D 3.1.Responsible Innovation Self-check

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RESPONSIBLE INNOVATION COMPASS

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1. Introduction

This Deliverable D3.1 Responsible Innovation self-check describes the activities and final output of Task 3.1 – Developing a Responsible Innovation Self-Check for industry in H2020 funded project COMPASS – evidence and opportunities for SMEs (COMPASS), European Commission Grant Agreement Number (710543).

The COMPASS (710543) Responsible Innovation Self-Check tool (hereafter referred to as COMPASS self-check tool) is a specialized responsible innovation assessment tool, tailored to the needs of Small and Medium-Sized Enterprises[1] (SMEs). Its main purpose is to lower entry barriers for SMEs wishing to engage with responsible innovation, but unsure of their options and potential benefits. It aims to help SMEs in highly innovative sectors to learn what responsible innovation means in practice, where their specific company stands and what they can do to make their innovation practices more responsible. As such, the self-check provides an easily accessible first contact to responsible innovation, which will gently guide users toward more elaborate responsible innovation practices and tools tailored to their sector and their specific needs (e.g. COMPASS (710543) roadmaps and roadmap co-creation method-kit[2]). The tool is based on a multiple choice questionnaire that assesses company practices in relation to responsible innovation. The tool can be freely accessed on the COMPASS (710543) website https://innovation-compass.eu/self-check/.

The COMPASS Self-Check was developed based on COMPASS (710543) project WP1 and WP2 insights of what is needed in industry, and with consideration on what other responsible innovation specific (e.g. RRI-TOOLS) and Corporate Social Responsibility (CSR) tools offer (e.g. B Impact assessment). A self-check approach is taken building on experiences in the field of CSR, where evidence suggests that organisational change toward more responsible conduct is a stepwise process. Such a gradual process is particularly important to SMEs, which have, in contrast to larger businesses, less disposable resources available to experiment with integrating responsible innovation approaches into their research, development and innovation practices.

In this deliverable, Section 2 introduces the concept of the COMPASS (710543) self-check tool, discusses the key target users and presents the functional interfaces the tool offers. Section 3 describes development process of the tool. Section 4 gives an outlook on possible future use of the tool.

2. COMPASS responsible innovation self-check

2.1. Concept: promoting learning and change in SMEs

For companies, responsible innovation as a concept, in its entirety, or its specific aspects, remains difficult to implement in practice, due to not being in line with actual industry processes (Dreyer et al., 2017) or because of misalignment of some of responsible innovation concepts

[1] The European Commission defines SMEs as companies with less than 250 employees and a turnover of less than EUR 50 Mio (European Commission 2003).
[2] See the following COMPASS (710543) Deliverables: D2.2 Responsible Innovation Lab Report & Roadmap (Cybersecurity), D2.3 Responsible Innovation Lab Report & Roadmap (Nanotechnology), D2.4 Responsible Innovation Lab Report & Roadmap (Healthcare), D2.5 Responsible Innovation Method Kit.

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with industry realities (Blok, Hoffmans, & Wubben, 2015; Blok & Lemmens, 2015). Empirical studies have also suggested that the concept of responsible innovation is new to industry and remains difficult to grasp in its entirety (Auer & Jarmai, 2017). However, once broken down into specific practices evidence suggests that firms have implemented practices that already operationalise some aspects of responsible innovation (Auer & Jarmai, 2017; Lubberink, Blok, van Ophem, & Omta, 2017). Empirical research on responsible innovation in companies is scarce to date, however it has a connection to the broader concept of corporate social responsibility of firms. Some argue that it is a potential evolution of the CSR concept (Martinuzzi, Blok, & Schönherr, 2018) or an extension of responsibility to research and development departments (Jarmai, Tharani, & Nwafor, Forthcomming 2019). Therefore, learning and change are key for responsible innovation to enter company practice.

Organizational learning has been discussed as a precondition for the development of corporate responsibility in firms (Fortis, Maon, Frooman, & Reiner, 2018). Whereas external-reporting focused corporate social responsibility assessment tools have been found to yield limited organizational learning effects (Gond & Herrbach, 2006; Mitchell, Curtis, & Davidson, 2012), internal self-assessments have been applied as promising tools for organizational learning in the field of quality management (Balbastre & Moreno-Luzón, 2003; Jose, 2008). Based on learnings in WP1 and insights from corporate responsibility literature it has been decided for the COMPASS (710543) self-check to be set up in a way that promotes organizational learning and change for more responsible innovation practices in SMEs.

The COMPASS (710543) tool was created with a purpose to be a self-consulting resource for SME users. This is especially key for a tool that targets SMEs since they often lack resources for contracting external advice and consulting. Therefore, the COMPASS (710543) self-check tool is a learning tool that guides a user through the most important responsible innovation practices in company operations, explains why they are important and how they can be implemented practically by suggesting good practices in the form of answer options. It has the main purpose of facilitating learning about what responsible innovation is, learning about different aspects of it across company and innovation management as well as how to implement it. As companies go through the questionnaire they discover the elements and practices that constitute responsible innovation, at the same time as they apply these elements to their own company situation by answering the questions. The outcome of the tool also helps companies to not only understand responsible innovation and reflect on their own company but also provides them with an analysis of their strengths and areas for improvement to instigate change. Overall the self-check tool serves two main goals:

(1) **Translating responsible innovation for an SME context and** (2) **Motivating SMEs to improve their responsible innovation performance.** This is to be achieved by:

a. **Operationalising responsible innovation for high-tech SMEs by** deconstructing each responsible innovation dimension into individual elements and questions allowing SMEs self-assess to what extent they have already implemented responsible innovation practices.
b. **Integrating responsible innovation into company functions:** providing guidance to SMEs on the company functions and innovation process stages at which each responsible innovation practice has to be implemented.
c. **Facilitating learning about responsible innovation good practice**: each question provides answer options/indicators that point the company to responsible practices.

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d. **Providing actionable results**: tool scores provide insights where the user company is already performing well (as a motivational factor) as well as providing an overview of weaknesses matched with suggestions for next steps for improvement (e.g. leading to sectoral roadmaps, guidance how to build own roadmap, other COMPASS (710543) resources). A benchmarking function also incentivizes the user to improve in areas where their scores are at biggest odds with peer group averages.

The following sections 2.1.1 - 2.1.4 describe the tool concept and key ideas behind it in more detail. This description is quoted from a book chapter written by two of the authors of the COMPASS (710543) self-check tool (Tharani, A. and Jarmai, K.) and colleagues: Tharani, A.; Jarmai, K.; Schönherr, N.; Urban, P. (Forthcoming), Enhancing Learning and Organizational Change through Self-Assessment. In Yaghmaei, E. & van de Poel, I., (Eds.), Responsible Research and Innovation Assessment Practices. Rutledge.

2.1.1. (a) Operationalising responsible innovation for an SME context

Given that responsible innovation has been born from the policy and academic research driven agendas, some of its elements have been more difficult to comprehend for SMEs or other for-profit innovation driven businesses. Therefore one of the key aspect that COMPASS (710543) self-check tool has focused on, was to operationalize the concept of responsible innovation for a business context especially focusing on pointing out good practices when it comes to responsible innovation and adapting the concepts underlying the concept of responsible innovation to company practices.

For the purpose of the tool, the concept of responsible innovation was operationalized in the broadest sense, utilizing the academic definitions (Stilgoe, Owen, & Macnaghten, 2013; von Schomberg, 2013) as well as the European Commission concept (European Commission, 2012). This was done to ensure all aspects of responsibility, as expected by various stakeholders, are encompassed in the tool. Therefore, aspects such as gender or science education or open access that do not play a major part in academic definitions of responsible innovation, yet are part of the policy concepts for responsible innovation, have been addressed in the tool to ensure an all-encompassing approach to responsibility of innovation-driven companies.

