

# PRISMA



## PRISMA PILOTS RRI ROADMAPS

# EVOLVA

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CEN workshop background document



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## The Company

Evolve was created in 2004, as one of the first biotech firms in the world. It is a Swiss based company producing innovative, high-value, sustainable ingredients with an emphasis on the health, wellness and nutrition sectors. Evolve leverages modern biotechnology, including synthetic biology, to produce what are called yeast "strains," which are then brewed like beer in the traditional fermentation process. The purified end product contains no recombinant material. These end-products are molecularly identical to those traditionally extracted from plants, animals and petrochemicals.

Many of the substances produced by Evolve are ingredients found in the natural world that come with supply chain issues, such as originating from a rare plant or animal. These ingredients are not available at the right quality or price in a sustainable manner. Sustainability, being one of Evolve's core values, drives Evolve to focus on a re-production of these types of ingredients by combining modern genetics with traditional brewing.

Evolve's products include substances such as Resveratrol, Nookatone and Valencene. Resveratrol is an example of a product with plenty of benefits (such as its potential to slow the rate of aging of neuromuscular junctions or lungs) but rare or difficult to be extracted from wine or grapes.

Evolve has experienced resistance from some environmental organisations in the past with some of their innovations such as fermentation-produced vanillin. The company is committed to Responsible Innovation, however, so far this has not prevented resistance from some societal actors.

### Commitment

- The RRI PRISMA pilot has been endorsed by the public relations Manager. Endorsement from the executive management has been intermittent, due to restructuring of the company and change of managements during the period of the pilot
- Motivation for RRI: showcase and further strengthen responsibility and sustainability efforts of the company

### Context

- Type of pilot organization: SME (100 employees)
- Country: Switzerland (headquarters)
- R&I project selected: Agarwood
- Technology: synthetic biology
- Relevant regulatory regimes: Genetically Modified Organisms (GMOs) legislation
- Type of R&I activities: in-house and cooperative research
- Type of business: business to business
- Time to Market (indicative): not available (project was stopped during the pilot because of company the restructuring)
- CSR policies: Sustainability strategy, based on the UN Convention on Biological Diversity. Responsible Research and Innovation and sustainability are part of the core values of the company
- RRI Maturity Level: Defensive

## Materiality & experimentation

- Key stakeholders: research partners, NGOs, industry observers, farmers and local communities, the media and the general public
- Key ethical, legal and social issues:
  - safety of genetically modified organisms: the potential threat to biological diversity if they escape to the environment
  - value chain/benefit sharing and impact on farming at local territories: risk of biotech and fermentation-derived products replacing those from small, independent farms in vulnerable communities and developing countries
  - Environmental sustainability of fermentation products: most common feedstock used for yeast is sugar, the production of which may lead to deforestation
  - information to consumers (labelling): Synthetic biology are generally not allowed to be labelled as “natural”. This applies also to Evolva products, though they are chemically identical to the product that was extracted from animals or plants, and contain no trace of the genetically modified yeast used in production.
- RRI actions performed during the pilot: ethical and social analysis, work with business and social actors sharing values and create positive ethical networks

## Validation aspects (key performance indicators)

- The most relevant criteria identified with the company to analysis and monitor over time the impacts (in terms of costs & benefits) of the RRI actions on the Agarwood project are <sup>5</sup>
  - Q1.2: Feasibility of the technology solution
  - Q2.1: Product acceptability
  - Q3.5: Building legitimacy and gain consumer loyalty on the product
  - Q4.3: Address regulatory barriers
  - Q5.3: Market penetration
  - Q6.1: Direct costs to perform the RRI action

## RRI Roadmap

### RRI VISION:

to create a mutual understanding of a desirable innovation pathway that can benefit both the synthetic biotechnology value chain as well as other stakeholders.

### R&I Technologies and products

The goal of the Agarwood project is the development of natural compounds using Evolva's yeast fermentation production platform. The goal is to create a new paradigm in the sustainable production of Malaysia's high value indigenous natural products, starting with agarwood fragrances.

