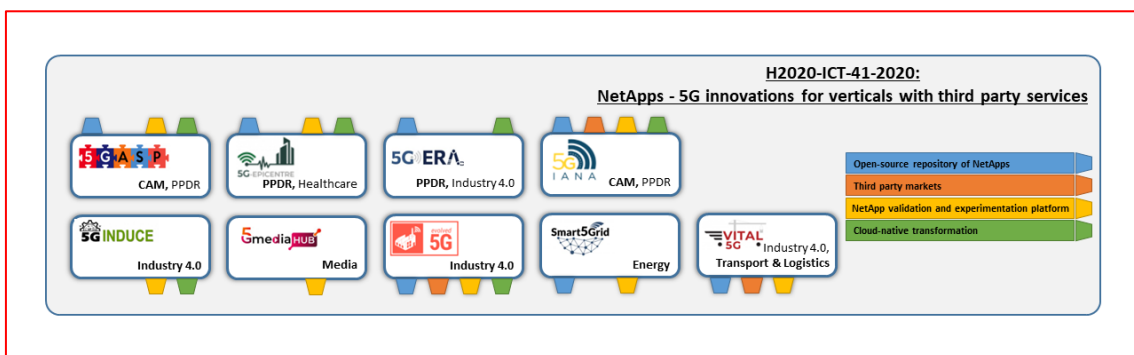


Figure 40: Reference Figure including ICT-41 projects, as produced by the Technical Board

Meeting, 19th of May 2022

During that meeting, there was a discussion to encourage the 5G-IA TB to focus on the production of concise and targeted white papers. These white papers should be geared towards addressing specific verticals and should encompass valuable lessons learned, experiences, and recommendations. This initiative was seen as highly beneficial not only for the SNS but also for

the broader 5G PPP community. The emphasis was on the importance of creating content that could provide practical insights and guidance to stakeholders in different domains within the 5G ecosystem.

Meeting, 22nd of September 2022

The meeting encompassed several significant agenda items, with a focus on the future of 5G-PPP Working Groups (WGs), Steering Board (SB), and the Technology Board (TB). Furthermore, project-related matters were discussed, including those pertaining to ICT-41 and the standardization efforts related to the Network Applications platform. These discussions were aimed at ensuring the harmonious development and alignment of projects within the 5G-PPP framework, fostering collaboration and coordination among stakeholders.

6th October 2022-Physical meeting Athens

During the physical meeting, both Dr. Harilaos Koumaras, Technical Manager and Dr. Dimitris Tsolkas, deputy Technical Manager participated in-person. On behalf of EVOLVED-5G, Dimitris Tsolkas delivered a presentation on “The Network App ecosystem: from the Network App lifecycle support to a Common API management framework,” providing an in-depth exploration of Network Applications and their lifecycle support, as well as the development of a Common API management framework of EVOLVED-5G project. Dr. H. Koumaras also pointed out the main concepts around which EVOLVED-5G deals with the Network App development and the tight integration with the 5G system in contrast to other sister projects that are considering the provision of Network Applications over the top of the 5G.

The meeting also included detailed discussions on various aspects related to Network Applications:

- The potential and challenges associated with moving towards a common marketplace for Network Applications, highlighting the opportunities and potential obstacles involved.
- The standardization of Network Applications platforms, with valuable input from the SB to ensure consistency and compatibility.
- The engagement of third parties in open experimentation, emphasizing the importance of collaboration and external involvement.
- The definition and tracking of KPIs specific to Network Applications, allowing for a comprehensive assessment of their effectiveness.

Additionally, the progress of the Industry 4.0 White Paper was discussed, with a positive outlook on the advancement of this work and the development of a White Paper on Non-Public Networks (NPNs) was also addressed,

Meeting, 27th of October 2022

Following up the F2F meeting, the call held, included updates on various whitepapers, reflecting the progress made in these important documents. This encompasses both the Industry 4.0 White Paper and the Non-Public Networks (NPNs) White Paper, with the assurance that work was advancing well. Additionally, the meeting featured key takeaways from the TB F2F meeting, allowing for reflections on the insights and discussions that transpired during that gathering.

Meeting, 8th of December 2022

During the meeting, there was a presentation on a potential cooperation initiative from ICT-41 projects. The initiative primarily focused on Network Applications concept and outlined several key objectives:

- Objective A: The creation of an ICT-41 website portal, potentially leveraging the support of the 6GStart CSA to address any website-related requirements necessary for this activity.
- Objective B: The emphasis on standardization efforts, with a proposed interaction between ICT-41 projects and the Software Network Working Group as well as the Pre-Standardization Working Group to promote consistency and alignment.
- Objective C: The exploration of business-related aspects, including the potential development of a white paper. This white paper might be created in collaboration with a relevant Working Group, such as the Vision Working Group, to provide valuable insights and recommendations.

In another note, during that meeting it was strongly recommended that the initial term “NetApp” should not be used within the context of 5G-PPP to avoid any potential confusion or trademark-related issues. A suggestion was made to replace “NetApp” with “Network Application” or “Network Applications” (as mainly used in this deliverable), or with its shorter forms, such as “Network App” or “Network Apps,” when referring to the broader concept, thus ensuring clarity and compliance with trademark regulations. This clarification aimed to promote consistency and legal compliance within the 5G-PPP framework. Moreover, the finalization of the Reference figure illustrating the whole initiative, has been presented (Figure 41).

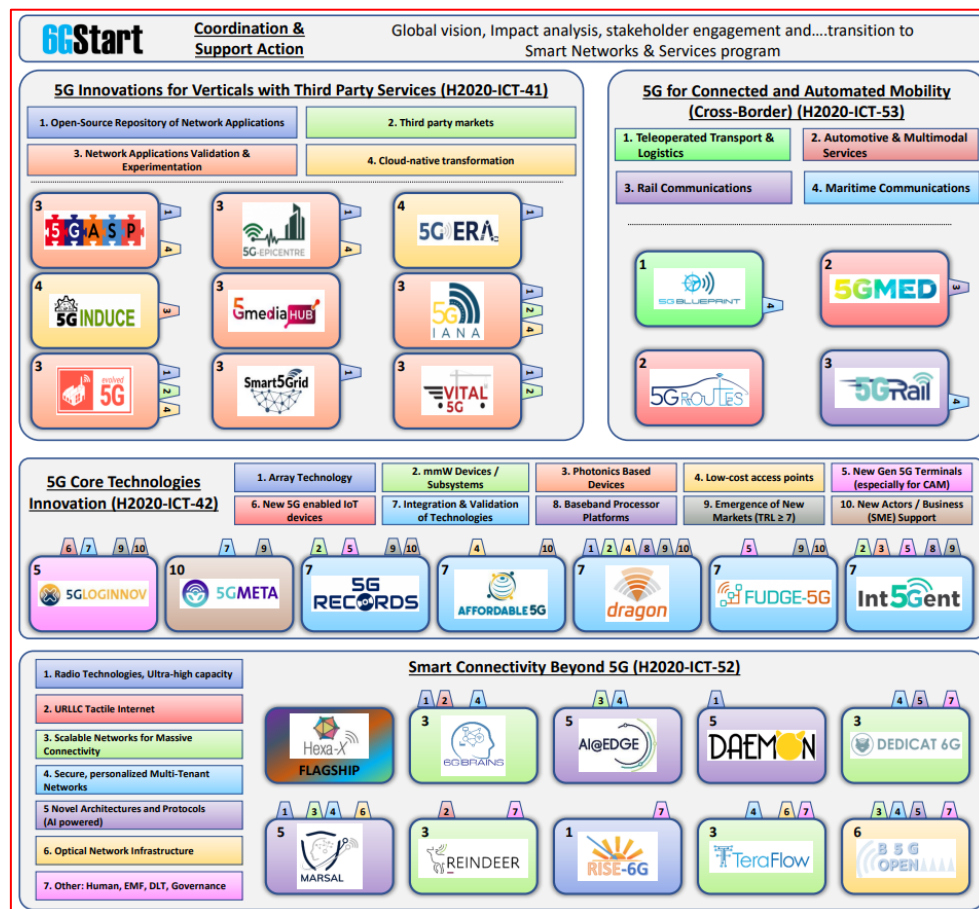


Figure 41: Reference Figure including all 5G-PPP projects (produced by the Technical Board)

Meeting, 26th of January 2023

The subject covered in the preceding meeting (Reference Figure of stakeholders and projects) was elaborated upon and subsequently revised.

Meeting, 16th of February 2023

The meeting at that time mainly addressed topics related to the 5G-PPP Stakeholder Picture, as well as upcoming events such as EuCNC and the 6G Summit scheduled for early June 2023.

Meeting, 30th of March 2023

During the meeting, there was a discussion about the need for a final 5G-IA TB document that would emphasize key takeaways and outcomes, and serve as a valuable resource. It was proposed and agreed that the goal should be to create a joint document involving the TB, SB, and WGs. The objectives of this document encompassed several key areas:

- A technical wrap-up that provides a comprehensive overview and points to key documents and perspectives developed during the initiative, including a potential connection to previous vision papers addressing various verticals.
- Providing guidance on how to meaningfully contribute to standards, potentially through collaboration with the Pre-Standardization Working Group.
- Offering insights and best practices on how to engage effectively with verticals, drawing upon lessons learned from both Working Groups and projects associated with or related to vertical markets.
- Bringing in key insights and learnings from the EuCNC session and expanding on these findings to provide valuable input for future endeavours.

The aim was to create a comprehensive document that encapsulates the knowledge, achievements, and strategic guidance developed within the 5G-IA TB and to ensure that it is well-received by the SB and other stakeholders.

Meeting, 1st of June 2023

One of the ongoing TB activities highlighted during the meeting was the conclusion of TB White Papers, which played a crucial role in sharing knowledge, insights, and key takeaways from TB's work. The meeting emphasized the significance of summarizing these activities and insights to bring them to a meaningful conclusion.

Meeting, 28th of September 2023

The meeting at that time emphasized the current joint activities involving the TB, SB and WGs, particularly focusing on the development of the 5G-PPP final/closing white paper. The primary goal was to compile and document the collective insights, achievements, and contributions made by the TB over the years.

A key point underscored in the meeting was the decision not to initiate any new technical activities. Instead, the focus was placed on concluding and wrapping up existing TB activities that were already in progress. This final stage was intended to provide a comprehensive summary of the overall achievements of the TB throughout its existence and to officially close all ongoing TB activities, ensuring that the legacy of the initiative is well-documented and preserved.

3.1.3 Architecture WG

The deputy Technical Manager Dr. Dimitrios Tsolkas (FOG) and Dr. Apostolis Salkintzis (LNV) have actively participated in all the telco calls of the Architecture WG during the lifetime of EVOLVED-5G project. Below, the series of meetings is described, along with some key takeaways from each meeting.

