Public Engagement Innovations for Horizon 2020

Toolkit Design Document
D4.1

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The PE2020 Project

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The PE2020 project

PE2020 will identify, analyse and refine innovative public engagement (PE) tools and instruments for dynamic governance in the field of Science in Society (SiS). PE2020 analyses the PE tools and instruments through a systemic and contextual perspective, and contributes to the potential and transferability of new governance innovations. PE2020 will create new knowledge of the status quo and trends in the field of PE in science, refines innovative PE tools and instruments and propose new ones.

The project will do this by (1) further developing a conceptual model that provides a systemic perspective of the dynamics of public and stakeholder engagement; (2) creating an updated inventory of current and prospective European PE innovations; (3) context-tailoring and piloting best practice PE processes related to the grand challenges of the Horizon 2020; and (4) developing an accessible net-based PE design toolkit that helps identify, evaluate and successfully transfer innovative PE practices among European countries.

New tools and instruments for public and societal engagement are necessary to boost the quality, capacity and legitimacy of European STI governance and to solve the looming problems related to the grand societal challenges of the Horizon 2020. In order to ensure practical relevance, the project will work through intensive co-operation between researchers and science policy actors. PE2020 will expand the capacity of European and national science policy actors to integrate better societal engagement by providing an easy access to new PE tools and instruments, to be included in the requirements and implementation of research in Horizon 2020 and beyond.

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Contents

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Introduction

One of the main outputs expected from the PE2020 project is the development of a web-based toolkit that, according to the Description of Work (DoW) project, "helps policy makers to adopt, adjust and implement (...) PE processes for their different needs".

Work package 4 is just devoted to develop the Toolkit. In particular, Task 4.1 is focused on the toolkit design process, the outputs of which are summarised in this Toolkit Design Document.

The process of toolkit design included three major steps:
- an analysis of the existing Toolkits, already presented in the framework of the Steering Committee Meeting held in Aarhus on January 29th and 30th 2015;
- an analysis of the outputs of the Catalogue of PE initiatives (D1.2), developed under WP1 on July 2014, from the perspective of the development of the Toolkit;
- an analysis of the results coming from the implementation of six PE pilot initiatives carried out under WP3 between February and November 2015.

In the context of the preparation process, some contacts have been also established in November 2015 with the Danish Board of Technology (DBT) Foundation in order to develop some form of cooperation between PE2020 and the EC-funded project Engage2020, carried out by a consortium led by DBT. In particular, this cooperation should concern the interaction between the PE2020 Toolkit and the Action Catalogue developed under Engage2020, already online, where the key PE approaches and tools are presented.

This document is organised in four sections.

Section one provides the background of the PE2020 Toolkit design process. It includes three chapters:
- Chapter One summarises the results of the analyses made on a group of toolkits on PE in science and technology;
- Chapter Two summarises the results emerging from the Catalogue of PE initiatives carried out under WP1;
- Chapter Three considers the results of the Pilot Projects as they emerged so far.

Section two is devoted to the analytical framework of the Toolkit. It includes two chapters:
- Chapter Four devoted to an interpretation of the present state of PE in S&T in Europe;
- Chapter Five deals with the role and features of the PE2020 Toolkit.

Section Three describes the main features of the Toolkit. This section includes four chapters:
- Chapter Six deals with the identification of the users for the web application;
- Chapter Seven proposes a structure for the Toolkit and an organisation of its contents;
- Chapter Eight dwells upon the style to be used;

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- Chapter Nine concerns the technical requirements of the website, also in consideration of the cooperation with other actors and, especially, with Engage2020;

Section Four is devoted to the next steps in the toolkit design process. This section includes two chapters:
- Chapter Ten proposes a work plan for the development of the Toolkit;
- Chapter Eleven concerns the distribution of tasks among the PE2020 consortium members.

This document was drafted by Luciano d'Andrea with the collaboration of LSC Team, including Giovanni Caiati, Fabio Feudo, and Federico Marta.

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Section One

Background

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This first section of the document is aimed at providing a set of background data and information useful for the PE2020 Toolkit development. In particular, three main sources of information will be considered: an analysis of the existing toolkits on PE in science and technology, carried out under WP3 (Chapter One); an analysis of the present state of PE in science and technology, based on information emerging from the Catalogue of PE initiatives (D1.2) carried out under WP1 (Chapter Two); an analysis of the results of the six pilot initiatives conducted under WP3 (Chapter Three).

1. Results of the analysis of the existing toolkits

As we just said, an analysis on a group of existing toolkits has been made between November 2014 and February 2015. This group included the texts listed in the following table.

Table 1 – Toolkits and handbooks analysed (last access: October 20 2015)

Toolkit no.	Name of toolkit	Country	Internet address	Source
T1	Toolkit of the National co-ordination centre for PE (online)	UK	http://www.publicengagement.ac.uk/how-we-help	National co-ordinating centre for PE
T2	Guide to planning public engagement (online)	UK	http://www.esrc.ac.uk/funding-and-guidance/impact-toolkit/what-how-and-why/public-engagement/guide/index.aspx	Economic and Social Research Council
T3	Engaging the public with your research (pdf)	UK	http://www.nerc.ac.uk/latest/publications/resources/engaging-the-public/	National Environment Research Council
T4	Science Engagement Toolkit (online)	AU	http://www.science.gov.au/education/Pages/scienceEngagement.aspx	Australian Department of Industry
T5	Urban research URP Toolbox (online)	AU	http://www.planningtoolexchange.org/resource/urban-research-program-toolbox	Griffith University
T6	Sciencewise (online and parts in pdf) + Departmental Dialogue Index Tool	UK	http://www.sciencewise-erc.org.uk/cms/about-dialogue	Sciencewise
T7	Doing Public Dialogue. A support resource for research council staff (pdf)	UK	http://www.involve.org.uk/wp-content/uploads/2012/01/120727-RCUK-Resource-FINAL.pdf	Research Council UK, Involve, CSaP, Sciencewise
T8	OECD Planning guide for public engagement and outreach in nanotechnology (pdf)	UK	http://www.oecd.org/sti/biotech/49961768.pdf	OECD

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Toolkit no.	Name of toolkit	Country	Internet address	Source
T9	Public Participation in Scientific Research (pdf)	US	http://informalscience.org/images/research/PublicParticipationinScientificResearch.pdf	CAISE
T10	Citizen Engagement Handbook (pdf)	CAN	http://www.cihr-irsc.gc.ca/e/documents/ce_handbook_e.pdf	Canadian Institute of Health Research
T11	A guide to Good Practice in PE with Physics (pdf)	UK	http://www.iop.org/publications/iop/2011/file_50861.pdf	Institute of Physics
T12	The engaging researcher. Inspiring people to engage with your research (pdf)	UK	http://www.bris.ac.uk/researchstaff/yourcareer/vitae-booklets/engaging-researcher.pdf	Vitae Researcher Development Framework
T13	Dialogue with the public: practical guidelines	UK	http://www.rcuk.ac.uk/RCUK-prod/assets/documents/scisoc/dialogue.pdf	Research Councils UK
T14	Public engagement lens on the Vitae Researcher Development Framework	UK	https://www.vitae.ac.uk/vitae-publications/rdf-related/public-engagement-lens-on-the-vitae-researcher-development-framework-rdf-apr-2013.pdf	Vitae Researcher Development Framework
T15	Dialogue in Public Engagement. Beacons for Public Engagement (pdf)	UK	http://edinburghbeltane.files.wordpress.com/2011/11/dialogue-handbook-final.pdf	Edinburgh Beltane
T16	Public Engagement Training: the Handbook	UK	http://www.bbsrc.ac.uk/web/FILES/Guidelines/pe-training-handbook.pdf	Biotechnology and Biological Sciences Research Council
T17	Participatory Methods Toolkit . A practitioners' manual	BE	http://archive.unu.edu/hq/library/Collection/PDF_files/CRIS/PMT.pdf	King Boudouin Foundation – viWTA
T18	Public Dialogue and Deliberation. A communication perspective for public engagement practitioners.	UK	http://www.ed.ac.uk/polopoly_fs/1.128804!/fileManager/eResearch_Oliver%20Escobar.pdf	Beacons for public engagement, QMU

It is to observe that this group cannot be considered a representative sample of toolkits and handbooks, mainly because no information about the universe of this kind of texts is available (and therefore any statistically representative sample can be built). Moreover, it is also to observe that – notwithstanding the effort made to take into consideration different linguistic and cultural areas – all the texts come from the English-speaking areas or are in English. However, the analysis of this group of texts allows providing a good empirical basis for identifying some main trends about how PE is interpreted and presented.

A detailed presentation of the results will be subject of a paper which will be published soon.

In this context, we can preliminary observe that – even though in English language only a large supply of web-based toolkits and handbooks on PE in science and technology is available, as part of a larger supply of toolkits and handbooks on PE in policy making in general. Hence the need to understanding the real added value which the PE2020 Toolkit may generate and the

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practical and knowledge needs it could match that the other toolkits does not meet. Otherwise, there is a risk not to innovate the present picture and to limit oneself to replicate already available information packages.

Moving to the analysis of the contents of these handbooks and toolkits, we recognise the presence of, so to say, a dominant view to PE in science and technology among the editors of handbooks and toolkits (hereinafter we will refer to them as "editors").

Such a view is summarised in four main points.

