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CONDUCTING CARING COLLABORATIONS IN SOCIETALLY ENGAGED RESEARCH:

A literature review

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This article presents a conceptual literature review on the topic of care in research collaborations. The review covers 27 articles that complied with our focus. Based on the findings, we call for an increased acknowledgement of external collaborations (with external stakeholders) versus internal dimensions of collaboration (within research institutions). With regard to internal dimensions, we underline the role played by subjective motivation and working conditions, which impact the possibility of building impactful collaborations. In terms of external dimensions, we highlight the role of temporal constraints, which discourage the development of trust with societal actors, and the importance of power relations between researchers and participants. Finally, we identify dimensions which cut across the internal and external, such as affect, normative framings of research and measures of excellence. We conclude that the performance of caring collaborations is often constrained by measures of excellence, institutional constraints and policy regulations.

Keywords: Collaboration, social innovation, ethics of care, societal engagement, working conditions, democratic participation

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Introduction

The focus on societal engagement and collaboration in science stems from the general objective of improving the science–society relationship by increasing the public's participation in science, orienting research towards societal challenges, and reinforcing democratic governance of science, where society has rights and responsibilities (Michali & Eleftherakis, 2022). A number of scientific and policy frameworks have played a role in shaping cross-sectoral and transdisciplinary research collaborations; for example, participatory design (Bratteteig & Wagner, 2016) or triple and quadruple helix (Carayannis & Campbell, 2010). One such framework is responsible research and innovation (hereafter RRI), which has placed a renewed emphasis on societal engagement and collaboration (Bauer et al., 2021; Rip, 2014). RRI adds to the other frameworks in that it has a specific focus on how cross-sectoral science collaborations hold ethical methodological and output responsibilities that are specifically related to the stakeholders involved in all stages of the collaboration and research process. RRI has grown to become an important concept at policy level (European Commission, 2011) – for example, as part of the European Framework Programmes such as Horizon 2020 – and was first used in the 7th Framework Programme (Regulation (EU) No 1291/2013) that highlighted cooperation between research and society (Burget et al., 2017). RRI has also become a burgeoning field of academic research (Dupret et al., 2022), and we take it as our focal point into a theoretical and empirical field that takes collaboration seriously. We call for a renewed exploration of the complex dimensions of collaboration, as it can provide us with insights about the dynamics and tensions of the relationships involved. We thus build on growing research that explores the value of the ethics of care for deepening the understanding of collaborations as embodied practices situated within institutional conditions (Dupret et al., 2024; Groot et al., 2019; Sheel et al., 2020).

We therefore address care in collaboration, as it can support the approach to collaboration that goes beyond a distribution of (scientific) knowledge, but frames science as having an obligation to engage in the development of society in a more just and inclusive manner. We engage with feminist ethics of care because it provides us with an opportunity to reimagine how research can be performed (Pellé, 2016) with an explicit self-reflective approach for researchers to engage with the dimensions on how and what to care about (Puig de la Bellacasa, 2017) and enriching the process of co-learning and co-becoming, challenging the productivity paradigm centred on publications and high research performance (Johansson et al., 2024). In relation to collaboration, being the central node in the analysis, we address tensions of private/public divisions widely addressed by feminist scholars, making them visible in the context of collaborations within and outside organisations. The following research question guides the investigation:

What are the implications of the care ethics literature for responsible scientific collaborations?

Theory: the different approaches to collaboration with external partners

This section outlines the different approaches to collaboration within research, with the academic and policy-based approaches to collaborations as commonly recurring in the literature. Collaboration is herein understood as the inclusive and collective pooling of resources, such as participants' time, ideas, knowledge, motivation and/or networks, towards a commonly defined goal (Dupret et al., 2024), while societal engagement in research refers to societally relevant research that cultivates collaboration and engagement among different social actors (Dupret et al., 2023).

Cross-sectoral collaboration in research

The negotiation of needs, concerns and priorities in research collaborations have different arenas of materialisation. Different kinds of actors and sectors of society are engaged, with different epistemological foci and aims (Dahlin-Ivanoff et al., 2024; Leydesdorff & Ivanova, 2021; Johansson et al., 2024). The so-called triple-helix model (or the collaboration between universities, government and business), spearheaded in the mid-90s (Leydesdorff & Etzkowitz, 1996), has long been highlighted as critically important for successful economic and social development (Miller et al., 2018) but did not include a focus on (civil) society. The follow-up analytical and normative quadruple-helix model of innovation recognises four major actors in the innovation system: science, policy, industry, and society and the need for openness and co-creation of universities' knowledge and technology transfer with research and innovation users' engagement at various stages of collaboration (Carayannis & Campbell, 2009). The quadruple-helix model is more inclusive in its incorporation of the public via the concept of a 'media-based democracy'. It is done through a policy approach of the importance of the political system (government) and its influence in developing the economy through its innovation policy. The argument goes that the innovation policy must be communicated 'adequately' via the media in order to obtain public support for new strategies or policies. It approaches civil society as an actor that is to be informed about the policies rather than collaborated with.

Care ethics – in relation to collaboration and societal engagement

There is a growing academic interest in how feminist ethics of care and the broad concept of care can be used to foster and reimagine research collaborations (Carrigan & Wylie, 2023; Hakkim, 2023; Scheel et al., 2020; Bergmark et al., 2023; Groot et al., 2019).

Groot et al. (2019) suggest that viewing research collaborations through the ethics of care lens is useful for revealing the aspects of collaborative research which are rarely documented in literature, such as invisible labour and emotional work. Other works explore how applying ethics of care (by focusing on relational approaches and cultivating attention to different positionalities of individual researchers and research participants) to develop collaborative methodologies helps to enhance reflexivity about knowledge production, increase trust and challenge power relations in collaborative research (Scheel et al., 2020; Bergmark et al., 2023). Care has increasingly become an important point in science and technology studies (STS) (Friese, 2013), with researchers exploring temporal (Puig de la Bellacasa, 2015), relational (Harmann, 2024), and emotional (Dupret et al., 2024) aspects of care in STS, as well as reflecting the non-innocent, often invisible, and potentially harmful dimensions of care (Murphy, 2015; Dupret et al., 2024), or pointing to the often gendered or hierarchized aspects of care in STS (Pinel et al., 2020).

The ethics of care emerged in the early 1980s through the writings of feminist thinkers. The so-called first generation of ethics of care studies saw it as closely related to women and social care, while second-generation care studies interpreted care beyond the domains of gender and healthcare, simultaneously attempting to detach care from normative values such as kindness and generosity and, instead, frame care from a social-political perspective (Leget et al., 2019).

