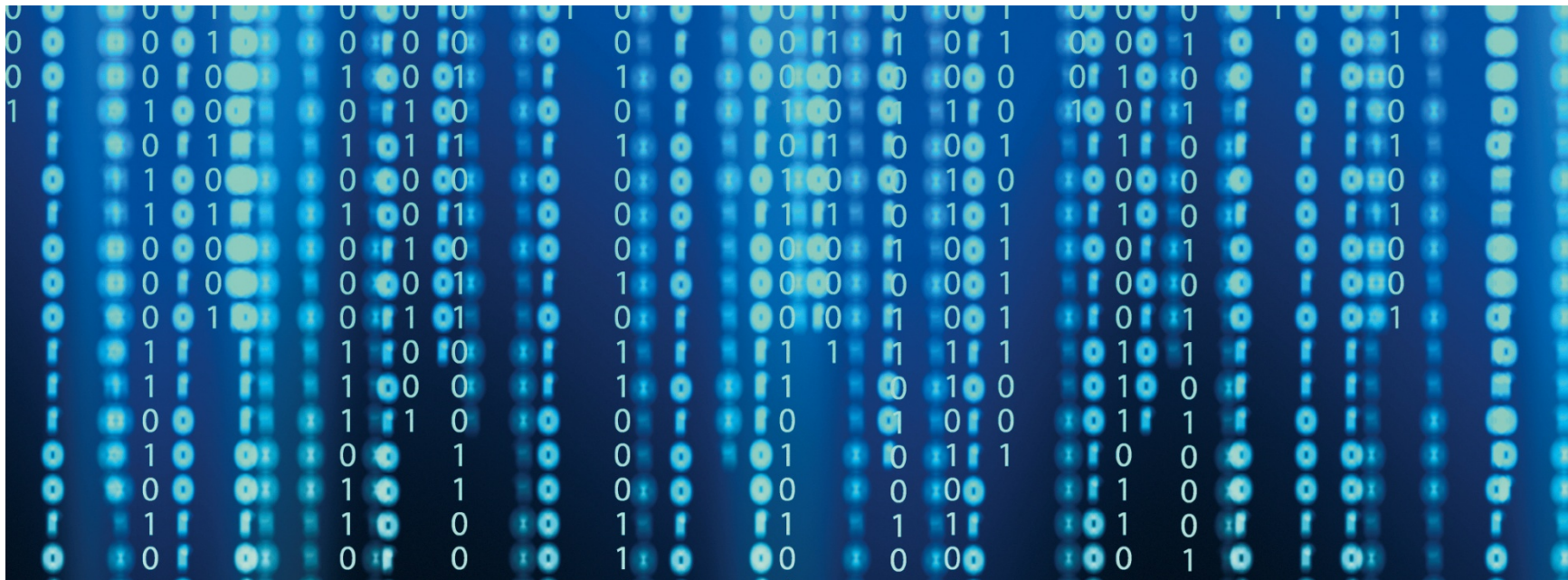

DEVELOPMENT OF IMPACT MEASURES FOR E-INFRASTRUCTURES

Munich, March 29th 2012



Objectives and key research questions

Objectives

- developing and testing a robust framework for monitoring and evaluation based on information obtainable by the projects themselves.
- analysing socio-economic impact of e-Infrastructures and contributions to EU policy aims based on the results of the test with a selected number of projects.
- recommend a set of concrete actions to be taken at the European and Member States level to implement the resulting monitoring and evaluation system

Key research questions

- Did the program achieve its goal of enabling e-Science?
- Are there any wider socio-economic impacts in relation to the goals?

Methodology - Challenges

- **Heterogeneity of projects**

- addressed by the development of a typology of e-Infrastructure projects and their clustering in a multi-criteria matrix.

- **Problem of data availability**

- addressed by a survey and by access to project proposals and any kinds of documents provided by the project coordinators and/or the Commission.

