Outline of MÜNCHNER KREIS
& Key Results of the Delphi Study 2030

September 15th, 2010

Prof. Dr. Dres. h.c. Arnold Picot

Chairman of MÜNCHNER KREIS

Director of the Institute for Information,
Organization and Management
Ludwig Maximilians Universität (LMU) Munich

Agenda

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Key results of the international Delphi Study 2030

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Mission

- The mission of MÜNCHNER KREIS is to take an active part in forming the information and knowledge-based society. As a non-profit supranational think tank working at the interface of public policy, academia, business, and the media, it addresses issues of technology, societal and business impacts, and regulation of information and communications technologies.

- MÜNCHNER KREIS supports responsible development of the information society and works constructively towards improving its basic parameters internationally.

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Goals

- ***Establish a path of change*** to a networked information and knowledge-based society

- ***Promote a climate*** in which innovations in communication technology can flourish

- Ensure that people are willing to ***accept and use*** new forms of communication

- ***Provide a forum*** for international discussion of future ICT trends and developments

- ***Promote co-operation*** between experts from different countries

- ***Achieve unified*** legal, organizational, and economic ***conditions*** for users throughout the world

- Convey a clear picture of future it/telecommunications in order to ***show both the possibilities and consequences*** of innovation

- Help to ***prepare the general public*** for progress

- ***Understand and consider people's reactions*** to the potential of new communication technologies

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Organization

- MÜNCHNER KREIS (MK) is a registered non-profit think tank
- Headquarter in Munich/Germany
- Primary bodies: General Assembly and Board of Directors
- Funded by voluntary contributions of members and by event registration fees
- Members of MK may be either persons or legal entities in Germany and abroad
- Admission of new members is verified by the Board of Directors
- Research Committee designs and implements the association's research and events in co-operation with the Board of Directors

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Working Methods

- MÜNCHNER KREIS
  - □ organizes workshops, member conferences, symposia, and congresses
  - □ initiates research projects
  - □ creates memorandums
- The work of MÜNCHNER KREIS is interdisciplinary
- Working principle: critical, yet constructive, future-oriented analysis and expert discussions in an open atmosphere
- Work results are published by leading publishers

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Members (excerpt)

- Alcatel-Lucent
- Bavarian Broadcasting
- Bertelsmann
- Boston Consulting Group
- British Telecom
- Burda
- Detecon
- Deutsche Bank
- Deutsche Telekom
- Docomo Comm. Labs Europe
- Federal Network Agency
- Fraunhofer Institutes
- Google
- Hewlett-Packard
- Holtzbrinck

- IBM
- Intel
- McKinsey
- Microsoft
- NEC
- Nokia Siemens Networks
- Robert Bosch
- Rohde&Schwarz
- Philips
- SAP
- Siemens
- Sony
- Tekelec
- Telefónica O2
- Universities (Germany and abroad)
- ZDF

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Events and Activities (excerpt)

- **Recent Events:**
  - **Smart Cities**, Berlin, July 8, 2010
  - **Next Generation Communication**, Munich, June 15-16, 2010
  - **Trust in IT**, Munich, February 4, 2010
  - **Prospects and Opportunities of ICT and Media (stage II)**, Berlin, November 5-6, 2009
  - **Enterprise 2.0**, Munich, October 21, 2009
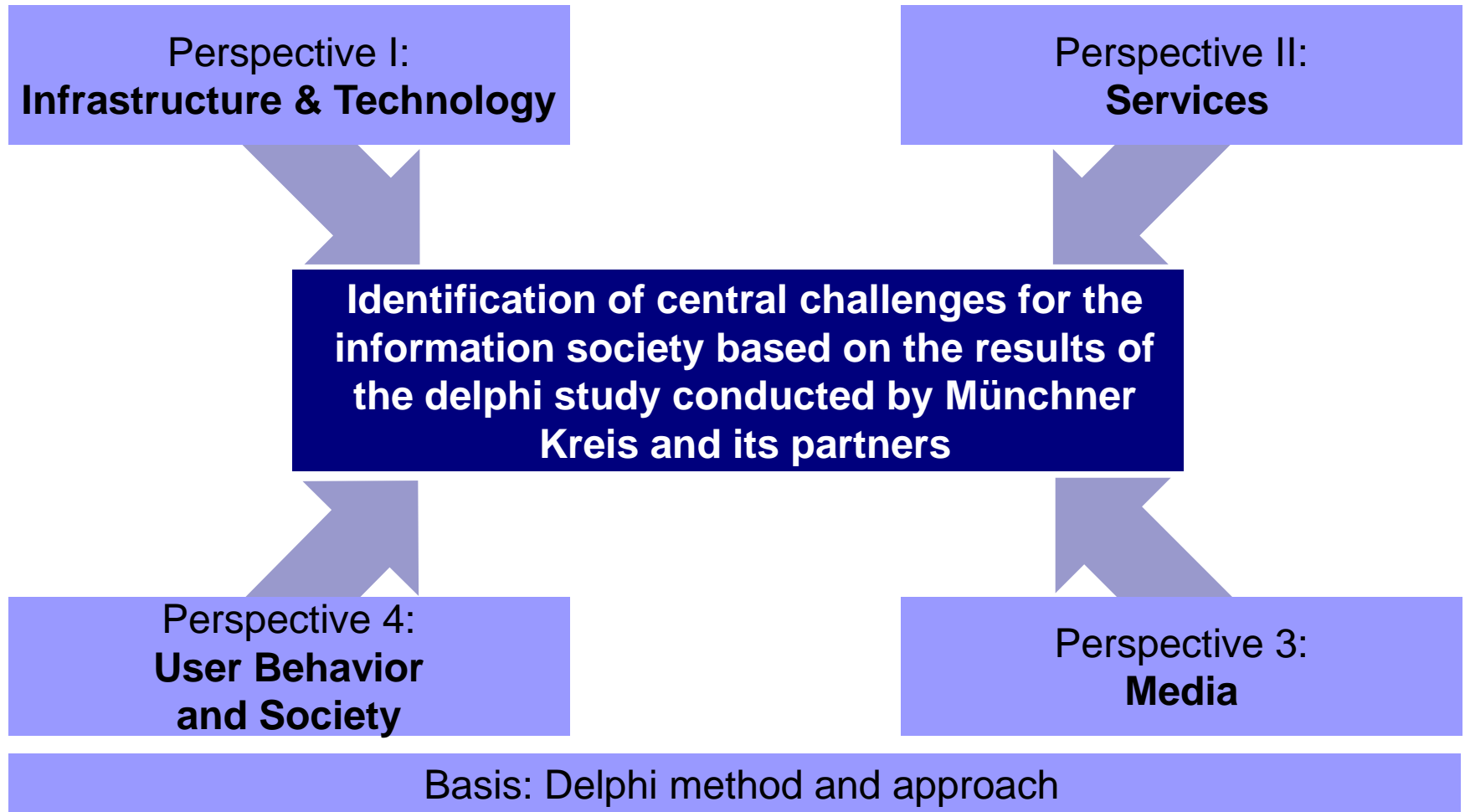
- **Upcoming Events:**
  - **Internet Governance**, 2011
  - **Embedded Systems**, Munich, November 17, 2010
  - **Prospects and Opportunities of ICT and Media (stage III)**, Berlin, November 4-5, 2010

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Objective and Structure

Perspective I:
Infrastructure & Technology

Perspective II:
Services

Identification of central challenges for the information society based on the results of the delphi study conducted by Münchner Kreis and its partners

Perspective 4:
User Behavior and Society

Perspective 3:
Media

Basis: Delphi method and approach

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Goals of Delphi

Goals of delphi studies

Provide a basis to adapt to expected future changes

Strengthen advantageous developments
➔ self-fulfilling prophecy

Fight against undesirable, dreaded developments
➔ self-destroying prophecy

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Approach of the International Delphy Study 2030

1. Assessment of when selected theses will become reality,
2. Estimation of the impact the realisation of the theses would have on various areas: economy, society, science and policy,
3. Evaluation of drivers and barriers for selected theses that would facilitate or prevent the occurrence of those theses.
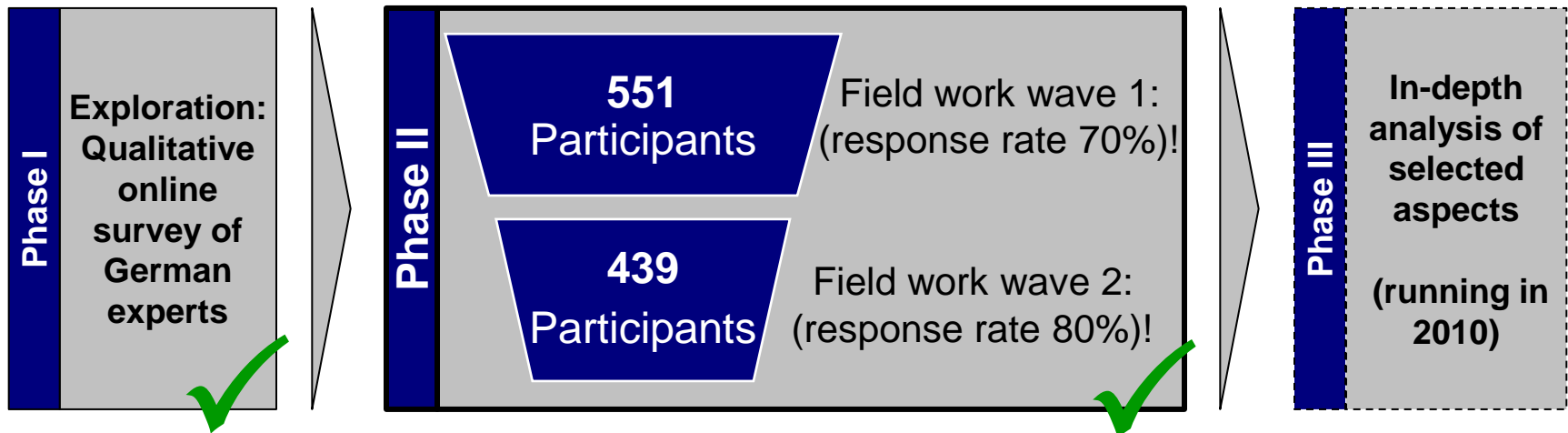
Respondents:

German experts	**EU** experts	**US** experts	Further **international** experts	members of the group **DNAdigital**

Project Partners:

Method: Internet-based Delphi Survey

- **Participants:**
  Representatives from business, academia and politics, who were personally invited to take part in the study on the basis of their knowledge and experience in certain subject areas.

Phase I	Phase II	Phase III
Exploration: Qualitative online survey of German experts ✔	**551** Participants — Field work wave 1: (response rate 70%)! **439** Participants — Field work wave 2: (response rate 80%)! ✔	In-depth analysis of selected aspects (running in 2010)

- **144 theses** from various subject areas on the future and sustainability of ICT and media as well as
- **61 further questions** on relevance, drivers and barriers etc.