The final version of the COMPASS (710543) self-check tool has 43 questions and 249 answer options pointing to good practices in responsible research and innovation. Each question in the COMPASS (710543) self-check tool asks about a specific company practice or policy that applies to majority of its innovation activities. The focus of the tool is on an organization, primarily a private company, and its processes as a whole, rather than an individual innovation projects. Nevertheless the tool's modular approach also allows for using sections of it for a specific innovation project without assessing the whole company.

The COMPASS (710543) self-check tool scoring system awards points for verifiable factual company practices. It does not investigate the user's awareness, understanding or opinion about specific issues related to responsible innovation in the company, but rather investigates what the company does and does not do. For example, the COMPASS (710543) self-check tool asks about what tools the company has *implemented* in anticipating potential effects of its innovations, rather than whether the company/user is *aware* of the effects the innovations may cause. This approach also allows to guide the user to concrete action points or practices, that can help implement and ensure responsible innovation in company processes. In this way, diagnosis and recommendation happens simultaneously.

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This approach of monitoring only verifiable practices has been challenging to implement, especially when it comes to more abstract elements of responsible innovation such as "responsiveness" or "reflexivity". In these instances, experts have been consulted in search for corporate practices that would facilitate responsiveness and reflexivity throughout the innovation process. For example in some questions stop/go procedures or feedback seeking and integration from experts and stakeholders at different stages of the innovation process have therefore been used as proxies to correspond to "reflexivity" and "responsiveness".

2.1.2. (b) Integrating responsible innovation into company functions

The second underlying idea behind the COMPASS (710543) self-check tool is the integration of responsible innovation into company functions.

Currently proposed models of responsible innovation in a business context do not offer an overview of responsible innovation considerations across company management and innovation process. For example Lubberink, Blok, van Ophem, & Omta (2017) took stock of corporate practices that operationalize anticipation, reflexivity, inclusion, deliberation, responsiveness and knowledge management aspects of responsible innovation. Stahl et al. (2017) proposed a maturity model to investigate where a company stands with regards to responsible innovation management with regards to "Purpose", "Process" and "Product". van de Poel et al. (2017) also took account of firm- external factors and firm strategy and assesses the contextual, strategic, operational and outcome practices across product development and life-cycle phases. Therefore, for the purpose of the COMPASS (710543) self-check tool, in order to bring the concept of responsible innovation closer to the business realities and facilitate its practical implementation, the concept had to be deconstructed and aligned with company processes.

As a result, the COMPASS (710543) self-check tool follows the structure of analysing general company management as well as the research and innovation process. In contrary to other proposed models and available tools (see Annex II for a list of reviewed tools) it is not structured according to responsible innovation themes (anticipation, reflection, responsiveness and reflexivity, or public engagement, open access, gender, ethics & science education), but rather these responsible innovation issues have been interlaced through company operational processes. This allows companies to investigate each issue as it is integrated in the company governance as well as research and innovation process.

Through extensive desk research, consultation with experts, and user testing, responsible innovation elements have been fully dissected and aligned with corporate functions and the innovation process. Company functions to form the structure of the COMPASS (710543) self-check tool were based on simplified innovation value chain phases (Hansen & Birkinshaw, 2007) as well as an additional company management section. The tool is therefore structured according the following sections:

1. Company management:
2. Idea generation
3. Development and Testing
4. Market and Impact

"Company management" encompasses responsible innovation issues that have to be addressed as an overall company policy or managed and ensured at the whole company level. "Idea generation" and "Development and testing" address the innovation process from idea

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inception to piloting. “Market and impact” analyses how company ensures responsible innovation once product or service is on the market – managing the impacts it may have.

The aforementioned four management sections form the top level structure of the COMPASS (710543) self-check tool. Each of these management sections hosts three to nine responsible innovation related sub-sections that are specifically applicable to the respective management section (see Figure 1). Each sub-section is then deconstructed into questions and answer options that point to good responsible innovation practices. Questions are closed-ended and aimed to be concise and focused on practices that are within company control.

The “company management” section addresses company practices and procedures that concern company objectives, strategic directions and values, as they relate to and affect research and innovation activities. Questions in this section investigate the overall company rules, procedures and practices that define the conditions for all company activities to take place in.

The “idea generation” section asks about practices that a company has implemented to guide their initial innovation idea generation, selection and underlying research. This includes questions about how the company prioritizes ideas for new products or services, measures to anticipate and assess potential positive and negative consequences of an innovation and decision making about aborting or proceeding with further idea development.

The “development and testing” section covers activities related to the idea development and testing of new products and services. It addresses decision-making processes in production, testing, and market entry, touching upon how these decisions are made and who is involved and consulted in making them. It also deals with the issue of planning for and implementing safeguards from anticipated unintended negative effects of innovations under development.

The “market and impact” section includes questions about how the company controls the impacts on people and the environment that may be caused by their innovations once they are being sold and used. It addresses company strategies for soliciting and integrating feedback and the management of unintended or negative effects resulting from the product/service use.

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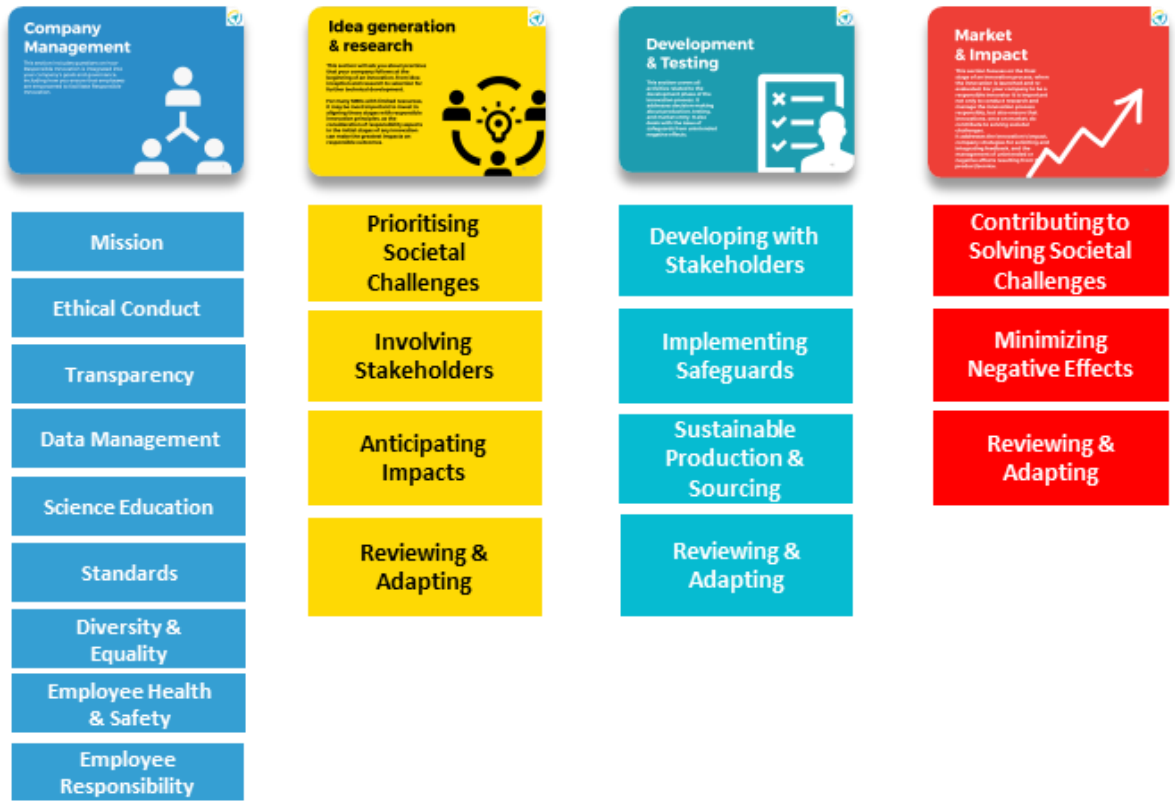

Figure 1: COMPASS responsible innovation self-check tool structure

2.1.3. (c) Facilitating learning about responsible innovation good practice

The third key concept in the COMPASS (710543) self-check tool is its design to facilitate learning about good responsible innovation practices.

