Editorial

Stefan Hüsig* and Julien Bucher

Chemnitz University of Technology,
Thüringer Weg 7, Raum 112, 09126 Chemnitz, Germany
Email: stefan.huesig@wiwi.tu-chemnitz.de
Email: julien.bucher@wiwi.tu-chemnitz.de
*Corresponding author

Ziska Fields

Department of Business Management,
School of Management,
College of Business and Economics (CBE),
Cnr Kingsway and University Road Auckland Park Kingsway (APK),
Ring D, Room 529, Johannesburg, 2092, South Africa
Email: ziskaf@uj.ac.za

Sven Schimpf

Pforzheim University,
Tiefenbronner Straße 65, 75175 Pforzheim, Germany
and
Fraunhofer Group for Innovation Research,
Nobelstraße 12, 70569 Stuttgart, Germany
Email: Sven.Schimpf@innovation.fraunhofer.de

1 Introduction

The individual and social imagination are at the nexus of the existing world and potential futures. Influenced by social practices, mental concepts, beliefs, and expectations that are rooted in the history of the social system and the contemporary zeitgeist, the human imagination draws upon actual experiences, as well as fictional concepts. These fictional concepts range from the idea of the nation-state (Anderson, 2016) and exaggerated beliefs in the contemporary technical abilities of humankind, like geoengineering (Augustine et al., 2019) to visions of the future including new technologies, products, services, as well as economic and social systems, typically associated with the genre science fiction (Vint, 2021; Michaud, 2017; Bucher, 2019). The articles in this special issue investigate, illustrate, and theorise how the human imagination, the arts, architecture and design relate to innovation and social change. In the following the key theoretical concepts are introduced. This creates the backdrop for the subsequent

Copyright © 2024 Inderscience Enterprises Ltd.

overview of the studies that were selected for the special issues. The article finishes with an outlook and the discussion of potential further research avenues.

2 Imagination and media

Imaginaries influence political and economic processes. In the intellectual, political discussion, narratives, and concepts of a better life in a changed future system are typically confronted with narratives emphasising shortcomings and potential negative implications of the proposed ideas. But parties and politicians and their agendas are not the only political actors. Social movements are pushing their own agenda by drawing upon the fictional concepts of the social imaginary to push alternative politics and scenarios of the future.

Imaginaries are the cognitive (re-)presentations of phenomena that are either not experienced directly or have not been experienced at all, encompassing real phenomena that have just not been perceived, as well as fictional phenomena that cannot be experienced or perceived directly due to their inherent imaginative nature. Fictional phenomena only exist as varying mental images based on ideas and narratives until someone explicates them using media and reduces the amount of variation by offering a more detailed and explicit version of the imaginary concept.

This process of a specific imagination, like a fictional technology, social system, or ideology, getting explicated using media, e.g., in the form of stories, books, movies, video games, design, or architecture (Bucher, 2019).

The term imaginary and more specific the speculative fiction (SF) imaginary (Vint, 2021), the robotic imaginary (Rhee, 2018), and the socio-technical imaginary (Jasanoff, 2004) refer to collectively shared visions of the future. These visions may be desirable, rather realistic, or even dystopic, regardless of the connotation it has been displayed at various times in history, that these rather complex imaginaries stick, evolve, and create expectations that influence contemporary action (Beckert, 2013) – strategic decision making, policy making, and social movements. Castoriadis (1997) referred to the social imaginary as the imagination of the social-historical field.

In this tradition, the contribution by Bucher and Hüsig in this special issue refers to specific, delimitable fictional concepts as imaginations and reserve the term imaginary for complex social imaginaries, sets of shared imaginations among a social group, like a social movement, the population of a geographical area or the global society that connect the members of a group and enables group affiliation (Bucher and Hüsig, 2024). Adam Smith distinguished practical (or sympathetic) and theoretical (or non-sympathic) imagination, an in itself rational distinction, but one that does not account for the difference between reproductive, mimicking imagination and creative imagination, which seems necessary to facilitate creative destruction (Smith, 1976), like transformational, radical or disruptive innovation. Castoriadis (1997) introduced this distinction and coined it primary (or radical) imagination and secondary (reproductive and simply combinatory) imagination and argued that the instituting social imaginary can spawn not only new, evolved iterations of existing imaginations but genuinely new ideas, radical imaginations. Ricoeur (1991) emphasised the productive nature of imagination and argued that imagination manifests itself most clearly in fiction, creating new meaning (Levy, 2014).

These fictional concepts often develop over decades and even centuries and materialise sooner or later, like geosynchronous satellites (Bassett et al., 2013). And the

key to this process is the transmission of ideas over time. Media seems to be that key (Appadurai, 2010; Weller and Bucher, 2016; Bucher and Weller, 2019; Dries et al., 2023) and if humans are able to handle it, it seems appropriate (Bucher, 2019). Visions of the future are easily associated with science fiction, and science fiction is present in various kinds of media, from books to movies and video games. But criticism of the present and history and visions of the future are also a domain of the arts in general, as well as architecture and design. These disciplines require imagining and applying imagination to pursue, discipline, and creatively express the content of the imagination when filling an empty canvas with ideas (Osborn, 1953; Johnson and Kruse, 2019). Doing so, the imagination draws from own experiences, but also from socio-historic imaginaries and the zeitgeist, which itself refers to contemporary imaginaries that drive feelings and decisions (apart from beliefs and attitudes).

3 Innovation and the arts

In the organisational context, art is already used to stimulate discussion, taking new perspectives, and foster innovation (Stüer et al., 2010). Strategically installing art in office spaces to evoke the ideals, ethos, and vision of the organisation is a pretty standard practice, as are exhibitions to inspire employees or make them rethink routines. Artist-in-residence programs, in which artists are invited to stay at an organisation, often to create or prepare new art projects and to display their work, have a similar intention. They are collaborations with the focus on creating art in an unfamiliar environment and setting and the mutual inspiration (Harris, 1999). Artistic interventions or initiatives (Berthoin Antal, 2012; Carlucci and Schiuma, 2018) are more aggressive invasions of the organisation by an artist, aiming at intervening in established organisational routines and perspectives. It emphasises the interaction and focuses on the process of creating rather than the outcome and mutual learning (Shrivastava et al., 2016).

