



Constellations of Transdisciplinary Practices: A Map and Research Agenda for the Responsible Management Learning Field

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Abstract

The emerging field of responsible management learning is characterized by an urgent need for transdisciplinary practices. We conceptualize constellations of transdisciplinary practices by building up on a social practice perspective. From this perspective, knowledge and learning are ‘done’ in interrelated practices that may span multiple fields like the professional, educational, and research field. Such practices integrate knowledge across disciplines (interdisciplinarity) and sectors (intersectorality) in order to learn to enact, educate, and research complex responsible management. Accordingly, constellations of collaborative transdisciplinary practices span the three layers of the responsible management field: Professional responsible management, responsible management education, and responsible management research. We apply this framework to map both recent responsible management learning publications and contributions to this special issue. We notice that although the responsible management field’s aspiration for transdisciplinarity is high the degree to which it has been realized is low. This results in our proposal for a research agenda, which points out impediments to transdisciplinary, and research directions for the responsible management learning field. We also highlight theoretical implications of our conceptual framework for the larger transdisciplinarity discussion.

Keywords Responsible management learning and education · Transdisciplinarity · PRME · Interdisciplinarity · Intersectorality · Social practices · Collaborative practices · Constellations of practices

The Need for Transdisciplinarity in the Responsible Management Learning Field

Imagine managers would learn to manage in circular demand–supply networks instead of uni-directional linear supply chains (Laasch and Conaway 2015). Imagine they had to learn to harmonize the value created for a network of heterogeneous stakeholders, as opposed to uni-dimensionally maximizing shareholder value (Carroll et al. 2020). Imagine learning to manage for the integral wellbeing of human beings, as opposed to managing people as a readily available human resource (Autier et al. 2016; Melé 2014). Imagine

learning alternative management philosophies, ranging from biomimetic to indigenous management, as opposed to simply learning ‘the one’ neoclassic management philosophy (Mead and Landrum 2020; Verbos and Humphries 2015b). Imagine managers considered it their priority to tackle grand challenges from gender equality to modern-day slavery (Christ and Burritt 2019), and learn to manage within the science-based boundaries of our planet (Schaltegger 2018; Whiteman et al. 2013). Imagine managers had to unlearn some of the most basic tenets and practices of business and management to become responsible (Moosmayer et al. 2019; Padan and Nguyen 2020; Painter-Morland 2015). All of this is responsible management learning (RML).

Engaging in RML is an outspokenly complex task, which cannot be achieved by relying on individual disciplines’ and sectors’ knowledge (Max-Neef 2005; Nicolescu 2014; Schaltegger et al. 2013). Instead, it requires the equally complex and often anti-paradigmatic re-integration of knowledge (Pirson and Lawrence 2010; Pohl 2010; Sroufe et al. 2015). In the case of the RML field the knowledge to be re-integrated stems from the disciplines of ethics, responsibility,

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and sustainability, as well as from the academic and business management sectors (Laasch and Moosmayer 2015a; PRME 2007b). Transdisciplinarity relies on collaborative practices (Gray 2008; Satterfield et al. 2009) to integrate such knowledge from multiple disciplines and sectors (Pohl 2010; Pohl et al. 2008; Stock and Burton 2011). It centers on a shared complex issue just like RML (Max-Neef 2005; Nicolescu 2014).

Given transdisciplinarity's match with the RML field's need for reintegrated knowledge, explicit calls for transdisciplinary RML practice do not come as a surprise: Beckmann and Schaltegger (2020) suggest that "transdisciplinarity is particularly promising to create a richer, more realistic analysis of the existing challenges and to support transformative change towards responsible management." Cunliffe et al. (2020) propose "transdisciplinarity as an additional underpinning strand of responsible management education."

To address these calls, we first build a framework of transdisciplinarity that corresponds to the particularities of transdisciplinarity in the field of RML. We then analyze publications in this special issue to assess their degree of transdisciplinarity. We find that transdisciplinarity in RML, to date, is rather an aspiration than a reality and identify main impediments. We finally suggest future research directions for the wider transdisciplinarity.

Collaborative Transdisciplinary Practices in RML

What does transdisciplinarity mean in the RML field? The transdisciplinarity discussion is firmly rooted in the limitations of disciplinary and sectoral approaches for tackling complex problems (Max-Neef 2005; Nicolescu 2014; Schaltegger et al. 2013). Transdisciplinarity therefore is about the "dynamic relationships" (Apostel et al. 1972: (1) between disciplines and sectors that are necessary for the integration of the knowledge endemic to these disciplines and sectors (Pohl 2010); Pohl et al. 2008; Schaltegger et al. 2013; Stock and Burton 2011; Walter and Wiek 2009). We need a "system without stable boundaries between the disciplines" (Piaget 1972, p. 144).

A complex overarching problem becomes the shared object that serves as organizing principle for the integration of disciplinary and sectoral knowledge (Max-Neef 2005; Nicolescu 2014; Stock and Burton 2011). Knowledge is aimed at solving mitigating, and preventing societally meaningful real-life problems (Hirsch-Hadorn et al. 2010; Pohl 2010; Pohl and Hirsch-Hadorn 2008). Knowledge from different disciplines and sectors has "to be interrelated and transformed through the specific problem field" (Pohl and Hirsch-Hadorn 2008, p. 111). This problem field is related to "the common good" (Pohl 2010). In transdisciplinary

research, societal problems are the shared research object that unifies and coordinates the disciplines (e.g., biology, psychology, economics disciplines) and sectors (e.g., academic, business, government sectors) involved in transdisciplinary practices (Jahn et al. 2012; Schaltegger et al. 2013). For the RML field, the shared object is nested:

The field's core issue is to promote responsible management, which in turn requires RML, which in turn requires research on responsible management, which in turn requires education to prepare responsible managers and responsible management researchers (e.g., Forray and Leigh 2012; Godemann et al. 2014; Laasch and Gherardi 2019; PRME 2007a).

We suggest a new conceptualization of transdisciplinary collaborative practices. The transdisciplinary literature has extensively highlighted the central role of collaboration (Gray 2008; Stepans et al. 2002) in reintegrating knowledge (Ormiston 2019; Stock and Burton 2011). While such transdisciplinary collaboration has frequently been framed as 'collaborative practices' (e.g., Ormiston 2019; Quigley et al. 2019; Satterfield et al. 2009), such a practice's perspective has not yet been conceptually developed (Gherardi 2012; Schatzki 1996; Shove et al. 2012). Below, we develop this conceptual connection and formalize a theories of practice perspective on transdisciplinarity.

From a perspective of "practice-based knowing" (Gherardi 2001), "knowledge is defined as something people do" (Gherardi 2019a, p. 56). From this perspective of "collective knowledgeable doing" (Gherardi 2019b) knowledge does not exist independently from practices. Instead knowledge is embedded in practicing and embodied in practitioners' "knowledgeable bodies" (p. 56). Such knowing is collective, as it is also embedded in textures or constellations of entangled practices (Gherardi 2006; Gherardi and Nicolini 2002) and collaboratively enacted by knowledgeable heterogeneous (human–nonhuman) communities of actors and practitioners (Fox 2000; Gherardi 2012, 2017; Wenger 2000). This mirror image between social practice theory's and transdisciplinarity's central consideration of knowledge and collaboration suggests potential for conceptual synergy. We put forward the following initial conceptualization of a collaborative transdisciplinary practice's perspective:

Collaborative transdisciplinary practices integrate disciplinary knowledge (interdisciplinarity) and sectoral knowledge (intersectorality) for solving shared complex overarching problems.