1.1. Event-based approach

Editors tend to "imagine" a specific "ideal-typical" application context of PE, i.e., the organisation of a PE event, to be held once in a while or periodically, lasting one day or some weeks as a whole. To a certain extent, editors take for granted that PE materialises through short-term projects which, starting from an idea or a perceived need, result in an event or a series of events. This project is something totally autonomous, in the sense that it does not affect in any way how the promoting organisation or the target organisations work, take their own decisions or organise themselves.

1.2. Technical/professional orientation

Editors largely adopt, so to say, a technical orientation, providing information and directions on how to organise PE events, mainly using a project management approach. Organising a PE initiative is then presented as a professional activity, mainly related to communication techniques and skills. The political nature of public engagement and its strong connections with the governance of science and technology or the research process are overlooked or, in some cases, totally ignored.

In this regard, it is interesting to notice that 14 toolkits out of 18 (around 3 out of 4) provide an often detailed description of the steps to follow for organising public engagement initiatives and 11 toolkits out of 18 (almost 2 out of 3) provide a significant description of possible public engagement tools, but only 8 dwell upon the connection between PE and the policy cycle (e.g., setting agenda, policy design, policy implementation, policy evaluation, etc.) or the research and innovation process (project design, data collection, data interpretation, research-based technological development, etc.).

1.3. Detachment from policy challenges facing research institutions

On the basis of what we noted above, it is not surprising that editors seem also to be little interested in connecting PE to the key policy challenges that any research institution has to address in a post-academic environment, such as, e.g., competing for funds and scientific

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recognition, ensuring high-quality standards in teaching and research, attracting new talents, internationalising staff and students, and boosting research-based innovation. Connections with policies are sometimes considered, but only in theoretical and abstract terms (connection with policy cycle, as we said above).

This same attitude can be observed (with some exceptions) when national and European policies are concerned, which are rarely mentioned or not mentioned at all. Consequently, in the examined texts, a certain vagueness can be noticed about the specific objectives of a PE-based strategy, i.e., why engaging stakeholders and the public should be necessary or at least useful.

1.4. Uncritical attitude

Almost as a corollary of the previous sub-sections (1.3. and 1.4.), we can highlight that editors tend to display an uncritical attitude towards PE, i.e., an attitude where little attention is given to critical aspects involved with PE, apart from those of a mere technical/professional nature (e.g., language adopted, ineffective interpersonal behaviours, lack of relevant information for taking a decision, etc.). Only 5 toolkits out of 18 (little bit more than 1 out of 4) provide a picture on the critical aspects of public engagement of social, organisational or political nature (such as active resistances from researchers and leaders, indifference and lack of interest to participate from stakeholders and citizens, poor use of the PE outputs on decisions, lack of institutional support, lack of funds, etc.).

2. Results of the analysis of the catalogue of PE initiatives

Some information about the present state of PE can be also drawn from the catalogue of PE initiatives developed under PE2020. Such a catalogue has been developed on the basis of a large analysis of PE initiatives based on documentary material, which brought to a selection of a group of cases. These cases have been examined through interviews with representatives of the coordinating organisation.

Even though not statistically meaningful, the catalogue allows deeply analysing, at least from the point of view of promoters, 38 advanced PE experiences. These experiences are listed below.

Table 2 – PE initiatives included in the Catalogue

No.	Title	Coordinator	Year
1	PRIMAS – Promoting inquiry in mathematics and science education across Europe	University of Education Freiburg, Germany	2010-13
2	Science Municipalities	Danish Science Factory	2008-11
3	Nanodialogue Project	Fondazione IDIS – Città della Scienza	2005-07
4	Breaking & Entering: Explore how science and society relate	University of Copenhagen	2013-14
5	EARTHWAKE Project	EUROSCIENCE	2007
6	Let's do it - movement and world clean up	Let's Do It Foundation	2012-18

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No.	Title	Coordinator	Year
7	DEEPEN Project	Durham University	2006-09
8	Flemish Science Shops	Vrije Universiteit Brussel and Universiteit Antwerpen	2003-ongoing
9	RESEARCH2015	Ministry for Science, Technology and Innovation	2007-08
10	iSPEX project	iSPEX consortium	2013-ongoing
11	PERARES - Public Engagement with Research and Research Engagement with Society	Living Knowledge Network	2010-14
12	SpICES - Special Initiative for Citizen Engagement in Science	Atomium Culture	2012-13
13	The Autumn Experiment	Vetenskap & Allmänhet	2013-14
14	VOICES - Views, Opinions and Ideas of Citizens in Europe on Science	Ecsite (European network of science centres and museums)	2013-14
15	SOAB -Societal Advisory Board	Joint Programming Initiative "More Years Better Lives"	2012 – Ongoing
16	Imagine Chicago	Imagine Chicago	1992-94
17	Bonus Advocates Network	BONUS programme	2010-11
18	Owela Open Web Lab	VTT, Technical Research Centre of Finland	Ongoing
19	Citizens' Dialogue on Future Technologies	German Ministry of Research and Education	2011-13
20	GenSET	Portia Ltd	2009-12
21	Law no. 69/07 of the Tuscany Region (Italy)	Tuscany Region	2008-13
22	ACE – Act Create Experience	WWF-UK	1996-ongoing
23	The National DNA Database on Trial – Avoiding the Usual Suspects	University of South Wales	2008-09
24	2WAYS	European Science Events Association, Eusea	2009-10
25	NanoDialogue	German Federal Ministry of Environment, Nature Conservation and Nuclear Safety	2006-ongoing
26	World Wide Views on Global Warming	The Danish Board of Technology	2007-09
27	Bioenergy Dialogue	Biotechnology and Biological Sciences Research Council	2012-14
28	Soapbox Science	Dr Seirian Sumner & Dr Nathalie Pettorelli	2011-ongoing
29	Futurescape City Tours	Consortium for Science, Policy & Outcomes	2012-14
30	CIVISTI- Citizen Visions on Science, Technology and Innovation	Danish Board of Technology	2008-2011
31	Empowering Citizen Voices in the Planning for Rebuilding New Orleans	America*Speaks*	2006-07
32	Consensus Conference on future energy supply	Wissenschaft im Dialog gGmbH	2010
33	Peloton	Demos Helsinki	2009-ongoing
34	PARTERRE project	Tuscany Region	2010-12
35	Imagine Jersey 2035	States of Jersey and Involve	2007-08
36	G1000	G1000	2011-12

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No.	Title	Coordinator	Year
37	Youth Council Espoo	City of Espoo	1997-ongoing
38	We the Citizens	University College Dublin	2011

An in-depth analysis of the results of the PE initiatives is carried out in the Catalogue (D2.1) and in other deliverable of the PE2020 project (D2.2, "A conceptual model of PE across the dynamically governed research policy cycle and related participatory performance factors").

Nonetheless, some observations can be made on the basis of some simple quantitative information about these experiences.

2.1. The secondary role of research institutions

First of all, it is to observe how research institutions are not at the very centre of PE.

This primarily emerges from the analysis of the institutional context where PE initiatives are made, which is highly variable, as shown in the following table.

Table 3 – Catalogue of PE initiatives: types of promoters

Type	No.
Non-profit organisations	14
Academic institutions	10
National governments	5
Networks	5
Local governments	3
Other	1
Total	38

It is to note that PE initiatives autonomously promoted by research institutions are relatively rare: this occurs only in 1 case out of 4 (assuming that the listed academic institutions are actually considered, according to national laws, as research institutions to some extent).

More likely, PE is promoted by not-for-profit organisations (including non-governmental organisations and community-based organisations). Overall, national governments play a promoting role in one case out of 7 and local governments in only one case out of 13. As for the networks, they include both networks created around a European project (including research institutions) and European associations (for example, of science centres or science shops).

A similar trend can be observed analysing the data concerning the target groups involved with the PE initiatives, displayed in the table below.

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Table 4 – Catalogue of PE initiatives: types of target groups

Target groups	No.
Lay people	34
Public officers	18
Stakeholders (i.e., individuals or groups involved with or having an interest in the issues dealt with in the PE initiative)	15
Experts	9
Researchers and Academic bodies	8
NGOs/CSOs	2
Other entities	4

As we can see, PE is largely geared to involve lay people (this occurs in 34 initiatives out of 38), in many cases with public officers and stakeholders. Experts are involved only in 9 cases out of 38 and researchers and academics in 8 cases only.

These data suggest that PE is not included in the institutional mainstream activities of research institutions. More likely, PE initiatives are organised by bodies different from research institutions (mainly non-profit organisations and more rarely national and local governments) and are only marginally targeted on researchers and academic bodies.

2.2. The lack of an institutional anchorage

As a consequence of a marginal role of research institutions, we also observe that in no case single organisations and institutions are the context for PE. The great majority of PE initiatives are national or European in scope. In few cases, the scope is local or regional, as it emerges from the information pertaining to the scope of the 38 PE initiatives, summarised in the table below.

Table 5 – Catalogue of PE initiatives: scope

Scope	No.
National	16
European	13
Local	4
Regional	3
Global	2
Single institution	0
Total	38

These data suggest that usually there is little or no institutional anchorage of PE initiatives, i.e., they are usually not structurally embedded in a specific institution (for example, becoming a

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permanent function of it, with devoted staff, budget or procedures, and without strong connections with the organisation's strategy and general policies), if not for a limited period of time. Being prevalently self-sustained projects, they therefore do not include the production of long-term institutional or organisational impacts among their objectives.