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Publication availability and Media Impact

- Study available in English and German

- Free download at:
  http://www.muenchner-kreis.de

- Up to now more than 60.000 downloads

- Presented at the German
  IT Summit Dec. 2009

- Substantial media response:
  23 print articles, 2 radio features,
  166 articles online
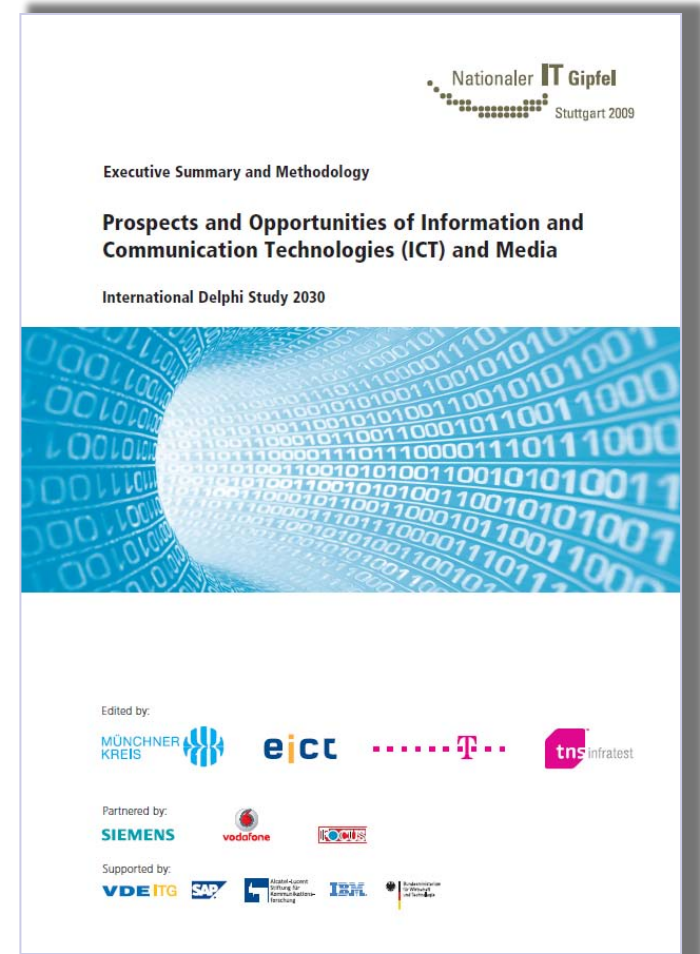
Selected aspects of Perspective I:
Infrastructure & Technology

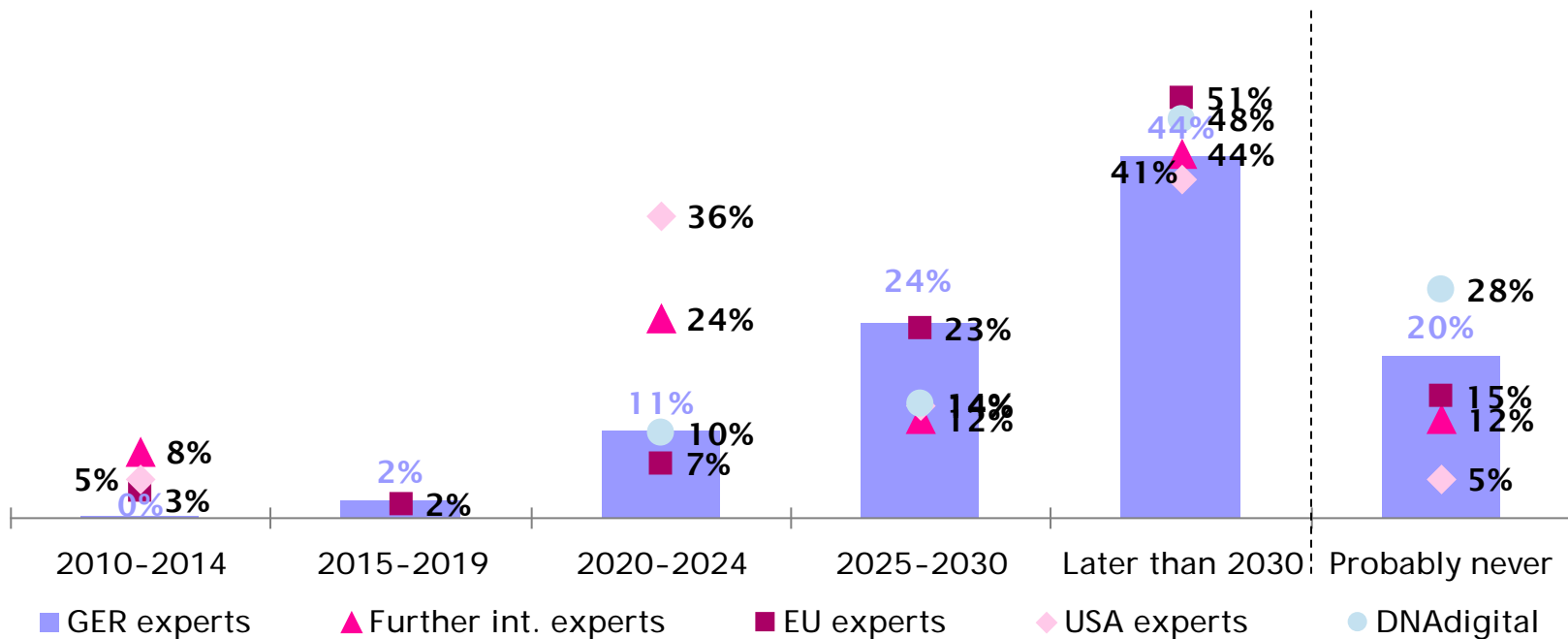| Internet usage penetration | Quantum cryptography | Internet Protocoll V6 |
Competitive Gap between Europe and USA in ICT	Implanted ID Chip as means of identification	digital certificates
New display technologies	**Mobile broadband**	Technology of chip production
Internet access by fiber	Biometrics	ICT in automotive
artificial intelligence in embedded systems	Bio-degradable electronics	Unified communication device
Internet of things	Mobile Internet usage	**Broadband penetration and usage**

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Internet access for everyone remains a long-term global challenge.

More than 75% of the world population actively use the internet several times per week (in 2008, approximately 16%, or 1.2 billion people worldwide used the internet).

	2010–2014	2015–2019	2020–2024	2025–2030	Later than 2030	Probably never
GER experts	0%	2%	11%	24%	44%	20%
Further int. experts	8%		24%	12%	44%	12%
EU experts		2%	7%	23%	51%	15%
USA experts	5%		36%		41%	5%
DNAdigital	3%		10%	14%	48%	28%

Legend: ■ GER experts ▲ Further int. experts ■ EU experts ◆ USA experts ● DNAdigital

Ubiquitous broadband internet access is still a major challenge: large differences between regions

In <country>, 100 MB/s are available nationwide for stationary internet use (i.e., equally for uploads and downloads).

Legend: ■ GER experts ▲ Further int. experts ■ EU experts ◆ USA experts ● DNAdigital

Categories: 2010-2014 | 2015-2019 | 2020-2024 | 2025-2030 | Later than 2030 | Probably never

Values:
- 2010-2014: 7%, 6%, 3%, 29%
- 2015-2019: 45%, 31%, 33%, 31%, 18%
- 2020-2024: 46%, 35%, 33%, 26%
- 2025-2030: 14%, 18%, 12%, 6%
- Later than 2030: 11%, 9%, 6%, 3%, 3%
- Probably never: 4%, 9%, 6%, 1%

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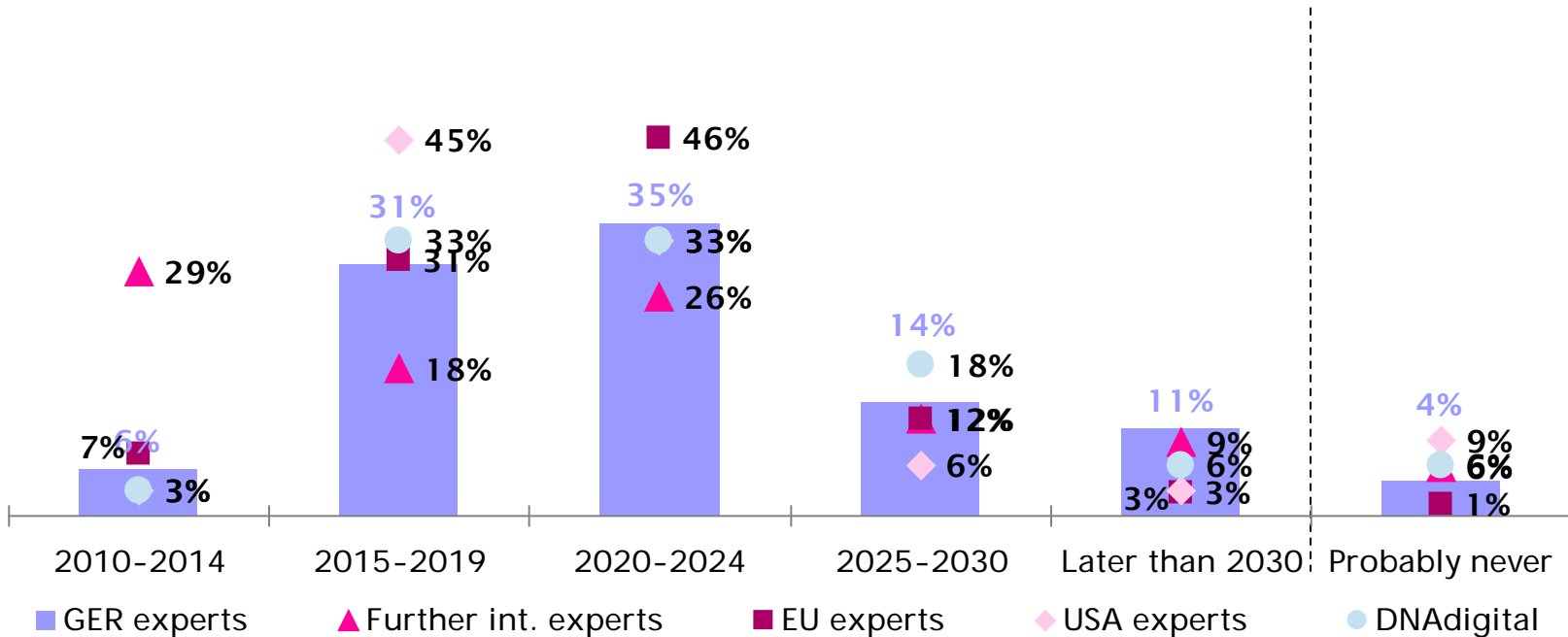
Bandwith available by fixed-line will continue to exceed mobile bandwith by far.