Such transdisciplinary collaborative practices for the RML field require integrating knowledge from the disciplines of ethics, responsibility and sustainability (Laasch et al. 2020). It also requires to collaborate intersectorally by bridging academia-management boundaries integrating knowledge on both sides of 'the great divide' (Rynes et al. 2001). Finally,

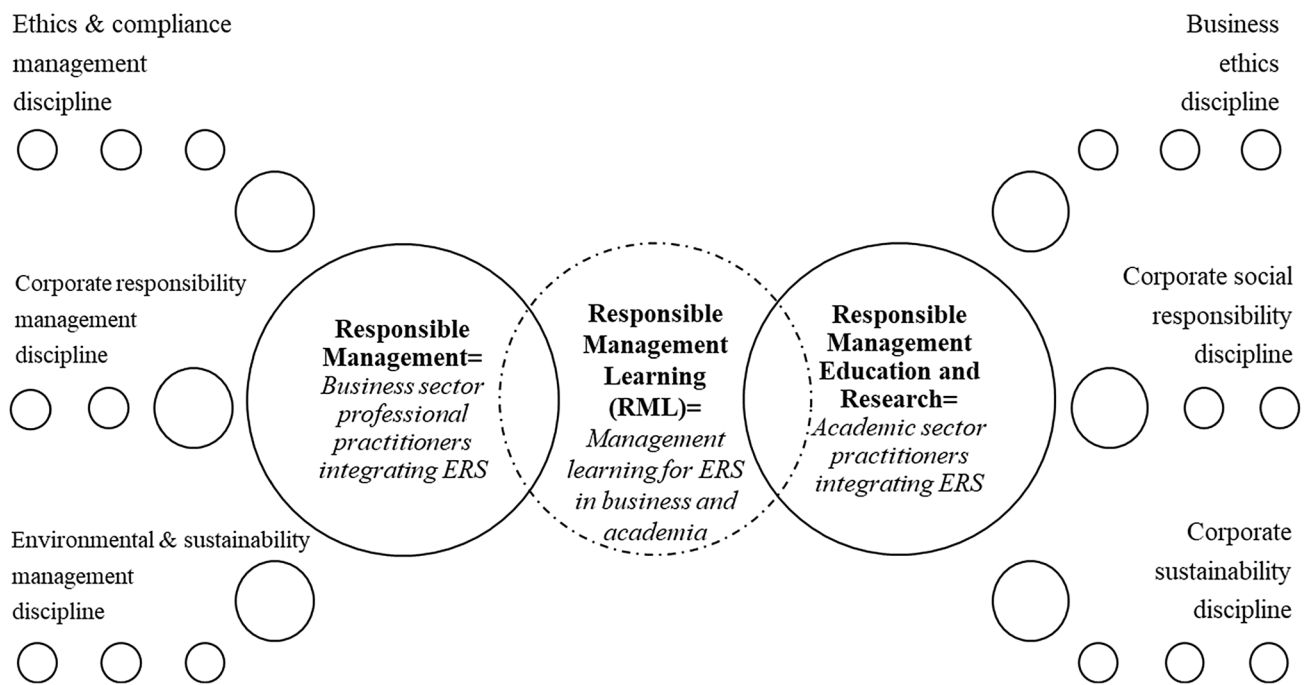


Fig. 1 ERS disciplines in the RML field

such transdisciplinary practices need to span the field's three constitutive layers of practices, of transdisciplinary responsible management, responsible management education, and responsible management research. We will now illustrate these elements of a transdisciplinary collaborative practice's perspective for the RML field.

Interdisciplinarity and Intersectorality

Interdisciplinarity describes practices that are collaborative beyond disciplinary boundaries, while intersectorality describes collaboration across sectors. Transdisciplinarity describes the co-occurrence of these two main types of collaborative practices, between disciplines and between sectors (Elzinga 2008; Schaltegger et al. 2013), interdisciplinarity and intersectorality, through which transdisciplinarity integrates problem-relevant knowledge (Klein 2004). Figure 1 visualizes how practices in the RML field (Laasch and Gherardi 2019) span the disciplines of ethics, responsibility, and sustainability as well as the academic and business management sectors.

First, interdisciplinarity collaborative practices start early on in the process, namely when multiple disciplines engage in a joint problem definition (Schaltegger et al. 2013; Stock and Burton 2011). Such a joint problem definition provides a shared overarching coordination principle, a higher level concept (Max-Neef 2005). As a result interdisciplinarity collaboration typically relies on exceptionally high coordination

between disciplinary partners (Schaltegger et al. 2013; Stock and Burton 2011). These characteristics distinguish interdisciplinary collaborations from weaker forms like multidisciplinary, where every discipline defines their problems in isolation, with little or no coordination, but where results 'happen' to be ex post relevant for the same subject area (Stock and Burton 2011).

The RML field has gone through phases of explicit and institutionalized problematization and co-definition of responsible management as the field's object. For instance, the initial UN Principles for Responsible Management Education's task force defined fostering responsible management as its purpose (Alcaraz and Thiruvattal 2010; Escudero et al. 2012; PRME 2007b), which later on was connected closely to complex problems related to the UN Sustainable Development Goals (Parkes et al. 2018; Storey et al. 2017). Interdisciplinarity in responsible management is primarily the integration between its three constitutive disciplines of ethics, responsibility, and sustainability (ERS) (Furray and Leigh 2012; Laasch and Conaway 2015; Rasche and Gilbert 2015).¹ In the academic sector, these

¹ In this article, we focus on the field's salient ERS disciplines. However, it is important to notice that there are many further disciplines converging in the responsible management learning field. First, there are further practices expressed as the '+' in ERS+, referring to further management disciplines like humanistic and biomimetic management, or critical management studies (Laasch et al., 2020). Second, responsible management also is an interdiscipline between management disciplines and occupations (Whittington 2011) such as marketing, accounting, operations, and people management (Laasch

disciplines often materialize as researching and teaching business ethics (Pritchard and Englehardt 2020), corporate social responsibility (Carroll 2020), and corporate sustainability (Storey 2020). In the business management sector they manifest as managerial disciplines or professions like ethics and compliance management (Constantinescu and Kaptein 2020), corporate responsibility management (Wesselink and Osagie 2020), as well as sustainability management (Beckmann et al. 2020; Schaltegger et al. 2003). Each of these disciplines has developed from distinct cores and offers unique part solutions to the issue of RML (Laasch and Conaway 2015). However, their largest potential lies in the synergetic integration in an ‘interdiscipline’ of responsible management (Laasch and Moosmayer 2015a), in which these disciplines converge to realize their complementary potential (Bansal and Song 2016; Montiel 2008; Muff 2015; Painter-Morland et al. 2018; Schwartz and Carroll 2008; Van Marrewijk 2003). Examples for the creation of such interdisciplinary spaces is business school accreditation agencies’ promotion of ERS practices (Falkenstein 2020; PRME 2018), and frameworks for integrated management education for ERS (Setó-Pamies and Papaioikonomou 2015), frequently reflected as a feature of textbooks’ titles (e.g., Carroll et al. 2017; Crane and Matten 2016; Laasch 2021). Further examples are calls for interdisciplinary responsible management research (McKiernan and Tsui, 2020), and for the integration of ERS into every manager’s practice, and not only those of specialized ethics, responsibility, or sustainability managers (Laasch 2018).

Second, intersectoral collaborative practices integrate problem-relevant knowledge from distinct sectors. Parker (2010) suggests that complex problems range across sectors, which requires an intersectorally shared problem definition. Given the involvement of varieties of sectors and stakeholders engaged in handling the real-life complex problems (Klein 2004; Pohl 2010), such intersectoral collaboration is more likely to also include the implementation of problem solutions (Stock and Burton 2011). Traditionally, the sectors involved were the academic sector plus some other ‘implementation’ sector(s) like the industrial or public policy sector (Scholz et al. 2006; Stock and Burton 2011), but also the social and healthcare sector (Hirsch-Hadorn et al. 2008; Holmesland et al. 2010). From this perspective, intersectoral practices are understood to be driven by the academic sector, which ‘allows’ other sector stakeholders to ‘participate’ in their practices (Elzinga 2008). In this article, however, we seek to de-emphasize this academic-sector

dominant ‘academia-practice’ collaboration (Bartunek and McKenzie 2017; Schaltegger et al. 2013) where “researchers and actors of the life-world collaborate.” (Pohl and Hirsch-Hadorn 2008). Instead, we provide a space for transdisciplinary practices that may be driven by other non-academic sectors (Schaltegger et al. 2013). For instance, governmental actors or business managers might set up some transdisciplinary collaboration where academia ‘merely’ participates, or might not be involved at all.