But art is not only used to help organisations innovate and rethink themselves or as a medium for imagination and imaginaries. Scientific innovation, or rather scientific excellence, is also very commonly achieved by polymaths, individuals who have mastered multiple fields of expertise on an extraordinary level. And that engage in the arts – from music to sculpturing. As Max Planck, "a polymath himself, put it, a pioneering scientist must have an […] artistically creative imagination" [Planck, (1949), p.109]. Notably, the seminal work by Root-Bernstein et al. (Root-Bernstein and Root-Bernstein, 2004; Root Bernstein, 2006; Root Bernstein et al., 2008) has shown that excellent scientific contributions are often achieved by polymaths. The majority of Nobel laureates engage in artistic action, from photography (most prevalent) to playing instruments and composing music, from singing to painting and sculpturing. And often, they achieve an expert level in these 'hobbies' that would have allowed for an alternative career, like in the case of Max Planck, who was an excellent pianist (Root-Bernstein and Root-Bernstein, 2004). The same applies to Werner Heisenberg or Niels Bohr. Qualitative research using interviews (Frenz et al., 2019) has indicated that these polymaths can draw from their knowledge and experiences in their other vocations to take new perspectives and get inspirations that they are able to transfer into their scientific work, enabling them to distance themselves from common paths and beliefs of

their discipline and innovate, supporting the quantitative investigations by Root Bernstein et al.

4 Architecture and design

Imagination as a crucial source of innovation, arguing for architectural education that aims to enable imaginative thinking (Havik and Sioli, 2021). The ideation in architecture, as well as design, draws upon the constructive imagination that considers the outlines and general construction, the inhabitative or usage imagination in which the architect considers the perspective of future inhabitants. Similarly, in design, one imagines how an object or interface may be experienced and used. Material imagination refers to the consideration of possible construction materials (Emmons, 2014). All three of these aspects are influenced by the zeitgeist and socio-historical imaginary, materialising as schools and styles that defined the artificial environments of the Anthropocene, the current geological age that is dominantly influenced by human activity, like the environment and the climate. One of such highly imaginative and influential schools is the Bauhaus movement, with its influential approaches such as functional design and bringing the idea of mass production to architecture and city planning. Going back to the Bauhaus movement, which inspired the development of design thinking, Schimpf et al. (2024) investigate, in their contribution to this special issue, how the classic Bauhaus methodologies in detail may be useful additions to the today's design thinking process.

5 Creativity, artificial intelligence, and the rise of the imagination age

Without imagination, there is no creativity, and without creativity, there is no innovation. However, these dependencies do not imply that imagination needs to lead to creativity and innovation (Chaurasia, 2019). Creativity refers to the generation of novel and useful ideas. While classic creativity research has emphasised and focused on individual creativity, the relevance of the individual social context has received a growing consideration over the years, popularising a social psychology of creativity instead of a strict individual one (Amabile, 1983; Amabile et al., 2005; Amabile and Pillemer, 2012). The complex problems and tasks that engineers, managers, scholars, and researchers are confronted with today – finding appropriate solutions that are viable, marketable, and profitable, and doing that responsibly and sustainably, commonly needs a team to have the needed expertise – knowledge, skills, and experience. This emphasises the importance of research on factors influencing creativity in teams and team creativity, like the composition of the team, its formal and informal structure, contextual factors such as the funding and the organisational environment, and team-specific factors like shared mental models among the team members (Heinbucher and Bucher, 2022). For the management of innovation, entrepreneurship, and strategy, creativity is key for problem-solving, generating new product or service ideas, and envisioning a venture or the future of an existing organisation. Imaginativeness, as a latent, domain-specific, and trainable human ability, has shown to predict new-venture quality and quantity better and differently than the commonly used factors for motivation, knowledge, and experience (Kier and McMullen, 2018).

With the advent of machine learning and artificial neuronal network applications for the end user, human creativity and imagination have gained a lot of new tools that can extend their creative reach. If someone wants to put a homepage up and only has vague ideas of the design and user interface but cannot program, a large-language model like ChatGPT can translate the descriptions from a dialog with the user into code for the homepage – or programs. But these new tools, which are rather extensions of the human cognitive capabilities than its physical body, may also foster the deterioration of basic human creative and imaginative skills. Regarding knowledge, it has become more important to know how to get the needed information and have access than actually knowing. The human memory is flawed. New memories and existing ones influence each other, and this includes new information as well as suggestions. The general quality of a memory depends on the individual attention, and how well a memory can be recalled depends on the emotions and stimulation related to the specific memory (Schacter, 2001). And on top the own information may be outdated. Regarding creativity and imagination, the shift may occur more along the lines of an emphasis on communicative skills and an imaginativeness that emphasises focusing on the general idea or the big picture of the innovation or new venture and the market fit instead of details and thinking something through meticulously. And then there is the prospect (and fear) of artificial intelligence that is not only learning, but also evolving on its own, potentially surpassing humans intellectually and creatively, a scenario popularised by Kurzweil (2005), who coined that event singularity – and what may come next has been the content of various works of the SciFi literature, from Stanislaw Lem's Golem to HAL 9000 in Kubricks Odyssey and SkyNet in Terminator. But before that, he envisioned that combining AI, nano-, and biotechnology would enable the creation of anything that can be imagined (Kurzweil, 2005). Building on that, Chaurasia (2019) proposed a new socio-economic era and describes the shift from the information age to the imagination age, in which everything that we can imagine, have imagined, and portrayed through fantasy writings, movies, etc. can be constructed into reality [Chaurasia, (2019), p.43]. And along with this shift proclaims the emergence of a new evolutionary paradigm, delimiting the human consciousness and breaking the standard definition of what it means to be human.

