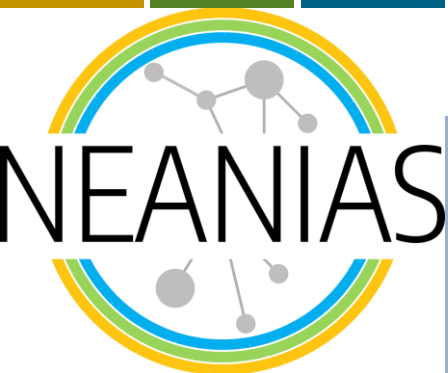# Business perspective of NEANIAS solutions

Market, Business Modelling and Sustainability Analysis

Dr. Ioannis Neokosmidis (INC), i.neokosmidis@incites.eu

Agenda

› NEANIAS solutions positioning/importance in the market

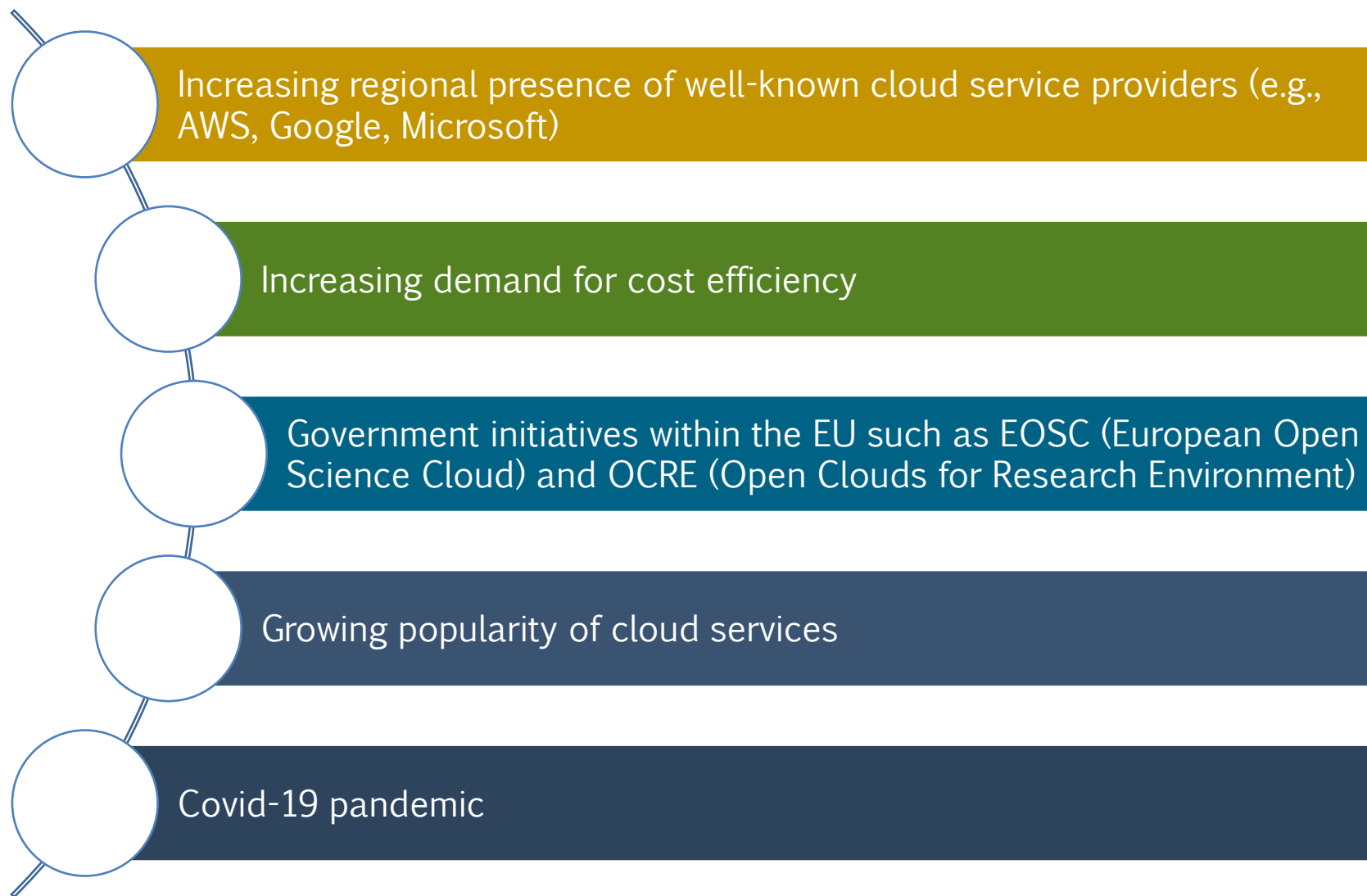› Business model of ViaLactea service

› Technoeconomic analysis of ViaLactea service

› Sustainability analysis of "non-commercial" solutions

EU cloud computing market growth 2019-2020
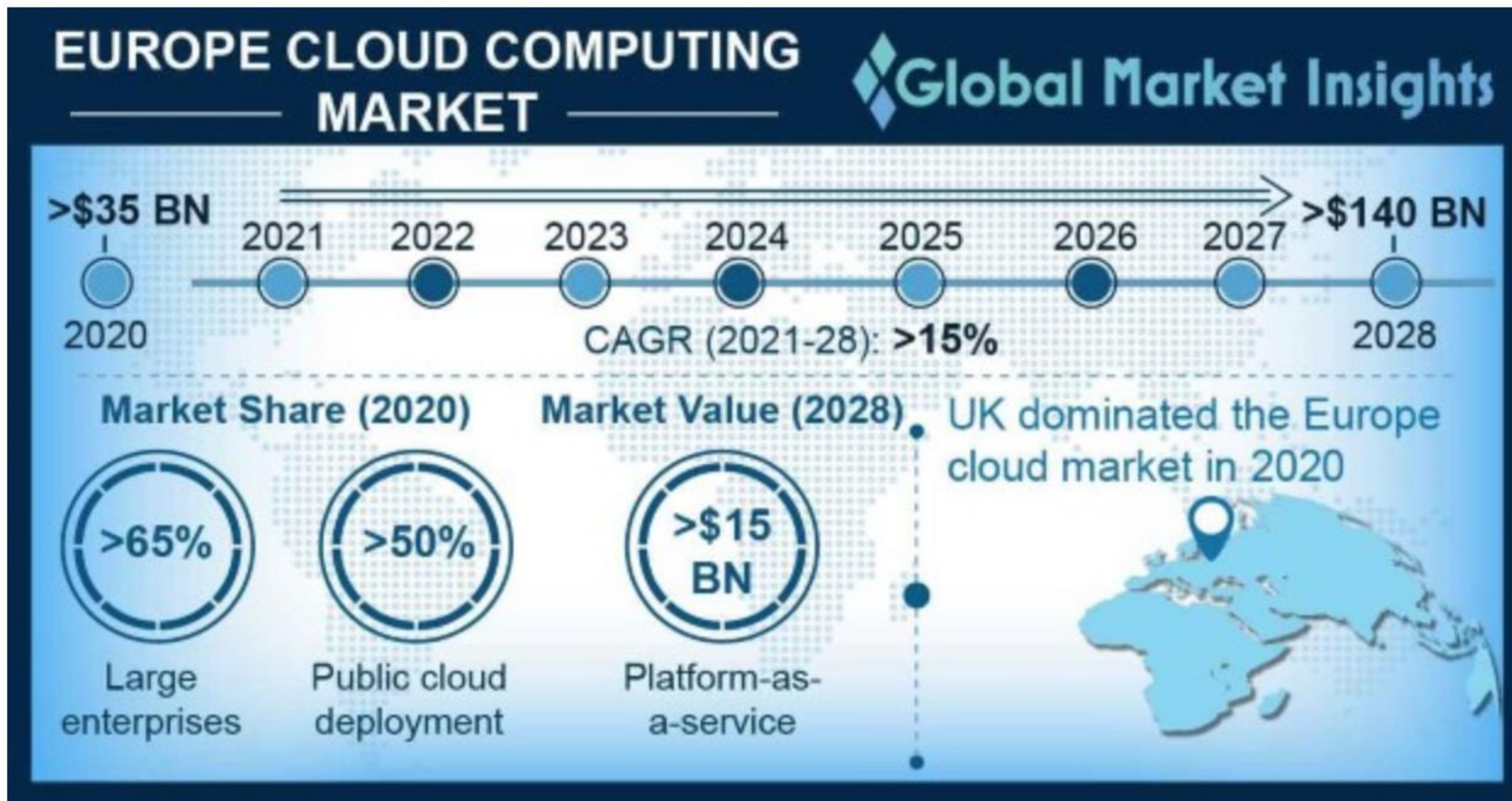
Drivers for the adoption of cloud infrastructure