Meeting 11th February 2022

During the meeting, the discussion revolved around individual project plans for EuCNC 2022, specifically pertaining to the Industry 4.0 Workshop on 'Technology Pillars and Use Cases for Industry 4.0.' This workshop was proposed jointly by 5G-CLARITY and FUDGE-5G, and involved participation from several 5G-PPP projects, including 5G-CLARITY, FUDGE-5G, 5G-DIVE, MARSAL, and EVOLVED-5G.

Additionally, the meeting covered the scoping of the next White Paper, outlining the intended focus and objectives for this document. This scoping process was a crucial step in defining the scope and content of the upcoming white paper, ensuring that it aligns with the project's goals and provides valuable insights to the 5G-PPP community.

Meeting 4th March 2022

The subjects covered in the preceding meeting were elaborated upon and subsequently revised.

Meeting 1st April 2022

The meeting agenda included a presentation on the Hexa-X Architecture focusing on Architectural Enablers, particularly from Hexa-X WP5, which was reflecting the content of the D5.1, an already published deliverable of the project.

Meeting 29th April 2022

The subjects covered in the preceding meeting were elaborated upon and subsequently revised.

Meeting 27th May 2022

The meeting covered the scoping of a new White Paper related to Beyond 5G and 6G, with an emphasis on defining the structure of the chapters within these documents. Additionally, there was a discussion on further considerations regarding the organization and structure of these chapters, aiming to ensure that the white paper would effectively convey the desired content and insights.

Meeting 8th July 2022

During the meeting, editors per chapter for the whitepaper have been assigned and the deputy technical Manager of EVOLVED-5G, Dimitris Tsolkas, had the responsibility of working on the Chapter focusing on programmability in 5G and 6G networks.

F2F Meeting 20-22 July 2022

The F2F meeting that took place on Heidelberg provided an excellent opportunity to collaborate and make significant progress on the topics related to the whitepaper. It allowed for in-depth discussions, knowledge sharing, and the alignment of efforts to achieve the defined goals set by the WG.

Meeting 28th October 2022

The meeting addressed the organization of future WG telcos, specifically focusing on topics related to 6G white paper, the development of a book with the content of the aforementioned whitepaper, and the business activities of the Arch WG. The discussions in this regard aimed at establishing a structured plan for managing and conducting these calls effectively, ensuring that the work on 6G white paper, book project, and Arch WG activities would proceed smoothly.

Meeting 9th December 2022

The meeting covered the Globecom 2022 Workshop on 6G Architecture (#2), which took place on December 8, 2022. It was reported that the workshop was a successful and productive event, likely involving discussions and presentations related to 6G architectural concepts and developments. Furthermore, there was a focus on the finalization of the 6G architecture white paper.

Meeting 3rd Feb 2023

The subjects covered in the preceding meeting were elaborated upon and subsequently revised.

Meeting 17th February 2023

The meeting included initial discussions regarding the proposal and submission of a workshop for EuCNC 2023.

Meeting 31st March 2023

The meeting addressed the final milestone related to the delivery of the 6G Book and discussed the progress made in preparing the book, its content, and the timeline for its delivery.

Meeting 12th May 2023

The meeting discussed two important topics:

Passing the “Torch” event from 5G-PPP to SNS: This topic involved planning and coordinating an event in which the "torch" of knowledge and responsibility was handed over from the 5G-PPP initiative to SNS.

EuCNC Participation: The meeting addressed the participation of the project in the EuCNC (European Conference on Networks and Communications) event. Specifically, it referred to the Working Group's involvement in "Special Session 2: 6G Architecture – European View" at the conference.

Meeting 23rd June 2023

During the meeting two main topics were discussed:

- EuCNC Participation: Specifically, the discussion revolved around the project's involvement in the EuCNC event and the outcome of the participation in "Special Session 2: 6G Architecture – European View."
- 6G Book Dissemination: There was a discussion regarding the dissemination plan for the 6G Book, which was nearing completion or publication.

3.1.4 Software Defined Networks WG (SDN) (LNV & UPV)

Partners from TID UPV and LNV have actively participated in the telco conference calls of the 5G-PPP SDN/NFV WG, representing the EVOLVED-5G project. Below, a list of the meeting dates and the most important topics discussed during these sessions is described.

1st June 2022

The main focus of the meeting was a discussion about the initial version of the whitepaper titled "Network App: Opening up 5G and Beyond Networks" by 5G-PPP. The primary agenda was to review the content and outline the work that needs to be undertaken to further develop and refine the whitepaper.

7th June 2022

The meeting primarily focused on preparations for the upcoming Meditcom 2022 workshop, as well as reviewing feedback received from EUCNC. Additionally, discussions centred on outlining further developments and refinements for the white paper.

12th December 2022

The meeting revolved around a detailed discussion of the various approaches outlined in the Network App whitepaper, specifically those related to Network Applications. Participants shared their insights and initial thoughts on how to proceed with the development of the second version (v2) of the whitepaper, highlighting the necessity for refining and evolving the content. This discussion included specific items and technologies (CAPIF, NEF, UPF exposure) to be described in the next version.

5th January 2023

The meeting took place including further discussions and work on Whitepaper v2, as well as preparations for an EUCNC Workshop. Key ideas included exploring how 6G enablers would impact the Vertical Business of Tomorrow, emphasizing their relevance to network applications. The discussions also centred on how these 6G enablers would be beneficial for next-generation vertical business operations.

19th January 2023

During that meeting, there was an exploration of the concept of "Marketplace & Business" as an additional element to be considered in the context of the Whitepaper.

1st February 2023

The meeting primarily revolved around discussing the composition of Network Applications, with a focus on the functions and components that are chained together to create them. Participants worked on listing and defining the available components per project, highlighting their exposed interfaces and related details.

In addition, the meeting featured an exploration of examples of Network Applications already in development within the projects, serving as practical demonstrations of how these components come together to form real-world applications. This discussion aimed to illustrate the practical aspects of Network Applications and the synergy between different projects in their development.

9th March 2023

During the meeting, there was a specific focus on White Paper v2 and the introduction of the CAMARA APIs concept. Participants engaged in discussions regarding how this concept would be integrated into the whitepaper, further elaborating on the role and relevance of CAMARA

APIs within the context of 5G and beyond networks. This included considerations for how CAMARA APIs would enhance network capabilities and enable new functionalities. The meeting aimed to provide clearer directions for the inclusion of the CAMARA APIs concept in the new version of the whitepaper.

4th May 2023

During the meeting, the relevant sections of CAMARA, standardization, and marketplace were refined and polished. The whitepaper was finally released in June 2023.

3.1.5 SME WG

EVOLVED-5G has joined the SME WG since the beginning of the project and it is represented by INFOLYSIS and ININ. During the reporting period, SME WG has organized 10 general assembly meetings (frequency shifted to monthly on the second half of 2023 with the latest ones being available online at <https://www.youtube.com/@NetworldEuropeSMEWG>), has run a new governing body election process and has participated in several dissemination and impact activities. INFOLYSIS has attended all meetings, while ININ attended 8 of them, voted for the new governing board, and represented EVOLVED-5G in project related activities.

In specific, interactions between the SME WG and other initiatives have been discussed and the following actions have taken place with INFOLYSIS participation/contributions on behalf of EVOLVED-5G in most of them:

- The “Find your SME” web page (<https://www.networldeurope.eu/find-the-sme-you-need-new-page>) at *NetworldEurope* (<https://www.networldeurope.eu>) has been updated 2 times in which INF has contributed.
- Feedback/Statistics on SNS Phase 1 calls was communicated.
- Progress on Phase 2 SNS calls for SMEs involvement has been discussed and communicated to SNS.
- A position paper/letter was drafted concerning SMEs role in upcoming HE SNS calls (INFOLYSIS contributed)
- 2023 updates of the SME WG web pages were implemented (<https://www.networldeurope.eu/sme-wg/>)
- New X (formerly Twitter) is online ‘@SME_WG_NwEurope’ (https://twitter.com/SME_WG_NwEurope) and used for retweeting EVOLVED-5G tweets.
- SMEs WG LinkedIn account created @NetworldEuropeSMEWG (<https://www.linkedin.com/company/networldeurope-sme-wg/>) and used for retweeting EVOLVED-5G posts.
- Social media interactions with shared/retweeted posts and mentions with partners, other projects, and events. Some indicative examples:
 - https://www.linkedin.com/posts/evolved-5g-project_learnaboutEVOLVED-5G-5g-5gppp-ugcPost-7119619345189646336-cNNr?utm_source=share&utm_medium=member_desktop
 - https://www.linkedin.com/feed/update/urn:li:activity:7084089058150277121?utm_source=share&utm_medium=member_desktop
 - https://www.linkedin.com/feed/update/urn:li:activity:7072897621694062592?utm_source=share&utm_medium=member_desktop
 - https://www.linkedin.com/feed/update/urn:li:activity:7071843700925960192?utm_source=share&utm_medium=member_desktop
 - https://www.linkedin.com/feed/update/urn:li:activity:7062728688517152768?utm_source=share&utm_medium=member_desktop

- <https://x.com/evolved-5g/status/1717463649495761328?s=20>
- <https://x.com/evolved-5g/status/1713879814564712798?s=20>
- <https://x.com/evolved-5g/status/1708777666130702626?s=20>
- EUCNC 2023 SME WG participation and shared booth with SNS JU where EVOLVED-5G communication material was shared by INFOLYSIS representative (Mr. Vasileios Mavrikakis) who physically attended EuCNC the full week.
- New SMEs brochure released in 2022 (<https://bscw.5g-ppp.eu/pub/bscw.cgi/d518320/2022-sme-brochure-final.pdf>) and a new one is planned for end of 2023. INFOLYSIS profile updated.
- Success stories of SMEs were initiated in a more intense way. INFOLYSIS submitted its EVOLVED-5G success story in September 2023.
https://www.linkedin.com/posts/networkdeurope-sme-wg_infolysis-success-story-activity-7114564738100924416-uE-P?utm_source=share&utm_medium=member_desktop
- SNS questionnaire for better positioning SMEs topics and needs in the upcoming SNS WGs and calls. INFOLYSIS participated on behalf of EVOLVED-5G.
- INFOLYSIS as project's representative in the SME WG participated in the NetworkWorldEurope SME Working Group survey (Sept 2023). This survey had a trifold objective: to update the SME WG database with the latest information about members, to gain further insights about the SMEs participation in the SNS JU and research projects, and to collect feedback about the activities of the WG, its future in SNS and members' overall research activities and interests.
- A future white paper is targeted to be authored by SME members (potentially next year). This paper would be key to position the WG in the SNS as it evolves, as well as to voice the SMEs vision. INFOLYSIS expressed interest for participation.