The COMPASS (710543) self-check tool is based on 43 multiple choice questions, all of which (to an extent possible) focus on factual information about company practices rather than opinions of the user, and point out good responsible innovation practices. By doing so, the tool creates clear boundaries of responsibility, therefore only focusing on observable responsible innovation practices that are within company control. Therefore all questions ask about what a company does, or has been doing regularly, when they do it, how they do it, and, where applicable, what has been the outcome of that specific approach when it comes to responsible innovation. In this way, the tool allows the user to learn about responsible innovation practices and, at the same time, receive information about how to leverage these practices for better results.

Answer options provided all are designed to point to a good responsible innovation practices from a number of angles. For example, when it comes to stakeholder involvement in innovation, the tool asks which stakeholders the company usually involves (see question example 1.), how they involve them (see question example 2) and what measures are taken to ensure effective and fair stakeholder involvement (see question example 3).

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Question example 1:
Which of the following groups does your company involve in the idea generation or early research stage of an innovation process?

- ❑ *Shareholders*
- ❑ *Customers*
- ❑ *Users*
- ❑ *Supply chain partners*
- ❑ *Experts*
- ❑ *Governmental agencies*
- ❑ *Civil society organisations*
- ❑ *Consumer bodies, patient associations or other civil society organisations*
- ❑ *The general public*
- ❑ *Other, please specify:*
- ❑ *We do not involve any of the above mentioned groups in the idea generation or early research stage of an innovation process.*

Question example 2:
In which roles are the groups indicated in the previous question involved in idea generation or early research?

- ❑ *They are informed of research topics and processes.*
- ❑ *They provide information; e.g. as respondents to market research or focus group participants.*
- ❑ *They provide feedback on the research process or the envisioned innovation.*
- ❑ *They are involved in agenda setting for company research.*
- ❑ *They co-design research with us.*
- ❑ *They are involved in other roles, please specify:*
- ❑ *We do not consult stakeholders in idea generation or early research.*

Question example 3:
How does your company ensure effective, productive and fair stakeholder engagement?

- ❑ *We are transparent about the objectives of stakeholder engagement and stakeholder roles prior to starting the process.*
- ❑ *We clearly define the tasks of participating stakeholders.*
- ❑ *We share all information relevant to the engagement process.*
- ❑ *We use a third party moderator or experienced facilitator to enable the development of trustful relationships between participating stakeholders.*
- ❑ *We take measures to facilitate the exchange of diverging views of different stakeholders.*
- ❑ *Other measures, please specify:*
- ❑ *We do not practice stakeholder engagement. / We practice stakeholder engagement, but none of the above apply.*

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Since responsible innovation in company settings is still an evolving concept, many questions include an answer option that allows the user to enter their own solution to operationalizing the particular aspect of responsible innovation addressed by the question. This also allows the tool administrators to collect different approaches to tackling specific responsible innovation issues that have not yet been evident from available empirical studies.

2.1.4. (d) Providing actionable results: scoring, benchmarking and action points

The fourth key concept underlying the COMPASS (710543) self-check tool is to provide the user with results upon which they can act and base decisions on to drive organisational change. This is done through the implementation of a positive scoring system, benchmarking to peer companies and linking to follow up actions to take.

The scoring system of the COMPASS (710543) self-check tool is facilitated through awarding points for answer options selected by the user. Throughout the questionnaire points are awarded for selecting answer options. (No points are awarded for answer options that demonstrate that a particular aspect of responsible innovation is not operationalized in the company; such as e.g. “We do not consult stakeholders in idea generation or early research.”) In most questions, the more answer options users select, the more points they score. Points can only be gained; the tool does not deduct points. This is done in order to incentivise learning and change, rather than assessment and subsequent penalty by point reduction.

The COMPASS (710543) self-check tool is based on the principle that each sub-section carries the same weight. In this way, the questionnaire does not prioritise one responsible innovation sub-section over another. Within each sub-section, all questions have equal shares of points. Different weighting systems were considered during tool development. In the final version, two different weighting systems of answer options exist:

1. Each positive response scores an equal fragment of total points available in the question (implemented for all but three questions in the questionnaire):
2. Any one positive response scores total points available in the question (implemented for the first three questions in the “Market & Impact” section.

As the tool evolves and more data is collected on more or less demanding responsible innovation practices, the scoring system could be adjusted to reward more difficult to implement practices (less prevalent) more than the easier (more prevalent) ones.

The tool benchmarks user results to peers who have also taken the questionnaire. In this way the user’s performance is not assessed in absolute terms, but rather compares the user to peers. In this way users are assessed based on whether they are below or above the average of companies that have completed the questionnaire or the respective management section. This sort of assessment through benchmarking facilitates a moving target when it comes to responsible innovation in companies – as other companies improve, the benchmark will also move, incentivizing others to catch up and take up more responsible innovation practices.

By providing an overview of users’ performance across the different sub-sections the tool allows for a structured and informed prioritization of which areas of company functions and responsible innovation should be tackled first.

The option to bookmark questions referring to specific practices should facilitate further action by the user after completing the questionnaire. As users navigate through the questionnaire,

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they can take bookmark questions they want to follow up on. On the results page[3], they can download all bookmarked questions. This feature allows to collect practices the user wants to work on for organizational change and feed them into their action plan using another COMPASS (710543) tool – the Co-Creation Method Kit[4].

2.2. Tool target users

COMPASS (710543) project focused on three highly innovative sectors, namely nanotechnologies, cyber security, and biomedicine, in order to develop and pilot the tools and resources for supporting the uptake of responsible innovation. The COMPASS (710543) self-check tool has therefore been developed with these sectors in mind, but is meant to be more broadly applicable to SMEs that operate in other sectors in Europe and beyond.

The primary target group of the COMPASS (710543) tool is companies in highly innovative industries. The three pilot sectors are highly innovation intensive, and operate on both product and service basis, as well as on business-to-business (B2B) and business-to-customer (B2C) models. Therefore using these three sectors as a pilots allowed for the COMPASS (710543) self-check tool to be adaptable for services and manufacturing, for business-to-business and business-to-customer companies with no restriction to particular industries or sectors.

With regard to company size, the COMPASS (710543) self-check tool was developed to be SME-friendly yet applicable to larger organizations as well. To a large extent, the tool questions and issues are equally applicable to large companies and SMEs and the tool can be used by large companies with ease. The only difference may be in terms of importance of specific questions to larger or smaller organizations, similarly as importance of specific responsible innovation issues may vary between different sectors.

In terms of an individual user profile, the COMPASS (710543) self-check can be implemented by anyone in the company that has a good understanding of how the company operates as well as the policies and procedures that govern the company's management and innovation processes. For larger companies, it can be that a collaboration among more people is needed to answer all questions, as one person may not have all the information at hand. A collaboration among a few persons from the same company can also be recommended for smaller organizations to facilitate a discussion and mutual learning. Completing the COMPASS (710543) self-check tool together, and discussing the issues it addresses, may yield learning effects and help prioritizing issues and defining actions for integrating responsible innovation in company and innovation management and setting up a comprehensive and realistic improvement plan.

Overall the COMPASS (710543) self-check tool supports a modular approach to self-assessment – the user does not need to implement all of the 43 questions across all of the four main sections – they can implement the questionnaire only for one of the management sections and still yield actionable results.