Which average bandwidth for Internet access will be used in Germany at the times quoted:

Year	Available bandwith (fixed-line)	Available bandwith (mobile)
2010	8 Mbit/s	3 Mbit/s
2015	36 Mbit/s	7 Mbit/s
2020	101 Mbit/s	20 Mbit/s
2025	195 Mbit/s	47 Mbit/s
2030	406 Mbit/s	84 Mbit/s

Only answers of experts for Germany shown, average values.

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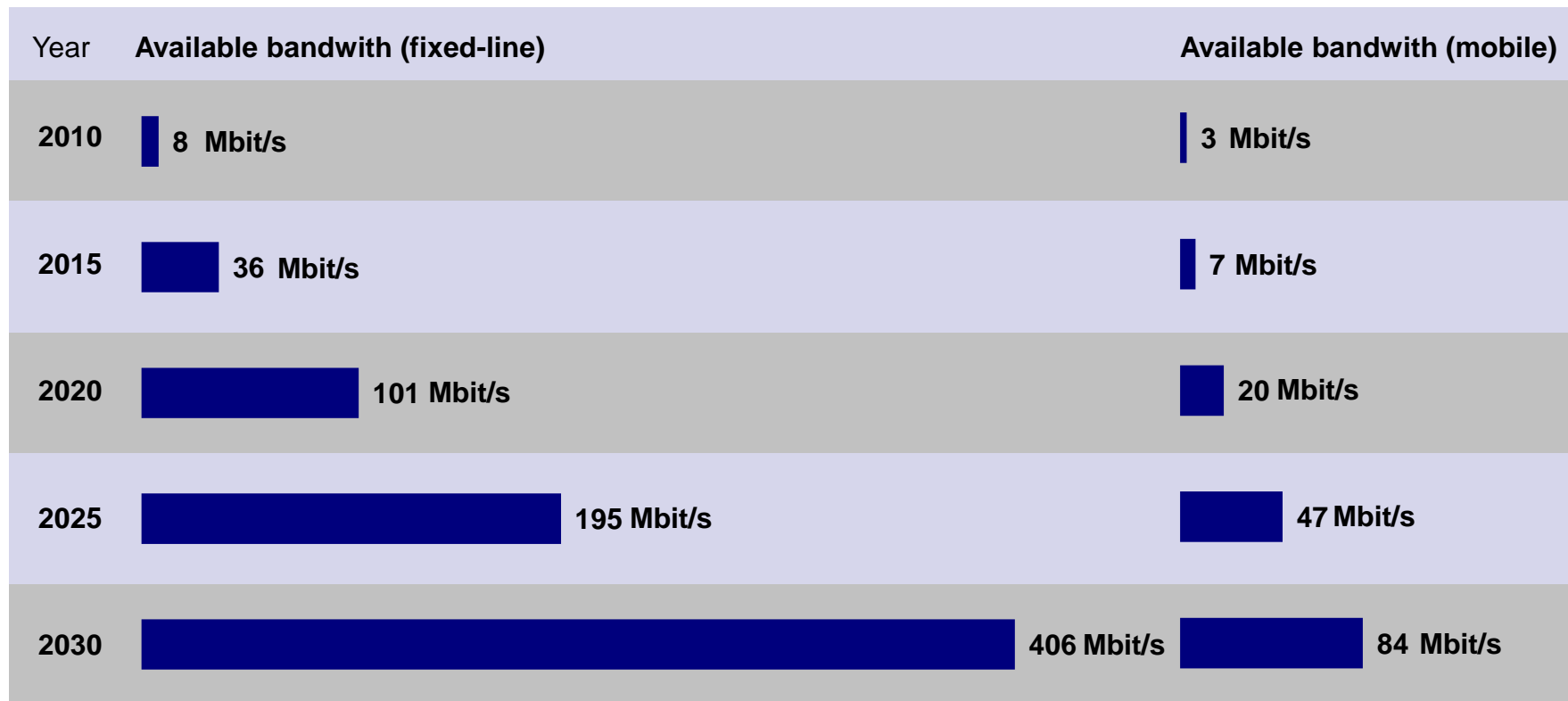
Selected aspects of Perspective II: Services

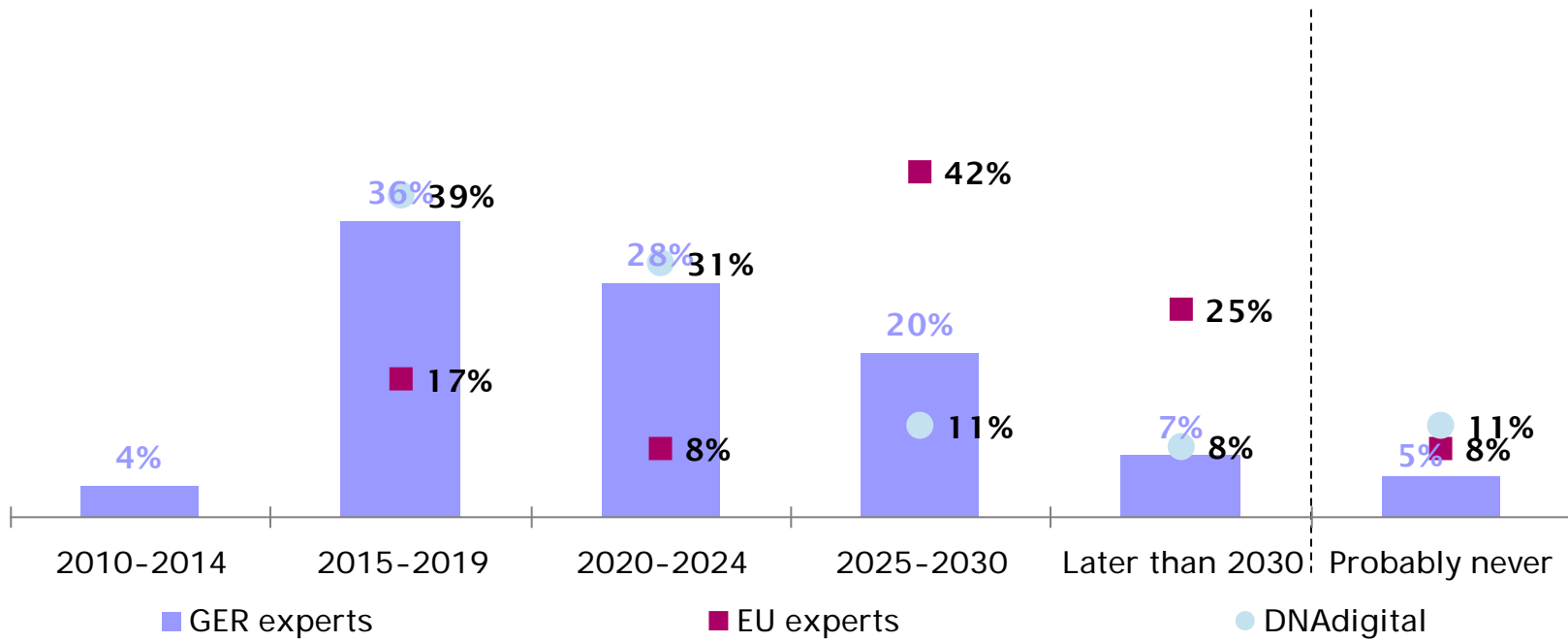|		
Mobile commerce	**Usability**	RFID in production and logistics
Quality of Service for internet services	E-Energy	New mobility concepts
Internet in business	Mobile office	Semantic web
Digital assistants	Usability of electronic devices	Location-based services
internet & IT security problems	video conferences in personal life	Networked car
Anonymous use of the internet	long-term archiving of documents	E-health
Digital identities	**Cloud Computing**	**Software as a service**
Social webs	Networked home	identity management

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Membership and usage of social networks will be common practice.

More than half of the population in <country> regularly maintain their social contacts using "social media" (Web 2.0) applications and services in and via the internet.

| | 2010-2014 | 2015-2019 | 2020-2024 | 2025-2030 | Later than 2030 | Probably never |

Legend: ■ GER experts ▲ Further int. experts ■ EU experts ◆ USA experts ● DNAdigital

Data values shown:
- 2010-2014: 24%, 9%, 17%, 12%, 9%
- 2015-2019: 38%, 30%, 33%, 32%, 19%
- 2020-2024: 36%, 30%, 26%, 24%, 18%
- 2025-2030: 17%, 18%, 12%, 12%, 6%
- Later than 2030: 12%, 7%, 3%
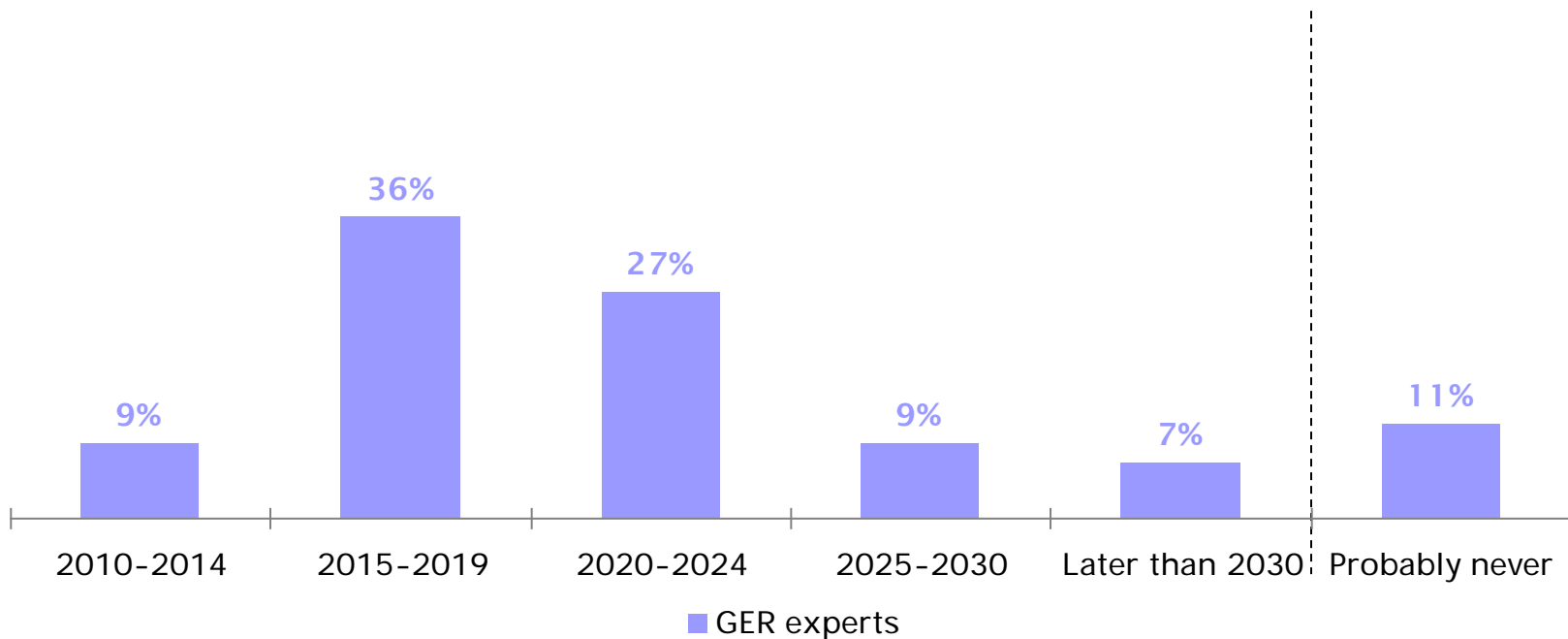- Probably never: 14%, 11%, 11%, 9%, 9%