Similarly, ININ partner has contributed to SME WG by following actions:

- Contribution to the "Find your SME" web page (<https://www.networkdeurope.eu/find-the-sme-you-need-new-page>) at NetworkWorldEurope (<https://www.networkdeurope.eu>) by regularly updating its profile.
- Contribution to the SME brochure entitled "European SME Expertise in 5G and Beyond" by publishing the company's profile in the brochure (<https://bscw.5g-ppp.eu/pub/bscw.cgi/d518320/2022-sme-brochure-final.pdf>)
- An article on ININ's Industrial IoT Gateway which has been recognized as a success story of November 2022 (https://www.networkdeurope.eu/find-the-sme-you-need-new-page/#SUCCESS_STORIES). Within the article, the EVOLVED-5G project is mentioned as the project where the IIoT GW is utilized.
- Participation in "SNS WG CONSULTATION 2023" survey.

3.1.6 Test, Measurement and KPI Validation WG (TMV) (UMA & TID)

Partners from FOG, ININ and COS have actively participated in the telco conference calls of the TMV WG, representing the EVOLVED-5G project. Below, an indicative list of the meeting dates and the most important topics discussed during these sessions is described below. Throughout the series of meetings, the focus remained on discussing and preparing 4 main key topics which encompassed the development of whitepapers on 5G Tools, 5G Trial Results, and B5G/6G KPI Monitoring and the contribution of the WG to ITU. All three whitepapers were released in May 2023.

During the meetings on the dates below, the main topics of discussion were the key concepts to be included in the whitepapers and the initiation of relevant activities.

- **25th January 2022**
- **23rd February 2022**
- **22nd March 2022**
- **3rd May 2022**
- **12th July 2022**

7th February 2023

During the meeting, comprehensive discussions were held on the progress of whitepapers on 5G Tools, 5G Trial Results, and B5G/6G KPI Monitoring. Additionally, there were deliberations on contributions to the International Telecommunication Union (ITU). It was also noted that two proposals prepared by 6G-IA are under consideration for submission: a) KVIs from Vision WG and b) KPIs from TMV WG.

2nd May 2023

During the meeting, comprehensive discussions revolved around the three key topics, namely the final touches on 5G Tools, 5G Trial Results, and B5G/6G KPI Monitoring whitepapers. These discussions were instrumental in shaping the direction and content of these important documents.

3.1.7 Pre-Standardization WG (Pre-Std)

Dr. Apostolis Salkintzis (LNV), as representative of EVOLVED-5G, has actively participated in the meetings that were held in regard to the Pre-Standardization WG. As an outcome, the project's substantial contributions to standards not only highlighted the impact and added value of the WG but also validated the quality and relevance of the produced results of the project during its lifetime. The overall standardization activities carried out during the period (M1-M36) have been integrated into Deliverable D7.6, outlining the accomplishments during this timeframe, particularly highlighting the incorporation of EVOLVED-5G contributions into standards.

Among the several topics addressed in the Pre-Standardisation WG meetings, it is noteworthy to highlight the produced reports, that reflect the successful SDO contributions.

2022 Q3 SDO impact report (*refer to the Figure 42, Figure 43, Figure 44, Figure 45 and Figure 46*)

During this quarter EVOLVED-5G has been ranked among the top Projects by Impact: 1) Hexa-X, 2) 5G-Victori, 3) EVOLVED-5G.

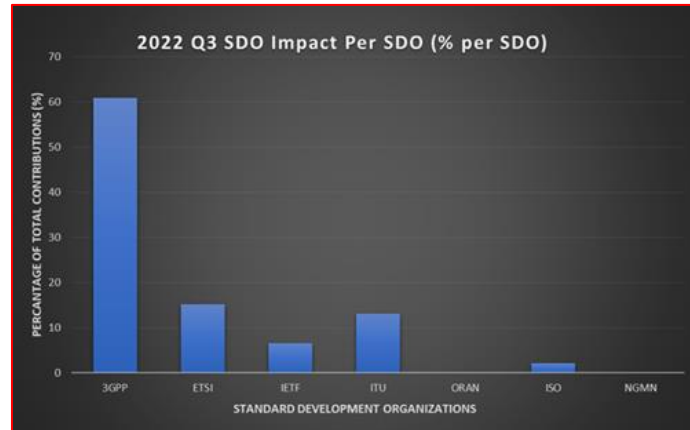


Figure 42: Q3 Impact Breakdown by SDOs

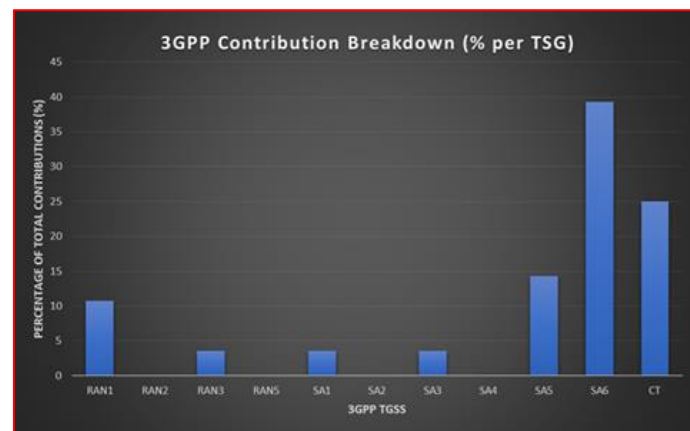


Figure 43: Q3 3GPP Impact breakdown by TSG.

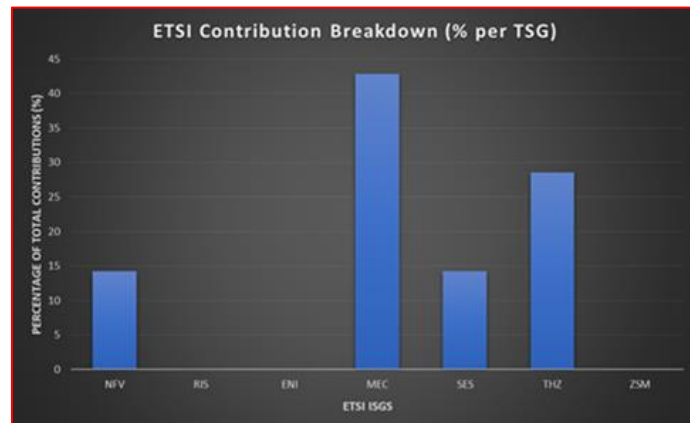


Figure 44: Q3 ETSI Impact breakdown by ISG

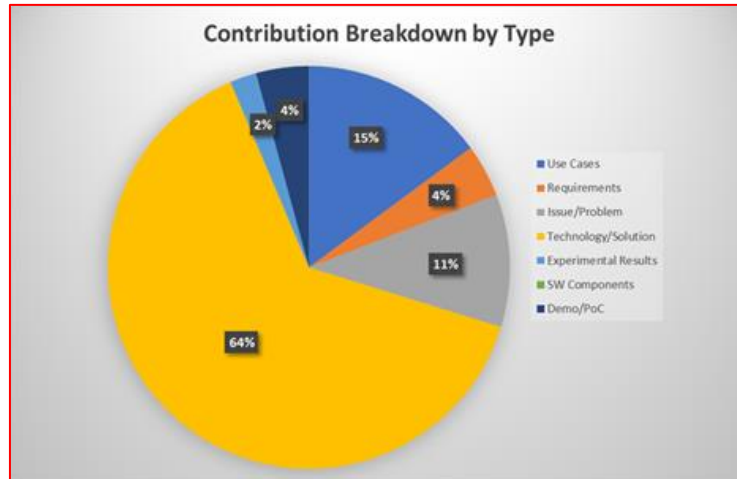


Figure 45: Q3 Impact breakdown by Type

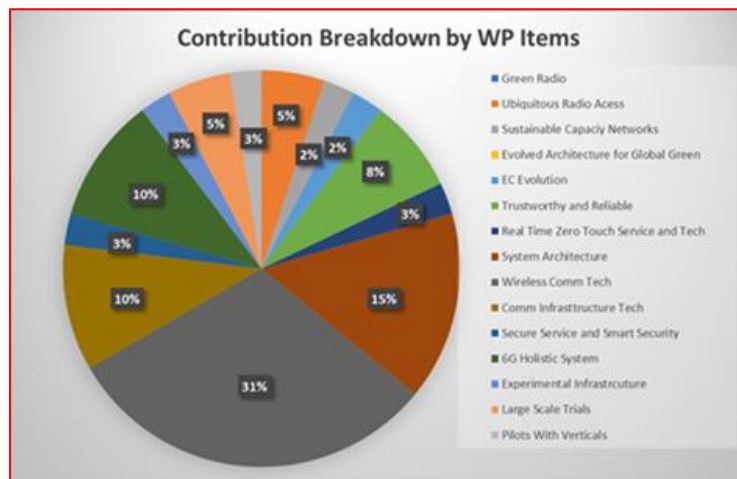


Figure 46: Q3 Impact breakdown by SNS WP Items

2022 Q4 SDO impact report

A special webinar has been organized, which focused on illuminating the scope, goals, and expectations of the Pre-Std Working Group (WG) with a specific emphasis on how it pertains to SNS-JU Phase 1 projects. The objective was to provide valuable insights and guidance for all stakeholders involved in these projects. The outcome and the key stats are reflected in the charts below. During the fourth quarter, EVOLVED-5G was again among the top 3 projects with the most contributions and active involvement.

Moderate response from projects

- 12 projects responded to the call
(-2 compared to Q3, -4 compared to Q2)
- 5 projects reported notable impact
(-8 compared to Q3)
- Fair impact for 2022 Q2 SDO
- ~80 impact items reported
(+75% compared to Q2)
- 3GPP, ETSI, O-RAN privileged targets

Projects reporting

- Deamon (24)
- Evolved 5G (20)
- Reindeer (17)
- Hexa-X (7)
- 5G-Solutions (3)
- Teraflow (3)
- Fudge-5G (2)
- 5G-IANA (1)
- 5GMETA (1)
- 5G-LOGGINOV (1)
- CONNECT (1)
- 5G VICTORI (?)