[3] See Deliverable 3.2 Responsible Innovation Compass Technical Specifications
[4] See COMPASS co-creation method kit on https://innovation-compass.eu/method-kit/

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2.3. Tool functional interfaces

COMPASS (710543) self-check tool is offered in three different interfaces: Online tool (with real time benchmarking), downloadable tool (Excel) and questionnaire cards set (PDF). Table 1 provides a comparison of the different interfaces and their features.

Functional interface	Links to roadmaps	Automatic results	Registration required	Benchmarking facilitated	Can be used offline
Online tool	x	x	x	x	
Excel tool	x	x			x
PDF cards set	x				x

Table 1. Comparison of COMPASS self-check interfaces offered.

2.3.1. Online tool

The online COMPASS (710543) self-check tool is hosted as a sub-page of www.innovation-compass.eu/self-check and has been developed in accordance with D3.2 Responsible Innovation COMPASS Technical Specifications. The online version of the tool is the primary one and offers the full range of features, including automated results, automated list of bookmarked questions, and benchmarking to other users. However, it can only be used online after registration. Its set-up is described in Deliverable 3.2 Responsible Innovation Compass Technical Specifications.

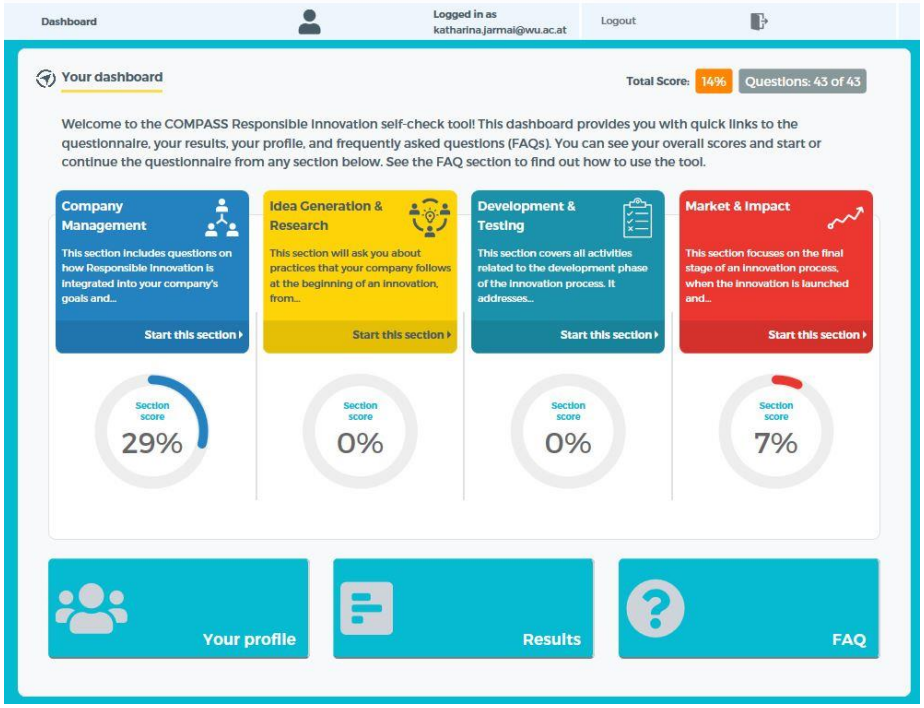

Figure 2: Screenshot of online self-check tool dashboard

2.3.2. Offline tools

In addition to the online version, an offline excel version of the COMPASS (710543) self-check tool was developed. This has been developed to respond to the needs of companies that may not want to share their data through an online tool and prefer to implement the self-check in an offline setting because of security or other reasons.

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The excel tool is freely accessible for download from the www.innovation-compass.eu/self-check page and can be used offline on a user's own computer. The excel based tool calculates user results in real time in a similar way that the online tool does, and provides a dashboard overview of user results indicating in which elements of responsible innovation the user has scored well and which elements could be improved (see Figure 3).

The excel tool is structured along the same four company functions by offering separate sheets for each section (Figure 4 shows "Company management" section example of excel based COMPASS (710543) self-check tool). Similarly to the online tool, the excel version provides the user with the complete questionnaire and automatic results calculation in the overall section as well as individual subsections.

The only two functionalities that are not offered by the excel version, are the real time benchmarking to other users, and a function of bookmarking a specific practice for a follow-up action.