Increasing regional presence of well-known cloud service providers (e.g., AWS, Google, Microsoft)

Increasing demand for cost efficiency

Government initiatives within the EU such as EOSC (European Open Science Cloud) and OCRE (Open Clouds for Research Environment)

Growing popularity of cloud services

Covid-19 pandemic
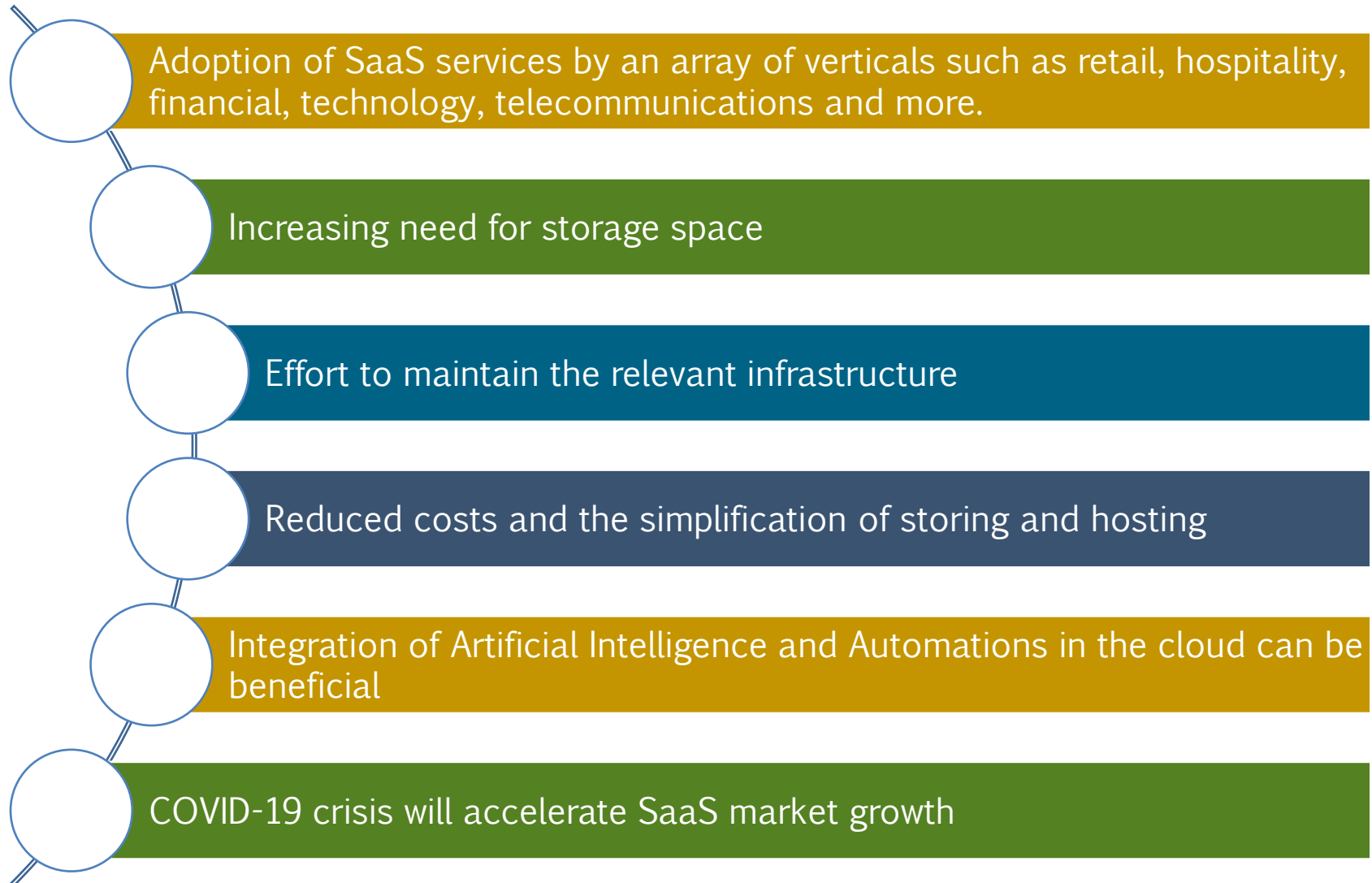
Global SaaS market

› The global SaaS market size was estimated at USD 165.9 billion in 2021 and is expected to reach USD 186.6 billion in 2022.

› Software-As-A-Service (SaaS) Market size was valued at USD 151.31 Billion in 2022 and is projected to reach USD 896.2 Billion by 2030, growing at a CAGR of 27.45% from 2023 to 2030 as per a report by Verified Market Research.

› According to the latest research by SkyQuest Technology, the Global SAAS Market was valued at USD 143.77 Billion in 2021, and it is expected to reach USD 720.44 Billion by 2028, with a CAGR of 25.89% during the forecast period of 2022 - 2028.

Global SaaS Market
share, by type, 2021 (%)

GRAND VIEW RESEARCH

$165.9B
Global Market Size, 2021

Global SaaS market share, by type, 2021 (%)

● Enterprise Software   ● Productivity Software

Source: www.grandviewresearch.com

VERIFIED MARKET RESEARCH

$ 896.2 BILLION

$ 151.31 BILLION

CAGR 27.45%

Global Software-As-A-Service (SaaS) Market

2023-2030

2022   2030

Drivers for the adoption of SaaS

Adoption of SaaS services by an array of verticals such as retail, hospitality, financial, technology, telecommunications and more.

Increasing need for storage space

Effort to maintain the relevant infrastructure

Reduced costs and the simplification of storing and hosting

Integration of Artificial Intelligence and Automations in the cloud can be beneficial

COVID-19 crisis will accelerate SaaS market growth
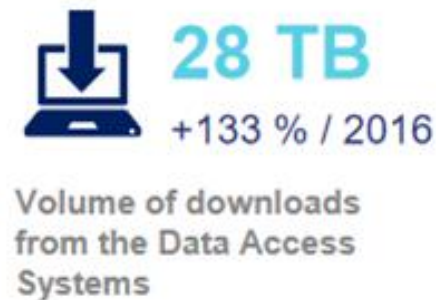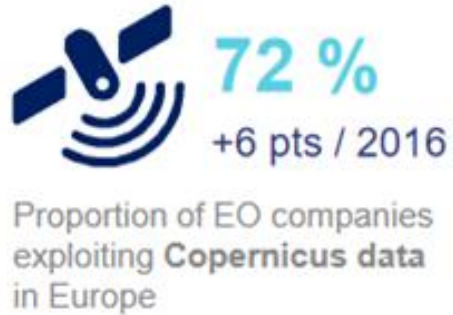
Interest on NEANIAS thematic areas (1/2)