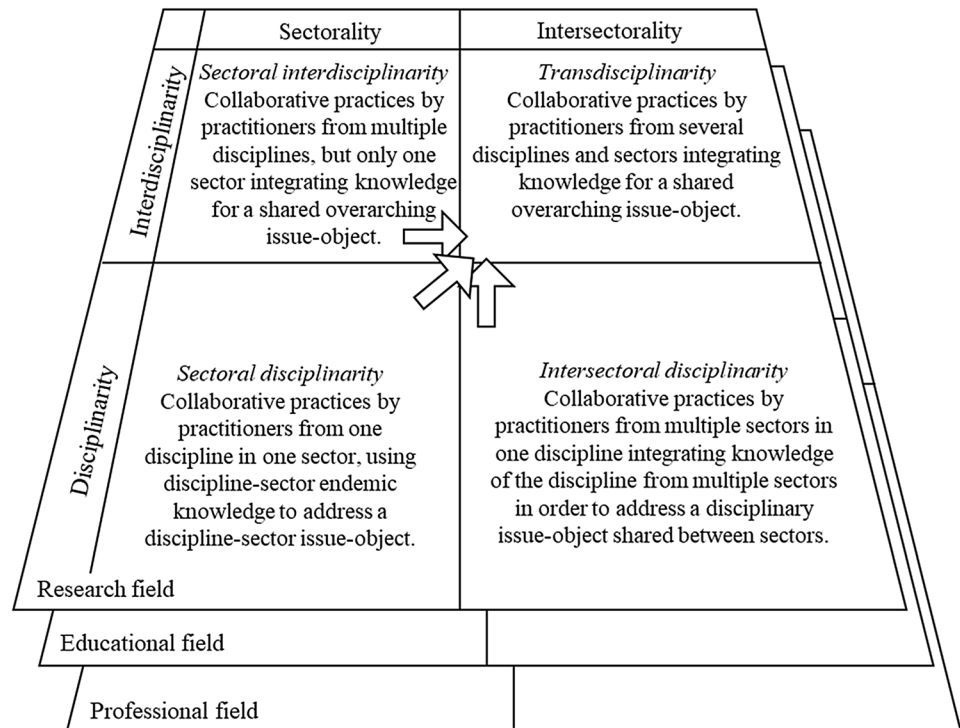
Intersectorality in responsible management implies the enactment of collaborative practices between academic sector and (business) management sector. The aspiration for intersectorality is engrained in Principle 5 of the PRME (2007b) titled “Partnership: We will interact with managers of business corporations to extend our knowledge of their challenges in meeting social and environmental responsibilities and to explore jointly effective approaches to meeting these challenges.” The academic UN PRME’s embeddedness into the UN Global Compact as a business sector initiative provides an opportunity for such intersectoral collaboration. Also Principles 6 “Dialogue” suggests intersectorality beyond academic-business collaboration: “We will facilitate and support dialog and debate among educators, students, business, government, consumers, media, civil society organisations and other interested groups and stakeholders on critical issues related to global social responsibility and sustainability.” Related intersectoral collaborations serve to integrate ERS knowledge from the academic sectors, for instance, from ERS research (Laasch et al. 2020) with ERS knowledge in the business management sector’s disciplinary professional communities (Beckmann et al. 2020; Constantinescu and Kaptein 2020; Wesselink and Osagie 2020). Such intersectoral collaboration corresponds to the insight that addressing the complex issues of RML requires, reciprocal knowledge exchange and integration between managers and academics (Beech et al. 2012; Laasch and Moosmayer 2015b), contributions from multiple sectors of society (Laasch and Conaway 2016), and the integration of plural logics corresponding to multiple sectors (Radoynovska et al. 2020).

To assess the modes of practices in the RML field, it is crucial to have a clear understanding of what qualifies as a transdisciplinary practice. Building on Schaltegger et al. (2013) classification, Fig. 2 illustrates four distinct modes of transdisciplinary and non-transdisciplinary practices by combining the two constituting dimensions of (inter)disciplinarity and (inter)sectorality. The most pronounced collaborative practices are to be found in *transdisciplinarity*. Practitioners from multiple disciplines and sectors engage in joint problem definition. They intensively, and iteratively coordinate their knowledge integration in the pursuit of real-life solutions. For instance, UN Global Compact companies’ managers might engage with researchers from UN PRME

Footnote 1 (continued)

and Conaway 2015; Rasche et al. 2013). Third, there are boundaries between disciplines studying management, management education, and management research methods. Fourth, there is the most embattled frontier between the neoclassic management as usual and emerging discipline centered on alternative approaches to management.

Fig. 2 Modes of collaborative practices across fields of RML



signatory business schools (intersectorality), in co-developing feasible degrowth strategies. Such strategies might be aimed at environmental sustainability, but also addressing the moral implications, for instance, in the form of responsibility towards employees that might need to be laid off when companies degrow (interdisciplinarity).

The mode of research with least-pronounced collaborative transdisciplinary practices is *sectoral disciplinarity*. Research is either conducted exclusively within individual disciplines (intradisciplinarity) or where individual disciplines work in parallel on the same subject, but coordinate very little (multidisciplinarity). Such practices are carried out typically in an individual sector or in parallel across multiple sectors with little coordination or joint problem definition. An example is initiatives by the Ethics Officer Association (disciplinarity), to provide moral awareness training for their members who are homogeneously employed by major corporations (sectorality). The other two modes of collaborative practices are combinations of the characteristics of transdisciplinarity and sectoral disciplinarity. *Intersectoral disciplinarity* is characterized by collaborative practices that involve actors from multiple sectors, but only one discipline. An examples is the paper by Chapple et al. (2019). It is based on intensive collaboration between the researchers and management practitioners (intersectorality), centered on the shared sustainability issue of carbon literacy (disciplinarity). *Sectoral interdisciplinarity* relies on interdisciplinary collaboration, but does not traverse sectors. The important work on how the planetary sustainability boundaries should

translate into managerial action by Whiteman et al. (2013, p. 307) calls for future “sectoral and firm level targets for [impact] reduction.” However, their research practices related only to academic-sector (sectorality) disciplines, particularly, to “integrate more closely with the natural sciences” (interdisciplinarity).

Because today’s complex problems require transdisciplinary practices, knowing how to move from non-transdisciplinary modes to transdisciplinary modes is important. Moreover, as RML is centered on today’s complex problems, such moves are also important for the RML field. The arrows in Fig. 2 express three moves towards transdisciplinarity from the three non-transdisciplinary modes of collaboration. A vertical move from intersectoral disciplinarity towards transdisciplinarity can be achieved by initiating interdisciplinary practices. The carbon literacy initiative mentioned above, could begin to involve the ethics and responsibility disciplines by relating to similar literacy initiatives, for instance, related to modern-day slavery or stakeholder democracy. A horizontal move from sectoral interdisciplinarity towards transdisciplinarity is achieved by an addition of intersectoral practices. For instance, the planetary boundaries research mentioned above could be complemented by action research that involves business management sector actors from the World Business Council for Sustainable Development. Realizing a transversal move from sectoral disciplinarity towards transdisciplinarity then requires the addition of both interdisciplinary and intersectoral collaborative practices. As an example, the Ethics Officer

Association training for moral awareness above could add intersectoral collaborations where their trainings involve academics, and include interdisciplinary contents related to sustainability and responsibility.

Layered Fields and Constellations of Transdisciplinarity

Transdisciplinarity in a field has been used to describe practices of research such as transdisciplinary research methodology (e.g., Hirsch-Hadorn et al. 2008; Nicolescu 2002; Pohl 2010); education, for instance, transdisciplinary curricula (e.g., Falls 2019; Remington-Doucette et al. 2013; Scholz et al. 2006); and of professional nature such as transdisciplinary collaborations between professional healthcare disciplines like nursing, psychology, and medicine and their academic counterparts (e.g., Satterfield et al. 2009).

Beckmann and Schaltegger (2020) stress the interrelated nature of transdisciplinary research, education, and professions: Research creates, education disseminates, and professions apply knowledge. Social practices theory, while featuring a less rigid attribution of these knowledge functions (Gherardi 2006; Gherardi and Nicolini 2000; Strati 2007), suggests that knowledge in practices of research, education, and professions have their complementary roles in addressing responsible management. In this article, we build on previous conceptualizations of the interrelatedness between research, educational, and managerial practices of the field (Laasch and Gherardi 2019). As visualized in Fig. 3, we use the conceptual imagery of constellations of practices (Gherardi and Nicolini 2002; Hui et al. 2016; Schatzki 2016b)² to show how interconnected collaborative practices coexist across layers of practices on³ research, educational,

and professional fields.⁴ We anchor the notion of fields in relationship to social practices theory in the seminal work of Bourdieu (1977, 1990), and in its recent applications of social practices theory (Reckwitz 2002; Warde 2016), particularly in the form of a social practice's perspective on RML with shared practices across fields (Boxenbaum and Battilana 2005; Laasch and Gherardi 2019).

Imagine a fictional RML project, for instance, studying the RML realized in a biodiversity protection training in an eco-tourist beach resort. The project involves interdisciplinary practices where research requires the collaboration between biologists studying the ecosystem-related biodiversity aspects and psychologists studying the related recreational impacts of biodiversity. Imagine it is an action research project where academic sector researchers and business sector managers co-design and co-steer the research project.

