Next Generation Internet

A key priority under H2020

.. and beyond

What Internet? What is the challenge?

- Internet as perceived by the **user**.
- The **vision** for the Internet: Internet which delivers more to people and society than today.
- The Internet keeps on **evolving rapidly**.

Drivers

Concerns

- Security & privacy
- Lack of trust
- Concentration, silos, lack of interoperability
- Socio-economic transformation with leaves people behind.
- A growing digital divide
- Loss of memory/heritage

Opportunities

- European values
  - Cooperation
  - Openness
  - Inclusiveness
- Digital Single Market
- Level playing field
- Emerging technologies, e.g. communication, processing, nano/bio/cogno tech

How is the EU positioned?

Fundamentals:

- Gross domestic expenditure on R&D: 1.93 → 2.03%
- ICT specialists: ~9M
- STEM Graduates are increasing: 1.2 million → 1.3 million
- Research landscape:

Internet:

- Internet usage: 79%, 6 countries>90%
- Mobile Internet usage: 2012=36%, 2015=57%
- Today more than 250 million social media users in EU
- 4 out of 25
- EU producing a wealth of content (but lacks monetization)
- Sprawling research landscape

What is the aim & what to do?

1. **Defragment – connect**:
   - Ecosystem of European actors
   - Ecosystem which broader than ICT
2. Engage **new stakeholders**
3. Link **long-term research** with **applied research and innovation**, with **policy and societal expectations**
4. **Radical new functionality** to support people's lives & global sustainability
5. European core values: Openness, security, respecting our vision of **privacy**, **participation**, **a level playing field** for all business actors, **open to innovation** and **preserving democracy**
6. A **European movement** for a human Internet as a political objective

Build a priority which unites stakeholders one common goal:

Human Internet

Next Generation Internet

Artificial Intelligence

Interactive Technologies

Internet of Things

Multilingual

Social Media

Inclusive

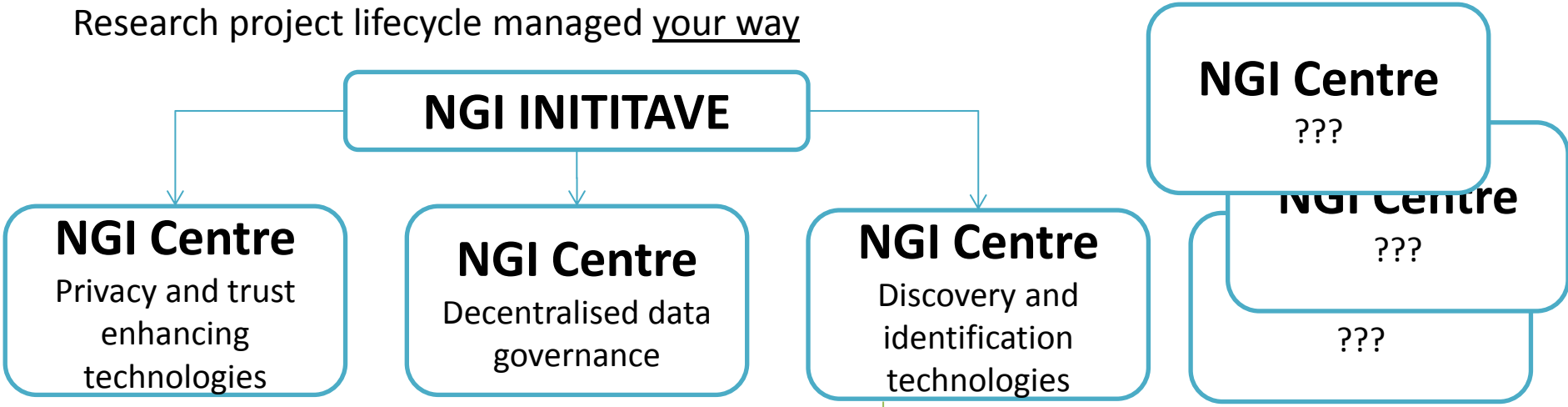
NGI - Open Internet Initiative

Characteristics

#Think Big:	Start now, prototype in H2020, flagship in FP9?
#Different process:	Fast & flexible, continuously agile
#Different people:	Real Internet researchers & innovators, stake-holders who are not part of community RTD&I today.
#Open:	Build true partnership, national programmes & US
#Visible:	Professional communication & marketing
#Multidisc:	Cater for innovation coming from the unexpected
#Policy:	Embed within the broader European policy lines