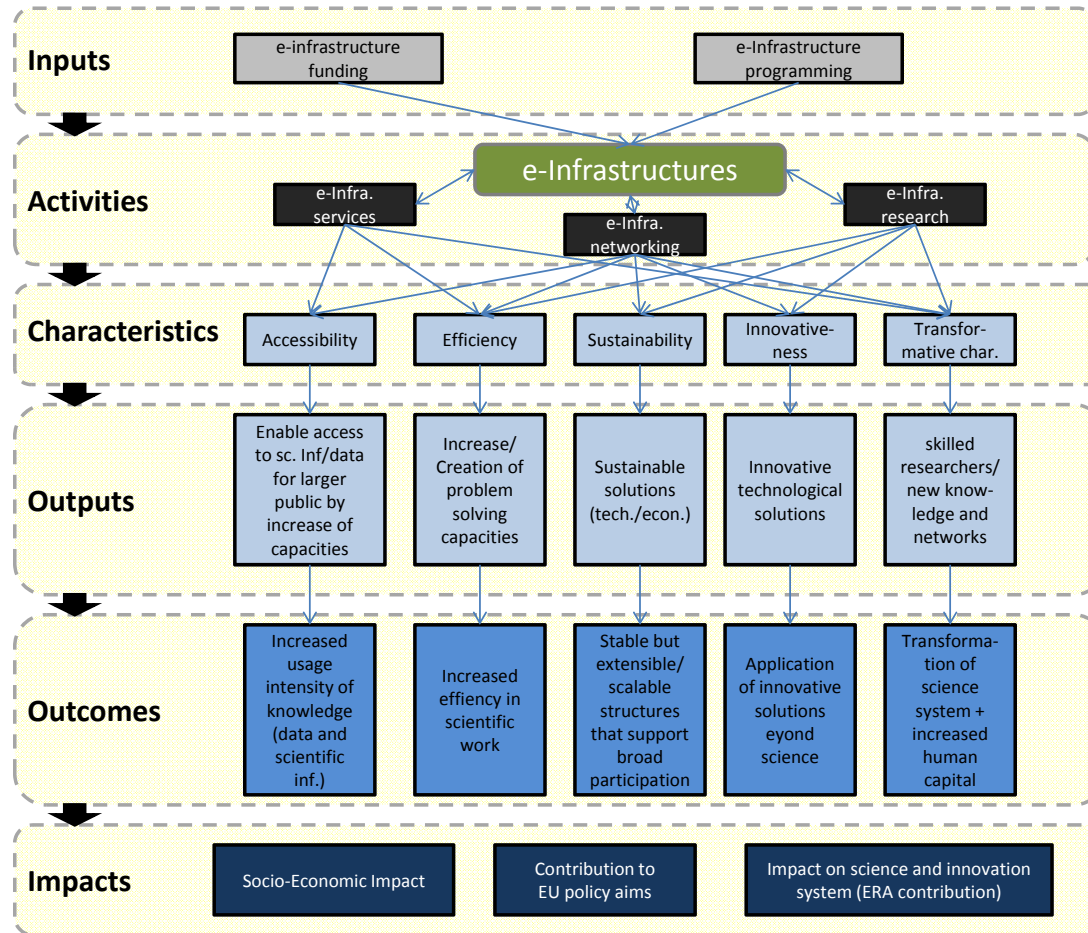
- **Measuring indirect impacts**

- tackled by consolidation of existing impact assessment approaches and an intervention logic chart for the relations between objectives, input, output and outcome of the program.

