INPACE

Indo-Pacific-European Hub
for Digital Partnerships

ヨーロッパとインド太平洋のための
デジタルパートナーシップ強化

디지털 파트너십 강화
유럽 및 인도 태평양의 경우

D4.2
Summary: desk research, interviews, survey, consultation (initial)

Work package	WP 4
Task	4.1, 4.2 and 4.3
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Reviewers	Susana Seabra
Abstract	WP4, aims at empowering the INPACE Hub by providing the Thematic Working Groups (TWGs) with the necessary data-based evidence and insights to develop well-informed initiatives for future cooperation between European Union (EU) and Indo-Pacific Partners. The methodology applied includes tools like desk research, interviews, surveys, and public consultations. In this document is made the report of main actions taken regarding each one of these tools
Keywords	WP4 methodology; empowering the Hub

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   DEC: Websites, patents filing, press & media actions, videos, etc.
   DATA: Data sets, microdata, etc.
   DMP: Data management plan
   ETHICS: Deliverables related to ethics issues.

EXECUTIVE SUMMARY

The INPACE project aims to strengthen digital collaboration between the European Union (EU) and Indo-Pacific countries, focusing on four key partners: Japan, Republic of Korea, Singapore, and India.

One work package in the project, WP4, aims at empowering the INPACE Hub by providing the Thematic Working Groups (TWGs) with the necessary data-based evidence and insights to develop well-informed initiatives for future cooperation between European Union (EU) and Indo-Pacific Partners. The methodology applied includes tools like desk research, interviews, surveys, and public consultations.

In this document is made the report of main actions taken regarding each one of these tools:

- In desk research a comprehensive analysis of national ICT strategies, funding mechanisms, and priorities highlighted areas of alignment and divergence between EU and partner countries;

- Semi-structured interviews provided qualitative insights to validate the contents of desk research and the identified opportunities for partnerships. The interviews are still being held, and most will take place in 2025 to improve the final recommendations regarding the Digital Partnerships. Also new interview guides will be developed according with the needs of Thematic Working Groups (TWG). These interviews were complemented by presentations of most important desk research findings in meetings with all WP3 members.

- Also a public consultation during an international symposium in Seoul, brought key stakeholders together, fostering dialogue on ICT partnerships and addressing collaboration barriers.

- Although not yet implemented in the first project year, surveys will be applied in the next year with focus on data spaces and digital skills.

In section 6 the main outputs and results in the first 12 months of INPACE project are summarized. Also in this section methodological improvements, that will give a particular emphasis on interviews and surveys to generate new knowledge inside the INPACE Hub and deeper engagement among stakeholders are stated.

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1 INTRODUCTION

1.1 EMPOWERING THE INPACE HUB

WP4 aims at empowering the INPACE Hub by providing the TWGs with the necessary data-based evidence and insights to develop well-informed initiatives for future cooperation between EU and Indo-Pacific partners.

Empowering the hub is a crucial endeavour within INPACE project serving as the nexus for collaboration, innovation, and strategic direction. By providing the necessary resources, support, and guidance, empowering the hub enables INPACE partners to fulfil their objectives effectively and drive meaningful impact.

In INPACE proposal a set of tools to be used during the project to empower the hub: desk research, interviews, surveys and public consultations was defined. In the beginning of the project, as part of the Toolbox (deliverable D1.1) key principles, strategies, and best practices for empowering the hub within the project were developed. Throughout this toolbox, are presented the essential components of empowering the INPACE project, including fostering collaboration and providing resources effectively to the Thematic Working Groups with the necessary data-based evidence and insights to develop well-informed initiatives for future cooperation between EU and Asian partners. This includes providing them with data analysis and recommendations that will enhance their ability to identify and prioritize areas of collaboration.

However, the working methodology should be flexible enough to accommodate the response to specific requests from the TWGs, according to the progress of the work and the needs that are identified during the course of the project, applying the reflexive methodology described below.

1.2 METHODOLOGICAL APPROACH

The approach for empowering the INPACE hub serves as a comprehensive framework for supporting and enhancing the effectiveness of Thematic Working Groups (TWGs) activities within the INPACE project.

