



CONVERSATIONAL INTERACTION TECHNOLOGY
INNOVATION ALLIANCE

Roadmap for Spoken Language Technologies

META-FORUM, Lisbon, 5 July 2016

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THE UNIVERSITY
of EDINBURGH



Global Technology Trends



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APR 28, 2016 @ 12:00 PM **6,923** VIEWS

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Hollywood Goes Multilingual

“The market share of local-language films is expanding in territories around the world, currently topping 90% in India” 2

Conversational Interaction Technologies



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are at the heart of AI

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- **Technologies for**
Human-Human Communication
Human-Machine Communication
Human-Environment Communication
 - No language barriers
 - Transferable across domains
 - Accessible
 - Multimodal
 - Multidevice
- Supporting **natural communication**

Bridge research & innovation



- Connect the European research base with commercial & industrial activity – especially startups and SMEs
- Facilitating a research/technical infrastructure
- Multiple stakeholders
 - **Industry** – SMEs and large companies
 - **Research** – universities and research institutes
 - **Investors** and venture capital
 - **Government**, EC, and policy makers
- **Build a community**
- **Provide an infrastructure for a multilingual world**

CITIA Roadmap – SWOT



Strengths

- European research community
- Strong research infrastructure
- Demand for CIT systems
- Cooperative SME culture
- 50 languages in use in EU

Opportunities

- Open data and infrastructure
- Digital single market
- Data science as a service
- Social drivers
- Many feasible R&I scenarios

Weaknesses

- Weak innovation infrastructure
- Fragmented market
- Fragility of current systems
- Limited control of platforms
- Available multilingual data

Threats

- “Solved problem”
- Proprietary platforms / data
- Dominance by the big corps
- No coherent vision
- Privacy/trust/security concerns

Roadmap scenarios



Roadmap scenarios



- **Adaptable interfaces for all**
 - *automatic interface subtitling*

Roadmap scenarios



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 - *automatic interface subtitling*
- **Smart personal assistants**
 - *smart assistants for kids*

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 - *immersive intelligence*

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- **Communicative robots**
 - *intelligent manufacturing*

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- **Smart personal assistants**
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- **Active information access**
 - *immersive intelligence*
- **Communicative robots**
 - *intelligent manufacturing*
- **Shared collaboration and creativity**
 - *conversational gaming interfaces*