The ethics of care, however, has from its beginning not been a homogenous concept. Generally, several main framings of ethics of care are distinguished (Edwards, 2009). Firstly, the ethics of care approach that can be attributed to the works of Carol Gilligan (Gilligan & Attanucci, 1988), who identifies two distinct approaches to moral problems – 'ethics of justice' and 'ethics of care' from a social psychological perspective. In the former, moral questions are approached by developing rules and regulations, while in the latter the focus is more on contextual factors. (Edwards, 2009). Gilligan applied this theory to explore patterns in decision-making in boys and girls from a socio-psychological perspective and aimed to shed light on girls' neglected perspectives on morality, which could inform an ethics that takes care into consideration. This strand of care ethics developed in a philosophical approach applied to various empirical fields, often detached from gender differences. For example, regarding research collaborations and research in general, Gilligan's version of care ethics has been increasingly applied in conceptualising collaborations and relations between science and society (Ruggui, 2020).

Another prominent version of ethics of care can be attributed to the political scientist Joan Tronto (1993, 1998), who places the practice of care more centrally in human life, because care is a fundamental aspect of life that is often overlooked. Tronto develops an ethics of care as a contribution to political philosophy, arguing that more focus on caring relationships can introduce a new, different set of social arrangements that challenges existing power relations (Edwards, 2009). Tronto argues that, firstly, care should be thought of as a fundamental state of individuals (receiving or giving care at different stages of life), and secondly, that care must be given more space and recognition as a part of 'institutions, societies, even global levels of thinking' (Tronto, 1995, p. 145).

Tronto's framing of ethics of care plays an important role in more recent conceptualisations of care by María Puig de la Bellacasa (2012; 2017). Puig de la Bellacasa draws on Fisher and Tronto's definition of care as 'everything that we do to maintain, continue and repair "our world" so that we can live in it as well as possible. That world includes our bodies, ourselves and our environments, all of which we seek to interweave in a complex, life-sustaining web' (Tronto, 1993, p. 103). Drawing on the relational aspect of this definition, Puig de la Bellacasa furthers the care ethics focus on the relations and interdependence between all human as well as non-human entities, hence in her reading care is 'ontological requirement of relational worlds' (2012, p. 199). With contributions by empirical philosopher Annemarie Mol and psychologist Jeanette Pols, she expands on the concepts of care in ways that emphasise its relational, ethical, and political dimensions. In particular, Puig de la Bellacasa adds a wider ethical and political dimension to her concept of care and care ethics in that other species and environments are to be considered. In addition, she introduces speculative thinking into the discussion of care, encouraging scholars to think beyond existing structures and practices. This speculative approach allows for the imagining of new forms of care that are not yet realised but are necessary for creating a more just and sustainable future. Puig de la Bellacasa's speculative ethics challenges us to rethink our relationships with the world in ways that foster care for marginalised beings and ecosystems, opening up possibilities for new forms of solidarity and coexistence that go beyond the actual practices of care in our everyday collaborations. Puig de la Bellacasa offers a non-predefined, non-idealised version of care ethics that acknowledges that care has space for contradictions, tension, asymmetrical power relations and even non-innocent and brutal exploitation, and the question 'how to care' in the relational world adds important dimensions to previous contributions in that our responsibility reaches into the future, since it is speculative (and contextually and practically defined).

Care is also one of the main concepts in feminist political economy and work–life research, where care labour (often considered as gendered) is viewed as undervalued and exploited within the predominant understanding of the economy as rational action with the purpose of capital maximisation (Bauhardt, 2018).

Drawing on these strands, this literature review positions care as a

'doing', as 'ethico-affective everyday practical doings that engage with the inescapable troubles of interdependent existences' that raises the speculative question *how to care?* (Puig de la Bellacasa, 2012, p.199). We explore how academic publications approach care in research collaborations, addressing methodological, institutional, and emotional implications.

Methodology

We conducted a conceptual literature review with the aim of identifying and exploring relations between the key concepts which emerge when researchers approach responsible collaborative research from a care perspective (Kennedy, 2007; Snyder, 2019). To select the articles for this review, we searched three databases: Scopus, ProQuest and Web of Science. For the search we used three clusters of keywords. Firstly, we used 'responsible research' OR 'RRI'. The second cluster included terms related to the care ethics framework: 'care ethics' OR 'ethics of care' OR 'Tronto[1]' OR 'Bellacasa'. The third cluster combined keywords related to the theme of societal engagement in research: 'collaborative research' OR 'collaboration' OR 'societal engagement' OR 'participatory' OR 'co-production' OR 'co-creation' OR 'civil society' OR 'triple helix' OR 'quadruple helix'. This third cluster of keywords was used to strengthen the focus on interaction between science and society in the search results. The article needed to engage with at least one term from one cluster to be included in the final selection with the aim of identifying literature that engages with collaborative research practices within the framework of RRI, from an ethics of care perspective.

The search returned 129 results. The next step was to manually exclude results which were irrelevant for the review. The main exclusion criteria we used were:

1) The article does not sufficiently engage with the ethics of care.

This category included literature that, for example, used the concept of care in a literal rather than theoretical/conceptual sense. By literal sense we mean, for example, healthcare (Ramvi et al., 2021) or robots as caregivers (Coghlan, 2021). Neither was the article selected if care ethics was only briefly touched upon; for example, in the reference list.

2) The article does not sufficiently engage with responsible research and innovation, collaborative/engaged research.

Articles were excluded when the collaborative/engaged research aspect of RRI was not in their scope; for example, articles focusing on technological innovation design without explicit user engagement in their methodological considerations. A total of 27 articles were selected for the final analysis.

The 27 selected articles comprise 11 empirical and 16 conceptual papers (see the overview in Table 1). The conceptual studies contribute to the conceptualisation of the diverse elements of responsible collaborative research from the perspective of care ethics. The methods used in the empirical studies are qualitative research, including ethnography of research practices, interviews with research teams, and auto-ethnography. The blend of conceptual and empirical works in this review allows for a comprehensive overview of what main themes, concepts and recommendations emerge if responsible research collaborations are approached from care ethics perspectives, and what conclusions unfold if research practices are empirically approached from care perspectives. In the conceptual articles, we analysed how the ethics of care shape theoretical frameworks and principles of collaborative responsible research, as well as critiques of existing practices. Empirical articles allow us to identify what conclusions are drawn when care ethics are used as a lens for analysis of collaborative research environments.

To summarise the findings, we used thematic analysis. The articles were carefully read, often several times, to identify different thematic categories, which were compiled in the thematic tables. Then the categories were refined, incorporated within existing categories or deleted, depending on the frequency of mentions. This exploratory analytical strategy allowed us to identify different aspects of research and academia which shape care in collaborations, such as methodological choices, relations within research groups, institutional and research evaluation structures, research paradigms, etc. This allowed us to map out the loci and levels of care in research.