The authors employ scientific manuscript mining for publications that use "seabed mapping" as a keyword, observing great increase in the use of the term
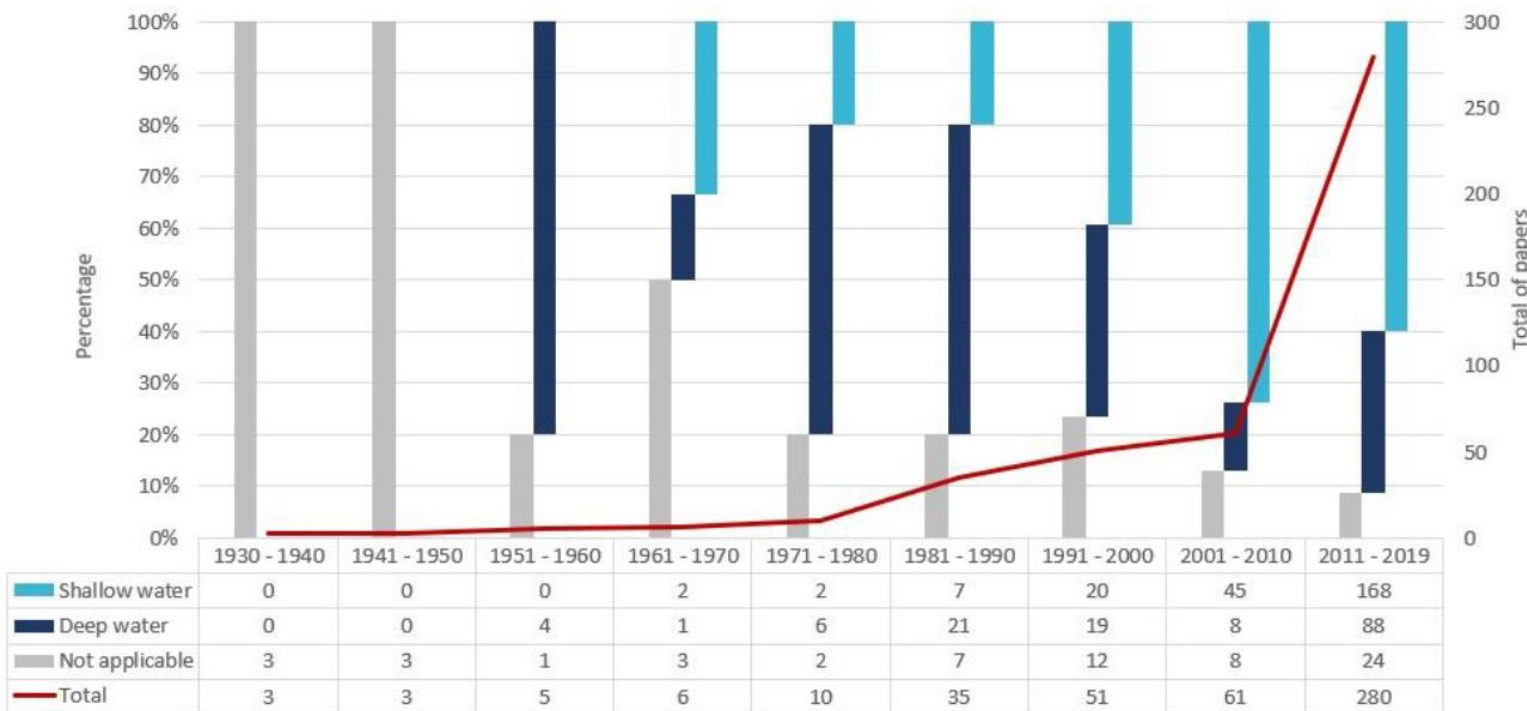

> Marine observation activities interest the private sector as well

> EMODnet underlines bathymetry as one of the most visited portals

> According to 360researchreports, the global marine big data market size is projected to reach $1782,8m from $790 in the period 2019-2027 at a 12,2% CAGR

Interest on NEANIAS thematic areas (2/2)

72 %
+6 pts / 2016

Proportion of EO companies exploiting **Copernicus data** in Europe

38 %
+11 pts / 2016

Proportion of EO companies exploiting **Copernicus services** in Europe

28 TB
+133 % / 2016

Volume of downloads from the Data Access Systems

300,000
+44% / Q1 2018

overall **registered users** on the different hubs (ESA, EUMETSAT, ECMWF, EEA, Mercator Ocean International and JRC)

› Copernicus, Europe's Earth Observation (EO) programme, reports great results as its data and services are being increasingly utilised by EO companies across Europe

› The EO market is closely related to several NEANIAS services, and it is considered that its characteristics can mirror at least a part of the most outstanding services offered by the project.

NEANIAS reference model
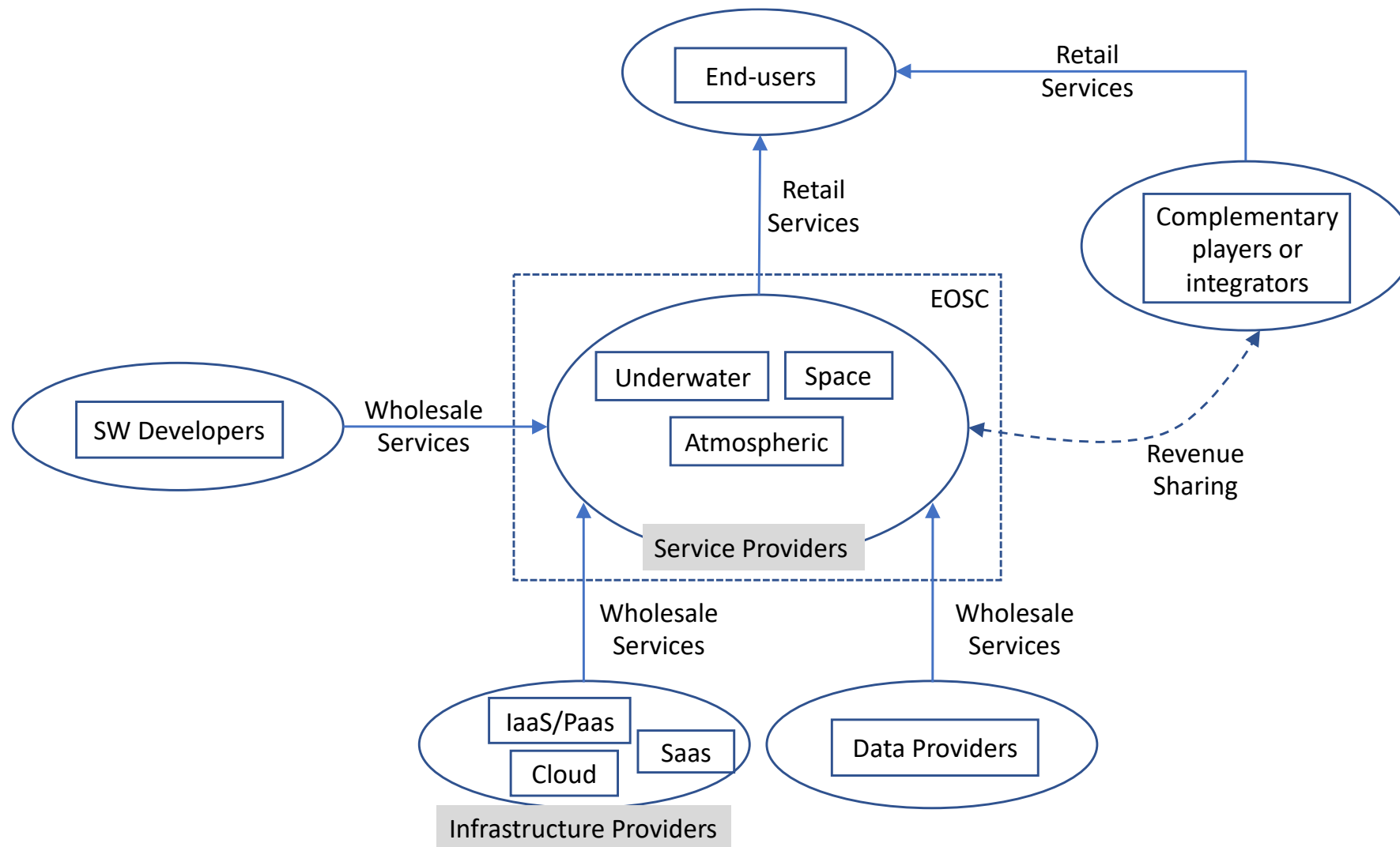
Analysis of exploitable items and business modelling (1/2)

› Twenty-one services (delivery and core) have been investigated

› NEANIAS services were briefly described.

› An initial discussion on their Intellectual Property Rights and exploitation strategy was also provided.

› The Business model canvas of each service was derived
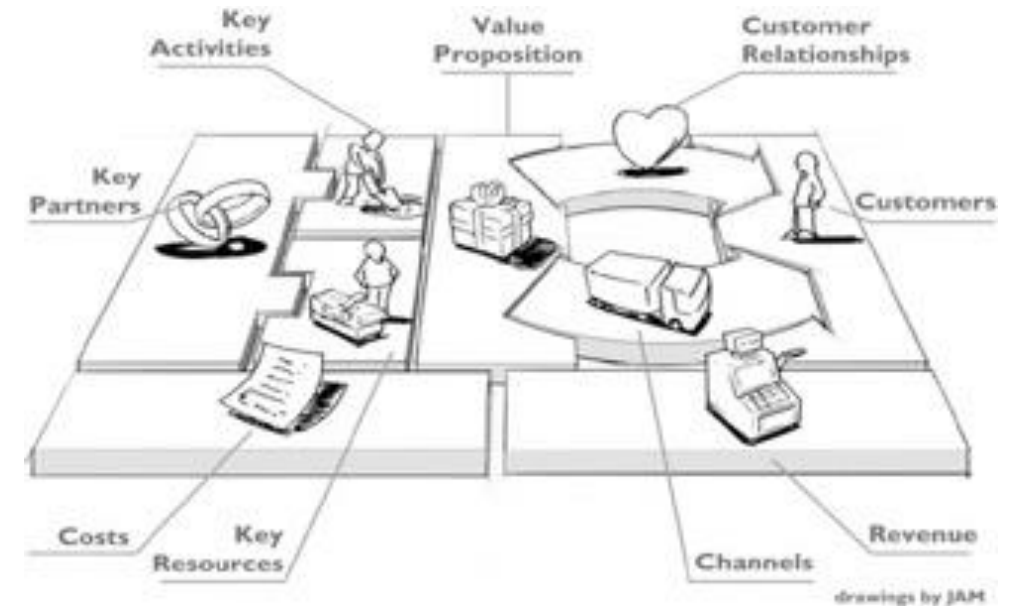
Analysis of exploitable items and business modelling (2/2)