Figure 47: Overall status of Q4 compared to Q3

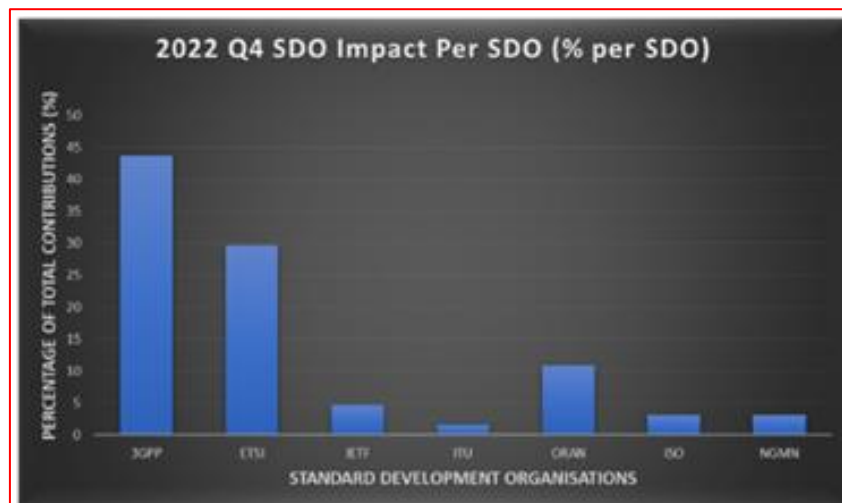


Figure 48: Q4 Impact Breakdown by SDOs

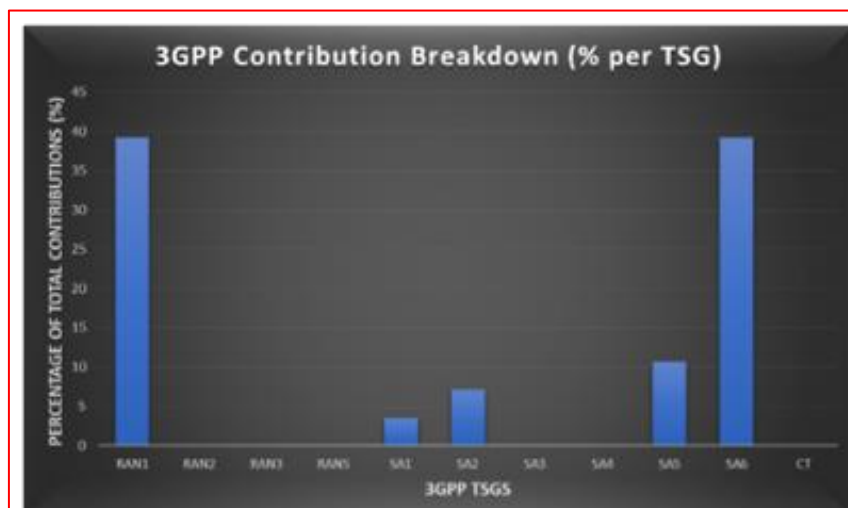


Figure 49: Q4 3GPP Impact breakdown by TSG.

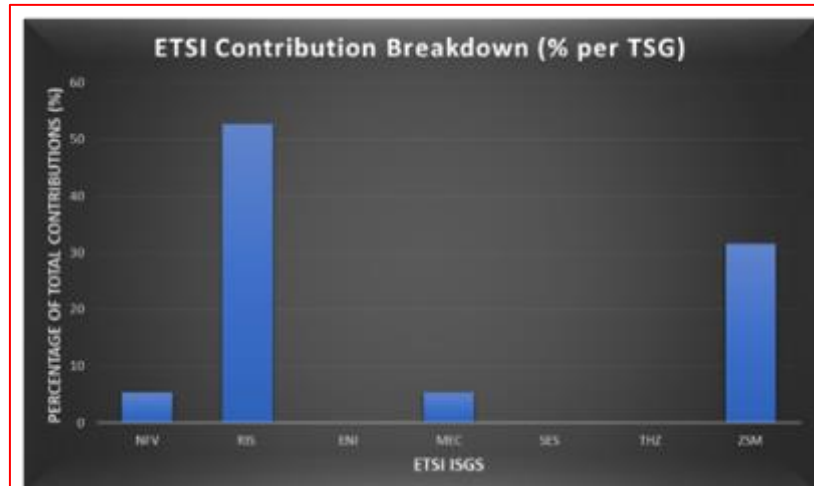


Figure 50: Q4 ETSI Impact breakdown by ISG

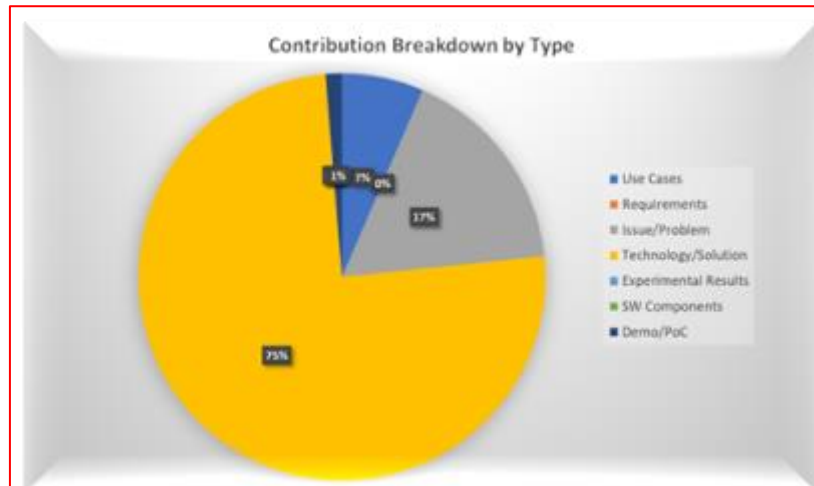


Figure 51: Q4 Impact breakdown by Type

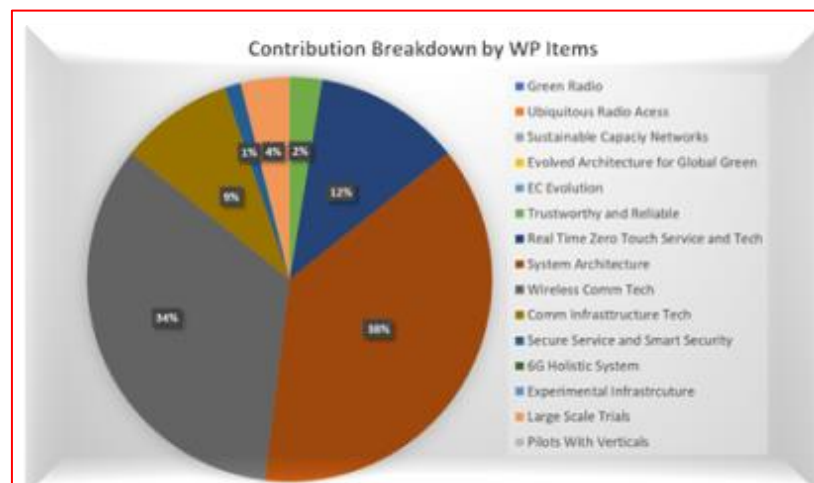


Figure 52: Q4 Impact breakdown by SNS WP Items

The final meetings of the WG focused on discussions on how to enhance the impact of EC-funded projects on standards, drawing from the experience of Horizon 2020. Based on the discussions,

the positive developments are evident, since SNS projects as well, have demonstrated clear intentions and plans toward engagement with the SDOs.

3.1.8 5G-PPP Comms

EVOLVED-5G main representatives (George Makropoulos-NCSRD and Vasilios Mavrikakis-INF) as well as other partners, have been constantly monitoring the activities of this initiative. An activity that reflects the active involvement was the constant circulation, to all EVOLVED-5G partners, of the emails stemming from 5G Comms describing synergies and impact creation opportunities via events, new calls, scientific papers, co-organization of workshops and special sessions.

3.2 EVOLVED-5G ACTIVITIES (M19-M36)

3.2.1 Contributions to 5G-PPP

From M21 through M36 of the EVOLVED-5G project, the consortium partners have maintained active involvement in 5G-PPP organized activities. Throughout this period, ongoing monitoring has been conducted, with a specific focus on the 5G-PPP working groups and the relevant activities stemming from the latter. EVOLVED-5G has been actively engaged in a variety of activities within the 5G-PPP framework. These activities include contributions to whitepapers from different working groups, as well as brochures, presentations, and surveys. The following subsections outline the specific contributions made by EVOLVED-5G during this timeframe.

3.2.1.1 *Contribution to 5G-PPP Software Network Working Group whitepaper "Network App: Opening up 5G and beyond networks"*

This paper aims to demystify the concept of the Network Applications. Different Network Applications implementations have been conducted by different ICT-41 projects considering various API types and different levels of trust between the verticals and the communications service providers (CSPs). In this paper, the different approaches considered by the projects addressing Network Applications, are summarized and categorized. In addition to the views of many ICT-41 projects, this paper also collected the view of some projects from ICT-52 & ICT-42. EVOLVED-5G project provided the view of delivering Network Applications referring to the control plane, that enable network-aware service provisioning to verticals (vertical application providers) by providing network and end user-related information (currently unavailable at the verticals side).

3.2.1.2 *5G and Beyond 5G Ecosystem Business Modelling*

The white paper, authored by the Business Validation, Models, and Ecosystems (BVME) subgroup of the 6G Infrastructure Association, Vision and Societal Challenges Working Group in May 2023, delves into the intricacies of business modelling within the context of 5G and beyond 5G ecosystems. It begins by elucidating how the disaggregated and modular nature of 5G and beyond 5G technologies fosters a dynamic business ecosystem characterized by a multitude of interdependent actors, roles, and business relationships. This dynamic environment poses the challenge of formulating sustainable business models that can thrive in such complexity. To tackle this challenge, the white paper proposes a structured methodology comprising five essential steps for conducting business modelling. This method takes into account the perspectives and interests of all the actors involved in the ecosystem. It integrates insights from various analytical approaches, including concepts like ecosystems, value networks, business and sustainability model canvassing. These concepts have already found application in numerous recent 5G projects, lending credibility and practicality to the proposed methodology.

Furthermore, the white paper draws on the experiences of experts and representatives from these projects, who have generously shared their knowledge and insights. These real-world examples serve as a source of inspiration and validation for the stepwise model presented in the paper. The contributions from these experts shed light on the approaches they employ within their respective organizations. EVOLVED-5G contributed with the approach of an example business modelling approach focusing on the 5G Vertical Ecosystem and the relevant roles.

3.2.1.3 6G Architecture Landscape – European Perspective

This white paper, released in February 2023 by the 5G Architecture Working Group, provides a concise overview of the key discoveries derived from the European research efforts pertaining to the conceptual framework of 6G architecture. Such a design vision is derived from around 45 projects starting from October 2020 in all relevant areas of 5G while paving the way towards 6G, within the 5G Public Private-Partnership (5G PPP) in the scope of the European Framework for Research and Innovation (the list of contributing projects can be obtained from the 5G-PPP website at <https://5g-ppp.eu/5g-ppp-phase-3-projects/>). At present, the European networking research community has started a new program along with 33 projects on the Smart Networks and Service (SNS) programme that will focus on 5G advanced and 6G. The 5G/B5G Architecture Working Group (WG), as part of the 5G-PPP Initiative, is identifying and capturing novel trends and key technological enablers for the realization of the 5G and 6G architecture. The main findings and results of the Architecture WG have been captured in the white paper, which presents a consolidated view from European perspective on the technical directions for the architecture design in the 6G era. EVOLVED-5G contributed to the chapter including the key technological enablers for a programmable 6G network, and more specifically how NEF and CAPIF concepts can harness programmability of a network to enhance its capabilities.