Contemporary management literature commonly emphasises how the uncertain and undetermined future influences decision-making, on top of the general volatility and complexity of organisational environments. Typical approaches to grasping and trying to manage the future are predictive in nature, mostly extrapolations based on historical data and cycle theories.

6 Science fiction

Science fiction is commonly understood as a category of popular media that deals with fictional future scenarios, including imaginary technologies and their use and implications, as well as utopic or dystopian social systems. In contrast to fantasy, science fiction is based on scientific knowledge and theories. It can also be understood as literary inter- and transdisciplinary thought experiments. Science fiction has been identified as an inspiration and driver for social change and technological innovation and a tool for envisioning innovation opportunities (Michaud, 2017; Bucher, 2019; Michaud and Appio, 2022; Bucher and Hüsig, 2024). But there is also a social correlation between

science and science fiction; the creator and the reader seem to be from similar societal groups. Scientists and engineers commonly refer to being interested in science fiction and that they have been influenced by it. And many science fiction authors have a background in related academic fields. Often, science fiction is the creative expression of a professional that tries to go beyond the walls of the contemporarily possible in its profession. And this motivates us to engage with science fiction that deals with this topic – by consumption or production. And the same people are the ones that drive technological development and innovation with their work. Building the technological foundation for the future is influenced by imaginary technologies and imaginaries of desirable and undesirable futures that they were introduced to in science fiction (Bucher, 2019). It is even reasonable to assume that the socio-technological imaginary, in general, is influenced by science fiction (Jasanoff, 2004).

Some scholars even argue that humankind is already heading toward a science-fiction future (Vint, 2021; Beukes et al., 2017; Yaszek and Davis, 2012). Popular science fiction is dominated by scenarios of dystopian futures that highlight potentially dangerous developments and the negative implications of technology for humankind. Utopian SciFi that envisions a future that has improved upon the status quo is much rarer, even though one of the earliest texts that might be considered proto (social) science fiction, Thomas Morus' Utopia, described a positive fictional social system based on the life in a monastery, a satire that is also commenting on the then existing forms of government. Jules Verne, on the other hand, was rather focused on crafting adventurous stories around his fictional technologies without a clear connotation. The darker shades in science fiction entered and were popularised with Mary Shelly's Frankenstein, a story that not only influenced the whole genre by addressing the moral side of research but also set the tone for especially the subgenre of hard science fiction. Another example of rather positive, utopian science fiction is the stories of the Starship Enterprise in Star Trek by the humanist Gene Roddenberry, which show from a contemporary perspective how much the zeitgeist and the cultural status quo make utopian visions age badly. The enterprise may be patrolling to keep peace in the galaxy and interact with other species appropriately if needed. Still, these concepts quickly fail to look at the role of female characters, especially extraterrestrial female characters in the stories, which, in typical classic James Bond fashion, usually end up with the main character, Captain Kirk.

7 Responsible innovation for sustainable development

Sustainability is a normative concept that, since the Brundtland Report from 1987, is based on the idea of intra- and inter-generational responsibility and equity. It encompasses environmental, economic, and social aspects of an action, the so-called triple bottom line (Elkington, 1994). Sustainability was explicated and translated into instruments such as the United Nations' Sustainable Development Goals and targets or the environment, social, governance (ESG)-rating for companies and investment vehicles to allow a more detailed assessment of the progress towards sustainable development (Dressler and Bucher, 2018; Molina-Maturano et al., 2020).

Jonas (1984) established the idea of an intergenerational ethic that is based on the imperative of responsibility. In practice, this translates to responsible action requiring the consideration and evaluation of the given knowledge regarding potential implications and consequences. Responsible innovation refers to the concept of accounting for social,

cultural, and environmental aspects of the innovation process (Lubberink et al., 2017). It refers to an approach to innovation that aims to create societal benefit, considers and manages the impact of new technologies, and is expected to lead to responsible solutions (Von Schomberg, 2011; Wickson and Carew, 2014; Ribeiro et al., 2017). Responsible innovation has been complemented by responsible research, emphasising the role of science and innovation in achieving a desirable future (Von Schomberg, 2011). Responsible research and innovation is also a governance approach of the European Union that supports its Innovation Union.

Responsibility and the concept of responsible research and innovation are the means to achieve sustainable development and overcome the grand challenges that humankind is facing, from poverty, inequality, and hunger to desertification and deforestation to conflicts and pandemics (Scherer and Voegtlin, 2020). Fields (2024) addresses the need for ecological or short eco-innovation and investigates it in the context of team creativity innovation in this special issue.

8 A new paradigm: imagination instead of prediction

An inherent problem with predictions is that they may influence the future themselves. There are future events that are not influenced by predictions, like the weather, earthquakes, or meteor showers, and there are those that are influenced by prediction – like strategic corporate decision-making, government spending, elections, or the stock market (Harari, 2015; Dries et al., 2023). Harari (2015) called this second-order chaos – a future influenced by predictions and the fight to become a prevalent prediction. Predictions of the future are a form of politics and persuasion – attempts to influence the future by prediction, trying to push certain narratives and interpretations regarding highlighted imaginary concepts, technologies, or social systems in a fight against rivalling predictions to achieve short- and medium-term goals such as influencing social movements, managerial as well as political strategic decision-making, policy and law-making while pursuing a long term goal that may, if genuine, or may not, if instrumental, be in line with the implications of their predictions.

The progression of humankind has been described as driven by various kinds of innovations and change, focusing on new technology, services, business models, social systems, and forms of organisation. At the front-end of innovations, there is usually an assumed problem to solve or a demand to supply that is creatively approached. Often ignored are the social imaginations, shared cognitive concepts of fictive developments or inventions such as technology, concepts of life, and social systems, that inspire and influence innovations.

