Chapter 2
Responsible Innovation in Business

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Abstract This chapter introduces responsible innovation in a business context. The first part explains the basic terms that constitute responsible innovation from a business perspective. The second part presents tangible business practices that operationalise responsible innovation and introduces two good practice examples that hint at the variety of ways in which responsible innovation can be implemented in companies.

Keywords Responsible research and innovation · Responsible innovation · Corporate social responsibility · Applied nanoparticles · Yoti · B Corporation

2.1   Introduction

"So, do you mean that I am irresponsible?"

This is the response you may get when you ask an entrepreneur if they would like to make their company's innovation processes and innovative products more responsible. Once you start explaining the elements of the responsible innovation (RI) concept, your conversation partner will likely relax and confirm that yes, consumer trust, ethical conduct or safety considerations are indeed of interest to their company, and that yes, they would be interested in hearing more about how they can decrease the risk of failing to meet consumer wants, or being blamed for undesirable side-effects of her company's innovation at a later point in time.

This chapter presents the contents of the conversation that could follow. To break down the concept of RI into practices that make sense in a business context, we first explore the two elements of RI, i.e. responsibility and innovation, from a business management perspective (Sect. 2.2). We then present RI as a collection of tangible

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company practices (Sect. 2.3) and introduce two companies that have already implemented many of these practices in their own particular way (Sects. 2.3.1 and 2.3.2). To conclude, we summarize main learning about RI in a business context (Sect. 2.4).

2.2 Defining "Responsibility" and "Innovation" in a Business Context

2.2.1 Responsibility

Business responsibility towards society has a longer history in business management literature than the idea of responsible innovation, or responsibility of science towards society. For a long time primary responsibility of business was defined only in economic terms – responsibility towards shareholders and the responsibility to make profit. The discourse on the extension of business' responsibility to stakeholders and broader society can be traced back to the 1950s and 1960s (Carroll and Shabana 2010), with scholars such as Howard R. Bowen (1953) and Peter Drucker (1954), who discussed the moral and ethical responsibilities of a business, and as such a business manager, towards society and the public good. The responsibility of business towards society has carried a number of conceptualisations, including philanthropy, business ethics, corporate social responsibility, corporate citizenship and corporate sustainability (Carroll and Shabana 2010). Corporate social responsibility (CSR) and corporate sustainability (CS) are currently the more common terms in business practice and are showing signs of convergence (Montiel 2008), yet so far have no fixed standardised definition (Montiel and Delgado-Ceballos 2014). In essence, business' responsibility to society can be linked to three main theories: stakeholder theory, social contracts theory and legitimacy theory (Moir 2001).

The concept of business responsibility has evolved from the philanthropic approach of "giving back", to a more strategic approach to business' responsibility towards society being addressed in management literature. Since the early 2000s scholars have started to connect business' strategic economic goals with business' roles and responsibilities towards society, with numerous studies examining the "business case of CSR" (Carroll and Shabana 2010). Porter and Kramer (2011) argue that by acting responsibly and gearing a business towards responding to societal needs, business can simultaneously serve its economic and societal responsibility and introduced the idea that business is a force that can "create shared value". Their idea brought business responsibility from the fringes of the company to the core of business strategy (Crane et al. 2014). Company responsibility was no longer seen as an activity outside a company's core operations and core competencies, but rather as responsiveness to societal needs through creating products and services, which became a potential avenue for business growth. One can argue that this shift from responsibility as an afterthought to responsibility as a strategy also fuelled the

increasing replacement of the term corporate social responsibility with corporate sustainability. The latter signifies that responding to societal needs and acting responsibly towards people and the environment is a precondition to business survival.

Recent years have seen a strong societal push to acknowledge that businesses' value chains, from sourcing of raw materials to production, sales and product end-of-life, cause impacts on people and the environment for which they are responsible. Therefore, the European Commission, as well as other public actors, has redefined what CSR means, from a "company voluntary contribution to society", to company "responsibility for its impacts" on society (European Commission 2011), including people and the environment.