3.2.1.4 Beyond 5G/6G and KPIs Measurements” Whitepaper

This white paper is the continuation of the 5G-PPP TMV Working Group white paper entitled «Beyond 5G/6G KPIs and Target Values». The latter provided an early analysis of possible Beyond 5G/6G KPIs based on current work and perspectives from ICT-52 projects, seeking to understand the level to which existing definitions in standard documents will apply to 6G and to identify, at early stages, gaps and new candidate KPIs to be standardized for 6G systems. The intention of this white paper is to provide an analysis of the nature of the beyond 5G/6G KPIs identified in the previous white paper, by further elaborating on the feasibility of these KPIs to be measured, on the methods and tools to be used for their evaluation, and on identifying challenges encountered, gaps identified and research steps to be followed on the measurement and evaluation methodologies to be used in the 6G era.

3.2.1.5 Network Applications: Opening up 5G and Beyond Networks

The 5G-PPP Software Network Working Group published a white paper introducing the concept of the Network App and the respective classifications of it. According to the 5G-PPP and the specific white paper, where EVOLVED-5G has actively contributed, reflecting the project innovations and concepts in its contents, the Network App ecosystem is more than the introduction of new vertical applications that have interaction capabilities. It refers to the need for a separate middleware layer to simplify the implementation and deployment of vertical systems on a large scale. Specifically, third parties or network operators can contribute to Network Applications, and depending on the level of interaction and trust, Network Applications is seen as a full-potential enabler for future vertical industries beyond current deployment. Therefore, it must be considered along with other 6G enabling technologies in the next-generation network architecture. Moreover, the different technical aspects of Network Application, new business models for all stakeholders, experimental facilities to support

Network Application, and new Network Intelligence (NI) solutions that can be enabled by using Network Application, are addressed in the paper.

3.2.1.6 *Whitepaper on "Innovation Trends in I4.0 enabled by 5G and beyond networks"*

The Industry 4.0 (I4.0) concept revolutionizes how processes like quality, productivity, customization, and safety are managed in manufacturing. It has developed alongside 5G technology, and the two influence each other significantly. 5G supports the communication needs of I4.0, while I4.0 is a major sector for 5G growth. This whitepaper offers a comprehensive view of I4.0 design principles, driven by collaboration between I4.0 leaders and contributors to 5G development. It also assesses the applicability of 5G for short and mid-term I4.0 challenges based on input from stakeholders. The report touches on evolving 5G technologies, like Deterministic Networking and Digital Twinning, and explores the future of ecosystem dynamics, regulation, and sustainability. Ultimately, it provides valuable insights into the synergy between I4.0 and 5G, drawing from leading 5G-PPP Phase III projects.

In the context of the whitepaper a comprehensive survey has been elaborated and distributed to I4.0 vertical stakeholders of representative 5G-PPP projects dealing with I4.0-5G challenges. The aim of this survey is to collect information that reflects the verticals' point of view on I4.0 motivations, trends, challenges as well as on the role and considerations on 5G as enabler for I4.0 evolution. In the light of the above, EVOLVED-5G partners (INF, GMI, IMM) have participated in the survey and their views have been included in the relevant chapter "Strategic Approaches for embracing and leveraging 5G and beyond networks in I4.0".

3.2.1.7 *European 5G Annual Journal 2023*

EVOLVED-5G has contributed to the European 5G Annual Journal 2023 which is the 7th and last edition of the European 5G Annual Journals. The journal presents major achievements and results of Phase 3 projects (<https://5g-ppp.eu/annual-journal/>). This initiative represents a significant opportunity to disseminate the activities and the overall outcome of the project.



Figure 53: 5G-PPP Annual Journal 2023

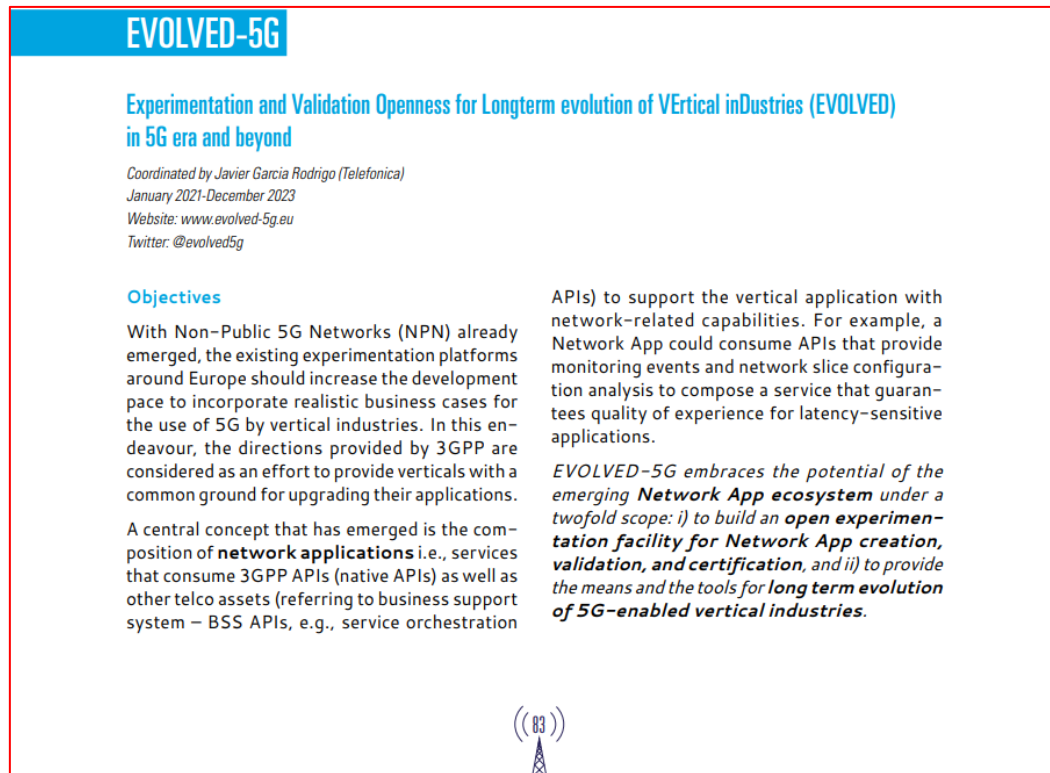


Figure 54: EVOLVED-5G section in the Annual Journal 2023

3.2.1.8 6G Book -Architecture WG

The envisioned 6G system promises to offer a more advanced and comprehensive user experience not only by achieving higher speeds, larger capacity, and lower latency, but also much more improved reliability, greater energy efficiency, and an enhanced security and privacy-preserving framework while natively integrating intelligence end to end (E2E). Achieving these goals will require innovative technological solutions and a holistic system design that considers the needs of various stakeholders and future 6G use cases.

Capitalizing on the European 5G-PPP Phase 3 projects working on 5G & Beyond and 6G research in recent years and the joint efforts between the Architecture WG and the 6G flagship Hexa-X project, this book delves into the critical challenges and enablers of the 6G system, including new network architectures and novel enhancements as well as the role of regulators, network operators, industry players, application developers, and end users. Accordingly, this book provides a comprehensive landscape of the current research activities on 6G in Europe and sets a solid cornerstone on the 6G development towards a more connected, intelligent, and sustainable world. Furthermore, as 5G-PPP Phase 3 consists of the last calls of the Horizon 2020 program, this book is aimed to lay the architectural foundation for the next European program towards 6G, i.e., Smart Networks & Services (SNS) Joint Undertaking (JU).

In the light of the above, EVOLVED-5G project has contributed to the 6G book entitled TOWARDS SUSTAINABLE AND TRUSTWORTHY 6G, led by the 5G-PPP Architecture WG and the Hexa-X project. Dr. Dimitris Tsolkas (FOG) was the editor of CH7 – “Towards Continuous Programmable Networks” wherein EVOLVED-5G provided several inputs for the NEF and CAPIF concepts.



Figure 55: EVOLVED-5G as a "contributor" in the book

3.2.2 5G-PPP Phase 3 Key achievements

EVOLVED-5G project has provided inputs for the 5G-PPP Key achievements webpage as part of the Verticals Experimentation, Trials and Pilots category. At that time the initial versions of the NEF APIs along with the initial versions of the Network Applications had been released and uploaded in GitHub repository.

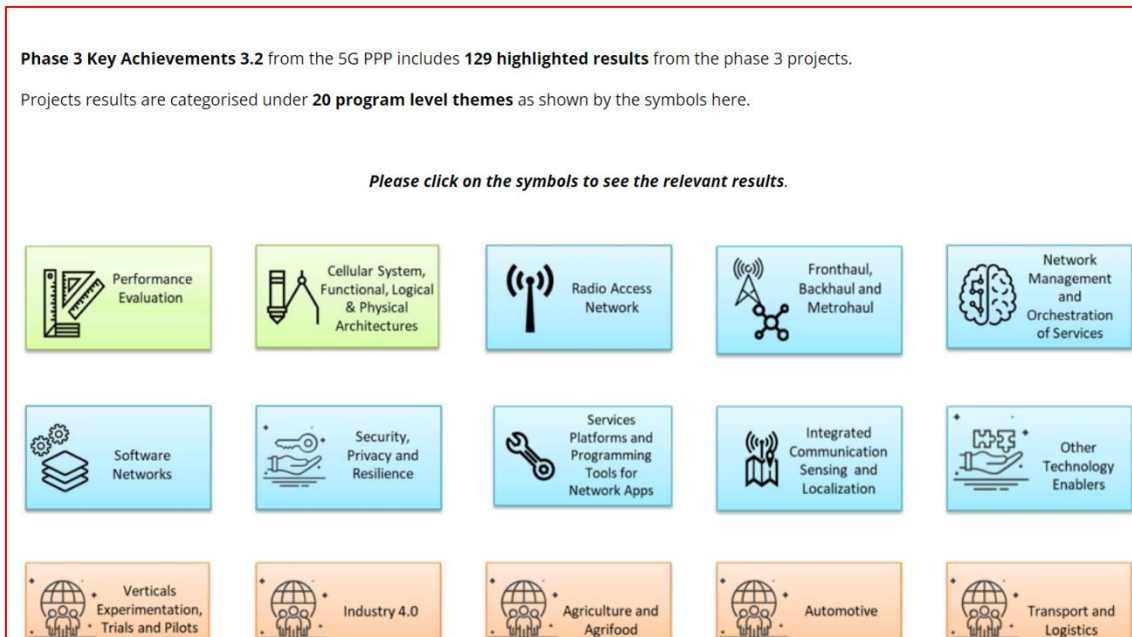


Figure 56: 5G-PPP Key achievements webpage

+ Verticals Experimentation, Trials and Pilots

– Industry 4.0

5G-CLARITY:
5G-CLARITY's technical innovations, e.g., in multi-connectivity and multi-technology positioning, were demonstrated in a Bosch factory plant (24th of November 2022, Aranjuez, Spain). The demonstrations' results indicate that 5G can play a major role in Industry 4.0 scenarios due to its relatively stable coverage over a much larger area compared to Wi-Fi-6 coverage area. The implication on the latency is being analysed and will be published soon. [5G-CLARITY-1], [5G-CLARITY-2], [5G-CLARITY-3]

5GInduce:
5GInduce will permit to deploy and develop advanced Industry 4.0 NetApp that will support innovative Industry 4.0 market verticals. Use cases will be demonstrated to guarantee Industry 4.0 and 5G KPI.