As this project involves both interdisciplinary and intersectoral collaboration, it would qualify as transdisciplinary on the research field. On the educational field, however, it may well be sectoral disciplinarity as the training conducted transmits only knowledge from the biology discipline (disciplinarity) and only involves business sector learners and instructors (sectorality). On the professional practices field, however, biodiversity protection activities in such a resort have to bring together professionals from varieties of disciplines, such as marine biologists, veterinarians, landscape architects, tourism managers. It is also likely that there will be some collaboration with the governmental sector, and possibly with local native communities, making this an intersectoral practice. Accordingly, the constellation of transdisciplinary practices in this case would be one of transdisciplinarity on the research field, sectoral disciplinarity on the education field, and of intersectoral disciplinarity on the professional field (see Fig. 3, with the sun icon expresses the seaside biodiversity context).

Research Practices Field

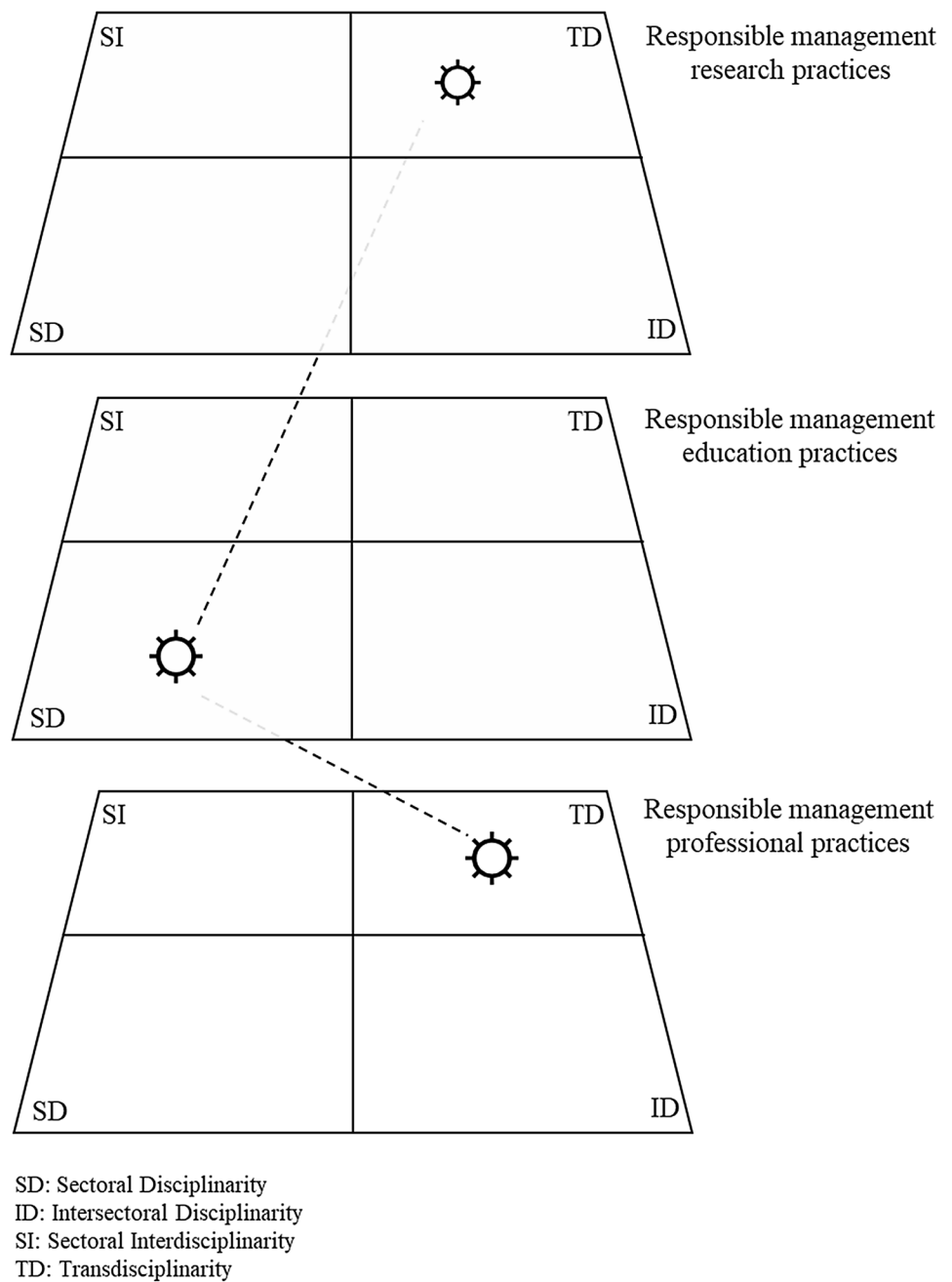
The potential of transdisciplinary *research* has been recommended for business phenomena similar to responsible management, like those of social entrepreneurship (Braun 2009) or corporate sustainability (Schaltegger et al. 2013). Transdisciplinary responsible management research practices (Beckmann and Schaltegger 2020) are centered on the complex phenomenon of RML which spans the disciplines of sustainability, responsibility, and ethics as well as academic, business, and civil society sectors (Laasch and Moosmayer

² While the notion of layered fields of practices could be understood as a contradiction to social practice theories' 'flat' ontology (Schatzki 2016a; Seidl and Whittington 2014), the underlying conceptual imagery and metaphor of a constellation (like that of stars in space) of practices (Gherardi and Nicolini 2002) may serve to address this perception of inconsistency. There is no gravity in space, implying that up and down, higher and lower, flat or high are relative terms. Accordingly, using layers in such a constellation does not contradict flat ontologies' criticism of hierarchical dualities like higher-lower. This goes in line with similar 'not entirely flat' conceptual imagery commonly used such as bundles (Laasch et al. 2019) or textures of practices (Fenwick and Landri 2012; Gherardi 2006).

³ We use the proposition 'on' the field rather than 'in' the field in order to express the layered plain-like conception of one field on the other. This is consistent with Bourdieu's notion of societal fields similar to a playing field with unique rules of competition (Bathmaker 2015; Bourdieu 1992), in our case the shared logic of the types of practices enacted *on* each respective playing field, namely research, educational, and professional logics.

⁴ The notion of layers of transdisciplinary practices introduced here should not be confused with seminal transdisciplinary typologies of levels of reality, knowledge, or disciplines (e.g., Jantsch 1972b; Max-Neef 2005; Nicolescu 2014).

Fig. 3 Constellations of collaborative practices in RML*



2015b).⁵ Pohl and Hirsch-Hadorn (2007, p. 20) suggest four core characteristics of transdisciplinary practices on the research field, namely to “(a) grasp the complexity of problems, (b) take into account the diversity of life-world and scientific perceptions of problems, (c) link abstract and case-specific knowledge, and (d) develop knowledge and practices

that promote what is perceived to be the common good.” At the core of transdisciplinary research are collaborative practices based on a “constructivist view” of research (Elzinga 2008, p. 350; Quattrone 2000), implying transdisciplinary collaboration throughout three phases of research: first, the collaborative problem definition; second, probing research outputs for relevance to the problem; and third, implementation of research outcomes in real-world settings.

Such collaborative practices need to be both interdisciplinary and intersectoral: Interdisciplinary collaboration requires collaboration between academic disciplines such as distributed leadership between disciplinary participants

⁵ Responsible management learning research overlaps with the field demarcated by the Responsible Research in Business and Management initiative (RRBM 2017, 2018), as the former is more narrowly focused on responsible management learning phenomena, while the latter opens a broader umbrella interested in responsible research on a wider variety of business and management phenomena.

and brokers between disciplines (Gray 2008). Intersectorality requires research methods that involve participants from the academic and other sectors. An example is participatory action research in which academic sector actors together with the business, community, or with public sector actors co-define and steer research projects (Argyris and Schön 1989; Cassell and Johnson 2006; Christens and Perkins 2008; Reason and Bradbury 2001). Responsible management research practices aspire to be interdisciplinary as they should be grounded in the academic disciplines of ethics, responsibility, and sustainability. Such research practices are also ideally intersectoral, when collaborating with managers to tackle the challenges RML. Such intersectorality may mean to conduct research that is deeply immersed in the managerial sector context, with managers co-shaping it.