› Several methodologies and cost models have been identified

› Service Providers were contacted about cost elements and models

› All service providers were not able to provide information in the level of details requested by the defined cost models

› A simplified methodology was decided and developed
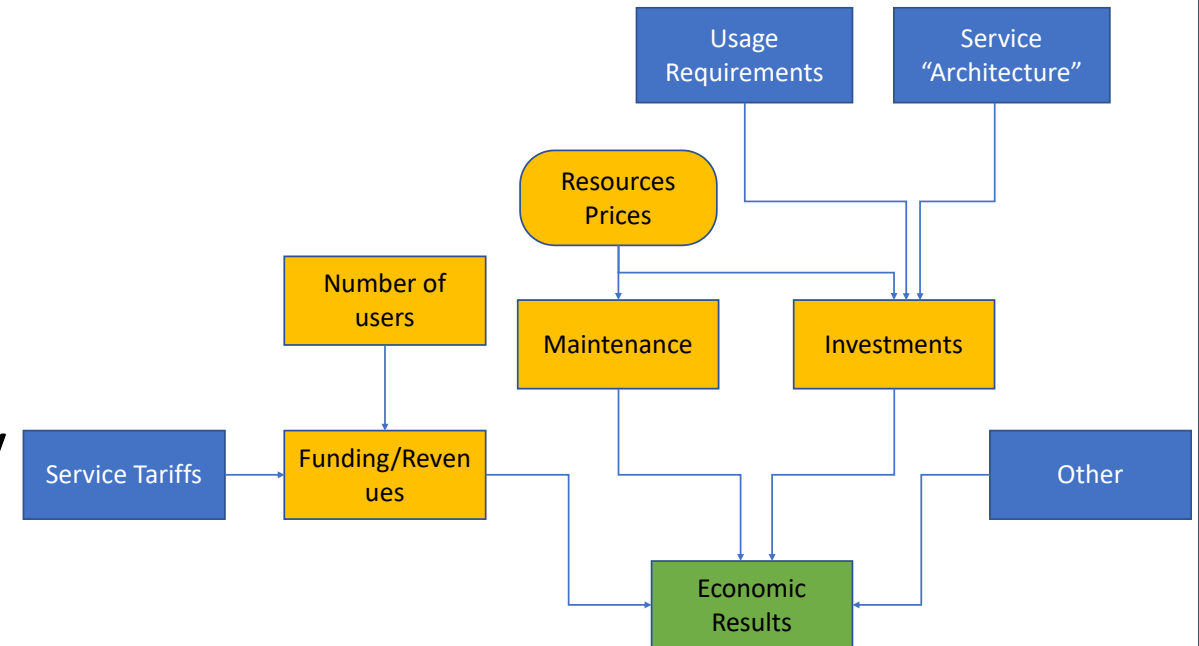
Assumptions

Parameter	Value
Duration	10
Start Year	2019
End Year	2026

Parameter	Value
Discount Factor	8%
Income taxes (if applicable)	20%

Service	Dimensioning Rule	Indicative Price (€)
AAI	1 / 2000 users	100
Accounting	1 / 200 users	200
Logging	1 / 500 users	200
Compute orchestrator	1 / 200 users	500

Accounting Service - Description

› It is being developed by CITE S.A.

› It provides an aggregation functionality through which NEANIAS services can centrally log accounting information as it is gradually accumulated by their usage from the respective authorized clients.

› Different accumulation policies and granularity of information is supported depending on the respective services.

› The information consists of globally defined key point indicators and the aggregation and reports generated based on these becomes available for further usage, as appropriate.

› The Technology Readiness Level (TRL) of Accounting service at the current stage of the project is 8 while the targeted TRL at the end of the project is expected to be 9.

Accounting Service – IPRs and Exploitation

› Freedom to Operate, IPR assets and Foreground & Postground IPR
  - The proposed Accounting Service innovative concept is not covered by any patent. So overall, no IPR barrier to entry is foreseen.
  - There is no joint ownership of any IP while boundaries between subsystems are clear.
  - The IP created during the project lifetime and beyond, related to Accounting Service, belong to CITE, who is the sole owner of the service.

› Form of exploitation
  - Publications in scientific journals and conferences;
  - Direct industrial use through open-source licenses;
  - License agreements and open-source licenses between the copyright's owner and the users/customers. In this agreement, terms about the installation, use, fees, liabilities and other issues will be described.
  - The main goal of exploitation is the generation of revenues that will contribute to the sustainability of the service.

› Competition:
  - Competitive products: D4Science Accounting and gcube accounting.
  - Competitive advantage: general applicability, security model integration, tailormade aggregations of accounting data.

Accounting Service – Business Model

Key Partners
- IaaS providers
- Identity providers
- Open Source communities

Key Activities
- Provision of the Service
- Consulting
- SW development

Key Resources
- ICT equipment
- Personnel

Value Propositions
- Simple extraction aggregation and consumption of accounting information
- General applicability
- Security model integration
- Tailormade aggregations
- Scalability

Customer Relationships
- Community-wide in EOSC
- customer-centric in specific cases (e.g. large infrastructures)

Channels
- Through EOSC
- Partnerships

Customer Segments
- Cloud service providers
- Infrastructure providers
- EOSC service providers that need an effective all-in-one accounting mechanism

Cost Structure
- Virtual machine costs (baseline + increase by usage)
- Personnel
- R&D Development
- Software maintenance (updates, fixes, upgrades).
- Other CAPEX/OPEX

Revenue Streams
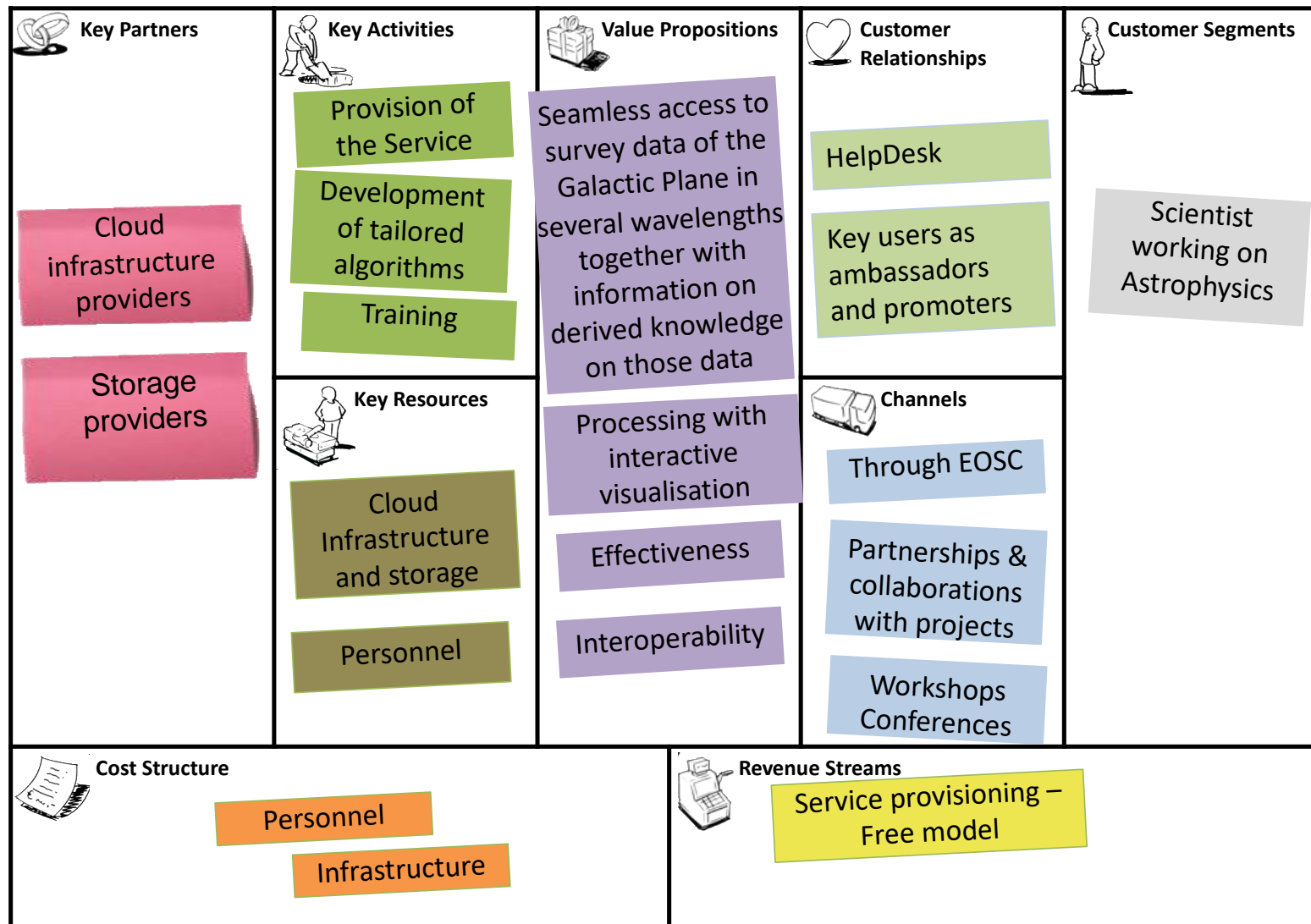- Provision of the service – Pay per use
- Item-based Consulting