The following figure illustrates the structured approach to data collection and analysis, organizing surveys, facilitating knowledge exchange, conducting semi-structured interviews, supporting best practices, and empowering TWGs. This methodology empowers TWG members to collaborate effectively, leverage valuable insights, and achieve project objectives.
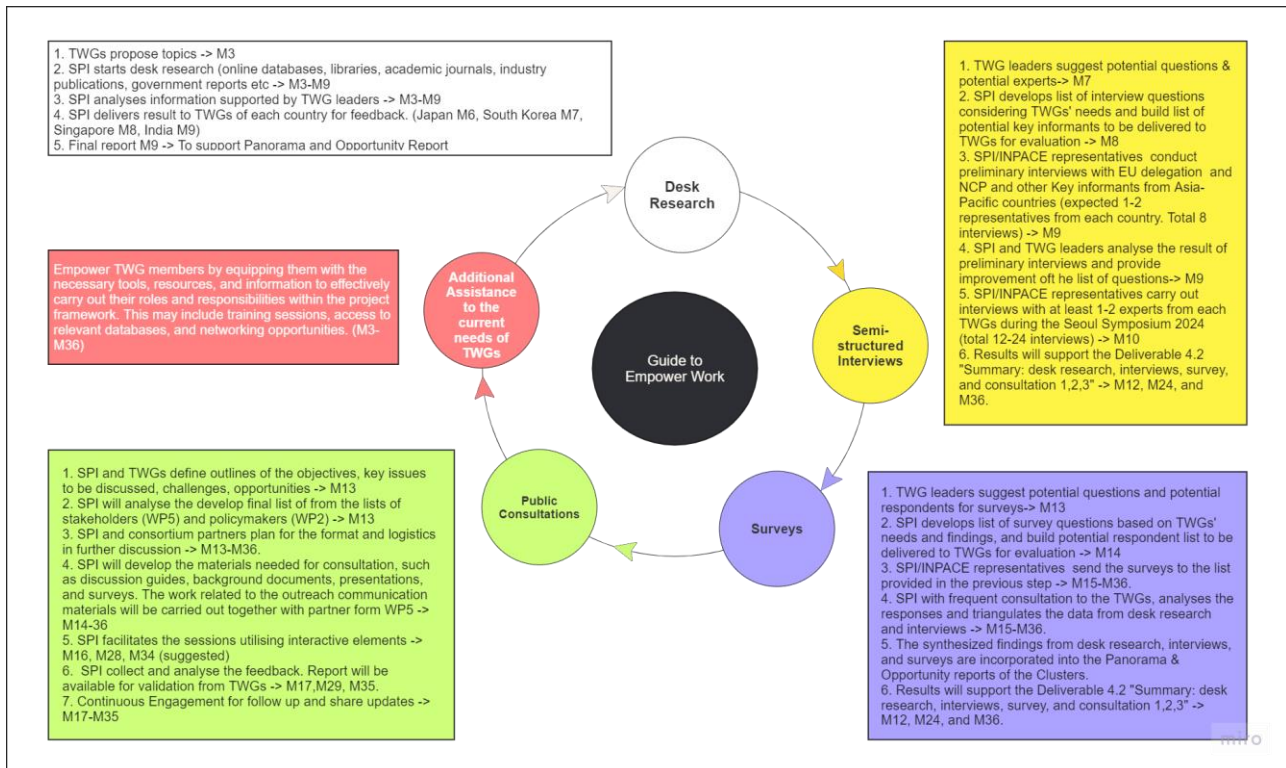
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1. TWGs propose topics -> M3
2. SPI starts desk research (online databases, libraries, academic journals, industry publications, government reports etc -> M3-M9
3. SPI analyses information supported by TWG leaders -> M3-M9
4. SPI delivers result to TWGs of each country for feedback. (Japan M6, South Korea M7, Singapore M8, India M9)
5. Final report M9 -> To support Panorama and Opportunity Report

Empower TWG members by equipping them with the necessary tools, resources, and information to effectively carry out their roles and responsibilities within the project framework. This may include training sessions, access to relevant databases, and networking opportunities. (M3-M36)

1. TWG leaders suggest potential questions & potential experts-> M7
2. SPI develops list of interview questions considering TWGs' needs and build list of potential key informants to be delivered to TWGs for evaluation -> M8
3. SPI/INPACE representatives conduct preliminary interviews with EU delegation and NCP and other Key informants from Asia-Pacific countries (expected 1-2 representatives from each country. Total 8 interviews) -> M9
4. SPI and TWG leaders analyse the result of preliminary interviews and provide improvement oft he list of questions-> M9
5. SPI/INPACE representatives carry out interviews with at least 1-2 experts from each TWGs during the Seoul Symposium 2024 (total 12-24 interviews) -> M10
6. Results will support the Deliverable 4.2 "Summary: desk research, interviews, survey, and consultation 1,2,3" -> M12, M24, and M36.

Additional Assistance to the current needs of TWGs

Desk Research

Semi-structured Interviews

Guide to Empower Work

Public Consultations

Surveys

1. SPI and TWGs define outlines of the objectives, key issues to be discussed, challenges, opportunities -> M13
2. SPI will analyse the develop final list of from the lists of stakeholders (WP5) and policymakers (WP2) -> M13
3. SPI and consortium partners plan for the format and logistics in further discussion -> M13-M36.
4. SPI will develop the materials needed for consultation, such as discussion guides, background documents, presentations, and surveys. The work related to the outreach communication materials will be carried out together with partner form WP5 -> M14-36
5. SPI facilitates the sessions utilising interactive elements -> M16, M28, M34 (suggested)
6. SPI collect and analyse the feedback. Report will be available for validation from TWGs -> M17,M29, M35.
7. Continuous Engagement for follow up and share updates -> M17-M35

1. TWG leaders suggest potential questions and potential respondents for surveys-> M13
2. SPI develops list of survey questions based on TWGs' needs and findings, and build potential respondent list to be delivered to TWGs for evaluation -> M14
3. SPI/INPACE representatives send the surveys to the list provided in the previous step -> M15-M36.
4. SPI with frequent consultation to the TWGs, analyses the responses and triangulates the data from desk research and interviews -> M15-M36.
5. The synthesized findings from desk research, interviews, and surveys are incorporated into the Panorama & Opportunity reports of the Clusters.
6. Results will support the Deliverable 4.2 "Summary: desk research, interviews, survey, and consultation 1,2,3" -> M12, M24, and M36.

Figure 1: Methodologic approach in WP4

This methodology was implemented in the first year, using regular consultations and presentations of project achievements to the thematic working groups, and subsequent refinement and adaptation of next steps based on feedback and evolving needs, ensuring the maximization of the impact and success of TWG initiatives within the INPACE project.

In the beginning of the project a first group of meetings took place with the Cluster leaders and the lead contacts for Technologies & applications in each partner country (India, Japan, Singapore, and Republic of Korea). In these meetings were agreed the contents of *D4.1 - Report on synergies and commonalities in policies, strategies and programmes between the EU and Asia-Pacific countries.* Also was defined the main source to be used to complete these sections, being considered that desk research should be priority, followed by just a few interviews to validate the findings related to each country.

2 DESK RESEARCH

2.1 APPROACH AND ACTIONS

Desk research forms the foundation of the methodology for the reports produced, allowing to gather existing knowledge, literature, and data relevant to the proposed research objectives. By analysing bilateral and multilateral agreement such as the EU-Japan Economic Partnership Agreement (EPA) and the CPTPP; RCEP, TTIP; Reports of World Bank, ITU, OECD; National policies and strategies; International organizations and platforms: WTO, the APEC's Digital Economy Task Force; case studies; articles; and other sources, was possible to collect valuable insights into the topic under investigation.