2.3. Boundary work

While showing the marginal role of research institutions, data collected through the Catalogue also allow noticing the high number of institutions of different kind usually involved with PE initiatives, as displayed in the table below.

Table 6 – Catalogue of PE initiatives: number of institutional players involved

Target groups	No.
One player	9
Two players	10
Three players	11
Four players	7
Five players	1
Total	38

Actually, only in 9 cases out of 38 the initiative has been carried out only involving lay people. In all the other cases, the number of institutional players involved are more than one. In 19 cases out of 38 (i.e., 50% of cases) the players involved are 3 or more.

This fact leads us to think that PE is strongly favouring a great diffusion of practices connected to boundary work[1], i.e., practices aimed at managing the interactions between institutions of different nature and, above all, between competences, knowledge, interests and expectations of different nature.

In this perspective, each PE initiative can be also understood as the context of a wide negotiation process, which concerns, not only the substantive issues put at the core of the initiative, but even more why and how PE mechanisms have to be introduced and used.

This fact suggests that, at least at the level of research systems, PE mechanisms are already producing institutional effects in the way in which organisations and social players of different kinds are dialoguing and co-operating with each other on science and technology-related issues.

Moreover, observing the cases in details, we can also highlight that many practices devised in the boundary work are particularly innovative, e.g., in using communication tools, in designing decision making process, in integrating public engagement in policy design or in managing

[1] Gieryn, Th. (1983), Boundary-work and the demarcation of science from non-science: Strains and interests in professional ideologies of scientists, *American Sociological Review,* 48 (6).

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organisational complexity. Therefore, the spreading of PE initiatives is already encouraging research institutions and the other concerned players to develop new solutions and to define new institutional arrangements in order to cooperate each other.

2.4. Multiple-objective initiatives

Another observation deriving from the analysis of the 38 PE initiatives included in the catalogue concerns the objectives pursued, which are synthesised in the table below.

Table 7 – Catalogue of PE initiatives: objectives

Objectives	No.
Dialogue/consultation	34
Deliberation	20
Awareness raising	17
Education and Capacity Building	8
Knowledge co-production	8
Co-governance	6
Other objectives	1

It is to note that PE initiatives pursue more objectives at the same time. Overall, 94 objectives have been mentioned in the catalogue, i.e., 2.5 objectives per initiative.

Undoubtedly, the key feature of PE is dialogue and consultation, which is pursued in 34 PE initiatives out of 38.

Around 1 PE initiative out of 2 is focused on deliberation. It is a high proportion, even though it is to observe that the nature and the significance of the deliberations to be taken are extremely variable. As a matter of fact, deliberation is usually not aimed to modify existing decisions making processes, or to develop binding recommendations. Thus, in the majority of cases, the initiatives are thought as pilots aiming to demonstrate the possibility to adopt participatory mechanisms in decision making processes, rather than actually taking decisions. This same tendency can be observed also in some of the 6 PE initiatives aiming to co-governance.

Almost 1 initiative out of 2 is geared to awareness-raising. This suggests that many initiatives are, so to say, demonstration initiatives, i.e., initiatives which are not aimed at changing the governance of scientific research, but at demonstrating the significance of PE in science and technology.

Knowledge co-production and education/capacity building are objectives pursued in around 1 case out of 5.

As for the combination of objectives, we can also notice that, on the one side, the objective "deliberation" is ever connected with the objective of "dialogue and consultation" (which

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evidently is a requirement for developing a real deliberative process) and, on the other side, the objective "education and capacity building" is ever associated with the objective "awareness raising (which is, again, a necessary step toward the activation of an education and learning process). No meaningful connections can be observed in the other cases.

2.5. The EC as promoter

Another aspect to be noticed is the key role played by EC in promoting PE initiatives. As many as 13 out of the 35 PE initiatives carried out in Europe (i.e., more than one out of three) have been directly funded by EC or in the framework of EC-funded programmes.

Analysing these 13 cases (PRIMAS, Nanodialogue Project, EARTHWAKE, DEEPEN, PERARES, SpiCES, VOICES, SOAB, BONUS Advocate Network, genSET, 2WAYS, CIVISTI and PARTERRE), it is to observe that most of them were geared to develop new approaches to public engagement or to raise awareness on science and technology through participatory approaches. They seem therefore to be part of a policy effort to promote a penetration of PE practices and tools in the scientific environment.

It is however to observe also the key role played by national governments or institutions, which are involved as promoters in around 4 initiatives out of 38.

2.6. The presence of obstacles

As emerged from the analytical work included in the PE2020 deliverable D2.2, coordinated by the Vilnius University International Business School, differently from the editors of toolkits analysed in the Chapter One, the promoters of the 38 PE initiatives included in the catalogue highlighted the presence of obstacles in the development of their initiatives, including:

- managerial obstacles (difficulties to get participants to cooperate with each other and to keep their attention high; time constraints; lack of funding and other resources; uncertainty about the expected outcomes of the PE initiative; limited relevance recognised to lay people; lack or limited support from leaderships);
- cultural obstacles (passivity of the involved people, especially decision makers and youth; political short-sightedness discouraging PE projects promoters and decreasing public trust in the political system; lack of comprehension of the importance of the issues at stake; conservatism; people's tendency not to transform their generic interest into specific longer-term commitment; indifference of scientist towards PE; lack of cooperation and awareness from decision makers; different interpretation of the ethical issues);
- technical obstacles (difficulties in organising in several countries with different languages and cultural background; difficulties in singling out the most appropriate solutions for getting feedbacks; difficulties in finding professional moderators and suitable places; difficulties in achieving representativeness in the composition of the participants);

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- capacity-based obstacles (lack of communication-related skills and in the use of new media; lack of experience in bringing together different kinds of stakeholders, combining their interests; lack of capacities in anticipating the expected outcomes of the PE process and in measuring them; limited awareness leading people and researchers to deficient understanding of concepts);
- political obstacles (fuzzy, unreliable or limited impacts of PE initiatives of the contents of public policies; limited capacities of PE initiatives to change existing power relationships; tendency from political actors to orient PE initiatives towards preferred outcomes).

It is to observe that – always in the deliverable D2.2 – some obstacles emerging from literature are also mentioned, conducive to a passivity of lay people to PE, including, due to, e.g.: failures in communication; wrong methodological choices; lack of sensitiveness to PE; participation in PE considered an optional extra onus; wrong time chosen to organise PE initiatives.

Other obstacles affect the actual capacity of PE to ensure a balanced democratic process, such as hidden selective processes of the participants (by age, education, or social position), negative representations of participants as mere users or costumers or limited public debate on certain topics. Thus, there are risks of manipulation of the final outcomes, limited legitimacy of PE exercises, limited incorporation of the evaluation of PE activities into practices and organisational practices, and the like.

All these data and information put in the forefront the presence of a significant gap between "PE in the handbooks" and "PE in practice", whereas the former tend to spotlight PE procedures, simplifying, overlooking or ignoring the contextual factors, which, on the contrary, play a pivotal role in PE "in practice", making PE initiatives actually effective or even simply possible.

2.7. The lack of standardised practices

Finally, an important point emerging from the analysis of the PE initiatives included in the Catalogue is the lack of consolidated practices. As emerged from the deliverable D2.2, 26 PE mechanisms were used in 38 initiatives. Only one mechanism ("21st Century Town Meeting") was used in four different initiatives. In some cases, the mechanisms adopted were used for the first time in the initiative analyses and were quite unique.

This high level of differentiation in developing and selecting the PE mechanisms to be used suggests that there are not yet, in this sector, standardised or preferential practices and likely shared knowledge about public engagement. Again, the dominant perception is that most of the initiatives are mainly a demonstration nature, i.e., they are made for promoting PE rather than applying PE for coping with specific problems, and that they still keep an exploratory or even experimental nature.

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3. Results of the analysis of the pilot projects

Starting from February 2015, under WP3, six pilot initiatives have been launched, of which three in Finland and three in Italy, i.e., the pilot initiative:

- "Empowering young scientists working on Baltic Sea research", in cooperation with the BONUS Programme;
- "Global change living lab", in cooperation with Future Earth Finland – National Committee for Global Change Research;
- "Societal interaction plan (SIP) and societal advisory board (SOAB) in research on demographic change", in cooperation with More Years Better Lives (MYBL) Project;
- "Educating on science-society relations and public engagement", in cooperation with Agora Scienza;
- "Dialogue Workshop on mobility and transportation", in cooperation with IDIS-Città della Scienza;
- "Empowering young researchers on PE in energy efficiency", in cooperation with the Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA).

Some of the initiatives have been concluded while others are still ongoing. Therefore, the results of the pilots are still to be fully identified and developed. However, some preliminary outputs can be mentioned, especially for what concerns obstacles and potentials of PE practices, which can be extremely relevant with the PE2020 Toolkit design process.

Beyond the pilot projects, two context tailoring workshops have also been organised, one in Finland and one in Italy, with the purpose of analysing with a group of experts and stakeholders the factors influencing the successful design and implementation of PE tools and instruments in local contexts. Also their outputs have been considered here.

3.1. Contextualising public engagement initiatives

Undoubtedly, one of the key elements emerging from the pilot initiatives is the necessity to strongly contextualise public engagement initiatives. There is no PE tool or approach that fits all organisations and aims. The same tool and approach could assume a set of meanings in a given context and another one in another context. This element clearly emerged from the context-tailoring workshop held in Finland, but also from the Dialogue Workshop on mobility and transportation especially by comparing the experiences made in the Naples area and those carried out in Zurich.