NGI Implementation (WP2018-2020)

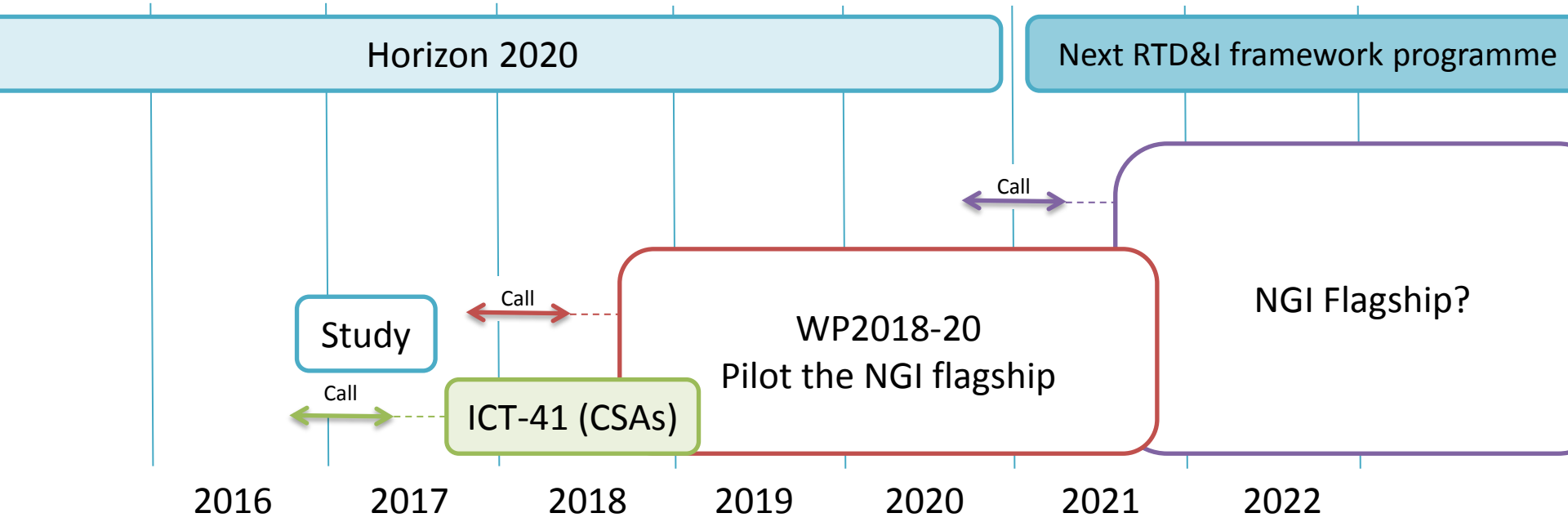
Research project lifecycle managed <u>your way</u>



- Selection
- Monitoring
- Mentoring
- Coaching
- Sharing
- Community building

- ✓ Pan European
- ✓ Procedures adapted to stakeholders
- ✓ Run by organisations in the ecosystem

Roadmap


Horizon 2020
Next RTD&I framework programme
Call
Study
Call
WP2018-20
Pilot the NGI flagship
NGI Flagship?
Call
ICT-41 (CSAs)
2016
2017
2018
2019
2020
2021
2022

Next Generation Internet

Human Centric

Artificial Intelligence

Interactive Technologies

Internet of Things

Multilingual

Social Media

Inclusive

NGI - Open Internet Initiative

5G

Cloud

HPC

Big Data

Cyber Security

Next Generation Internet

Artificial Intelligence

Interactive Technologies

Internet of Things

Multilingual

Social Media

Inclusive

NGI - Open Internet Initiative

AI: NGI enabled & NGI enabler

- **AI takes advantage of NGI to access distributed sources of information/data and to bring it to users**

- **AI transforms this information in useful knowledge and allows the user to interact with it in a seamless and intuitive way**

- **AI embeds intelligence in the connected objects, robots, smart systems, and networks, integral part of next generation of Intelligent Internet of Intelligent Things**

AI and the Internet

AI can be a threat to the Internet e.g.:

- Privacy - By deriving undesirable knowledge about individuals from Internet available data (e.g. pictures, videos)
- By enabling smart attacks on the infrastructure (as opposed to brute force DDOS)