Enabled by the new digital infrastructure, these imaginations are spread globally, evolving through adoption, and some even become part of the social imaginaries of cultures unrelated to the origin of the imagination. The modern global mediascapes have enhanced this development even more (Appadurai, 2010; Bucher, 2019) and do not seem to slow down in contrast to the general (de-) globalisation. Humans have always been fascinated by imaginations of alternative and future lifeworlds incorporating fictive social systems and technologies. One of the most well-documented forms of imagination of future innovation and developments is science fiction, presented, e.g., as fiction in books, movies, series, audio books, and pictures, or as inspiration and influence in marketing

innovative technology and business ventures (like public space travel) or social systems, new social structures, concepts of life and relations to the environment. Bucher and Hüsig (2024) focus on the human side of this process by discussing the role of social entities – individuals or groups. A role which they coined imaginator, a social being that proactively uses existing imaginaries and imaginations, evolve and distribute them to enhance the likelihood of them manifesting as actual innovation.

Using science fiction for foresight is not a particularly new idea (Elkins, 1979), but it takes time to find recognition and adoption. In recent years, conventional foresight methods have shown their weaknesses; however, they seem to fail with their extrapolative, analytic predictions once the future shifts from the common paths of development and progression (Schimpf and Lauster, 2021).

9 Scope and content of the special issue

This special issue aims to tackle the nexus of sustainable and responsible innovation and imagination, with a special interest in forms of art, (science) fiction and retrofutures, raising questions on how these imaginations, imaginaries, and narratives may be methodologically approached, how they influence and have influenced human societies/progress, and how they may be utilised in an intergenerationally responsible way to facilitate sustainable development. We are pleased that the submitted manuscripts addressed most of the major topics mentioned in the call. In the end, nine articles by authors from various countries such as France, Egypt, Germany, and South Africa were accepted for publication covering imagination, creativity, and the arts in the context of organisational theory, impact entrepreneurship aiming at realising a real utopia, institutional change and blockchains, eco-innovation prototyping, design thinking and the Bauhaus methodologies, the implementation of a university incubator in a developing country as well architectural design for sustainable development.

These articles in this special issue address this nexus of disruptive innovation and imagination in the context of social narratives like sustainability, social change, or the potential future utilisation of new technologies. In the following succinct summaries of the articles in this special issue are presented: A rough overview of the articles and the prevalent themes in them is presented in Table 1.

Three articles focus on the science fiction Imagination and its influence on inventors, innovators, creative individuals and social groups in general. Bucher and Hüsig (2024) present two case studies: the historic one of Wernher von Braun, the original rocket man, and the contemporary one of Elon Musk. They introduce and argue for the concept of the imaginator and imagination as a socio-historic phenomenon that influences the social imaginary, introduces, and prepares the market for potential future innovation and the society for social change. Michaud (2024) investigates how sectoral myths, especially imaginary technology archetypes (technotypes), influence the economy as institutionalised forms of science fiction. Assuming that fiction is the source of reality, he shows how organisations use science fiction to stimulate their creativity using narrative story building and tools like science fiction prototyping and design fiction. Schmitten and Bucher (2024) focus on the cyberpunk narratives used by various blockchain ventures as an ideological base. In their study, they analyse how blockchain projects frame their ventures in terms of institutional change to reach a desirable future. They investigate the institutional goals of these projects and assess whether these frames are appropriate to

achieve institutional change based on two cases of blockchain projects that frame themselves using cyberpunk and one contrasting case of a blockchain project without this frame.

Table 1 Articles in the special issue (see online version for colours)

#	*Author*	*Title*	*Imagination*	*Creativity*	*Responsibility*	*Sustainability*	*SciFi*	*Architecture*	*Design*
1	Bucher and Hüsig	Innovation as manifesting imagination: exploring the role of imaginations and imaginators in the innovation process	■	■	■	■	■		
2	Michaud	Sectoral myths, technotypes and institutional science fiction: how organisations stimulate their creativity	■	■			■		
3	Schmitten and Bucher	Cyberpunk as a frame for institutional change through blockchain applications? A narrative analysis of three blockchain projects examining their goals regarding established institutions	■				■		■
4	Schimpf et al.	Back to the roots: imagining the application of bauhaus methodologies in design thinking	■	■				■	■
5	Geith and Goubran	Creative transdisciplinary architectural design as means for realising the sustainable development goals in the built environment		■		■		■	■
6	Gangloff et al.	The interplay between moral and creativity: examples from R&D institutions		■	■				
7	Fields	Using green team creativity in developing eco-innovation prototypes		■		■			■
8	Houssou et al.	University incubators and entrepreneurial universities: a case study of the process of setting up a university incubator in a developing country		■		■			
9	Sonntag and Torres Ramos	Impact entrepreneurship to fight global warming: from utopia to practice	■		■	■			

Two of the articles address the role of architecture and classic design concepts in the context of sustainable development and design thinking. Schimpf et al. (2024) discuss how German Bauhaus methodologies could enhance the design thinking process. The

idea to do so was born in relation to the 100-year anniversary of the Bauhaus movement which lead to numerous analyses and the documentation some new documentations of Bauhaus methodologies. Bauhaus, being mentioned among the roots of design thinking is thereby used to inspire today's design thinkers by providing an allocation of methodologies to the design thinking process. The contribution by Geith and Goubran (2024) introduces the concept of creative transdisciplinary architectural design as a means to realise the SDG's, a critical issue since the building sector accounts for 38% of total energy-related CO_2 emissions. To facilitate this, the authors propose a framework that builds on how architecture, as a practice, encompasses a series of design-thinking domains with open possibilities, potential, and power for innovation. This framework comprises nine design domains: building technology, building materials, building construction, building management systems, indoor climate, recycling advancements, spatial planning, urban planning, and strategic planning. The framework is used to analyse case studies and to highlight how creative transdisciplinarity, integrated through architectural design, advances the realisation of global goals. The findings emphasise the often synergistic and innovative nature of the architecture solutions that link to multiple design domains with the SDGs.