MÜNCHNER KREIS
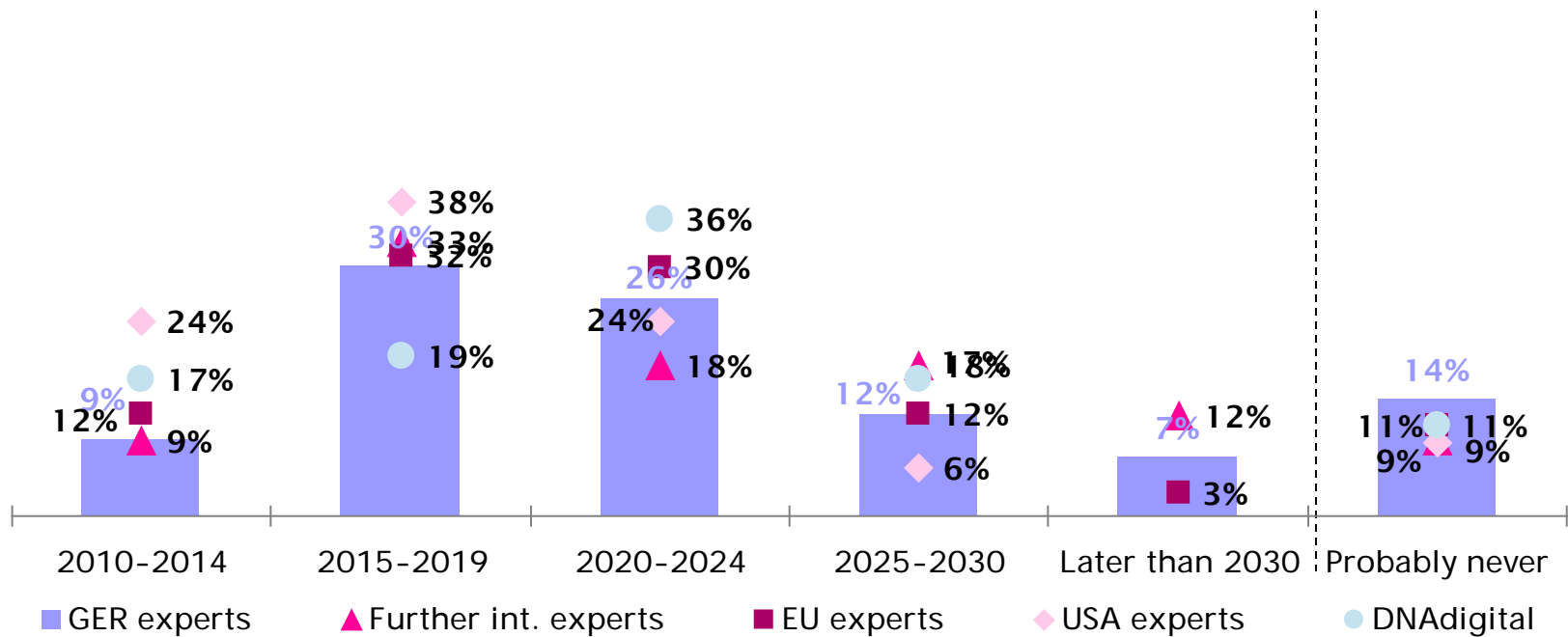
Routine tasks will be delegated and done automatically by digital assistants.

Digital assistants detect the needs of their users automatically and on a self-taught basis, and complete routine tasks independently (e.g., during internet use and to control end devices, software and services of all kinds).

	2010–2014	2015–2019	2020–2024	2025–2030	Later than 2030	Probably never
GER experts	4%	36%	28%	20%	7%	5%
EU experts		17%	8%	42%	25%	8%
DNAdigital		39%	31%	11%	8%	11%

■ GER experts ■ EU experts ● DNAdigital

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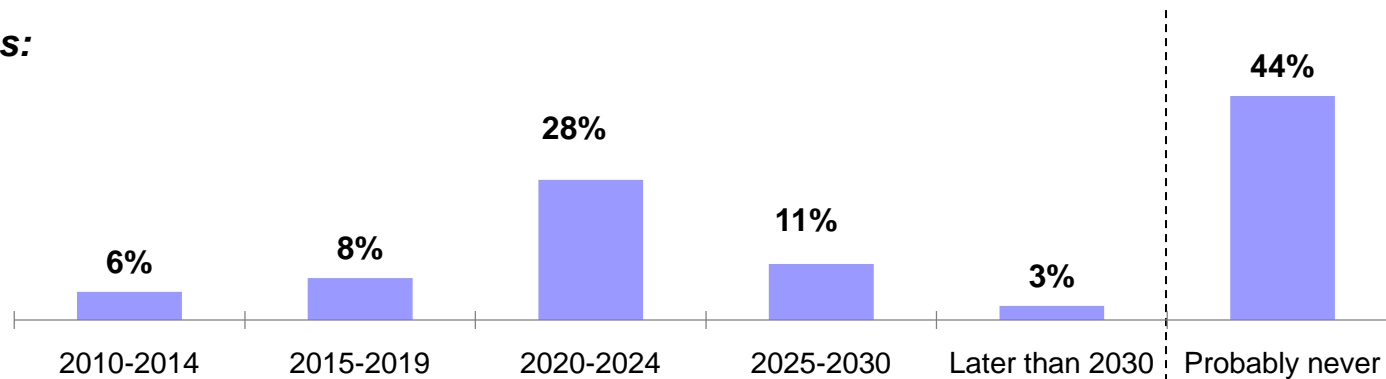# Software as a service will be commonly accepted.

Software is no longer used on an isolated basis on local computers or mobile end devices, but rather on an "on-demand" basis as "webware" in and via the internet.

Bar chart — GER experts:
- 2010–2014: 9%
- 2015–2019: 36%
- 2020–2024: 27%
- 2025–2030: 9%
- Later than 2030: 7%
- Probably never: 11%
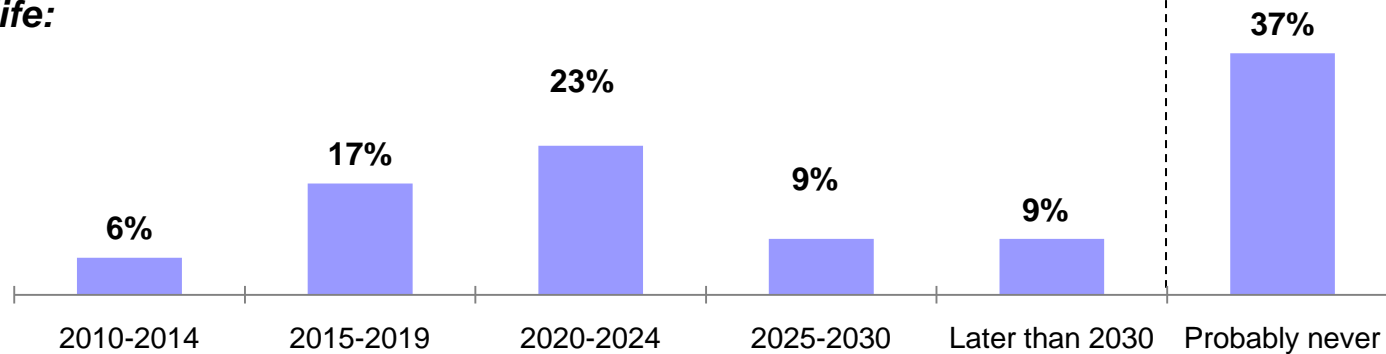
■ GER experts

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Cloud computing will not be the dominant concept; acceptance in private life is higher than in business.

More than 75% of data (e.g. documents, pictures, music, databases) are located on the internet (net-centric approach).

Business:

	2010-2014	2015-2019	2020-2024	2025-2030	Later than 2030	Probably never
	6%	8%	28%	11%	3%	44%

Private life:

	2010-2014	2015-2019	2020-2024	2025-2030	Later than 2030	Probably never
	6%	17%	23%	9%	9%	37%

■ GER experts

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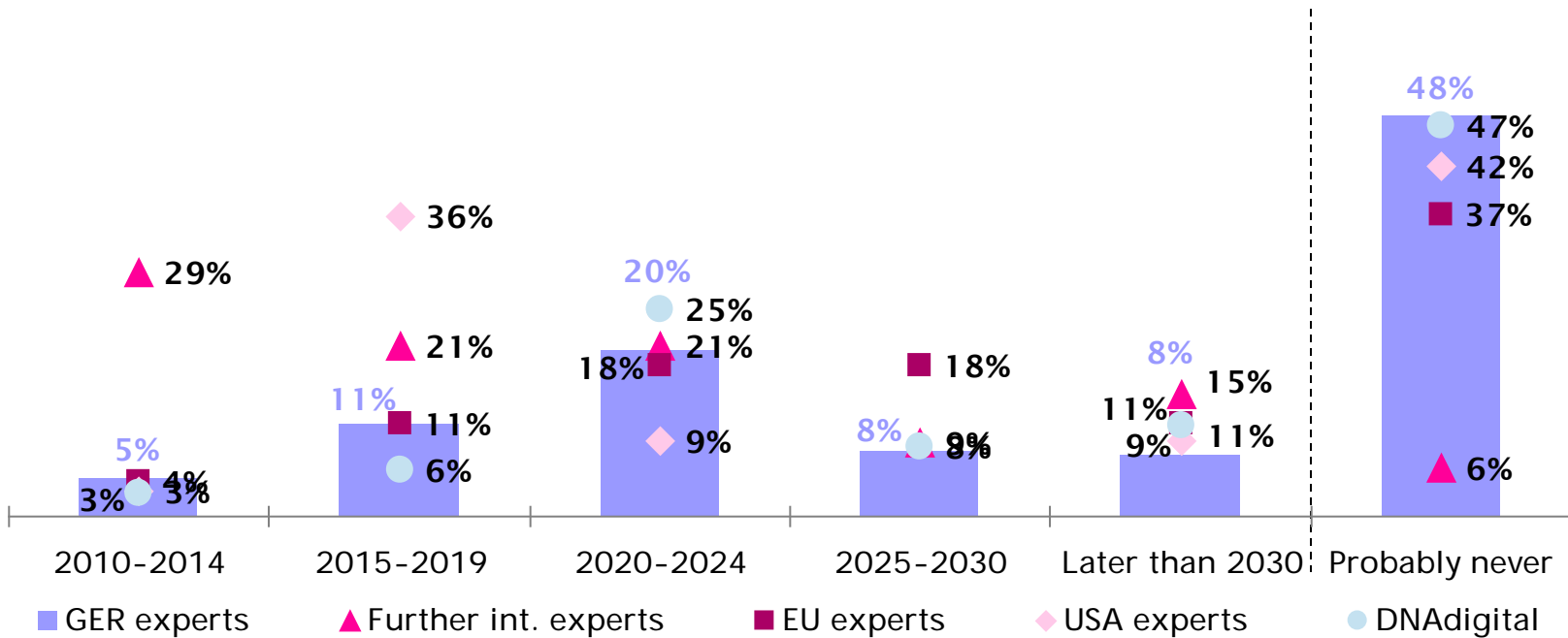
Usability of electronic devices improves, but intuitive operation without need for manuals is not expected.