AI can be an opportunity for the Internet

- Automatisation of some functions such as monitoring, maintenance, optimisation…
- By enabling **smart reactions** to abuses

It is essential that Internet users understand what level of AI they are exposed to

AI Intervention logic and EU added value

Issues:

- **AI potential not fully exploited in EU**

  Scattered European S&T excellence

  Pure AI, Big Data, Robotics, IoT, HMI…

- **Huge investment abroad (e.g. Google, IBM, Amazon, Facebook, Apple)**

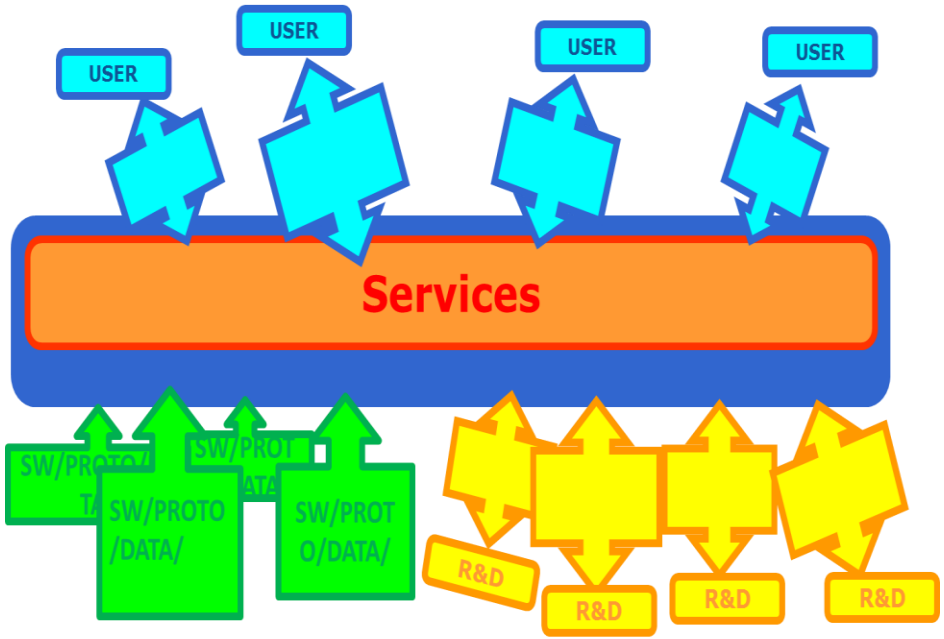
Possible way foward in AI

→ Join forces in Europe: Build an AI Platform -> ecosystem integrating knowledge, capacity and access to data

→ Invest in R&D in areas where Europe can lead

→ Boost European industry competitiveness with AI and make European citizens benefit from AI (ageing, transport, etc.)

European "AI-on-demand platform"



One-stop shop" offering solutions and support to all users of AI to integrate such technology into applications, products and services