CITIA Roadmap

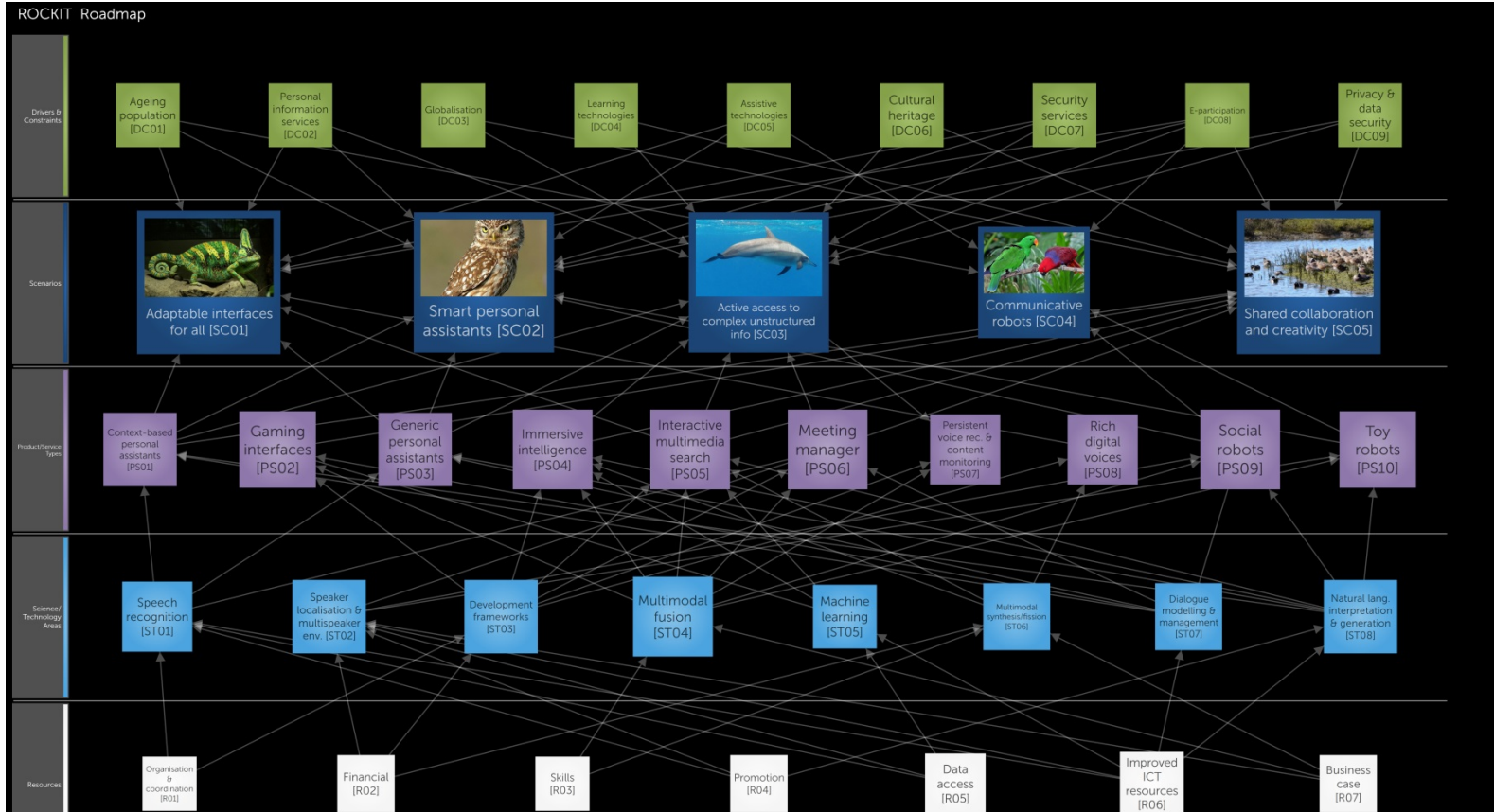


- 12 workshops
- >200 experts consulted
- >1000 information items collected

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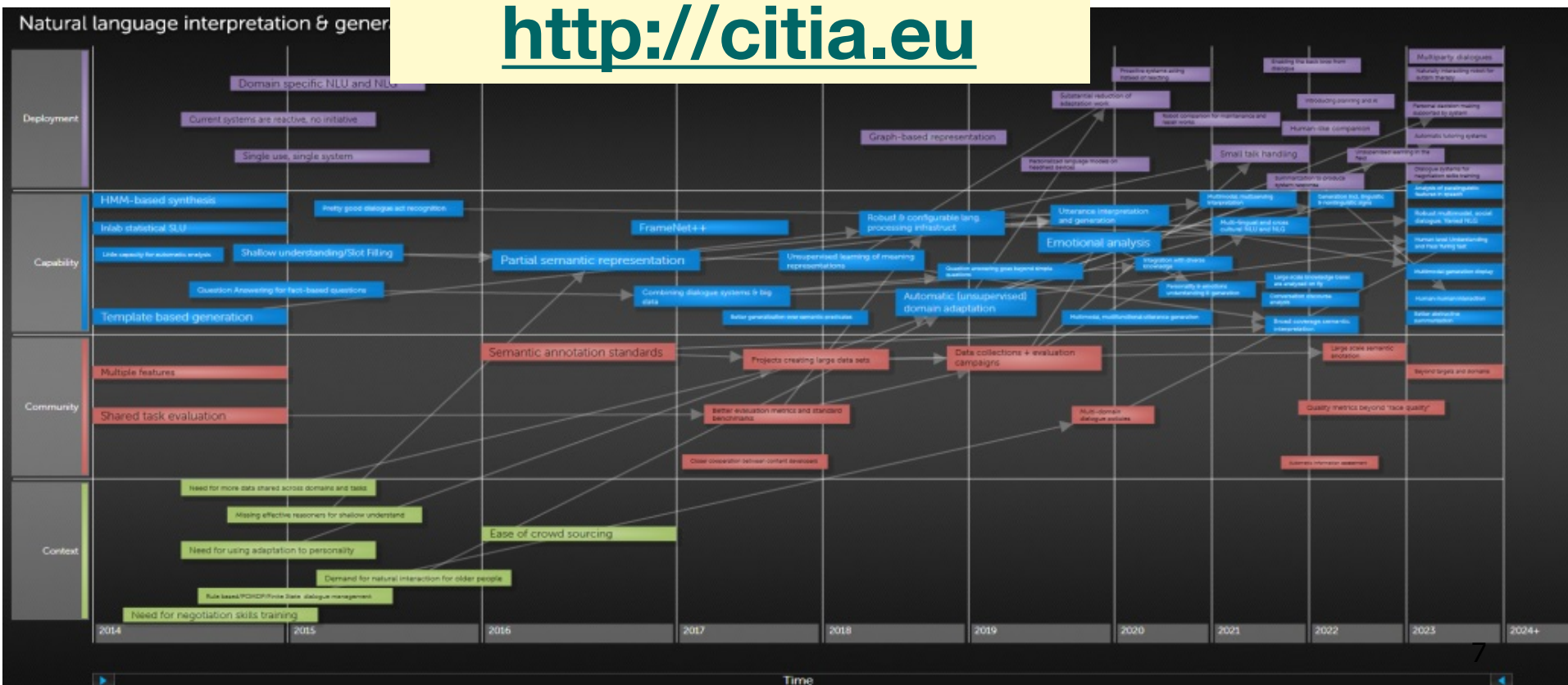


CITIA Roadmap



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<http://citia.eu>



- **Rapid technological progress**, including
 - Speech recognition
 - Spoken dialogue
 - Face analysis
- Improved **robustness & adaptation** to real-life contexts
- Focus on **composed services**, not single interfaces
- **Interaction** driven and informed by **analytics**
- **Rich dialogues**, social and cultural context
- Innovation across speech and language technologies requires **more data**
- **Privacy** concerns – what happens to my data?
- **Data required** to build **multilingual** systems

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Multilingual Infrastructure



- “We need more data”
- The multilingual digital single market needs to support
 - 24 official languages
 - 5 “semi-official” languages
 - >100 further regional/minority languages
 - not to mention languages required for the global market!
 - If we rank the 50 most used languages in Europe, then there are >50 million speakers of languages 26–50 (Finnish – Montenegrin)
- Lack of multilingual speech resources is a major barrier to researchers, developers, and innovators

Multilingual baselayer



- **Open multilingual infrastructure for speech technology:** Enable research, enable innovation, create the multilingual digital single market
- Develop a **core multilingual base layer**
 - **core open access data across 40–50 languages**
 - **baseline open systems** for across these languages
 - **practical recipes** – data collection & annotation, system building
 - **cloud-based reference services** to enable multilingual applications
- **Sustainability**
 - open data and open source systems for 40-50 languages
 - **virtuous cycle of apps-users-data**
 - enough to seed a sustainable community
- **Growth**
 - more data, better software systems
 - widened coverage

Going forward



- Multilingual interaction technologies can enable and grow the digital single market – soon everything will be an interface
- Robust multilingual language & speech technologies / services will be at the heart of future interfaces
- How to move forward
 - Attack the **hard research problems** – best way to drive high-impact innovation
 - Create an open infrastructure – the **multilingual base layer**
 - Build a **community** around the infrastructure

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Thanks!