Agarwood of the Aquilaria and Gyrinops variety has been used since a long time by incense and perfume makers, and traditional medicine practitioners. Despite conservation measures and concerted efforts to grow Aquilaria and Gyrinops in tree nurseries and organic tree farms, these trees are rapidly vanishing from forests due to high demand. Agarwood has been designated as an endangered species by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The production of a range of

<sup>5</sup> For more details on the criteria for impact analysis used in this section, see PRISMA D5.1: Report on conditions for success of RRI uptake by industry

agarwood products by fermentation could complement the existing traditional approaches and allow a significant widening of their use without increasing the pressure on the endangered trees.

The project got underway in 2014 and been in an exploratory phase until 2018 and has been currently suspended.

#### Drivers and challenges for RRI

##### Drivers:

- **Finding replacements for the use of natural ingredients in health, wellness and nutrition products related to critical supply chains or originating from a rare plant or animal**
- **Ingredients for health and food that respect sustainability, availability of animal welfare issues**

##### Challenges:

- **Innovation trajectory and innovation eco-system internationally dispersed**
- **Lack of company resources for RRI due to volatile market**

##### Risks and barriers to be addressed by RRI actions

- **Prospective costumers are not primarily driven by sustainability**, and by mechanisms such as LCA analysis. For example, most food and beverage producers focus on price and taste. They rarely pay suppliers a premium for ingredients that come with LCA data. There is no green premium.
- **Societal debates about 'naturalness' and 'economic justice', and around synbio are highly polarized**
- **Some societal actors, such as some critical NGOs, are not open to exchange and collaboration**
- **It is difficult to establish sustainability of a product while developing the innovation, this is also due to the fact that different actors will use different criteria to establish sustainability**

## RRI Actions

##### Reflection & anticipation:

- **Ethical analysis**, through foresight, scenario analysis, and other approaches, in order to develop a "socially ideal" business case for the R&I project (e.g. Agar Wood).
- Further explore the opportunity to implement **Life Cycle Assessment (LCA) and Social-LCA**

##### Inclusiveness:

- **In the early stages of the R&I process, work with stakeholders to develop robust ethical and social framework** (sharing values and create positive ethical networks, building user-based communities of practice), for selecting the 'problematic' ingredient which deserves to be replaced by a synthetic alternative. This includes exploring how to determine what fair and equitable benefit sharing implies for stakeholders.
- Share and communicate the ethical and social framework with stakeholders and the civil society, in a societally robust and transparent way

##### Responsiveness:

- **Implement adaptive risk, quality and sustainability management approaches**, in order to: develop and continuously update ways to demonstrate whether Evolva's products are indeed more sustainable than the existing ingredients; and to re-evaluate metrics used for analysis and reporting of sustainability performances (e.g. parameters to perform LCA), to adapt them to production and product development and optimization.

- Further participate in **sustainability, social accountability, quality certification schemes surrounding the 'problematic' ingredient**, at both company and supply chain level
- Support **and invest in sustainable supply chains for the feedstock supply of the engineered yeast**
- **Realize capacity building initiatives with vulnerable actors in the value chain**, creating opportunities for vulnerable farmers in new value chains

## Roadmap design

The aspects relevant for the RRI uptake by the company have been synthesized in an overall diagram, following the visual approach described in the PRISMA exemplar roadmap (Figure 3).

The RRI roadmap developed in PRISMA is a useful starting point for RRI uptake. If the above-mentioned issues are answered in a collaborative practice with a wide range of constructive actors, Evolva could move from a *defensive* kind of RRI to a more pro-active, confident kind of RRI. Defensive RRI is geared towards damage control and risk-management. Confident kind of RRI is geared towards the development of a robust rationale underlying and motivating all steps in the innovation chain. Such a rationale will allow for a more confident engagement with critical NGOs and concerned consumers.