Next Generation Internet

Artificial Intelligence

Interactive Technologies

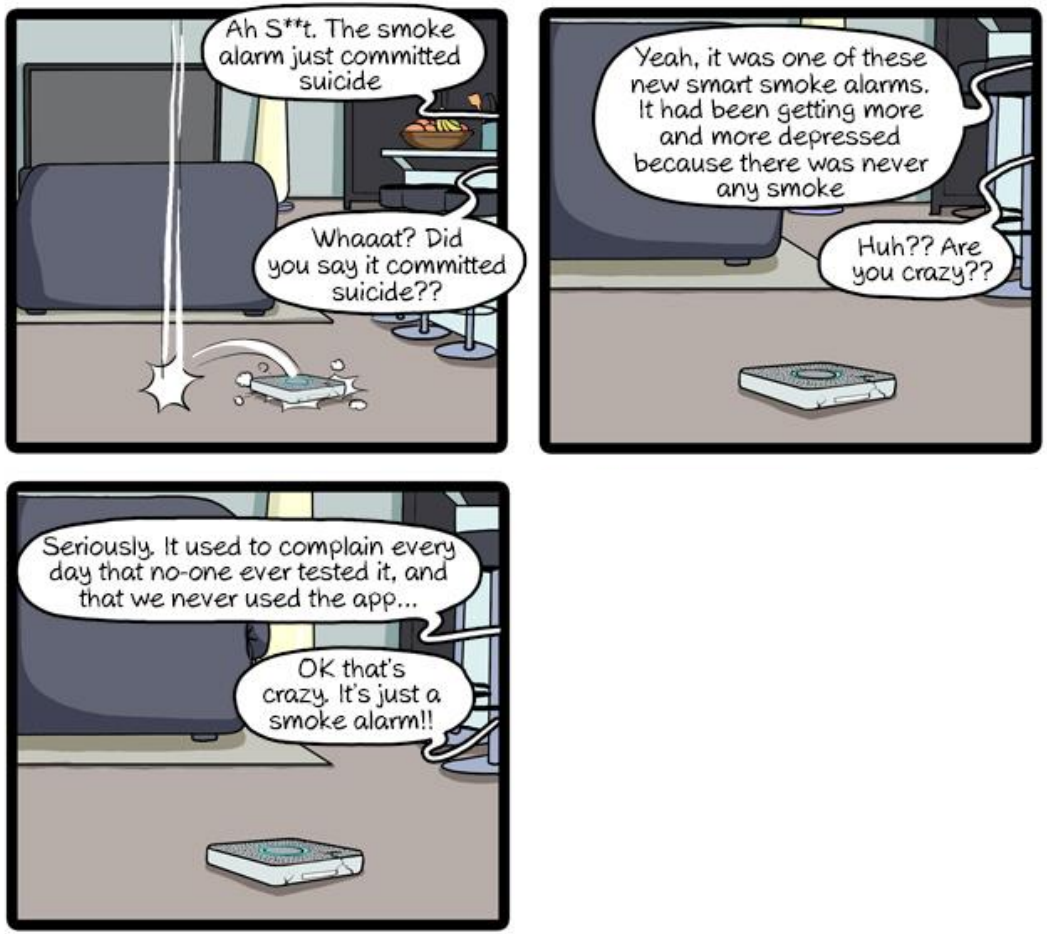
Internet of Things

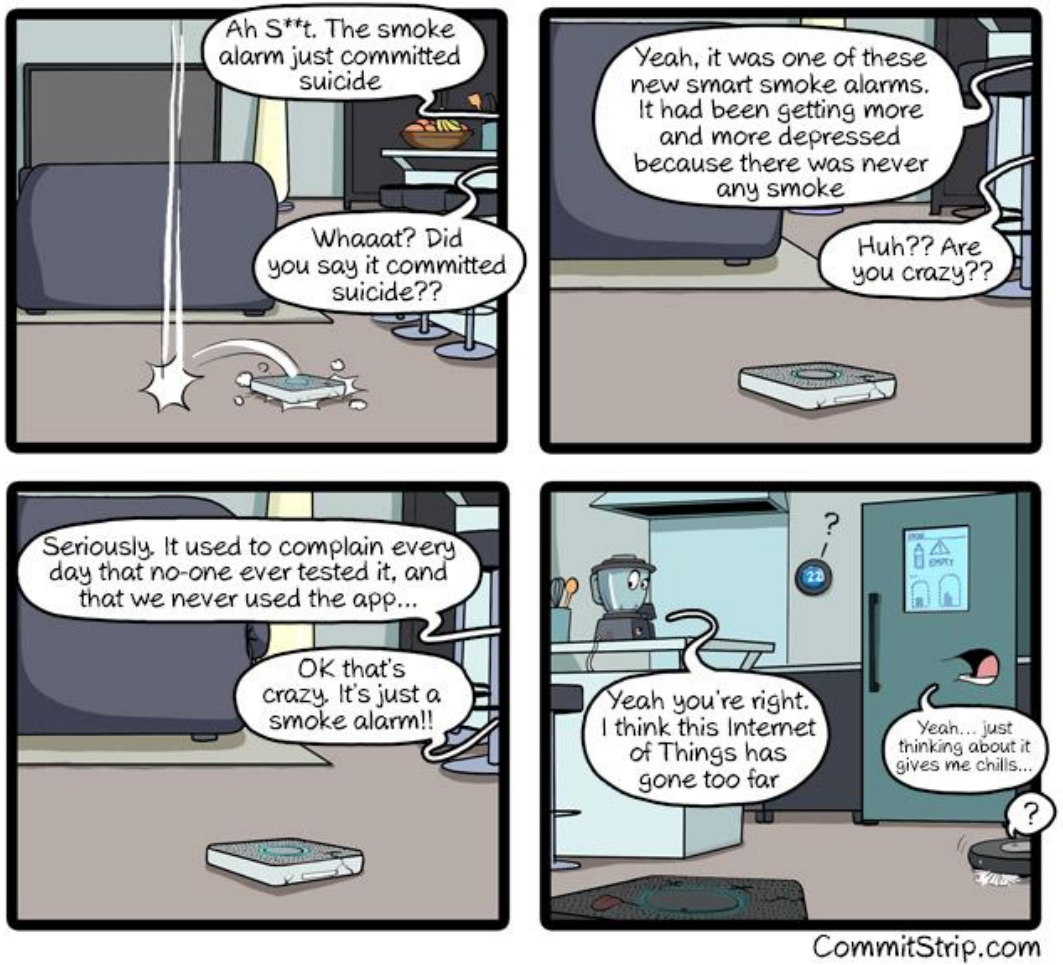
Multilingual

Social Media

Inclusive

NGI - Open Internet Initiative


Ah S**t. The smoke alarm just committed suicide
Whaaat? Did you say it committed suicide??
Yeah, it was one of these new smart smoke alarms. It had been getting more and more depressed because there was never any smoke
Huh?? Are you crazy??
Seriously. It used to complain every day that no-one ever tested it, and that we never used the app...
OK that's crazy. It's just a smoke alarm!!


Ah S**t. The smoke alarm just committed suicide
Whaaat? Did you say it committed suicide??
Yeah, it was one of these new smart smoke alarms. It had been getting more and more depressed because there was never any smoke
Huh?? Are you crazy??
Seriously. It used to complain every day that no-one ever tested it, and that we never used the app...
OK that's crazy. It's just a smoke alarm!!
?
22
EMPTY
Yeah you're right. I think this Internet of Things has gone too far
Yeah... just thinking about it gives me chills...
?
CommitStrip.com

IoT in NGI

- **Current revolution**
  - IoT is one of the main drivers of the current economy transformation.
  - More devices, more data, more information creates new challenges: concentration of power, privacy, security,…
- **Human centric IoT**
  - IoT need to reflect European values.
  - 3rd Pillar of IoT strategy as defined in the DEI communication C(2016)178 (SWD on Advancing the IoT in Europe SWD(2016)110).
  - Policy actions (e.g. Trusted labels)
  - R&I (IOT-03-2017) to ensure, trust, security and privacy.
- **IoT & Next Generation Internet of Things**
  - IoT Technology development in line with NGI
  - Joining forces with different all digital technologies is key success factor.

Possible ways forward in IoT

