Use of
Technology Readiness Levels and funding rates in H2020

Nicholas Deliyanakis
DG Research & Innovation
Industrial Technologies

Key Enabling Technologies (KETs)

Six strategic technologies

- possessing economic potential

- contributing to solving societal challenges

- Knowledge- and Capital intensive

- Cut-across many technologies and sectors

- *Nanotechnologies*

- *Advanced Materials*

- *Micro- and nano-electronics*

- *Photonics*

- *Biotechnology*

- *Advanced Manufacturing*

Example - combining several KETs for advanced products

Societal Challenge
Health

New nanotechnology-based diagnostics

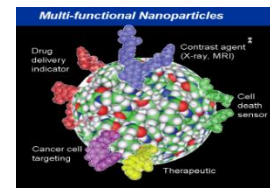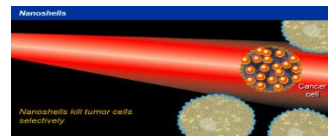New target drug delivery and release
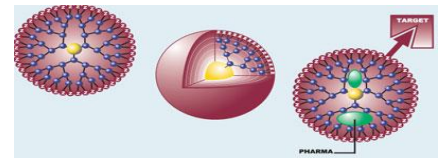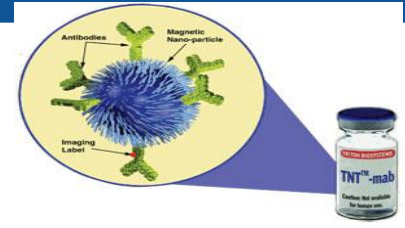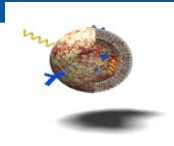
Regenerative medecine

Nanomedicine

Advanced materials

Microelectronics

Nanotechnologies

Photonics

Biotechnologies

The issues regarding KETs

- **Europe has strong position in science and in patenting activity, although the latter is declining**

- **<u>But</u> there is a gap between the technology base and the manufacturing base**

- **We need to add product development (e.g. demonstrators) and competitive manufacturing to the technologies**
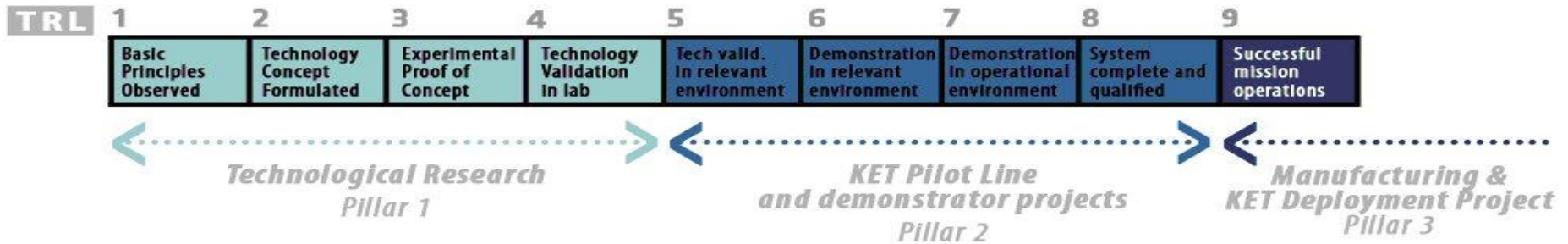
<u>From Lab to Industry to Market</u>

Main priorities for KETs

➢ <u>Technology development and validation, aiming at industrial deployment</u> of Key Enabling Technologies (KETs)

➢ Strategic research agendas, roadmaps and value chains (applications in several sectors)

➢ Industrial engagement / leverage

➢ Pilots and demonstrators

➢ Cross-cutting KETs (combinations of KETs and manufacturing), 30% of KET budget

➢ Enabling applications in societal challenges

Technology Readiness Levels (TRLs) – a useful tool in development and deployment of KETs

TRL	1	2	3	4	5	6	7	8	9
	Basic Principles Observed	Technology Concept Formulated	Experimental Proof of Concept	Technology Validation in lab	Tech valid. in relevant environment	Demonstration in relevant environment	Demonstration in operational environment	System complete and qualified	Successful mission operations

Technological Research
Pillar 1

KET Pilot Line
and demonstrator projects
Pillar 2

Manufacturing &
KET Deployment Project
Pillar 3

- ➢ NMP in FP7: TRLs 1 – 4;

  up to 5-6 in 2012-13 (pilots and demonstrators)