Every user is capable of intuitively operating electronic devices used in their daily private lives without an user's manual.

Legend: ■ GER experts ▲ Further int. experts ■ EU experts ◆ USA experts ● DNAdigital

Selected aspects of Perspective III: Media

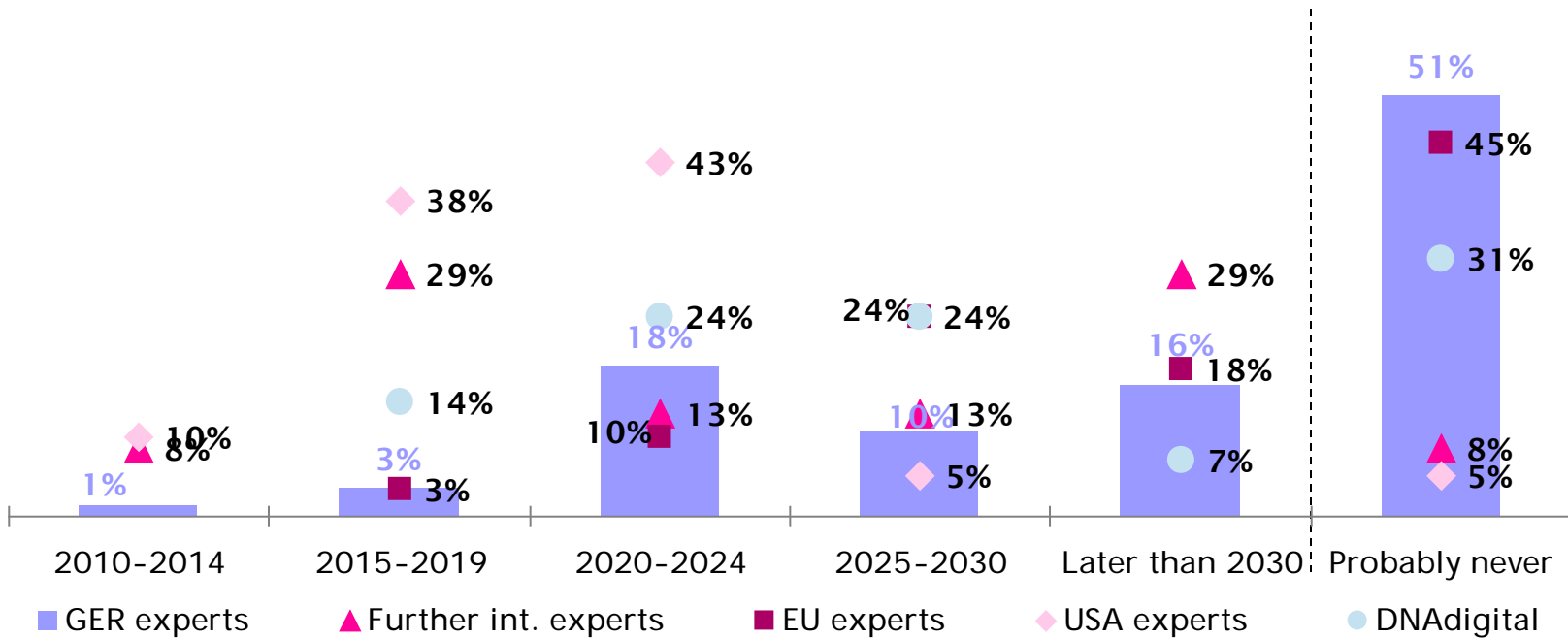|		
3D-TV	User generated content	Private media budget
Internet as entertainment medium	Paid online media content	HDTV
Public (state-funded) broadcasting	Quality indicators for internet information	Convergent multimedia mobile device
Electronic newspapers & magazines	Media convergence	On demand media services
Electronic books	**Willingness to pay for online journalism**	cross-format media brands
Personalized e-newspapers	IPTV	**Willingness to pay for online entertainment**
Personalized Media	**Online advertising**	**Social significance of traditional media**

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Traditional media will keep their social significance.

Conventional media like television, newspapers and magazines have lost their social significance and their function as the prevailing media in <country>.

2010-2014 1% · 10% · 8%

2015-2019 3% · 3% · 14% · 29% · 38%

2020-2024 10% · 13% · 18% · 24% · 43%

2025-2030 5% · 10% · 13% · 24% · 24%

Later than 2030 7% · 16% · 18% · 29%

Probably never 5% · 8% · 31% · 45% · 51%

Legend: ■ GER experts ▲ Further int. experts ■ EU experts ◆ USA experts ● DNAdigital

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Publicly financed broadcasting is still needed.

State-operated broadcasting (subject to public law) is no longer relevant for the functioning of public democratic opinion-making in <country>, due to the broad diversity of readily available data and its high quality.
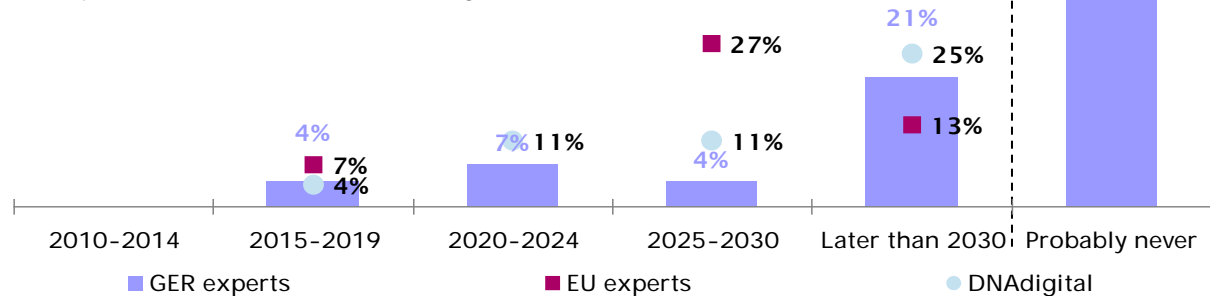
72%
69%
35%

29%

18%

9%
11%
6%
6%
8%
6%
3%
6%
6%
6%
6%
2%
3%

2010–2014   2015–2019   2020–2024   2025–2030   Later than 2030   Probably never

■ GER experts   ■ EU experts   ● DNAdigital

MÜNCHNER KREIS
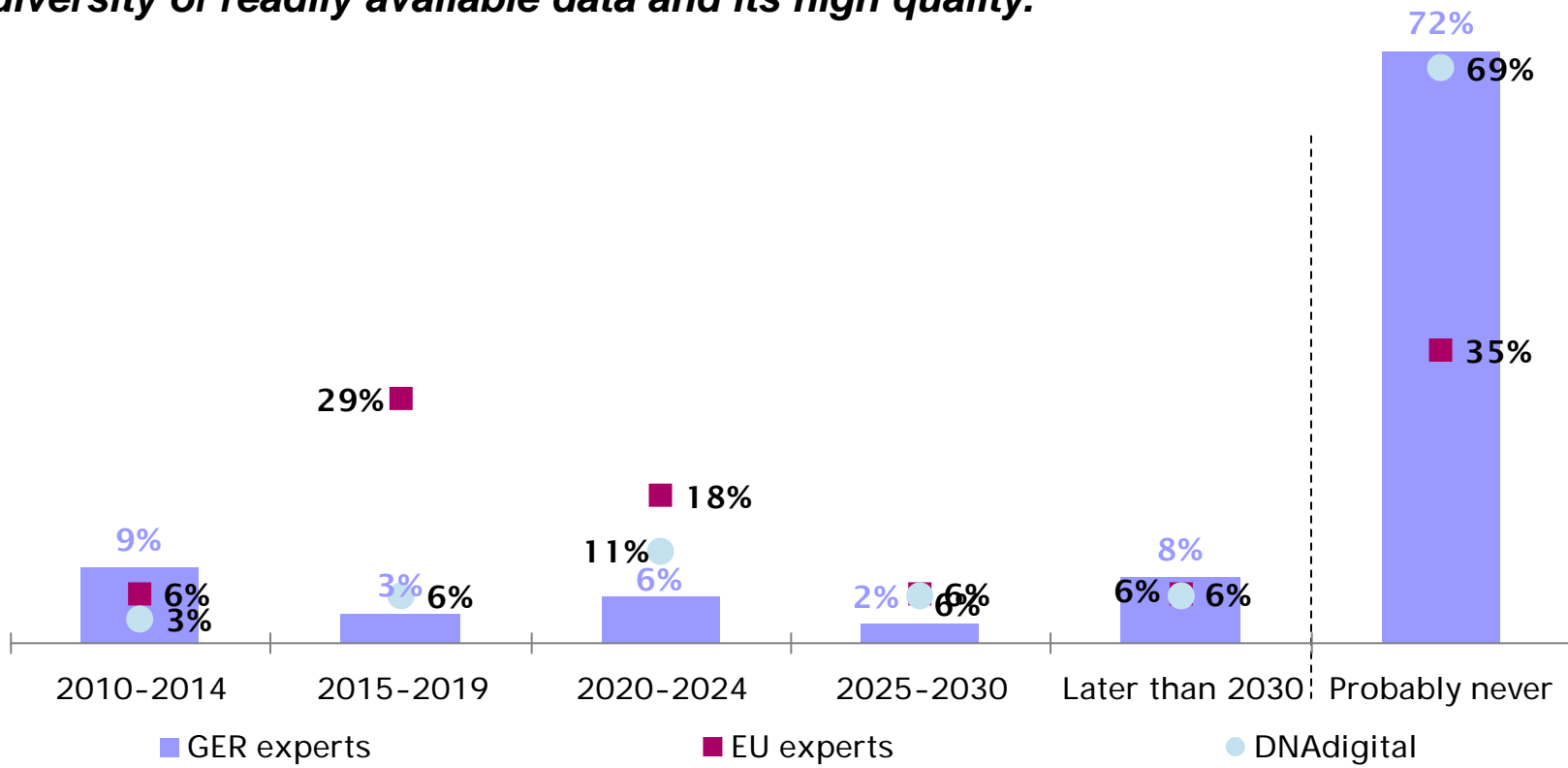
In print media, hybrid usage patterns will be common.