Beyond Coordinating the communities,
Research trends are in the following domains:

- The next generation of IoT devices
- Tactile/contextual Internet of Things
- Self-aware and semi-autonomous
- Semantic models for transaction security

Next Generation Internet

Artificial Intelligence

Interactive Technologies

Internet of Things

Multilingual

Social Media

Inclusive

NGI - Open Internet Initiative

A multilingual, inclusive NGI

Main Challenge

Remove key barriers to DSM:

- Content and services available in all EU languages

- Accessible formats for all.

- Interoperable, reusable content and applications for developing digital skills.

Possible ways forward – A multilingual, inclusive NGI

Key components

- Technology development and transfer of research results for language services to industry and final users
- Incubators for boosting the uptake of personalised learning technologies.
- Spread of innovative research results for enabling accessible information and services on NGI

Impact

Users, in particular Public Administration, get access to high level, affordable language services

Increasing opportunities for SMEs in the educational market.

All EU citizens, including elderly and disabled, to participate daily and actively on NGI

Next Generation Internet

Artificial Intelligence

Interactive Technologies

Internet of Things

Multilingual

Social Media

Inclusive

NGI - Open Internet Initiative

Interactive Technologies

Internet will be

- **Smarter**
  - Curator (Spotify) Organiser (Alexa) *(+10% of spending)*
- **Simpler**
  - 10% of web search are voiced based (Google US 2016)
  - 20% of mobile phone query are speech based (US – Android)
- **Ubiquitous and personalised.**
  - When going to work, do you prefer to forget your wallet or your phone ?
  - You are using your smartphone 150x per day.
  - Increase number of personal services.