EVOLVED-5G:
EVOLVED-5G consortium produced a reference architecture (reported in D2.1 and [D2.2](#) [EVOLVED5G-6] and later updates in D3.1 [EVOLVED5G-7]), by the conceptualization of the necessary means, tools, components, and processes required, towards: Creating on top of the 5G facility a "Network App ecosystem", where third party developers and SMEs can take advantage of the 5G programmability, and providing a detailed illustration of the "Network App lifecycle", i.e., all the necessary phases – Development/ Verification, Validation, Certification and Publishing – each Network App shall go through, until the eventual release to the market. EVOLVED-5G has released in the related Github repository, initial versions of various Industry 4.0 related Network Apps. Fundamental principles on their functionality and implementation approach is provided in D4.1 and D4.2.

Figure 57: EVOLVED-5G project in the 5G-PPP key achievements webpage

3.2.3 Other type of contributions and activities

3.2.3.1 5GPPP Heritage Brochure

Given the vast amount of work being carried out by the portfolio of 5G Infrastructure PPP projects, this PPP Projects Heritage Brochure and related Heritage Figure are summarizing the interconnections between the PPP projects under three specific categories:

- Projects follow-up
- Components use/re-use and
- ICT-19 Verticals Pilots / ICT-17 Platforms use

The work is consolidating and concluding the initial work achieved with the PPP Heritage Figure Version and that was one of the PPP "Reference" Figures, widely used to depict the Programmatic connections between projects. You may find more information in the 5GPPP Programmatic operation projects heritage and interactions [here](#).

3.2.3.2 Interactions with other 5G-PPP Projects

EVOLVED-5G participated in a special Session entitled "EVOLVED-5G & 5G USE CASES INNOVATION", at 5G FORUM where there was the opportunity to interact with other projects and to exchange views on the verticals' ecosystem and the use cases stemming from the programmability of the network.

Moreover, the project participated in the EuCNC & 6G Summit (see section 2.2.9) during which it showcased network core openness by exposing core network functions like NEF and TSN through standardized API managers, enabling verticals to utilize them in network applications. It also demonstrated the programmability features of EVOLVED-5G, emphasizing the DevOps and CI/CD framework. Additionally, performance improvements in Industry 4.0 applications were exhibited, highlighting the enhanced capabilities of robot control applications. Throughout the event, there was active interaction and exchange of views with other 5G-PPP projects.

- **5G-IANA**

5G-IANA representatives participated in EVOLVED-5G ACCELERATOR INFO DAY and a follow up meeting with the TM Dr. Harilaos Koumaras and deputy PM of 5G-IANA Dr. Eirini Liotou took place in order to define some joint activities concerning the Network App views of the two projects. In this framework, some liaison activities were planned and executed, such as presentation of 5G-IANA tools at the EVOLVED-5G Accelerator Cohort in May 2023 (title of presentation “The 5G-IANA project: What’s in it for SMEs?”), which resulted in two applications eventually from SMEs/start-ups that attended the virtual event, namely Wirdus and Link Robotics to the 5G-IANA open-call. Also in June 2023, joint activities took place on exploiting the use of the NEF emulator in 5G-IANA network applications (Figure 58).

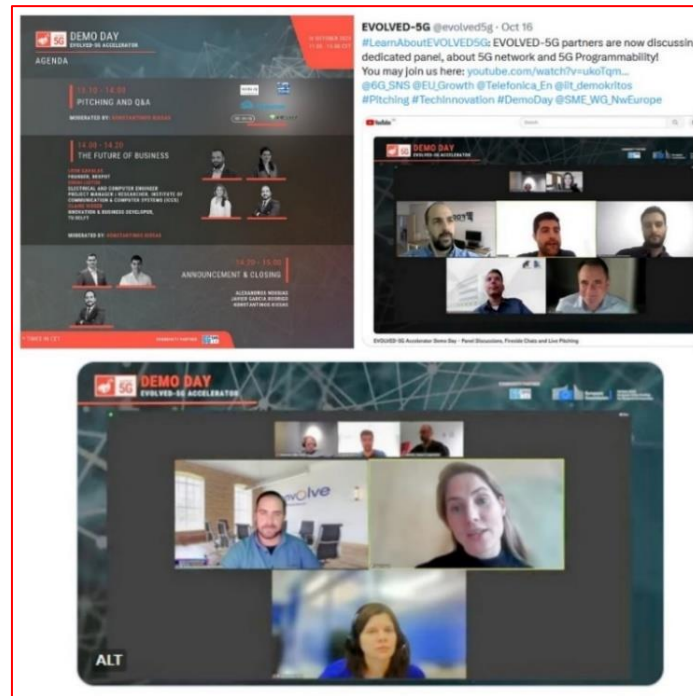


Figure 58: EVOLVED-5G & 5G-IANA Interaction

Another joint activity was also the participation of 5G-IANA project coordinator at the EVOLVED-5G virtual demo day on October 16th, 2023. This liaison activity, communicated by both 5G-IANA and EVOLVED-5G communication channels, sealed even more the joint activities of the two projects.

Finally, EVOLVED-5G participated in all the virtual meetings that took place on the initiative by 5GASP on closer collaboration among the ICT-41 projects towards sharing experience and good practices, which resulted in a workshop proposal “Session 3: Next-Generation Business Model for 6G Network Applications: Value chain, Marketplace, and Community” at the EUCNC 2023.

- **Smart5Grid**

Both the EVOLVED-5G and Smart5Grid projects, funded under H2020-ICT-41-2020, focus on distinct sectors (Energy for Smart5Grid and Industry 4.0 for EVOLVED-5G) but share common objectives. These include aims such as

1. Development of Network Applications.
2. Delivery of a 5G experimentation platform for the validation and verification of Network Applications.

3. Fostering collaboration and participation among small and medium-sized enterprises (SMEs) and encouraging third-party experimentation within the community.

Therefore, collaboration in both technical and dissemination / engagement aspects was feasible.

Because of the shared involvement of partners like ATOS, INFOLYSIS, and 8BELLS in both projects, continuous monitoring was in place to detect synergies and possible collaboration opportunities. Various technical elements, including the definition and specifications of EVOLVED-5G Network Applications, architectural design, verification, validation frameworks, etc., have been extensively scrutinized. Discussions on technical matters were ongoing within the ICT-41 Call projects' Task Force, with further details about this Task Force to be provided later in this document.

Collaboration on actions related to community building, training, and involvement of SMEs and third parties was the backbone of this collaboration. INF, as communication leader in both projects, tried to arrange common activities throughout both projects' duration. This effective collaboration took place on a multidimensional level.

First of all, we had the social media collaboration. Both projects are extremely active on all famous and impactful social media channels. This collaboration can be translated into dedicated posts, reshares, likes and news sharing. These simple but effective actions, made both projects visible and recognizable. Also, this visibility attracted more engagement and made more stakeholders interested about our content. As we have stated previously, these projects may have some common fundamental pillars, but different uses cases. This difference on the use cases allowed us to address in different audience and in general to attract the broadest possible audience (Figure 59).

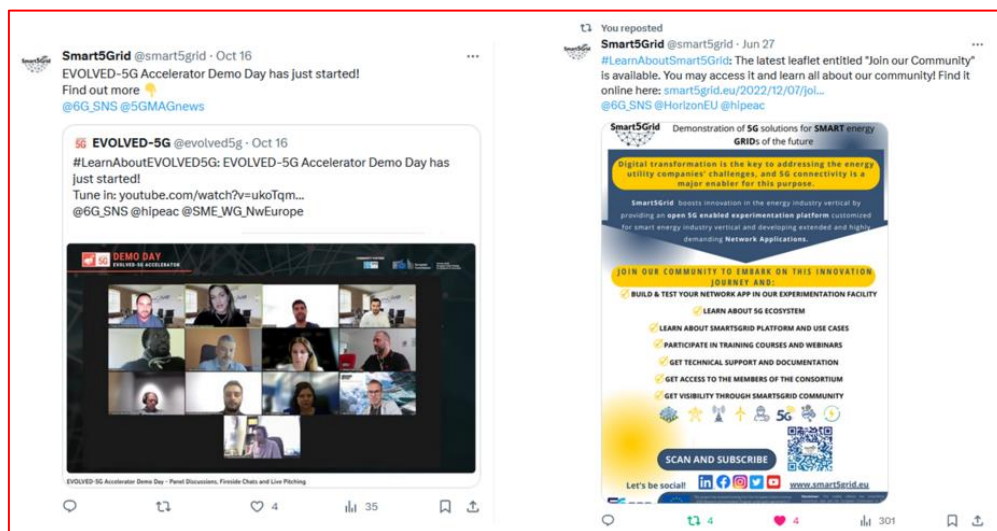


Figure 59: EVOLVED-5G and Smart5Grid Social media interaction

Another important aspect of this collaboration is the organization/participation in common activities. In March 2022, Smart5Grid project was invited to participate as speaker in a Training Workshop organized by EVOLVED-5G in collaboration with the Computer Science department of Athens Metropolitan College. The workshop was entitled "5G Networks Programmability"

where Smart5Grid project and its approach towards Network Applications was presented. On the other hand, EVOLVED-5G project was also invited to 8Bells “1st Open Annual Workshop on Future ICT”, organized on 25th of May 2022. Furthermore, project coordinators and technical managers have met in 5G-PPP SB and TB face to face meetings in Athens, in October 2022.

The biggest event that both projects, participated in and had common activities, was the EuCNC & 6G Summit 2023, in Gothenburg. This event builds on putting together two successful conferences in the area of telecommunications: EuCNC (European Conference on Networks and Communications), supported by the European Commission, and the 6G Summit, originated from the 6G Flagship programme in Finland, one of the very first in its area. The conference is sponsored by the IEEE Communications Society (ComSoc), the European Association for Signal Processing (EURASIP) and the European Association on Antennas and Propagation (EurAAP), and focuses on all aspects of telecommunications, ranging from 5G deployment and mobile IoT to 6G exploration and future communications systems and networks, including experimentation and testbeds, as well as applications and services. It brought together leading-edge research with internationally acclaimed industries and businesses, drawing global attention in recent years. Over 1300 delegates from over 40 countries worldwide gathered to share and deliberate on the most recent findings. Additionally, an exhibition hosting over 70 exhibitors displayed technology advancements specifically developed in the field, notably within research projects from EU Research and Innovation (R&I) programs.

There, INFOLYSiS represented both projects. Representative from INFOLYSiS provided Smart5Grid material at the booth of SNS. Also, through the EVOLVED-5G project booth, all interested stakeholders, could be informed about the Network App infrastructure and were redirected to the SNS booth for more specific information about the Smart5Grid project (Figure 60).