The process of desk research started by collecting the topics for research defined by a simple questionnaire and information exchanges with the different INPACE Thematic Working Groups (TWGs). Based on their information needs, the main priorities for desk research were identified:

1. Priority topics/investments in the TWG target area within the Partner Countries (PC): Japan, Republic of Korea, Singapore and India – national level;

2. Relevant funding schemes in PC, to support these priorities;

3. Related EU priorities and to what extend there is alignment or divergence between EU and PC countries

After collecting these main topics of interest for TWGs, was conducted an in-dept desk research to obtain comprehensive understanding of the ICT Research and Development (R&D) initiatives in each Partner Country by leveraging data from existing sources, starting by consulting official government institutions dedicated to the ICT field and identify their strategic focus for the different ICT areas.

SPI analysed and synthesize the information obtained to generate insights and inform decision-making processes to support the development of Panorama and Opportunity Reports. The information was organized and prepared taking into account the INPACE TWGs definition.

In the end, SPI produced one dedicated mid-term report to each one of the Partner Countries with the following contents:

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OVERVIEW OF ICT RESEARCH AND DEVELOPMENT (R&D) INITIATIVES

Introduction of ICT R&D Programme

Research and Innovation priorities

National funding mechanisms and priorities (including whenever possible a quantitative analysis of the amounts of funding by TWG)

Present collaboration with the EU

Potential synergies and communalities between PC national programmes and European programmes

The mid-term reports were sent to the Cluster Leaders in order to get insights and to know what findings should be further investigated. Furthermore, it was conducted a public session (that will be detailed in the chapter 5 of this document) in Seoul, Republic of Korea, with experts from the ICT field that contributed to improve the information collected and to direct the research in more specific directions. Additionally, a few interviews with researchers from each PC were made to validate the information about each country. The interviews are still being held, and most will take place in 2025 to improve the final recommendations regarding the Digital Partnerships. These interviews were complemented by presentations of most important desk research findings in meetings with all WP3 members.

The results from all the work were condensed and incorporated into the Deliverable 4.1 - Report on synergies and commonalities in policies, strategies and programmes between the EU and PC and intends to provide a foundational understanding of the current state, trends and opportunities in the ICT field for each PC. The main goal of this deliverable is to support the panorama reports by providing information on the needs and technology developments in each INPACE technical domain.

2.2 DATA COLLECTION

Desk research dedicated to each PC was conducted and was focused on the pre-existing data from diverse sources such journals, industry reports, government publications, and other online databases. An extensive online search was made to identify the national government policies, first, to identify the strategy for the R&D in the ICT field and the main agencies responsible for the national strategy and, then, the existent funding mechanisms and the calls opened or recently closed for the different ICT themes that are related to the INPACE TWGs.

Each governmental agency working in the ICT filed was consulted and the relevant information form policy documents from government websites was duly noted to obtain a comprehensive understanding of the funding priorities. The data was collected in the original language of each one of the countries to access the real information and not a translated and short resume of the page. In many cases, this difference in the search was crucial to identify the national funding programmes and the amounts allocated through the official governmental instruments or dedicated agencies/ministries.

Relevant documents were identified using keyword searches such as "ICT strategy", "ICT funding schemes", "R&D ICT calls", among others, in the national language of the targeted country. Criteria for selection included publications and documents within the last year and containing information for the future strategy and/or calls from 2024 onwards.

After the data analysis a description was made based on key ICT themes matching the INPACE TWGs topics, including the overall ICT strategy, the Call topic, the research filed and the amount whenever was possible to obtain this kind of information. These themes were then analysed to identify patterns in the national prioritization and distributed in terms of amounts per INPACE TWGs allowing to identify the TWGs with more relevance in terms of funding amounts, revealing the priority areas. To ensure credibility, data was cross-referenced between multiple sources.

This desk research provided a solid foundation for understanding PC policies, strategies, and programmes, while highlighting major areas of synergies, potential avenues for collaboration, key policy developments and standardization approaches.

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3   INTERVIEWS

3.1 APPROACH AND ACTIONS

Through interviews with thematic working groups, key stakeholders, policymakers, and other relevant individuals, may be gathered valuable qualitative data to complement the desk research findings, which will then be incorporated into the project. Over the course of the INPACE project, SPI has the objective to conduct over 60 interviews, covering all 12 thematic working groups. These semi-structured interviews will follow a clear process to ensure the meetings are effective and insightful.

The interviews are conducted flexibly – in person, over the phone, via video conferencing, through focus groups, or even using ethnographic methods – to ensure accessibility and convenience. Depending on the situation, interviews may be carried out by the TWGs, the SPI team, or other INPACE project representatives.

For each group of interviews SPI will create an interview guide, tailored to meet the needs of the thematic working groups. This will be reviewed to ensure that the project's goals and areas of interest are aligned.

All interview responses will be recorded, transcribed, and analysed to identify recurring themes, patterns, and insights, as well as participants' experiences relating to the project's key topics.

Within this process, as described in section 1.2, thematic working groups must provide reference questions, which will be developed into practical and focused interview questions. They will also suggest the profiles or contacts of potential experts to interview, supporting the mapping efforts led by WP4.

The first action taken in this topic was to develop interviews / collect inputs from the thematic working groups members themselves. For that effect, a first group of meetings took place with the Cluster leaders and the lead contacts for Technologies & applications in each partner country (India, Japan, Singapore, and Republic of Korea). In these meetings were agreed the contents of D4.1 - Report on synergies and commonalities in policies, strategies and programmes between the EU and Asia-Pacific countries. Also was defined the main source to be used to complete these sections, being considered that desk research should be priority, followed by just a few interviews to validate the findings related to each country.