NETFLIX

- **In other words…. It will augment you.**

Users gain access to complex technology

Realities

- **Augmented Reality**

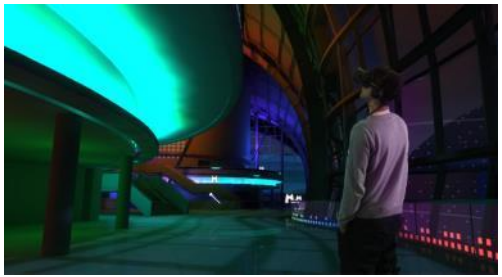
(See-through phone/tablets + virtual objects)

- **Mixed Reality**

(See-through glasses + virtual objects)

- **Virtual Reality**

(Full immersion in virtual environment)



Examples in Cultural Heritage

INCEPTION

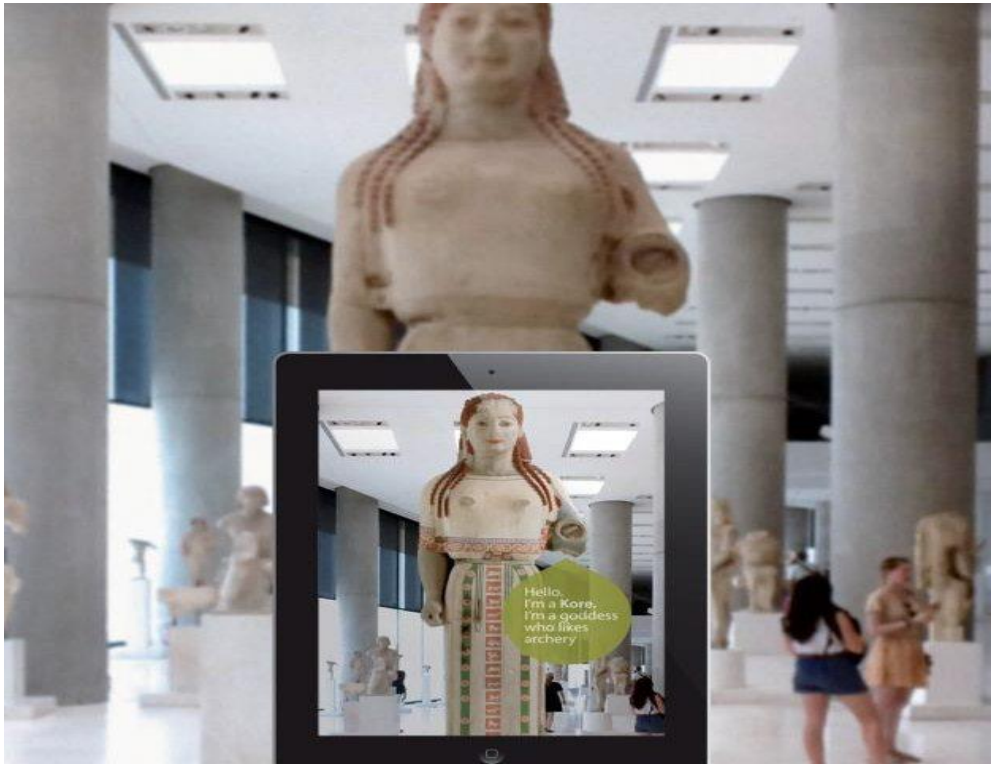
From 3D to 4D

The research realises innovation in 3D modelling of cultural heritage through an inclusive approach for time-dynamic 3D reconstruction of artefacts, built and social environments. It enriches the European identity through understanding of how European Cultural Heritage continuously evolves over long periods of time.

Examples in Cultural Heritage

- Chess

See the statue as it could have been but also talk to her.



Examples in Cultural Heritage

ROVINA

Captured in 3D by a robot and after processing, visit the catacomb from home.

Intervention logic

- What's happening now in AR/VR is in many ways similar to the revolution of the Personal Computer
  - Cost decreased, enlarging market size.
  - Acquisition by GAFAs (Apple with Metaio, Microsoft with Hololens, Samsung, …)

Market prospects,

look at the new smartphones

Hardware ⇔ Software ⇔ Content

Possible ways forward in Interactive Technologies

- Building an EU AR/VR ecosystems,
- Develop next generation of interactive devices (post Hololens)
- Research in Augmented interaction (virtual meetings,…)
- Develop authoring tools (augmented applications)

Change of User Interface ⇔ EU opportunity

To take back our information and content production

Next Generation Internet

Artificial Intelligence

Interactive Technologies

Internet of Things

Multilingual

Social Media

Inclusive

NGI - Open Internet Initiative