Two articles focus on moral aspects in the context of creativity. The paper by Gangloff et al. (2024) investigates how ethical aspects and creativity may correlate using case examples from R&D institutions. Specifically, the authors explore the relationship between collective creativity and moral engagement within a sample of research and development teams. The purpose of this research is to demonstrate that social skills represent an essential point of commonality between the concepts of creative behaviour and moral engagement. Based on 13 semi-structured interviews at four European public and private institutions involved in both applied and fundamental research domains, their research identified that prosocial motivation, which can be seen as the desire to share and help others, has a positive effect on creativity and moral behaviour. In addition, this research confirms the theoretical posture on the construct of prosocial motivation and contributes to the literature by isolating the concepts of perspective-taking and other-focused as two concise leverages for moral and creative engagement in teams of researchers.

Fields (2024) illustrates in her contribution how green team creativity can be facilitated to create eco-innovation prototypes. This study aimed to show how important it is for the teaching and learning activities in higher education institutions (HEIs) to focus on green teamwork, green creativity, and eco-innovation. This is important to prepare and encourage students and graduates to

1 work in green teams

2 use green creativity, eco-innovation, and prototyping to find green solutions.

The study took the form of a small-group project carried out by 46 master's students at a German HEI. The instruction was that each team had to focus specifically on green issues in the project. They had to select their own green problem using green creativity and solve it using eco-innovation and prototyping. A survey was administered to gather the students' views about green teamwork and their overall view of the project, instructions, and suggested templates. The findings indicated that HEIs play an important role in green creativity, green prototyping, and eco-innovation.

The special issue is closing with two articles that provide contemporary case studies that address how ideas and creative potential can be facilitated to foster entrepreneurship and sustainable development using university incubators and then the concept of impact entrepreneurship. Houssou et al. (2024) show how Universities can play a role in promoting frugal innovation by encouraging the valorisation and transfer of research to the socio-economic world as well as the development of skills related to the employability of students. Specifically, through the practices it promotes, an entrepreneurial university can encourage innovations that will benefit vulnerable communities and act in response to their challenges. In the context of weak financial support from public authorities, the University of Abomey-Calavi setup a project to promote entrepreneurship that advances frugal innovation. Their study bases its approach on identifying the actors and factors that favoured the development of its incubation program five years after its implementation. The same applies to the identification of the frugal innovation practices that it puts in place. The results show, among other things, that the university created a specific organisational framework, with a relatively long incubation period and mobilising resources from local stakeholders.

The contribution by Sonntag and Torres Ramos (2024) presents the case of 'Time for the Planet®' a citizen community dedicated to global action with the mission to fight climate change at a large scale by funding new ventures to market innovations that allow to capture or reduce CO_2 emissions. They frame their case as impact entrepreneurship that aims to create a real utopia, a positive future scenario. To do so, they combine perspectives from economics, entrepreneurship, and sociology to reflect on data collected through a netnography. This paper also addresses and integrates the aspects of sustainability and imagination in terms of the special issues' call.

10 Outlook

With this special issue, we have aimed to advance the field at the crossroads of art and imagination for responsible innovation, especially from a transdisciplinary perspective that might enhance further investigations in the area of technology management. More recently, the concepts of imagination and narratives gained further traction in the management field per se, with several articles being published in high-profile journals (Sasaki and Ravasi, 2023; Michaud and Appio, 2022; Alvarez and Porac, 2020; Augustine et al., 2019; Archibugi, 2017) and dedicated special issues like this one or the upcoming special issue 'Science fiction and the quest for innovation' in *Technovation*.

The underlying theme of the articles in this special issue seems to be a push to move forward from the mantra of uncertainty and indeterminacy and rivalling predictions to competing frames, narratives, imaginations, and imaginaries as a proactive approach to collectively shape a future for the following generations. Humankind has had its share of crises, from natural phenomena like volcanoes erupting, earthquakes, and extreme weather to pandemics, epidemics, and socio-cultural conflicts like riots, wars, and revolutions to study and learn from. Just referring to volatility, uncertainty, complexity and ambiguity (VUCA) and simply relying on managerial experience and extrapolations whenever it comes to managing our future beyond the next few days, years, and decades seems dated and inappropriate. From here on, that's several research avenues have already shown to yield interesting results and others that are promising but still need to be

explored. The following final section addresses these topics potential theoretical and methodological approaches.

One future direction of research regards the question of responsible action in general. How do we proactively promote, plan, and prepare for a more responsible future, considering and utilising imaginaries of the future (like science fiction)? Case studies, ethnography (or netnography), quasi-experiments, and action research are appropriate tools to explore this process.

Sasaki and Ravasi (2023) highlighted the historical memory of an organisation, representations of the past that are reproduced through practices, narratives, and artefacts. The representations of past events are not exact; their content rather lies at the border between fact and myth, reality and fantasy – supporting innovation as a source of inspiration for imaginative projection, rather than information for problem-solving (Sasaki and Ravasi, 2023). They argue that historical memory does not inhibit innovation, but it binds the direction of it. Future research may focus on the underlying imaginaries of organisational memory and culture and address how those affect organisational behaviour. How organisations unlearn undesired parts of the historic organisational memory and shift from existing underlying imaginaries to new ones also seems to be well worth investigating to understand how to do this proactively.

Similarly, Suarez et al. (2015) argue that the categories of future technologies emerge before the actual technologies. Investigating the factors that influence the timing for a market entry they have shown that dominant categories of new technologies emerge before the dominant design, and that this creates a window of opportunity for a successful market entry that starts with the emergence of the dominant category and ends with the emergence of the dominant design (Suarez et al., 2015). They have also conceptualised how categories and technological designs co-evolve during industry emergence and show how differing categorical understandings among the stakeholders influence the design competition (Grodal et al., 2015). Future research may investigate the origin of these categories and how they are influenced by socio-historic and contemporary imaginations, imaginaries, narratives, and frames.

Interdisciplinarity has been highlighted as a critical element for the consensual realisation of responsible innovation. Further research should try to test this assumption, e.g., through experiments or surveys.

