



## The dead end of classical innovation management and unsustainable innovation

### 1. Introduction

Innovation management emerged as an academic field, raising considerable attention among scholars and practitioners (Adams et al., 2006). So far, most inquiries on these matters concentrate on innovation generation, process management, and application diffusion, with little emphasis on sustainability and societal aspects (Biggi and Giuliani, 2021). In turn, sustainable development approaches became mostly standalone research fields with little overlap with the management of innovation-related activities, commonly labelled ‘innovation management’.

During the last decades, innovation management more and more followed the user-driven approach first named by Eric von Hippel in the early 2000s (Von Hippel 2006). However, the pure focus on users often fails to develop a systemic perspective that accounts for applications and external effects associated with social, societal, and environmental impact (Coad et al., 2021). The failure stems from the fact that the individual is aware of the external effects but considers personal well-being first, assuming that others will care about these effects. Thus, innovation management focuses on the individual user (customer) needs in the first instance with some more or less modest adjustment to the external effects on others.

Also, companies carefully monitor innovation projects, employing sophisticated controlling instruments that force innovation managers to pay more attention to economic indicators. Thus, innovation management perceives ‘sustainability’ traditionally as the aim of achieving lasting revenues resulting from innovation activities but less in the sense of meeting grand challenges or tackling environmental issues purposefully. While we recognize the exceptional companies that align their business model closely to environmental needs abroad, environmental or grand challenges-driven innovation management is hardly implemented in many companies’ innovation management. This failure generates a myopic view of how technological innovation can be achieved *vis-à-vis* the grand challenges we face collectively.

Sustainable innovation (from social, environmental and economic perspectives) requires harmonization between micro, meso and macro processes that can be orchestrated beyond the limits of particular companies, regions or countries. Such orchestration is unlikely to result from voluntary actions. At least at the initial stages, regulators design framework conditions that force and incentivize companies to adjust their innovation management, considering the revised framework described by the grand challenges.

Grand challenges are highly complex and can only be tackled through coordinated and collaborative action (Howard-Grenville, 2021; George et al., 2021). Examples of such challenges include climate change, inequality, poverty, water access, pandemics, pollution, and inequality (Grillitsch et al., 2019; Porter et al., 2020; Wright and Nyberg, 2017). Overcoming these challenges is non-negotiable to build more sustainable and inclusive socioeconomic systems (Addo, 2022). However, what we know so far is insufficient; we need new theories and empirical guidance to move forward. Grand challenges can be characterized as diffuse problems that isolated individuals and firms cannot solve. When left to their own devices, markets have demonstrated incapacity to regulate the construction of an environment supportive of sustainable innovation management. Adequate policies can – and should – take moral and ethical values to help shape more efficient incentive mechanisms that reward sustainable impacts from economic activity. We are not here arguing in favour of market “steering or “planning”, but rather in favour of smarter institutional settings in a coordinated fashion, thus requiring new forms of innovation policy governance (Fagerberg, 2023). This also limits the role of individual enterprises to become competitive in isolation, thus requiring a stronger sense of ecosystem thinking to address complex problems embedded in global contexts.

Ecosystem thinking in this context does not necessarily refer to actively engaging in ecosystem-based collaborative activities. It relates to networking activities and informal exchanges arising from these ecosystems. Typically, such informal exchanges have an inspirational impact resulting from the experiences with certain activities others made who are not necessarily competitors but might even be. Thus, the informal nature of these exchanges potentially leads to companies rethinking their business models, including designing their innovation management practices and ambitions and considering initiatives with different ambitions.

Summing up, we understand that traditional innovation management needs to develop further -towards a dedicated business function which designs, implements and finetunes the business processes related to innovation activities with consideration of grand challenges. Furthermore, innovation management supports and maintains an innovation culture that incorporates awareness of grand challenges. Creating grand challenges awareness is the initial step on a longer path towards sustainable innovation management. Sustainable innovation management connects the basic awareness of grand challenges and the readiness to incorporate this awareness in developing company-specific

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solutions (products, processes, services) with the user and economic impact (revenues) driven innovation. Furthermore, sustainable innovation management balances short-, mid-, and long-term planning and impact assessment. Impact assessment goes beyond the pure financial assessment but includes environmental and societal impacts. In other words, sustainable innovation management applies a systemic, holistic view of managing innovation.