The concept of context is quite large. It may include, e.g., key regulators and regulations at national and international level (e.g., in the EU), the role and nature of the bodies funding the PE initiative, the features and past experience of the organisation(s) where the PE initiative is

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conducted, the features of the key stakeholders or the existing cultural and social representations of science and technology.

In this perspective, contextualising public engagement initiatives from the very beginning is inevitably a step to take in order to avoid or, at least, reduce the risk of wasting time and resources or, worse, producing counterproductive effects.

Contextualisation implies a deep preliminary analysis (of, e.g., needs and expectations about PE, available resources and opportunities, existing risks and obstacles, key stakeholders' attitudes and behaviours, or leadership support) leading to a designing and implementation process, allowing to effectively identify the methods used, the objectives pursued or the players involved.

This clearly suggests that PE in the vacuum does not exist. Discussing of PE tools without making reference to the application context is only an abstraction. The only PE which actually exists is the PE in the context.

3.2. Embedding public engagement in the organisation

A second element emerging from the pilot is, to a certain extent, connected the previous one, i.e., the need for embedding PE in the organisation.

As a matter of fact, the pilots show that public engagement should not be glued on top of existing activities, but it is to be embedded in the practices of research organisations as well as in its culture, languages and ethical standards. This is also to put in the foreground the continuity of PE action as one of the key features in order to make the engagement of public and stakeholders actually effective.

This necessarily implies that research organisations had to develop their own policies and programmes for making PE a permanent component of their strategies, including, e.g., the establishment of new organisational units, the identification of new tasks or the appointment of new PE-dedicated leaders.

This issue was discussed in both the context-tailoring workshops held in Helsinki and in Turin.

Moreover, the need for embedding (even formally) PE practices in the organisation also emerged as a critical issue in the pilot project "Empowering young researchers on PE in energy efficiency" by the ENEA project managers, who reported the lack of an explicit PE policy at the organisation level. This fact prevented them from debating of and learning from each other experiences as well as to develop common participatory strategies.

Similar observations were made by the researchers involved with the pilot project "Educating on science-society relations and public engagement", who highlighted how, in their own research institution, they were not supported at all by the management in promoting PE

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initiatives, which remained therefore as a "voluntary activity" made by the single researchers, without any form of recognition.

3.3. Understanding and respecting participants' motivational ground and orientations

Another element which appears to be particularly important is that of understanding and respecting both the motivations of the participants and their orientations.

The pilots in fact highlight how often participants in PE initiatives are disappointed because of the lack of a real recognition of their motivations and orientations. It is not rare that PE initiatives do not take participants seriously, especially when they are lay people or part of the public at large. This mainly occurs when those, who promote the PE initiatives are not aware about their objectives and possible consequences or, worse, when a PE initiative is organised only for improving the visibility of the promoting organisation or for validating decisions already taken elsewhere.

All this may lead to some negative effects: lack of people accepting to participate, lack of interest during the PE exercise, biased results of the PE exercise, conflicts and tensions among the participants and, more in general, the failure of the PE exercise in itself.

This aspect was discussed in the context-tailoring workshop in Helsinki as well as in the context of the pilot project held in Naples. In particular, the key question was that often the outputs of the participatory initiatives are not taken seriously and, in particular, the opinions and motivations expressed by "lay people" and the public at large are overlooked or, in some cases, even ignored when new actions and measures are to be taken on the basis of the results of the PE initiative.

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Section Two

Analytical Framework

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In this section, we can now move to the analytical framework, which should underpin the PE2020 Toolkit.

This analytical framework is organised in two components:

- an interpretation of the present state of PE in S&T in Europe (Chapter Four);
- an interpretation of the role and features of PE2020 Toolkit (Chapter Five).

4. The present state of PE in S&T

The short analysis made in the previous section lead us to make some considerations about the present state of PE in science and technology in Europe. For the sake of brevity, such considerations are only summarised in the following points.

4.1. A bottom-up movement for PE

Some elements coming up from the analysis made so far show the existence of a social and political movement towards the diffusion of PE practices.

The high number of non-profit organisations as promoters of PE initiatives and the large involvement of voluntary action in PE initiatives lead us to think the presence of a bottom-up movement in Europe aimed at favouring the diffusion of PE as a democratic practice within the European science systems.

However, as suggested by the data drawn out of the Catalogue about the target groups and the promoters of PE initiatives, this pro-PE movement only marginally involves academic institutions as such . In fact, as we observed above, it is largely addressed to the public at large or specific targets. Only in 1 case out of 4 PE is promoted by academic institutions and only in 1 case out of 5 is addressed to them.

4.2. The EC commitment and the RRI strategy

Undoubtedly, there is also a significant commitment from EC in promoting PE in science and technology. It is remarkable, in this regard, the fact that EC is the funding entity of PE initiatives in one case out of three (non-European initiatives excluded).

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Starting from 2011, this commitment led to the inclusion of Public Engagement as one of the five keys of the Responsible Research and Innovation (RRI) strategy launched by EC in the context of Horizon 2020[2].

The development of the RRI strategy is bringing EC to increasingly focus on the involvement of research institutions with PE. In fact, this strategy is explicitly aimed at structurally changing practices and governance of the European research institutions.

Interpreting EC policies[3], changes can be considered as structural when they are:

- irreversible, since they modify the institution in itself and therefore they cannot be reversed, e.g., by a simple leadership turn-over or budget cuts;
- comprehensive, in the sense that they imply a modification of the organisational life as a whole (e.g., cultural and cognitive attitudes of staff and leaders, daily behaviours and practices, communication patterns, procedures, rules, standards, organisational structure, etc.);
- inclusive, in that they have to involve, sooner or later, most players and stakeholders within the institution;
- context-sensitive, since they are to be tailored to each organization (its features, past experience, specific problems, cultural background, mission and objectives) and to the different national cultures and policies.

Including PE as part of RRI strategy, EC evidently sees PE as a means for transforming research institutions, making them more aligned with the societal needs and expectations.

4.3. PE as a still weak practice

The question is therefore if PE is presently able to play the transformative role of S&T governance that the EC RRI strategy are assigning to it.

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[2] European Commission (2012), *Responsible Research and Innovation. Europe's ability to respond to societal challenges*, European Union, Brussels.

[3] See, in this regard: European Commission (2012), *Structural change in research institutions; Enhancing excellence, gender equality and efficiency in research and innovation*, Brussels, Publications Office of the European Union; European Commission (2011), *Initiating and sustaining structural change. Reflection on the outcomes of the workshop on "Structural Change in order to improve Gender Equality in Research Organisations in Europe. Towards a Recommendation to the Member States,* 30 June – 1 July 2011", Avramov D. (Rapporteur) (https://ec.europa.eu/research/swafs/pdf/pub_gender_equality/structural-changes-workshop-report_en.pdf); Cacace, M., Balahur, D., Bleijenbergh, I., Falcinelli, D., Friedrich M., Kalpazidou Schmidt, E. (eds.) (2015), *Structural Transformation to Achieve Gender Equality in Science. Guidelines*, STAGES Project, (http://www.stages.unimi.it/upload/documents/Guidelines_STAGES_new.pdf).

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Undoubtedly, PE is a consolidated approach to leverage upon for improving science-society relationships. In fact, as we noticed above, PE is largely diffused in science and technology also thanks to the presence of the robust pro-PE movement mentioned above. This is also encouraging many institutions (research organisations, policy institutions, societal actors, stakeholders of different nature) to be engaged in boundary work through which they are learning how to negotiate and cooperate with each other, often developing innovative solutions.

And yet, notwithstanding that, PE seems to be still too weak to play the transformative role that EU is assigning to it.

Different elements lead us to this conclusion:

- the cultural obstacles recorded in the implementation of PE initiatives included in the Catalogue, such as passivity of decision makers and political short-sightedness; lack of cooperation and awareness from decision makers, showing a lack of acceptance of PE in many environments;
- the secondary role played by research institutions as promoters and as target group;
- the limited engagement of research institutions and political leaderships in PE initiatives, e.g., in terms of funds and resources;
- the lack of an institutional anchorage of PE initiatives;
- the lack of standardised or preferential practices, as witnessed by the use of as many as 26 different PE mechanisms in the 38 PE initiatives included in the Catalogue;
- the political obstacles recorded in the implementation of PE initiatives included in the Catalogue, with special reference to their incapacity in modifying the existing power relationships and their limited impacts on the contents of public policies.

Considering the features of structural change mentioned above (irreversibility, comprehensiveness, inclusiveness and context-sensitiveness), we can therefore observe that none of them can be attributed to PE. PE is still far from being largely accepted (for example, by leaders and staff), it is not conceived as a continuous function of research organisations (connected to, e.g., scientific careers or recognition) and has only very limited impacts, if any, on research organisations.

4.4. The present development stage of PE

The last consideration is that the present supply of handbooks and toolkits on PE in S&T, analysed in the previous section, largely reflect the present development stage of PE. As we said above, some elements emerged from the analysis:

- the large diffusion of toolkits on PE in S&T likely reflects the presence of a large pro-PE movement involving many intermediate institutions (both governmental and private);
- the event-based approach adopted by the toolkits mirrors the lack of continuity in PE;

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- their technical/professional orientation and their detachment from policy context reflect the lack of integration of PE practices in the institutional processes;
- finally, their dominant uncritical attitude (i.e. an attitude little interested to the critical aspects of and obstacles to PE) reflects the focus of the toolkits' editors on promoting PE, thus overlooking constraints and problematic aspects.