- ➢ LEIT KETs: TRLs 3/4 – 7; centre at TRLs 5-6

# H2020 – LEIT/KETs: From R&D to close-to-market activities

- Use of Technology Readiness Levels (TRLs from 3-4 to 8)
- Two funding rates

  100% funding: TRLs 3-6

  70% funding: TRLs 5-7

  Non-profit participants can claim 100% funding
- Cross-cutting KETs (combinations of KETs and manufacturing)
- Seamless coverage provided by FETs/ERC – LEIT – Societal Challenges
- Ground prepared in FP7 (first pilots and demonstrators, innovation activities)

Ex 1: CassaMobile - Flexible Mini-Factory for local and customized production in a container (DEMO project)
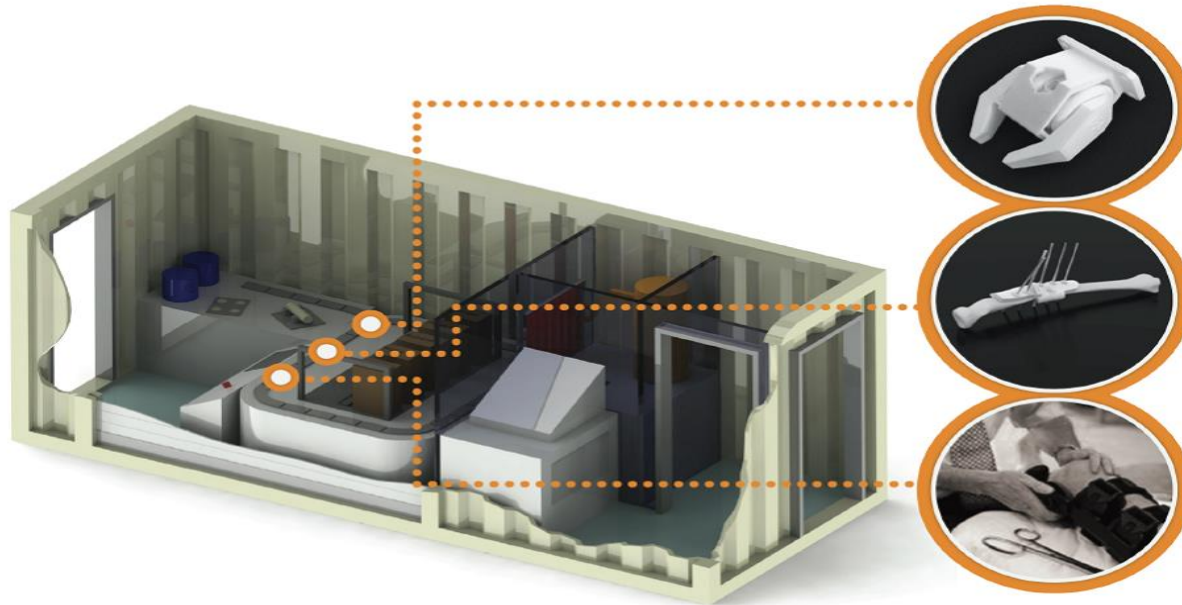
Ex 2 - Innoshade – Start TRL ~4 End TRL ~6

- Switchable light transmittance technology based on nano-composites

- Technology developed previously for small sized objects; project enables low-cost production of electrochromic shading appliances with lower energy consumption and faster response.

- Sub-projects on: Ophthalmic lenses, Domestic appliances, Aircraft & Vehicle applications
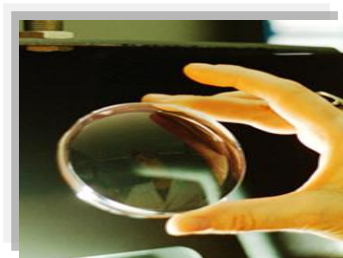
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Research and Innovation

Issues to consider

- High TRL does not necessarily translate to 'close-to-market'

- High TRL in KETs does not necessarily translate to suitability for particular applications

   but may be a prerequisite for access to high-value markets in e.g. health, energy or transport

- The proposal must be credible with regard to the target TRL

- Funding rate does not depend only on TRL

- Transition from moderate to high TRLs – mix of R&D and innovation activities in one project (funding rate fixed for topic in WP, applies to all activities)

Questions and Answers

22/04/2015

Q: **How to provide proof in proposals that the requested TRL in the call text is reached?**

Q: **TRLs are new in H2020/ WP 2014-2015, will the concept stay the same in the future?**

[*Germany, Leibniz Universität Hannover*]

Q: In RIA TRL is up to 6? In IA TRL is greater than 6?;

Q: How to deal with call topics that do not mention TRL?