Newspapers / magazines in <country> only exist in digital format on the internet.

Newspapers :

2010-2014	2015-2019	2020-2024	2025-2030	Later than 2030	Probably never

Newspapers chart values:
- 2015-2019: GER experts 6%, EU experts 7%
- 2020-2024: GER experts 9%, EU experts 20%, DNAdigital 17%
- 2025-2030: GER experts 13%, EU experts 13%, DNAdigital 7%
- Later than 2030: GER experts 19%, EU experts 20%, DNAdigital 24%
- Probably never: GER experts 54%, DNAdigital 52%, EU experts 40%

■ GER experts   ■ EU experts   ● DNAdigital

Magazines:

Magazines chart values:
- 2015-2019: GER experts 4%, EU experts 7%, DNAdigital 4%
- 2020-2024: GER experts 7%, DNAdigital 11%
- 2025-2030: GER experts 4%, DNAdigital 11%
- Later than 2030: GER experts 21%, EU experts 13%, DNAdigital 25%, EU experts 27%
- Probably never: GER experts 63%, EU experts 53%, DNAdigital 50%

2010-2014	2015-2019	2020-2024	2025-2030	Later than 2030	Probably never

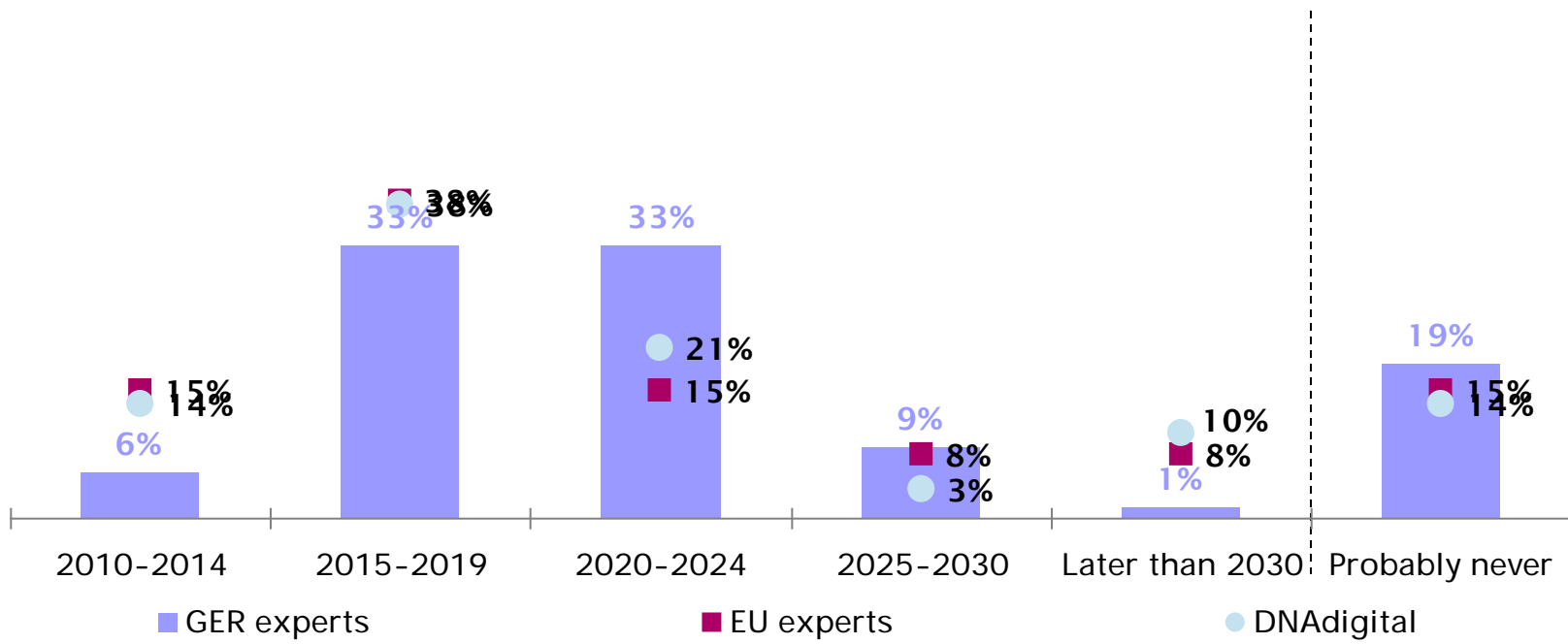■ GER experts   ■ EU experts   ● DNAdigital
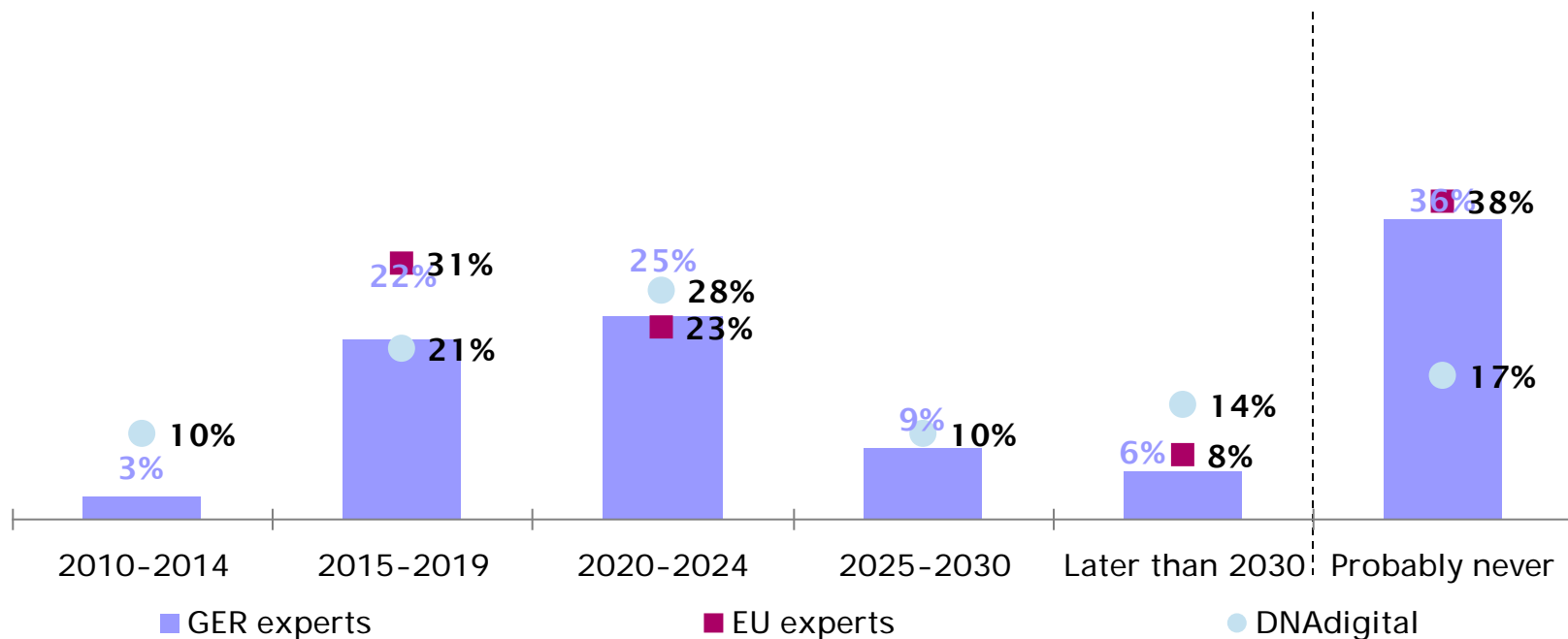
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There is willingness to pay for internet-based entertainment.

For more than half of the internet users in <country>, it is normal to pay for retrieving from the internet professionally produced entertainment programmes (films, videos, music, etc.).

	2010–2014	2015–2019	2020–2024	2025–2030	Later than 2030	Probably never
GER experts	6%	33%	33%	9%	1%	19%
EU experts	15%	38%	15%	8%	8%	15%
DNAdigital	14%	38%	21%	3%	10%	14%

■ GER experts   ■ EU experts   ● DNAdigital
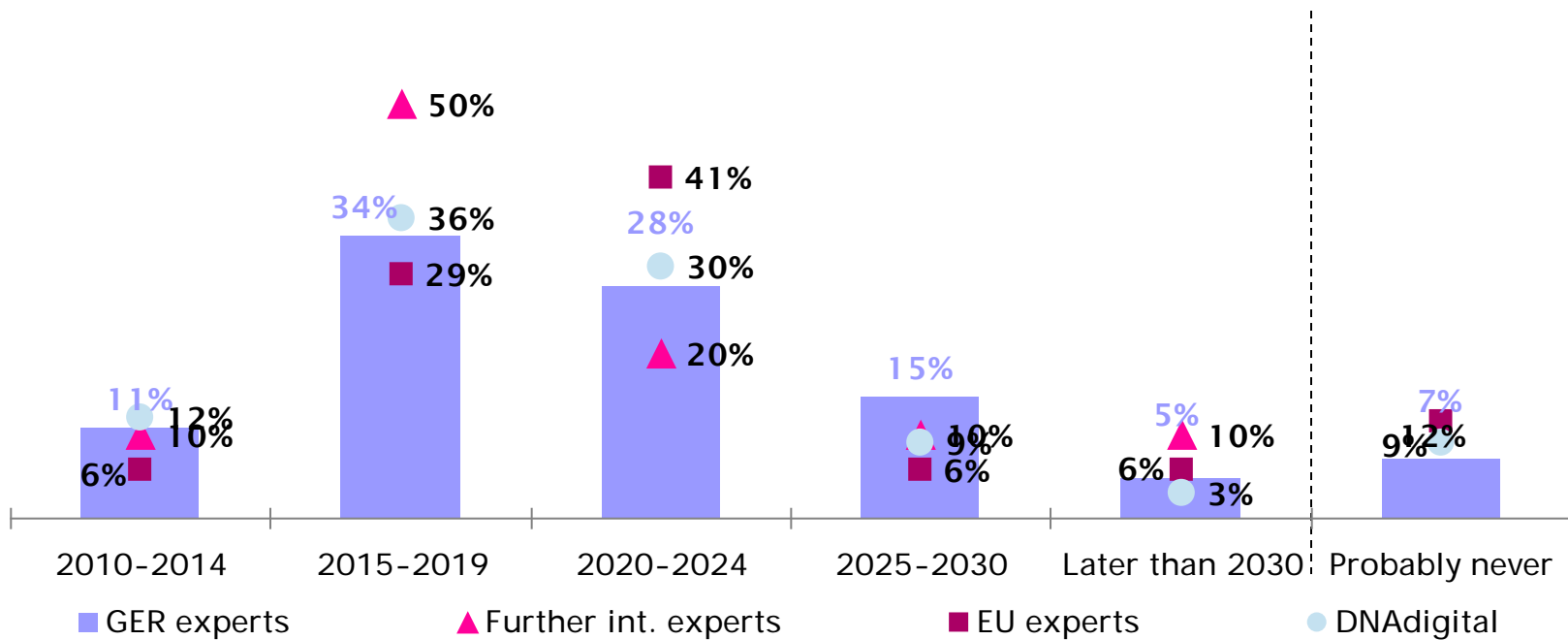
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.. but not for online-journalism.