After being developed the section of D4.1 related to OVERVIEW OF ICT RESEARCH AND DEVELOPMENT (R&D) INITIATIVES IN JAPAN, a meeting was held in 11th of July with all members of WP3 to present and refine the contents developed. The inputs collected were used to improve this section and develop the other 3 (with the same information for Republic of Korea; Singapore and Japan). All sections were also presented to the WP3 members in 26th of September 2024.

After being developed a first draft of D4.1, a *Powerpoint* presentation was prepared with the main contents, to be used in a public consultation session held in Seul (see section 5.2) and in the following interviews to be held with a list of relevant stakeholders indicated by the Cluster leaders. These interviews are still running during the beginning of 2025. The list of those already held are in the table below:

Table 1: List of interviews

Interview information			
Name	Country	Cluster	Dates
Adam Kapovits	Germany	5	14 March 2024
Franck Le Gall	France	2	3 October 2024
Francis Balestra	France	4	29 November 2024
Mitsumasa Koyanagi	Japan	4	2 December 2024
Mukesh Mohania	India	3	5 December 2024
Junho Shin	Republic of Korea	3	12 December 2024
Naoko Watanabe	Japan	5	18 December 2024

SPI team is sending out deck slides to the interviewees before any interview conducted online so the experts have sufficient time to review the information from SPI's side. This ensures that the experts are able to give inputs that aligns with the direction of the project, alongside with any other interesting key ideas to take note of. During the interviews the slides were showed followed by some questions as those described below:

1. Introduction
   What is your field of expertise? What has been your interaction with partner country/ies (India, Japan, ROK or Singapore)?
2. Research and Innovation Priorities / National Funding Mechanism and Priorities (ICT)
   Do you have any information about the Research and Innovation Priorities in this country? And national programmes for ICT? Do you have anything to add to the contents in the

presentation? Do you know examples of R&D projects in collaboration with industry in this country (link!)?

3. Present Collaboration with the EU

   Do you know or have experience of projects in cooperation between EU and PC? Could you give information about it?

4. Potential Synergies and Commonalities between European and Japan National policies, strategies and programmes

   Can you identify these synergies? Something to add to those identified in the report?

5. Final comments

   Could you give any recommendation to foster EU-Asia pacific countries digital cooperation?

Future schedules will be discussed with the thematic working groups and coordinated with key project activities or events, including work under Task 5.2 on Stakeholder Engagement and Community Building.

3.2 INTERVIEW INSIGHTS

Currently, SPI gathered insights from the speakers in 3 of 4 Indo-Pacific partner countries as well as partners from Japan and France. They provided an insightful and interesting viewpoint of their countries perspectives regarding their ICT priorities and recommendations on sources to consider for the INPACE project.

Based on the current insights from the EU partner, the reports and presentation provided for the current reports of the Indo-Pacific partners were generally insightful and informative with some small areas of add-ons recommended. A possible area to delve into was specific sectorial/industries' ICT initiatives.

Similarly, for Japan, the contents of the reports are well and clearly illustrated with small areas of adjustments recommended. Areas to consider is the discussion of the harmonisation between Japan and EU collaboration to better illustrate the synergy between both nations, as well as further development on the initiatives by the National Institute of Information and Communications (NICT) of Japan.

On the other hand, Republic of Korea is a country that was new to the EU collaboration having introduced to the Horizon Europe projects only this year. Currently, the country has a clear system of the different roles and responsibilities of academia/research institutions and industries, and a consortium between local academia and industries are recommended by the Korean government. However, Korean academia institutions and industries currently have little information on

international collaboration. The only platform available is a closed channel for specific personnel and this lacks public access to information and how to participate in collaborations. As such, possible steps to explore is the increase in publicity and information for global collaboration since the Korean and EU partnerships are currently at a very early stage.

The issues mentioned in Republic of Korea are also similar for India, while there are minimal issues with the content of ICT initiatives that India is working on, there lies many differences in the priorities and perspectives of the organisations in India and the EU organisations. Grants are generously offered for the areas of ICT focus in India since the government places a strong emphasis on the industries and academia to expand scientific vigilance and to be self-reliant as a nation. While it is recognised that the India and EU collaboration would bring more jobs into India and reduce the imports from other countries due to the possible increase in production in India, there are some gaps for successful collaborations. Currently, India partners with European countries like France and Germany but on a more business-oriented discussion rather than on ICT research initiatives. This is due to the mind-set of current Indian organisations to think from the point of view of a profitable company. The paperwork and philosophy between the two nations also differ rather drastically. As such, the current step for improvement is for India to find the ideal intersection between research and business.

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4 SURVEYS

4.1 APPROACH

Surveys are important contributions for knowledge generated during INPACE project. Surveys are invaluable tools for gathering systematic data and insights from the pool of experts in our TWGs, policymakers and relevant stakeholders. Surveys provide a structured approach to collecting information, allowing for quantitative analysis and the identification of trends and patterns. By conducting surveys, it is possible to gather feedback, opinions, and preferences on identified topics related to status of DPs and TTC in the Asian partner countries. This information will enable to make informed decisions, identify areas for improvement, and tailor strategies to meet the needs of our TWGs effectively. The survey instrument will be developed in these following steps:

- Thematic working groups will provide some potential questions and profiles of respondents
- Survey questions will be developed for providing quantitative data in term of first-hand perspectives, experiences, and insights.
- List of potential respondents is developed – in articulation with Task 5.2 - 2 Stakeholder Engagement and Community Building
- Surveys may be carried out synergistically with Task 5.2 targeting relevant stakeholders (e.g. using Community Platform). The survey questions will be evaluated and adapted frequently when it is needed.
- The conclusions drawn from surveys are synthesized to generate comprehensive insights by SPI with guidance from the TWGs.
- The synthesized findings from desk research, interviews, and surveys are incorporated into the Panorama reports of the Clusters.

4.2 ACTIONS AND NEXT STEPS

During the interactions with WP3 to define and refine the methodology approach, was not considered pertinent to held the surveys in the first year of the project. Surveys were considered relevant to validate conclusions/ strategy/ research roadmaps that will be developed later in the project. Surveys can also be used to triangulate data from desk research, interviews, and surveys to validate findings and ensure accuracy and reliability.