[Germany, Fraunhofer-Institut für Schicht- und Oberflächentechnik IST]

Q: **How should we classify the projects in terms of TRL?**

Q: **Should we identify the TRL for each activity?**

[*Portugal, Mota-Engil Engenharia*]

Q: **Which have been the specific problems related to the applicants' interpretation/usage of TRLs observed in the evaluation of proposals in the calls so far?**

[Norway, The Research Council of Norway]

Q: **What TRL is required to apply for the Phase 1 of the SME Instrument (NMP-25-2015)?**

[Norway, Scaberia]

Q: **From which level may I consider I have a product?**

[Portugal, INESCTEC]

NMP TeAm

Q: **In a multidisciplinary proposal different technologies may be at different starting TRLs. How much latitude is there to have certain parts which are outside the TRL range quoted in the call text?**

[*United Kingdom, TWI Ltd*]

Q: **TRL5 and TRL6 are important in H2020 proposals, but sometimes it is hard to define and differentiate. It would be good to have as many examples as possible to try to make its own opinion from the very short definition given by the EC. In particular what means "validated" and what means "demonstrated" - what are the proofs required?**

[Germany, Steinbeis-Europa-Zentrum]

Q: There is also a problem of wording. Many people rather talk about "proof of concept" (is that TRL 4-5) and prototypes may be developed in a lab, so what is the prototype of TRL7 in the EC definition and is it necessarily developed in industrial environment?

[*Germany, Steinbeis-Europa-Zentrum*]

Q: **It would also be great to highlight the difference between "relevant" and "operational" environment. Last but not least, other important keywords are** <u>**miniaturization / upscaling**</u>**: at which TRL does it take place? Same question for the production of pre series e.g. on pilot lines? And can the product certification be considered as being at TRL8?**

[*Germany, Steinbeis-Europa-Zentrum*]

Q: **How can we distinguish between two TRLs when the project is at the frontier of both?**

[*Spain, INESCOP*]

Q: **For TRL 5 and 6 what does it mean "industrially relevant environment"?**

[Italy, ENEA]

Q: **A commercial product is on TRL 9 or outside?**

[*Portugal, INESCTEC*]

Q: Can you provide information about the relation between Manufacturing Readiness Level (MRL) and TRL;

Q: Is TRL application specific? Therefore, a multi-purpose technology can be at different TRL level depending on the type of application?

[*Belgium, ENEA*]

Q: **How to determine the corresponding TRL to healthcare?**

[*Italy, Università Milano Bicocca*]

Q: **How the reviewers are instructed about TRLs?**

Q: **How different KETs are being evaluated to be assigned a specific TRL?**

Q: **How different models of TRLs are being confronted and integrated if any? (EARTO, NASA, DOD)**

[*Italy, in srl*]

Q: **TRL4 indicates technology validation in lab, TRL5 technology validation in relevant environment; does also the scale matter here (e.g. pilot) or is placing the lab scale equipment in the industrial environment sufficient? And maybe some connection to upstream or downstream elements of the value chain?**

[*Germany, Consultant*]

Q: **Most TRL for RIA proposals start by default at 4. Why is that? When the word "new" (catalysts, processes, etc.) appears in the call, I would expect lower TRL and for implementation actions I would expect higher TRL. What aspects are considered to determine the start TRL?**

[*Spain, ICIQ (Institute of Chemical Research of Catalonia)*]

Q: **Did proposals tend to indicate what TRL range each Work Package was contributing to - or was it left to the evaluators to infer the TRL from the text of the proposal? Did evaluators look out for statements about what TRL proposers were working at/to?**

[UK, Innovate UK]

Q: **Were there many proposals that positioned themselves outside the TRL range specified in the WP? It would be useful to know how this worked for all proposals (i.e. did proposers think we had the wrong TRL range?) and if the successful ones stayed more rigidly within the topic TRL banding.**

[*UK, Innovate UK*]

Q: **It would be good to define the scale of the demonstrators that are expected depending on the TRL and sector both for IA and RIA so people standardize their approach. Are there guidelines?**

[*Spain, IRIS*]