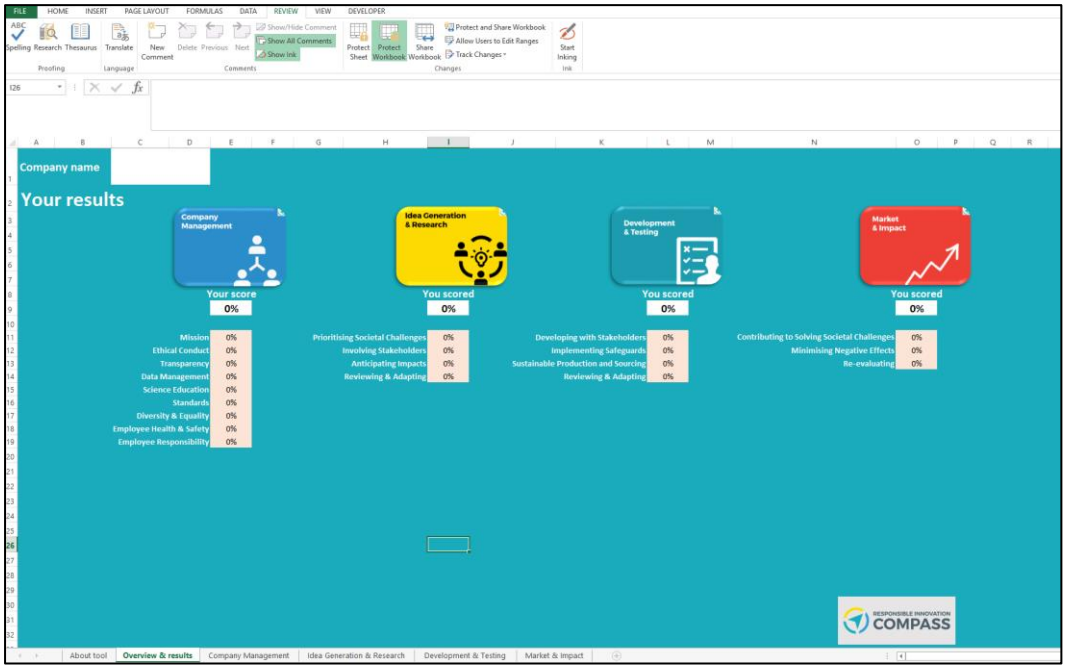

Figure 3: Screenshot of self-check excel tool dashboard

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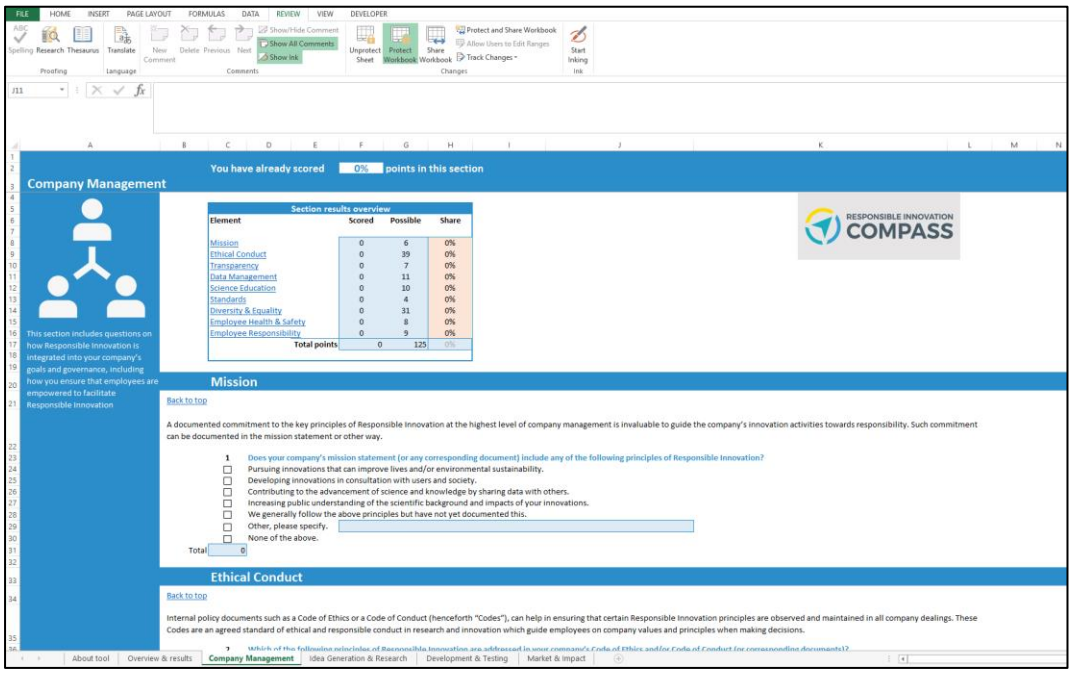

Figure 4: COMPASS self-check excel tool section "Company governance".

Another offline functional interface of the COMPASS (710543) self-check tool is a PDF based cards set. These can be used in workshop or consulting settings by business support organisations, consultants and other third party users. The card set contains all the COMPASS (710543) self-check tool questions and answer options and is structured identically to the online and excel tool. The cards can be printed at users' own facilities or used as an interactive presentation, and can help facilitate prompting questions to discuss responsible innovation with SMEs. These cards are available for free download on the www.innovation-compass.eu/self-check page.

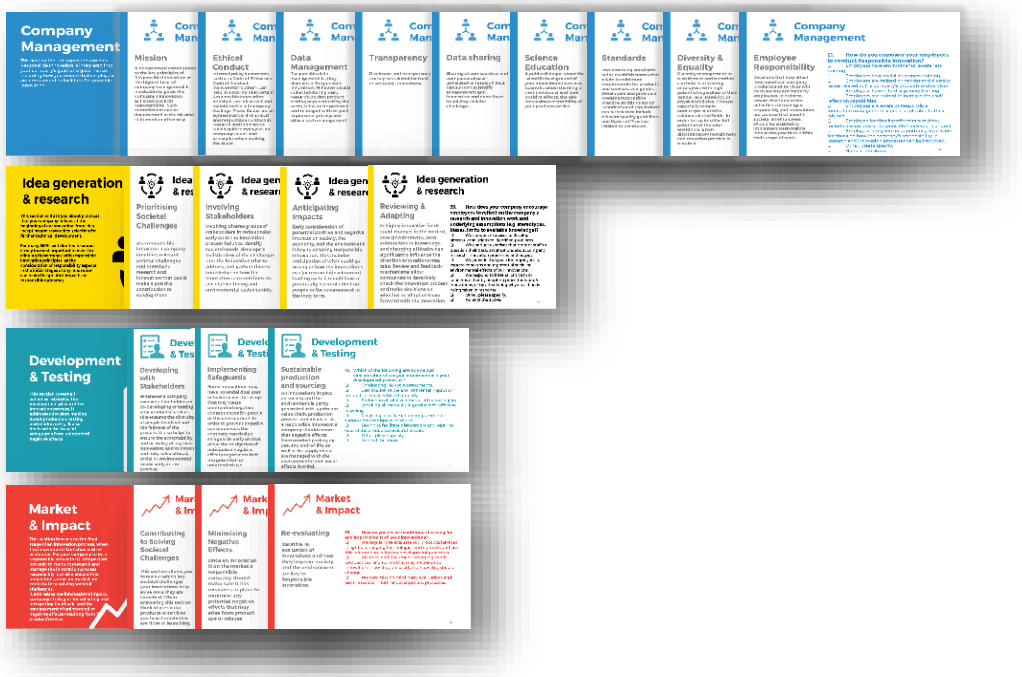

Figure 5: Printed COMPASS self-check tool cards from a PDF version

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Figure 6: COMPASS team using printed self-check tool cards at EBN Congress in Luxembourg June 6-8th

3. Tool development

The COMPASS (710543) self-check tool questionnaire and concept of the online self-check tool has been developed by the COMPASS (710543) team at WU, in close collaboration with COMPASS (710543) consortium partners, especially UCLan CY (to ensure alignment with outcomes of WP1), DMU (ensuring compatibility and alignment with WP2), B Lab Europe (building on their knowledge of self-assessment tools), FBLC, EBN and SDS. SDS designed the symbols of the four management sections.

The COMPASS (710543) self-check tool questionnaire was developed in the following steps:

I. **Desk research and consortium workshops (April 2017 - September 2017)**
   In the first stage of tool questionnaire development, an extensive stock taking of responsible innovation practice and industry standards in companies was conducted from the following sources (for a list of major sources reviewed please see Annex II):
   a. responsible innovation academic literature (with a focus on responsible innovation in industry),
   b. interview outcomes and insights from WP1,
   c. case study practices from WP1,
   d. reports of responsible innovation practice in industry context from EU funded projects on responsible innovation,
   e. responsible innovation -specific assessment tools,
   f. CSR tools and standards.

   Based on this desk research, an initial scope, concept and structure of the tool was devised and further refined in discussions with the COMPASS (710543) Consortium in two workshops (one on contents, one on structure and functionalities).

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II. Operationalising responsible innovation practices along company and innovation management activities (September 2017 - February 2018)

As a second step, the collected responsible innovation practices from desk research were operationalised along company functions. For a description of what each section contains please see section 2.1.2. The stocktaking practices where used as a basis for developing questions and answer options of the self-check questionnaire that formed the initial basis for iterative improvements and refinements.

III. **Iterative development using feedback rounds with experts (February 2018 - June 2018)**

Once an initial draft of the self-check questionnaire was available, iterative further development was conducted in order to extensively refine and further improve the structure, questions and answer options provided in the tool both in terms of content and language. Significant focus in this stage was on selecting the right wordings and terms that would be easy to understand for the main target group.

The consultations were run in in the form of individual semi-structured interviews or group discussions with:

a. Consortium experts on specific responsible innovation related topics (e.g. gender, ethics, responsible business, sustainability, innovation management, stakeholder involvement)
b. B Lab Europe experts (on questionnaire scoring and benchmarking systems)
c. Advisory Board experts (on specific responsible innovation topics and overall tool approach).

For complete overview of consultations and testing sessions for the development of the COMPASS (710543) self-check tool please see D4.3 Review and Recommendations for Revision of the Responsible Innovation Self-Check.

IV. Finalisation after pilot testing

As the last step of COMPASS (710543) self-check tool development, an offline prototype was developed for the purpose of testing it with stakeholders and target groups. During testing rounds, necessary adaptations were made and a Beta version of an online self-check tool was developed together with a sub-contractor. Once the beta version of the COMPASS (710543) self-check tool was launched online, an open consultation was conducted in early 2019 (February – March).

The technical implementation of the online tool was subcontracted as foreseen in the DoA based on technical description of the COMPASS (710543) self-check tool (please see D3.2 Responsible Innovation COMPASS Technical Specifications). The technical functionalities had been developed after a review of available responsible innovation specific tools for business (for a list of reviewed tools please see Annex II), as well as insights of corporate responsibility assessment tool best practices resulting from a European Commission FP7 funded project GLOBAL VALUE (www.global-value.eu/toolkit) (Martinuzzi et.al. 2017) in order to identify gaps in user needs and best practice in available tool solutions.

For detailed description of tool testing and open consultation please see D4.1. Piloting and demonstration strategy and D4.3 Review and recommendations for revision or revision of the Responsible Innovation Self-Check.