Following these introductory reasons, this Special Issue adopts a systemic view of innovation management. It shows the shortcomings of established innovation management concepts that limit the focus on economic reasoning but fail to adequately tackle sustainable development (grand challenges) and circular economy. The SI postulates that governments in many countries will impose stricter environmental regulations on companies' activities in the foreseeable future. This will require adjustment of now-established innovation management routines. The integration of innovation management and ecology-driven sustainability is not yet diffused. Also, innovation management needs to consider the impacts of innovation on society early to be prepared for finetuning and adjusting activities in the foreseeable future. Both themes are relatively new in integrating different schools of thought and approaches.

## 2. Lightning up the dark side of innovation management

Strictly speaking, we could argue that our negative environmental and social impact started in parallel with the appearance of modern innovation management. Since we have been managing innovation roughly for the last 150 years, more and more environmental and social issues have arisen in line with this. In other words, **innovation management highly correlates with unsustainable ecological and social impacts**. The research and practitioners' community on innovation management has not fully realized this.

Years back, in the second half of the nineteenth century, efforts towards creating innovations had become increasingly structured and managed. These efforts often took place in cooperation and teamwork of people with established goals and roughly documented procedures. With this, the discipline of innovation management was born, dating back to the Edison labs in the US or the chemical industry in Europe. Years after, particularly during the two world wars, more and more refined management techniques as systematic design methods have appeared (i.e. Leenders et al., 2007). Later, lean and cross-functional work, stage gate management, user and customer involvement, agile management practices and many other aspects and nuances were integrated and applied. This overview, of course, is far from comprehensive. However, it shows that many efforts have been made but hardly do any seriously address the biggest of all our current challenges, namely creating global ecological and social sustainability.

At least since the famous Brundtland report (1987), global awareness about sustainability challenges has existed. The 17 UN Sustainable Development Goals are currently one of the most prevalent acknowledgements of the economic, social, and environmental challenges ahead of us. The primary source of unsustainable development is today's economic system, in which many externalities are not internalized. Still, most business activities are the main obstacle to more sustainable development (Schaltegger et al., 2016). In theory and pure volume, large corporations constitute the most significant lever to reduce negative externalities. Still, organizational inertia and the economic attractiveness of unsustainable business opportunities and innovations prevent disruptive and sustainable innovations for sustainability (Weissbrod and Bocken, 2017).

To explain those phenomena, a look at (bounded) rational choice theory might help (Lammers et al., 2022). In this theory, individuals act motivated by their (bounded) rational wants within constraints. All innovation efforts in teams, departments or start-ups inevitably choose utility-maximizing options within an incentive framework (Mole and Roper, 2012). It might also seem rational to "save the planet" and

prioritize ecological and social goals. Rationality, however, is situational (Miller, 2007). The bounded rational choice theory frame was later extended to bounded ethicality and bounded awareness (Bazerman and Sezer, 2016). Bounded awareness refers to behavioural results of people making the wrong choice because they focus on their thoughts and actions, ignoring essential information, such as the consequences for society and the environment (Schkade and Kahneman, 1998). Bounded ethicality is a psychological phenomenon that leads people to engage in ethically questionable behaviours inconsistent with their preferred ethics (Chugh and Bazerman, 2007), resulting from limited reflection on or responsibility for their choices and actions. There are many examples of such bounded effects – a recent and prominent one for bounded responsibility is "Dieselgate", the manipulation of car software to create an illusion of reduced emissions in the automotive industry (Parloff, 2018).