In this sense, the dominant approach underlying toolkits and handbooks on S&T cannot be understood as inadequate, since it simply mirrors the present stage of PE evolution. However, in the new RRI perspective, PE toolkits should be asked to do more, i.e. anticipating the emerging needs for public engagement strategies and tools in terms of acceptance, continuity and relevance.

5. Role and strategic set-up of the PE2020 Toolkit

In this chapter, reasoning on role and strategic set-up of the PE2020 Toolkit is proposed, on the basis of the background elements presented in Section One and the interpretation of the state of PE in S&T proposed in Chapter 4. Some strategic lines are proposed in the following paragraphs.

5.1. Understanding the critical state of science as a social institution

The first strategic line is that of framing PE within the critical state of science as social institution.

From the last decades of XIX century onward, an overall shift is affecting societies which can be operationally termed as the shift from modernity to post-modernity.

Such a shift is characterised by many trends, including growth of uncertainty and instability, cultural and social fragmentation, globalisation and localisation, weakening of social boundaries, and increased weight of cognitive and emotional dynamics. One of them certainly is the crisis of all the "institutions of modernity", including religions, politics, States, trade unions, and economic authorities.

Science is one of these institutions. As the others, it has lost authority, power and autonomy; it is asked to be more transparent and accountable; in order to be functioning, it is more in need of the support of stakeholders, users and citizens; to manage themselves, research organisations can less and less rely upon hierarchical relationships and have to activate large negotiation processes, both internally and with other external actors.

In the case of science, this shift has been depicted in different ways, resorting to concepts like "post-academic science", "mode 2 of scientific production" or "triple helix" (more recently, also a "quintuple helix" model has been developed). All these concepts converge in stressing the

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need for profound changes in the governance of science, in the relations between science and societal actors as well as in research and innovation practices.

However this shift is to be supported, guided and oriented. Otherwise it risks becoming an uncontrolled drift rather than a managed change; and PE is one of the most powerful tool for driving the change in the governance of science.

5.2. Moving PE from communication to governance

The second strategic line proposed here is that of emphasizing how, differently from the approach of Public Understanding of Science (PUS), PE is not aimed at communicating science but to manage it. Even more, differently from PUS, PE is not based on the so-called "deficit model" (which revealed to be ineffective[4]), according to which the attitude of the public is strongly dependent upon the level of people's knowledge about science.

Overcoming the communication perspective is important given the fact that PE is still often perceived as another name given to PUS or a more advanced, enlarged and effective form of public communication of science and technology.

Contrary to this view, PE concerns governance. It is based, so to say, on the "participatory paradigm", according to which a smart and strategic involvement of stakeholders and the public may make the governance of science and technology more effective, more sustainable, and more productive in social and economic terms:

- more effective, since the lack of an intense, continuous and trust-based dialogue involving stakeholders and, in some cases, the public at large produces delays, obstacles, constraints, conflicts and wastes in terms of time and resources strongly hindering scientific and technological research;
- more sustainable, because a limited engagement from the public and stakeholders may have significant effects on how much society invests on research and on the social value and recognition of science;
- more productive, because, in absence of systematic PE activities, connecting research with social expectations and needs and adapting research-based technological products to social existing mechanisms are more difficult and uncertain in their effects.

[4] See, in this regard: Bucchi, M. (2013), Style in science communication, *Public Understanding of Science*, 22(8); Bauer, Martin W. (2009), The evolution of public understanding of science - discourse and comparative evidence, *Science, technology and society*, 14 (2); Pitrelli, N. (2003), The crisis of the "Public Understanding of Science" in Great Britain, *JCOM*, 2 (1); Bakuva, J. (2014), The Role of Laypeople in the Governance of Science and Technology, *International Journal of Humanities and Social Science*, Vol. 4, No. 5(1); Quaranta, G. (2007), Knowledge, responsibility and culture: food for thought on science communication, *JCOM*, 6 (4).

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In this perspective, the deficit model can no longer be applied, since all the actors (including experts and researchers) are "lay people" and no one is expert on how developing effective participatory approaches to S&T governance.

However, all this also implies being aware of the risks such move from communication to governance may entail. For example, PE may increase the conflicts among stakeholders, since it tends to mobilise them; it may make the governance of S&T more complex and difficult to manage; PE may imply time-wasting participatory exercises which are less productive than expected or producing delays in the planned programmes; it may be met by many stakeholders with scepticism or distrust. Nevertheless, this is the only way for taking PE seriously.

5.3. Favouring a leap forward in PE contents and practices

The third strategic line is that the PE2020 Toolkit should support this shift, claiming a leap forward in the way in which PE is conceived and practised.

In fact, the picture given in the previous section leads us to think that such a leap forward is both possible and necessary.

It is possible since a window of opportunity now exists for enhancing the role of PE in S&T, at the crossroad of three main trends:

- the increasing diffusion of PE initiatives in Europe, supported by a largely voluntary pro-PE movement;
- the increasing knowledge produced by social sciences on PE;
- the existence of a new European strategic framework strongly favouring PE in S&T, i.e., the RRI strategy.

It is necessary since, as we observed above, PE is still a weak practice:

- it is largely based on occasional events, often of an exploratory nature;
- it is an optional practice without a clear institutional anchorage;
- in the great majority of cases, it is not promoted by or targeted to research institutions as such;
- it meets many obstacles and resistances of different nature (political, cultural, managerial, technical, etc.).

This prevents PE from taking on the structural nature EC is trying to assign to it. To become structural, PE is asked to become congruent in terms of:

- an irreversible practice fully integrated within research institutions and research systems;
- comprehensively modifying the way in which such institutions and systems work;
- inclusively involving all the relevant players and stakeholders when it is needed and how it is needed; and

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- fully tailored to the organisation's and national science system's features and demands.

This process is already occurring, even though in a fragmented, uncertain and uneven way. However, after a long pioneering do-it-yourself period, PE needs to pass to, so to say, a more systematic approach, allowing it to get stability and clear strategic aims and orientations.

5.4. Recognising PE as a process and as a function

The fourth strategic line underlying the PE2020 Toolkit is that of recognising PE as a process, i.e. a coordinated and continuous stream of actions, communications, negotiations and outputs, marked with intermediate objectives to pursue. PE events make sense only understood as steps of longer and more complex processes.

As emerged in the analysing the results of the pilot projects (see Chapter Three), continuity is necessary to make PE a permanent function within research institutions and any other political or social body involved with science and innovation. Shifting from a non-participatory to a participatory governance of science and technology cannot be evidently done on a voluntary basis by single researchers or occasionally organising isolated PE events.

Such a function concerns not only the support to leaders and staff in promoting PE within both research processes and decision making, but also – and perhaps mainly – the consolidation of the boundary work made through PE initiatives. This entails a capitalisation upon the work made by the organisation as a whole or part of it (departments, research groups, etc.) in redefining tasks, roles, forms of cooperation and even power distribution with external public and private entities, stakeholders and, in some cases, the public at large.

A permanent institutional anchorage of PE is therefore necessary in two different perspectives. On the one side, it is necessary for endowing research institutions with recognisable poles of responsibility and a pool of expertise on PE. On the other side, an institutional anchorage of PE is also necessary to allow the research institution and its internal units to learn from dialogue, by constantly redefining and progressively consolidating, through a boundary work, new and more effective demarcations between their own role, tasks and responsibilities and those of the external players.

At the level of single organisations, this may require, e.g., devising long term strategies, establishing new organisational units in charge of developing them, and the appointment of leaders specifically responsible for connecting PE with the objectives of the organisations.

At the level of research systems, this may require, e.g., linking together the many PE initiatives ongoing in Europe, creating permanent networks connecting the many organisations involved with PE in science and technology, developing educational curricula and new professions around

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PE and incorporating new standards based on PE in the procedures of research project selection for funding[5].

5.5. Emphasizing the concreteness of PE

The fifth strategic line is that of emphasizing the concreteness of PE.

In this framework, concreteness means that PE should be always connected to clear results in terms of improvements in the way in which scientific research is designed, implemented and politically managed. The usefulness of PE exercises should be always assessed in terms of outputs which should be as far as possible specific and permanent, context-sensitive and localised in time and space.

Public and stakeholders should be aware about the fact that they are not convened for participating in a merely emotionally intense experience or in a demonstration initiative but in a step in a process aiming to deal with and solve specific questions related to the functioning and governance of a research institution or a research system.

Also innovativeness should be framed in the context of concreteness. Innovation does not only mean creating something new – a new process or product – but actually creating something new that has proven to be useful for solving a problem or providing a new opportunity. Hence the need to measure the innovativeness of PE approaches and mechanisms on the basis of their contribution in coping with the critical points of scientific practices and governance for, e.g., increasing the matching between scientific research and societal needs and expectations, speeding up the move from research to technological development, increasing the access of young people to scientific careers or increasing the public and private investments in research and innovation.

5.6. Connecting PE with the development of scientific citizenship

The last strategic line – the sixth one – is that of connecting PE with the development of scientific citizenship.

Scientific citizenship may be operationally defined as a specific set of rights, duties and responsibilities pertaining to science and technology shared by everyone as citizen.