At the SNS booth the visitors could find material for our project such as stickers and leaflets. Also, frequently a representative of our project was present to discuss with visitors and present insights of the Smart5Grid. The booth of SNS was also used as a common repository for all ICT-41 projects where they could share material and information with visitors.



Figure 60: EuCNC cross-representation

Also, these two projects participated in IEEE MeditCom that took place on September 5th – 8th. This was a physical event where a hybrid joint Workshop titled ‘Network Apps into Beyond 5G and 6G Network’ took place. During this workshop, Antonello Corsi and Giampaolo Fiorentino from ENGINEERING company, had the opportunity to present the Smart5Grid main achievements of the first 20 months of the project. In more detail, they illustrated the Network Application definition and descriptor, the Smart5Grid platform, and presented Use Case 3. This workshop was co-organized by 9 ICT-41 Projects. Apart from Smart5Grid and EVOLVED-5G, 5GERA, 5GASP, 5GMEDIAHUB, 5GINDUCE, VITAL5G and 5GEPICENTRE participated. The aim was to bring together all the Network Applications stakeholders, discuss their experiences so far and pave the way for Network Applications into 6G to span all domains RAN/CORE/Transport/Devices/Applications.

The official invitation to our project was made by EVOLVED-5G’s technical manager Dr. Harilaos Koumaras. Moreover, both projects were represented at the DEFEA 2023 conference. There, 8bells and INFOLYSiS partners promoted and communicated our project to visitors of the exhibition. DEFEA was addressed to several sectors such as defense and Security. At Defense Exhibition Athens, top Greek defense industry manufacturers, and the most important international companies, presented the latest technologies and cutting-edge defense systems.

EVOLVED-5G and Smart5Grid might have been represented in different booths, but common activities took place for both projects. Common partners, used to visit both booths to provide all related information and insights about the projects (Figure 61).



Figure 61: DEFEA cross-representation

Last but not least, a very distinctive common activity between the two projects is the participation in the 24th Infocom World 2022. This event examined how Fiber and 5G are changing the market and offering new opportunities, the investments being made, the

operation of the hubs of large companies in Greece and how our country can attract even more, discussing about the talent that the ICT field is looking for, the brain drain and the opportunities that are offered.

At this event, EVOLVED-5G was invited by Smart5Grid and participated with two presentations. On the one hand, Smart5Grid has organized its own special session entitled “5G in the Smart Grid – The Novel Approach of the Smart5Grid European Project”. Smart5Grid Partners’ OTE (Dr. I.Chochliouros, Mr M.Rantopoulos), Entra Energy (Ms R.Rumenova) and IPTO (Mr. D.Brodimas) contributed with 5 presentations, which introduced the project, communicated the Opportunities and Challenges and the developing of a modern network interconnection scheme by the 5G operators, as derived from UC4. Additionally, a presentation on Distributed Energy Operation & Maintenance in energy installations was introduced as derived from UC3. Finally, the Essential Components and Core Features of the Smart5Grid Platform for Implementing the 5G Perspective were also presented.

On the other hand, on behalf from EVOLVED-5G, Nikolaos Vrionis (INFOLYSiS) presented “Intent-driven Chatbots for Precise Maintenance in 5G-enabled Industry 4.0 Environments” and Dimitrios Fragkos (NCSR DEMOKRITOS) presented “Network Exposure Function simulator: Opening Up 5G network to Verticals” (Figure 62 and Figure 63).



Figure 62: Intent-driven Chatbots for Precise Maintenance in 5G-enabled Industry 4.0 Environments presentation

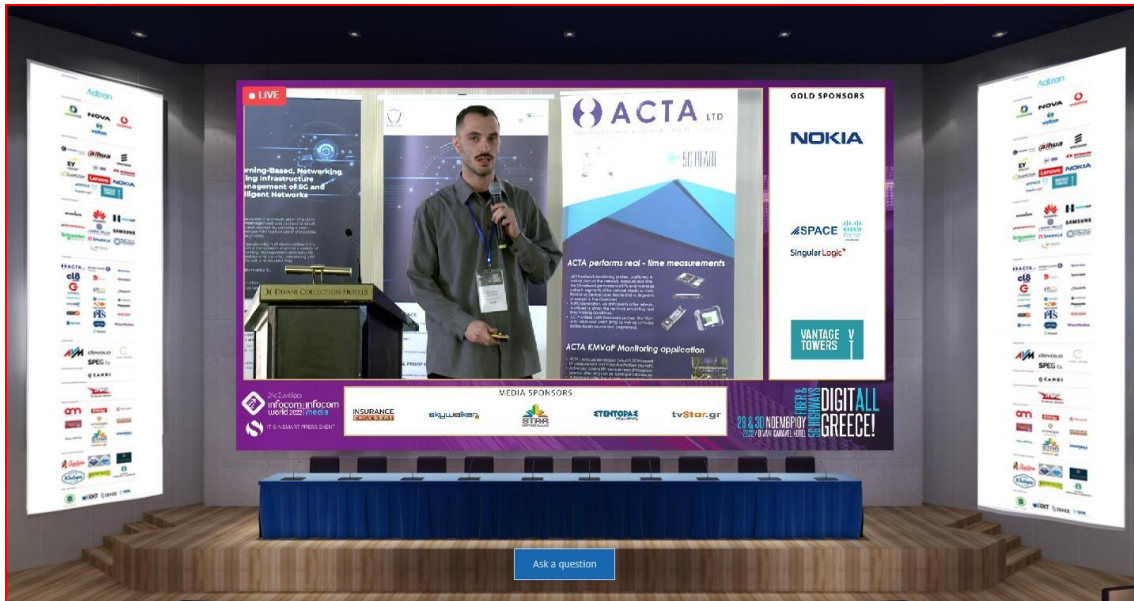


Figure 63: Network Exposure Function simulator: Opening Up 5G network to Verticals presentation.

- **6G-SANDBOX**

During the second period of the EVOLVED-5G life, the project has managed to collaborate with another newly started project. This project is 6G-SANDBOX and it is one of the first projects in the 6G era. It is a HORIZON-JU-SNS-2022 project which brings a complete and modular facility for the European experimentation ecosystem (in line and under the directions set by SNS JU), which is expected to support the next decade technology and research validation processes needed in the pathway towards 6G. The target is on technologies and research advances, that span over the entire service provisioning chain, and refer to user/data, control and management planes. In this direction, 6G-SANDBOX introduces the concept of Trial Networks, which refers to fully configurable, manageable, and controlled end-to-end networks, composed of both digital and physical nodes.

The 6G-SANDBOX Trial Networks incorporate infrastructures distributed within the EU (namely in Malaga, Athens, Berlin, and Oulu) and offer to third parties (including experimenters from open calls) automated experimentation capabilities through a rich and extensible toolbox. Meant to create tangible and long-term impact, the 6G KPIs and KVis that will be quantified with the facility, will be released to any interested party; while the set of developments and APIs that will be produced, will feed an open repository as an initial step to move the contributions and the lessons learned beyond the project borders and define a European 6G library.

At this point, the collaboration between EVOLVED-5G and 6G-SANDBOX projects has been through social media channels, with posting and resharing material especially for the 6G-SANDBOX Open Call promotion (Figure 64).

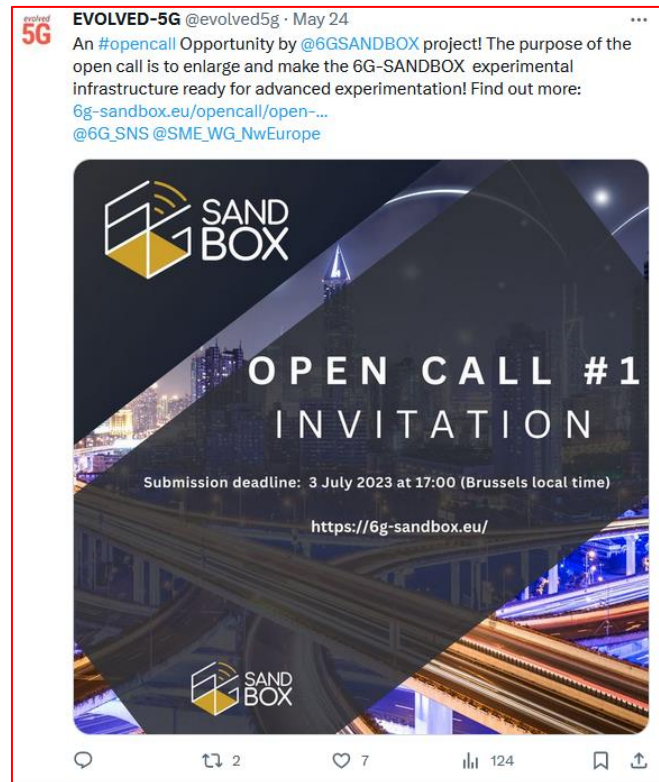


Figure 64: 6G-SANDBOX material re-shared by EVOLVED-5G

Also, the two projects co-existed at “5G Technology as innovation enabler. Present and Future” Panel Discussion during Transfiere 2023. There, Professor Pedro Merino Gomez explained the fundamental insights of EVOLVED-5G project along with new concepts of the newly started project, 6G-SANDBOX (Figure 65).



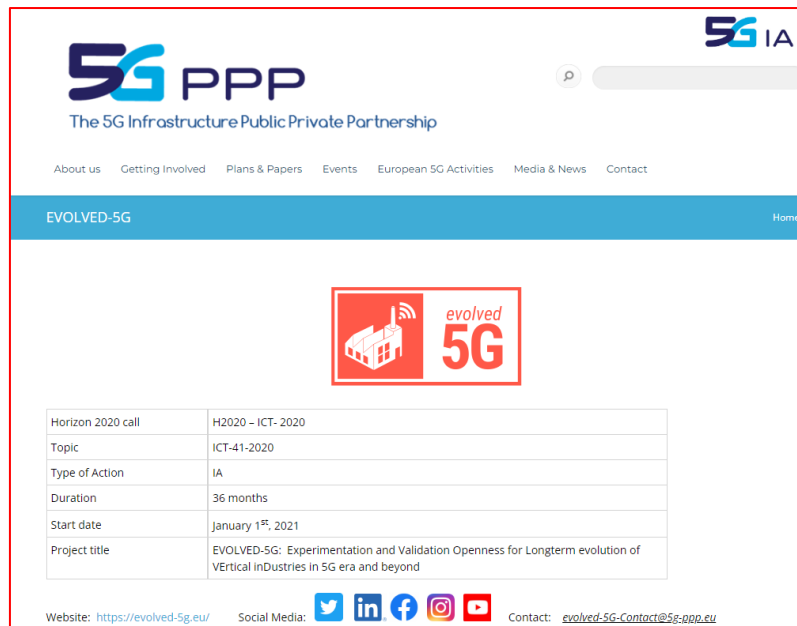
Figure 65: Transfiere 2023

3.3 EVOLVED-5G PRESENCE AT 5G-PPP CHANNELS

In the following sections, the 5G-PPP initiatives in which EVOLVED-5G has been involved during the reporting period are described.