Two topics were already found relevant to launch two surveys in 2025:

- Data spaces – evaluate which industries are more propitious for data spaces and how can this topic be implemented in digital partnerships.

- Digital skills – evaluate the relevance and critical topics for industries and developers.

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5   PUBLIC CONSULTATIONS

5.1 APPROACH

Throughout the INPACE project, public consultations will be organized at various stages to solicit feedback, gather input, and validate findings. These consultations may take the form of workshops, roundtable discussions, webinars or stakeholder forums, depending on the preferences and needs of participants.

Total of 3 consultation sessions must be conducted synergistically with other potential activities organised by INPACE partners. Important the input from TWG to define the objectives of these sessions.

In the DoA, the first session should be held in 2025. However, SPI and partners from WP3 considered relevant to use the INPACE symposium to validate the findings already compiled in the draft version of D4.1.

5.2 INTERNATIONAL SYMPOSIUM EVENT

The International Symposium on Digital Technologies and Policies in Seoul commenced on the 21st and 22nd of October 2024. It brought together representatives from Republic of Korea (ROK), India, Singapore, and Japan, alongside experts from Europe, to explore ways of strengthening digital partnerships across the Indo-Pacific and European regions.

During the event, SPI made a presentation slide deck showcasing the findings of the four Asian country partners in their field of ICT Research and Development (R&D) initiatives. Each country starts with an overview of the key organisations involved for ICT projects, followed by their respective research and innovation priorities, as well as their national funding mechanism and priorities. In addition, present collaboration with the EU, as well as potential synergies and commonalities between the partner country programmes and the European programmes.

Figure 2: Public consultation session in Seul

Besides the long discussion that took place after SPI presentation, discussion meetings with the respective country representatives during the event were essential. It provided many valuable insights between their own country's perspectives regarding the collaboration with the EU on ICT R&D initiatives. The summaries below provided insights of each individual Asian country partner regarding their position on ICT collaborations and Digital Partnerships (DP) with the EU, as well as recommendations on sources to consider for the INPACE project.

Republic of Korea growing relationship with the European Union (EU) was an interesting focal point. As a newly designated third country in Horizon Europe, Republic of Korea has demonstrated strong engagement, achieving a 23.7% success rate in funded projects despite not receiving EU funding support. However, a recurring concern was the lack of dialogue between policymakers and technology stakeholders in both regions, which hampers more integrated collaboration. During our meeting interview with the experts, Dr Junho Shin also brought up this issue. The focus of cybersecurity were identified as common grounds, with potential opportunities for Republic of Korea

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and the EU to standardise their approaches. Resources, such as the reports/ Republic of Korea Quarterly Newsletter from EURAXESS, were recommended to gather more information.

In addition, India's contributions were influenced by a top-down approach driven by intense security concerns, due to tensions with China and Russia. Hence, the focus was on trade rather than digital collaboration. India's state-centric protection Intellectual Property (IP) policies differ sharply from the EU's author-focus protection, showcased very little convergence in many areas. Nonetheless, sectors like semiconductors, data governance, and space technology were highlighted as promising potential areas for partnership if there is greater involvement from the private sector in India.

However, Singapore's engagement with EU digital initiatives has been limited, largely due to concerns about the resistance to EU bureaucracy and the complexity of EU processes. Therefore, the country expressed little interest in the DP.

As such, the discussions underscored many potential issues to be addressed between the partner countries in Asia and the EU in order to expand the scope of collaboration between them. By addressing the identified gaps, leveraging on existing resources such as EURAXESS newsletters and projects with industries by CELTIC – NEXT Eureka Cluster could foster stronger connections between stakeholders. Nevertheless, the symposium laid a foundation for more meaningful and sustainable digital partnerships between the Indo-Pacific and Europe.

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6 FINAL REMARKS

6.1 OUTPUTS AND RESULTS AT MONTH 12

In the topics below is presented a summary of the outputs and results reached during the first year of INPACE project, using the tools and methodology described in this document:

Japan

One key focus of Japan R&D is Society 5.0, which aims to create a human-centered society that merges the physical and digital worlds. This includes using advanced technologies like AI and quantum computing to improve areas like sustainability and quality of life.

Recently, on the 3rd of June 2024, the CSTI held a conference on Science Technology and Innovation where the Japanese Innovation Strategy for 2024 was outlined. The direction of the strategy is the automation and labour-saving through AI and robotics. These are seen as a critical priority due to the worsening labour shortage, and preparation for and response to frequent disasters are also urgent issues. The focus includes sectors like healthcare, autonomous driving, and finance, where the societal impact is of particular significance. The strategy emphasizes a thorough study of legal regulations to counter the risks associated with AI, such as the spread of misinformation, discrimination, bias and criminal activities, ensuring that its application in society is safe and expedited.

Besides AI initiatives, emphasis is also being placed on support for research and talent development in nuclear fusion, quantum technology, and biology. A collaborative approach is being championed to foster innovation using AI in quantum technology and robotics.