With these societal pressures, the understanding and conceptualisation of company responsibility towards society now encompasses a number of issues, themes and business activities. Companies from a variety of sectors are being scrutinised for their effects on people and the environment throughout their value chains (Phillips and Caldwell 2005); extending their responsibility for impact beyond their own operations to supply chains and product use. This includes materials sourcing and procurement in supply chains, production, transport and packaging, and lastly the life-cycle effects from the actual use of the product, and its disposal or afterlife. The issues range from environmental resource use or emissions into air, land or water, to effects on human rights, ensuring decent work and health and safety in company production or operations, ensuring an environmentally friendly afterlife of company products or even the social desirability of a company's products and services. Therefore, business responsibility towards society now means both, responsible management of business operations, as well as a business' responsibility for the impacts of its products and services on people and the environment. Companies globally are being expected to take responsibility for doing no harm to people or the environment, whereas the most advanced ones are looking into strategies that drive the business through responsiveness to societal needs.

2.2.2 Innovation

The story of innovation often begins with the economist Joseph Schumpeter (1883–1950) and is thus deeply rooted in socio-economic theory. For Schumpeter (1939), economic development was a dynamic process driven by the development of novel[1] combinations – innovations – which in processes of creative destruction

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[1] Definitions of innovation differentiate between the scopes of novelty. While Kieser (1969) defines innovation as novelty at the level of an organization, according to Vedin (1980: 22) innovation is "…an invention brought to its first use, its first introduction to the market". Garcia and Calantone (2002) identify six perspectives of novelty in the innovation literature current at the time: New to the company, new to the adopting unit, new to the market, new to the industry, new to the consumer and new to the world.

generate new business models. Innovation can arise in the form of a new product formerly unknown to the consumer, but also in the form of a new quality of an existing product. Likewise, innovation can emerge in the form of the introduction of a new production method, an opening up of new sales markets, the development of new sources of raw materials or a re-organization of a business already in the market. In any form, innovation allows businesses to occupy a temporary monopoly position, which lasts until competing businesses either successfully imitate the innovation or gain supremacy through further or novel developments.

From an economic point of view, innovation is generally conceived as the basis for a competitive economy (cf. Adams et al. 2006) and thus as something that is inherently desirable in the present perception of the western industrialized world (cf. Blok and Lemmens 2015; Moldaschl 2010). Companies pursue innovation to develop new market segments, improve the quality of their products or reduce the costs of production. They aim to maintain their competitive edge or improve their position in the market through innovative products (goods and services), innovative processes (production or delivery methods), innovative marketing (design, packaging, placement, promotion, pricing) or organisational innovation (business practices, workplace organisation, external relations). In this constant race for novelty and improvement only those that constantly reinvent themselves and their products can win. An innovation's success is, however, measured in terms of its uptake on the market and its generation of economic profit for the owner of the innovation. Societal benefit may arise as positive externalities of innovation, but are not per-se decisive for action. In this way, innovations can be a source of income for the innovation owner and at the same time lead to job losses, or cause short- or long-term environmental, health or safety issues that may or may not become apparent at the time of the innovation's introduction to the market. This fact has found its countermovement in approaches to substitute solutions on the market with more eco-friendly, more sustainable or more socially desirable ones (see Chaps. 3 and 4 for an introduction to these types of innovation), and thus combine the pursuit of competitiveness with a normative requirement to reduce harm to people and the natural environment.

Innovation management in companies is mostly concerned with creating fruitful environments for new ideas, and deciding which of these ideas will be pursued further and which are to be discarded. This means that not every new idea will necessarily turn into, or lead to, innovation[2]. It also means that innovation management is constantly concerned with creating opportunities for innovation through the formulation of new ideas, and destroying opportunities for innovation by discarding a large proportion of these ideas before they reach the market, or even the develop-

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[2] Different authors consider different events as decisive for defining innovation: According to Roberts (1987), innovation takes place when an introduction to the market is followed by commercial exploitation, application, diffusion and further development; an innovation needs to be successful on the market and create value in order to earn the name. Brockhoff (1992), in contrast, considers market entry to be sufficient criterion for product or process innovation; irrespective of its level of commercial success.

ment phase. Management literature has extensively discussed approaches to establishing an innovation culture within an organization, the pros and cons of involving company external actors and the selection process of one idea over another. These discussions are too versatile to be reproduced in this chapter. It should be noted, however, that decisions to pursue one idea and discard another are generally taken under high levels of uncertainty about potential success. The higher the dynamics in a particular market and the more radical[3] the innovation, the higher the levels of uncertainty will be. Well-known management approaches to decrease uncertainty through utilising information from company-external sources include open innovation, user innovation and innovation communities (Fichter 2009; Chesbrough et al. 2006; Gassmann and Enkel 2004; von Hippel 1986).