Together, companies act (bounded) rationally when they pursue economic success over environmental and social performance (Pacheco et al., 2010). In addition, civil societies reward economic success by worshipping "unicorns" and "economic growth". There is empirical evidence that bounded rationality affects particularly innovation trajectories. First, to identify opportunities, actors make bold decisions based on perception and imagination, which goes beyond the rational choice paradigm (Renko et al., 2012). Second, they profit significantly from reassessing perceived solutions to their problems based on an intensive search for external information and consultation (Cohen et al., 2019). Actors in innovative endeavours, while reporting a solid faith in initial intuition (Koudstaal et al., 2019), tend to make significant changes to their initial innovations based on this external information.

Further empirical evidence shows that even for sustainability-oriented innovative efforts, economic rationality prioritizes profitability over a balance with socioecological goals so that the benefits of sustainable practices are assessed based on their contribution to overall economic objectives (Spence et al., 2011). This may be because innovators are unaware of how they can be sustainable without financial or strategic gain, as the standard narrative portrays sustainability as an expense. Another reason could be the lack of a shared and operationalized definition of sustainability, which would provide an orientation towards sustainable action. Third, people define sustainability to suit their biases, goals, priorities, and vested interests.

Moreover, actors often trick themselves by balancing out small sustainable contributions with other, more considerable sustainable damage, as described in the low-cost theory of sustainable behaviour (Diekmann and Preisendörfer, 2003; Voinov, 2017). Therefore, it remains to be seen to what extent a proposed paradigm shift in innovation management from selfish and rational to moral, social and nature-based innovations is materializing (Hofstra, 2007).

## 3. Articles in the Special Issue

In our Special Issue, we present nine studies devoted to our guiding theme of how meaningful innovation management can contribute to the sustainable transformation of the economy and society. The pessimistic view on innovations, in general, is addressed and challenged, possible changes to innovation ecosystems in legal regulations, policies or start-up incubation towards sustainable innovations are discussed, and the focus on growth, technological determinism and productivism is questioned.

Authors	Title	Main findings
Ben Robra, Alex Pazaitis, Chris Giotitsas, Mario Pansera	From Creative Destruction to Convivial Innovation - A Post-growth Perspective	- Innovation underlined by counter-hegemonic values already exists, albeit in the cracks of the dominant system and the constant danger of co-optation.

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Authors	Title	Main findings
David Sarpong, Derrick Boakye, George Ofosu, David Botchie	The Three Pointers of Research and Development (R&D) for Growth-Boosting Sustainable Innovation System	<ul style="list-style-type: none"> <li>- Align R&amp;D investments with talents and learning institutions.</li> <li>- Opportunities for reflection on R&amp;D investment strategies.</li> <li>- Connect sustainability with the intellectual traditions of R&amp;D in innovation management.</li> </ul>
Yang Song, Zhiyuan Zhang, Jean-Michel Sahut, Ofir Rubin,	Incentivizing Green Technology Innovation to Confront Sustainable Development	<ul style="list-style-type: none"> <li>- New market entrants are disadvantaged by higher costs and use subsidies to catch up.</li> <li>- Disruptive innovation to potentially change the market's structure is frequently subsidized.</li> </ul>
Leonardo Augusto de Vasconcelos Gomes, Danika A. Castillo-Ospina, Ana Lucia Figueiredo Facin, Camila dos Santos Ferreira, Aldo Roberto Ometto	Circular ecosystem innovation portfolio management	<ul style="list-style-type: none"> <li>- New framework circular ecosystem innovation portfolio management.</li> <li>- The circular ecosystem needs: circular ecosystem, circular dominance, and circular health.</li> <li>- A new type of innovation process involving a new kind of innovation project</li> </ul>
Erica H. S. Siqueira, Bruno Brandão Fischer, Adriana Bin, Jill Kickul	Entrepreneurial Ecosystems' Readiness towards Knowledge-Intensive Sustainable Entrepreneurship: evidence from Brazil	<ul style="list-style-type: none"> <li>- 'Ecosystem readiness' towards sustainable transitions varies between maturity levels.</li> <li>- More mature ecosystems are less sustainable oriented.</li> </ul>
Qian Chen, Mats Magnusson, Jennie Björk	Selection bias of ideas for sustainability-oriented innovation in internal crowdsourcing	<ul style="list-style-type: none"> <li>- New light on the effects of managerial bias, managerial attention, and innovation</li> <li>- Search for decision-making enabling fruitful adoption of sustainability-oriented innovation ideas.</li> </ul>
Romana Rauter, Dietfried Globocnik, Rupert J. Baumgartner	The Role of Organizational Controls to Advance Sustainability Innovation Performance	<ul style="list-style-type: none"> <li>- Formal controls of clear sustainability-related innovation goals, program activities, and a mission statement support sustainable company innovation.</li> <li>- Social controls that coordinate behaviour and decisions through shared sustainability-related norms and values are essential features of innovation management.</li> </ul>
Manlio del Giudice, Veronica Scuotto, Armando Papa, Sanjay Singh	The 'bright' side of innovation management for International New Ventures	<ul style="list-style-type: none"> <li>- Business's individual level to create social breakthroughs.</li> <li>- Support sustainable innovations by utilizing technology to boost job quality, uphold human rights, and foster global entrepreneurship.</li> </ul>
David B. Audretsch, Maksim Belitski, Maribel Guerrero	Sustainable Orientation Management and Institutional Quality: Looking into European Entrepreneurial Ecosystems	<ul style="list-style-type: none"> <li>- Institutional quality and sustainable orientation management of entrepreneurs determine the quality of entrepreneurial ecosystems.</li> <li>- Sustainability is often less visible.</li> </ul>