The "Five Priority Areas" of The National Institute of Information and Communications Technology (NICT) - the only public research institute specializing in ICT for Research - are the five areas of advanced electromagnetic wave technology, innovative networks, cybersecurity, universal communication, and frontier science. From a medium- to long-term perspective, each field is working on cutting-edge, basic, and foundational themes. In addition, NICT promotes cross-sectional and

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strategic R&D in the four strategic areas ("Beyond 5G, AI, Quantum Information and Communications, and Cybersecurity") that should be strategically pursued.
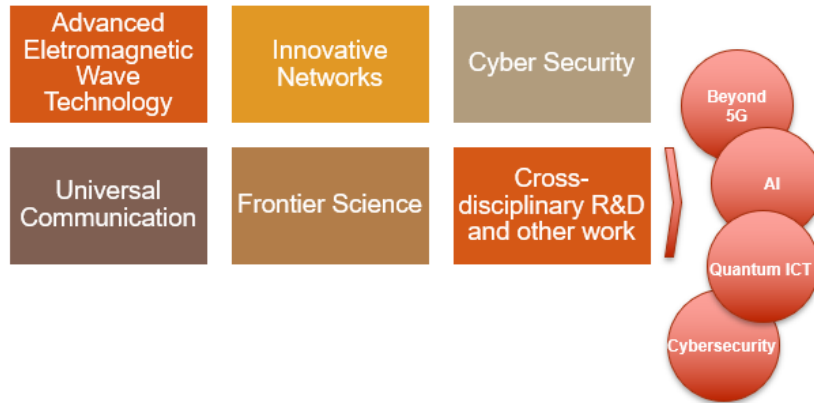

Figure 3: Priority research areas of NICT.

By analysing the information collected about the competitive research funding programs in ICT domains for 2024, in terms of amounts of investment, has a total of around 183.000 million-yen, that are allocated through the different funding agencies. Making a distribution in terms of amounts per INPACE Thematic Working Groups, is shown clearly that in competitive funds a big amount of the government is allocated to the TWG 2.8 "Digitalization of industry, infrastructures and services" (meaning that belongs to cluster 2; TWG 8), representing around 30% of the total budget, followed by IoT (TWG 17) and Smart Cities and communities (TWG 5).
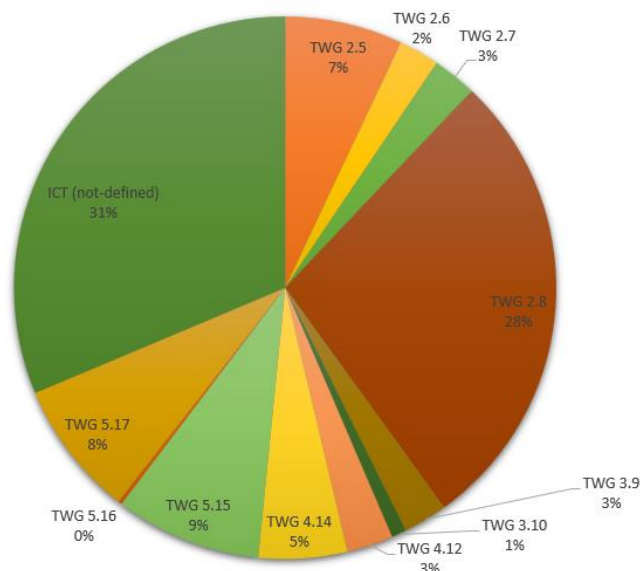
Figure 4: Distribution of competitive research programmes for 2024 (million yen)

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Singapore

Singapore has the vision to position the nation as a global leader in Information and Communications Technology (ICT), currently ranked the fifth in the world with the highest digital quality of life.[1] The ICT R&D programme of Singapore is focused on the Digital Economy and Smart Nation, where there are commissioned and competitive ICT projects in the market. The main initiative is the RIE2025 where the government invested 25 billion over the next 5 years from 2021. Some key stakeholders include the Prime Minister's Office, Ministry of Digital Development and Information (MDDI), and Infocomm Media Development Authority of Singapore (IMDA). In addition, the country is venturing to the 6G technology for its household nationwide broadband network despite already being the key leaders in the 5G market.

The RIE2025 is Singapore's key ICT initiative. This investment entails 1% of Singapore's GDP, the largest amount ever invested to R&D in Singapore, as the government's persistence to be the leader in ICT in the long run. There is an additional budget of 3 billion pumped in RIE2025 on FY2024 to further support the advancements of the nation's ICT progress. The initiative aims to tackle 4 main domains – Manufacturing, Trade and Connectivity, Human Health and Potential (HHP), Urban Solutions and Sustainability (USS), as well as Smart Nation and Digital Economy (SNDE). Under the RIE2025 umbrella, there are many commissioned projects tackling different ICT objectives.

Other main initiatives involve Singapore National AI Strategy 2.0 (NAIS 2.0), Future Communications Research and Development Programme (FCP) projects, 5G innovation, and the Digital Enterprise Blueprint (DEB). For instance, the Smart Nation initiative, launched in 2014, not only aimed to integrate digital technologies into the everyday life of households but also actively promoted advancements in various sectors. Key projects include the development of a National Digital Identity platform and 5G infrastructure deployment. Additionally, AI Singapore was also established to promote AI adoption, research, and local talent development.

Table 2 illustrates some of the breakdown of the RIE2025 budget into various funding initiatives. The majority of the budget was allocated to 2 main funding initiatives: AI Singapore (AISG) and National Quantum Office (NQO).

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[1] https://content.mycareersfuture.gov.sg/singapore-ict-sector-economic-success/

Table 2: Allocation for various funding initiatives in the ICT sector

Funding Initiatives	RIE2025 (in S$ million)
AI Singapore (AISG)	250
Future Communications R&D Programme	70
Digital Trust Centre	50
Combatting the Weaponisation of the Internet	Not available
National Quantum Office (NQO)/ National Quantum Strategy	300
National Cybersecurity R&D Programme	62
Translational R&D for Digital Government	Not available

Doing the connection with INPACE project, Figure 4 illustrates the funding allocation within Singapore's Research, Innovation, and Enterprise (RIE) Plan across key technological areas identified by Thematic Work Groups (TWGs) of INPACE. The largest funding of S$300 million is collectively dedicated to TWG11 High Performance Computing and 14 Ground-breaking Technologies, possibly due to factors like adopting government platforms on a commercial cloud service.