In contrast to a few decades ago, today a company can fall back on various methods to support both the idea generation process as well as the selection of ideas for further development. Many of these methods have been developed by companies and now find their way into both the practitioner and academic literatures. These range from "classic" methods such as brainstorming to more recent development such as design thinking, the "innovation sprint" (cf. e.g. Ma and Morris 2017), or gaming approaches.

2.3 How Should Companies Be(come) Responsible in Their Innovation Activities?

Once an entrepreneur's interest in responsible innovation has been stirred, they will probably have two pressing questions: 'What exactly do I need to do?' and 'What's in it for me and my business?' Innovation is usually closely connected to the core business of a company, and different companies operate under different conditions (depending on e.g. business model, size, product and contextual factors such as legal frameworks or sector dynamics), so there are no universally valid answers to these questions. It is, however, possible to describe a general process to develop a tailored RI strategy and point out resources that companies can rely on. The following five steps provide guidance to a company wishing to engage with RI:

1. **Understand what responsible innovation is all about.** While you may not have heard of the concept of responsible innovation, your company may already be doing things that fall under the concept of RI. You can figure out in which areas of your operations RI might be particularly important, find out what your current strengths are, and what action you may want to take. One way to self-assess your

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[3] While incremental innovations are born along existing paths of (technological) development and improve the performance of existing products or processes, radical innovations are disruptive in their nature and create path changes. Radical innovation is generally followed by a multitude of incremental innovations, and often by organisational or societal changes (cf. e.g. Utterback 1996).

company is using the COMPASS online self-check tool[4]. Another way is reflecting together with a responsible innovation expert.

2. **Reflect on the expected benefits of responsible innovation.** The implementation of RI will take time, may require additional investments and will likely require changes in company practices. It could result in the (re-)definition of company values, goals or collaboration patterns. It might even affect the company's business model, if people realize that core business activities are not in line with the objectives of RI. A company will only invest in these efforts if a particular added value can be expected. This added value can be measured in terms of e.g. improving customer relationships, pro-actively meeting expected future regulation, or increasing the company's positive impact on society. This will differ between sectors, regions and individual companies. The crucial point is to understand what pursuing RI may yield and what the company is willing to invest to this end.

3. **Establish management and employee commitment.** To ensure that time and money is allocated to employees' engagement with RI, and that practices are actually implemented, both top management as well as employees need to commit to pursuing RI. Such commitment can, for example, be facilitated through inclusive development of a company Code of Conduct that respects RI (see Sect. 2.3.2), or providing employees with training in RI.

4. **Develop an action plan for development/adaptation of practices**. Once a company has a clear idea of where it stands, and commits to making a step towards RI, an action plan can be developed. First, identify contextual factors that will likely shape your company's working context, potential markets, societal trends, workforce and collaborations in the middle- to longer-term future. Then identify practices and milestones, and specify responsibilities and deadlines. Potentially, you could develop indicators and procedures for monitoring progress. If already apply suitable methods for taking these steps in your company, make use of those. If you are not familiar with any suitable methods, you could utilize e.g. the COMPASS co-creation method kit[5] or procure the services of a consultant or facilitator.

5. **Stay focused on the objective of responsible innovation**. Different aspects of RI will seem more relevant than others, depending on the company and the context it operates in. Some practices will be more intriguing in terms of expected added value. Nevertheless, it is important to implement practices that are the most important and critical in that sector, and which cover different aspects of RI

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[4] The COMPASS self-check tool allows companies to find out what they already do that qualifies as responsible innovation and what they could do to improve their responsible innovation performance. All proposed practices are entirely within company control and can be put into practice one-by-one or in combination. The tool has been available free of charge at https://innovation-compass.eu/self-check/ since March 2019.

