

# SMART·map

RoadMAPs to Societal Mobilisation for  
the Advancement of Responsible  
Industrial Technologies

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#euSMARTmap



## THE EXPERIENCE OF THE PILOTS

The selected tool – **The Repository of Learning Cases** – was tested in the UK, through the voluntary participation of three diverse organisations: **a large governmental science and technology development and commissioning organisation (Defence Science and Technology Laboratory – Dstl)**; **a medium-sized knowledge consultancy (Cambridge Consultants)**; and **a synthetic biology micro-business (Innovation and Sparkling Science Ltd)**.<sup>1</sup> Overall, we judge the Synthetic Biology pilot testing the Repository of Learning Cases tool, to have been a success.

The UK pilot followed a systematic process as follows:

### The Governance Structure and Mechanisms for guiding the UK Pilot

Acknowledging the need to build into the UK SMART-Map pilot the ‘Dual’ structure, we thus formed the UK synbio SMART-Map multi-stakeholder ‘Task Group’ in order to draw upon the prior frameworks and experiences of these high-level cross-sector and inter-disciplinary individuals, to also guide the next steps of the SMART-Map tool selection and testing process, with a view to their continued involvement after the formal end of the SMART-Map project.

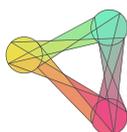
Organisation	Actor category
UK Knowledge Transfer Network (KTN) Manager for Synthetic Biology & Innovate UK	Knowledge-transfer intermediary and stakeholder development support
UK SBLC Governance Sub- Committee & Innovation & Sparkling Science Ltd – a	UK Governance + Small Industrial Biotech company (and author of a Learning Case



Funded by the European  
Commission under the Horizon  
2020 Framework Programme

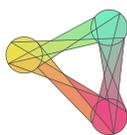
Official link  
[cordis.europa.eu/project/  
rcn/203167\\_en](https://cordis.europa.eu/project/rcn/203167_en)

Project coordinator  
prof. Francesco Lescai – Aarhus University  
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micro biotech business	Study)
UK SBLC Governance Sub- Committee Chair & UK academic	UK Governance + Professorial Academic (University of Edinburgh)
UK SBLC Co-Chair	UK Governance + Industry (Shell)
Manchester MadLab	CSO & social enterprise
Defence Science and Technology Laboratory (Dstl) within the Ministry of Defence	Govt R&D organisation (and author of a Learning Case Study)
Cambridge Consultants	Knowledge Consultancy Company (and author of a Learning Case Study)
University of Manchester, Manchester Institute of Innovation Research & SYNBIOCHEM centre.	Professorial Academic (Innovation policy & RRI)
University of Manchester, Manchester Institute of Biotechnology & SYNBIOCHEM centre.	Professorial Academic (systems biology)
University of Manchester, Manchester Institute of Biotechnology & SYNBIOCHEM centre.	Senior Academic (biological sciences) & SYNBIOCHEM Director of Operations
Central European University, Budapest, Hungary	Academic (Ethics and governance) & Chair of the SMART-Map Advisory Board & WP3 Hungary partner
Central European University, Budapest, Hungary	Academic (Ethics and governance) & WP3 Hungary partner.
University of Aarhus, DK	Academic (Science & Technology Studies) & SMART-Map Project Manager.
Manchester Metropolitan University Faculty of Business and Law	Academic (Innovation Studies) & WP3 Co-ordinator





Manchester Metropolitan University, Graduate Assistant	Graduate Assistant to WP3 and WP7
Manchester Metropolitan University Faculty of Business and Law	Professorial Academic (Sustainability and Innovation). WP3 lead. WP7 lead.

## The Piloting Process, Participants and Implementation Plan

In order to achieve a shared understanding, a co-ordinated process; a ‘standardised’ case study template and an implementation plan, the following steps were followed. First, the SMART-Map document authored by Randles and Demeny *‘WP3- Synthetic Biology Pilots: Tool Selection and Implementation Plan’* was produced as a guidance note, bridging the SMART-Map Advisory and Executive Boards; and the UK TG and pilot organisations, in order to achieve a degree of consistency in objectives and implementation across the 3 SMART-Maps pilots (synthetic biology, precision medicine, 3D bio-med). Next:

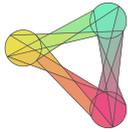
### Selection of the Pilot company(ies) and organisations

At the micro level of individual organisations four organisations expressed interest in participating in the SMART-Map pilots. Randles conducted 1:1 discussions with each of these, with the knowledge that the *Repository of Learning Case Studies* tool had been selected by the TG.