ViaLactea Service - Description

› The ViaLactea Service is provided by INAF-Istituto Nazionale di Astrofisica.

› It aims to exploit astrophysical surveys of the Galactic Plane to study the star formation process of the Milky Way.

› The ViaLactea Visual Analytic (VLVA) tool combines different types of visualization to perform the analysis exploring the correlation between different data, for example 2D intensity images with 3D molecular spectral cubes.

› All underlying data are managed in the ViaLactea Knowledge Base (VLKB). The VLKB includes 2D and 3D (velocity cubes) surveys, numerical model outputs, point-like and diffuse object catalogues and allows for retrieval of all the available datasets as well as cut-outs on the positional and/or velocity axis.

› A Map Merging service using Montage allows to merge adjacent datasets.

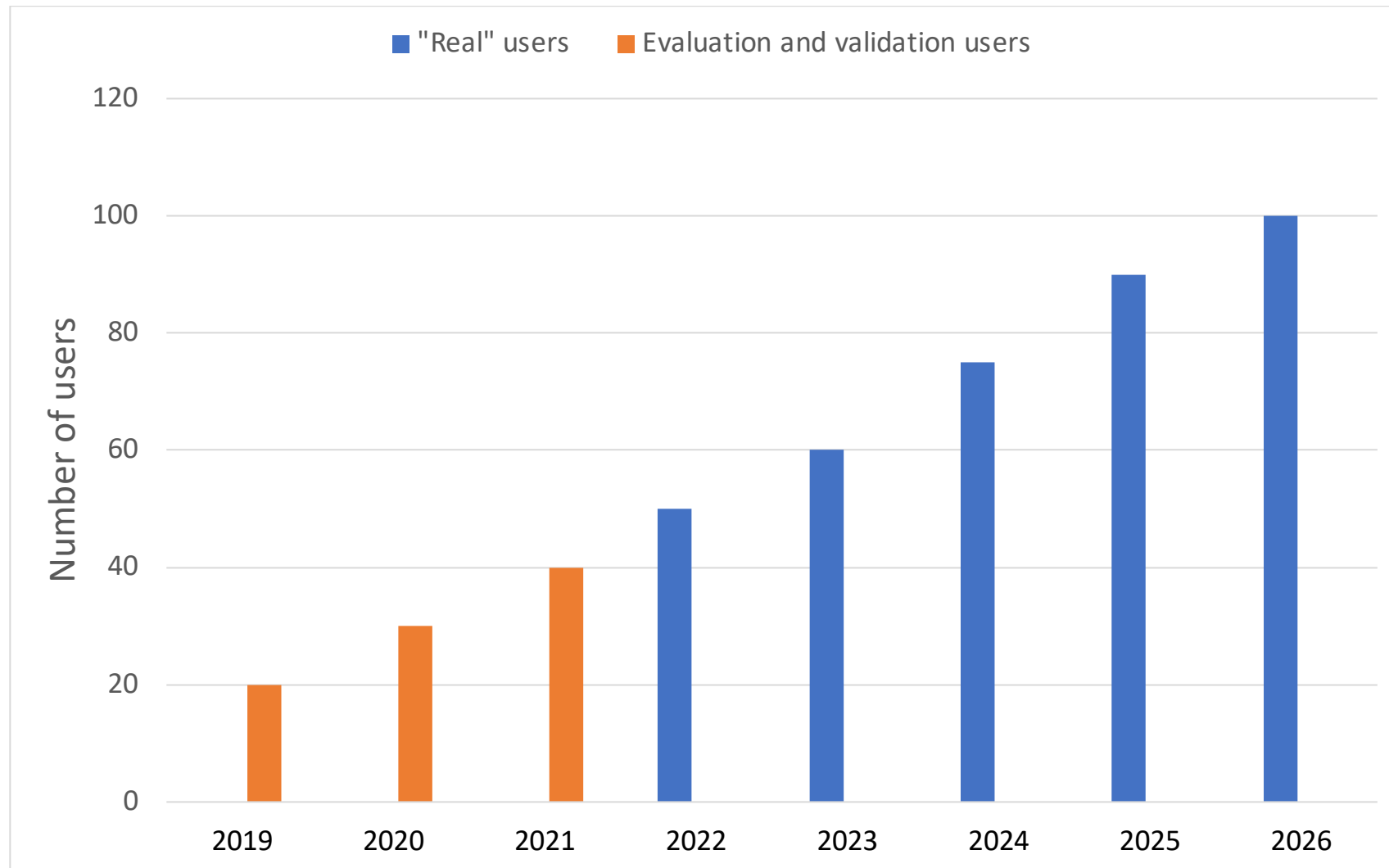› The targeted Technology Readiness Level (TRL) of ViaLactea service at the end of the project is expected to be 8

ViaLactea Service – IPRs and Exploitation

› Freedom to Operate, IPR assets and Foreground & Postground IPR
- − The proposed ViaLactea Service innovative concept is not covered by any patent. So overall, no IPR barrier to entry is foreseen.
- − There is no joint ownership of any IP while boundaries between subsystems are clear.
- − University of Portsmouth Higher Education Corporation (UoP) also contributed to the development of ViaLactea service through the improvement of ViaLactea Visual Analytic (VLVA) tool.
- − The IP created during the project lifetime and beyond, related to ViaLactea Service, belong to INAF, who is the sole owner of the service.

› Dependencies:
- − To run the service, NEANIAS AAI, logging and Accounting services are mandatory.

› Form of exploitation
- − Through scientific publications and collaborations
- − It will also be provided for research purposes through an open-source license.