of innovation management within the context of growth-oriented societies. They defy the traditional notion of Creative Destruction as a mechanism that generates welfare, arguing that it portrays a hegemonic view of technology aligned with capitalist modes of production. They perceive alternatives based on the notions of conviviality and use-value to address better environmental and social challenges - current and future - better to address current and future environmental and social challenges. In this respect, the authors see a strategic role to be played by governmental institutions to nurture such forms of innovation management that do not aim at achieving solely quantitative growth of economic output.

Also adopting a macro perspective, [Sarpong et al. \(2023\)](#) follow a more conservative approach by connecting innovation systems to sustainability through R&D reorientation. They enumerate three pivotal elements: investment, talent, and learning institutions. Based on these elements, the authors present a set of propositions that can guide policies towards articulating innovation 'systems' components towards a setup that favours more sustainable forms of technological progress. [Song et al. \(2023\)](#) build an exploratory model to show that public incentives can set the stage for environmentally sustainable innovations. The authors consider two policy choices: subsidizing company innovations and subsidizing their products. Results suggest that new entrants, disadvantaged by higher operating costs, use subsidies to engage in disruptive innovations that can change the market's structure to their benefit. Ultimately, this might lead to changing standards for promoting sustainable development.

From a meso perspective, [Gomes et al. \(2023\)](#) take an ecosystem perspective to address the dynamics of circular innovation. Drawing from in-depth analyses of seven companies and their respective innovation ecosystems, the authors identify four critical strategic decisions in achieving circularity: internalizing, co-developing, inducing, and synchronizing. In turn, they lay out three strategic orientations that help explain how firms interpret and deal with their own needs and the circular ecosystem needs: circular ecosystem, circular dominance, and circular health. These insights derive a framework for circular ecosystem innovation portfolio management.

[Siqueira et al. \(2023\)](#) use the entrepreneurial ecosystem approach to assess local-level configurations that lead to more robust entrepreneurial activity associated with sustainable development. They derived the concept of Knowledge-Intensive Sustainable Entrepreneurship (KISE) to analyze data for municipalities in the State of São Paulo, Brazil, for the last two decades. Their findings outline substantial overlaps between "traditional" entrepreneurial ecosystems and those conducive to KISE. However, differences arise when looking at more fine-grained specificities regarding entrepreneurial domains (challenges associated with cities, health, education and green technologies). In this case, "ecosystem readiness" varies from mature (healthtechs) to incipient configurations (cities and edtechs).