To achieve transdisciplinary research's purpose of socially relevant knowledge production requires co-definition of research questions, joint evaluation of usefulness of knowledge, and of putting it to use (Elzinga 2008; Hollaender et al. 2008) as well as reciprocal knowledge transfer between sectors and disciplines (Ren and Bartunek 2020; Rynes et al. 2001). This quest for socially relevant knowledge also relates transdisciplinary research to pragmatic research philosophies grounded in solving socially meaningful issues (Baker and Schaltegger 2015; Dewey 1916; James 1907/1995); 'Mode 2' research that is motivated and contextualized by real-life issues (Bartunek 2011; Gibbons et al. 1984; Guerri et al. 2019; MacLean et al. 2002; Nowotny et al. 2003; Van Aken, 2005); and design science that begins with the identification of problems in the research context (Cross 2001; Hevner 2007; Järvinen 2007; Van Aken 2004). Transdisciplinary research is centered on performativity of how research may create new realities or continuously re-create existing ones (Callon 2007; Gond et al. 2016). Responsible management research has connected to many of these lenses, for instance, through deeply immersed ethnographic research methods (Price et al. 2020); the continuous translation between academic and business sectors (Ren and Bartunek 2020); and a shared problematization of managerial and academic sector practices, such as their (ir) responsible uses of the past (Stutz and Schrempf-Stirling 2020). Such research relies on engaged modes of participant action research or appreciative inquiry (Beveridge et al. 2020; Langmead and King 2020) as well as emancipatory paradigms like critical management research (Parker and Racz 2020). There is a strong emphasis on the performative 'world-making' characteristics of responsible management research (Laasch et al. 2019; Langmead and King 2020).

Methodological challenges of collaborative transdisciplinary research practices are, for instance, framing research questions as real life-world problems rather than through disciplinary frameworks (Kueffer et al. 2007; Pohl and Hirsch-Hadorn 2008), complexities of publishing research

that transcends disciplines and sectors in the 'normal' disciplinary journals (Kueffer et al. 2007), and that is difficult to translate into common funding schemata (Jahn et al. 2012). Another challenge of transdisciplinary research is to bridge and integrate research paradigms between academic sector disciplines (Pohl 2010), including ontological, epistemological, and methodological characteristics (Nicolescu 2014). The transdisciplinarity discussion's emphasis on the need to transcend disciplinary paradigms calls for renewed attention to the underlying research paradigms in responsible management learning and education research (Laasch and Moosmayer 2015b; St John and Neesham 2020). Heterogeneity of teams with research actors from multiple disciplines and sectors is at the core of managing transdisciplinary research projects. It implies continuously navigating the transdisciplinary tension between integrating heterogeneous inputs and effectiveness in reaching research outputs (Hollaender et al. 2008), best achieved through collaborative leadership (Gray 2008). To address these challenges, transdisciplinary researchers require a 'transdisciplinary attitude,' a willingness to take risks, a nuanced understanding of transdisciplinary practices, and a creative relativism that accepts others' disciplinary stances (Augsburg 2014).

Educational Practices Field

Transdisciplinary education is centered on complex real-life problems. It aims to prepare professionals who address such problems (e.g., Nandan and Scott 2013), or to enable other actors across society to produce problem-solving knowledge (Winberg 2006). Transdisciplinary education has been applied to complex issues such as healthcare for the poor (Beck 2005; Nandiwada and Dang-Vu 2010) or engineering education for sustainability (Tejedor et al. 2018). Similarly, the issues addressed through responsible management education beg for transdisciplinarity (Parkes et al. 2017; Storey et al. 2017).

Responsible management education straddles the disciplines of education for ethics, responsibility, and sustainability. It can draw from the full range of these disciplinary educational practices to build an interdisciplinary synthesis by integrating the fields of education for sustainability (Carteron et al. 2014; Dyllick 2015; Wals and Jickling 2002; Young and Nagpal 2013), responsible leadership education (Dugan and Komives 2010; Grey 2004; Higham et al. 2010; Pless et al. 2011, 2012), and business ethics education (Gentile 2017; Goodpaster et al. 2017; Verbos and Humphries 2015a). In terms of intersectorality, responsible management education has stressed collaborative learning between higher education and business sectors, where managers learn from academics and vice versa (PRME 2007b).

Transdisciplinary education is a persistent theme of the transdisciplinarity discussion (e.g., Apostel et al. 1972;

Jantsch 1972b; Klein 2008; Max-Neef 2005). Calls for a transdisciplinary turn in education have described the transdisciplinary university (Jantsch 1972a), a ‘transdisciplinary evolution of the university’ (Nicolescu 1999), and envisioned entire transdisciplinary educational models (Nandan and Scott 2013). As is transdisciplinary research, transdisciplinary education also builds on a constructivist paradigm in which knowledge and learning are co-constructed between students, instructors, and possibly professionals (Levin and Nevo 2009; Williams et al. 2003). Education is a “collective enterprise.” With a transdisciplinary turn in education, curricula integrate knowledge across disciplines and sectors (Penaluna and Penaluna 2009). Subject-based classes are meant to be transformed to become transversal-transdisciplinary learning units (Eronen et al. 2019). Quigley et al. (2019, p. 149) provide a helpful list of transdisciplinary teaching practices, namely “discipline integration, problem-based approach, authentic tasks, inquiry-rich methods, student choice, technology integration, teacher facilitation, and assessments...connected to the problem to be solved.”

Two specific educational methods have been highlighted for their transdisciplinary potential. First, project- and problem-based learning serves to make collaborative learning revolve around a central transdisciplinary problem (Falls 2019). Second, transdisciplinary case studies translate the complexity of real-life problems into the educational setting (Krohn 2008; Scholz et al. 2006). Both the responsible management education field and most of the transdisciplinary education literature are strongly academic-sector centric. However, recent developments of the field have suggested a stronger emphasis on education, training, and development for responsible management in the business sector that is centered on learning in the managerial workplace (Andrianova and Antonacopoulou 2020), including explicit and implicit learning outside the academic higher education sector (Laasch and Gherardi 2019; Laasch et al. 2017).

Transdisciplinarity is built on several underlying shifts in educational practices. First, transdisciplinary education “traverses... classroom boundaries” (Nandan and Scott 2013, p. 268) as it requires the creation of new learning spaces such as transdisciplinary ‘ateliers’ outside the university, including the cyberspace. In such spaces, disciplines and sectors can meet to jointly learn for the mitigation of real-live problems (Nicolescu 1999). An excellent example is a medical student-run⁶ free clinic (Beck 2005) that creates such transdisciplinary ‘real-world learning opportunities’ (Fadееva et al. 2010). Second, transdisciplinarity also transcends the usual degree-bounded timeframe of learning, as transdisciplinary learning is well suited to be enacted as a form of lifelong learning (Canter and Brumar 2011), and a way of addressing the challenge of professional ineptitude

(Antonacopoulou 2018). Third, at the center of transdisciplinary learning are unique competences that paradoxically, are both necessary for transdisciplinary learning to take place and that are meant to be fostered through transdisciplinary learning. An example is the social competence to collaboratively learn with and from practitioners from other disciplines and sectors. An example is ‘training team players’ in transdisciplinary healthcare (Downing and Bailey 1990; Nandiwada and Dang-Vu 2010). Also, there are key cognitive competences, ‘transdisciplinary habits of mind’ (Mishra et al. 2011), that counter-act the taken-for granted disciplinary habits of mind fostered in disciplinary signature pedagogies (Gurung et al. 2009). Fourth, transdisciplinary education aims to immediately impact the issues at hand. For instance, service learning immediately impacts the issues that the type of service provided is centered on (Dunkel et al. 2011; Marcus et al. 2011). In responsible management education, already, varieties of methods are practiced that lend themselves to transdisciplinarity. For instance, pragmatic inquiry often involves a structured collaboration between academic sector and business management sector practitioners that is centered on a complex problem experienced in their organizations (Kelley and Nahser 2014). Another great example is reciprocal (service) learning that spans the academic higher education and business management sectors (Fougère et al. 2019).

Professional Practices Field

The professional⁷ field originally was not part of the transdisciplinary agenda which was dominantly focused on education and research fields (Apostel et al. 1972; Jantsch 1972b). However, addressing complex problems is not unique to research and education. Professional practices characterized by an important societal contribution often address ethical, social, and environmental problems (Blond et al. 2015; Greenwood 1957; Saks 2016), using highly specialized professional knowledge (Freidson 2001). These characteristics make professional practice prone to transdisciplinary challenges similar to those on the research and education fields. On the professional practices field, transdisciplinarity is enacted as an “approach to work” of professional practitioners (Wall and Shankar 2008, p. 553). Through the “professionalization of the various branches of knowledge”

⁶ Note the ethical complexities.