The Case Study authors and their role and position within the synthetic biology innovation ecosystem:

1/ Defence Science and Technology Laboratory (Dstl)	An executive agency of the Ministry of Defence, Dstl has ~3,500 employees distributed over three core sites.  Dstl undertakes its own scientific research on a range of emerging technologies, as well as commissioning R&D and
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undertaking new product development with external companies and ventures, where appropriate creating new venture partnerships to jointly develop and exploit intellectual property involving collaborations with a focus on partnering SMEs.

Opportunities for developing new technologies and uses for civilian applications (such as materials, coatings and medical applications) are also pursued through joint ventures.

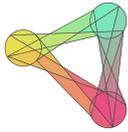
*Dstl represents an innovation ecosystem 'anchor institution' in the sense that it is a strategic actor able potentially to affect the responsiveness of the system due to its size, scope and purchasing power, and in setting the conditions and criteria of its procurement, to which applicants respond, thereby influencing their behaviour through their compliance with the tender requirements and standards.*

*The focus of the Learning Case Study was to reflect on one small programme within the jurisdiction of the author. As a Technical authority within Dstl one of the programmes for which he is responsible involves commissioning challenging far-future R&D in synthetic biology. The case aims to consider how the principles of Responsible Innovation can be incorporated into the tender/call process as a demonstrator of the embedding of RI into the mechanism of a commercial tender process.*

*Due to the long-term horizons of the context of the call, with the technologies under development forming part of wider systems of inter-dependent components and parts in a large object (for example ships, aircraft); and where the other system parts may equally be shifting given the long-time horizon, the RI principle of anticipation and reflection are particularly pertinent to the case.*

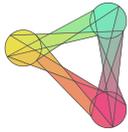
*Many of the EU RRI dimensions (diversity, science education, public engagement) are the direct responsibility of higher levels in the government organisation and apparatus, (eg the Home*





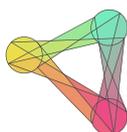
	<p><i>Office and the Cabinet Office) which sets the culture and tone and direction of these policy areas within the wider government organisation architecture, into which Dstl is inserted and from which Dstl 'takes' its normative values and priorities, but Dstl does not directly define or develop policy in these areas.</i></p>
2/Cambridge Consultants	<p>CC are a knowledge services consultancy, and consider themselves 'World Leaders in Disruptive Innovation'</p> <p><a href="https://www.cambridgeconsultants.com/home">https://www.cambridgeconsultants.com/home</a></p> <p>They offer market knowledge and technical expertise across a range of sectors: medical, telecoms, semi-conductors, and defence and security. CC are able to evidence their reputational capital by citing the different awards and recognitions they have received. This confers legitimacy within the innovation system, and therefore an appropriate actor for spreading the word and actively demonstrating 'hi-status' responsibility credentials.</p> <p><i>As a mid-sized cross-sectoral 'boundary-crossing' knowledge consultancy, CC are able to 'carry' translate and adapt knowledge (including RI 'knowledge' and practice) from one sector to another, and from one technology area to another. By providing knowledge and advice to clients, CC are able to practically affect the knowledge, actions and processes of clients. Interestingly CC use case studies as a primary mechanism for the sharing of knowledge and lessons on their website.</i></p> <p><i>The case shows how an organisation like CC works as a relational system-spanning actor, translating RI learned in one sector or company case, to another, thus 'lubricating' the knowledge system, articulating, translating and transferring (RRI) normative (values) dimensions, knowledge and practice across the system actors, highlighting the reputational benefits to (client) companies of engaging with the RRI agenda.</i></p>





3/Innovation and Sparkling Science Ltd	<p>ISS is a micro-business. The sole proprietor is a regulatory expert who has provided advice on a number of UK Advisory Committees eg on GM. She also sits on the SBLC Governance Subcommittee. Her view is that GM's problems emerged through not engaging wider society early enough in its development. She has provided regulatory advice on novel foods, environmental release, and business training in business for research scientists. She is highly committed to RRI as part of the DNA of her business.</p> <p><i>However, the case highlights the precarious funding conditions faced by a micro-businesses operating through a series of fixed-term contracts. It highlights that financial support is needed if such businesses are to build the capacity to become meaningfully engaged in RRI. The case draws attention to the fragility of client relationships and highlights that the needs and wishes of the client must come first. If not aligned to RRI, client demands present a dilemma to the micro-business which is ethically committed to RRI, but the micro-business may not yet be sufficiently self-sustaining and financially resilient to be selective about which clients it does business eg if the client is not committed to RRI. Though once a client is on board it is possible to influence them towards the reputational benefits of RRI.</i></p>
MadLab Manchester	<p>Madlab describes itself as a 'grass roots innovation organisation' based in Manchester, bringing together science and technology, art and culture for the benefit of local communities. Madlab is therefore a social enterprise with societal concerns at the heart of its values and operations. However, MadLab survives on making applications to funding bodies, a precarious existence where the priority to secure a continuous funding stream is its greatest challenge.</p> <p><i>In the end, Madlab did not have the capacity to provide a case study. The example does highlight the need to build the capacity</i></p>