[5] Some EU funded projects have been launched to capitalise on the European experiences about PE in science and technology, such as the RRI Tools project (http://www.rri-tools.eu/) (which is developing a platform for PE projects in Europe) or the Engage2020 project (http://engage2020.eu/) (which developed an interactive platform for selecting among 54 different PE tools).

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These rights, duties and responsibilities are far from being identified and established. Moreover, the great majority of people are little or not interested in the problems affecting science and few of them feel the need for developing a specific kind of citizenship related to science.

PE is therefore to be viewed as the most effective tool at our disposal for mobilising citizens, for urging them to "take a position" on S&T, seeing S&T as something important for the local community, for the society and for themselves as well and, finally, to take on some responsibilities about science and its development (as the concept of "scientific citizenship" suggests).

The consolidation of a scientific citizenship through the practice of PE is therefore to be viewed as a necessary step for making participation a stable and essential part of the governance of S&T, representing the basis for a societal anchorage of PE as a component of the S&T governance which is no less important than the institutional anchorage of PE within research organisations and research systems.

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Section Three

Main features of the Toolkit

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This section of the document is aimed at providing a description of the main features of the PE2020 Toolkit. In particular: Chapter Six is devoted to the identification of the users of the Toolkit; Chapter Seven will discuss the structure and the organisation of the contents of the Toolkit; Chapter Eight will concern the style to be used; Chapter Nine will deal with the technical requirements of the website, also in consideration of the possible cooperation with other institutions and, especially, with Engage2020.

6. The users of the toolkit

A preliminary and pivotal question is that of defining who are the users or, better, the main users of the Toolkit.

On the basis of the arguments made so far, we can identify in the research institutions, so to say, the "weak link" in the development of PE in European research systems.

In particular, the following considerations can be made in this regard:

- research institutions are presently playing a secondary role in the development of PE (see Chapter Two) and are marginally touched by the pro-PE movement (see par. 4.1.);
- however, the need for a direct and continuous engagement of research organisations emerges as a key point for the development of PE (see par. 3.2.);
- at the same time, research institutions are put at the very centre of the RRI Strategy launched by EC in the framework of Horizon 2020, aimed at introducing PE, together with other four elements, as a structural component of research organisations (see par. 4.2.);
- there is therefore a gap, which is necessary to bridge, between what research institutions actually do about PE and what they are expected to do (see par. 5.4.).

Obviously, speaking of research institutions as the main target of the Toolkit, we refer to complex organisations characterised by the presence of various internal players to be taken into considerations.

In particular, the following players are to be mentioned.

- Top management. Making PE a structural component of the research institution cannot be done if the top management is not involved. We are referring to, e.g., in the case of Universities, rectors, vice rectors, members of the University Board or the Academic Senate or the different Committees, in charge of the different aspects of the institution (such as education, Personnel, Planning, Resources allocation, or Research).
- Key offices. Another target is made up of some key offices or units, such as Communication Department, Human Resources Department or University Liaison Office.
- Department Heads. A third kind of player is made up of the heads of departments. They are directly involved in the research processes, in getting funds, in promoting publications, and are therefore more sensitive towards the use of PE at that level. It could be particularly

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important addressing the Toolkit especially to heads of STEM Departments, who are supposed to be less familiar with PE dynamics.
- Researchers. Finally, also the researchers are to be considered as a target of the Toolkit. Their involvement should be important to attract both researchers already mobilised on PE and those who are far from being interested in it. It is in fact to recall that researchers are prevalently those who are on the frontline of PE initiatives, playing often different roles.

In practical terms, targeting prevalently research institutions means:

- using examples or presenting cases making reference to research institutions (their experience, their social environment, their objectives, etc.);
- proposing practices and strategies that are appropriate for or compatible with research institutions;
- using narrative approaches and languages which are as far as possible tailored on the social context of research institutions.

This evidently does not mean that the Toolkit is only addressed to research organisations. In fact, PE rarely involves only an institution, but, by its very nature, it tends to lead different actors to cooperate with each other beyond organisational and institutional boundaries. Moreover, the majority of the problems which are usually the subject of PE exercises are almost always of a nature that they cannot be effectively coped with at a level of single institution.

However, it is difficult to imagine that PE could become a structural part of science governance without the full and proactive participation of research institutions in promoting PE within themselves and in the research systems they are part of. Focusing the Toolkit on this kind of actor appears to be a well-grounded choice, especially taking into consideration the present relative marginalisation of research institutions as promoters or targets of PE initiatives.

Besides research institutions, the Toolkit should be secondarily addressed to other actors, including:

- Policy makers at national and European level (especially those involved with research policies);
- Experts in public engagement and/or science communication;
- Science centres and science museums;
- Civil Society Organisations.

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7. Structure and content organisation

In this chapter, a proposal will be developed concerning the structure and the content organisation of the PE2020 Toolkit, in the light of the strategic lines presented in the previous chapter. The single elements will be shortly introduced and discussed in the following paragraphs.

7.1. Aims

The Toolkit should be aimed at:

- providing a set of guidelines on how to develop PE within one's own institution;
- providing a set of resources on how to do it in the best way as possible.

Therefore, the toolkit will have both the character of a handbook (providing guidelines for the action) and the character of a toolkit in the strict sense of the term (providing organised resources for the action).

The toolkit is intended to be thought as a support to anyone (managers or simple researchers) engaged or interested in designing and developing a long-term strategy or an action plan aimed at embedding PE as a current practice in their own research institution.

Taking into consideration the many documents, materials and resources already available on PE and the other key subjects to be dealt with (e.g., structural change, scientific citizenship, see below), a strategy adopted in developing the PE2020 Toolkit will be that of making it, as far as possible, a meta-toolkit, i.e., a text conceived for guiding the reader into the different issues by leveraging upon already existing materials, summarising or embedding them in the toolkit (for example, texts in pdf format).

To facilitate the implementation of such strategy, a benchmarking approach will be also used, so as to allow singling out the most successful solutions also outside the context of PE initiatives, such as, for example, that of gender equality in science and technology.

7.2. Sections

The Toolkit should include five sections, connected with each other, but which can be read autonomously from each other and directly accessible from the Toolkit homepage.

A. The Toolkit
B. Strategic Framework
C. Methods and tools
D. Institutional anchorage
E. Societal anchorage

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A. The Toolkit. This section should provide information on the toolkit: institutional background, aims, for whom the toolkit is for, how the toolkit is organised, how to use it, etc.

B. Strategic Framework. This section should provide guidelines and resources for interpreting PE in the current European policy framework. This section may deal with issues such as: the shift from the academic to the post-academic dimension; the evolution from PUS to PE; the diffusion of PE; the RRI policy framework; the need for a leap forward in the consolidation of PE as an essential component of S&T governance; what is at stake with such a leap; facilitating and hindering factors. To a certain extent, this section should be organised as a set of guidelines and resources for interpreting PE within the present development phase of science and technology in Europe.

C. Methods and tools. This section should provide guidelines and resources on PE methods and tools, broadly leveraging on existing toolkits and handbooks. It may allow the reader to categorise the many PE approaches and mechanisms and to understand how they can be used. Special attention should be devoted to obstacles and resistances to PE as well as on facilitating factors.

D. Institutional anchorage. This section should be focused on developing PE as structurally embedded in the governance practices of the institution. The section may deal with issues like: mapping PE experience in the institution; interpreting the needs for PE; developing a PE-oriented action plan; connecting PE initiatives with specific aims and outputs; ensuring sustainability of PE programmes; involving leaderships and staff; creating communication channels with external stakeholders and the public. Connections between PE and policy cycle as well as between PE and research process is to be shown.

E. Societal anchorage. This section should deal with PE as an approach for favouring the societal anchorage of PE. This also includes the capacity of research institutions to develop their boundary work strategies, establishing long-term interaction processes with both research institutions and other types of organisations (policy institutions, local authorities, NGOs, professional associations, private companies, etc.). The presence of a societal anchorage of PE is justified on the ground of some considerations. Firstly, PE is not a current practice at societal level and – as emerged in the analysis of the 38 PE initiatives included in the Catalogue – the will and interest of people and stakeholders to participate cannot be taken for granted when opportunities to participate are given. Moreover, PE mechanisms are to be rooted into society also for avoiding that forms of people's activism on scientific and technological issues may have negative or even disruptive effects, both for science and for the society as a whole. In this sense, PE could provide these forms of social mobilisation with a guidance and orientation. Finally, a societal anchorage is necessary to permanently hook PE to the key processes of change and values characterising contemporary societies, including transparency and accountability, security and privacy, environmental protection, health improvement, personal autonomy and so forth. In the perspective of this Toolkit, the societal anchorage of PE necessarily passes through the development of a scientific citizenship, i.e., a set of socially recognised rights, duties, and responsibilities (but also social meanings) shared by all the citizens, be they lay people or