› Competition:
- − Competitive products: ESASky developed by ESA.
- − Competitive advantage: Its effectiveness and the increased interoperability.
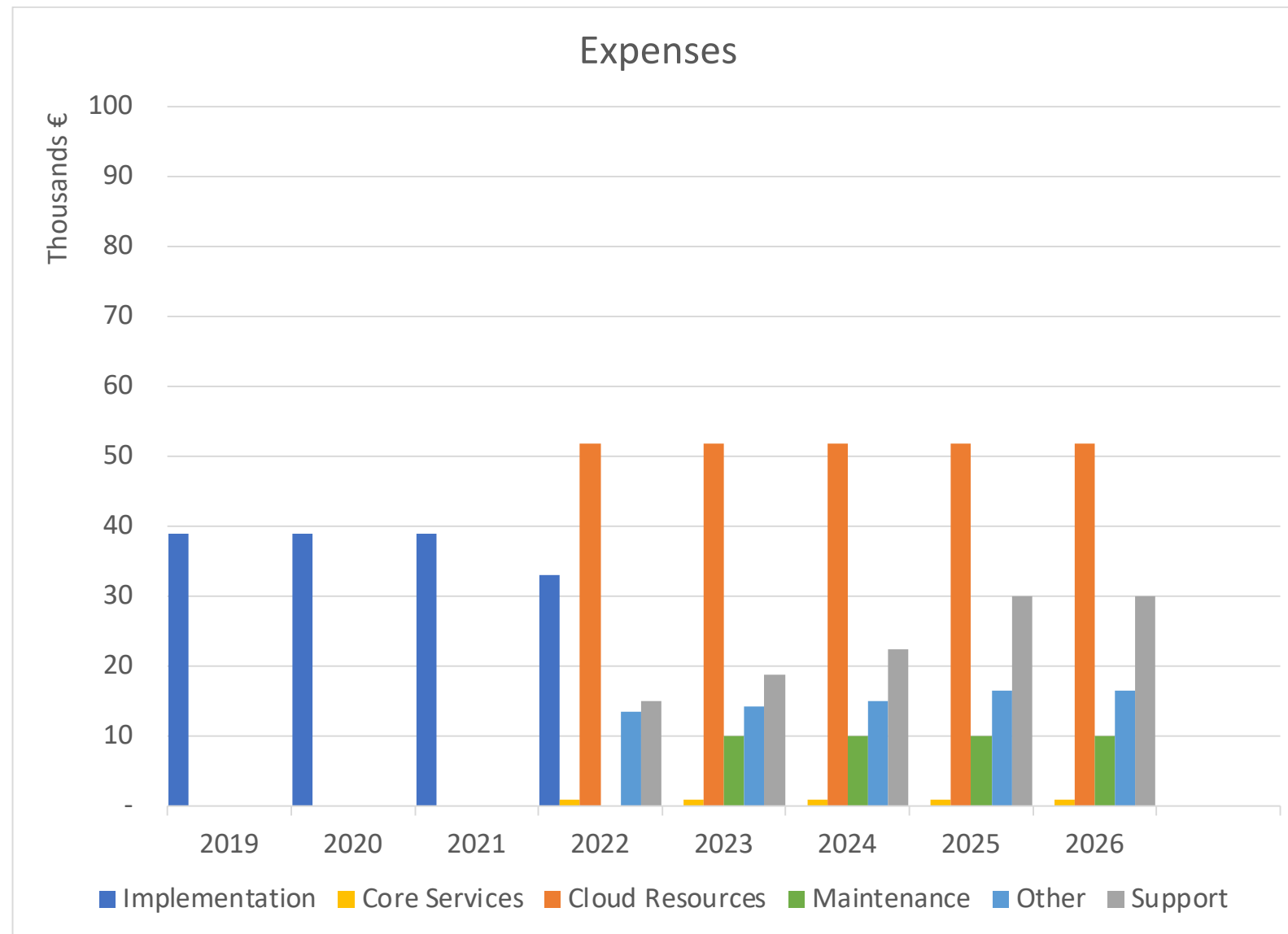
ViaLactea Service – Business Model

Key Partners
- Cloud infrastructure providers
- Storage providers

Key Activities
- Provision of the Service
- Development of tailored algorithms
- Training

Key Resources
- Cloud Infrastructure and storage
- Personnel

Value Propositions
- Seamless access to survey data of the Galactic Plane in several wavelengths together with information on derived knowledge on those data
- Processing with interactive visualisation
- Effectiveness
- Interoperability

Customer Relationships
- HelpDesk
- Key users as ambassadors and promoters

Channels
- Through EOSC
- Partnerships & collaborations with projects
- Workshops Conferences

Customer Segments
- Scientist working on Astrophysics

Cost Structure
- Personnel
- Infrastructure

Revenue Streams
- Service provisioning – Free model

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ViaLactea: Number of Users

22-03-2022

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ViaLactea: Expenses

Expenses (Thousands €)

ViaLactea: Expenses Breakdown

Total Expenses per Category

Maintenance 6%

Implementation 23%

Cloud Resources 40%

Other 12%

Core Services 1%

Support 18%

22-03-2022   NEANIAS OPEN EVENT

ViaLactea: Financial Results

Chart legend: Expenses (blue), Funding (orange), Cash flow (yellow line), Cumulative cash flow (gray line)