Three papers take a micro-oriented stance. [Chen et al. \(2023\)](#) examine how managerial biases interfere with selecting sustainability-oriented ideas in a multinational corporation. Their findings underscore that managerial biases can negatively affect the selection of sustainable projects, ultimately favouring alternatives with fewer market and technological uncertainties. Such perspective offers novel and exciting evidence that helps understand the micro-foundations of firms' reluctance to adopt sustainable practices in their innovation management portfolio. For monitoring these practices, [Rauter et al. \(2023\)](#) propose a sustainability innovation performance (SIP) indicator which supports organizations to govern systemic innovation management. [Del Giudice et al. \(2023\)](#) investigate the dynamics of automation and human rights in innovation management in International New Ventures. Assessing a sample of over 3000 European firms, the authors reach optimistic conclusions (a "bright" side of innovation management) regarding how social entrepreneurship can play a constructive role in promoting human rights in increasing industrial automation. As the authors conclude, this can also help to guide

[Robra et al. \(2023\)](#) bring an instigating discussion on the very logic

innovation policies that can select those projects that tackle the pressing challenges of our time.

#### 4. Concluding remarks: beyond the dead end

Over the 20th century, innovation came to be recognized as a central feature of economic systems and firm-level competitiveness (Rosenberg, 1982). This has led to a rapid evolution in innovation management tools worldwide (Anderson et al., 2014). This situation has often gone without proper critical assessments from innovation management scholars concerning potential – and actual – harms caused by technological evolution on the natural environment and social systems writ large (Coad et al., 2021).

Challenges for innovation management in this context are myriad. Long-standing pressures on the natural environment have increased policies and corporate actions. However, innovative solutions often fail to develop proper life-cycle assessments of new and alternative technologies (Hansen et al., 2021). In turn, digitalization brings additional complexity to the current dynamics of innovation management. Adverse outcomes range from ethnic and racial profiling of the widespread implementation of Artificial Intelligence (Didier et al., 2015), job loss and insecurity (Levy, 2018; Lewchuk, 2017), increasing social inequality as a result of the “digital divide” (Dimaggio et al., 2001), effects of social media platforms on social relations – with potential impacts on the broader social fabric (Baccarella et al., 2018), and even underestimated environmental footprints of digitalization (Obringer et al., 2021).

These examples warrant the key role that innovation management and policy can play in shaping future conditions for the well-being of societies worldwide. This will inevitably require further evidence to inform decisionmakers beyond fragile rationales based on simple solutions that neglect deeply ingrained problems in how innovation is managed today. In this Special Issue, we can gather a variety of high-quality assessments that can help guide research and practice towards more sustainable innovation. Long-standing traditions oriented towards firm-level competitiveness and macro-level economic growth have generated prosperity. However, it has also engendered social inequality and environmental chaos across the globe. The current pace of adaption falls short of developing the much-needed turns in our ways of production.

The collection of articles included in this volume makes it clear that solutions are complex and multisided. Innovation management must change at the firm’s level, contingent upon macro contexts that allow such shifts to become viable. In addition, we must take meso perspectives very seriously. Given the grand challenges that must be tackled immediately, individual actors/firms cannot deliver substantial outcomes if they continue applying the short-term perspective of innovation as a cash machine. It requires a more holistic innovation management, emphasizing society’s needs. The long-established user/demand-driven innovation is not sufficient any longer. Certainly, the customer is key for companies. Still, the customers are also society, which the innovation management paradigm does not reflect correctly. Instead, demands require that organizations and institutions coalesce around common goals. Hence, the notion of ecosystems (business ecosystems, innovation ecosystems, knowledge ecosystems, entrepreneurial ecosystems) gains relevance in this discussion. Any form of ecosystem mirrors society to a varied extent, expanding innovation managers’ horizons considerably. The challenge for companies lies in integrating these additional dimensions into their activities. We hope the contributions presented in this Special Issue can trigger further insights and actions towards a better future.

#### Data availability

No data was used for the research described in the article.

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