This conceptual literature review was conducted to identify the core ideas and theoretical perspectives that shape collaborative research within a care ethics perspective[2]. The process of literature analysis was informed by work on redefining responsibility in research and innovation (Dupret et al., 2022). Additionally, a reading group was formed among the members of the research team. On a weekly basis, articles were selected from the review, read and discussed by the members to validate the analytical themes.

1 We were interested in exploring the literature that, to a greater or lesser extent, analyses responsible research collaborations from a theoretical perspective of care (which does not We We were interested in exploring the literature that, to a greater or lesser extent, analyses responsible research collaborations from a theoretical perspective of care (which does not exclude practices of care). However, since care is a concept that can be used in many contexts, the initial search that used just 'care' as a key word returned most of the literature that focused on analysing care in a narrow sense – in terms of medical and nursery care. To avoid this skewing, we added 'key scholars of care ethics' to the key words.

2 It was part of scientifically validating the collaborative research methodologies and best practices as part of a European scientific and educational alliance project (RE:ERUA). For more information on the project, please see Acknowledgements.

TABLE 1

Empirical		**Conceptual**	
	Dimensions of collaboration addressed		Dimensions of collaboration addressed
Pandey 2020	External	Jenkins et al. 2020	External
Endaltseva & Jerak-Zuiderent 2021	Mixed	Ruggiu 2020	External
Sylvestre et al. 2018	External	Agate et al. 2020	Internal, mixed
Loman 2015	External	Francis et al. 2021	External
Smolka et al. 2021	Internal	Codeiro-Cruz 2021	External
Sigl 2019	Internal	Reber 2018	External
Rivard et al. 2021	Mixed	Coenen 2016	External
Davies & Horst 2015	Internal, mixed	Randles et al. 2022	External
Brun 2009	Mixed	Albertson 2021	External
Latimer 2019	Internal, mixed	Timmermans& Job 2020	External, mixed
Herron & Skinner 2013	External	Beauchemin 2022	External
		Pellé 2016	External
		Tolbert et al. 2018	External
		Groves 2015	External
		Mejlgaard 2019	Mixed
		Latimer & López Gómez 2019	Internal, mixed

Table 1: Distribution of the selected articles according to their methodologies and analytical dimensions of collaboration

Analysis

In the analysis of the articles, we focused on mapping out what is understood by 'caring collaborative research', what is required for reinforcing this type of research, and what is at stake if conditions do not allow these practices to be carried out. We started the analysis by identifying the primary thematic patterns that addressed the directions in which caring collaborative research can take place.

We then grouped them into external or internal dimensions of collaborative responsible research, or a mix of both (see Table 1 for the overview). By external we mean collaborations with societal actors, end-users and research participants. By internal – collaborations within the teams of colleagues and management. Following Felt (2017), we recognise that researchers' responsibility to non-academic stakeholders and societal values, which is the core of RRI, can only be considered if researchers' emotional, social and institutional environments are taken into account and centered in RRI policies. Hence, we choose to differentiate between internal and external dimensions of caring collaborative research in the analysis to highlight that care in research collaborations is required not only vis-à-vis societal stakeholders, but also, inseparably, towards, researchers themselves, and their immediate working environments.

The external and internal dimensions of caring collaborative research are inherently interconnected, and excluding one of the dimensions can become prescriptive and even exploitative, hence we argue for attention to both the external and the internal dynamics of caring collaborations. Research on cross-sectoral collaborations traditionally focuses on outputs, and responsibility dimensions such as anticipation, reflexivity, and inclusion are important to ensure that research does no harm and in fact serves the common good. However, the internal dimensions of collaboration cannot be detached from the outputs. The relations and methodologies that are applied, the way power relations and institutional practices are enacted internally, are interrelated and embedded with external

relations. We acknowledge the danger of dichotomising the public and the private, the society and the research when explicitly differentiating between external and internal dimensions as these dimensions in practice are inherently interwoven. However, by analytically visibilising the two dimensions, we are at the same time also showing the interdependence of caring relations with societal stakeholders and caring relations with more immediate environment. This can provide a heuristic device to reconsider the directions in which caring exchanges flow in their particular conditions, where they might be hindered, and the reason for this. Hence, in the following sections we approach external and internal dimensions as analytically distinct to explore how the care ethics approach frames these themes.

The first section discusses which elements constitute caring collaborative research with societal stakeholders, or so-called external collaborations (see Figure 1). This topic focuses on relations between researchers and participants, the importance of strengthening participatory methodologies, and the co-creation of knowledge, and explores the requirements for caring research collaborations with external stakeholders.

The second section of the analysis delves into questions related to what we identified as the internal aspects of collaborative research – collaborations within research institutions, for example, in cross-disciplinary research teams. In this section we first look at how we understand our roles as researchers, the way we connect and know about the world (i.e., the subjective approach), and why that matters in collaborative research. This section maps out collaboration through the prism of researchers' lived experiences and perceptions of how they build collaboration in their daily tasks. We further distinguish the subject of researchers' working conditions and how researchers' well-being influences the possibility of building meaningful collaborations.

Finally, in the third section we identify the topics which cover both external and internal dimensions: the role of affective and embodied experiences in collaborations, as well as how normative framing of research and situatedness within measures of excellence frame possibilities for caring collaborations.