Augustine et al. (2019) showed, using the fictional technology geoengineering, which is commonly assumed to be already real, that there are false, rebuttable imaginations that are part of the social imaginary. Bucher and Hüsig (2024) suggest investigating cases of imaginations that failed to be realised and imaginators that were not pushing for possible futures and trying to innovate but rather prolific snake oil salesmen that sell a product or service that does not provide what it claims to do (Gottschall, 2016). Or that at least were not able to convert prototypes into functioning products. For example the cases of the failed venture Theranos and Nikola (Garud et al., 2023; Bucher and Hüsig, 2024).

Further research could focus on such cases of deceptive ventures, identifying rebuttable imaginations and imposing imaginators and entrepreneurs. Comparative case studies and quantitative approaches seem appropriate to investigate successful and failed projects and focus on the reasons for failure. A qualitative or ethnographic research approach, as well as surveys, seem fit to investigate the role of the imaginator and existing imaginaries in the context of fraud and wrong assumptions that are collectively shared. The same research approaches seem appropriate to investigate the role of teams

and social movements in the development and realisation of imaginary concepts – from fictive technologies to utopian social systems.

Several scholars argue that media is a key element in the distribution, evolution, and realisation of imaginations and imaginaries and their accompanying narratives and frames (Dries et al., 2023; Garud et al., 2023; Bucher and Weller, 2019; Weller and Bucher, 2016; Appadurai, 2010). Mass media like radio, TV, videogames, or social media and how they are used to convey imagination and influence the social imaginary is another field of research that seems worth pursuing by management and marketing scholars. In addition, the role of media and politics in the competition of rivalling imaginaries (of the history, present, and future) seems worth investigating and conceptualising to responsibly utilising the insights for research and strategic purposes.

We hope this special issue raises awareness for the influence of imaginary concepts on the individual, social and organisational behaviour, strategising, and decision-making. Ideally, the selected contributions got you interested in these topics, and you may now consider engaging in research in this field as well. Please get in touch with us if you have any questions, feedback or looking to collaborate.

References

Alvarez, S.A. and Porac, J. (2020) 'Imagination, indeterminacy, and managerial choice at the limit of knowledge', *Academy of Management Review*, Vol. 45, No. 4, pp.735–744 https://doi.org/10.5465/amr.2020.0366.

Amabile, T.M. (1983) *The Social Psychology of Creativity*, Springer Verlag, New York.

Amabile, T.M. and Pillemer, J. (2012) 'Perspectives on the social psychology of creativity', *Journal of Creative Behavior*, Vol. 46, No. 1, pp.3–15.

Amabile, T.M., Barsade, S.G., Mueller, J.S. and Staw, B.M. (2005) 'Affect and creativity at work', *Administrative Science Quarterly*, Vol. 50, No. 3, pp.367–403.

Anderson, B. (2016) *Imagined Communities, Reflections on the Origin and Spread of Nationalism*, Verso, London, UK.

Appadurai, A. (2010) 'Modernity at large', *Cultural Dimensions of Globalization*, 9th ed., University of Minnesota Press, Minneapolis, MN.

Archibugi, D. (2017) 'Blade runner economics: will innovation lead the economic recovery?', *Research Policy*, Vol. 46, No. 3, pp.535–543.

Augustine, G., Soderstrom, S., Milner, D. and Weber, K. (2019) 'Constructing a distant future: imaginaries in geoengineering', *Academy of Management Journal*, Vol. 62, No. 6, pp.1930–1960.

Bassett, C., Steinmueller, E. and Voss, G. (2013) *Better Made Up, The Mutual Influence of Science Fiction and Innovation*, Nesta Working Paper, No. 13/07 [online] https://media.nesta.org.uk/documents/better_made_up_the_mutual_influence_of_science_fiction_and_innovation.pdf.

Beckert, J. (2013) 'Imagined futures: fictional expectations in the 'economy'', *Theor. Soc.* https://doi.org/10.1007/s11186-013-9191-2.

Berthoin Antal, A. (2012) 'Artistic intervention residencies and their intermediaries: a comparative analysis', *Organizational Aesthetics*, Vol. 1, No. 1, pp.44–67.

Beukes, L., Robinson, K.S., Liu, K., Rajaniemi, H., Reynolds, A. and de Bodard, A. (2017) 'Science fiction when the future is now', *Nature*, 21/28 December, Vol. 552, pp.329–333.

Bucher, J. (2019) 'The overlooked roots of innovations. Exploring the relevance of imagination on innovation using science fiction', in Fields, Z. and Hüsig, S. (Eds.): *Responsible, Sustainable, and Global Aware Management in the Fourth Industrial Revolution*, IGI Global, Hershey, PA.

Bucher, J. and Hüsig, S. (2024) 'Innovation as manifesting imagination: exploring the role of imaginations and imaginators in the innovation process', *Int. J. Technology Management*, Vol. 95, Nos. 3/4, pp.269–291.

Bucher, J. and Weller, A. (2019) 'From the visual turn to turned up visuality: modes of interaction in the digitalized era and ways to utilize them', in Fields, Z., Bucher, J. and Weller, A. (Eds.): *Imagination, Creativity, and Responsible Management in the Fourth Industrial Revolution*, pp.80–100, IGI Global, Hershey, PA.

Carlucci, D. and Schiuma S. (2018) 'The power of the arts in business', *Journal of Business Research*, Vol. 85, pp.342–347 https://doi.org/10.1016/j.jbusres.2017.10.012.

Castoriadis, C. (1997) *The Castoriadis Reader*, trans. and edited by D.A. Curtis, Blackwell Publishers, Cambridge, UK.

Chaurasia, R. (2019) 'On the principles of imagination and creativity: philosophy, neuroscience, and the 4IR', in Fields, Z., Bucher, J. and Weller, A. (Eds.): *Imagination, Creativity, and Responsible Management in the Fourth Industrial Revolution*, pp.1–63, IGI Global, Hershey, PA.