⁷ We use the term ‘professional’ here consistent with the transdisciplinarity discussion. It refers to competent and skilled practitioners who are engaged in a paid occupation outside the academic sector. While being aware of the more nuanced discussion of attributes of professions and professionalism in the sociology of professions (e.g., Abbott 1988; Freidson 1994; Greenwood 1957), particularly about management’s professional status (e.g., Donham 1962; Follett 1927; Khurana and Nohria 2008), we decided to stick to the transdisciplinarity discussion’s more inclusive implicit framing.

(Collin 2009, p. 102), disciplines have formed outside the academic sector, which may collaborate in “interdisciplinary work” (Holmesland et al. 2010, p. 4). The extension of the transdisciplinary discussion to related practices of non-academic practitioners is an important step toward recognizing the “limits to social scientific knowledge” (Whittington 2011, p. 183) and toward creating a space for professional practitioner-led transdisciplinary practice. Examples of how professional transdisciplinary management practice has been applied to ERS, range from environmental management (Attwater et al. 2005); impact assessment (Ormiston 2019); responsible tourist boat management (Hirsch et al. 2016); and anti-neoliberal management (Chiapello and Fairclough 2002); to transdisciplinary work that integrates social work and social entrepreneurship (Nandan and Scott 2013).

An excellent example for interdisciplinarity on the professional practices field is the collaboration between professions of nursing, medical doctors, psychologists, and social workers, together addressing the complex issue of patients’ health and wellbeing (Satterfield et al. 2009; Stepan et al. 2002; Vyt 2008). Another example is interdisciplinary collaboration between varieties of caring professions and architects to address the entangled health-housing problem nexus (Lawrence 2004). Intersectorality on the professional practice field implies an emancipation of the authority of the ones ‘served’ by the profession to become active participants. For instance, patients’ knowledge and preferences regarding their condition and medical practitioners’ become equally important in medical practice (Satterfield et al. 2009). This feature mirrors aspects of the research practices field, where authority becomes more evenly distributed between academic researchers and research participants, or on the educational practices field, where teacher and taught become equally authoritative in the educational process.

Responsible management practices (Laasch and Gherardi 2019; Pérezts et al. 2011; Price et al. 2020) on the professional field, on the one hand, are interdisciplinary ‘by definition’ as a type of management that deeply integrates ethics, responsibility, and sustainability management (Laasch and Conaway 2015). It integrates knowledge related to specialized job profiles like that of the environmental and sustainability managers in the (environmental) sustainability discipline (e.g., Baumgartner and Winter 2014; Carollo and Guerci 2017; Friedman 1992; Visser and Crane 2010); of CSR managers in the (social) responsibility discipline (e.g., Chaudhri 2016; Godos-Díez et al. 2011; Molteni and Pedrini 2009); and of ethics and compliance managers in the business ethics discipline (e.g., Adobor 2006; Hoffman et al. 2008; Morf et al. 1999). Furthermore, responsible management practices are frequently inspired by fundamentally interdisciplinary management frameworks, such as biomimetic management that integrates biological and managerial knowledge (Mead 2018; Mead and Landrum 2020), or

humanistic management that integrates knowledge from evolutionary biology, economics, and psychology (Lawrence and Pirson 2015; Pirson 2020).

Collaborative intersectoral practices on the professional field, on the other hand, emerge, for example, when responsible management practices are inspired by academic research findings. Intersectoral collaboration may consist of academics mentoring or consulting; through action research with a professional practitioner-led co-definition of the problem; or in auto-ethnographic studies conducted, for instance, by DBA students. Another example is evidence-based management that relies on research insights (Briner et al. 2009), or that engages in performative processes, for instance, of ‘realizing’ an academic concept like ‘shared value’ through responsible management practice (Ligonie 2017). Responsible management’s central theme of stakeholder engagement is fundamentally intersectoral, as most stakeholders, such as governmental representatives, civil society organizations, or indigenous groups belong to other sectors than business.

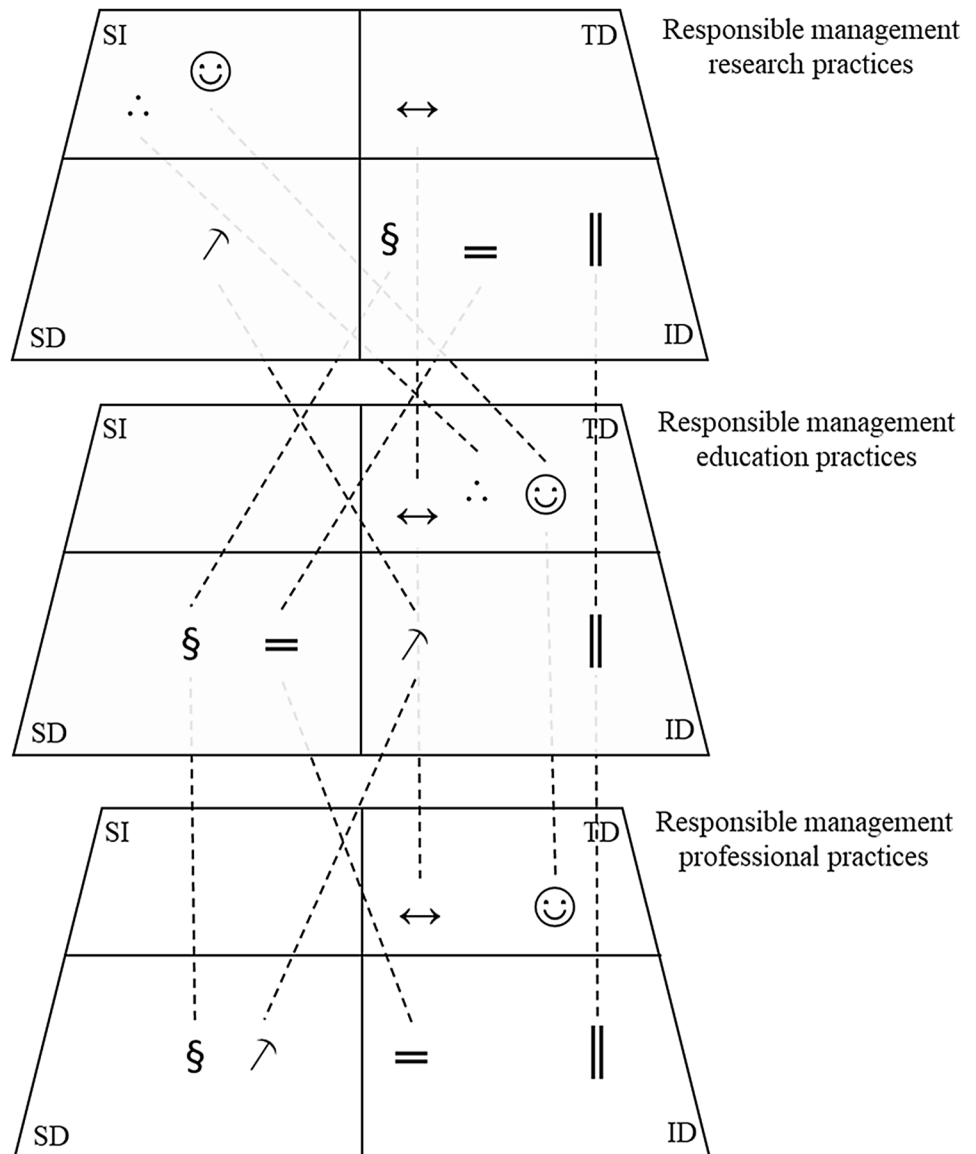
Contributions to This Special Issue and Their Constellations of Transdisciplinarity

We started this article with a call for transdisciplinarity in the RML field. However, we suspect that transdisciplinarity, up to now, is more an aspiration than a pervasive reality of the field. To further corroborate, we have mapped the articles in this special issue, which we will now briefly introduce and discuss in terms of their transdisciplinary or non-transdisciplinary modes on research, educational, and professional fields (see Fig. 4 and Appendix Table 1 which illustrates how we have assessed interdisciplinarity).

The first set of papers is conceptual and relies on established literature to make their contributions to the RML discussion and to contribute insights that have a disruptive potential to improve RML. Cullen (2019) presents four types of responsible management learning and education derived from a structured literature review. Pirson (2019) proposes a humanistic management ontology as a more promising description of human nature for the RML field than the currently dominant ‘economistic’ ontology. Montiel et al. (this issue) review the corporate sustainability literature and synthesize threshold concepts to translate academic insight into conceptual knowledge that is adequately packaged to change managers’ mindsets fundamentally. Dzhengiz and Niesten (2019) conceptually integrate individual and organization level learning for sustainability by reviewing the literatures of environmental competences and capabilities.