For more than half of the internet users in <country>, it is normal to pay for retrieving from the internet professionally produced journalistic media contents (latest information and background information on various issues).

	2010-2014	2015-2019	2020-2024	2025-2030	Later than 2030	Probably never
GER experts	3%	22%	25%	9%	6%	36%
EU experts		31%	23%		8%	38%
DNAdigital	10%	21%	28%	10%	14%	17%

- ■ GER experts
- ■ EU experts
- ● DNAdigital

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Revenues from online-advertising will exceed those from traditional advertising.

Online advertising leads to greater sales in <country> than traditional advertising formats (television, radio and print advertising).
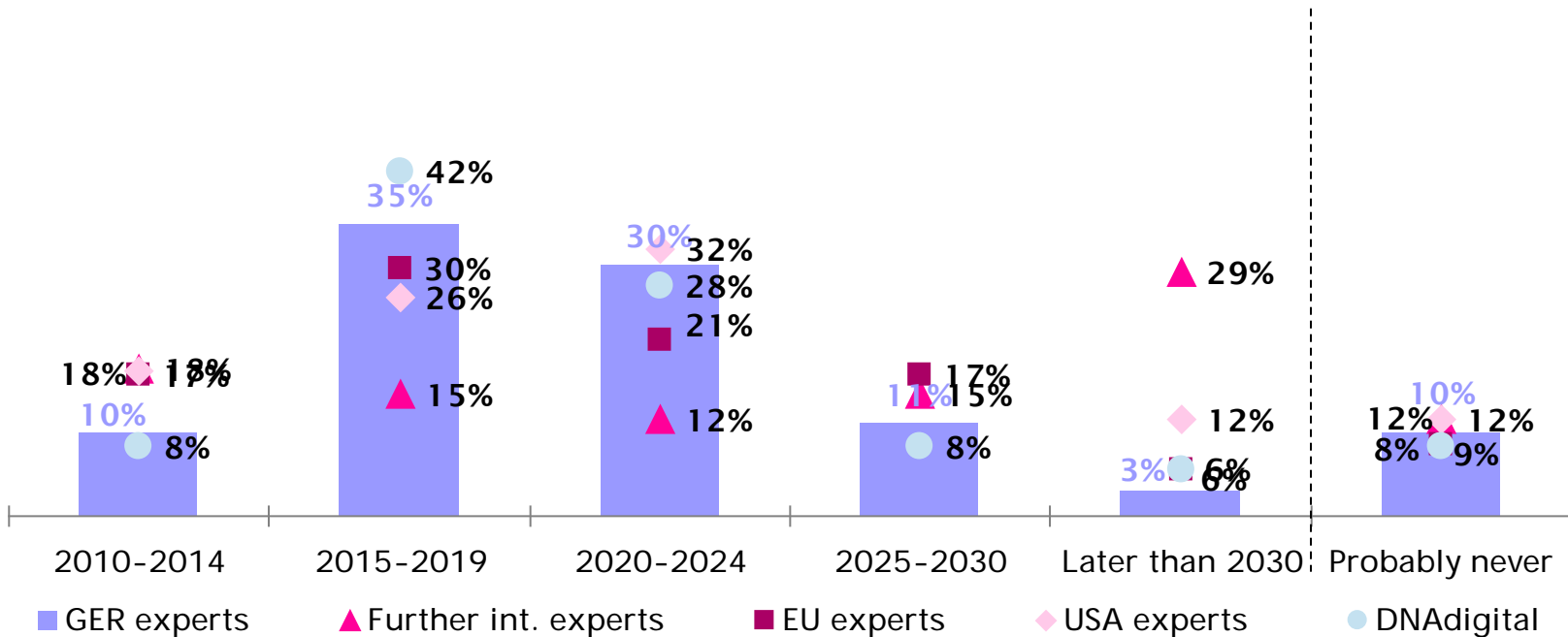

▲ 50%					
34% 36%	■ 41%				
■ 29%	28% 30%				
	▲ 20%				
11% 12%		15%		7%	
▲ 10%		▲ 9% 10%	5%	9 2%	
6%		■ 6%	6% ■ 10%		
			● 3%		

2010–2014	2015–2019	2020–2024	2025–2030	Later than 2030	Probably never

■ GER experts   ▲ Further int. experts   ■ EU experts   ● DNAdigital

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Selected aspects of Perspective IV:
User behavior and implications for society

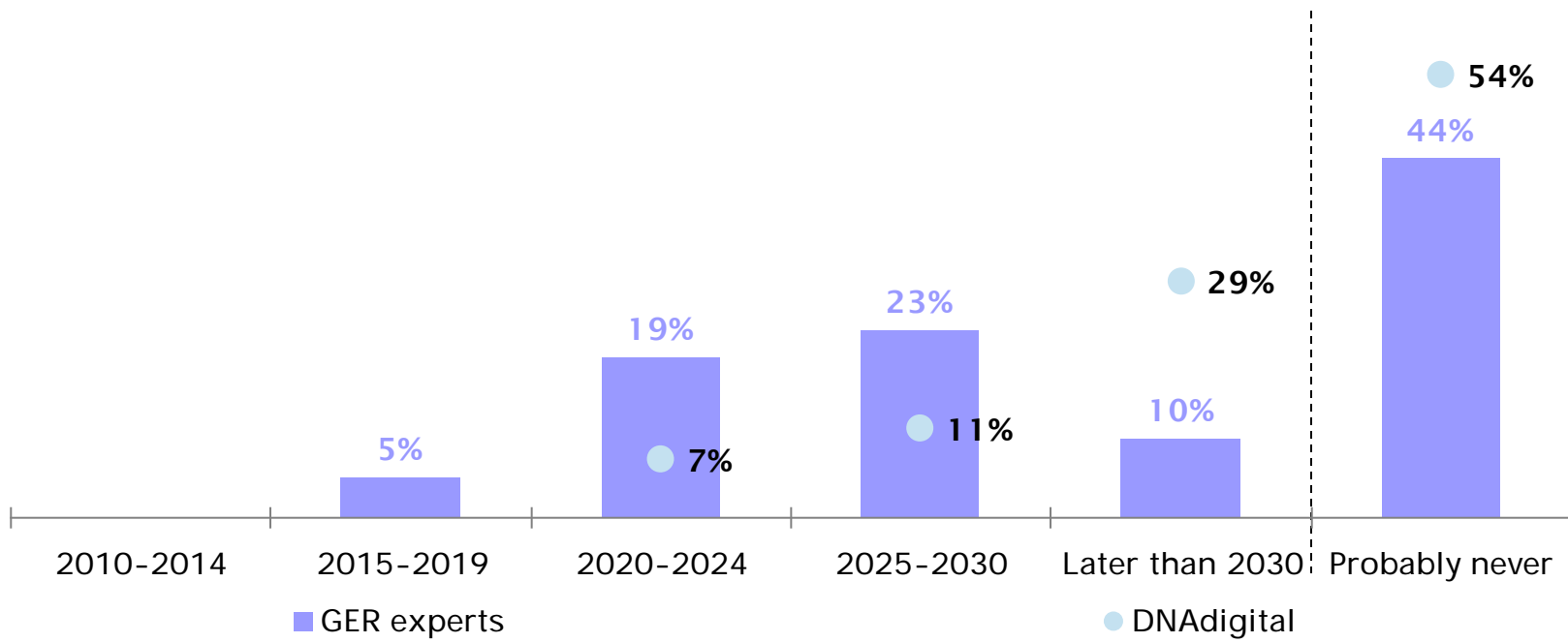| Internet usage competence	E-Democracy	digital divide
National internet usage	Education of ICT-professionals	CO2-Reduction by ICT usage
Global regulation	ICT at school	Privacy regulations
competitiveness by TC/ICT investments	right of privacy principle	Internet security problems
Internet access censorship	ICT Research & development	Impacts of demographics on ICT job market

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Within the next two decades, the internet will be used by almost everyone.

More than 95% of the adult population in <country> actively and regularly use the internet and its services.
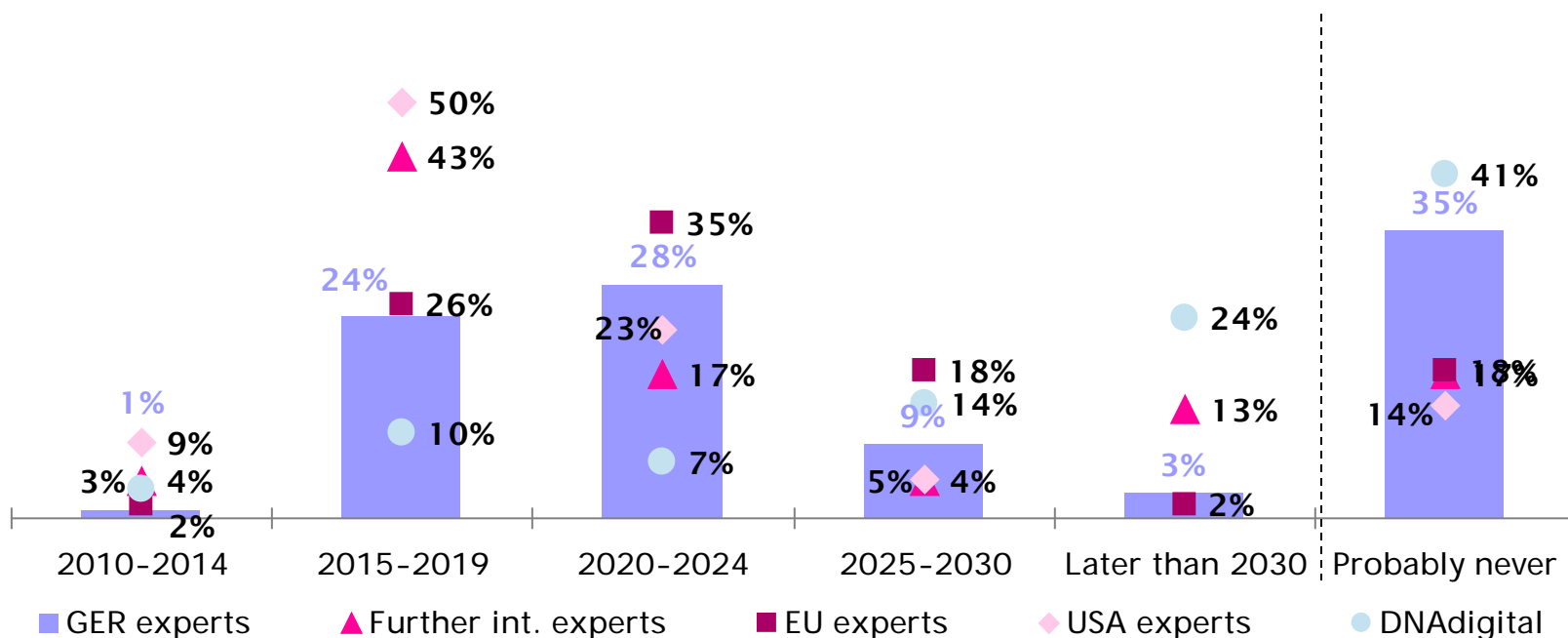

| | 2010–2014 | 2015–2019 | 2020–2024 | 2025–2030 | Later than 2030 | Probably never |