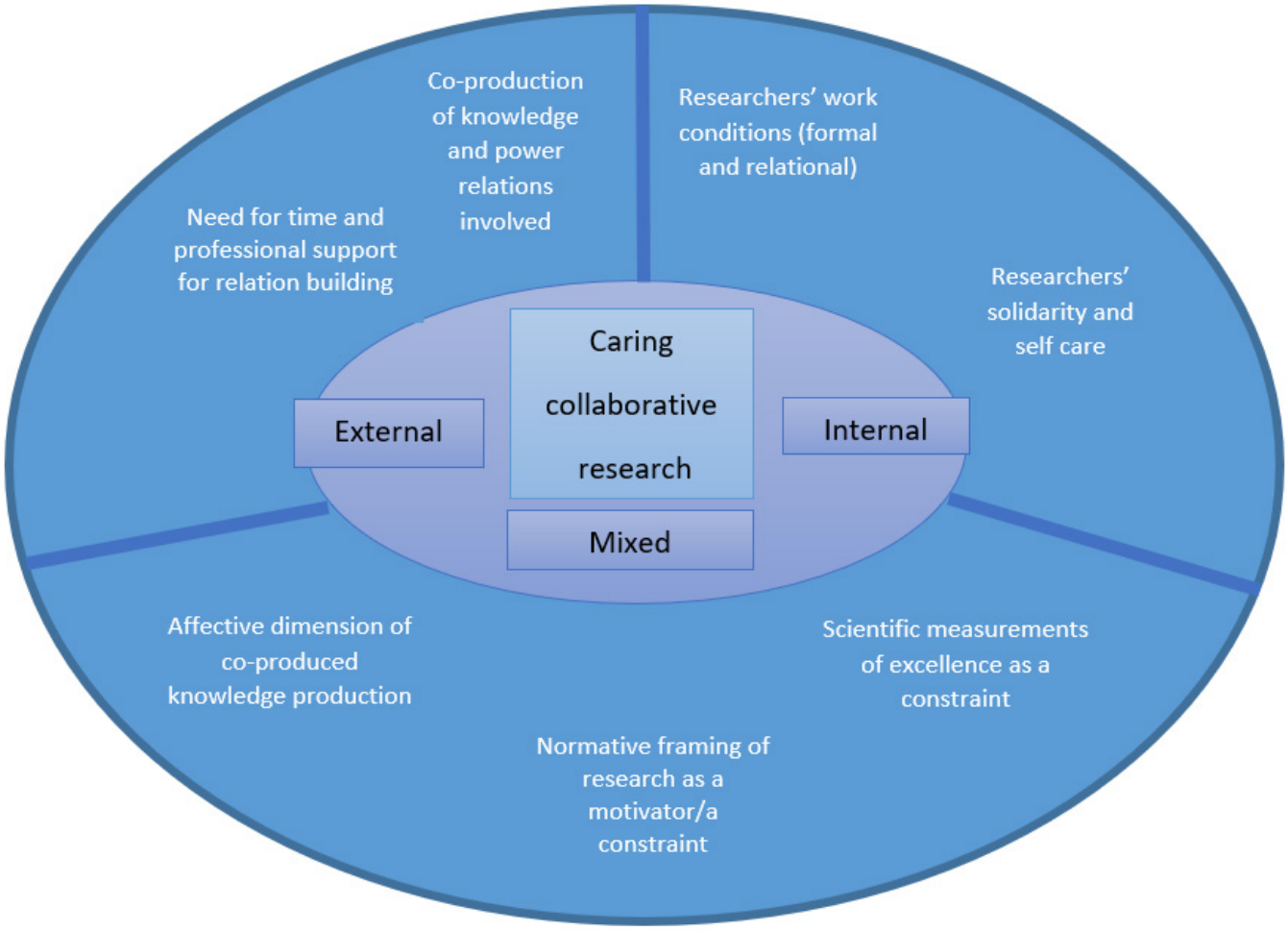

Figure 1. Analytical themes

Analysis part 1. Collaborations with external stakeholders: what constitutes caring collaborations between researchers and societal stakeholders

Co-production of knowledge and power relations between researchers and research participants

An array of articles (Tolbert et al., 2018; Pandey, 2020; Herron & Skinner, 2013; Sylvestre et al., 2018; Codeiro-Cruz, 2021; Francis et al., 2021) discuss how the ethics of care can be a way to change and challenge relations between researchers and research participants. The articles can be summarised as an attempt to rethink the objective of engaging participants in research, which, as suggested by these articles, is not primarily to produce knowledge or contribute to the research field, but to *care* about the research participants, their needs and well-being. However, a common thread that was identified in this literature is the lack of attention to constraints and the danger of exploitation that care can provoke, which we discuss further in this sub-section.

This topic focuses particularly on rethinking power relations in the production of knowledge to avoid 'objectification', in the sense of speaking for instead of speaking with participants in the research process (Tolbert et al., 2018). This approach explicitly posits research as a practice that can be caring. Some articles associate caring academic practices with the aims and processes of decolonising research (Codeiro-Cruz, 2021; Francis et al., 2021). For example, Codeiro-Cruz (2021) suggests the need for decolonising knowledge co-production between researchers and technology recipients, which involves researchers engaging in a dialogue of knowledge and reflecting on their positioning, values, and worldview. Following Codeiro-Cruz (2021), decolonisation of knowledge is the opposite of paternalism, of 'doing *for* or *in the place of* the colonized/oppressed/subalternate' (p. 1852), which means engaging in listening instead of merely delivering solutions, and not impinging on the other's views and decisions. It is suggested that these processes are inseparable from nurturing 'care as affective bonds' in the research field (p. 1858). Similarly, Sylvestre et al. (2018) suggest that giving 'the power to dictate the terms of care' (p. 763) is an important dimension of caring, even if this implies that participants refuse to take part in research, especially in contexts where 'responsibility' and care towards communities by settler-colonial states traditionally implied oppression and violence. These points raise a broader discussion about participative methodologies – questioning to what extent and how participants, especially vulnerable groups, can lead collaborations, including instances of refusing to collaborate if they consider that their voices are not sufficiently integrated. The authors suggest that responsible and caring methodology cannot be 'prefigured or researcher ascribed' (p. 763), and research participants' power to shape (or refuse) what is perceived as care from the part of the researchers should be inscribed in caring collaborations.

Pandey (2020), drawing on Puig de la Bellacasa's (2015) conceptualisation of care as cultivating attention to multiple relationalities between humans and non-humans, similarly argues for a transition in the technical sciences away from technological fixes of 'a singular, disconnected problem' (p. 251) to engage in understanding a complex nexus of interdependencies, relations and vulnerabilities around the research problem. The authors illustrate this point with a research project related to farming practices where researchers engaged in participatory research instead of following their mandate to develop technical solutions. They engaged in dialogues with participants, aiming to create trusting spaces where multiple dimensions of concern could be shared, related to economy, institutional affiliation and peer pressure. This research process revealed an array of renegotiation of relations which shape the farmers' decision-making, including extractivist and exploitative production and market environments, decline of 'sociocultural institutions of community' (p. 252), and the loss of local knowledge.

Another point often raised within this topic is how the concept of care can be a guiding principle in reassessing what responsibility, relevance, and impact mean in collaborative research. Herron & Skinner (2013) and Tolbert et al. (2018) suggest that the relevance of research is too often approached from the viewpoint of contribution to an academic field, and there is a need for viewing its relevance in terms of responsiveness to participants and the transformative impact of academic work on participants' lives from their point of view. Democratising dissemination practices (sharing and verification of research results with the participants and with audiences outside academia) is proposed as one way to support this transition.