Y-axis: Thousands €, ranging from 200 to -500

X-axis: 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026
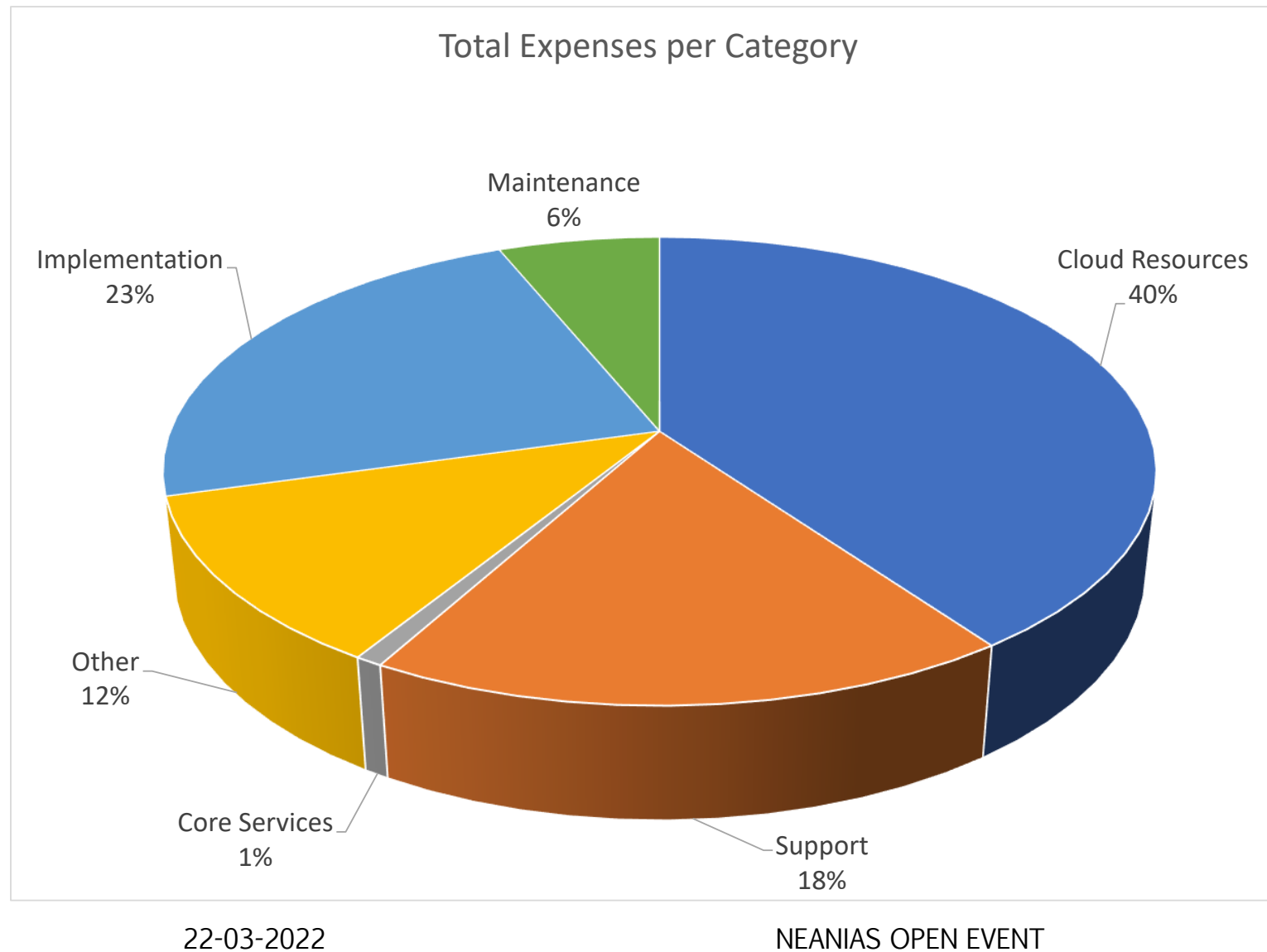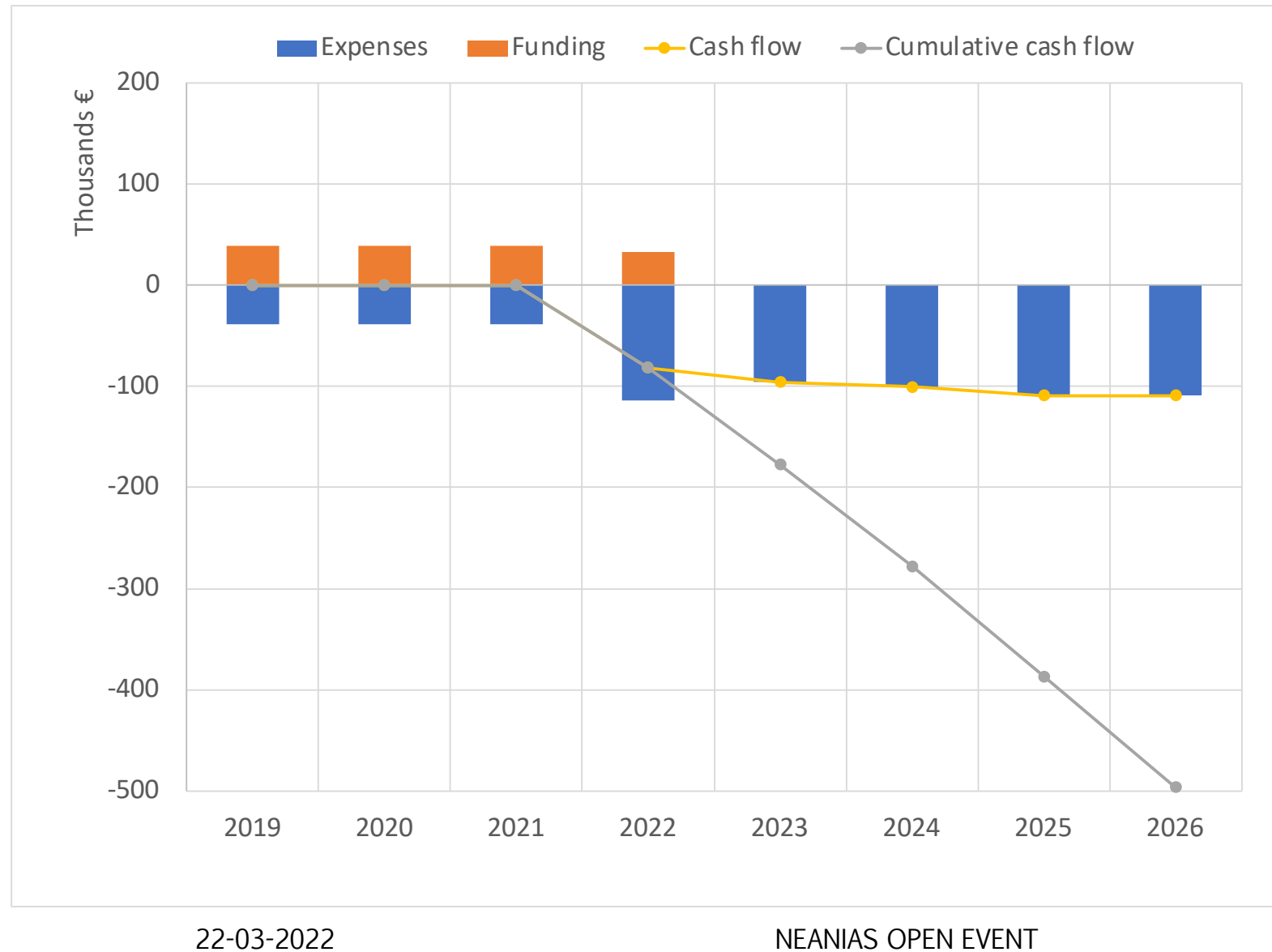
ViaLactea: Financial Results excluding the cost of cloud resources
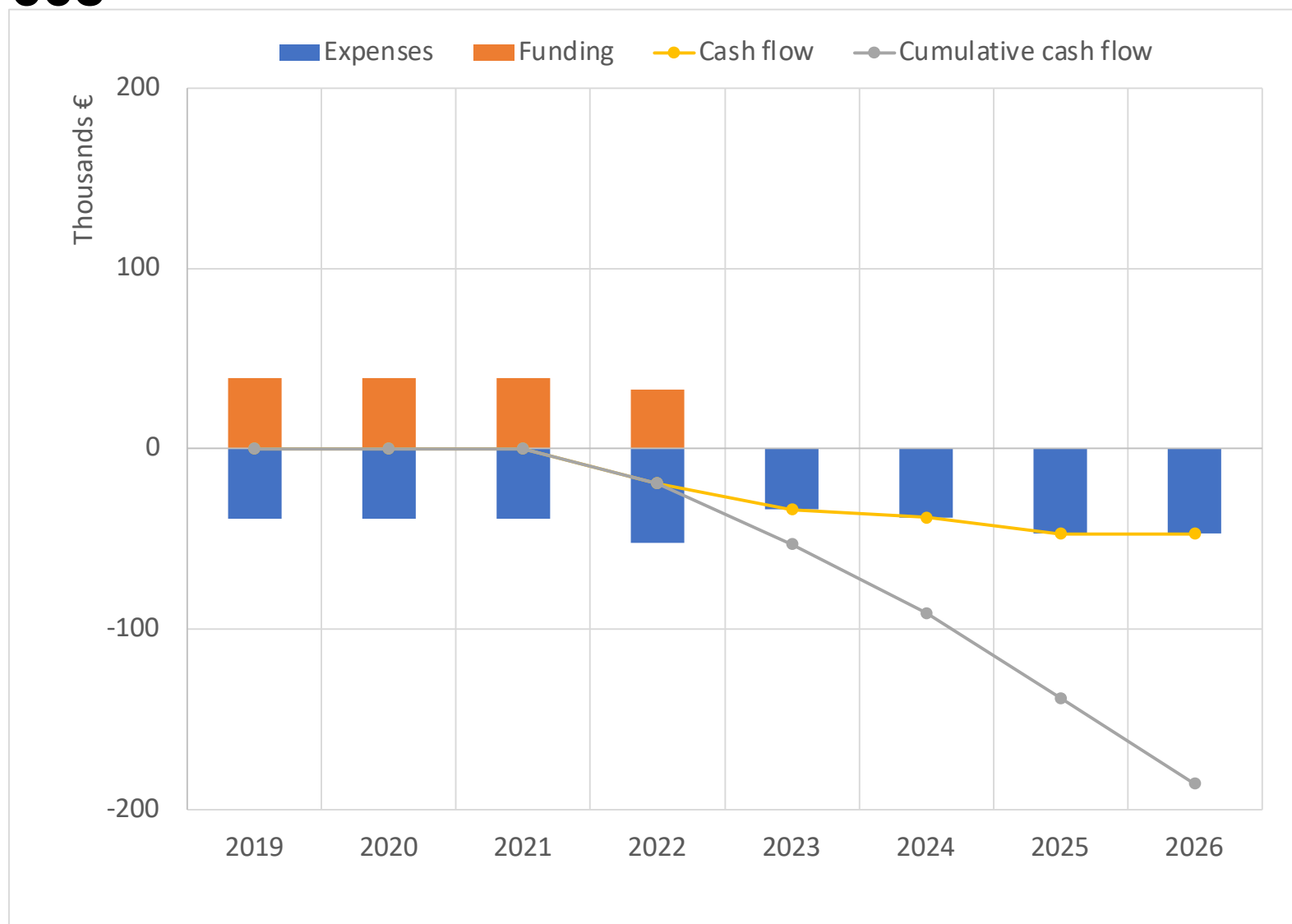
Required Funding for Sustainability

Service	Required Funding (k€)	
	With cloud resources costs	Without cloud resources costs
ATMO-SEISM	385	355
ViaLactea	500	185
CEASAR	430	150
ADN	100	100

Thank you

Dr. Ioannis Neokosmidis (INC), i.neokosmidis@incites.eu
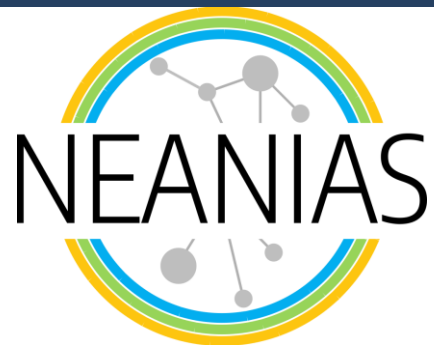
NEANIAS

Novel EOSC Services for Emerging Atmosphere, Underwater & Space Challenges

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Backup Slides

NEANIAS Players (1/2)

Players	Description – Product/service details
End Users (EU)	Universities, Scientists, Researchers, Research Community, Research Organisations, Innovators, Archeologists, Biologists, Geologist, Robotics community, SMEs (interested in services related to data processing, mapping, classification), marine industry, environmental agencies, Tourism agencies and Municipalities etc. Even research Infrastructures and Service providers can be customers of core services.
EOSC	It provides to customers/EU the means to discover and access services and technologies
Service Providers	Third parties that provide products to end users (EUs). This can be thematic sector's related products or bundle of products or core services.