3.3.1 EVOLVED-5G in 5G-PPP Website

As we have described in the previous deliverables, EVOLVED-5G is featured at the 5G-PPP webpage, here: <https://5g-ppp.eu/evolved-5g/>. It is an extensive reference on our project with all relevant details (Figure 66).



The screenshot shows the 5G-PPP website with the 'EVOLVED-5G' section highlighted. The page features the 5G-PPP logo and navigation links. Below the navigation bar, the 'EVOLVED-5G' section is displayed with a table of project details and social media links.

Horizon 2020 call	H2020 – ICT- 2020
Topic	ICT-41-2020
Type of Action	IA
Duration	36 months
Start date	January 1 st , 2021
Project title	EVOLVED-5G: Experimentation and Validation Openness for Longterm evolution of Vertical Industries in 5G era and beyond






Website: <https://evolved-5g.eu/> Social Media:      Contact: evolved-5g-contact@5g-ppp.eu

Figure 66: EVOLVED-5G reference in 5G-PPP website

Apart from this reference, EVOLVED-5G project has been communicated by the 5G-PPP platform several times. This collaboration between EVOLVED-5G and 5G-PPP occurred not only in the reported time period, but throughout the whole project's lifetime. A variety of EVOLVED-5G material can be found at the 5G-PPP website, including activities such as surveys, events, newsletters, videos and milestone. This two-way communication "relationship" led to the successful promotion of EVOLVED-5G activities, and the communication of 5G-PPP activities from our project as well. The latest communication of an EVOLVED-5G activity, was the promotion of our Accelerator's Demo Day, in the context of WP6, by 5G-PPP (Figure 67).

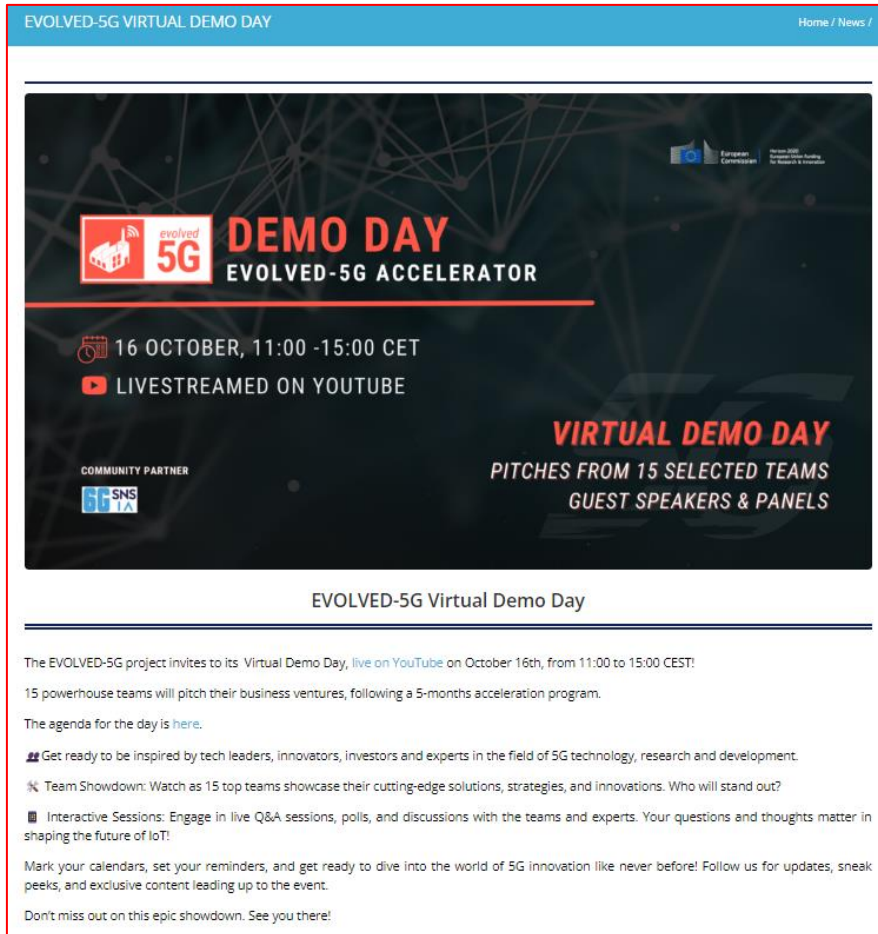


Figure 67: EVOLVED-5G Demo Day as promoted by 5G-PPP

In general, the support of 5G-PPP helped our project to reach the broadest possible audience in the context of 5G and added extra prestige within the Horizon framework. Also, this association enriched our visibility and helped us boost our engagement.

3.3.2 5G-PPP social media channels

In addition to the website, 5G-PPP presence in social media platforms was another mean for finding support for our activities since EVOLVED-5G posts were reshared by the 5G-PPP channels several times (Figure 68). The main difference here is that despite the 5G-PPP website that still supports actively 5G-related projects, the social media accounts of 5G-PPP have been merged with the new succession association of SNS. Despite the fact that SNS is mostly related with 6G projects, it offers support to 5G projects too. This fact actually increases the visibility of our activities as it can diffuse the activities to broader audiences and stakeholders. Also, it is worth mentioning that since the SNS administers social media channels, the LinkedIn account is far more active than previously.



Figure 68: EVOLVED-5G retweeted by SNS

3.4 OVERALL EVOLVED-5G 5G-PPP ACTIVITIES AND COLLABORATIONS (M1-M36)

3.4.1 Summary of 5GPPP activities, collaborations and achievements

EVOLVED-5G partners actively participated in and made contributions to the working groups organized by 5G-PPP. The table below (Table 18) presents the 5G-PPP WGs which EVOLVED-5G partners attended and contributed to throughout the project's duration.

Table 18: 5G-PPP WGs and EVOLVED-5G representatives

Working Group	Main representative	Company	Second representative	Company
5G-PPP Steering board	Javier Garcia Rodrigo	Telefónica	Dr. Harilaos Koumaras	NCSR Demokritos
5G-PPP Technical Board	Dr. Harilaos Koumaras	NCSR Demokritos	Dr. Dimitris Tsolkas	FOGUS
Pre-Standardization	Dr. Apostolis Salkintzis	Lenovo	David Artuñedo	Telefónica
5G Architecture	Dr. Dimitris Tsolkas	FOGUS	Dr. Apostolis Salkintzis	Lenovo

Software Networks	Dr. Dimitris Tsolkas	FOGUS	Dr. Regel G. Usach	UPV
Vision and Societal Challenges	Javier Garcia Rodrigo	Telefónica	Ioanna Mesoggit	COS
SME	Vaios Koumaras	INFOLYSIS	Janez Sterle	Internet Institute
Test, Measurement and KPI Validation (TMV)	Janez Sterle	Internet Institute	Dr. Dimitris Tsolkas	FOGUS

The summary of the activities related to 5G-PPP, mainly encompasses valuable contributions to whitepapers, active participation in presentations within 5G-PPP Working Groups, and collaborative efforts in co-organizing events with other projects. The engagement in crafting whitepapers reflects a dedication to advancing collective knowledge and shaping academia's and industry's insights. Additionally, the involvement in 5G-PPP Working Groups and the delivery of EVOLVED-5G related presentations underscores the commitment of the project to share expertise and foster collaborative discussions within the research community. Furthermore, the joint organization of events with other projects, demonstrates the collaborative spirit and the synergistic impact achieved through shared initiatives.

Apart from that, EVOLVED-5G has actively contributed to surveys to facilitate the production of whitepapers, brochures, and the key achievements' initiative describing the innovations as developed in the lifetime of the project.

Collectively, all these activities reflect a multifaceted and impactful engagement of EVOLVED – 5G project in the framework of 5G-PPP.

The summary of activities of the project related to 5G-PPP are as follows:

EVOLVED-5G project has contributed to a total of 12 whitepapers across the different WGs of 5G-PPP:

- 5G-PPP, Programmatic operation projects heritage and interactions, October 2023
- 5G-PPP, Innovation Trends in I4.0 enabled by 5G and Beyond Networks, October 2023
- 5G-PPP, Network Applications: Opening up 5G and Beyond networks, V2.0, July 2023
- 5G-PPP, "The European 5G Annual Journal 2023", May 2023
- 6G-IA, "5G and Beyond 5G Ecosystem Business Modelling", February 2023
- 5G-PPP, "The 6G Architecture Landscape – European perspective", February 2023
- 5G-PPP, 'Network App: Opening up 5G and beyond networks', September 2022
- 5G-PPP, 'View on 5G Architecture V4.0', November 2021
- 5G-PPP, '5G Ecosystems', 5G Infrastructure Association - Vision and Societal Challenges Working Group - Business Validation, Models, and Ecosystems Sub-Group, September 2021

- 5G IA, ‘European Vision for the 6G Network Ecosystem’, June 2021
- 5G-PPP, Phase 3 Projects Brochure, June 2021
- 5G-PPP, “The European 5G Annual Journal 2021”, May 2021

Regarding the presentations in the context of 5G PPP, the project has delivered 5 presentations in total as follows:

- Presentation of EVOLVED-5G concept—Architecture WG
- Presentation of EVOLVED-5G concept - 5G-PPP TMV WG
- Presentation of EVOLVED-5G principles-Technical Board WG
- Presentation of EVOLVED-5G project—SoftNet WG
- Presentation of EVOLVED-5G Ecosystem—Athens physical meeting Technical Board WG
- Presentation of EVOLVED-5G Network App concept –SoftNet WG

As indicatively presented in section 3.2.3.2, EVOLVED-5G has also collaborated effectively with the following projects

- 5G-IANA (<https://www.5g-iana.eu/>),
- Smart5Grid (<https://smart5grid.eu/>),
- 6G-Sandbox (<https://6g-sandbox.eu/>)

while it has made common dissemination activities with many more as reported in the dissemination section and events.

4 CONCLUSION

The conclusion of EVOLVED-5G's dissemination, communication and 5G-PPP interaction activities has been thoroughly presented, analysed, and appraised in this deliverable. Through the utilization of statistical dashboards, the project's outreach, engagement activities, KPIs and interactions within the realm of 5G-PPP have been comprehensively evaluated. This assessment was conducted in alignment with the predetermined impact objectives delineated in the EVOLVED-5G communication plan ([D7.1](#)).

The analysis highlighted the coordinated efforts applied on communicating and disseminating project insights, fostering engagement, and promoting the project's advancements within the 5G ecosystem and I4.0 environment. These comprehensive evaluations serve as proof of the commitment and strategic alignment of EVOLVED-5G's communication initiatives within targeted/planned impact framework. The insights from this evaluation and the successful fulfilment of all impact KPIs will undoubtedly be useful for future impact strategies, ensuring greater impact within the targeted fields, audiences, research communities, business, and market entities, as well as the 6G-IA/SNS JU community and WGs (as successor of 5G-PPP) and beyond.