Brun (2009), Agate et al. (2020) and Sylvestre et al. (2018) discuss how collaborative responsible research requires time and resources – for prolonged fieldwork, for developing trusting relations with the participants. Agate et al. (2020, p. 4) argue that 'careful and caring scholarship' – one where the process matters as much as the output – needs time, reflexivity and attention, which are often in conflict with institutional cultures of quantifiable research evaluations and production metrics, such as publishing and quotations.

For all the above articles, care means changing the power relations between researcher and participants to make them more egalitarian and democratic, or giving research participants more power of voice, ownership of research, etc. This is done through methodological changes (e.g. Pandey, 2020), through reflexivity, and through changing what research relevance and impact means. This signifies a movement from contribution to the field to transformative effect on participants' lives (Tolbert et al., 2018; Herron & Skinner, 2013). These articles call for extending what ethics and responsibility mean in research beyond standardised ethical guidelines. We are called to pay attention to affective/emotional dimensions and socio-political dimensions (e.g. by including activism as a part of academic practice), as well as to avoid the essentialisation of vulnerability and vulnerable groups (Herron & Skinner, 2013).

At the same time, we suggest that articles within this topic (although positioning their stand as critical) often lack self-reflection about the nature and directionality of the care they propose. Making relations with participants more participatory and egalitarian – and therefore

more caring – can be criticised as a rather one-sided view of what 'good' and 'caring' methodologies and relations with participants are. Most of these articles view lengthy development of trust and reflexivity in relations with participants as a desirable path towards cultivating care for the well-being of research participants. As Puig de la Bellacasa (2012) points out, 'care can be consuming both for the carer and the cared, care can devour their lives, (…), can asphyxiate other possible skills' (Puig de la Bellacasa 2012, p. 209). We found that the challenges and constraints that care and its exercise can pose in relation to socially innovative research collaborations were insufficiently addressed (with the exceptions, perhaps, of pointing out the time constraints and acknowledging that care in research can be oppressive because it can reproduce colonial violence). To conclude this section, analysing collaboration with external participants from the angle of care highlights the participatory dimension of collaborative experiences with the focus on researchers' responsibility to societal actors, and the great need for sensitivity towards power relations inevitably framing the collaborations.

Analysis part 2. Internal dimensions of collaborations

Internal dimensions of research collaborations correspond to collaborative experiences which are related to interactions with other researchers within the research teams (often in cross-disciplinary settings), as well as with other actors in the research institutions. This section, therefore, reflects collaborators' subjective experiences and perceptions of the collaboration and how these experiences are produced by institutional positionality and working conditions.

Caring about the researcher's institutional positionality

The following articles relate to researchers' care for the self and their own position and role in an institutional dynamic and to the infrastructural support to conduct societally engaged research that they might or might not have (Agate et al., 2020; Sigl, 2019). Sigl (2019) suggests that research cultures and academic knowledge are shaped by the interaction of the researcher's agency and their research environment. The author records and analyses researchers' experiences with the question of responsibility in research practice, showing that dimensions of responsibility in research are experienced along two lines: one, with responsibility perceived as a bureaucratic, strategic tool to get funding by including some 'standard sentences' into grant proposals; and the other, with researchers caring deeply about doing research to improve societal well-being, to engage societal stakeholders. In the latter type of cases, researchers tend to detach themselves from external expectations, framing them as bureaucratic procedures, but not from societal responsibilities and engagement with the public. In these articles the notions of responsibility and care are not limited to the outcomes of their research (Agate et al., 2020; Sigl, 2019). They care about people in their labs, their careers and well-being; they care about continuing to be curious in their research, about creating and maintaining a network of people with shared research interests. Sigl (2019, p. 132) concludes that policy tools in research 'never work in direct ways but are mediated by how researchers interpret, evaluate, and act upon them'.

The articles in this section raise the important issue of lack of attention to subjectification and social relations as a methodological procedure for understanding how external requirements, such as focus on societal engagement, are perceived, interpreted and lived by researchers. This focus on subjectification, according to the authors, would contribute to understanding how researchers co-produce the worlds of research, co-creating the external requirements through their lived experiences.

The importance of researchers' working conditions for conducting caring collaborative research

Interestingly, although this review was prompted by interest in collaborative research, and societal engagement in science, the studies show that many themes revolve around the researchers themselves: the values and motivations of scholars (Davies & Horst, 2015), devalued labour, unrecognised by traditional metric measurements (Agate et al., 2020), as well as emotional and affective elements of knowledge production (Smolka et al., 2021; Latimer & Gómez, 2019). The articles reviewed address what needs to be in place so that researchers can care for societal engagement and impact, and point to the role of adequate research support and the importance of researchers' professional well-being.

From the articles reviewed, we see that care in collaborations is approached not only as having 'external' engagement as a focus of one's activities, but also as the internal and immediate work environment and team. The team and collaborators could act as the main locus of one's action and agency. Like Sigl (2019), Davies and Horst (2015) base their article on conversations with researchers to explore how they understand responsibility in research. Through their fieldwork, however, it became apparent that although scientists are concerned about responsibility in their research to society at large, in the interviewed researchers' narratives the focus of responsible research was situated on the research group itself, as responsibility for the well-being and good dynamics of the research group and of the researchers themselves. The authors noted that the site where responsibility is located and performed was the research group, rather than the broader and more abstract locus of society – which differs from the definition of RRI in policy. For the interviewed researchers, responsibility for broader societal issues was inseparable from creating a good working environment.

Several authors list institutional structures as a general barrier for caring research. For instance, following Brun (2009), for caring responsible research to be supported, the control of the research project must be ceded to a substantial degree, making way for

the co-construction of research. However, as the author notes, it is challenging, mainly due to the accountability of the researcher to the institutions, which rarely accept unpredictability as a valid element of research design.

From these articles we can see that in academic environments, particular distinctions are created between the private and the public. It can be described as a paradox when the societal needs of engaged and caring research create institutional procedures and cultures that are in fact counterproductive. This paradox leads to reflection on the relations of production and reproduction in academic work, in that it disregards the effect of working conditions on the academic's capacity for social engagement. These spheres in research, we argue, are intertwined, and the private constructs the public, and is therefore subject to constant negotiation and struggle – influencing, not least, how researchers can and will engage. Many of the themes raised by academics in the literature reviewed can be thought of as calls to acknowledge the crucial role of reproductive activities in generating the production of science. These reproductive activities include the relations with research participants, relations within the research group and academic institution, and relations between researchers and the scientific paradigms they operate in. Hence, approaching responsibility in research from a care perspective suggests that responsibility and social impact often reside in the invisible dimensions of research processes, often rendered of secondary importance by institutional ethical procedures. Invisibility resonates with the non-innocence of care, in the sense that concerns regarding care ethics that are embedded in the internal relations of research are neglected and not acknowledged as important in performance indicators and institutional procedures. Yet another paradox is that thinking of these reproductive activities, following Puig de la Bellacasa (2011, p. 93), as productive labours of care and 'doings which support liveable relationalities' suggests that these dimensions of research (affects, relations) are fundamental for building responsible and caring research practices. Perhaps what is needed is not more requirements and measurements of social impact and societal engagement coming from policy framing of responsible research, but attention to how collaborative research is constructed through 'bodies, emotions, and the private realm' (Davies & Horst, 2015, p. 375). This of course raises important questions about how the power dynamics that influence 'how to care' in ways that also attend to the internal dynamics are negotiated, as well as on policy level, which resonates with Tronto's approach to care.