[5] The COMPASS co-creation method kit provides detailed instructions on how to conduct (a) a forward-looking exercise to identify future relevant company context and important responsible innovation practices and (b) a back casting exercise to develop an actionable roadmap for the company. It has been publicly available at https://innovation-compass.eu/method-kit/ since March 2019.

to keep pursuing the overall objective, which is to increase positive societal impact and minimize actual and potential negative impact to the highest degree possible. Keep re-evaluating your company practices and adapting your action plan at regular intervals to respond to changing contextual factors, technological advances and company developments.

The next two sections of this chapter present two companies that have successfully completed these five steps towards responsible innovation[6]. The two good practice examples hint at the variety of ways in which RI can be implemented in companies. One of them details the various practices that a nanotechnology company has introduced to ensure that all of its research and innovation processes and products exceed the requirements of RI, the other demonstrates how a cyber security company relies on the principles of RI to inform their decision-making processes.

2.3.1 Good Practice Example 1: Responsible Innovation as a Business Model[7]

Applied Nanoparticles SL (AppNps) was founded in 2013, arising as a spin-off company from the Universitat Autònoma de Barcelona (UAB), the Institut Català de Recerca i Estudis Avançats (ICREA), and the Catalan Institute of Nanoscience and Nanotechnology (ICN2), with the goal to base the research and development of nanoparticles on Responsible Research and Innovation (RRI) principles. AppNps's main product is BioGAS+, which is an additive based on iron nanoparticles directed to the optimisation of anaerobic digestion processes. The main aim of BioGAS+ is to transform waste into appealing raw materials in an efficient and sustainable way.

AppNps's company structure exhibits several features that demonstrate its commitment to the principles of responsible innovation. There is a collective ownership of the company without an explicit CEO. Employees are involved in decision-making with the objective of keeping the company diverse and robust; and to ensure that the initial aims of the company are preserved. This is what AppNps refers to with their slogan "a company in the making". Their second slogan, "a company with purpose", refers to the collectively agreed upon vision to become a role model in terms of responsible innovation and nanoparticles. Aware of the need for communication between science and society for a smooth introduction of nanotechnology in society, AppNps is a strong advocate of science education and a pronounced stakeholder

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[6] Both cases were developed according to the requirements of Sage Business Cases (http://sk.sage-pub.com/cases) and will be published in 2020. Each case consists of an introduction to nanotechnology or cyber security, respectively, an introduction to responsible innovation, the case, expected learning outcomes and discussion questions. Both cases are further accompanied by a teaching note that describes teaching objectives, target audience, suggested teaching strategy and suggested answers to the discussion questions.

[7] The complete case study is available at https://innovation-compass.eu/training/cases/

dialogue. Efforts to act responsibly are further implemented through implementation of safety and health regulations that go beyond compliance and employee's education on nanotoxicity and nanosafety. On the whole, AppNps continually monitors that actions are directed to seek social, economic and environmental sustainability.

AppNps constantly need to balance scientific and commercial interests and tackle the challenge of involving society in a way that benefits both society and the company. The company is willing to engage themselves with ethical dilemmas, such as the ethical dimension of growing crops when this could potentially affect food security negatively. These questions require AppNps to constantly reflect and re-evaluate its values and strategies.

2.3.2   *Good Practice Example 2: Responsible Innovation as a Decision Support System*[8]

Yoti[9] is a London-based information technology company which was founded in 2014. It employed over 200 people in 2018 and has offices in India, the US and Canada. Yoti brings together the advance in biometric technologies and an increased smartphone usage to create a digital identity solution that allows online users to prove who they are without compromising their privacy. More specifically, the main company product in an app that combines biometric information with a government-issued identity document (passport, driving license, etc.). The app was launched in 2017 and was downloaded more than 1.5 million times within the first half year. The Yoti app is beneficial both for organisations – to verify online and in person who people are – and for individuals – to prove their age or identity with their smartphone.