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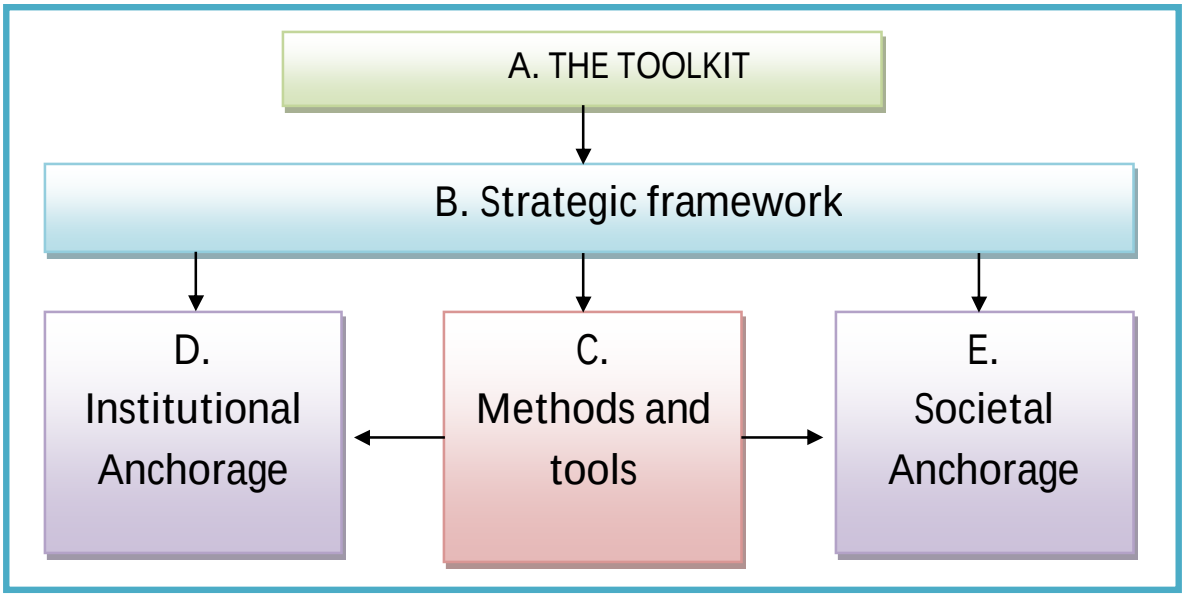
scientists. This section may deal with issue like: what scientific citizenship is or may be; which rights, duties and responsibilities may be considered as part of scientific citizenship; when and how scientific citizenship can be practically developed through PE; which role may be played by schools, science museums, science centres, civil society organisations, universities and the media to feed the development of a scientific citizenship.

In logical terms, the relations among the components can be schematised as follows.



Section A. introduces the Toolkit. Section B. allows interpreting the present evolutionary stage of PE in a changing science, justifying the next following sections. Section C. explains how to do PE; Section D. explains how to promote a permanent institutional integration of PE in research institutions, via structural changes; Section E. explains how to promote a permanent integration of PE in society via the development of a scientific citizenship.

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7.3. Relationships between strategic lines and sections

As we said above, the toolkit will be based on six main strategic lines. Connections between sections and strategic lines are shown in the following scheme.

Strategic lines	B Strategic Framework	C Methods and Tools	D Institutional Anchorage	E Societal Anchorage
1. Understanding the critical state of science as social institution				
2. Moving PE from communication to governance				
3. Favouring a leap forward in the way in PE contents and practices				
4. Recognising PE as a process and as a function				
5. Emphasizing the concreteness of PE				
6. Connecting PE with the development of scientific citizenship				

7.4. Sources

To develop the Toolkit, a vast array of sources will be used, both internal and external to PE2020. A preliminary list may include the following sources.

Internal sources:
- D1.1 Inventory of PE procedures and practices;
- D1.2 Catalogue of 38 case descriptions;
- D2.1 Refined typology of PE tools and instruments;
- D2.2 Conceptual model of PE across the dynamically governed research policy cycle and related participatory performance factors;
- D3.1 Guideline for context tailoring workshops;
- D3.2 Report of the PE pilot cases on societal challenges;
- Paper on PE Toolkits in S&T.

External sources:
- International literature (e.g., on PE, PUS, science-society relationships, post-academic sciences, deliberative democracy, etc.);
- EC strategic documents (on RRI, structural change, etc.);
- Deliverables of EC-funded projects on structural change in S&T institutions towards gender equality;
- Deliverables of EC-funded projects on PE in S&T, with special reference to Engage2020;
- Handbooks and toolkits on PE in general and on PE in S&T in particular.

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8. Style

In this chapter, some issues concerning the style to be adopted in the toolkit are shortly introduced and discussed.

8.1. Recurrent schemes

In order to facilitate the readers by creating user-friendly template, it is advisable to organise the four substantive sections (B, C, D and E) adopting a recurrent scheme. If appropriate, also the sub-sections can be developed using the same recurrent scheme. Since the toolkit will be online, such a set-up should be immediately understandable by opening the webpage of the section or sub-section, allowing the readers to directly open the parts and pages they are more interested in.

It is premature, at the moment, to propose a unique scheme for all the sections or sub-sections. Anyhow, the general logic for organising the contents may be proposed.

- Rationale: a short and clear description of the contents of the section/sub-section.
- What is at stake: a short description of what is at stake with the issue dealt with, in consideration of possible risks and opportunities; for example, for Section C (PE methods and tools) the risks may be related to the lack of effectiveness of PE mechanisms, their irrelevance, the possibility that they trigger conflicts or induce a feeling of disappointment in the participants, etc., while the opportunities offered by PE may be related to increasing people's awareness about how science works, establishing more transparent and democratic control over science and technology, enhancing and speeding up the research processes, increasing the relevance of scientific products with people's expectations.
- Obstacles and hindering factors: a short description of possible obstacles or hindering factors making difficult to appropriately manage the risks and opportunities mentioned above; for example, Section B (Strategic framework) may include obstacles and hindering factors like cultural resistances from the public, researchers and leaders; lack of funds; lack of national policies; etc.
- Key issues: each section could be presented as organised in key issues; each key issue may be presented in the form of a guideline, with a short justification and description and may be the subject of a sub-section; for example, Section D (institutional anchorage of PE) could include a set of key issues such as: making a diagnosis of the organisation, defining a PE action plan, involving leaderships, involving staff, preventing conflicts, and so forth; Section C (PE methods and tools) may include key issues such as: defining the aims; choosing the right tools; selecting the targets; evaluating the outputs; etc.

Following this (or a similar) scheme, a tree-shaped structure may be envisaged for the toolkit, where any key issue/guideline of each section may be developed in a sub-section and, if that be

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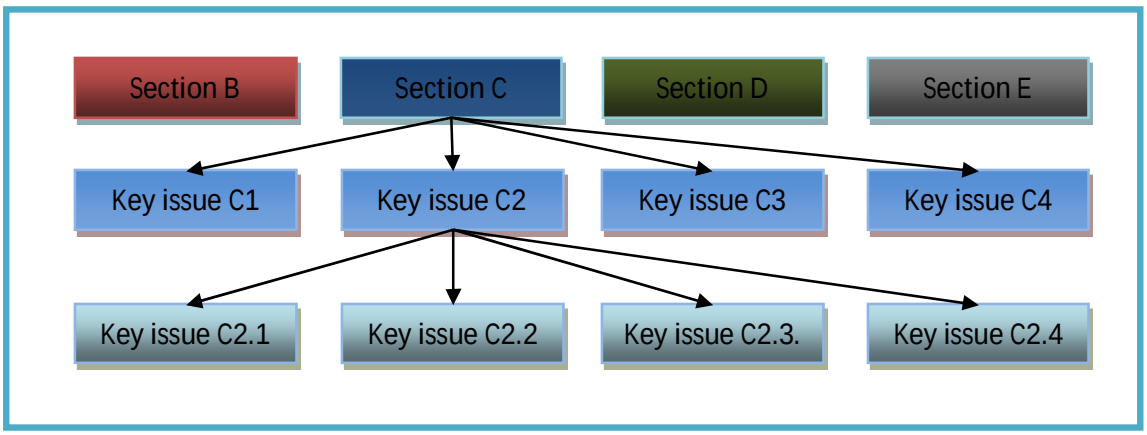
the case, any key issue of a sub-section may generate other sub-sections. Therefore different levels of reading can be defined, as shown in the following figure.



In the figure, we imagine that the section C of the toolkit is substantively organised in 4 key issues. We can then imagine that the second key issue, in turn, may be analysed in depth and organising it in other four issues, and so forth.

8.2. Recurrent text patterns

One possible stylistic strategy to make the toolkit more readable is that of including in the sections/sub-sections recurrent text patterns, which can be signalled though colours or other kinds of graphic solutions.

Among the possible recurrent patterns, the following can be mentioned:

- Facts and figures, providing data or describing facts pertaining to the issue dealt with;
- Tips and suggestions, providing suggestions pertaining to the issue dealt with;
- Resources, providing links relevant to the issue dealt with (e.g., to other toolkits, to EC policy documents, etc.);
- Actors, providing lists of actors relevant to the issue dealt with (when possible with clickable links);
- References, providing lists of books or papers (when possible with clickable links);
- Quotations, short texts drawn out from documents relevant to the issue dealt with;
- Going in depth, longer and more complex text for deepening the issue dealt with;
- Summaries, short texts (using bullets) summarising some contents of the main text.