Dressler, A. and Bucher, J. (2018) 'Introducing a sustainability evaluation framework based on the sustainable development goals applied to four cases of South African frugal innovation', *Business Strategy and Development*, Vol. 2, No. 1, pp.276–285, https://doi.org/10.1002/bsd2.37.

Dries, N., Luycky, J. and Rogiers, P. (2023) 'Imagining the (distant) future of work', *Academy of Management Discoveries*, in press https://doi.org/10.5465/amd.2022.0130.

Elkington, J. (1994) 'Towards the sustainable corporation: win-win-win business strategies for sustainable development', *California Management Review*, Vol. 36, No. 2, pp.90–100, https://doi.org/10.2307/41165746.

Elkins, C. (1979) 'Science fiction versus futurology: dramatic versus rational models', *Science Fiction Studies*, Vol. 6, No. 1, pp.20–31.

Emmons, P. (2014) 'Demiurgic lines: line-making and the architectural imagination', *The Journal of Architecture*, Vol. 19, No. 4, pp.536–559 https://doi.org/10.1080/13602365.2014.949822.

Fields, Z. (2024) 'Using green team creativity in developing eco-innovation prototypes', *Int. J. Technology Management*, Vol. 95, Nos. 3/4, pp.411–433.

Frenz, R., Bucher, J. and Hermann-Fankhänel, A. (2019) 'Is an artist a better scientist? An empirical analysis on the impact that artistic activity has on a scientist's achievement', in Fields, Z., Bucher, J. and Weller, A. (Eds.): *Imagination, Creativity, and Responsible Management in the Fourth Industrial Revolution*, pp.102–125, IGI Global, Hershey, PA.

Gangloff, S., Schulz, K-P. and Mnisri, K. (2024) 'The interplay between moral and creativity: examples from R&D institutions', *Int. J. Technology Management*, Vol. 95, Nos. 3/4, pp.388–410.

Garud, R., Snihur, Y., Thomas, L.D.W. and Phillips, N. (2023) 'The dark side of entrepreneurial framing: a process model of deception and legitimacy loss', *Academy of Management Review*, in press https://doi.org/10.5465/amr.2022.0213.

Geith, R. and Goubran, S. (2024) 'Creative transdisciplinary architectural design as means for realising the sustainable development goals in the built environment', *Int. J. Technology Management*, Vol. 95, Nos. 3/4, pp.361–387.

Gottschall, J. (2016) 'Theranos and the dark side of storytelling', *Harvard Business Review* [online] https://hbr.org/2016/10/theranos-and-the-dark-side-of-storytelling (accessed 12 June 2019).

Grodal, S., Gotsopoulos, A. and Suarez, F.F. (2015) 'The coevolution of technologies and categories during industry emergence', *Academy of Management Review*, Vol. 40, No. 3, pp.423–445 http://dx.doi.org/10.5465/amr.2013.0359.

Harari, Y.N. (2015) *Sapiens. A Brief History of Mankind*, Harper Perennial, New York, NY.

Harris, C. (1999) *Art and Innovation: The Xerox PARC Artist-in-Residence Program*, MIT Press, Massachusetts, MA.

Havik, K. and Sioli, A. (2021) 'Stories for architectural imagination', *Journal of Architectural Education*, Vol. 75, No. 2, pp.160–169 https://doi.org/10.1080/10464883.2021.1947670.

Heinbucher, D. and Bucher, J. (2022) 'Team creativity: the interplay of shared mental models and the ideation process', *International Journal of Technology Management*, Vol. 88, pp.175–204.

Houssou, U., Schulz, K-P., Biga-Diambeidou, M. and Abihona, S. (2024) 'University incubators and entrepreneurial universities: a case study of the process of setting up a university incubator in a developing country', *Int. J. Technology Management*, Vol. 95, Nos. 3/4, pp.434–455.

Jasanoff, S. (2004) *States of Knowledge, The Co-Production of Science and the Social Order*, Routledge, London, UK https://doi.org/10.4324/9780203413845.

Johnson, B.L. and Kruse, S.D. (2019) 'Leadership as 'disciplined imagination', on developing the cognitively agile leader', in Johnson, B.L. and Kruse, S.D. (Eds.): *Leadership, Organizational Learning, and the Ideas of Karl Weick*, Routledge, New York, NY.

Jonas, H. (1985) *Technik, Medizin und Ethik: Zur Praxis des Prinzips Verantwortung*, Insel Verlag, Leipzig, GER.

Kier, A. and McMullen, J.S. (2018) 'Entrepreneurial imaginativeness in new venture ideation', *The Academy of Management Journal*, Vol. 61, No. 6, pp.2265–2295.

Kurzweil, R. (2005) *The Singularity is Near: When Humans Transcend Biology*, Penguin Books, New York.

Levy, L. (2014) 'Sartre and Ricoeur on productive imagination', *The Southern Journal of Philosophy*, Vol. 52, DOI: 10.1111/sjp.12049.

Lubberink, R., Blok, V., Ophem, J.V. and Omta, O. (2017) 'Lessons for responsible innovation in the business context: a systematic literature review of responsible, social and sustainable innovation practices', *Sustainability*, Vol. 9, No. 5, p.721 https://doi.org/10.3390/su9050721.

Michaud, T. (2017) *Innovation, Between Science and Science Fiction*, ISTE Ltd., London, UK.

Michaud, T. (2024) 'Sectoral myths, technotypes and institutional science fiction: how organisations stimulate their creativity', *Int. J. Technology Management*, Vol. 95, Nos. 3/4, pp.292–306.

Michaud, T. and Appio, F.P. (2022) 'Envisioning innovation opportunities through science fiction', *Journal of Product Innovation Management*, Vol. 39, No. 2, pp.121–131.

Molina-Maturano, J., Bucher, J. and Speelman, S. (2020) 'Understanding and evaluating the sustainability of frugal water innovations in México: an exploratory case study', *Journal of Cleaner Production*, Vol. 274, https://doi.org/10.1016/j.jclepro.2020.12269.