Analysis part 3. Crossing boundaries: conditions of caring collaborations which comprise both external and internal dimensions

While the former two analytical sections addressed the external and internal conditions that frame research–society collaborations, in this analytical section we address dimensions that transcend this divide and creep across groups, stakeholders and institutions. We begin by addressing affect and its role in creating alliances and communities. We then go on to address cultural norms and the ways their internalisation affects what is perceived as 'good scholarship'. Finally, we address the (constraining) effect that measures of excellence have on developing caring research–society collaborations.

How can caring research collaborations be conceptualised through affect and what does it offer to our understanding of societal engagement?

An emergent theme that applies to collaborations with external participants and to internal dimensions of collaboration is the importance of affect as different ways of doing research and producing knowledge.

The following articles can be summarised as exploring how research collaborations (with human and non-human research objects, with colleagues, with others present at academic institutions and research sites, with our own bodies) can be meaningful and joyful. Following Davies and Horst (2015, p. 375), care in responsible research gives attention to the invisible dimensions of scientific practice – 'the private, emotional, embodied, messy, and insoluble, as opposed to the calculable and controllable'. Latimer and Gómez (2019), reflecting upon care, affect and intimacy in the construction of scientific knowledge, note that research is traditionally viewed as a 'protocolised activity' (p. 251) where intimacy – affective, emotional, bodily dimensions – are viewed as dangerous, unethical and a source of bias. The authors view affect as an emotional dimension of research activity, while intimacy refers to a broader dimension which combines the affective and the material (emotions and the body). Referring to feminist studies of technoscience which highlight the value of affect and embodiment in knowledge production, the authors suggest that bringing affect and intimacy into the methodologies of science and technology can challenge the erroneous neutrality of sciences:

> Bringing to the fore the more-than-human intimacies that configure the current modes of doing science and technology, we believe, is also a way to politicise them and even to offer a mode of resistance to the entanglements that emplace and position them. (Latimer & Gómez, 2019, p. 254)

For Latimer and Gómez (2019), affect and intimacy transform the notions of collaboration and inclusion from instrumental tools for achieving socio-economic goals to 'possibilities of our being-in-common' (p. 280) and creating collective attachments around things researchers and participants care about. The notion of intimate entanglements – paying attention to the affective and material

practices that form scientific knowledge –, broadens the dimension of inclusion in scientific processes into collective thinking. This includes humans as well as non-humans, through acknowledging that our knowledge creation as scientists is never individual and is done alongside intimate entanglements with human and non-human participants, often rendered invisible in scientific practice. This, according to the authors, includes other scientists, support staff, soils, air pollution, lab animals, and other human and non-human actors which are often othered but participate in collective knowledge-production besides the figure of the individual scientist.

Smolka et al. (2021) talk about the affective dimension as a way to rethink interdisciplinary collaborations not as strategic alliances but as spaces of reflexivity, where affective elements – notably, disconcertment – could be approached, using the body as a source and sensor, to generate knowledge, to identify epistemological differences when engaging in transdisciplinary collaboration, and hence, to facilitate recognition of what has so far been taken for granted in different disciplines. Endaltseva and Jerak-Zuiderent (2021) emphasise the need to recognise and account for embodied and affective resources of caring collaborative research, as they are often invisible and taken for granted both by academic institutions and by stakeholders. The authors point out that with the increasing strategic requirements for responsible research and innovation, including the quest for collaborations in research proposals, it is important not to take for granted 'the energy and resources required for epistemic collaborations' (p. 51). The authors understand collaboration as an embodied experience from a 'bodies-in-movement' perspective. 'Bodies-in-movement' (p. 38) is argued to be important for collaborative responsible research because a diversity of resources is required for a caring collaboration, including 'listening emotively to stories, (…) choosing a right moment for a question, overcoming fatigue and pain during the interview' (p. 42). The authors suggest that caring collaborations require time, space and resources to move back and forth – physically (to go back to the sites of research), emotionally, and epistemically (p. 42). Thus, Endaltseva and Jerak-Zuiderent (2021) argue that embodied engagement grants access to the creation of scientific knowledge in ways that challenges more instrumentalised methodologies and that this is necessary in research that cares to tend to the differences among collaborators. Likewise, Sylvestre et al. (2018), talking about a responsible deeply collaborative research, highlight the need for physical presence, physical interactions, and the bodily and affective labour they entail:

> …through bodies meeting, sometimes across great distance (both socially and physically), sitting at "kitchen tables", to listen and learn in places that decentre the academic in the messy world of imperfect interactions. (p. 762)

Creating collaborative practices with attention to affective and embodied experiences can open doors for meaningful and reflexive collaborative experiences, but it is also important to take certain concerns into account, such as having to confront scientific silo thinking, time, space and resources for them to be successful.

Normative framing of research – how different visions of what is 'good' and valid research influence collaborative research

We identified that prominent constraints for conducting caring research were created by the structures and practices of research institutions (Agate et al., 2020; Pandey, 2020). Furthermore, we identified barriers which can be described as cognitive and cultural norms. These rigidly determine the aims and limits of 'good scholarship'. According to Davies and Horst (2015), one of the main challenges for integrating care into collaborative research is general exclusion of affective elements from what is considered high-level, legitimate scholarship. Brun (2009) argues that the element of unpredictability which is essential for crafting caring research (similar to how Davies and Horst (2015, p. 375) define caring research 'as a continuous process of creative experimentation') is not constrained solely by institutional structures but also by our own presumptions of what valid academic research is. Tolbert et al. (2018) argue that the impossibility of nurturing caring research largely comes from the depoliticisation of scholarship that, on the structural level, is supported by, for instance, discouraging activism as a part of research or publication in alternative journals. The authors, however, call for resistance against these cognitive and structural norms, to 'promote creativity (vs. standardisation), critique, and transformation of unjust educational conditions and opportunities' (p. 800).