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4. Future outlook

The COMPASS Self-Check has laid a foundation for operationalising responsible innovation practices in industry through a comprehensive and organisational change-oriented self-assessment tool. The questions and practices that the COMPASS self-check is based on, are reflecting the current state of knowledge and practice in SMEs and industry in general with regards to responsible innovation.

The online COMPASS self-check tool, as its usage grows, will provide aggregate insights into the current state of responsible innovation among SMEs. Aggregate user questionnaire data will be tracked and remain accessible to the WU Vienna team for further analyses and will indicate the most prevalent, as well as the most challenging areas of responsible innovation practice among companies. Upon registration users will have to indicate their type and the size of their organisation. This data can then be used to inform not only general insights into the state of responsible innovation but also differentiate it by company size. These aggregate insights generated by the COMPASS self-check tool can therefore significantly contribute to further development of industry standards for responsible innovation.

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Annex I: Complete COMPASS self-check tool questionnaire

Company Management

1. **Does your company's mission statement, or any corresponding document, include any of the following principles of Responsible Innovation?**
   - ❑ Pursuing innovations that can improve lives and/or environmental sustainability
   - ❑ Developing innovations in consultation with users and society
   - ❑ Contributing to the advancement of science by sharing data with others
   - ❑ Increasing public understanding about scientific progress
   - ❑ Other, please specify:
   - ❑ We follow (some of) the above principles but have no mission statement or corresponding document.
   - ❑ We do not include any of the above in our mission statement or corresponding document.
2. **Which of the following principles of Responsible Innovation are addressed in your company's Code of Ethics, Code of Conduct or corresponding document?**
   - ❑ Ethical research conduct
   - ❑ Avoiding the pursuit of innovations that can potentially harm people or the environment
   - ❑ Responsible management of research data
   - ❑ Disclosure of potential conflicts of interest
   - ❑ Disclosure of research and innovation funding sources
   - ❑ Consultation of a diverse set of stakeholders at various stages of an innovation process
   - ❑ Special care for vulnerable research participants
   - ❑ Experiments with animals in line with the "three Rs": Replacement, Reduction and Refinement
   - ❑ Other, please specify:
   - ❑ We follow (some of) the above principles but have no Code of Ethics, Code of Conduct or corresponding document.
   - ❑ We do not specify any of the listed principles in our or corresponding document.
3. **Which of the following statements applies to your company's Code of Ethics, Code of Conduct or corresponding document?**
   - ❑ The document is publicly accessible.
   - ❑ The document is reviewed periodically.
   - ❑ Employees have been involved in the development of the document.

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- ❑ External stakeholders have been involved in the development of the document.
- ❑ Existing standards or tools were used to define the contents of the document.
- ❑ The document specifies guidelines and procedures for dealing with breaches.
- ❑ New employees are informed about the document, its contents and enforcement.
- ❑ Employees are regularly trained on how to make sure the contents of document are enforced within the company.
- ❑ The document outlines employee responsibilities.
- ❑ Other, please specify:
- ❑ We have no such document. / We have such a document but none of the above apply.

4. **Does your company have access to a body or individual that acts as an ethics advisor; such as e.g. an ethics committee? If so, which of the following apply?**
   - ❑ The terms of reference are publicly available.
   - ❑ Approval is required for human participation or animal experiments in research and development.
   - ❑ Tasks include feedback about research studies and conveying concerns and complaints.
   - ❑ Its members receive relevant training on a regular basis.
   - ❑ Other, please specify:
   - ❑ We do not have access to such a body or individual. / We have access to such a body or individual, but none of the above apply.

5. **Which of the following apply to your company's handling of concerns about the company's research or innovations?**
   - ❑ We specify what concerns should be reported (e.g. health and safety concerns, ethical issues, risks).
   - ❑ We publish contact details for reporting concerns.
   - ❑ We specify protection measures for persons expressing concerns (e.g. confidentiality, rights).
   - ❑ We specify procedures for investigating reports of misconduct.
   - ❑ We have rules for maintaining records in place.
   - ❑ Other, please specify:
   - ❑ We specify none of the above.

6. **Are any of the following groups represented in a decision-making capacity in your company (e.g. on an advisory board)? Select all that are represented:**
   - ❑ Customer representatives

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- ❑ End-user representatives
- ❑ Civil society organisations
- ❑ Academic experts or industry experts
- ❑ Consumer bodies
- ❑ Trade unions
- ❑ National governments
- ❑ International governing bodies
- ❑ The general public
- ❑ Other, please specify:
- ❑ None of the above

7. Does your company make any of the following information public?

- ❑ Sources of research funding received
- ❑ Involvement in research consortiums or partnerships with other companies
- ❑ Research methodologies used
- ❑ Product/service impact assessment results
- ❑ Supply chain Codes of Conduct
- ❑ Joint use of research data with third parties
- ❑ Joint use of user-generated data with third parties
- ❑ We make none of the above information public.

8. How does your company ensure ethical management of (research) data?

- ❑ Users' personal or other sensitive data is not shared with third parties.
- ❑ Data storage is secured and remains inaccessible to unauthorized third parties.
- ❑ Data storage is protected against disaster and risk as long as the respective data is in use or until terminated.
- ❑ When data is no longer in use or the legally required time to maintain it has expired, it is destroyed in a way that guarantees off- and online data protection and irreversibility.
- ❑ Our measures to ensure protection of data during sharing, re-use, and distribution go beyond the legal requirements applicable to our company.
- ❑ Other, please specify:
- ❑ We have none of the above measures in place.

9. Does your company share research data with third parties for a public good?

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- ❑ Non-sensitive and non-personal user-generated or research data is shared, if it has a potential to solve societal challenges.
- ❑ Research output data (such as analysis and publications) are made openly accessible.
- ❑ Precompetitive research data is shared.
- ❑ We decide on a case-by-case basis.
- ❑ Other, please specify:
- ❑ We do not share or make any data openly accessible.

10. Does your company engage in any activities aimed at raising public awareness about the science behind your innovations?

- ❑ We collaborate with universities or other educational institutions.
- ❑ We host Open Door Days for the public.
- ❑ We publish background information or give interviews in non-scientific media (e.g. newspapers, magazines, blogs).
- ❑ We organise, or participate in, events targeted at the general public.
- ❑ Other activities, please specify:
- ❑ We do not engage in any activities aimed at raising public awareness.

11. How does your company address relevant standards and regulations relating to your industry or products/services?

- ❑ We constantly monitor developments of standards and regulations at national and international levels.
- ❑ We improve our processes, products and services in preparation for expected regulatory changes and future standards.
- ❑ We engage in, and support, the standards and regulatory development in our field.
- ❑ None of the above

12. How does your company ensure non-discriminatory (e.g. in terms of gender, age, ethnicity, religion, physical abilities, marital status, sexuality) recruitment practices?