Osborn, A.F. (1953) *Applied Imagination: Principles and Procedures of Creative Problem Solving*, Charles Scribner's Sons, New York.

Planck, M. (1949) *Scientific Autobiography and Other Papers*, F. Gaynor, Trans., Original Work Published 1948, Philosophical Library, New York, NY.

Rhee, J. (2018) *The Robotic Imaginary: The Human and the Price of Dehumanized Labor*, University of Minnesota Press https://doi.org/10.5749/j.ctv62hh4x.

Ribeiro, B.E., Smith, R.D.J. and Millar, K. (2017) 'A mobilising concept? Unpacking academic representations of responsible research and innovation', *Science and Engineering Ethics*, Vol. 23, No. 1, pp.81–103, DOI: 10.1007/s11948-016-9761-6.

Ricoeur, P. (1991) 'Imagination in discourse and in action', in Ricoeur, P. (Ed.): *From Text to Action, Essays in Hermeneutics*, 2nd ed., Northwestern University Press, Evanson, II.

Root-Bernstein, R.S. (2006) 'Art science: the essential connection, Albert Michelson, painter of light', *Leonardo*, Vol. 39, No. 3, p.232.

Root-Bernstein, R.S. and Root-Bernstein, M.M. (2004) 'Artistic scientists and scientific artists: the link between polymathy and creativity', in Sternberg, R.J., Grigorenko, E.L. and Singer, J.L. (Eds.): *Creativity: From Potential to Realization*, pp.127–151, American Psychological Association, Washington, DC, DOI: 10.1037/10692-008.

Root-Bernstein, R.S., Allen, L., Beach, L., Bhadula, R., Fast, J., Hosey, C., Kremkow, B.G., Lapp, J., Lonc, K.M., Pawelec, K.M., Podufaly, C. R., Tennant, L.M., Vrtis, E. and Weinlander, S. (2008) 'Arts foster scientific success: avocations of Nobel, national academy, royal society, and Sigma XI members', *Journal of Psychology of Science and Technology*, Vol. 1, No. 2, pp.51–63, DOI: 10.1891/1939-7054.1.2.51.

Sasaki, I. and Ravasi, D. (2023) 'Historical consciousness and bounded imagination: how history inspires and shapes innovation in long-lived firms', *Academy of Management Discoveries*, in press https://doi.org/10.5465/amd.2021.0184.

Schacter, D.L. (2001) *The Seven Sins of Memory*, Houghton Mifflin Company, Boston MA.

Scherer, A.G. and Voegtlin, C. (2020) 'Corporate governance for responsible innovation: approaches to corporate governance and their implications for sustainable development', *Academy of Management Perspectives*, Vol. 34, pp.182–208 https://doi.org/10.5465/amp.2017.0175.

Schimpf, S. and Lauster, M. (2021) 'Foresight, innovation und science-fiction: Methodische Ansätze zur Vorbereitung auf eine unerwartete Zukunft', in Gausemeier, J., Bauer, W. and Dumitrescu, R. (Eds.): *Vorausschau und Technologieplanung, Tagungsband 16, Symposium für Vorausschau und Technologieplanung*, Berlin, pp.577–599.

Schimpf, S., Wussow, K. and Zeh, M. (2024) 'Back to the roots: imagining the application of Bauhaus methodologies in design thinking', *Int. J. Technology Management*, Vol. 95, Nos. 3/4, pp.335–360.

Schmitten, J-P. and Bucher, J. (2024) 'Cyberpunk as a frame for institutional change through blockchain applications? A narrative analysis of three blockchain projects examining their goals regarding established institutions', *Int. J. Technology Management*, Vol. 95, Nos. 3/4, pp.307–334.

Shrivastava, P., Ivanaj, V. and Ivanaj, S. (2016) 'Sustainable development and the arts', *International Journal of Technology Management*, Vol. 60, Nos. 1–2, pp.23–43 https://doi.org/10.1504/IJTM.2012.049104.

Smith, A. (1976) *The Theory of Moral Sentiments*, edited by D.D. Raphael and A.L. Macfie. Liberty Classics, Indianapolis.

Sonntag, C. and Torres Ramos, G. (2024) 'Impact entrepreneurship to fight global warming: from utopia to practice', *Int. J. Technology Management*, Vol. 95, Nos. 3/4, pp.456–481.

Stüer, C., Hüsig, S. and Biala, S. (2010) 'Integrating art as a trans-boundary element in a radical innovation framework', *R&D Management, Special Issue: Emerging Methods in R&D Management*, Vol. 40, No. 1, pp.10–18.

Suarez, F.F., Grodal, S. and Gotsopoulos, A. (2015) 'Perfect timing? Dominant category, dominant design, and the window of opportunity for firm entry', *Strategic Management Journal*, Vol. 36, No. 3, pp.437–448.

Vint, S. (2021) *Science Fiction*, The MIT Press, Cambridge, MA, USA.

Von Schomberg, R. (2011) 'Introduction: towards responsible research and innovation in the information and communication technologies and security technologies fields', in *Towards Responsible Research and Innovation in the Information and Communication Technologies and Security Technologies Fields*, pp.7–15, Publications Office of the European Union, Luxembourg https://doi.org/10.2777/58723.

Weller, A. and Bucher, J. (2016) 'Visualisierte imaginationen der lebenswelt und der einfluss der medien', in Raab, J. and Keller, R. (Eds.): *Wissensforschung – Forschungswissen, Beiträge zum 1, Sektionskongress der Wissenssoziologie*, Belz Juventa, Weinheim, pp.595–607.

Wickson, F. and Carew, A.L. (2014) 'Quality criteria and indicators for responsible research and innovation: learning from transdisciplinarity', *Journal of Responsible Innovation*, Vol. 1, No. 3, pp.254–273, DOI: 10.1080/23299460.2014.963004.

Yaszek, L. and Davis, D. (2012) 'Introduction', *Configurations*, Vol. 20, No. 1, pp.1–6, https://doi.org/10.1353/con.2012.0002.