5G and beyond emphasising the nation's commitment to developing advanced telecommunications infrastructure to enable next-generation technologies. While TWG 9 and 16 are funded with S$250 million, reflecting Singapore's emphasis on integrating AI systems across industries. Moderate funding is allocated to areas like High Performance Computing and Ground-breaking Technologies and the Internet of Trust and Security, each receiving between S$50 million and S$100 million, indicating their importance in addressing cybersecurity and computational advancements.
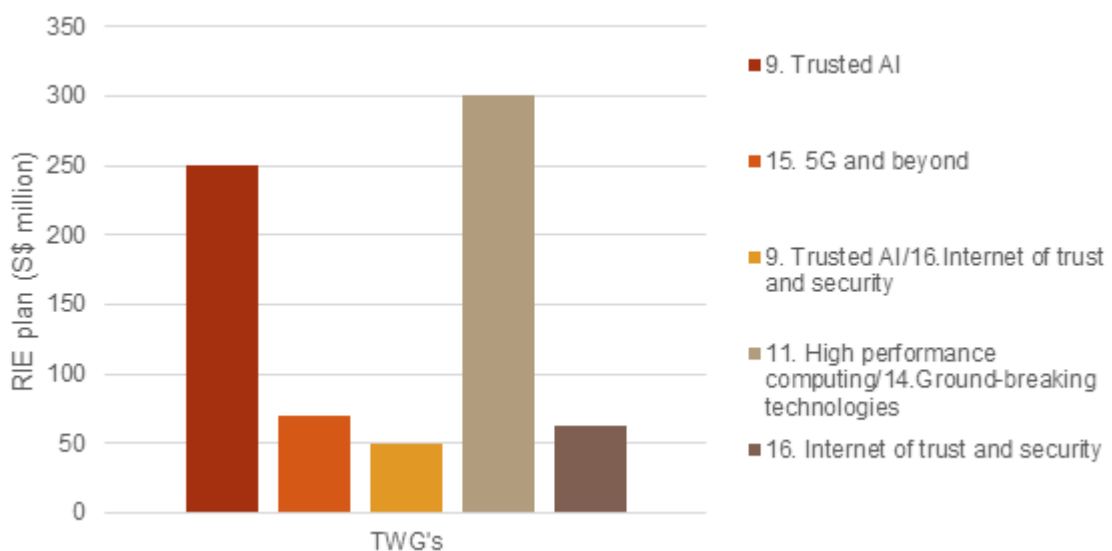

Figure 5: Breakdown of RIE2025 spending in the various TWGs

Singapore's ICT efforts remain globally competitive to secure its advantage position in the ICT sector. As such, Singapore participates in various collaborations such as the EU-Singapore

collaboration. One of the latest EU-Singapore collaboration is the EU-Singapore Digital Trade Agreement (EUSDTA) that was signed in July 2024. It aims to better facilitate cross-border data flow and trade in the digital economy. This not only ensures seamless, cost-effective transactions but also secure digital systems. Additionally, it prioritises consumer protection and opens new opportunities for small and medium-sized enterprises (SMEs) to participate in the digital economy.

In conclusion, Singapore's ICT R&D ecosystem exemplifies a well-rounded approach by leveraging on technology. With the clear focus on innovation and international collaboration, the nation is still well positioned to remain as a leader in the global digital economy. Continued emphasis on bridging gaps in digital access and advancing workforce skills will ensure sustainable growth and resilience of the country in the domain of ICT.

Republic of Korea (ROK)

The Korean government, through its Digital Innovation and Diffusion Strategy, has prioritized six key areas to strengthen its leadership in the global technology landscape and drive the Fourth Industrial Revolution. Artificial Intelligence (AI), a foundational technology, aims to support industries like healthcare and law enforcement, positioning Republic of Korea as a global AI powerhouse. To complement this, AI Semiconductors will secure advanced technologies such as NPUs and PIMs, enabling Republic of Korea to lead in AI hardware innovation. 5G-6G Networks are identified as essential infrastructures, offering ultra-low latency and real-time capabilities to support advanced applications like virtual reality and autonomous systems. Quantum Technology, valued for its strategic applications in encryption and navigation, will be localized to secure leadership in computing, sensors, and cryptographic systems. The Metaverse is viewed as the next digital frontier, with plans to build a strong ecosystem to drive digital industrial transformation. Lastly, Cybersecurity will focus on safeguarding Korea's expanding digital infrastructure through advanced security systems and core data protection technologies. These priorities collectively aim to ensure Republic of Korea's competitiveness in emerging technologies and global markets.

The Ministry of Science and ICT (MSIT) aims to position Republic of Korea as a global R&D leader through four strategies in 2024. These include creating a global R&D hub by attracting international talent and fostering collaboration, advancing technologies like AI, quantum computing, and next-gen semiconductors, and promoting AI-driven digital transformation across key sectors. Additionally, MSIT focuses on building an inclusive AI society with regional projects and innovation hubs to ensure equitable benefits nationwide.

ROK's national funding mechanisms play a critical role in advancing its ICT and R&D ecosystem. Two primary agencies — the National IT Industry Promotion Agency (NIPA) and the National

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Science and Technology Information Service (NTIS) — are responsible for distributing research funding and driving technological innovation.

The National IT Industry Promotion Agency (NIPA) focuses on enhancing ICT competitiveness and supporting industrial growth. NIPA achieves this through a range of strategic programs, including AI ecosystem development, software innovation, and global market expansion. For instance, NIPA funds projects that promote AI talent development, regional digital innovation hubs, and metaverse applications. Programs like the AI Semiconductor Talent Supply Platform and AI-Based Healthcare Services demonstrate NIPA's commitment to fostering emerging technologies and industries.

Similarly, the National Science and Technology Information Service (NTIS) serves as Republic of Korea 's national R&D information portal. It consolidates data on ongoing and completed projects, offering transparency and promoting collaboration across ministries and organizations. NTIS provides funding for projects that focus on global ICT competitiveness, innovation tracking, and start-up development. Examples include the ICT R&D Excellence Support Program and the ICT Innovation Square Expansion Project.