- ❑ Recruitment staff are trained in gender and diversity issues.
- ❑ Job interviews are conducted by diverse interviewers.
- ❑ Job descriptions are clear about the requirements of the job, in order to provide an objective basis for recruitment.
- ❑ In case of equal credentials among candidates, preference is given to underrepresented groups (e.g. women).
- ❑ Other, please specify:
- ❑ None of the above

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13. **How does your company support employees in managing balance between work and private life?**
    - ❑ Leave opportunities (e.g. sabbatical, parental leave)
    - ❑ Child care arrangements for employees (e.g. offsite subsidized child care)
    - ❑ Measures to support breastfeeding mothers (e.g. lactation rooms)
    - ❑ Prayer rooms for religious employees
    - ❑ Meetings are not scheduled in the early morning or the late afternoon to make sure staff members with caring duties or other private obligations can take part.
    - ❑ Flexible work time arrangements
    - ❑ Part-time work arrangements
    - ❑ Support for dual careers by helping partners to find employment in case of relocation
    - ❑ Other, please specify:
    - ❑ None of the above
14. **Which of the following career development practices are implemented in your company?**
    - ❑ Unbiased staff performance appraisals
    - ❑ Transparent career paths and requirements
    - ❑ Internal mentoring opportunities
    - ❑ Trainings appropriate to staff development needs
    - ❑ Trainings organised during paid working time
    - ❑ Training schedules respect employee family care or other personal duties
    - ❑ Other, please specify:
    - ❑ None of the above
15. **How does your company ensure transparency and equality in remuneration and benefits?**
    - ❑ Our pay and benefit schemes are made transparent to all employees.
    - ❑ We publicly report our equal pay statistics.
    - ❑ We strive to make all additional benefits (e.g. training) equally available to all staff members regardless of their gender, marital status, religion, age, or any other diversity dimension.
    - ❑ Other, please specify:
    - ❑ None of the above.
16. **How does your company protect employees against harassment?**
    - ❑ We have an anti-harassment policy.
    - ❑ We conduct harassment prevention training.

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- ❑ We have an anonymous complaints procedure (including reporting of incidents, protection for whistle-blowers, and support of harassment victims).
- ❑ Managers are held accountable to the principles of respectful behaviour in communication and interaction.
- ❑ Other, please specify:
- ❑ None of the above

17. How does your company ensure health and safety of employees involved in development, manufacture, distribution, use, disposal, and recycling of products?

- ❑ We have a written health and safety policy in place.
- ❑ Regular health and safety trainings are organised.
- ❑ We have a formalised system for employees to report their health and safety concerns.
- ❑ Safety procedures are available on site for all employees and visitors.
- ❑ Routine internal and external inspections are conducted and analysed for possible improvements.
- ❑ Safety issues and accidents are archived.
- ❑ We disclose the standards and protocols used for ensuring health and safety.
- ❑ Other, please specify:
- ❑ None of the above

18. How are employees in your company empowered to conduct Responsible Innovation?

- ❑ Employees receive environmental awareness training.
- ❑ Employees receive social awareness training.
- ❑ Employees are trained on gender and diversity issues related to the company's products and services.
- ❑ Employees receive interdisciplinary training.
- ❑ Employees are encouraged to reflect on purpose and the potential impact of the company's research and innovative solutions.
- ❑ Employee feedback/performance reviews include aspects of Responsible Innovation.
- ❑ Employees are given an opportunity to provide feedback on how the company's responsibility in research and innovation processes can be improved.
- ❑ Other, please specify:
- ❑ None of the above

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Idea Generation & Research

19. Which of the following criteria are decisive in prioritising new ideas for products or services?

- ❑ Serving user needs
- ❑ Potential to alleviate a societal or environmental challenge
- ❑ None of the above

20. How does your company identify societal challenges and the company's role in alleviating them?

- ❑ We observe international and national societal challenges (e.g. the United Nation's Sustainable Development Goals).
- ❑ We observe societal trends to identify how we could contribute to positive changes.
- ❑ We engage in activities outside our core business to broaden our long-term view of societal, technological, and regulatory developments.
- ❑ We cooperate with experts to better understand social, ethical and environmental concerns related to our innovations.
- ❑ We consult with external stakeholders to better understand potential positive impact of our innovative products or service on the society or the environment.
- ❑ Other, please specify:
- ❑ None of the above

21. Which of the following groups does your company involve in the idea generation or early research stage of an innovation process?

- ❑ Shareholders
- ❑ Customers
- ❑ Users
- ❑ Supply chain partners
- ❑ Experts
- ❑ Governmental agencies
- ❑ Civil society organisations
- ❑ Consumer bodies, patient associations or other civil society organisations
- ❑ The general public
- ❑ Other, please specify:
- ❑ We do not involve any of the above mentioned groups in the idea generation or early research stage of an innovation process.

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22. In which roles are the groups indicated in the previous question involved in idea generation or early research?

- ❑ They are informed of research topics and processes.
- ❑ They provide information; e.g. as respondents to market research or focus group participants.
- ❑ They provide feedback on the research process or the envisioned innovation.
- ❑ They are involved in agenda setting for company research.
- ❑ They co-design research with us.
- ❑ They are involved in other roles, please specify:
- ❑ We do not consult stakeholders in idea generation or early research.

23. How does your company ensure effective, productive and fair stakeholder engagement?

- ❑ We are transparent about the objectives of stakeholder engagement and stakeholder roles prior to starting the process.
- ❑ We clearly define the tasks of participating stakeholders.
- ❑ We share all information relevant to the engagement process.
- ❑ We use a third party moderator or experienced facilitator to enable the development of trustful relationships between participating stakeholders.
- ❑ We take measures to facilitate the exchange of diverging views of different stakeholders.
- ❑ Other measures, please specify:
- ❑ We do not practice stakeholder engagement. / We practice stakeholder engagement, but none of the above apply.

24. How is stakeholder input handled in the idea generation or early research stage of an innovation process?

- ❑ We aim to integrate stakeholder views, including critical ones, into the development of our innovation.
- ❑ We are transparent about the process of deciding which ideas and feedback are taken up and which are not.
- ❑ We are transparent about what happens to stakeholder input and how it is integrated into further developments.
- ❑ Other measures, please specify:
- ❑ We do not practice stakeholder engagement. / We practice stakeholder engagement, but none of the above apply.

25. What types of impact does your company take into account when anticipating the (positive and negative) impacts of your product/service?

- ❑ Expected positive impact on society or the environment

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- ❑ Unintended negative consequences e.g. from unintended use of a product/service
- ❑ Trade-offs between different sustainability issues or societal needs (e.g. environmental benefit at a social cost)
- ❑ Trade-offs between consequences at different stages of the product/service life cycle
- ❑ Impacts on different groups of people (genders, ethnicities, ages, physical abilities, geographic locations, cultures, religions etc.)
- ❑ Other, please specify:
- ❑ We do not anticipate the potential impact of our innovations. / We anticipate the potential impact of our innovations, but do not take any of the above into account.

26. Which practices does your company have in place to anticipate potential positive and negative consequences of an innovation?

- ❑ We clearly identify which societal needs we want to address with our innovations.
- ❑ We conduct pilot studies to evaluate different impact scenarios.
- ❑ We employ exercises in which we try to imagine the worst case scenarios of misuse/misemployment/derivation/evil use of our innovation as a way to explore potential risks.
- ❑ We conduct ex-ante impact assessments of our innovations.
- ❑ We conduct technology assessments.
- ❑ Other, please specify:
- ❑ None of the above

27. Which of the following environmental issues are considered when anticipating the (positive and negative) impacts of your company's products/services?

- ❑ Energy consumption
- ❑ Renewable resource consumption (e.g. land, wood, water)
- ❑ Non-renewable resource consumption (e.g. metals, fossil fuels)
- ❑ Greenhouse gas emissions
- ❑ Toxic substances emissions (e.g. into water, soil or air)
- ❑ Waste generation
- ❑ Biodiversity maintenance
- ❑ Other, please specify:
- ❑ We do not consider any consequences on the natural environment when anticipating the potential impact of our innovations.

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28. Which of the following social aspects are considered when anticipating the (positive and negative) impacts of your company´s products/services?

- ❑ Equal opportunities independent of e.g. gender, age, ethnicity, religion, physical abilities, marital status, sexuality
- ❑ Impact on marginalised groups; e.g. disabled people, migrants, elderly
- ❑ A person's legal and human rights, such as access to sufficient food and water, health rights, work rights, land rights
- ❑ Employment opportunities
- ❑ Affordable housing
- ❑ Public health
- ❑ Public safety
- ❑ Access to education
- ❑ Personal privacy
- ❑ Personal autonomy
- ❑ A person's access to human interaction
- ❑ A person's attitudes, emotions, thoughts
- ❑ Other, please specify:
- ❑ We do not consider any social aspects when anticipating the potential impact of our innovations.