NEANIAS Players

| Players	Description – Product/service details
Infrastructure Providers	This category includes all types of providers like cloud providers, data centers that own physical resources that can be used by interested parties. They can also be in the as-a-Service form.
Data providers	Provide data or data sets for services testing, validation and/or research and business purposes.
Integrators	An entity that specializes in bringing together components into a whole, ensuring that those components function together.
Software Developers	They are developing several types of software programs and necessary services.

Underwater MOS Service (UW-MOS) - Description

› It is being developed by Coronis Computing S.L.

› It deals with optical mapping in underwater environments.

› UW-MOS provides an operational solution for large area representation of the seafloor addressing also visibility limitations from the underwater medium.

› UW-MOS service is composed of four sub-services or tasks:
  − Calibrate a camera.
  − Check image data quality.
  − Create a 2D image mosaic.
  − Create a 3D model.

› At the current stage of the project, the Technology Readiness Level (TRL) of UW-MOS service is 7 while the targeted TRL at the end of the project is expected to be 8.

Underwater MOS Service (UW-MOS) – IPRs and Exploitation

› Freedom to Operate, IPR assets and Foreground & Postground IPR
  − The proposed UW-MOS innovative concept is not covered by any patent. So overall, no IPR barrier to entry is foreseen.
  − There is no joint ownership of any IP while boundaries between subsystems are clear.
  − Other partners have not been contributed to the development of UW-MOS service. Therefore, the IP created during the project lifetime and beyond, related to UW-MOS, belong to Coronis Computing S.L., who is the sole owner of the service.

› Dependencies:
  − To run the service, NEANIAS AAI, logging and Accounting services are mandatory.

› Form of exploitation
  − Direct industrial use through commercial licenses.
  − The goal of exploitation is the generation of revenues that will contribute to the sustainability of the service.

› Competition:
  − Competitive products: Photoscan provided by Agisoft and the Recap offered by Autodesk.
  − Competitive advantage: It is a cloud-based service developed for underwater environments containing thus focused functionalities.

Underwater MOS Service (UW-MOS) – Business Model
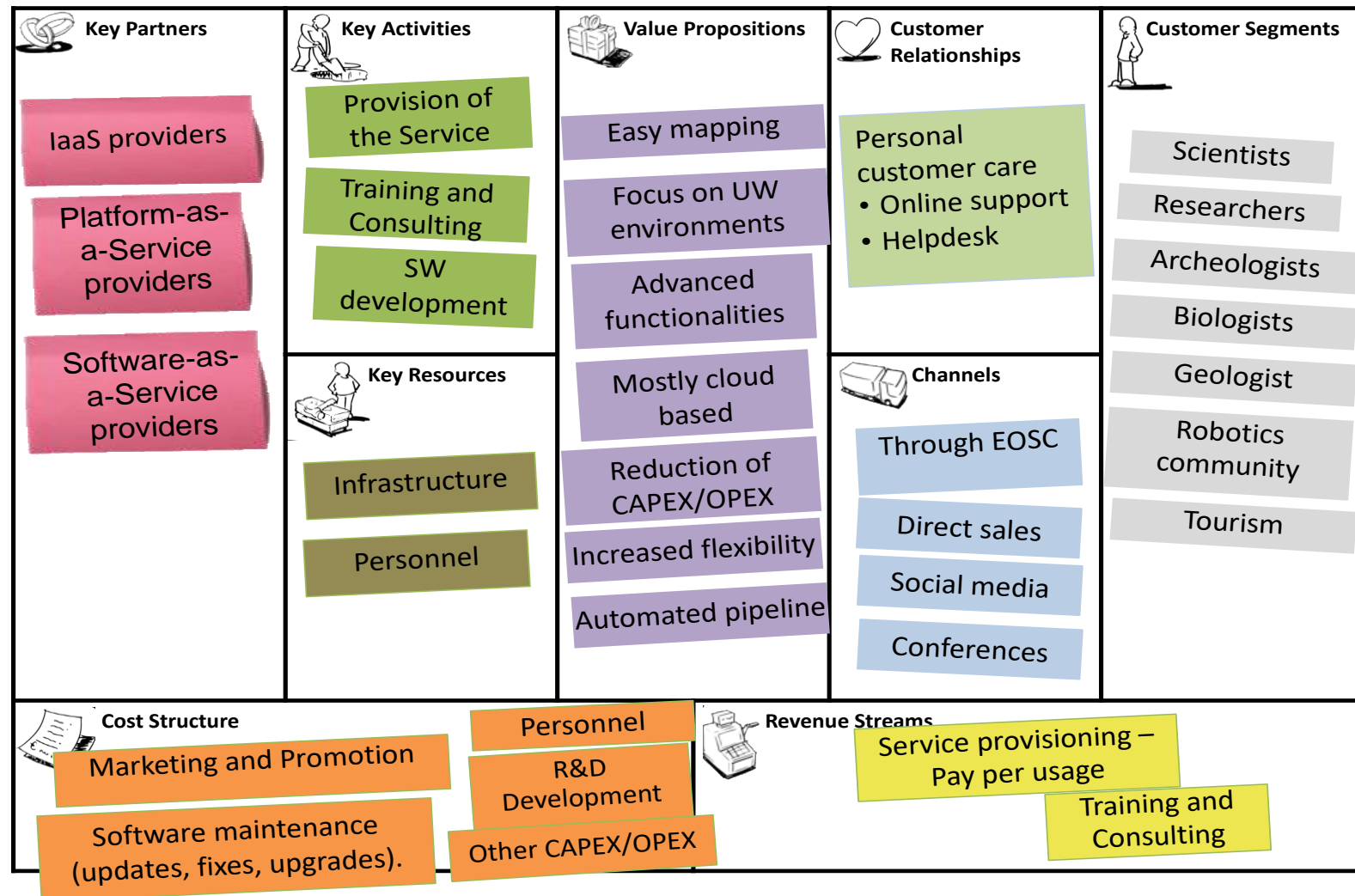
Atmospheric Forecast Service (ATMO-4CAST) - Description

› It is being developed by Ubiwhere.

› It allows the generation of meteorological forecasts by using the Weather Research and Forecast Model.

› For this forecast computation, it is expected that the users provide relevant meteorological data.

› The service results are files, downloadable in different formats for a more custom analysis and PDF files for a preliminary graphical visualisation.

› At the current stage of the project, the Technology Readiness Level (TRL) of ATMO-4CAST service is 6 while the targeted TRL at the end of the project is expected to be 8.

Atmospheric Forecast Service (ATMO-4CAST) – IPRs and Exploitation

› Freedom to Operate, IPR assets and Foreground & Postground IPR
  − The proposed ATMO-4CAST innovative concept is not covered by any patent. So overall, no IPR barrier to entry is foreseen.
  − Background IPs include FIWARE data models on AirQuality and Weather observations.
  − There is no joint ownership of any IP while boundaries between subsystems are clear.
  − ATHENA RC has also contributed to the development of ATMO-4CAST service.
  − The IP created during the project lifetime and beyond, related to ATMO-4CAST, mainly belong to Ubiwhere, who is the owner of the service.

› Dependencies:
  − To run the service, NEANIAS AAI, Logging, Accounting core services as well as Nextcloud and Cloud (Kubernetes) are mandatory.

› Form of exploitation
  − Direct industrial use in smart city solution developed and provided by Ubiwhere (Urban Platform)
  − The goal of exploitation is the generation of revenues that will contribute to the sustainability of the service.

› Competition:
  − Competitive products: Breezometer, Aclima, air quality data commons, OpenAQ, World Air Quality Index and Weather Underground.
  − Competitive advantage: It is an open-source solution accessible via REST API with worldwide coverage and compliance with open standards. Moreover, it provides the ability for forecasting to its users.

Atmospheric Forecast Service (ATMO-4CAST) – Business Model

Key Partners
- IaaS providers
- Platform-as-a-Service providers
- Air quality and atmospheric data providers

Key Activities
- Provision of the Service
- Training and Consulting
- SW development

Key Resources
- Infrastructure
- Personnel

Value Propositions
- Forecasting
- Open source
- Accessibility via REST API
- Worldwide coverage
- Compliance with open standards
- Results visualisation

Customer Relationships
- Online support
- Training
- Corrective maintenance

Channels
- Through EOSC
- Workshops
- Social media
- Conferences

Customer Segments
- Environmental agencies
- Weather agencies
- Municipalities
- Tourism agencies
- Robotics community
- Universities, Researchers, Research Community, Innovators

Cost Structure
- Marketing and Promotion
- Personnel
- R&D Development
- Software maintenance (updates, fixes, upgrades).
- Other CAPEX/OPEX

Revenue Streams
- Service provisioning – Pay per usage
- Training and Consulting