- **Lack of conceptual framework**

- Addressed by extensive feasibility and test studies

Intervention Logic



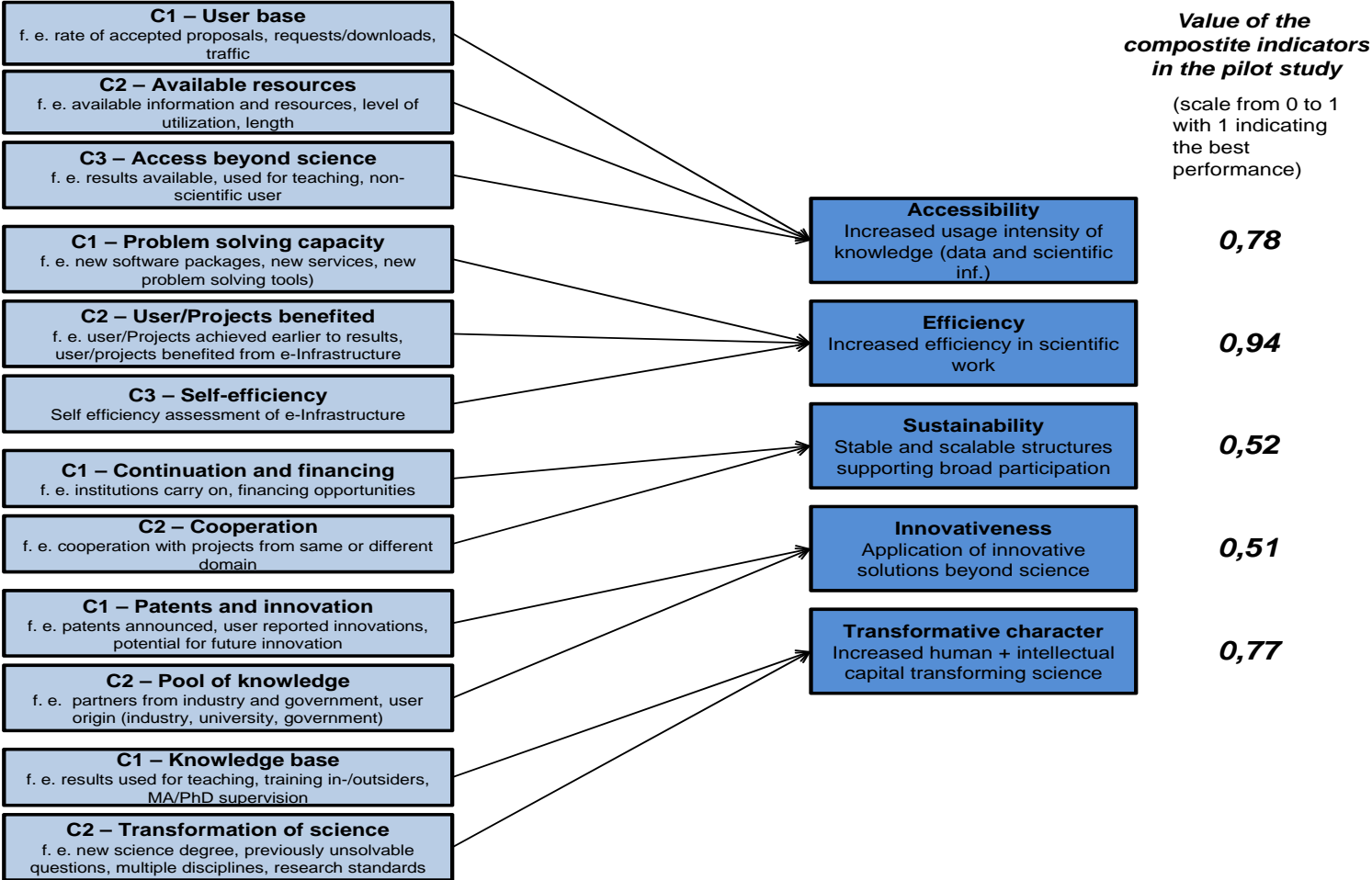
Project selection

- multi-criteria selection process in order to select representative set of projects
- ensuring framework will be applicable to the program as a whole
- 21 out of 29 projects responded
- dimensions of selection
 - domain (implicit) → 4-5 per domain
 - Status → ongoing, nearly finished
 - discipline orientation → strong inter- and multidisciplinary focus
 - size (in financial terms)
 - geographical focus → most consortia consist at least of 5 EU partners, several EU-Non EU
 - Access → mostly open, application based
 - type of actors → orientation towards research institutions, few private companies