29. Which practices are in place in your company to ensure that societal impact is considered in the decision to further develop an innovative idea?

- ❑ We keep the management regularly informed about expected positive and negative impacts connected to a particular idea.
- ❑ We discuss and share our insights with relevant communities or organisations in order to identify common solutions.
- ❑ We include social and environmental costs and benefits in business modelling.
- ❑ We document anticipated negative consequences in order to develop mitigation or prevention measures during the product/service development stage.
- ❑ If there are expected potential negative impacts on people or the environment, we do not pursue an idea.
- ❑ Other, please specify:
- ❑ None of the above

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30. Is it common practice in your company to adapt or discard a novel idea before development for any of the following reasons?

- ❑ Potential negative impacts on society can be expected.
- ❑ Potential negative impacts on the environment can be expected.
- ❑ With current knowledge, we cannot assess potential negative impacts on society or the environment.
- ❑ The idea does not promise any positive societal or environmental impact.
- ❑ Other, please specify:
- ❑ None of the above

31. How does your company encourage employees to reflect on the company's research and innovation?

- ❑ Employees are encouraged to develop alternative solutions to identified problems.
- ❑ Staff are prompted to question their basic assumptions about company research, innovation processes, and output.
- ❑ Employees are encouraged to express concerns about the potential social or environmental effects of the company's innovations.
- ❑ Concerns are often followed by an adaptation of procedures or an adaption of the product or service.
- ❑ Other, please specify:
- ❑ None of the above

Development & Testing

32. How does your company involve stakeholders in product/service development and testing?

- ❑ They test prototypes or pilots of new products/services.
- ❑ They provide feedback on the comprehensiveness of information provided on products or services.
- ❑ They are asked to identify ethical, social, or environmental concerns.
- ❑ They are asked to identify solutions that could alleviate ethical, social, or environmental issues.
- ❑ They are asked to suggest improvements to increase the positive impacts of an innovative product or service.
- ❑ We do not involve stakeholders at this stage and disclose our reasons for not doing so (e.g. competitive data protection).
- ❑ Other, please specify:

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- ❑ We do not involve stakeholders in product/service development and testing and do not offer any explanation for this.

33. How does your company try to prevent unintended use of it innovative products or services?

- ❑ We design our products/services in a way that minimizes their potential for unintended use.
- ❑ We include safeguards to prevent any potential negative effects that could not be addressed through design.
- ❑ A reclamation strategy takes effect if unforeseen failures or negative effects become apparent when the product/service is already on the market.
- ❑ We seek to find solutions with relevant external communities (e.g. industry associations, other industry sectors, civil society organisations, communities of practice, regulators) if we cannot prevent negative consequences through design, safeguards, or reclamation strategy.
- ❑ Other, please specify:
- ❑ None of the above

34. How does your company aim to minimise negative impacts on the natural environment?

- ❑ We conduct life-cycle assessments.
- ❑ We acquire certification by a third party.
- ❑ We strive to reduce the total volumes used in packaging.
- ❑ We label all materials in products for effective recycling.
- ❑ We have a recycling or reclamation programme to support proper disposal or re-use.
- ❑ We design to facilitate disassembly and repair to extend the product's/service's lifespan.
- ❑ We monitor, report and have targets to reduce our environmental impacts.
- ❑ Other, please specify:
- ❑ None of the above

35. Which of the following practices of responsible sourcing of materials does your company follow?

- ❑ We hold suppliers accountable to social and environmental standards.
- ❑ We screen suppliers for positive practices; such as environmentally friendly production, excellent human rights, or labour practices.
- ❑ We screen suppliers for negative practices or non-compliance with international human rights or environmental standards.
- ❑ If we identify social or environmental issues, we notify our supply chain partners of the need to address them.
- ❑ We avoid sourcing significant parts of our supply chain from areas with poor records on human rights unless we ensure an effective human rights compliance policy.

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- ❑ Other, please specify:
- ❑ None of the above

36. How does your company re-evaluate expected impacts prior to market launch?

- ❑ We re-examine the initial knowledge base.
- ❑ We re-examine contextual factors (e.g. social, political, legal).
- ❑ Other, please specify:
- ❑ We do not re-evaluate expected impacts prior to market launch.

37. Is it common practice in your company to hold back or adapt an innovative product/service before it goes to market for any of the following reasons?

- ❑ Negative impacts on society and/or the environment can be expected.
- ❑ Negative impacts on society and/or the environment cannot be assessed.
- ❑ No positive societal or environmental impact can be expected.
- ❑ None of the above

Market & Impact

38. Which of the following social aspects do your company's innovations support?

- ❑ Employment opportunities
- ❑ Equality (e.g. gender, age, ethnicity, religion, physical abilities, marital status, sexuality)
- ❑ Societal cohesion and solidarity
- ❑ Reduced poverty or risk of poverty
- ❑ Employment opportunities
- ❑ Access to housing or improved housing conditions
- ❑ Access to products or services
- ❑ Healthcare or access to healthcare
- ❑ Education or access to education
- ❑ Gaining or maintenance of autonomy
- ❑ Gaining or maintenance of personal privacy
- ❑ Safety
- ❑ Human rights
- ❑ Peace

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- ❑ None of the above

39. Which of the following aspects of environmental sustainability do your company's innovations support?

- ❑ Reduced energy consumption
- ❑ Increased share of renewable resource consumption
- ❑ Reduced usage of non-renewable resources
- ❑ Reduced greenhouse gas emissions
- ❑ Reduced emissions of toxic or harmful substances into air, land or water
- ❑ Reduced waste generation
- ❑ Improved recycling processes
- ❑ None of the above

40. How do you monitor the impact of your company's innovations to societal well-being once they are on the market?

- ❑ We conduct case studies.
- ❑ We conduct analyses based on expert feedback.
- ❑ We conduct analyses based on user feedback.
- ❑ We continuously assess societal impact using performance indicators.
- ❑ Other, please specify:
- ❑ We do not monitor an innovation's impact on societal well-being once it is on the market.

41. How does your company ensure that potential negative impact is minimised once an innovation is on the market?

- ❑ We provide appropriate information and guidance on safe processing, usage, transportation, storage, disposal, or recycling of our products.
- ❑ We communicate and educate about potential risks.
- ❑ We disclose information about incidents of unintended use, processing, transportation, storage, disposal, or recycling.
- ❑ We have an alert system in place where customers and end-users can notify us of potential negative effects or issues.
- ❑ Other, please specify:
- ❑ None of the above

42. How does your company ensure continuous improvement of products or services?

- ❑ We regularly re-evaluate our products/services in light of changing technologies and contexts and use this information in further development.

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- ❑ We monitor trends that may influence our innovations or how they are used.
- ❑ We commission third-party evaluations and use the results in further development.
- ❑ We commission user or customer surveys and implement feedback.
- ❑ We ask for stakeholder feedback about the impact of our products or services.
- ❑ Other, please specify:
- ❑ None of the above

43. How does your company integrate insights from evaluation or feedback back into your innovation processes?

- ❑ We improve information about a product/service.
- ❑ We adapt our marketing or sales approaches.
- ❑ We adapt innovative products or services.
- ❑ We transparently communicate our reasons for not taking feedback into account.
- ❑ Other, please specify:
- ❑ None of the above

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Annex II: Additional Resources

In the development of the COMPASS (710543) self-check tool the COMPASS (710543) team has reviewed numerous academic publications, project reports, case studies and responsible innovation in business related tools. In addition, numerous consultations and discussions among the Consortium, external experts and the Advisory Board took place, to derive the questions and answer options for the self-check tool. Below please see a list of resources that have been used most extensively in the development of the COMPASS self-check tool.

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