The issue of research commercialisation is another common concern found in the literature, as it is seen to create obstacles for developing caring responsible research. Mejlgaard et al. (2019) draw attention to the predominant paradigm that requires universities to contribute to societies by focusing on 'strengthening commercialisation, industrial relevance, and technology transfer rather than the more complex issues related to democratisation of alignment with societal values' (p. 610).

In summary, the authors suggest that activities and methodologies which constitute caring collaborative research can often be located outside the boundaries of what is considered 'valid' research by institutions or the general public. Caring collaborative research can require blurring the boundaries between, for instance, research and activism, or including affective methodologies. Hence, there is a need for expanding the spectrum of what kind of research is considered responsible so that it includes a diversity of methodologies and approaches.

Caring collaborative research – is it compatible with scientific excellence?

This section comprises articles which generally criticise the institutional structures of academia which are unable to provide conditions for accommodating care in research practices. In this regard, the articles in this section can be positioned alongside Tronto's approach to care ethics – a critique of undervaluing care as a building-block of society and suggesting reforms of institutional

structures to accommodate care – as well as alongside care as viewed by feminist political economy.

The rigidity of measures of excellence (publications, citations, h-index) employed in universities to quantitatively measure and evaluate the output of researchers' work is a common concern. Firstly, according to Agate et al. (2020) these measures of excellence do not reflect and reward many of the activities researchers engage in (e.g. building trusting relations with research participants, public dissemination of research, work promoting diversity and inclusion, etc.) which are the basis of caring collaborations, and can generate a different kind of impact than, for instance, research publications. Secondly, the rigid evaluation metrics can limit researchers in acting upon the values which drive care for the world, instead succumbing to the logic of academic competition (Agate et al., 2020). Several of the articles argue for the change in how excellence in research is evaluated, stating that its nature/rigidity is destructive of caring responsible research and even counterproductive to societally engaged research. Mejlgaard et al. (2019) suggest that universities are change-averse institutions, and the mainstream interpretation of research excellence has not adapted to the shift towards responsibility in research and innovation, if responsibility is interpreted as giving care in researchers' daily tasks 'to public values, to the anticipated positive and negative consequences of their praxis' and including reflexivity in their work (p. 611). The authors suggest that the measures of excellence and impact favour more instrumental and technical aspects of research outputs such as counting citations in highly profiled journals where research is published, as well as patenting the research results (prevalent in the fields of natural science and engineering and computer sciences) – components which are often incompatible with the ideas of care in research collaborations, especially in social and human science, and particularly within fields that work with, for example, action research, interventions, social design, social change, systemic and social innovation that involve participatory and empowering methodologies.

Agate et al. (2020) share the view that the role of research and educational institutions must shift towards supporting and encouraging the values which drive caring and responsible research, instead of suppressing them by competition-driven institutional culture, largely reflected in rigid measures of excellence. The authors suggest that current excellence metrics and evaluation mechanisms sustain 'an impoverished definition of scholarship' (p. 6), restricted to a limited number of academic products 'counted as artefacts of scholarship in isolation from the broad array of processes and practices that contribute to their creation and enhance their quality' (p. 6). The authors therefore suggest reorienting measures of excellence towards attending with sensitivity to others' circumstances, cultivating trust, responding to needs, as well as aiming at the well-being of others and oneself. The authors thus propose setting an agenda to explore, firstly, the socio-professional values and motivations of researchers; secondly, how these values can be translated into the practices; and lastly, how universities and research policies acknowledge and reward academic work that is committed to these values.

The articles in part 3 of the analysis make mention of the theoretical terms 'affect', 'materiality' and 'disconcertment' and of the use of theory within the field of STS and embodiment. The result is also that theoretical conceptualisations about cross-sectoral collaboration show a counter-movement against more instrumental approaches to collaborative research – both as a critique and as making visible the work on care ethics that is in fact necessary and widely practised. Moreover, the result not only challenges instrumentalised methodologies or paradigmatic traditions within academia but may even be seen as questioning the privileged positioning of academia itself. If we are to be caringly attentive and acknowledge the expertise and needs of humans and non-humans in more sustainable/inclusive ways, it might be in ways we have not been accustomed to practising before.

Discussion: collaborating in responsible research through the ethics of care

The analysis demonstrates that there are two dominant approaches to collaborative research from the care perspective. On the one hand, care for research participants works towards changing power relations between different stakeholders, especially when working with external collaborators. The second main theme has been described as the internal dimension of collaboration. This focuses on the researcher (working conditions, importance of personal motivations, aspirations and satisfaction with the research process). We find that caring collaborative research requires attention to both external and internal dimensions of collaboration. Understanding caring collaborative research only as care for research participants without equal attention to what this care requires from the researcher side can easily become prescriptive and exploitative, falling into the trap pinpointed by most of the critics of the ethics of care.

Looking at research collaborations from the lens of care ethics demonstrates that, theoretically, the concept of care draws from multiple approaches to the ethics of care. We see that some have been inspired by Gilligan, contrasting ethics of care and ethics of justice in arguments that it is not enough to regulate relations between researchers and research participants through ethical regulations; rather, these relations need to strive towards challenging power relations and changing the practices of research ownership and control. This angle frames the participatory aspect of caring collaborative research – societal engagement and participation with a strong emphasis on the quality of relations and degree of empowerment/disempowerment that takes place. Furthermore, the emphasis on the importance of care and, simultaneously, the scarcity of care in research created by institutional constraints can be interpreted within Tronto's

approach to care as an undervalued aspect of life that needs to be recognised more within society, at both the institutional and the personal level, as well as care as understood in the tradition of feminist political economy as an exploited aspect of economic and work-life activity. Finally, the focus on care as a manifestation of interdependency and relationality emphasised in Puig de la Bellacasa's approach to care is evident in the focus of some of the articles on the emotional, affective and embodied dimensions of collaborative research practices.

The literature review demonstrates the multiplicity of levels where caring collaborative research is constructed, nurtured, or, on the contrary, suppressed. Based on the review, we propose the following definition of caring collaborative research, comprising external and internal collaborative dimensions: *A caring approach to collaboration in research necessitates building relations with research participants, while paying attention to power and to the value of the research for the participants. Simultaneously, there needs to be structural acknowledgement of the needs (professional, relational and emotional) and labour of the researchers, whose collaborations are embedded and shaped by institutional resources and conditions.*

The articles reviewed show that caring collaborative research is often situated within a certain approach to the methodological development of collaborations. This includes dedicating time and attention to creating trusting relations with research participants, reflecting about power relations and forms of knowledge production in research collaborations, co-identifying needs and co-creating research design, as well as making affective elements a part of knowledge production.