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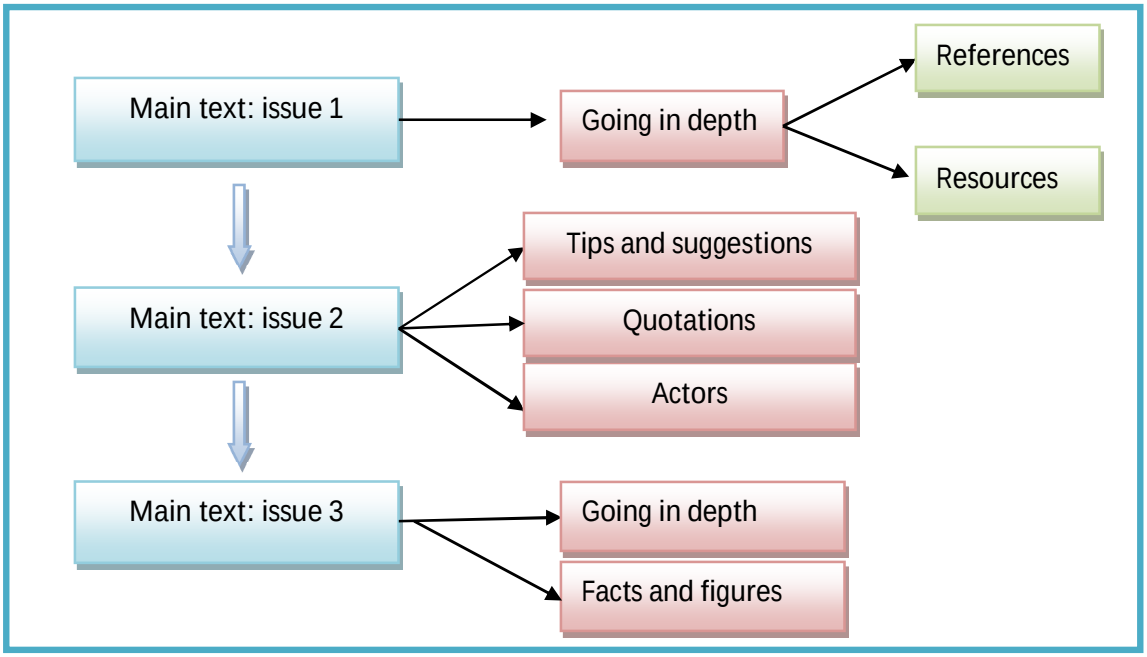
8.3. Formats

Being a web-based toolkit, different formats can be used. In principle, it could be useful to make the main text available both in HTLM and in pdf format, so as to make possible for the readers to save it in their own computer and friendly for other devices (tablet, smartphones).

8.4. Language and approach to reading

In principle, texts should be in plain English, easily readable. They should be as short as possible. Complex arguments and issues may be dealt with by appropriately linking the main text with text patterns such as those presented above ("Going in depth", "Actors", "Resources", etc.). This should allow the reader to decide what to read (only the main text, some part of it, the main text plus the connected text patterns, etc.) and what to skip.

In the following scheme, this kind of approach to reading is presented as an example.



We may imagine that the reader may read only the main texts, or deciding to read only one of them in details (for example, the issue 2) also reading the three text patterns included (tips and suggestions, quotations and actors).

This also means adopting an approach in writing proceeding by "boxes" to be filled up with contents, each of them more or less autonomous from the others.

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9. Cooperation with other institutions and website technical requirements

In this chapter, three issues are considered, i.e., possible forms of cooperation with Engage2020, the website technical requirements and the consultation process necessary to develop the PE2020 Toolkit. These issues are dealt with under the same chapter since the choice which will be made about the cooperation between PE2020 and other institutions could have some consequences on the website technical requirements.

9.1. Cooperation with Engage2020

As said above, following a suggestion from the EC, the possibility has been envisaged to connect the PE2020 Toolkit with the Action Catalogue already developed under the EC-funded project Engage2020. In this regard, a meeting with the project coordinator, the Danish Board of Technology (DBT) Foundation, has already taken place.

The Action Catalogue is an online decision support tool that is intended to enable researchers, policy-makers and others wanting to conduct inclusive research, to find the method best suited for their specific project needs. The tool allows the user to search 57 different PE methods on 32 different criteria, with the possibility of weighing the importance of each criterion. The user will be presented with the results, either on a prioritized list of the methods that fits his search or in a visually intuitive overview with relevance of each method.

At the moment, three main possible cooperation lines can be envisaged.

- The first line is that of referring to the Action Catalogue in developing the Section C of the Toolkit, i.e., that devoted to PE methods and tools.
- The second possible line of cooperation is that of developing a database of tools and methods for the institutional anchorage to be technically treated in the same way the Action Catalogue treats the PE methods. This database may be derived from existing guidelines and methods aimed for activating structural change processes, especially drawn out of the experience made by the EC in the sector of gender and science. The actual feasibility of such a database is however to be still assessed. If that be the case, the new database should be integrated into the Action Catalogue website.

These two cooperation levels could be developed in two different perspectives.

- The first one is that of keeping the two websites fully distinguished, with reciprocal links.
- The second perspective is that of developing the PE2020 Toolkit on the same platform of the Action Catalogue, then producing a unified website presenting the results of the two projects and reachable from both the Engage2020 website and the PE2020 website.

These different hypotheses will have to be dealt with the EC and the DBT within March 2016.

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9.2. Website technical requirements

As highlighted above, the website technical requirements will have to be fully identified when the terms of the cooperation between PE2020 and Engage2020 will be defined. At the moment, we can only indicate the key issues to be considered for the technical requirements:

- Website usage (number and type of users, expected usage patterns, expected users' growth, log-in procedures, tasks allowed to users, etc.);
- Website structure, including the flow of operations allowed to users, organised in possible use cases, organised in the most common user tasks;
- System requirements (in terms of, e.g., time performance, scalability, system monitoring and administration, security and access);
- Software used (Basic HTML, CMS, etc.);
- Web Hosting (autonomous domain, part of an existing website, etc.);
- Wireframe (website layout) and graphics.

9.3. Consultation process

Notwithstanding the time available for developing the PE2020 Toolkit is limited, an effort will be made to favour a large consultation process on the Toolkit's contents and structure with other institutions and experts working in the field of science-society relationships.

In this framework, the members of the Advisory Board could play an important role, both giving their own advice and facilitating the contacts with relevant experts and institutions. A consultation process may also be enlarged to the coordinators of EU-funded projects focused on PE and science-society relationships, RRI and structural change projects in gender equality in science and technology.

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Section Four

The Toolkit Design Process

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In this section, the next steps to take in order to develop the Toolkit are briefly described, in particular for what concerns the work plan (Chapter 10) and the distribution of tasks among the PE2020 consortium members (Chapter 11).

10. Work Plan

The Work Plan includes two different timesheets.

The first timesheet (see below) concerns the production of the Toolkit for what concerns its contents.

#	Main Steps WP4 – Production of the Toolkit	Deadline
1.	Consultation with the consortium members at the Vilnius Steering Committee Meeting on the Toolkit Design	November 2-3 2015
2.	Meeting with Engage2020 for possible forms of cooperation in developing the Toolkit	November 4
3.	First draft of the Toolkit Design Document by the WP leader	December 30
4.	Consultation with the consortium members on the first draft	January 30 2016
5.	Finalisation of the Toolkit Design Document	February 10
6.	Revision of the Toolkit Design Document by the project coordinator	February 15
7.	Uploading of the Toolkit Design Document (D4.1) on the EU Participant Portal	February 20
8.	First draft of the Toolkit text	May 31
9.	Revision of the first draft of the text	June 15
10.	Final version of the Toolkit	July 15
11.	Development of the Summary report of the activities and deliverables in WP4 (Deliverable D4.3) by the WP leader	December 31
12.	Revision of both the Toolkit website (D4.2) and the Summary report (D4.3) by the project coordinator	January 2017
13.	Uploading of both the Toolkit website (D4.2) and the Summary report (D4.3) on the EU Participant Portal	January 2017

The second timesheet (see below) concerns the development of the website from a technical point of view.

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#	Main Steps WP4 – Development of the Website	Deadline
1.	Identification of the provider	February 28 2016
2.	Designing of the Toolkit website by the web application producer	April 30
3.	Development of the Toolkit website (Version I) by the web application producer	July 31
4.	Identification of a restricted group of potential users for testing the Toolkit website with the support of the Consortium members	May-Sept
5.	Testing of the Toolkit website (Version I) on a testing server	July
6.	At-distance consultation with the Consortium members on the Toolkit website (Version I)	July-Sept
7.	Development of the Toolkit website (Version II)	September 30
8.	Testing of the Toolkit website (Version II) with a restricted group of potential users	October 31
9.	Development of the final version of the Toolkit website	November 15
10.	Presentation and approval of the final version of the Toolkit website (Deliverable D4.2) (preferably at the Steering Committee Meeting in Brussels)	November 30

11. Tasks Distribution

A clear distribution of tasks among the PE2020 consortium members will be possible only when the Toolkit Design Document will be approved and the forms of cooperation with Engage2020 will be agreed.

It is also to consider that, according to the DoW, the person-months per participant for WP4 are 6.5 for LSC, 1.5 for the coordinator and 0.5 for the other partners. This evidently means that, in principle, LSC will be in charge for the production of the texts, the project coordinator for supervising the process and the other partners for a revision of the texts produced. Moreover, LSC, in strong cooperation with the Coordinator, will be also in charge of the development of the website.

However, this scheme may be modified in the case that the partners express their interest in participating in the drafting process. In that case, after the approval of the Toolkit Design Document, the WP coordinator will develop a proposal for distributing part of the text among the partners. To this end, a "map" of the texts to be produced will be developed so as to allow the partners to decide to what extent and how to contribute in the production of the texts.

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