Yoti aims to have a positive impact on society and has the goal to become the world's most trusted identity platform. The firm is well aware of the responsibility that goes along with handling personal data and thus considers data responsibility to be a core strategy of the business model. This is achieved by asking users to provide only a minimal amount of data in the first place and by implementing a system that encrypts and stores the data separately, so that only the individual users can tie together all the data. Moreover, Yoti has put several principles in place to ensure a maximum amount of transparency and consumer trust. These principles include continually considering the firm's impact on users, employees, suppliers, partners and the environment; providing a digital identity to anyone for free; and disclosing terms and conditions in a transparent way. To watch over the compliance with these

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[8] As a cyber security B Corporation based in the UK, Yoti was invited to participate in the COMPASS project in 2017. Yoti was highly active in co-creating the Responsible Innovation roadmap for cyber security, and has since been in close contact with the COMPASS Consortium for advice on questions related to ethics and transparency, and to spread word about data trust and security issues.

[9] https://www.yoti.com/

principles, Yoti has installed a "Guardian Council"[10]. The principles are practically applied by an intense stakeholder collaboration, an engagement with digital policy, digital identity and data protection advocates and by committing to standards beyond legal requirements.

Inherent to the collection and storage of data there are multiple challenges. First and foremost, this is the issue of data privacy. In contrast, from a perfect privacy of user data arises the possible implication of facilitating illegal activity. Minimizing the risk of criminal misuse while maintaining data security is a major challenge that has been tackled in an extensive dialogue with human rights and consumer rights experts.

2.4 Chapter Conclusions

Responsible innovation, albeit born in the public policy realm and to date adopted primarily by research institutions, is highly complementary to the broad concept of business responsibility towards society. From the process dimension it allows the extension of the concept of responsible business management to research and development (R&D) departments, and guides businesses in how to make their R&D more responsible and responsive to societal needs. Traditional approaches to CSR have not as yet extensively considered the R&D stage as a crucial one in which responsibility aspects should be integrated and considered. Furthermore, from an outcomes perspective, innovation and R&D intensive firms, especially those whose customers are intermediaries and not the ones who will use the product or service, have not often considered how their innovations affect society. They may have looked at their sourcing and manufacturing process but paid less attention to what effects may be caused for people or the environment once their products or services are utilised. With the RI concept, these considerations of the effects on society and how to best serve to society enter the R&D functions in companies. The concept is also promising in addressing the core business responsibility for companies in sectors that are innovation-intensive.

While innovation itself has no normative orientation, some companies have made it part of their strategies or business models to innovate in order to reduce the negative impacts of their products or services on people and/or the environment. As an innovation management strategy, responsible innovation can be understood as a measure to reduce the risks of innovation failing to meet consumer wants, missing out on potential markets, or costly adaptations or roll-back at late points in the innovation process, while simultaneously increasing public credibility, legitimacy and trust of the company and its innovative products or services. All of which correspond to making innovative businesses more competitive.

The examples of AppNps and Yoti show that businesses can develop their own approaches and work out RI practices that suit them in their particular contexts.

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[10] https://www.yoti.com/about/council/

Even though the two companies are vastly different, and the key issues of responsibility in their innovation processes are also different, both AppNps and Yoti have, (1) understood what RI in their specific context is and what are the most critical elements to address; (2) reflected on the potential benefits of RI for their specific case; (3) established management and employee commitment to RI; (4) established an action plan and roadmap to RI. The companies have in common a basic interest in creating positive societal impact. They both want to go beyond what is legally required of them in terms of safety, security or ethical issues. They want to play an active role in shaping the regulatory environment for their current and future business undertakings. Even though, like any other small enterprise, personnel time is among their scarcest resources, they invest time and effort into deliberation within and beyond company boundaries and into putting new practices and routines into place. Even though there are no numbers (yet) to predict a monetary return on these investments, both companies are committed to traveling this path and reaping economic profits based on the principles of responsible innovation.

Rather than implementing a top-down initiated policy concept, RI in companies concerns company values, innovation practices and interaction with consumers and other external stakeholders. If we accept that the RI concept is currently not tailored towards businesses, but that businesses are willing to implement elements of RI once they understand the benefits for their own business strategy as well as towards society, then a promising manner to approach implementation would be to build on what businesses are already doing – either individually or in sectoral initiatives – and provide them with information as well as with tools to explore other aspects of RI. Implementation strategies are highly likely to vary between sectors, application areas or even between individual businesses. Learning from "responsible innovation pioneers" among peers can constitute an important first step towards understanding how RI can be made operational in a business context.

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