Among these conceptual papers, several achieve interdisciplinarity on the research field by integrating knowledge from multiple literatures. For instance, Pirson (2019) integrated knowledge from the humanities and evolutionary

Fig. 4 Constellations of trans-disciplinarity in contributions to this special issue



- ∴ : Cullen (in this issue), Varieties of responsible management learning
- ☺ : Pirson (in this issue), Humanistic management ontology
- = : Montiel et al. (in this issue), Sustainability threshold concepts
- ↗ : Dzhengiz and Niesten (in this issue), Competences for environmental sustainability
- § : Hauser (in this issue), Ethics and compliance learning
- || : Chapple et al. (in this issue), Carbon literacy across boundaries
- ↔ : Fougère et al. (in this issue), Enriched reciprocal learning

biology to build an argument for the humanistic ontology. Similarly, Cullen (2019) builds his typology on interdisciplinary conceptualizations of integrated education for ethics, responsibility, and sustainability. On the professional field, typical interdisciplinary practices are aimed at ethical, responsible, and sustainable outcomes as Pirson (2019) posits. However, we also see varieties of disciplinary practices.

For instance, both papers Dzhengiz and Niesten (2019) and Montiel et al. (this issue) stayed within the environmental sustainability discipline on all fields. Establishing intersectorality in these conceptual papers appeared more difficult than in empirical papers. However, for instance, Dzhengiz and Niesten (2019) established intersectorality on the educational field as they studied phenomena related to absorptive

capacity, which is concerned with organizations' ability to relate to 'outside knowledge' from distinct sectors. Cullen (2019) showed an intersectoral aspiration by calling for responsible management learning and education that spans boundaries between the higher education and business management sectors.

A second set of contributions consists of empirical articles that study RML in the workplace. These articles provide much needed insight into the actual practicing of RML outside the academic sector. Hauser (2019) studies ethics and compliance trainings programs, proposing an integrated, more effective ethics and compliance training scheme. Chapple et al. (2019) study how carbon literacy training on a television set enabled social learning across departmental boundaries. Fougère et al. (2019) studied reciprocal multistakeholder learning realized through a service learning project in which students and managers collaborated. These contributions more frequently featured intersectoral practices than the conceptual contributions introduced previously. Several papers showed intersectorality on the research field through collaboration with research participants. For instance, Chapple et al. (2019) worked with managerial research participants "as 'knowledgeable agents'" and Hauser (2019) collaborated with "focus group participants [who] were... asked to share their comments and elaborate on the preliminary findings." Chapple et al. (2019) and Hauser (2019) focussed on single disciplines of environmental sustainability and ethics, respectively, on all three fields.

The article by Fougère et al. (2019) deserves special attention. Among the contributions, it was the only one that showed an entirely transdisciplinary constellation, with interdisciplinarity and intersectorality on all three fields. On the research field, the authors interdisciplinarily integrated their literature positioning in the sustainable development and corporate responsibility disciplines and an empirical analysis instrument based on virtue ethics. They achieved intersectorality by involving managers as boundary spanners between academic and business sectors. Reciprocal service learning as the educational phenomenon they studied is built on close collaboration between students from the academic sector, as well as managers from the business sector and from civil society organizations. These educational designs were centered on varieties of managerial challenges related to the ERS disciplines. The same challenges also established interdisciplinarity on the professional field, and intersectorality as managers and students jointly addressed these challenges.

Concluding Discussions: A Research Agenda for RML

We believe to make at least two meaningful contributions through this article. First, our conceptualization of transdisciplinarity in RML and the articles brought together in this issue constitute an important starting point in our journey towards truly transdisciplinary RML practices. Second, transdisciplinary collaboration has frequently been framed as practices, but this has never been developed further conceptually. Our theoretical contribution is to conceptually scaffold a theories of practice perspective on transdisciplinarity.

The original intention of this special issue was to shift the emphasis of responsible management research away from RML realized in the academic sector, and to direct attention to learning in the business sector; in the managerial workplace. Also, in working with the special issue contributors, we have put emphasis on the need to research responsible management, as a management that integrates the disciplines of ethics, responsibility, and sustainability. These core features of this special issue mirror the transdisciplinarity discussion's foundational features of interdisciplinarity (ERS) and intersectorality (academic-business management sectors). We have built on this connection by calling for and conceptualizing transdisciplinarity as a foundational feature for the emerging RML field.

We have highlighted how each of the seven articles included in this special issue make unique and invaluable contributions to the emerging field of RML. Yet we find, in spite of our attempt at nurturing articles' transdisciplinarity, that the transdisciplinary practices expressed in these contributions are rather limited. This observation leads us to discuss what may impede transdisciplinarity in the responsible management field. Also we wonder what implications the conceptualization of transdisciplinarity in the RML field may hold for the larger transdisciplinarity discussion.

Impediments to Transdisciplinarity in the RML Field

We suggested in the introduction to this article that issues typically encountered in RML are neither disciplinary nor sectoral. Accordingly, developing a transdisciplinary research agenda in responsible management is an important and urgent endeavor.

'What's in a Name?' Responsible Management Learning Versus Education

Due to its close entanglement with the UN PRME initiative, the discussion in the RML field up to now has been dominated by a focus on educational practices. The original purpose of this special issue was to start evening out this skew

by directing researchers' attention to RML in the managerial workplace (Laasch et al. 2017). In spite of making this emphasis explicit roughly two-thirds of the over fifty initial submissions to this special issue emphasized academic education practices.

It appears that responsible management learning has become normalized with a taken-for-granted link to the word 'education,' which impedes the study of RML on other fields, most importantly the field of professional management. As a consequence, we propose to re-center the field around the inclusive term of responsible management learning that also covers the form of implicit day-to-day learning of managing (ir)responsibly (Laasch et al. 2020) in the workplace (Andrianova and Antonacopoulou 2020), and over the course of a responsible management career (Tams 2020). For the sake of achieving its own purpose of fostering RML in all its forms, the field's structure has to be 'renegotiated' by shifting emphasis between dominant issues, objects, actors, and spaces of RML (Bourdieu 1984/1979, 1988/1984, 1993, 1996/1992).

From Smorgasbord to Melting Pot

We found that four out of the seven contributions to this special issue addressed RML through disciplinary lenses only ethics or only sustainability (see Table 1 in Appendix). This observation fits the definition of multidisciplinary (Max-Neef 2005; Schaltegger et al. 2013), where an issue or object is shared and addressed in multiple disciplines, but without collaboration or integration between disciplines and therefore forfeiting synergies. This observation is transferrable to the varieties of disciplinary communities affiliated with the responsible management learning and education agenda, and with the UN PRME's self-declaration as "a network of networks" (PRME 2016, p. 8).

If transdisciplinary is to be achieved, the RML field will have to achieve a shift in its current structure from being a Smorgasbord of separate disciplines neatly presented next to each other on the shared buffet that is RML, to a melting pot in which disciplines and sectors integrate what they have to contribute. A major challenge necessary for such disciplinary integration will be to abandon the disciplinary turf wars for dominance of one or another discipline, for instance, the ones between the ethics, responsibility, and sustainability disciplines.

Towards Reflexive Collaborative Practicing

We have made the case for RML as transdisciplinary practices and we explored this in relation to relevant collaborative practices of different actors that are integral to this emerging field. However, to operationalize such an agenda will call for more than promoting collaborative practices.

Following Bourdieu (1977), no habitus, practice or field can emerge without a commitment to reflexive critique. What distinguishes the latter from other forms of reflexivity or reflection or review of one's practice is the commitment to go beyond established wisdom, assumption and actions. It invites personal change and learning amongst actors, point that is integral to Bourdieu's habitus and recent conceptualizations of this as practicing (Antonacopoulou and Fuller 2019), and to recent developments in the RML field (Hibbert and Cunliffe 2013).

This demands investment in practicing the various dimensions that necessarily need to be connected to enable the impact that is aspired through the interdisciplinary and intersectoral collaborations formed. Such practicing, however, is not to be misunderstood as merely repetitive and reproductive of norms, a mode of performativity that is at risk of failing to question and renew fundamental practices and habitus (Gherardi 2006). Instead, we follow Antonacopoulou and Fuller (2019) who recognize repetition as a critical process enabling the relationality among diverse actors, their distinctive knowing and the emergence of their shared practices. In other words, one must necessarily extend beyond their world view in order to be able to recognize and understand another perspective. We therefore, call for a 'return to reflexivity' to renew our understanding of how practices are performed within fields before we can seek ways of expanding the appreciation of how practices are performed in other disciplines and sectors.