Structure of the questionnaire

- Measurement of direct results of the projects in the different dimensions
- Each dimension reflects goals of intervention logic
- Accessibility
 - *to be easily accessible to the public and to provide large enough capacities*
- Efficiency
 - *to offer sufficient problem solving capacities*
- Sustainability
 - *to develop sustainable activities and infrastructure solutions*
- Innovativeness
 - *to develop innovative technological solutions*
- Transformative character
 - *to produce skilled researchers and new knowledge and networks*
- Additional set of questions capturing complementary aspects

Composite Indicator Overview



Impact Analysis

Impact Areas:

- **Research Excellence and Innovation:**
 - Research quality; dissemination of research results; preservation of scientific knowledge; innovation performance

- **Human Capital:**
 - Opportunities for training, lifelong learning, skills; achievements/improvements of the educational system

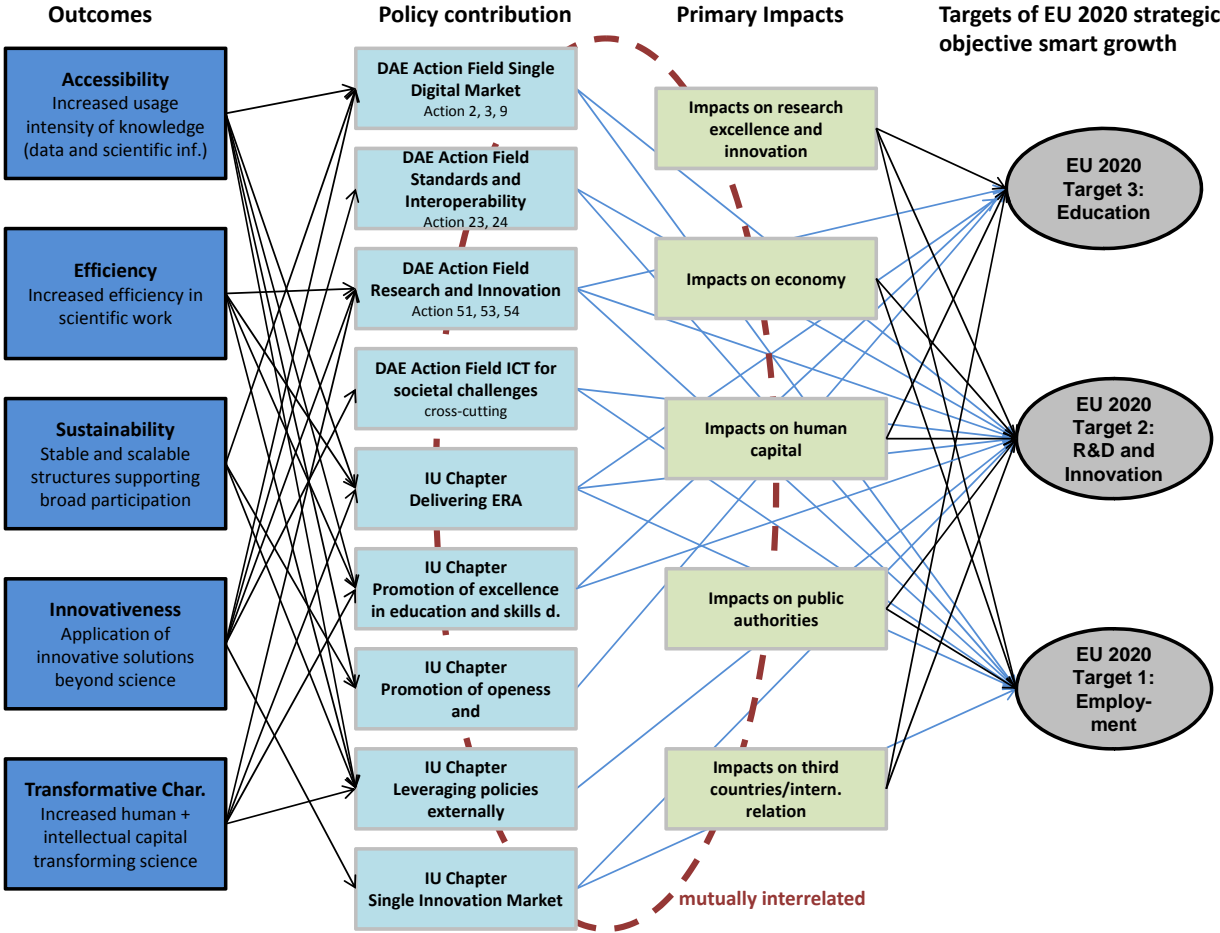
- **Economy:**
 - Productivity; competition; employment; growth