Legend:
- ■ GER experts
- ▲ Further int. experts
- ■ EU experts
- ◆ USA experts
- ● DNAdigital

2010–2014: 18%, 18%, 17%, 10%, 8%
2015–2019: 42%, 35%, 30%, 26%, 15%
2020–2024: 30%, 32%, 28%, 21%, 12%
2025–2030: 17%, 15%, 11%, 8%
Later than 2030: 29%, 12%, 3%, 6%, 6%
Probably never: 10%, 12%, 12%, 8%, 9%

But the digital divide is predicted to persist.

The digital divide of the population in <country> has virtually disappeared.

	2010-2014	2015-2019	2020-2024	2025-2030	Later than 2030	Probably never
GER experts		5%	19%	23%	10%	44%
DNAdigital			7%	11%	29%	54%

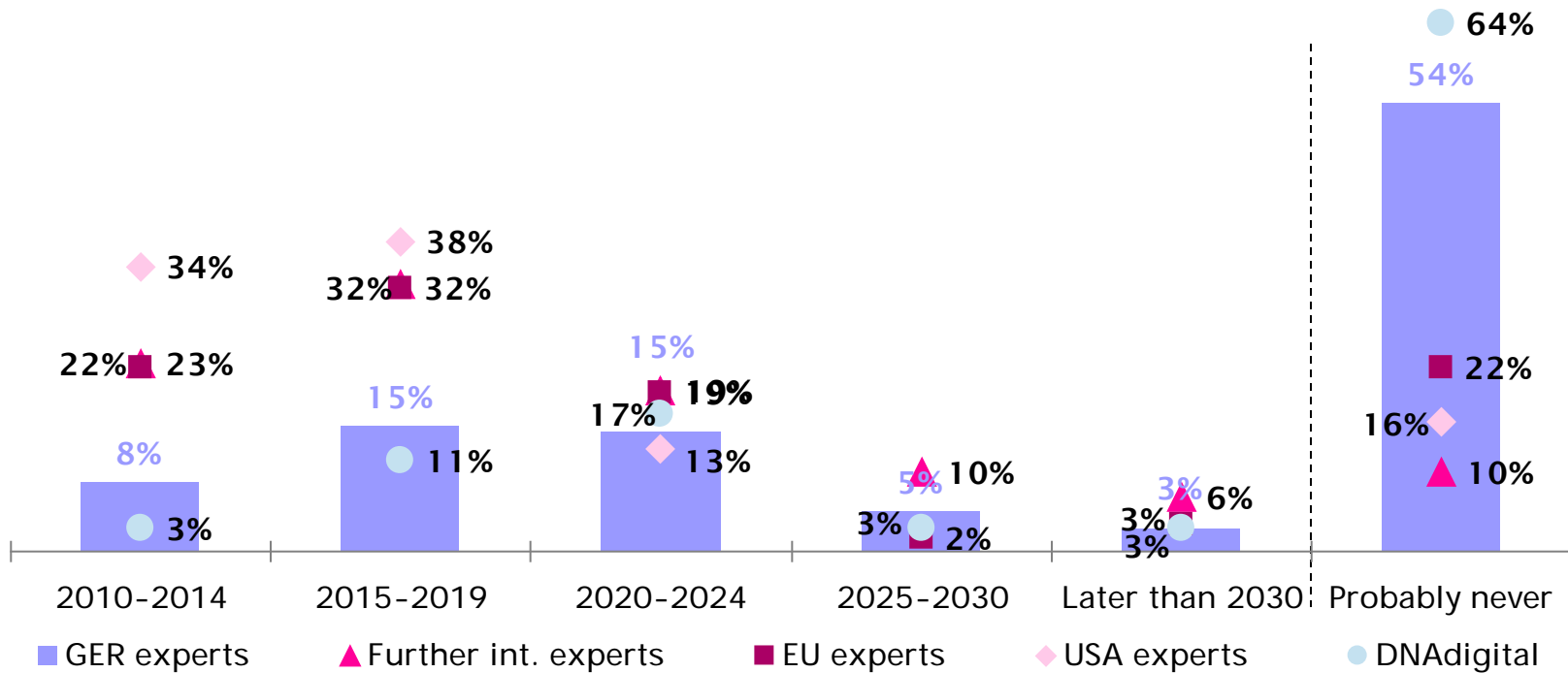■ GER experts   ● DNAdigital

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Competence in dealing with personal data on the internet needs to be improved considerably.

In <country>, approximately 75% of the population is well-versed and competent in dealing with personal data on the internet.

Legend: GER experts · Further int. experts · EU experts · USA experts · DNAdigital
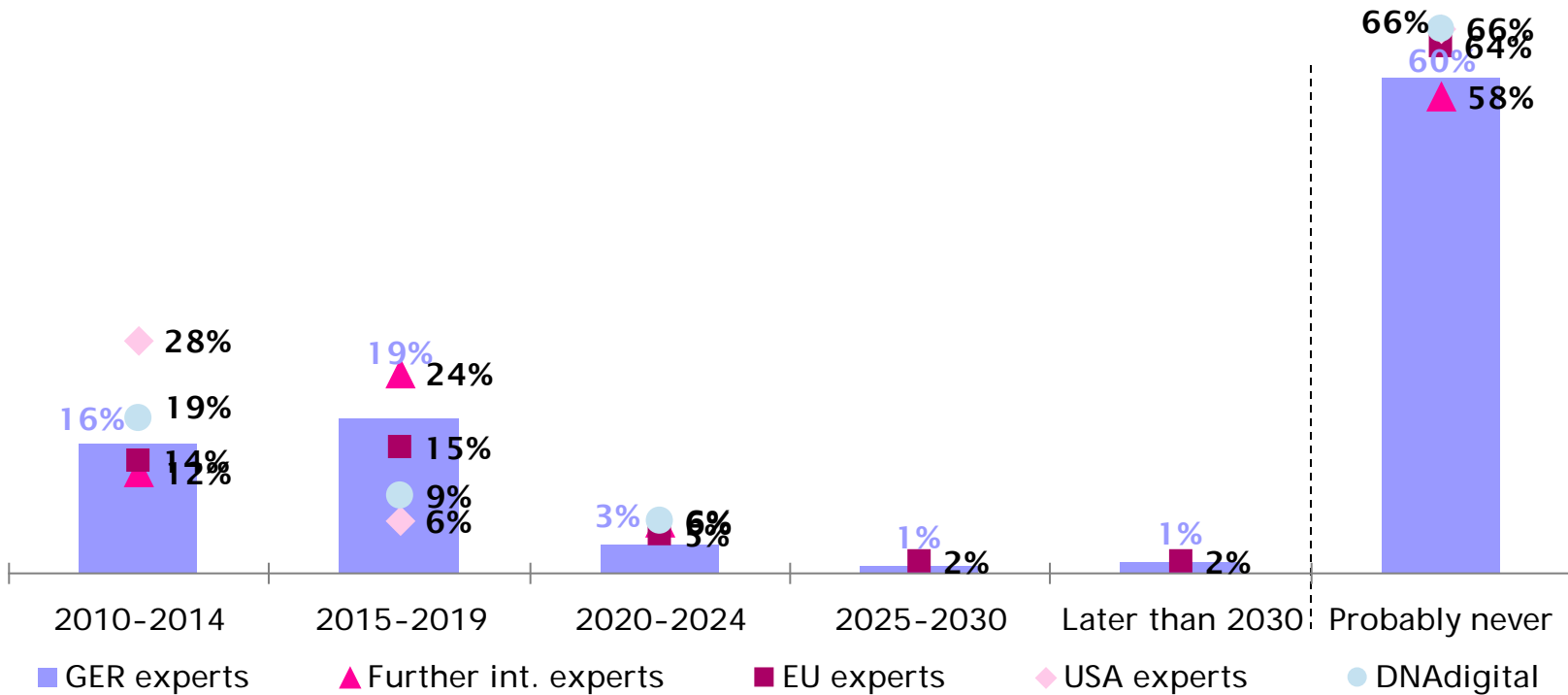
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There will not be a satisfying solution for the individual right of privacy.

An individual's control over the use of his/her personal data on the internet is protected by law in <country> (right of privacy principle).

Legend: ■ GER experts ▲ Further int. experts ■ EU experts ◆ USA experts ● DNAdigital

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Security problems on the internet will not have significant impact on internet-based communication.

Security problems on the internet have intensified so greatly that private and business communications via the internet have been severely impaired worldwide.

66% 66%
60% 64%
58%

28%

19% 24%

16% 19%
15%
14% 12%

19%

3% 6% 6%
9% 5%
6%

1% 2%

1% 2%

| 2010-2014 | 2015-2019 | 2020-2024 | 2025-2030 | Later than 2030 | Probably never |

■ GER experts   ▲ Further int. experts   ■ EU experts   ◆ USA experts   ● DNAdigital

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Summary:
Some challenges and recommendations

- **Infrastructure and technology**:
  - Public support for rollout of high speed broadband access in rural areas needed
  - Mobile internet access is not a substitute for fixed-line access
- **Services**
  - Recognize and encourage private usage behavior as driver of innovation
  - Usability of electronic devices remains a persisting challenge
- **Media**
  - Education in media literacy is more important than ever before
  - Sustain key media (such as public broadcasting) for the sake of social orientation and quality journalism
- **Implications for society**
  - Investments in education are crucial to overcome digital divide

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Thank you for your attention!

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