A quantitative analysis of funding programs for 2024 highlights MSIT as the leading ministry in ICT R&D projects. Most projects align with priorities such as AI development, digital transformation, and trusted cybersecurity systems. Budget allocations are heavily directed towards critical areas, with "Trusted AI" receiving 30% of the total budget. Other significant areas include "Digitalization of Industry and Services" (19%), "Data Technologies" (14%), and "High-Performance Computing" (13%).

India

India, the world's fifth-largest economy, is tackling global challenges like digitalization, space exploration, and the transition to zero emissions. However, its research and development (R&D) expenditure remains under 1% of GDP, far below the global average of 2.2%. The ICT sector, a critical pillar of India's economy, drives digitalization and innovation but faces low R&D investment, particularly in hardware. With R&D intensity at 0.88% in FY 2021-22 and 0.87% in FY 2022-23, ICT firms focus primarily on software services. Despite this, companies are increasingly investing in emerging technologies like AI and digital twins, supporting innovation across industries.

The Prime Minister's Science, Technology, and Innovation Advisory Council (PM – STIAC) plays a crucial role in fostering India's research and innovation landscape by overseeing several ecosystem initiatives aimed at enhancing collaboration, capacity building, and innovation in the country. Key PM-STIAC ecosystem Initiatives include:

1. **Anusandhan National Research Foundation (ANRF):** This initiative focuses on improving research funding, particularly in higher education institutions (HEIs), and strengthening collaboration between academia, industry, and government to boost India's research output;

2. **National Technology Clusters:** Aimed at creating regional hubs for scientific and technological innovation, these clusters encourage cross-disciplinary collaboration and facilitate public-private partnerships. They serve as platforms to develop and test new technologies across sectors;

3. **I-STEM Portal:** The Indian Science, Technology, and Engineering Facilities Map (I-STEM) is a comprehensive national platform designed to provide access to research facilities, tools, and instruments across the country, promoting more efficient use of resources;

4. **AGNIi (Accelerating Growth of New India's Innovations) Mission:** AGNIi supports the scaling and commercialization of innovations developed by Indian startups, offering them access to industry partners and government-backed networks;

5. **Waste to Wealth Mission:** This initiative focuses on converting waste materials into valuable resources, promoting sustainability and innovation in waste management;

6. **G20 Collaboration:** India has engaged globally through initiatives like the G20 CSAR (Collaboration in Science and Research), facilitating international research collaboration to address shared challenges such as climate change, energy, and health.

The Ministry of Electronics and Information Technology (MeitY) serves as India's central authority for policy formulation and implementation in the Information and Communication Technology (ICT) sector. MeitY envisions the e-development of India, aiming to transform the nation into a developed and empowered digital society. It plays a pivotal role in shaping ICT research and development (R&D) by publishing reports, offering guidelines, and updating stakeholders on sector advancements.

Under MeitY, the National Informatics Centre (NIC), established in 1976, acts as the government's technology partner, providing IT-driven solutions to enhance governance and public services at both Central and State levels. NIC develops IT systems and ICT infrastructure, advising on emerging technologies to maintain India's leadership in digital transformation, particularly in governance.

The National Institute of Electronics and Information Technology (NIELIT) focuses on human resource development in Information, Electronics, and Communications Technology (IECT). NIELIT conducts R&D projects, consultancy services, and turnkey IT projects in areas like office automation,

software development, and website creation. Additionally, it spearheads data digitization efforts in 15 states and 2 Union Territories for the creation of the National Population Register (NPR) under the Registrar General of India (RGI).

The Centre for Development of Advanced Computing (C-DAC), another key R&D organization under MeitY, leads innovation in IT, electronics, and related fields. Together with NIC and NIELIT, C-DAC strengthens India's technological landscape through research, innovation, and infrastructure development.

MeitY's R&D group comprises several specialized divisions: R&D in Electronics, R&D in Information Technology, Convergence, Communications & Broadband Technologies (CC&BT), Cybersecurity, Strategic Electronics, Schemes and Policies, and Startup and Innovation Initiatives. It also oversees PRIME (Project Review and Information Management Electronics System), supporting efficient project management.

Complementing MeitY's role, the Department of Telecommunications (DoT) under the Ministry of Communications is responsible for formulating telecom policies, licensing, and infrastructure regulation. DoT established the Standards-R&D-Innovation Division in 2019 to implement the National Digital Communications Policy (NDCP) 2018. This division promotes R&D, standardization, and innovation in Digital Communication Technologies (DCTs), positioning India as a global leader in communications technology. By fostering R&D and setting global standards, DoT aligns with India's vision to lead the digital communications sector.

Together, MeitY and DoT drive India's ICT advancements through policy frameworks, R&D initiatives, and infrastructure development, ensuring the nation's leadership in emerging technologies, digital governance, and global communications.

6.2 METHODOLOGICAL REFINEMENT

The methodology was implemented in the first year, using regular consultations and presentations of project achievements to the thematic working groups and members of WP3, and subsequent refinement and adaptation of next steps based on feedback and evolving needs, ensuring the maximization of the impact and success of TWG initiatives within the INPACE project.

As described in the above sections, was considered pertinent at this point of the project to put most of the effort in the desk research work, in order to collect all relevant information regarding the status in different Partner Countries concerning ICT and digital area, to support the development of D4.1 -

Report on synergies and commonalities in policies, strategies and programmes between the EU and Asia-Pacific countries, and the panorama reports.

It is important to stress that, in D4.1, was made not only a compilation of desk research findings, but a quantitative analysis, to correlate the ICT themes considered relevant in each country, and respective investment amounts, with the thematic working groups of the INPACE project.

Also, even if the public consultation sessions were not due in the first year of the project, was considered as very relevant the opportunity to present in Republic of Korea the contents of the draft version of D4.1, in order to collect insights and different perspectives regarding the potential synergies and communalities between EU and the four partner countries that were identified.

Regarding the interviews, these are considered of very high interest, to be used to collect comments on the results of surveys and further findings through desk research and future interactions inside and outside the consortium of INPACE.