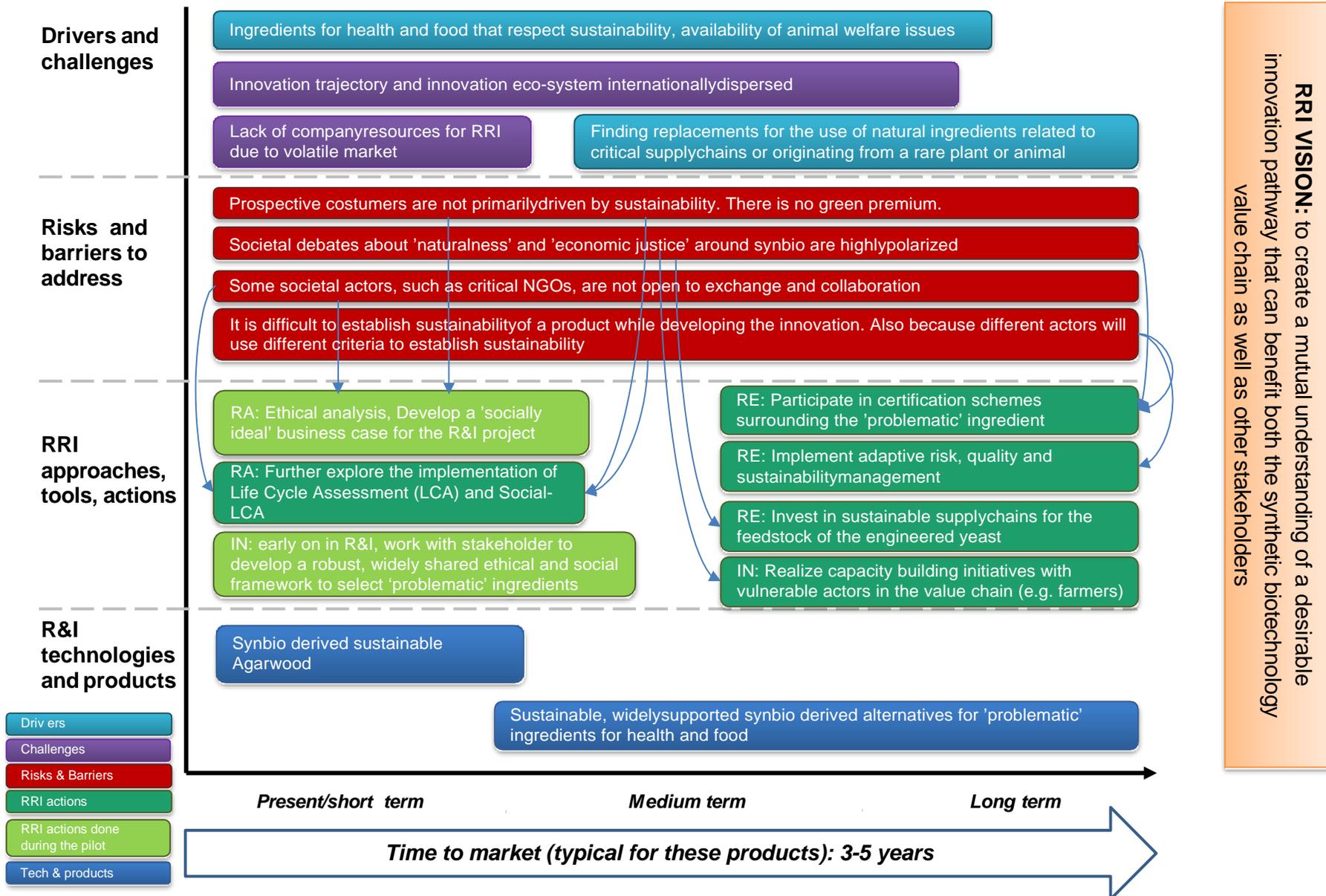


Figure 3 Evolva, PRISMA RRI roadmap