Implications for the Transdisciplinarity Discussion

Whittington (2011) highlights the value of a transdisciplinary approach to practice theory. We conversely suggest the value of a practice-theory perspective on transdisciplinary. We will now briefly scaffold salient implications for the transdisciplinarity discussion arising from our conceptualization.

A New Understanding of Intersectionality

A distinction between theory and practice as it is often suggested in the transdisciplinarity discussion (e.g., Schaltegger et al. 2013) clashes with main conceptual assumptions of the social practices discussion. Through a social practices lens, academic practitioners practice just as management practitioners do, but the types of practices they engage in are distinct. Therefore, in this article, we have chosen the less common, but equally valid and in-use framing of intersectorality to replace the theory-practice duality. This shift towards sectorality opens up new conceptual avenues for transdisciplinarity. Sectorality goes beyond the dyadic theory-practice distinction and opens up for a more nuanced discussion of transdisciplinary

collaborations spanning more than two sectors. For example, Whittington et al. (2015) studied ‘open government’ as a transdisciplinary practice that involved municipal data management (governmental sector), suppliers (business sector), and citizens (civil society sector).

Learning and Knowing in Constellations of Transdisciplinary Practices

We have proposed the conceptual imagery of constellations of transdisciplinary collaborations that evolve on layered fields of practices. Transdisciplinary research so far has mostly focused on transdisciplinarity on just one field of practices at a time, research, education, *or* professional practices. Our conceptualization, however, affords a study of transdisciplinarity that links transdisciplinary collaborations ‘vertically’ on the distinct fields of practices. Using this conceptualization may generate a type of future research that focuses on the relationships between distinct, but interconnected transdisciplinary practices on different fields. We may study, for instance, how action research practices on the research field may link to service learning on the educational field, which in turn links to managerial practices on the professional field.

Such research of transdisciplinary constellations linking distinct fields of practices are particularly promising for studying transdisciplinary knowledge and learning. Earlier on we have outlined how in a social practices ontology knowledge does not cognitively exist ‘in peoples’ heads,’ but rather interrelationally and processually in practices. Transdisciplinary collaborative practices are ‘collective knowledgeable doing’ (Gherardi 2019a), knowing

is enactment in such practices (Law 2000). Accordingly, the integration of transdisciplinary knowledge requires an integration of practices not only across disciplines and sectors, but also across fields of practices. This implies that also learning happens in such constellations of transdisciplinary practices (Gherardi and Nicolini 2002), and through the transfer, displacing, and translation (Gherardi and Nicolini 2000; Law 2000) of practices across fields.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval This article does not contain any studies with human participants or animals performed by any of the authors. The ethical procedures put in place by the authors’ institutions have been followed.

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Appendix

See Table 1.

Table 1 Analyzing transdisciplinary constellations in contributions to this special issue

(Inter)Disciplinary	(Inter)Sectorality	Mode
A. Conceptual articles		
Cullen (2019), varieties of responsible management learning Research Yes: Integration of research responsible management learning and education research that builds on the disciplines of ethics, responsibility, and sustainability	No: Structured review of academic literature without use of 'grey literature' that often comes from distinct sectors	Sectoral interdisciplinarity
Education Yes: "Responsible, sustainable and ethical modes of management education... professionals and managers who learn for sustainability, responsibility and ethics"	Yes: Call for responsible management learning and education that spans boundaries between the higher education and business management sectors	Transdisciplinarity
Profession No information	No information	None
Pirson (2019) Humanistic management ontology Research Yes: Combines the humanistic discipline with economics and evolutionary biology and psychology	No: No evidence of intersectoral research collaboration	Sectoral interdisciplinarity
Education Yes: "Efforts to integrate ethics and sustainability into management learning"	Yes: "Dignity workshops" in which managers co-develop with academics help their personal competences to act with dignity	Transdisciplinarity
Profession Yes: "Responsibility as inclusive of ethical and sustainable business practice... managers to be responsible for ethical and sustainable outcomes."	Yes: Promotes a managerial "co-creation process [that] allows for collective problem solving of all affected stakeholders"	Transdisciplinarity
Montiel et al. (this issue), Sustainability threshold concepts (=) Research No: Structured literature review from the corporate sustainability discipline	Yes: Co-definition of the research problem between authors and "twenty-five managers in different industries"	Intersectoral disciplinarity
Education No: Corporate sustainability threshold learning concepts from corporate sustainability discipline's literature	No: Proposition of academic threshold concepts for managerial learning, corresponding to "translate theoretical frameworks into actionable knowledge," but no suggestion of collaborative learning involving business and "academic world[s]."	Sectoral disciplinarity
Profession No: "Managers [who] try to implement their CS [corporate sustainability] initiatives"	Yes: "They identify the use of decentralization and cross-sector partnerships as effective means to achieve CS [corporate sustainability] goals"	Intersectoral disciplinarity
Dzhengiz and Niesten (2019), Competences for environmental sustainability Research No: Homogeneous researcher team from environmental sustainability discipline and related concepts from the "sustainability domain"	No: Structured review of academic literature without use of 'grey literature' that often comes from distinct sectors	Sectoral disciplinarity
Education No: Focused on "managerial skills aimed at improving environmental sustainability"	Yes: Absorptive capacity capability that allows to "acquire external knowledge [from varieties of sectors] and transform this knowledge into organizational capabilities"	Intersectoral disciplinarity
Profession No: Focus on environmental professionals' practices, of "key individuals that introduce green values in organizations as 'green champions' or 'environmental advocates'"	No: "Stakeholder pressures" as external forces, but no intersectoral collaboration	Sectoral disciplinarity
B. Empirical articles		
Hauser (2019), Ethics and compliance training (§) Research No: "Drawing on both the qualitative analysis of existing ethics and compliance training and the conceptual literature on behavioral ethics..."	Yes: "Focus group participants were then asked to share their comments and elaborate on the preliminary findings."	Intersectoral disciplinarity
Education No: "Ethics and compliance training"	No: "Corporate training" (only business sector)	Sectoral disciplinarity

Table 1 (continued)

	(Inter)Disciplinary	(Inter)Sectorality	Mode
Profession	No: Only “ethics and compliance” discipline	No: “The business world... professionals... behavior in day-to-day business life” (only business sector)	Sectoral disciplinary
Chapple et al. (2019), Carbon literacy across boundaries			
Research	No: Conceptual framing grounded in discipline of sociology of learning centered on the conceptual lenses of “social learning” and “boundary objects”	Yes: Research participants’ “roles as ‘knowledgeable agents’”	Intersectoral disciplinary
Education	No: “Carbon literacy training” (environmental sustainability discipline)	Yes: “Sector specific training,” but “the ‘ultimate boundary object: the show’ educates private citizens about carbon literacy	Intersectoral disciplinary
Profession	No: “Organization-wide change in sustainability practice...greenest television programme in the world”	Yes: “How the CLT had impacted both the informants’ work and personal life”	Intersectoral disciplinary
Fougère et al. (2019), Enriched reciprocal learning (↔)			
Research	Yes: Positioned in “literature on sustainable development and corporate responsibility” and analyzing data using virtue ethics	Yes: “Involved managers to be boundary spanners”	Transdisciplinary
Education	Yes: Learning centered on “social and environmental challenges (under the label ‘CSR’)”	Yes: “Reciprocal learning” creating “learning experiences of students, managers... and sometimes other stakeholders... NGOs and firms”	Transdisciplinary
Profession	Yes: Managerial challenges “related to social and environmental responsibility by using, analyzing and solving real-world problems with the project organizations”	Yes: “Students work on projects with the organizations for 4–5 months... managers and the students jointly work out the particular goals and targeted outcome”	Transdisciplinary

Methodological note: We scrutinized the disciplinary backgrounds of research participants and the conceptual lenses use. On the educational field, we checked if contents and learning objectives of educational activities were from one or more disciplines and if they were integrated. On the professional field we scrutinized if the subject and professionals involved in the managerial activity were from one or several disciplines. We assessed intersectorality on the research field by analyzing the type of interaction with non-academic sector actors in the course of research. On the educational field we checked if educational practices only involved business management learners and educators, or if it evolved as collaborative learning with learners or educators from other sectors. On the professional field we explored if the managerial activity involved collaboration with or participation of non-business management sector actors in professional practices

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