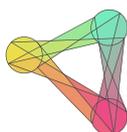


*of civil society as a pre-condition of enabling organisations like MadLab who wish to pro-actively engage in RRI, since it speaks to the core of their own mission and values; to meaningfully be able to do so. This not only involves participating in initiatives; but deeper, to participate and have influence in strategic conversation that will shape the normativity and direction of RRI development. Civil society and social enterprise organisations like MadLab are also fundamental to the objective of engaging lay publics and local communities in the co-development 'grass-roots' development of synthetic biology, because such objectives and the activities that go with them, are fundamental to their reason for existing.*

## A Common Template for organising the written inputs of the Learning Case Studies

Via the conduit of the TG discussions, the case study authors requested a common Template or guidance to steer the production of the written cases, through a standard framework. This was drafted by Randles and Demeny and enabled some of the evaluation criteria which would later assist in the comparative assessment and evaluation of the cases to be incorporated into the cases. For example, Section 6 of the Template requests the author to reflect on the actual, or scope for *transformational organisational change achieved by each case as a result of the SMART-Map intervention, including recommendations for the longer-term achievement of transformational institutional change beyond the life of the pilot, since 5 months was accepted as too short a timescale to achieve lasting change.* The Template also, at Section 4, incorporated the Advisory Board's terms of reference and questions referring to *the definition and engagement of Society in each case.* The Template provided a standard framework for capturing *core descriptive details about the organisation and the technologies and products/processes to which the case study referred, and how RRI is understood and already enacted by the organisation ('de-facto' normative orientations and 'values', and with respect to the specific H2020 EU RRI dimensions).*





The last section of the Template asked the authors *to provide their own reflections, learning lessons and recommendations arising from the Case*, for example towards the longer-term SMART-Map objectives of establishing an RRI Standard/Accreditation and/or gathering further cases towards the objective of creating, organising and making public a Repository of RRI Learning Cases. The Template is included in MS12 public document.

## The Learning Case Studies Template

### 1.0 Context

Please summarise the focus of the case study in organizational, process, and anticipated outcome terms.

### 2.0 Organisational Dimensions and Considerations

Please describe the organizational focus. What is the case-type that the case study represents and what issues and challenges come with this organizational focus (for large organisations please incorporate a visual figure of the organisation: levels of decision making, organizational units; where the case study focus sits within the larger organization etc).

### 3.0 Technological Dimensions and Considerations

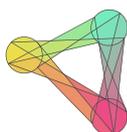
Please describe the technological context, inputs and outputs in terms of products to which the organization contributes (for example supply chain and procurement considerations; markets and clients for the research and innovation outcomes). In what ways is the particular technological focus novel, uncertain, so on. What aspects of anticipation come with the new product/compound development in the absence of certainty and what RRI issues does this raise.

### 4.0 Normative (values-led) dimensions of the case

Please describe the normative (RRI dimensions, values, objectives) that the case focuses on.

### 5.0 Governance instruments, mechanisms and arrangements





What are the **governance instruments, mechanisms and already in place**, to ensure due diligence in the development of novel synthetic biology materials (such as Ethics Committees and Ethical clearance processes). What new challenges does RRI bring and how would the existing arrangements need to change or be modified to incorporate the new challenges and dimensions of RRI?

### 6.0 Transformational change

The longer-term objective of RRI is to achieve transformational change to the synthetic biology ecosystem and individual organisations in collective pursuit of the Responsible Development of Synthetic Biology. Over the timeline of the SMART-Map pilots, what transformations (including learning on behalf of the case study author and others involved in the pilot within the organization) have been achieved? What factors have hindered transformational change?

### 7.0 Key messages and recommendations

Please provide 5-10 key learning points from the case author providing a critical reflection on your own experiences and learning, in order to help others in same-type organizations who may be considering embarking on a similar process. How would you encourage them? What recommendations do you have for wider system actors including policy makers (EU and National level) and research councils/funders?