- **Public Authorities:**
 - Performance of public authorities; exploitation of public data

- **Third Countries and International Relations**

Contribution to Policy Aims

EU 2020 strategy - Overview



General Conclusions

Conclusions regarding key research questions:

- Applied methodology is suitable to indicate the program achievement in relation to its goals
- suitable to determine and assess socio-economic impacts and contributions to EU policy aims
- there are limitations
 - due to the lack of time series, benchmarks (negative, positive) and reference values
 - no unintended impacts covered
 - any interventions should not be aimed at optimizing single indicators → mutual interrelations of indicators with other aspects
- Based on that we suggest:
 - Implementation of a monitoring system
 - development of tool box for further analysis

Recommendation

Monitoring system - Survey

- Regular monitoring system based on the selected items of the pilot study:
 - 10 items each year: easy obtainable, comparable among projects and data points
 - Items collected:
 - direct measurable impacts on scientific environment, overall science, public
 - projects' pool of knowledge
 - projects' innovative activity
 - items picturing the development and growth of projects' infrastructure and capacity
 - Implementation as part of the annual reporting → easy calculable for projects

- Complementing survey in non-regular intervals
 - collect additional information to fill the composite indicators enhance analysis of impacts and policy contribution
 - implementation within the final reporting of the projects

Thank you

for your attention!

Questionnaire development

- Survey as the basic tool for collecting data from projects → Basis for measuring the outcomes
- development in several loops and close coordination with Commission
- extensive pre-test with seven projects
 - Géant, EGI, NeXpres, PRACE, EUDAT, OpenAire, i4Life
- Aims of the pre-test
 - to demonstrate the appropriateness and feasibility of the survey questions
 - To test appropriateness and feasibility of the output indicators for the monitoring system
 - To identify the best output measures in terms of usefulness for impact assessment and contribution to policy aims
- formed valuable input for the final questionnaire deployed

Outcome Analysis (Limitations)

Potential Limitations:

- Needs sufficient number of observations
- Some component items based on few responses
- Large projects could drive results
- Values need to be treated with care
- Indicator sensible to results

Solutions:

- Repeating the study frequently
- Building composite indicators over several years
- Control for large projects or projects in starting phase

Recommendation

Tool Box

- experiences during the study confirm results of the review of existing approaches (f. e. UK e-Science program, NSF cyberinfrastructure program) as well as of existing literature → no one size fits all solution
 - Exploitation of the experiences of the different studies in order to develop tool box for e-Infrastructure monitoring and assessments
 - Additional instruments could be for example:
 - Inventory (siehe eNventory) supported by general surveys (examples: Survey of Science and Engineering Research Facilities) → coordination required
 - User surveys: integrating needs and challenges of users to understand impact on their work
 - Bibliometrical support: enable to measure research excellence
 - To be considered:
 - Not only tools, also how and when to use
 - concertation required → understanding intersections between EU and national level f.e.
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