At the same time, the review highlights that these methodological considerations struggle to exist within the currently used research evaluation metrics. These rigid metrics do not have the capacity to reflect and reward caring methodological approaches, because the work that has been done to create such collaboration cannot be easily reflected in a publication or a patent. This can lead the researcher to avoid pursuing engagement with methodologies which require time and other embodied resources, resulting in exclusion of caring methodologies from collaborative research. Because of the strong hegemonic practices and discourses that praise instrumental approaches to scientific collaborations it is difficult in practice to make the relational dimensions and care ethics in collaborations not only visible but also actively attended to.

Besides evaluation measures, the normative framing of research as problem-solving through technological fixes is described as another obstacle to caring collaborative research (Pandey, 2020; Latimer, 2019a). The ethics of care suggests that care is valuable but pluralistic because needs are different. Therefore, the paradigm of research as activity that seeks to create solutions to societal problems can be contradictory to the ethics of care approach, because the concept of a solution creates a pre-defined, rather top-down approach, of how to fix societal ills. Latimer (2019a) describes this tendency as turning collaborative research into strategic alliances instead of striving to be alongside each other.

The importance of care for the self for the capacity to care with – how collaborative research is shaped by researchers' working conditions

From the articles reviewed we can see that working conditions within academia consist of various aspects, such as the formal matters of loads of administrative responsibilities, work contracts and allocated resources, as well as relational conditions, which in turn largely underpin the ways researchers are able to conduct engaged research.

As emphasised in Davies and Horst (2015), the conditions for conducting research with social engagement do not allow one to observe or follow the output of researchers' efforts in their everyday work. Hence the effect of one's work becomes more accessible and tangible in the researchers' immediate environment, for example, in the team. Therefore, caring within the team can be experienced as a fertile ground for caring for ourselves and for society, because caring within the team is what we have access to on a daily basis.

The distinction between internal and external dimensions of collaboration that we arrived at reviewing the articles also reflects feminist theories' focus on forced separation between the public and the private, production and reproduction, rational and emotional, that is the basis for exploitation. We found that the focus on researchers' societal engagement in the RRI literature is disconnected from working conditions (formal and relational work) which need to be ensured for researchers to be able to create caring collaborations and be responsible to society. We find this finding to be both our contribution to the RRI research field and a call to action for policy makers to align expectations of the societal impact of research with adequate working conditions.

It is important at the same time to add a critical reflection about the feminist approach and how it also needs to be aware of its own power dynamics that can create inequalities. The authors' contributions in the reviewed literature also bring their own gaze into how to theorise what collaborative research is or should be on different levels, which brings in certain normativities and blind spots. Revealing the affective, reproductive and vulnerable dynamics, being aware of emotions and sharing one's vulnerabilities, demanding intimacy in collaborative dynamics (in methodological approaches with research participants or within the research groups) can also be hegemonic and marginalising, because it demands personal commitment in spaces which are often seen as professionalised and detached from affective engagements. When approaching care ethics as a pluralistic theory that calls for attending to a diversity of needs, it is important to consider how to make collaborations caring in ways which do not impose unwanted dynamics on participants.

Difference in paradigms: caring research vs policy regulations

One of the themes analysed in this review is the need for relational and embodied understanding of collaboration and societal engagement. How can it be integrated into ethical procedures, and should it be so? And why is it important to have a dialogue, an exercise in translation between a subjective approach to collaboration and policy measures?

As Hesjedal and Åm (2022) suggest, research policies often introduce concepts built on implicit assumptions not backed by analysis of different contexts or lived experiences. Along these lines, the understanding of collaborative research and societal engagement can be enriched by relational ontological foundations of ethics of care.

Relying on the lens of care, as a deeply relational ontology (Puig de la Bellacasa, 2017; Tronto, 1998), brings relational aspects to the front. Hence, from the care perspective, aspects such as societal engagement and social impact acquire a strong focus on the analysis of relations – between researchers and participants, of power and positionality, and between different knowledge systems (Dupret et al., 2024). Attention to these relations needs to be more visible, recognised and valued in ethical procedures. Sigl (2019, p. 132) suggests that exploration of responsible research needs 'analytical focus on (the quality of) relations and relational work' to explore how subjective experiences of societal engagement and responsible research shape research cultures and societal impact.

Addressing these tensions adds to the feminist ethics of care literature, in a manner that points to the mutual correspondence between working conditions of academics and the kind of output in terms of social engagement that they can generate. Care ethics also grapples with particular (masculine) kinds of power structures and world views about what is legitimate knowledge (Plumwood, 1991; Cross, 2018). In particular, it addresses Kantian theories of morality and ethics that tend to create different types of segregated dualisms/dichotomies, for instance between knowledge and emotion/affectivity, or masculine and feminine, resulting in the marginalisation of particular kinds of knowledge (Plumwood, 1991; Puig de la Bellacasa, 2011, 2017).

Conclusion

Our analytical focus in this literature review has been structured around the implications of the literature on care ethics for responsible scientific collaborations. We found that a line of internal as well as external conditions need to be in place so that researchers can perform research that has the potential to be socially innovative in a way that takes the ethics of care as its guiding principle. We also found that there are conditions that are not as easily squared into the former categories, as they cut across groupings. We found that collaborations, and the nurturing of professional relationships with a plenitude of societal actors, can offer alternatives to professional practices as they are available in universities and defined by metrics systems. In spite of the increasing inclusiveness of models of collaboration suggested in policy frameworks such as RRI, they neither address the intersections between internal and external conditions of the stakeholders that are collaborating and their consequences (Dupret & Pultz, 2021), nor do they have an explicit focus on how needs, priorities, and concerns from a democratic participatory perspective may affect the outcome of the research collaboration. Collaborations, that have the privilege of developing over time and are infused with trust, can provide meaning and value for the various parties involved. The articles reviewed further indicate that current working conditions are at odds with caring engagement. Adequate working conditions are a prerequisite. When this is not in place – if, for example, the work of relationship maintenance is not made visible and appreciated, or this labour is not calculated in the timelines of a researcher's projects and employment – such engagements are performed in a 'covert' manner. While all researchers have access to various resources, it seems universal that the time for care of the professional self and relationships is not institutionalised.

Thus, our analysis tallies well with recent calls for evaluating research assessments, wherein funding agencies, institutions and publishers re-examine the basis on which successful research is defined and make space for qualitative assessments of work that is focused on outreach, relationship building, teaching, etc. Nevertheless, as we pointed out, it is essential to keep in mind that while the work of caring can be giving, both for individuals, institutions and research subjects, this is not to be imposed but based on transparency, consensuality and mutual respect for boundaries.

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