## **An Implementation plan for the pilots**

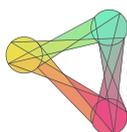
Finally, an implementation plan to govern the five-month pilot plan was agreed with the TF and participating organisations as follows:<sup>2 3</sup> Four parallel threads comprised the UK SMART-Map pilot implementation phase:

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<sup>2</sup> Taken from Randles and Demeny 'WP3- Synthetic Biology Pilots: Tool Selection and Implementation Plan

<sup>3</sup> Hajhashem, Demeny, Kakuk and Randles 'RRI Implementation Phase (WP3)





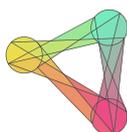
- i) Input and activities of the multi-stakeholder Task Group (simulating the responsible innovation ecosystem)
- ii) Input and activities of (up to) 3 pilot companies/organisations implementing the selected tool(s).
- iii) Input from the SMART-map overseeing governance structures: the Executive and Advisory Boards.
- iv) Input and activities of the formative evaluation team.

Combining these four threads, a time-tabled programme for the UK Synthetic Biology pilots was proposed and implemented

No	Phase	Objectives/Tasks	Key dates
1	Orientation	<p>Orienting all participants and agreeing the 6<sup>4</sup> month pilot plan including selection of tool(s) and confirmation of pilot companies. Undertake pre-pilot briefings with potential participant organisations in order to confirm and co-construct their participation. Report implementation plan to the SMART-Map Executive and Advisory Board.</p> <p>Actions and key dates:</p> <ul style="list-style-type: none"> <li>i) <b>Task Group</b> – skype briefing on pilots implementation phase. Discuss and agree tools for piloting</li> <li>ii) <b>Pilot companies</b> 1:1 discussions to brief 3 organisations and confirm participating companies</li> <li>iii) <b>Report to the SMART-Map ExBo and AB</b></li> <li>iv) <b>Formative evaluation</b> produce 'before/after'</li> </ul>	<p>Early Oct</p> <p>Completed by 20 Oct</p> <p><b>25 Oct</b></p> <p><b>25 Oct</b></p>

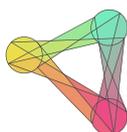
<sup>4</sup> In the event the length of the pilot was reduced from 6 to 5 months.





		interview plan and schedule. Report to AB on <b>25 Oct.</b>	
2	Implementation	<p>Explanation of agreed tools and agreed process/steps to all involved. Carry out the training and implementation of 6 month pilots.</p> <p>Actions and key dates:</p> <ul style="list-style-type: none"> <li>i) <b>Task Group</b> – Receive feedback from AB and green-light implementation phase. Complete the constitution of the TG by adding 1-2 CSO representatives. Skype meeting with the TG.</li> <li>ii) <b>Pilot companies</b> – Feedback from AB and green-light and carry out 6 months implementation phase, inc cascades to all levels of the organization and implications for organizational routines.</li> <li>iii) <b>Advisory Board.</b> Recruit one CSO member from the AB to UK TG to provide advice and bridge between UK TG and SMART-Map AB.</li> <li>iv) <b>Formative Evaluation.</b> Undertake 8-10 ‘pre-pilot’ formative interviews</li> </ul>	<p>w/c 30 Oct</p> <p>30 Oct-31 April</p> <p>Early Nov</p> <p>Nov2017</p>
3	Supporting, coaching, tracking	<ul style="list-style-type: none"> <li>i) <b>Task Group</b> – all members of TG asked to keep diary notes as aide-memoir, according to a simple Diary Questionnaire.</li> <li>ii) <b>Pilot Companies</b> – contacted by the SMART-Map team once/week to monitor progress, identify problems and trouble-shoot any difficulties</li> <li>iii) <b>Advisory Board.</b> Watching brief as and when needed.</li> <li>iv) <b>Formative Evaluation.</b> Receive any ad-hoc</li> </ul>	





		feedback prompted by participating organisations.	
4	Feedback & Formative and Summative Evaluation	<p>Summative and formative evaluation of pilots.</p> <p>i) <b>Task Group</b> – Participate in 6–8 ‘after’ evaluation interviews. Input to completion of D3.3 Final SMART-Map</p> <p>ii) <b>Pilot Companies</b> – Participate in 6–8 ‘after’ evaluation interviews. Write-up the pilot experience as a 3–4 page Case Study. Input to D3.3 Final SMART-Map Deliverable on Synthetic Biology</p> <p>iii) <b>Advisory Board</b> – input views on the UK pilots achievements and challenges as input to D3.3 Final SMART-Map Deliverable on Synthetic Biology</p> <p>iv) <b>Formative Evaluation:</b> Conduct 6–8 ‘after’ interviews with pilot participants and TG. Incorporate with input from other SMART-Maps pilots in Spain and Italy, to the final Report of WP7, Formative and Summative Evaluation</p>	<p>May 2018</p> <p>May 2018</p> <p>May 2018</p> <p>May 2018</p>

